



Ephémérides des satellites de Mars, Jupiter, Saturne et Uranus pour 1994

Th. Derouazi, Ch. Ruatti, W. Thuillot, D.T. Vu

► To cite this version:

Th. Derouazi, Ch. Ruatti, W. Thuillot, D.T. Vu. Ephémérides des satellites de Mars, Jupiter, Saturne et Uranus pour 1994. [Rapport de recherche] Institut de mécanique céleste et de calcul des éphémérides(IMCCE). 1993, 92 p., figures, tableaux. hal-01467432

HAL Id: hal-01467432

<https://hal-lara.archives-ouvertes.fr/hal-01467432>

Submitted on 14 Feb 2017

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

SUPPLÉMENT À LA CONNAISSANCE DES TEMPS - PARIS 1993

BUREAU DES LONGITUDES

ÉPHÉMÉRIDES DES SATELLITES DE MARS, JUPITER, SATURNE ET URANUS POUR 1994

EPHEMERIDES OF THE SATELLITES OF MARS, JUPITER, SATURN AND URANUS. FOR 1994

les éditions

de physique

SUPPLÉMENT À LA CONNAISSANCE DES TEMPS – PARIS 1993
BUREAU DES LONGITUDES



**ÉPHÉMÉRIDES
DES SATELLITES
DE MARS, JUPITER,
SATURNE ET URANUS
POUR 1994**

*EPHEMERIDES
OF THE SATELLITES
OF MARS, JUPITER,
SATURN AND URANUS
FOR 1994*

Avenue du Hoggar
Zone Industrielle de Courtabœuf,
B.P. 112,
F-91944 Les Ulis Cedex, France

PUBLICATIONS DU BUREAU DES LONGITUDES

- La *Connaissance des Temps* (Éphémérides Astronomiques du Soleil, de la Lune et des planètes pour 1994). Editée par l'EPSHOM, BP426, F-29275 Brest Cedex, France

Autres suppléments à la *Connaissance des Temps* :

- Éphémérides des satellites faibles de Jupiter (VI, VII, VIII, IX) et de Saturne (IX) pour 1994
- Phénomènes et configurations des satellites galiléens de Jupiter pour 1994
- Configurations des huit premiers satellites de Saturne pour 1994

Autres publications du Bureau des Longitudes :

- Annuaire du Bureau des Longitudes, Éphémérides pour 1993 (Masson, Paris)
- Éphémérides nautiques pour l'an 1993 (Bordas, Paris)
- Encyclopédie Scientifique de l'Univers (Bordas, Paris) :
 - La physique (1981)
 - La terre, les eaux, l'atmosphère (épuisé)
 - Les étoiles, le système solaire (réédition, 1985)
 - La Galaxie, l'univers extra-galactique (réédition, 1988)
- Cahiers des Sciences de l'Univers (Masson, Paris)
 - Cahier n° 1 « Les profondeurs de la Terre », J.P. POIRIER, I.P.G.
 - Cahier n° 2 « Stratosphère et couche d'ozone », G. MÉGIE, professeur à l'Université Pierre et Marie Curie
 - Cahier n° 3 « L'Univers en questions », A. MAZURE, G. MATHEZ, Y. MELLIER (en préparation)
- Le Calendrier Républicain (Éditions de l'Observatoire de Paris)

PUBLICATIONS OF THE BUREAU DES LONGITUDES

- *The Connaissance des Temps (Astronomical Ephemerides of the Sun, of the Moon and the Planets for 1994). Published by EPSHOM, BP426, F-29275 Brest Cedex, France*

Other supplements to the *Connaissance des Temps* :

- *Ephemerides of the faint satellites of Jupiter (VI, VII, VIII, IX) and of Saturn (IX) for 1994*
- *Phenomena and configurations of the Galilean satellites of Jupiter for 1994*
- *Configurations of the first eight satellites of Saturn for 1994*

Other publications of the Bureau des Longitudes (in French) :

AVERTISSEMENT

Depuis 1980, la *Connaissance des Temps* publie les éphémérides du Soleil, de la Lune, des planètes et des satellites galiléens de Jupiter sous forme de coefficients de Tchébycheff. A partir de 1981, des éphémérides des huit premiers satellites de Saturne ont été publiées sous la même forme dans un supplément à la *Connaissance des Temps*. Ces éphémérides ayant été appréciées par les utilisateurs, nous avons décidé d'étendre ces publications à d'autres satellites naturels du système solaire.

Depuis 1985, nous publions dans un même recueil des éphémérides des satellites galiléens de Jupiter, des huit premiers satellites de Saturne et des cinq satellites d'Uranus. A partir de 1991, les éphémérides des satellites de Mars ont été ajoutées. Les éphémérides ne sont plus représentées à l'aide de coefficients de Tchébycheff, mais à l'aide de fonctions mixtes du paramètre « temps » comprenant des termes séculaires et des termes périodiques. Cette représentation permet de garder une bonne précision tout en diminuant notablement le nombre de valeurs numériques à publier et en autorisant une plus grande facilité d'emploi.

La liste des satellites dont nous publions les éphémérides n'est pas limitative et nous envisageons de l'étendre en fonction des données dont nous disposerons.

En dehors des éphémérides proprement dites cet ouvrage contient des données diverses sur les satellites de Mars, Jupiter, Saturne et Uranus et présente un formulaire permettant de calculer les phénomènes des satellites galiléens de Jupiter.

FOREWORD

Since 1980, *Connaissance des Temps* has published ephemerides of the Sun, the Moon, the Planets and the Galilean satellites of Jupiter as tables of Chebychev polynomials. From 1981, ephemerides of the first eight satellites of Saturn have been published under the same form in a supplement to the *Connaissance des Temps*. These ephemerides have been well received by the users; hence, we now intend to enlarge the publication to incorporate other natural satellites of the planets.

Starting from 1985, we have gathered in this booklet, the ephemerides of the Galilean satellites of Jupiter, the first eight satellites of Saturn and the five satellites of Uranus. From 1991, we added the ephemerides of the Satellites of Mars. The representation does not use Chebychev polynomials. It appears that a mixed form of representation, involving secular and periodic terms and depending directly on time, allows sufficient accuracy and reduces the amount of numerical data to be published. Furthermore, it is very easy to use these tables.

The list of the satellites, the ephemerides of which are published, is not limited and will be extended as soon as it is possible.

Beside the tables, the present publication contains various data concerning the satellites of Mars, Jupiter, Saturn and Uranus. We will also present, a formula which permits the calculation of the phenomena of the Galilean satellites.

J.-E. ARLOT

Responsable de la publication

Directeur du Service des Calculs et de Mécanique Céleste du Bureau des Longitudes,
Unité de Recherche Associée au CNRS

Collaboration scientifique et technique : Th. DEROUAZI, Ch. RUATTI, W. THUILLOT, D.T. VU

Bureau des Longitudes, 77, avenue Denfert-Rochereau, 75014 Paris, FRANCE

TABLE DES MATIÈRES

| | Page |
|---|----------|
| PRÉSENTATION DES ÉPHÉMÉRIDES | 7 |
| Contenu | 8 |
| Représentation des coordonnées | 8 |
| Description des éphémérides | 9 |
| Echelles de temps | 9 |
| Exemple de calcul d'une position..... | 10 |
| Précision des éphémérides | 11 |
| Phénomènes des satellites galiléens de Jupiter | 11 |
| Références bibliographiques..... | 11 |
| LES SATELLITES DE MARS | 13 |
| Données sur les satellites de Mars | 14 |
| Éphémérides des satellites de Mars | 15 |
| Phobos (I)..... | 16 |
| Deimos (II)..... | 20 |
| LES SATELLITES DE JUPITER | 25 |
| Données sur les satellites galiléens | 26 |
| Données sur l'ensemble des satellites de Jupiter..... | 28 |
| Éphémérides des satellites galiléens | 29 |
| Io (I)..... | 30 |
| Europe (II)..... | 38 |
| Ganymède (III)..... | 44 |
| Callisto (IV)..... | 47 |
| Phénomènes des satellites Galiléens..... | 51 |
| LES SATELLITES DE SATURNE | 55 |
| Données sur les satellites de Saturne | 56 |
| Éphémérides des huit premiers satellites de Saturne | 57 |
| Mimas (I)..... | 58 |
| Encelade (II)..... | 64 |
| Téthys (III)..... | 66 |
| Dioné (IV)..... | 68 |
| Rhéa (V)..... | 70 |
| Titan (VI)..... | 72 |
| Hypérion (VII)..... | 75 |
| Japet (VIII)..... | 78 |
| LES SATELLITES D'URANUS | 81 |
| Données sur les satellites d'Uranus | 82 |
| Éphémérides des cinq satellites d'Uranus | 83 |
| Miranda (V)..... | 84 |
| Ariel (I)..... | 87 |
| Umbriel (II)..... | 88 |
| Titania (III)..... | 89 |
| Obéron (IV)..... | 91 |

TABLE OF CONTENTS

| | Page |
|--|-----------|
| PRESENTATION OF THE EPHEMERIDES | 7 |
| <i>Contents.</i> | 8 |
| <i>Representation of the coordinates</i> | 8 |
| <i>Description of the ephemerides</i> | 9 |
| <i>Time-scales.</i> | 9 |
| <i>Example of a position calculation.</i> | 10 |
| <i>Accuracy of the ephemerides</i> | 11 |
| <i>Phenomena of the Galilean satellites of Jupiter.</i> | 11 |
| <i>References</i> | 11 |
| SATELLITES OF MARS | 13 |
| <i>Data on the satellites of Mars.</i> | 14 |
| <i>Ephemerides of the satellites of Mars</i> | 15 |
| <i>Phobos (I)</i> | 16 |
| <i>Deimos (II).</i> | 20 |
| SATELLITES OF JUPITER | 25 |
| <i>Data on the Galilean satellites.</i> | 26 |
| <i>Data on the Galilean and other satellites of Jupiter.</i> | 28 |
| <i>Ephemerides of the Galilean satellites</i> | 29 |
| <i>Io (I).</i> | 30 |
| <i>Europa (II).</i> | 38 |
| <i>Ganymede (III).</i> | 44 |
| <i>Callisto (IV).</i> | 47 |
| <i>Phenomena of the Galilean satellites.</i> | 51 |
| SATELLITES OF SATURN | 55 |
| <i>Data on the satellites of Saturn.</i> | 56 |
| <i>Ephemerides of the first eight satellites of Saturn</i> | 57 |
| <i>Mimas (I).</i> | 58 |
| <i>Enceladus (II).</i> | 64 |
| <i>Tethys (III).</i> | 66 |
| <i>Dione (IV).</i> | 68 |
| <i>Rhea (V).</i> | 70 |
| <i>Titan (VI).</i> | 72 |
| <i>Hyperion (VII).</i> | 75 |
| <i>Iapetus (VIII).</i> | 78 |
| SATELLITES OF URANUS | 81 |
| <i>Data on the satellites of Uranus</i> | 82 |
| <i>Ephemerides of the five satellites of Uranus</i> | 83 |
| <i>Miranda (V).</i> | 84 |
| <i>Ariel (I).</i> | 87 |
| <i>Umbriel (II).</i> | 88 |
| <i>Titania (III).</i> | 89 |
| <i>Oberon (IV).</i> | 91 |

PRÉSENTATION DES ÉPHÉMÉRIDES

PRESNTATION OF THE EPHEMERIDES

CONTENU

On trouve dans cette publication :

- des données sur les satellites galiléens de Jupiter rassemblant les résultats d'un certain nombre de travaux théoriques ou d'observations effectués sur ces satellites, ainsi que des données (en général recommandées par l'UAI) sur l'ensemble des satellites de Mars, Jupiter, Saturne et Uranus ;
- des tables permettant de calculer les positions des satellites de Mars, des satellites galiléens de Jupiter, des huit premiers satellites de Saturne et des cinq satellites d'Uranus ;
- des tables permettant de calculer les prédictions des phénomènes des satellites galiléens de Jupiter.

Les éphémérides des satellites donnent les coordonnées différentielles tangentielles des satellites par rapport au centre de la planète. Soit, au premier ordre :

$$X = \Delta\alpha \cos \delta \text{ et } Y = \Delta\delta$$

où δ est la déclinaison de la planète et où $\Delta\alpha$ et $\Delta\delta$ sont les différences en ascension droite et en déclinaison entre le satellite et la planète.

Ces coordonnées sont des coordonnées moyennes rapportées à l'équateur J2000 pour tous les satellites. L'axe des Y est dirigé vers le pôle de l'équateur moyen des coordonnées (nord) et l'axe des X est orienté dans le sens des ascensions droites croissantes (est).

Les théories utilisées pour la construction des éphémérides sont les suivantes :

- satellites de Mars : la théorie de Chapront-Touzé (1990) ;
- satellites galiléens : la théorie de Sampson (1921) améliorée par Lieske (1977) ; les constantes introduites ont été déterminées par Arlot (1982) ;
- huit premiers satellites de Saturne : les théories issues des travaux de Dourneau (1987), de Rapaport (1977), de Kozai (1959) et de Struve (1930) ;
- satellites d'Uranus : la théorie de Laskar et Jacobson (1987).

REPRÉSENTATION DES COORDONNÉES

Soit T une date Julianne appartenant à l'intervalle de temps $T_0, T_0 + \Delta t$, les coordonnées des satellites pour la date T sont données par la formule :

$$\left. \begin{array}{l} X \\ Y \end{array} \right\} = A_0 + A_1 \cdot t + B_0 \sin(Nt + F_0) + B_1 \cdot t \sin(Nt + F_1) + B_2 \cdot t^2 \sin(Nt + F_2) + C_0 \sin(2Nt + P_0) \quad (1)$$

CONTENTS

This publication contains the following :

— data on the Galilean satellites of Jupiter which sum the results of theoretical or observational studies in addition to various data (most of which are recommended by the IAU) concerning all known satellites of Mars, Jupiter, Saturn and Uranus ;

— tables which allow the computation of the positions of the satellites of Mars, the Galilean satellites of Jupiter, the first eight satellites of Saturn and the five satellites of Uranus ;

— tables to calculate the phenomena of the Galilean satellites of Jupiter.

These ephemerides of the satellites give the differential tangential coordinates of the satellites with respect to the centre of mass of the planet. We have, at the first order :

$$X = \Delta\alpha \cos \delta \text{ and } Y = \Delta\delta$$

where δ is the declination of the planet, $\Delta\alpha$ and $\Delta\delta$ the separations in right ascension and declination between the satellite and the planet.

These coordinates are mean coordinates equator J2000 for all the satellites. The Y -axis is set towards the pole of the equator (North) and the X -axis towards the increasing right ascensions (East).

The theories which have been used for the construction of the ephemerides are :

— satellites of Mars : theory from Chapront-Touzé (1990) ;

— Galilean satellites : Sampson's theory (1921) improved by Lieske (1977) ; the constants introduced have been determined by Arlot (1982) ;

— first eight satellites of Saturn : theories from the studies of Dourneau (1987), Rapaport (1977), Kozai (1959) and Struve (1930) ;

— satellites of Uranus : theory from Laskar and Jacobson (1987).

REPRESENTATION OF THE COORDINATES

Let T be a Julian date belonging to the interval of time $T_0, T_0 + \Delta t$. The coordinates of the satellites for the date T are given by the formula :

où :

- $t = T - T_0$;
- $A_0, A_1, B_0, F_0, B_1, F_1, B_2, F_2, C_0, P_0$ sont les coefficients numériques valables pour l'intervalle de temps $T_0, T_0 + \Delta t$ contenant T ;
- N est la fréquence associée au satellite considéré. Cette fréquence est en général proche de celle du satellite lui-même, sauf dans le cas d'Hypérion pour lequel on prend une fréquence proche de celle de Titan du fait de l'existence d'un très gros terme perturbateur de fréquence plus grande que celle du satellite lui-même.

Cette représentation sous forme de fonctions mixtes (termes séculaires et sinusoïdaux) utilise le caractère quasi périodique des variations des positions des satellites naturels des planètes. On trouvera des explications détaillées sur cette représentation dans Chapront et Vu (1984).

where :

- $t = T - T_0$;
- $A_0, A_1, B_0, F_0, B_1, F_1, B_2, F_2, C_0, P_0$ are numerical coefficients valid for the time interval $T_0, T_0 + \Delta t$;
- N is the frequency associated with the chosen satellite. Generally, N is close to the natural frequency of the satellite itself. Nevertheless, in the case of Hyperion, N is close to the frequency of Titan because of the appearance of a large disturbing term which frequency is larger than the proper frequency of the satellite.

This representation with mixed functions (secular and sinusoidal terms) of time, makes use of the quasi-periodic character of the variations of the differential coordinates of the satellites. Detailed explanations about this representation are given in Chapront and Vu (1984).

DESCRIPTION DES ÉPHÉMÉRIDES

Pour chaque satellite et pour chaque intervalle de temps, on donne :

- les dates de début et de fin de l'intervalle de validité ainsi que la date Julianne du début de validité des coefficients ; cet intervalle peut varier de 3 jours à 31 jours ;
- deux jeux de coefficients $A_0, A_1, B_0, F_0, B_1, F_1, B_2, F_2, C_0, P_0$: l'un pour la coordonnée X , l'autre pour la coordonnée Y . Notons que pour quelques satellites (Titan, par exemple), certains coefficients ne sont pas donnés car ils sont nuls ;
- la valeur de la fréquence N associée au satellite est indiquée en haut de chaque page.

Les unités sont : la seconde de degré pour les coefficients A_0, B_0, C_0 , la seconde de degré par jour pour A_1, B_1 , la seconde de degré par (jour)² pour B_2 ; les phases F_0, F_1, F_2, P_0 sont mesurées en radian. N est en radian par jour et le paramètre « temps » t est compté en jours à partir du début de l'intervalle (époque T_0).

DESCRIPTION OF THE EPHÉMERIDES

The following is given for each satellite and for each time interval :

- the dates of the beginning and end of the interval and the Julian date of the beginning of the validity of the coefficients. The duration of the time interval may cover from 3 days to 31 days ;
- two sets of coefficients $A_0, A_1, B_0, F_0, B_1, F_1, B_2, F_2, C_0, P_0$: the first set for the X -coordinate and the second set for the Y -coordinate. Let us note that for some satellites (Titan for example) some coefficients, with zero value, are not listed ;
- the value of frequency N , associated with the satellite is indicated at the top of each page.

Units of the data : A_0, B_0, C_0 in arcsecond ; A_1 and B_1 in arcsecond per day and B_2 in arcsecond per (day)². For phases F_0, F_1, F_2, P_0 the unit is the radian. N is expressed in radian per day and t in days from the beginning of the interval (epoch T_0).

ÉCHELLES DE TEMPS

L'argument « temps » des éphémérides publiées ici est le TDB (temps dynamique barycentrique) que l'on peut confondre, à la précision des éphémérides, avec le TDT (temps dynamique terrestre), proche du TE (temps des éphémérides) et réalisé physiquement par la mesure du TAI (temps atomique international). On a :

$$\text{TDT} = \text{TAI} + 32,184 \text{ s}$$

TIME-SCALES

The time argument of the ephemerides is TDB (barycentric dynamical time) which can be identified with TDT (terrestrial dynamic time) close to the former definition of ET (ephemeris time) and physically made by measuring TAI (international atomic time), so that :

$$\text{TDT} = \text{TAI} + 32.184 \text{ s}$$

Les événements astronomiques étant mesurés dans l'échelle UTC (temps universel coordonné), le tableau ci-dessous donne la relation (entre le 1 juillet 1985 et le 1 juillet 1994) entre TDT et UTC (d'après la relation entre TAI et UTC publiée par l'IERS).

Astronomical events are measured in the time-scale UTC (coordinated universal time). The table below gives the correspondence (from 1985 July 1 to 1994 July 1) between TDT and UTC (using the relationship between TAI and UTC published by the IERS).

TDT-UTC

| | |
|-----------------------------|----------|
| 1985 Juil. 1 - 1988 Jan. 1 | 55.184 s |
| 1988 Jan. 1 - 1990 Jan. 1 | 56.184 s |
| 1990 Jan. 1 - 1991 Jan. 1 | 57.184 s |
| 1991 Jan. 1 - 1992 Juil. 1 | 58.184 s |
| 1992 Juil. 1 - 1993 Juil. 1 | 59.184 s |
| 1993 Juil. 1 - | 60.184 s |

Pour 1994, on ne sait pas encore quelle en sera la valeur ; on peut cependant prendre 60 secondes, l'erreur commise n'ayant que peu d'influence sur la valeur des positions calculées des satellites.

For 1994 the value of TDT-UTC is not yet known ; one may take 60 seconds : the error made will have little effect on the values of the calculated positions of the satellites.

EXAMPLE DE CALCUL D'UNE POSITION

Pour calculer les coordonnées X et Y d'un satellite pour une date T exprimée en UTC :

- on effectue une correction déduite du tableau du paragraphe précédent pour se ramener à l'échelle TDT (identifiée à TDB) ;
- on cherche parmi les tableaux représentant X et Y celui qui correspond à l'intervalle $T_0, T_0 + \Delta t$ dans lequel se trouve T ;
- on applique la formule (1) avec $t = T - T_0$.

Il faut insister sur le fait que la représentation n'est valable que sur son intervalle de validité : T doit être compris entre T_0 et $T_0 + \Delta t$.

EXAMPLE : Calculer les coordonnées tangentialles de Téthys (3^e satellite de Saturne) par rapport à la planète, le 5 janvier 1994 à 23 h 30 min UTC.

On effectue d'abord une correction pour se ramener à l'échelle TDB. Pour 1993 nous avons choisi 59 secondes ; la date T est donc le 5 janvier 1993 à 23 h 30 min 60 s TDB.

Les coefficients nécessaires au calcul de X et Y sont ceux de la page 66 correspondant à l'intervalle du 1^{er} janvier à 0 h au 17 janvier à 0 h. On a, pour X :

$$A_0 = -0.000\ 8, A_1 = 0., \quad B_0 = 38.724\ 8, \\ F_0 = 0.368\ 345,$$

et pour Y :

$$A_0 = -0.000\ 5, A_1 = 0.000\ 00, \quad B_0 = 8.703\ 1, \\ F_0 = 2.497\ 069,$$

On applique ensuite la formule (1) :

$$\left. \begin{matrix} X \\ Y \end{matrix} \right\} = A_0 + A_1 \cdot t + B_0 \sin(Nt + F_0) + B_1 \cdot t \sin(Nt + F_1) + B_2 \cdot t^2 \sin(Nt + F_2) + C_0 \sin(2Nt + P_0)$$

EXAMPLE OF A POSITION CALCULATION

To compute the X and Y coordinates of a satellite for a date T (expressed in UTC), one has to :

- apply the correction deduced from the preceding table to express the date T in TDT (identified with TDB) ;
- select from the tables of coefficients, the one which corresponds to the time interval $T_0, T_0 + \Delta t$ where T is found ;
- apply formula (1) with $t = T - T_0$.

It is important to state that the representation is valid only for its time interval : T must belong to the interval $T_0, T_0 + \Delta t$.

EXAMPLE : Let us compute the tangential coordinates of Tethys (third satellite of Saturn) with respect to the planet for 1994 January 5, 23 h 30 m UTC.

First, the date must be corrected in order to fit with the TDB time-scale. For 1993, we choose 59 seconds ; so, the date T is 1993 January 5, 23 h 60 m 60 s TDB.

The coefficients necessary to compute X and Y are given on page 66 (interval from January 1, 0 h to January 17, 0 h). We read for X :

$$B_1 = 0.074\ 73, \quad B_2 = 0.000\ 387, \quad C_0 = 0.003\ 5, \\ F_1 = 4.446\ 6, \quad F_2 = 0.005\ 0, \quad P_0 = 0.037\ 9,$$

and for Y :

$$B_1 = 0.039\ 27, \quad B_2 = 0.000\ 054, \quad C_0 = 0.000\ 8, \\ F_1 = 5.645\ 2, \quad F_2 = 3.826\ 4, \quad P_0 = 6.200\ 3.$$

We then apply formula (1) :

On a ici :

$$N = 3,328 \text{ radian/jour}$$

t est le nombre de jours écoulés entre le 1 janvier à 0 h (début de l'intervalle) et le 5 janvier à 23 h 30 m 59 s, soit 4,979 849 jours.

On obtient finalement :

$$X = -36,24''$$

$$Y = 1,86''$$

PRÉCISION DES ÉPHÉMÉRIDES

Les théories dont sont issues les éphémérides sont construites pour la plupart avec une précision meilleure que 0,01" géocentrique.

Les observations utilisées pour l'ajustement des constantes et aussi certains défauts de la théorie ne permettent pas d'obtenir en réalité une précision meilleure que 0,05"; cette précision peut n'être que de 0,5" pour Hyperion.

La représentation en fonctions mixtes publiée ici a été déterminée de façon à ce que l'écart avec la théorie-source soit de l'ordre de 0,01".

PHÉNOMÈNES DES SATELLITES GALILÉENS DE JUPITER

Les prédictions des phénomènes des satellites galiléens sont données suivant une représentation polynômiale en fonction d'une variable temporelle. La méthode (Thuillot, 1983) permet une représentation compacte puisque 14 coefficients suffisent à représenter chaque type de phénomène (passages, occultations, éclipses, passages d'ombre, débuts ou fins) de chaque satellite pour une année entière avec une précision de l'ordre de la minute de temps.

Des explications sur cette méthode, le formulaire et les tables de coefficients sont donnés pages 51 à 54.

Where :

$$N = 3.328 \text{ radian/day}$$

t is the number of days elapsed between January 1, 0 h (beginning of the interval) and January 5, 23 h 30 m 59 s. Hence $t = 4.979\,849$ days.

Finally, we get :

$$X = -36.24''$$

$$Y = 1.86''$$

ACCURACY OF THE EPHEMERIDES

The theories from which are built the ephemerides have an internal precision better than 0.01" (in a geocentric reference frame).

In reality, the observations used to fit the constants and shortcomings in the theories, do not allow a precision better than 0.05" and may reach 0.5" for Hyperion.

The representation in mixed functions, as published here, has been determined in such a way that the difference between the representation and the source always remains around 0.01".

PHENOMENA OF THE GALILEAN SATELLITES OF JUPITER

The predictions of the phenomena of the Galilean satellites are given as a polynomial representation which depends directly on time. The method (Thuillot, 1983) allows a compact representation as only 14 coefficients are sufficient to represent each type of phenomenon (transits, occultations, eclipses, shadow transits, beginnings or ends) for each satellite for a complete year with an accuracy of about one minute of time.

Some explanations about the method, the formulae and the tables of coefficients are given on pages 51 to 54.

RÉFÉRENCES

- ARLOT, J.-E. : 1982, *Astron. Astrophys.* **107**, 305.
- CHAPRONT, J., VU, D.T. : 1984, *Astron. Astrophys.* **141**, 131.
- CHAPRONT-TOUZÉ, M. : 1990, *Astron. Astrophys.*, **240**, 159.
- DOURNEAU, G. : 1987, Thèse d'État, Université Bordeaux I.
- KOZAÏ, Y : 1959, *Astron. J.* **64**, 367
- LASKAR, J., JACOBSON, R.A. : 1987, *Astron. Astrophys.* **188**, 212.
- LIESKE, J.H. : 1977, *Astron. Astrophys.* **56**, 333.
- RAPAPORT, M. : 1977, Thèse d'État, Université Bordeaux I.
- SAMPSON, R.A. : 1921, *Mem. Roy. Astron. Soc.* **63**.
- STRUVE, G. : 1930, *Veröff. Univ. Sternw. Berlin Babelsberg* **6**.
- THUILLOT, W. : 1983, *Astron. Astrophys.* **127**, 63.

Note : Les calculs nécessaires à l'élaboration de cet ouvrage ont été effectués sur l'ordinateur NAS 9080 du Centre Inter-Régional de Calcul Electronique du CNRS, F-91405 ORSAY (France).

Nota : The calculations performed in order to build these tables have been made on the NAS 9080 computer of the Centre Inter-Régional de Calcul Electronique of the CNRS, F-91405 ORSAY (France).

SATELLITES DE MARS

SATELLITES OF MARS

DONNÉES SUR LES SATELLITES DE MARS

DATA ON THE SATELLITES OF MARS

| NOM | masse | rayon | période rotation sidérale | albédo géométrique | magnitude visuelle | période orbitale | élongation maximale | 1/2 grand axe | excentricité | inclinaison sur l'équateur de Mars |
|-----------|----------------------|-------------------------|---------------------------------|-----------------------|-----------------------|---------------------|------------------------|-----------------------|--------------|--|
| unité → | masse de Mars | km | jour | | | jour | (') ('") | 10^3 km | | degré |
| I Phobos | 2.0×10^{-8} | $13 \times 11 \times 9$ | (S) | 0.06 | 11.6 | 0.3189 | 25 | 9.38 | 0.0151 | 1.1 |
| II Deimos | 0.3×10^{-8} | $8 \times 6 \times 5$ | (S) | 0.06 | 12.7 | 1.262 | 1 02 | 23.46 | 0.0002 | 0.9/2.7 |
| NAME | mass | radius | sidereal period | geometrical albedo | visual magnitude | orbital period | greatest elongation | semi major axis | eccentricity | inclination on Mars' equator |
| unit → | Mars' mass | km | day | | | day | (') ('") | 10^3 km | | degree |

NOTES

(S) : Révolution synchrone

(S) : synchronous revolution

ÉPHÉMÉRIDES DES SATELLITES DE MARS

EPHEMERIDES OF THE SATELLITES OF MARS

Coordonnées différentielles tangentielles données en secondes de degré dans le repère équatorial moyen J2000. On a, au premier ordre :

Differential tangential coordinates given in arcsecond in the mean equatorial frame J2000. We have, at the first order :

$$\begin{aligned}\Delta\alpha \cos \delta &= X \\ \Delta\delta &= Y\end{aligned}$$

$$\left. \begin{matrix} X \\ Y \end{matrix} \right\} = A0 + A1 \cdot t + B0 \sin(Nt + F0) + B1 \cdot t \sin(Nt + F1) + B2 \cdot t^2 \sin(Nt + F2) + C0 \sin(2Nt + P0)$$

où $t = T - T0$ avec $T0$ date du début de l'intervalle et T date du calcul

where $t = T - T0$ with $T0$ date of the beginning of the interval and T the date for the calculation

| satellite | intervalle Δt (jours) | N (rad/j) | page |
|---------------|-------------------------------------|----------------|------|
| Phobos | 7 | 19.702 7 | 16 |
| Deimos | 7 | 4.978 8 | 20 |
| <i>(days)</i> | | <i>(rad/d)</i> | |

1994

COORDONNÉES EQUATORIALES DIFFÉRENTIELLES

DU SATELLITE 1 DE MARS: PHOBOS

N=19.7027

| | | A0 | A1 | B0 F0 | B1 F1 | B2 F2 | CO PO |
|-----------------------------|----|---------|----------|----------------------|--------------------|---------------------|--------------------|
| JAN. 1 (OH) (2449353.5) | X: | +0.1105 | +0.00045 | + 4.9250 0.307777 | +0.07073 5.2816 | +0.000544 3.6111 | +0.0376 -4.2387 |
| A JAN. 8 (OH) | Y: | -0.0447 | +0.00076 | + 2.1491 3.768012 | +0.02853 0.1570 | +0.000410 4.9279 | +0.0155 -0.6992 |
| JAN. 8 (OH) (2449360.5) | X: | +0.1133 | +0.00047 | + 5.0499 6.183997 | +0.06955 4.8613 | +0.000500 3.1682 | +0.0384 -5.0032 |
| A JAN. 15 (OH) | Y: | -0.0391 | +0.00079 | + 1.9823 3.511893 | +0.02958 5.9333 | +0.000423 4.4120 | +0.0144 -1.3077 |
| JAN. 15 (OH) (2449367.5) | X: | +0.1161 | +0.00042 | + 5.1655 5.781059 | +0.06856 4.4431 | +0.000512 2.6201 | +0.0390 -5.7743 |
| A JAN. 22 (OH) | Y: | -0.0334 | +0.00084 | + 1.8458 3.283604 | +0.03046 5.4300 | +0.000413 3.9255 | +0.0135 -1.8943 |
| JAN. 22 (OH) (2449374.5) | X: | +0.1187 | +0.00033 | + 5.2689 5.381559 | +0.06723 4.0262 | +0.000584 2.1425 | +0.0398 -0.2648 |
| A JAN. 29 (OH) | Y: | -0.0276 | +0.00088 | + 1.7562 3.081027 | +0.03130 4.9332 | +0.000390 3.3840 | +0.0131 -2.4566 |
| JAN. 29 (OH) (2449381.5) | X: | +0.1208 | +0.00023 | + 5.3582 4.985078 | +0.06547 3.6035 | +0.000644 1.7671 | +0.0408 -1.0264 |
| A FEV. 5 (OH) | Y: | -0.0216 | +0.00088 | + 1.7272 2.894821 | +0.03192 4.4469 | +0.000391 2.8017 | +0.0131 -3.0069 |
| FEV. 5 (OH) (2449388.5) | X: | +0.1223 | +0.00013 | + 5.4316 4.591297 | +0.06375 3.1695 | +0.000631 1.4236 | +0.0412 -1.7792 |
| A FEV. 12 (OH) | Y: | -0.0156 | +0.00084 | + 1.7647 2.709271 | +0.03209 3.9642 | +0.000410 2.2709 | +0.0136 -3.5683 |
| FEV. 12 (OH) (2449395.5) | X: | +0.1234 | +0.00001 | + 5.4872 4.199820 | +0.06261 2.7281 | +0.000553 1.0277 | +0.0413 -2.5398 |
| A FEV. 19 (OH) | Y: | -0.0097 | +0.00076 | + 1.8639 2.508346 | +0.03189 3.4763 | +0.000412 1.7875 | +0.0146 -4.1515 |
| FEV. 19 (OH) (2449402.5) | X: | +0.1240 | -0.00010 | + 5.5232 3.810044 | +0.06209 2.2904 | +0.000486 0.5313 | +0.0416 -3.3035 |
| A FEV. 26 (OH) | Y: | -0.0041 | +0.00069 | + 2.0123 2.282145 | +0.03161 2.9821 | +0.000397 1.2746 | +0.0159 -4.7584 |
| FEV. 26 (OH) (2449409.5) | X: | +0.1238 | -0.00014 | + 5.5395 3.421263 | +0.06177 1.8621 | +0.000488 0.0357 | +0.0419 -4.0583 |
| A MAR. 5 (OH) | Y: | +0.0009 | +0.00066 | + 2.1949 2.028368 | +0.03136 2.4884 | +0.000398 0.7151 | +0.0173 -5.3897 |
| MAR. 5 (OH) (2449416.5) | X: | +0.1231 | -0.00011 | + 5.5374 3.028200 | +0.06129 1.4400 | +0.000524 5.9671 | +0.0417 -4.8079 |
| A MAR. 12 (OH) | Y: | +0.0055 | +0.00067 | + 2.3978 1.749672 | +0.03094 1.9958 | +0.000428 0.2088 | +0.0188 -6.0466 |
| MAR. 12 (OH) (2449423.5) | X: | +0.1219 | -0.00004 | + 5.5196 2.644189 | +0.06076 1.0151 | +0.000524 5.7401 | +0.0413 -5.5639 |
| A MAR. 19 (OH) | Y: | +0.0099 | +0.00066 | + 2.6095 1.450493 | +0.03033 1.4945 | +0.000445 6.0758 | +0.0204 -0.4421 |
| MAR. 19 (OH) (2449430.5) | X: | +0.1206 | -0.00004 | + 5.4879 2.255190 | +0.06090 0.5865 | +0.000463 5.4981 | +0.0410 -0.0431 |
| A MAR. 26 (OH) | Y: | +0.0140 | +0.00058 | + 2.8207 1.135023 | +0.02995 0.9804 | +0.000422 5.6544 | +0.0221 -1.1320 |
| MAR. 26 (OH) (2449437.5) | X: | +0.1194 | -0.00017 | + 5.4425 1.865393 | +0.06198 0.1651 | +0.000390 5.0814 | +0.0409 -0.8000 |
| A AVR. 2 (OH) | Y: | +0.0180 | +0.00044 | + 3.0243 0.806602 | +0.03007 0.4660 | +0.000390 5.1371 | +0.0236 -1.8299 |
| AVR. 2 (OH) (2449444.5) | X: | +0.1180 | -0.00038 | + 5.3846 1.474038 | +0.06346 6.0413 | +0.000385 4.5151 | +0.0404 -1.5539 |
| A AVR. 9 (OH) | Y: | +0.0213 | +0.00030 | + 3.2161 0.467890 | +0.03047 6.2472 | +0.000394 4.5780 | +0.0249 -2.5375 |

| COORDONNEES EQUATORIALES DIFFERENTIELLES DU SATELLITE 1 DE MARS: PHOBOS | | | | | | | N=19.7027 |
|--|------------|----------|----------------------|--------------------|---------------------|--------------------|-----------|
| | A0 | A1 | B0 FO | B1 F1 | B2 F2 | CO PO | |
| AVR. 9 (OH) (2449451.5) | X: +0.1161 | -0.00053 | + 5.3175 1.080295 | +0.06461 5.6432 | +0.000444 4.0974 | +0.0397 -2.3143 | |
| A AVR. 16 (OH) | Y: +0.0240 | +0.00023 | + 3.3938 0.121175 | +0.03073 5.7546 | +0.000423 4.1191 | +0.0261 -3.2576 | |
| AVR.16 (OH) (2449458.5) | X: +0.1133 | -0.00054 | + 5.2456 0.683679 | +0.06541 5.2429 | +0.000479 3.8633 | +0.0391 -3.0849 | |
| A AVR.23 (OH) | Y: +0.0259 | +0.00023 | + 3.5553 6.051645 | +0.03091 5.2892 | +0.000420 3.7482 | +0.0274 -3.9825 | |
| AVR.23 (OH) (2449465.5) | X: +0.1099 | -0.00046 | + 5.1723 0.284097 | +0.06658 4.8376 | +0.000450 3.6643 | +0.0388 -3.8542 | |
| A AVR.30 (OH) | Y: +0.0275 | +0.00025 | + 3.6981 5.694421 | +0.03144 4.7630 | +0.000375 3.3371 | +0.0285 -4.7031 | |
| AVR.30 (OH) (2449472.5) | X: +0.1064 | -0.00036 | + 5.0991 6.164522 | +0.06856 4.4372 | +0.000382 3.3400 | +0.0384 -4.6191 | |
| A MAI 7 (OH) | Y: +0.0288 | +0.00023 | + 3.8206 5.333605 | +0.03231 4.2816 | +0.000335 2.7890 | +0.0293 -5.4283 | |
| MAI 7 (OH) (2449479.5) | X: +0.1031 | -0.00034 | + 5.0284 5.758019 | +0.07086 4.0490 | +0.000356 2.8256 | +0.0377 -5.3925 | |
| A MAI 14 (OH) | Y: +0.0300 | +0.00016 | + 3.9227 4.969940 | +0.03302 3.8191 | +0.000348 2.2019 | +0.0299 -6.1639 | |
| MAI 14 (OH) (2449486.5) | X: +0.1000 | -0.00041 | + 4.9646 5.347287 | +0.07287 3.6694 | +0.000412 2.3115 | +0.0372 -6.1794 | |
| A MAI 21 (OH) | Y: +0.0310 | +0.00008 | + 4.0050 4.604289 | +0.03242 3.3642 | +0.000387 1.7191 | +0.0306 -6.6180 | |
| MAI 21 (OH) (2449493.5) | X: +0.0968 | -0.00050 | + 4.9134 4.932293 | +0.07445 3.2891 | +0.000492 1.9447 | +0.0372 -0.6837 | |
| A MAI 28 (OH) | Y: +0.0315 | +0.00002 | + 4.0675 4.237609 | +0.03309 2.9032 | +0.000399 1.2965 | +0.0311 -1.3467 | |
| MAI 28 (OH) (2449500.5) | X: +0.0932 | -0.00056 | + 4.8794 4.513492 | +0.07605 2.9022 | +0.000508 1.6445 | +0.0371 -1.4625 | |
| A JUN. 4 (OH) | Y: +0.0318 | +0.00000 | + 4.1094 3.870729 | +0.03296 2.4353 | +0.000365 0.8021 | +0.0312 -2.0758 | |
| JUN. 4 (OH) (2449507.5) | X: +0.0895 | -0.00061 | + 4.8655 4.091501 | +0.07805 2.5127 | +0.000448 1.2982 | +0.0368 -2.2498 | |
| A JUN.11 (OH) | Y: +0.0319 | -0.00002 | + 4.1298 3.504217 | +0.03281 1.9718 | +0.000341 0.1677 | +0.0312 -2.8136 | |
| JUN.11 (OH) (2449514.5) | X: +0.0857 | -0.00064 | + 4.8742 3.666963 | +0.08027 2.1280 | +0.000371 0.7983 | +0.0368 -3.0507 | |
| A JUN.18 (OH) | Y: +0.0319 | -0.00004 | + 4.1286 3.138604 | +0.03224 1.5146 | +0.000368 5.8238 | +0.0313 -3.5488 | |
| JUN.18 (OH) (2449521.5) | X: +0.0817 | -0.00064 | + 4.9080 3.240653 | +0.08220 1.7506 | +0.000363 0.1846 | +0.0375 -3.8474 | |
| A JUN.25 (OH) | Y: +0.0318 | -0.00002 | + 4.1061 2.774551 | +0.03106 1.0538 | +0.000409 5.3355 | +0.0311 -4.2747 | |
| JUN.25 (OH) (2449528.5) | X: +0.0776 | -0.00057 | + 4.9696 2.813554 | +0.08343 1.3770 | +0.000420 6.0221 | +0.0382 -4.6317 | |
| A JUL. 2 (OH) | Y: +0.0317 | +0.00002 | + 4.0625 2.412851 | +0.02946 0.5756 | +0.000409 4.9222 | +0.0306 -4.9967 | |
| JUL. 2 (OH) (2449535.5) | X: +0.0734 | -0.00043 | + 5.0615 2.386986 | +0.08394 1.0005 | +0.000453 5.7716 | +0.0386 -5.4198 | |
| A JUL. 9 (OH) | Y: +0.0317 | +0.00010 | + 3.9978 2.054440 | +0.02789 0.0769 | +0.000372 4.4651 | +0.0299 -5.7220 | |
| JUL. 9 (OH) (2449542.5) | X: +0.0695 | -0.00031 | + 5.1838 1.962530 | +0.08437 0.6189 | +0.000418 5.5449 | +0.0396 -6.2161 | |
| A JUL.16 (OH) | Y: +0.0320 | +0.00014 | + 3.9122 1.700285 | +0.02659 5.8525 | +0.000354 3.9124 | +0.0293 -0.1596 | |

1994

COORDONNEES EQUATORIALES DIFFÉRENTIELLES

DU SATELLITE 1 DE MARS: PHOBOS

N=19.7027

| | | AO | A1 | B0 F0 | B1 F1 | B2 F2 | CO PO |
|-----------------------------|----|---------|----------|----------------------|--------------------|---------------------|--------------------|
| JUL. 16 (OH) (2449549.5) | X: | +0.0662 | -0.00030 | + 5.3337 1.541465 | +0.08516 0.2374 | +0.000339 5.1529 | +0.0411 -0.7201 |
| A JUL. 23 (OH) | Y: | +0.0326 | +0.00013 | + 3.8061 1.351289 | +0.02538 5.3414 | +0.000367 3.3951 | +0.0285 -0.8683 |
| JUL. 23 (OH) (2449556.5) | X: | +0.0634 | -0.00043 | + 5.5077 1.124439 | +0.08613 6.1453 | +0.000306 4.4768 | +0.0426 -1.4939 |
| A JUL. 30 (OH) | Y: | +0.0335 | +0.00009 | + 3.6812 1.008399 | +0.02419 4.8165 | +0.000425 2.9749 | +0.0274 -1.5692 |
| JUL. 30 (OH) (2449563.5) | X: | +0.0608 | -0.00056 | + 5.7036 0.711668 | +0.08651 5.7771 | +0.000377 3.9115 | +0.0439 -2.2650 |
| A AOU. 6 (OH) | Y: | +0.0344 | +0.00008 | + 3.5401 0.672776 | +0.02329 4.2666 | +0.000426 2.5859 | +0.0262 -2.2660 |
| AOU. 6 (OH) (2449570.5) | X: | +0.0579 | -0.00058 | + 5.9207 0.303549 | +0.08587 5.4086 | +0.000437 3.6341 | +0.0454 -3.0404 |
| A AOU. 13 (OH) | Y: | +0.0355 | +0.00014 | + 3.3866 0.345984 | +0.02312 3.7009 | +0.000396 2.1342 | +0.0250 -2.9552 |
| AOU. 13 (OH) (2449577.5) | X: | +0.0548 | -0.00044 | + 6.1562 6.183848 | +0.08478 5.0329 | +0.000411 3.4496 | +0.0475 -3.8085 |
| A AOU. 20 (OH) | Y: | +0.0366 | +0.00024 | + 3.2248 0.029858 | +0.02369 3.1466 | +0.000383 1.6037 | +0.0239 -3.6283 |
| AOU. 20 (OH) (2449584.5) | X: | +0.0519 | -0.00022 | + 6.4052 5.786352 | +0.08411 4.6535 | +0.000319 3.1963 | +0.0497 -4.5641 |
| A AOU. 27 (OH) | Y: | +0.0382 | +0.00033 | + 3.0594 6.009406 | +0.02459 2.6105 | +0.000401 1.1015 | +0.0226 -4.2874 |
| AOU. 27 (OH) (2449591.5) | X: | +0.0496 | -0.00006 | + 6.6634 5.393835 | +0.08396 4.2808 | +0.000243 2.7016 | +0.0515 -5.3141 |
| A SEP. 3 (OH) | Y: | +0.0401 | +0.00038 | + 2.8972 5.720061 | +0.02569 2.0838 | +0.000409 0.6689 | +0.0214 -4.9344 |
| SEP. 3 (OH) (2449598.5) | X: | +0.0482 | -0.00002 | + 6.9295 5.005769 | +0.08379 3.9201 | +0.000271 2.0814 | +0.0533 -6.0675 |
| A SEP. 10 (OH) | Y: | +0.0425 | +0.00036 | + 2.7472 5.446738 | +0.02713 1.5665 | +0.000391 0.2486 | +0.0203 -5.5645 |
| SEP. 10 (OH) (2449605.5) | X: | +0.0474 | -0.00005 | + 7.2046 4.621902 | +0.08307 3.5655 | +0.000350 1.7416 | +0.0556 -0.5360 |
| A SEP. 17 (OH) | Y: | +0.0451 | +0.00034 | + 2.6196 5.190611 | +0.02893 1.0687 | +0.000370 6.0760 | +0.0195 -6.1764 |
| SEP. 17 (OH) (2449612.5) | X: | +0.0470 | -0.00005 | + 7.4891 4.242185 | +0.08212 3.2078 | +0.000371 1.5466 | +0.0582 -1.2745 |
| A SEP. 24 (OH) | Y: | +0.0478 | +0.00036 | + 2.5253 4.951458 | +0.03089 0.5932 | +0.000371 5.5994 | +0.0190 -0.4881 |
| SEP. 24 (OH) (2449619.5) | X: | +0.0467 | -0.00001 | + 7.7827 3.866401 | +0.08153 2.8472 | +0.000311 1.3662 | +0.0603 -2.0069 |
| A OCT. 1 (OH) | Y: | +0.0505 | +0.00042 | + 2.4744 4.726730 | +0.03283 0.1308 | +0.000383 5.1716 | +0.0188 -1.0720 |
| OCT. 1 (OH) (2449626.5) | X: | +0.0468 | +0.00004 | + 8.0858 3.494202 | +0.08159 2.4905 | +0.000197 1.1212 | +0.0622 -2.7430 |
| A OCT. 8 (OH) | Y: | +0.0533 | +0.00049 | + 2.4757 4.511124 | +0.03488 5.9588 | +0.000375 4.7873 | +0.0190 -1.6503 |
| OCT. 8 (OH) (2449633.5) | X: | +0.0475 | +0.00008 | + 8.4004 3.125279 | +0.08215 2.1443 | +0.000084 0.5159 | +0.0647 -3.4804 |
| A OCT. 15 (OH) | Y: | +0.0565 | +0.00053 | + 2.5349 4.297476 | +0.03716 5.5153 | +0.000349 4.3924 | +0.0197 -2.2282 |
| OCT. 15 (OH) (2449640.5) | X: | +0.0488 | +0.00012 | + 8.7292 2.759365 | +0.08283 1.8113 | +0.000054 5.5442 | +0.0677 -4.2060 |
| A OCT. 22 (OH) | Y: | +0.0599 | +0.00052 | + 2.6529 4.078719 | +0.03958 5.0881 | +0.000336 3.9617 | +0.0208 -2.8136 |

1994

COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 1 DE MARS: PHOBOS

N=19.7027

| | A0 | A1 | B0 FO | B1 F1 | B2 F2 | CO PO |
|----------------------------|------------|----------|----------------------|--------------------|---------------------|--------------------|
| OCT.22 (OH) (2449647.5) | X: +0.0504 | +0.00026 | + 9.0768 2.396300 | +0.08338 1.4907 | +0.000028 5.6974 | +0.0703 -4.9242 |
| A OCT.29 (OH) | Y: +0.0635 | +0.00046 | + 2.8266 3.849691 | +0.04200 4.6745 | +0.000345 3.5490 | +0.0222 -3.4123 |
| OCT.29 (OH) (2449654.5) | X: +0.0524 | +0.00056 | + 9.4487 2.036136 | +0.08405 1.1790 | +0.000089 1.0493 | +0.0728 -5.6459 |
| A NOV. 5 (OH) | Y: +0.0671 | +0.00041 | + 3.0501 3.607730 | +0.04436 4.2692 | +0.000352 3.2121 | +0.0241 -4.0269 |
| NOV. 5 (OH) (2449661.5) | X: +0.0553 | +0.00089 | + 9.8504 1.679098 | +0.08526 0.8729 | +0.000225 1.1457 | +0.0759 -0.0846 |
| A NOV.12 (OH) | Y: +0.0705 | +0.00040 | + 3.3163 3.352317 | +0.04679 3.8702 | +0.000328 2.9461 | +0.0263 -4.6529 |
| NOV.12 (OH) (2449668.5) | X: +0.0598 | +0.00108 | +10.2865 1.325422 | +0.05760 0.5717 | +0.000378 1.1993 | +0.0796 -0.7996 |
| A NOV.19 (OH) | Y: +0.0736 | +0.00044 | + 3.6184 3.084383 | +0.04948 3.4828 | +0.000269 2.6734 | +0.0287 -5.2847 |
| NOV.19 (OH) (2449675.5) | X: +0.0661 | +0.00110 | +10.7617 0.975135 | +0.09133 0.2847 | +0.000503 1.2046 | +0.0835 -1.5066 |
| A NOV.26 (OH) | Y: +0.0766 | +0.00048 | + 3.9511 2.805797 | +0.05224 3.1128 | +0.000199 2.2690 | +0.0312 -5.9273 |
| NOV.26 (OH) (2449682.5) | X: +0.0740 | +0.00106 | +11.2842 0.628345 | +0.09595 0.0183 | +0.000574 1.1221 | +0.0875 -2.2114 |
| A DEC. 3 (OH) | Y: +0.0794 | +0.00047 | + 4.3096 2.518815 | +0.05460 2.7539 | +0.000150 1.7076 | +0.0339 -0.2983 |
| DEC. 3 (OH) (2449689.5) | X: +0.0832 | +0.00122 | +11.8638 0.285550 | +0.10078 0.0534 | +0.000621 0.9143 | +0.0920 -2.9146 |
| A DEC.10 (OH) | Y: +0.0822 | +0.00037 | + 4.6881 2.225614 | +0.05607 2.4160 | +0.000112 1.1652 | +0.0369 -0.9588 |
| DEC.10 (OH) (2449696.5) | X: +0.0936 | +0.00171 | +12.5078 6.230716 | +0.10560 5.8168 | +0.000727 0.5971 | +0.0970 -3.6157 |
| A DEC.17 (OH) | Y: +0.0845 | +0.00017 | + 5.0784 1.928003 | +0.05654 2.0811 | +0.000050 0.3740 | +0.0400 -1.6196 |
| DEC.17 (OH) (2449703.5) | X: +0.1063 | +0.00243 | +13.2195 5.898275 | +0.11093 5.5905 | +0.000929 0.3215 | +0.1030 -4.3097 |
| A DEC.24 (OH) | Y: +0.0860 | -0.00004 | + 5.4706 1.627360 | +0.05599 1.7570 | +0.000130 4.6843 | +0.0430 -2.2796 |
| DEC.24 (OH) (2449710.5) | X: +0.1227 | +0.00313 | +13.9984 5.572194 | +0.11734 5.3781 | +0.001172 0.1926 | +0.1094 -4.9909 |
| A DEC.31 (OH) | Y: +0.0860 | -0.00024 | + 5.8522 1.324746 | +0.05376 1.4499 | +0.000384 4.3842 | +0.0456 -2.9449 |
| DEC.31 (OH) (2449717.5) | X: +0.1437 | +0.00371 | +14.8992 5.253263 | +0.12428 5.1863 | +0.001375 0.1925 | +0.1157 -5.6660 |
| A JAN. 7 (OH) | Y: +0.0844 | -0.00043 | + 6.2052 1.020997 | +0.04836 1.1603 | +0.000720 4.2011 | +0.0482 -3.6152 |

| COORDONNEES EQUATORIALES DIFFÉRENTIELLES DU SATELLITE 2 DE MARS : DEIMOS | | | | | | | N= 4.9788 |
|---|------------|----------|----------------------|--------------------|---------------------|-------------------|-----------|
| | A0 | A1 | B0 FO | B1 F1 | B2 F2 | CO PO | |
| JAN. 1 (OH) (2449353.5) | X: +0.0011 | -0.00008 | +12.3624 0.770534 | +0.19494 5.7054 | +0.001587 3.9538 | +0.0008 2.4647 | |
| A JAN. 8 (OH) | Y: +0.0000 | +0.00007 | + 5.1969 4.165167 | +0.06866 0.7297 | +0.001134 5.3918 | +0.0004 5.8122 | |
| JAN. 8 (OH) (2449360.5) | X: +0.0015 | -0.00009 | +12.6569 4.100192 | +0.19170 2.7440 | +0.001566 1.0442 | +0.0012 2.6716 | |
| A JAN. 15 (OH) | Y: +0.0000 | +0.00009 | + 4.7599 1.357469 | +0.06977 3.9330 | +0.001115 2.3079 | +0.0004 5.9393 | |
| JAN. 15 (OH) (2449367.5) | X: +0.0019 | -0.00010 | +12.9329 1.150496 | +0.19044 6.0641 | +0.001626 4.1967 | +0.0013 2.6840 | |
| A JAN. 22 (OH) | Y: +0.0000 | +0.00008 | + 4.3903 4.862686 | +0.07059 0.8627 | +0.001130 5.5578 | +0.0003 0.0157 | |
| JAN. 22 (OH) (2449374.5) | X: +0.0020 | -0.00004 | +13.1844 4.486941 | +0.18501 3.0989 | +0.001611 1.4290 | +0.0012 3.0906 | |
| A JAN. 29 (OH) | Y: +0.0001 | +0.00008 | + 4.1304 2.113870 | +0.07207 4.0760 | +0.001100 2.4272 | +0.0001 1.3120 | |
| JAN. 29 (OH) (2449381.5) | X: +0.0022 | -0.00003 | +13.4024 1.543705 | +0.18429 0.1277 | +0.001602 4.5322 | +0.0007 3.5460 | |
| A FEV. 5 (OH) | Y: +0.0004 | +0.00006 | + 4.0184 5.669763 | +0.07243 1.0141 | +0.001101 5.7081 | +0.0003 2.4810 | |
| FEV. 5 (OH) (2449388.5) | X: +0.0025 | +0.00000 | +13.5823 4.885628 | +0.17839 3.4445 | +0.001614 1.8574 | +0.0007 4.7234 | |
| A FEV. 12 (OH) | Y: +0.0005 | +0.00009 | + 4.0753 2.946592 | +0.07384 4.2390 | +0.001136 2.5432 | +0.0005 2.7386 | |
| FEV. 12 (OH) (2449395.5) | X: +0.0026 | +0.00002 | +13.7225 1.947158 | +0.17938 0.4691 | +0.001537 4.8631 | +0.0011 5.3453 | |
| A FEV. 19 (OH) | Y: +0.0006 | +0.00009 | + 4.2947 0.209817 | +0.07355 1.1744 | +0.001082 5.8541 | +0.0004 2.9981 | |
| FEV. 19 (OH) (2449402.5) | X: +0.0026 | +0.00006 | +13.8198 5.292820 | +0.17427 3.7868 | +0.001568 2.2007 | +0.0016 5.6504 | |
| A FEV. 26 (OH) | Y: +0.0008 | +0.00008 | + 4.6467 3.729212 | +0.07453 4.4037 | +0.001159 2.7264 | +0.0003 3.5825 | |
| FEV. 26 (OH) (2449409.5) | X: +0.0028 | +0.00006 | +13.8771 2.357066 | +0.17495 0.8123 | +0.001421 5.3529 | +0.0016 5.7923 | |
| A MAR. 5 (OH) | Y: +0.0010 | +0.00009 | + 5.0922 0.936039 | +0.07461 1.3389 | +0.001123 5.9990 | +0.0003 5.1003 | |
| MAR. 5 (OH) (2449416.5) | X: +0.0028 | +0.00010 | +13.8916 5.704765 | +0.17281 4.1346 | +0.001538 2.5436 | +0.0013 6.0506 | |
| A MAR. 12 (OH) | Y: +0.0010 | +0.00012 | + 5.5932 4.398664 | +0.07544 4.5632 | +0.001157 2.9428 | +0.0006 5.5183 | |
| MAR. 12 (OH) (2449423.5) | X: +0.0029 | +0.00012 | +13.8718 2.769754 | +0.17347 1.1630 | +0.001321 5.8369 | +0.0008 0.2762 | |
| A MAR. 19 (OH) | Y: +0.0011 | +0.00011 | + 6.1204 1.555735 | +0.07638 1.5031 | +0.001164 6.2010 | +0.0008 5.8207 | |
| MAR. 19 (OH) (2449430.5) | X: +0.0030 | +0.00010 | +13.8149 6.117550 | +0.17421 4.4912 | +0.001463 2.8630 | +0.0007 1.5639 | |
| A MAR. 26 (OH) | Y: +0.0013 | +0.00010 | + 6.6508 4.978349 | +0.07789 4.7248 | +0.001115 3.1596 | +0.0007 6.0334 | |
| MAR. 26 (OH) (2449437.5) | X: +0.0031 | +0.00013 | +13.7309 3.181306 | +0.17378 1.5261 | +0.001298 0.1290 | +0.0013 2.1187 | |
| A AVR. 2 (OH) | Y: +0.0013 | +0.00012 | + 7.1674 2.103849 | +0.07945 1.6825 | +0.001235 0.1749 | +0.0005 0.4569 | |
| AVR. 2 (OH) (2449444.5) | X: +0.0030 | +0.00016 | +13.6183 0.244207 | +0.17794 4.8597 | +0.001395 3.2136 | +0.0017 2.3865 | |
| A AVR. 9 (OH) | Y: +0.0014 | +0.00012 | + 7.6588 5.502358 | +0.08236 4.9046 | +0.001036 3.3670 | +0.0006 1.5051 | |

1994

COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 2 DE MARS: DEIMOS

N= 4.9788

| | | AO | A1 | B0 FO | B1 F1 | B2 F2 | CO PO |
|----------------------------|----|---------|----------|----------------------|--------------------|---------------------|-------------------|
| AVR. 9 (OH) (2449451.5) | X: | +0.0031 | +0.00015 | +13.4872 3.588078 | +0.17770 1.9038 | +0.001305 0.5627 | +0.0018 2.5765 |
| A AVR.16 (OH) | Y: | +0.0015 | +0.00009 | + 8.1160 2.608964 | +0.08422 1.8834 | +0.001218 0.4305 | +0.0009 2.0988 |
| AVR.16 (OH) (2449458.5) | X: | +0.0032 | +0.00015 | +13.3407 0.647126 | +0.18258 5.2405 | +0.001308 3.6861 | +0.0015 2.7902 |
| A AVR.23 (OH) | Y: | +0.0016 | +0.00008 | + 8.5346 5.992944 | +0.08776 5.1237 | +0.001016 3.6084 | +0.0012 2.3200 |
| AVR.23 (OH) (2449465.5) | X: | +0.0030 | +0.00020 | +13.1857 3.986362 | +0.18381 2.2936 | +0.001313 0.9770 | +0.0011 3.2965 |
| A AVR.30 (OH) | Y: | +0.0015 | +0.00011 | + 8.9081 3.088355 | +0.08978 2.1178 | +0.001176 0.6541 | +0.0012 2.5278 |
| AVR.30 (OH) (2449472.5) | X: | +0.0030 | +0.00019 | +13.0290 1.039848 | +0.18905 5.6336 | +0.001275 4.1742 | +0.0009 4.0907 |
| A MAI 7 (OH) | Y: | +0.0016 | +0.00008 | + 9.2369 0.180440 | +0.09288 5.3755 | +0.000982 3.8647 | +0.0010 2.8383 |
| MAI 7 (OH) (2449479.5) | X: | +0.0030 | +0.00016 | +12.8771 4.372940 | +0.19236 2.6937 | +0.001290 1.3125 | +0.0013 4.8314 |
| A MAI 14 (OH) | Y: | +0.0016 | +0.00007 | + 9.5153 3.552590 | +0.09504 2.3806 | +0.001068 0.8116 | +0.0007 3.4625 |
| MAI 14 (OH) (2449486.5) | X: | +0.0029 | +0.00017 | +12.7394 1.419358 | +0.19608 6.0384 | +0.001305 4.7280 | +0.0017 5.1192 |
| A MAI 21 (OH) | Y: | +0.0015 | +0.00006 | + 9.7469 0.639608 | +0.09587 5.6607 | +0.001007 4.1790 | +0.0008 4.5227 |
| MAI 21 (OH) (2449493.5) | X: | +0.0027 | +0.00017 | +12.6237 4.745549 | +0.20188 3.1026 | +0.001287 1.6429 | +0.0017 5.3585 |
| A MAI 28 (OH) | Y: | +0.0014 | +0.00006 | + 9.9262 4.006811 | +0.09836 2.6684 | +0.001022 0.9022 | +0.0011 4.9856 |
| MAI 28 (OH) (2449500.5) | X: | +0.0028 | +0.00011 | +12.5385 1.784640 | +0.20461 0.1677 | +0.001348 5.1961 | +0.0016 5.6120 |
| A JUN. 4 (OH) | Y: | +0.0014 | +0.00001 | +10.0564 1.093822 | +0.09663 5.9588 | +0.000986 4.4074 | +0.0014 5.2944 |
| JUN. 4 (OH) (2449507.5) | X: | +0.0028 | +0.00008 | +12.4931 5.104024 | +0.21140 3.5173 | +0.001269 2.0290 | +0.0012 5.9730 |
| A JUN.11 (OH) | Y: | +0.0013 | +0.00001 | +10.1340 4.462627 | +0.09796 2.9679 | +0.001011 1.0583 | +0.0014 5.4970 |
| JUN.11 (OH) (2449514.5) | X: | +0.0027 | +0.00007 | +12.4955 2.136852 | +0.21330 0.5878 | +0.001426 5.6335 | +0.0010 0.4692 |
| A JUN.18 (OH) | Y: | +0.0012 | -0.00001 | +10.1605 1.548384 | +0.09394 6.2618 | +0.000971 4.6362 | +0.0010 5.9209 |
| JUN.18 (OH) (2449521.5) | X: | +0.0027 | +0.00003 | +12.5552 5.451416 | +0.22057 3.9364 | +0.001237 2.3966 | +0.0013 1.1297 |
| A JUN.25 (OH) | Y: | +0.0012 | -0.00004 | +10.1351 4.919460 | +0.09412 3.2673 | +0.001071 1.2165 | +0.0008 0.3483 |
| JUN.25 (OH) (2449528.5) | X: | +0.0027 | -0.00001 | +12.6746 2.480948 | +0.22220 1.0107 | +0.001436 5.9669 | +0.0017 1.5594 |
| A JUL. 2 (OH) | Y: | +0.0012 | -0.00006 | +10.0565 2.008764 | +0.08855 0.2688 | +0.000986 4.7431 | +0.0010 1.1713 |
| JUL. 2 (OH) (2449535.5) | X: | +0.0025 | -0.00002 | +12.8621 5.793980 | +0.22750 4.3597 | +0.001235 2.8906 | +0.0020 1.7603 |
| A JUL. 9 (OH) | Y: | +0.0010 | -0.00005 | + 9.9263 5.384658 | +0.08609 3.5456 | +0.001050 1.4910 | +0.0014 1.5672 |
| JUL. 9 (OH) (2449542.5) | X: | +0.0024 | -0.00006 | +13.1151 2.824383 | +0.23011 1.4374 | +0.001441 6.2414 | +0.0020 1.9660 |
| A JUL.16 (OH) | Y: | +0.0010 | -0.00009 | + 9.7435 2.480538 | +0.08039 0.5360 | +0.001071 4.8882 | +0.0015 1.7947 |

1994

COORDONNEES EQUATORIALES DIFFÉRENTIELLES

DU SATELLITE 2 DE MARS: DEIMOS

N= 4.9788

| | | A0 | A1 | B0 F0 | B1 F1 | B2 F2 | C0 F0 |
|-----------------------------|----|---------|----------|----------------------|--------------------|---------------------|-------------------|
| JUL. 16 (OH) (2449549.5) | X: | +0.0023 | -0.00010 | +13.4394 6.140159 | +0.23264 4.7867 | +0.001262 3.3339 | +0.0018 2.2273 |
| A JUL.23 (OH) | Y: | +0.0009 | -0.00008 | + 9.5130 5.864627 | +0.07621 3.7858 | +0.001039 1.7504 | +0.0013 2.0614 |
| JUL. 23 (OH) (2449556.5) | X: | +0.0020 | -0.00010 | +13.8244 3.175669 | +0.23579 0.8631 | +0.001370 0.2402 | +0.0013 2.6542 |
| A JUL.30 (OH) | Y: | +0.0007 | -0.00007 | + 9.2337 2.970929 | +0.07117 0.7544 | +0.001161 5.0556 | +0.0009 2.4139 |
| JUL. 30 (OH) (2449563.5) | X: | +0.0018 | -0.00014 | +14.2727 0.214580 | +0.23516 5.2180 | +0.001338 3.6242 | +0.0012 3.5278 |
| A AOU. 6 (OH) | Y: | +0.0006 | -0.00007 | + 8.9140 0.083783 | +0.06613 3.9601 | +0.000962 2.0224 | +0.0006 3.3776 |
| AOU. 6 (OH) (2449570.5) | X: | +0.0017 | -0.00019 | +14.7727 3.541281 | +0.23924 2.2920 | +0.001293 0.5171 | +0.0016 4.1544 |
| A AOU.13 (OH) | Y: | +0.0006 | -0.00010 | + 8.5572 3.488294 | +0.06263 0.9095 | +0.001224 5.2806 | +0.0008 4.1869 |
| AOU.13 (OH) (2449577.5) | X: | +0.0014 | -0.00020 | +15.3230 0.588774 | +0.23654 5.6531 | +0.001345 4.1900 | +0.0022 4.5394 |
| A AOU.20 (OH) | Y: | +0.0004 | -0.00007 | + 8.1759 0.618678 | +0.05903 4.0711 | +0.000977 2.2603 | +0.0011 4.5860 |
| AOU.20 (OH) (2449584.5) | X: | +0.0012 | -0.00022 | +15.9134 3.924660 | +0.23903 2.7263 | +0.001200 0.9804 | +0.0025 4.7367 |
| A AOU.27 (OH) | Y: | +0.0004 | -0.00008 | + 7.7796 4.044134 | +0.05738 0.9868 | +0.001168 5.5369 | +0.0011 4.8174 |
| AOU.27 (OH) (2449591.5) | X: | +0.0011 | -0.00030 | +16.5392 0.981536 | +0.23676 6.0922 | +0.001262 4.5884 | +0.0023 5.0128 |
| A SEP. 3 (OH) | Y: | +0.0004 | -0.00009 | + 7.3842 1.199176 | +0.05702 4.1348 | +0.000990 2.4822 | +0.0008 5.1938 |
| SEP. 3 (OH) (2449598.5) | X: | +0.0008 | -0.00031 | +17.1972 4.326461 | +0.23819 3.1702 | +0.001098 1.4565 | +0.0019 5.3864 |
| A SEP.10 (OH) | Y: | +0.0005 | -0.00009 | + 7.0087 4.652987 | +0.05763 1.0420 | +0.001126 5.7949 | +0.0006 5.9322 |
| SEP.10 (OH) (2449605.5) | X: | +0.0004 | -0.00028 | +17.8834 1.392301 | +0.23709 0.2567 | +0.001082 4.9227 | +0.0015 6.0737 |
| A SEP.17 (OH) | Y: | +0.0004 | -0.00006 | + 6.6760 1.839834 | +0.06017 4.2163 | +0.001038 2.7661 | +0.0007 0.6688 |
| SEP.17 (OH) (2449612.5) | X: | +0.0002 | -0.00032 | +18.5968 4.745474 | +0.23619 3.6294 | +0.001064 2.1488 | +0.0021 0.5177 |
| A SEP.24 (OH) | Y: | +0.0004 | -0.00006 | + 6.4118 5.327007 | +0.06378 1.1384 | +0.001066 6.0288 | +0.0009 1.0745 |
| SEP.24 (OH) (2449619.5) | X: | +0.0001 | -0.00035 | +19.3377 1.819496 | +0.23837 0.7176 | +0.000825 5.2580 | +0.0027 0.8911 |
| A OCT. 1 (OH) | Y: | +0.0005 | -0.00007 | + 6.2421 2.546603 | +0.06793 4.3561 | +0.001057 3.1154 | +0.0009 1.3740 |
| OCT. 1 (OH) (2449626.5) | X: | -0.0004 | -0.00027 | +20.1092 5.179936 | +0.23665 4.1057 | +0.000967 2.8001 | +0.0031 1.1868 |
| A OCT. 8 (OH) | Y: | +0.0006 | -0.00005 | + 6.1934 6.060912 | +0.07409 1.3173 | +0.001065 0.0205 | +0.0007 1.7419 |
| OCT. 8 (OH) (2449633.5) | X: | -0.0010 | -0.00025 | +20.9176 2.261055 | +0.24067 1.2021 | +0.000561 5.7499 | +0.0030 1.4048 |
| A OCT.15 (OH) | Y: | +0.0006 | -0.00004 | + 6.2823 3.297858 | +0.07932 4.5710 | +0.001045 3.4810 | +0.0004 2.7848 |
| OCT.15 (OH) (2449640.5) | X: | -0.0012 | -0.00028 | +21.7664 5.628135 | +0.23930 4.6075 | +0.000962 3.5211 | +0.0022 1.8502 |
| A OCT.22 (OH) | Y: | +0.0007 | -0.00005 | + 6.5182 0.532648 | +0.08716 1.5745 | +0.001073 0.3555 | +0.0007 3.7181 |

1994

COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 2 DE MARS: DEIMOS

N= 4.9788

| | A0 | A1 | B0 F0 | B1 F1 | B2 F2 | C0 PO |
|-----------------------------|------------|----------|----------------------|--------------------|---------------------|-------------------|
| OCT. 22 (OH) (2449647.5) | X: -0.0017 | -0.00025 | +22.6679 2.715761 | +0.24565 1.7101 | +0.000182 0.5589 | +0.0019 2.6183 |
| A OCT. 29 (OH) | Y: +0.0009 | -0.00007 | + 6.8971 4.043367 | +0.09340 4.8583 | +0.001004 3.8980 | +0.0010 4.1432 |
| OCT. 29 (OH) (2449654.5) | X: -0.0024 | -0.00018 | +23.6267 6.089050 | +0.24732 5.1350 | +0.000664 4.2693 | +0.0026 3.4326 |
| A NOV. 5 (OH) | Y: +0.0010 | -0.00006 | + 7.4050 1.258544 | +0.10200 1.8952 | +0.001035 0.7967 | +0.0011 4.4126 |
| NOV. 5 (OH) (2449661.5) | X: -0.0027 | -0.00023 | +24.6656 3.182712 | +0.25257 2.2604 | +0.000500 2.3168 | +0.0038 3.7997 |
| A NOV. 12 (OH) | Y: +0.0012 | -0.00007 | + 8.0386 4.744017 | +0.10940 5.2136 | +0.000949 4.2694 | +0.0008 4.9233 |
| NOV. 12 (OH) (2449668.5) | X: -0.0031 | -0.00022 | +25.7854 0.279477 | +0.26008 5.6965 | +0.000335 5.7042 | +0.0043 4.0593 |
| A NOV. 19 (OH) | Y: +0.0015 | -0.00010 | + 8.7684 1.933164 | +0.11769 2.2730 | +0.000896 1.2751 | +0.0008 5.8922 |
| NOV. 19 (OH) (2449675.5) | X: -0.0037 | -0.00017 | +27.0157 3.662864 | +0.26458 2.8499 | +0.000917 3.1963 | +0.0043 4.3326 |
| A NOV. 26 (OH) | Y: +0.0017 | -0.00010 | + 9.5835 5.394370 | +0.12506 5.6247 | +0.000846 4.6966 | +0.0013 0.3201 |
| NOV. 26 (OH) (2449682.5) | X: -0.0042 | -0.00016 | +28.3598 0.767045 | +0.27714 0.0147 | +0.000932 1.1590 | +0.0034 4.7315 |
| A DEC. 3 (OH) | Y: +0.0017 | -0.00008 | +10.4680 2.563132 | +0.13251 2.7025 | +0.000610 1.7496 | +0.0018 0.6647 |
| DEC. 3 (OH) (2449689.5) | X: -0.0046 | -0.00014 | +29.8489 4.158241 | +0.28217 3.4954 | +0.001241 3.9607 | +0.0032 5.5371 |
| A DEC. 10 (OH) | Y: +0.0020 | -0.00012 | +11.4080 6.007659 | +0.13774 6.0899 | +0.000680 4.8563 | +0.0019 0.9232 |
| DEC. 10 (OH) (2449696.5) | X: -0.0052 | -0.00006 | +31.4887 1.271799 | +0.29799 0.6713 | +0.001898 2.0637 | +0.0042 6.2065 |
| A DEC. 17 (OH) | Y: +0.0022 | -0.00014 | +12.3814 3.164040 | +0.14120 3.1772 | +0.000212 1.2959 | +0.0016 1.3667 |
| DEC. 17 (OH) (2449703.5) | X: -0.0062 | +0.00002 | +33.2940 4.673377 | +0.30462 4.1909 | +0.001619 5.1548 | +0.0057 0.3632 |
| A DEC. 24 (OH) | Y: +0.0023 | -0.00014 | +13.3662 0.316142 | +0.14065 0.3082 | +0.000655 4.3055 | +0.0013 2.1337 |
| DEC. 24 (OH) (2449710.5) | X: -0.0067 | +0.00001 | +35.2667 1.798819 | +0.31812 1.4020 | +0.002878 2.8726 | +0.0064 0.6722 |
| A DEC. 31 (OH) | Y: +0.0024 | -0.00014 | +14.3288 3.749456 | +0.13489 3.6939 | +0.001012 0.7581 | +0.0019 3.0242 |
| DEC. 31 (OH) (2449717.5) | X: -0.0076 | +0.00012 | +37.3918 5.214196 | +0.32555 4.9627 | +0.002403 0.2915 | +0.0056 1.1191 |
| A JAN. 7 (OH) | Y: +0.0028 | -0.00024 | +15.2212 0.897486 | +0.12118 0.8233 | +0.001830 4.3005 | +0.0026 3.4458 |

SATELLITES DE JUPITER

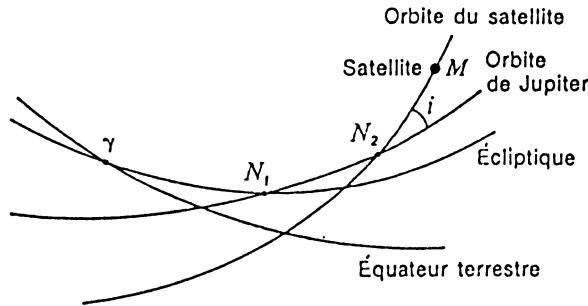
SATELLITES OF JUPITER

DONNÉES SUR LES SATELLITES GALILÉENS**DATA ON THE GALILEAN SATELLITES**

| | IO (I) | EUROPE (II) | GANYMÈDE (III) | CALLISTO (IV) |
|---|--------------|--------------|----------------|---------------|
| <i>Masses (10⁻⁵ masse de Jupiter)</i> | | | | |
| Sampson (1921) : | 4.50 | 2.54 | 7.99 | 4.50 |
| De Sitter (1931) : | 3.81 | 2.48 | 8.17 | 5.09 |
| Pioneer 11 (1976) : | 4.68 | 2.52 | 7.80 | 5.66 |
| <i>Rayons (km)</i> | | | | |
| Danjon (1954) : | 1650 | 1400 | 2450 | 2300 |
| Dollfus (1961) : | 1775 | 1550 | 2800 | 2525 |
| Pioneer 11 (1976) : | 1840 | 1552 | 2650 | 2420 |
| Voyager (1983) : | 1816 | 1563 | 2638 | 2410 |
| <i>Magnitudes visuelles à l'opposition de Jupiter :</i> | | | | |
| Harris (1961) : | 4.8 | 5.2 | 4.5 | 5.5 |
| <i>Albedos géométriques (Harris, 1961)</i> | | | | |
| U : 353 nm | 0.19 | 0.47 | 0.29 | 0.14 |
| B : 448 nm | 0.56 | 0.67 | 0.41 | 0.21 |
| V : 554 nm | 0.92 | 0.83 | 0.49 | 0.26 |
| R : 690 nm | 1.12 | 0.93 | 0.56 | 0.30 |
| I : 820 nm | 1.15 | 0.95 | 0.57 | 0.31 |
| <i>Albédo de Bond (visuel)</i> | 0.54 | 0.49 | 0.29 | 0.15 |
| <i>Demi-grand axe (Sampson, 1921)</i> | | | | |
| en UA : | 0.002820 | 0.004486 | 0.007155 | 0.012586 |
| en rayons de Jupiter : | 5.87 | 9.34 | 14.91 | 26.22 |
| en kilomètres : | 421810 | 671140 | 1070500 | 1882900 |
| <i>Plus grande élongation à l'opposition de Jupiter (minutes et secondes de degré)</i> | | | | |
| Sampson (1921) : | 2° 17" | 3° 40" | 5° 48" | 10° 13" |
| <i>Période synodique (jours)</i> | | | | |
| Sampson (1921) : | 1.7698604883 | 3.5540941742 | 7.1663872292 | 16.7535523007 |
| <i>Inclinaison moyenne sur l'équateur de Jupiter pour 1994.5 (minutes et secondes de degré)</i> | | | | |
| Sampson (1921) : | 1° 12" | 27° 7" | 9° 50" | 21° 58" |
| <i>Valeur moyenne de l'excentricité pour 1994.5</i> | | | | |
| Sampson (1921) : | 0.004 | 0.009 | 0.001 | 0.007 |
| <i>Partie séculaire du mouvement (degrés par an)</i> | | | | |
| nœud : | - 48.5 | - 11.9 | - 2.6 | - 0.6 |
| périjove : | 57.0 | 14.6 | 2.7 | 0.7 |
| Sampson (1921) | | | | |

**Théorie du mouvement
des satellites galiléens**

**Theory of the motion of
the Galilean satellites**



(repère moyen de la date)
(mean frame of the date)

Du fait de la complexité du mouvement des satellites galiléens, il est difficile de donner des valeurs précises sur les nœuds et les périodes. En effet, les excentricités et les inclinaisons sont faibles (cf. tableau précédent) et tous ces éléments sont soumis à de grandes variations.

On donne ci-après les longitudes moyennes (d'après Sampson, 1921) dans le plan des orbites, ce plan étant confondu avec l'équateur de Jupiter.

Si τ est le temps en jours moyens compté à partir de 1900,0 on a :

Because of the complexity of the motion of the Galilean satellites of Jupiter it is difficult to provide precise values for nodes and perijoves. Indeed, eccentricities and inclinations are small (see the preceding table) and all these elements undergo large variations.

The mean longitudes (Sampson, 1921) in the orbital planes identified with Jupiter's equator are given below.

If τ is the time in days which has elapsed from 1900.0, one gets :

$$\gamma N_1 N_2 = 316.051^\circ + 0.00003559 \tau, i = 3.10350^\circ$$

| | $\gamma N_1 + N_1 N_2 + N_2 M$ | Période sidérale en jours Sidereal period in days |
|----------|--|--|
| Io | $142.59987^\circ + 203.488992435 \tau$ | 1.7691374639 |
| Europe | $99.55081^\circ + 101.374761672 \tau$ | 3.5511797420 |
| Ganimède | $168.02628^\circ + 50.317646290 \tau$ | 7.1545476894 |
| Callisto | $234.40790^\circ + 21.571109630 \tau$ | 16.6889884746 |

DONNÉES SUR L'ENSEMBLE DES SATELLITES DE JUPITER

DATA ON THE GALILEAN AND OTHER SATELLITES OF JUPITER

| NOM | masse | rayon | période rotation sidérale | albédo géométrique | magnitude visuelle | période orbitale | élongation maximale | 1/2 grand axe | excentricité | inclinaison sur l'équateur de Jupiter |
|---------------|------------------------|---------------------------|---------------------------------|-----------------------|-----------------------|---------------------|------------------------|---------------------|--------------|---|
| unité → | masse de Jupiter | km | jour | | | jour | (°) (') (") | 10 ³ km | | degré |
| I Io | 4.70×10^{-5} | 1 815 | (S) | 0.61 | 5.02 | 1 769 137 | 2 18 | 422 | 0.004 | 0.04 |
| II Europa | 2.56×10^{-5} | 1 569 | (S) | 0.64 | 5.29 | 3 551 181 | 3 40 | 671 | 0.009 | 0.47 |
| III Ganymède | 7.84×10^{-5} | 2 631 | (S) | 0.42 | 4.61 | 7 154 552 | 5 51 | 1 070 | 0.002 | 0.21 |
| IV Callisto | 5.6×10^{-5} | 2 400 | (S) | 0.20 | 5.65 | 16 689 018 | 10 18 | 1 883 | 0.007 | 0.51 |
| V Amalthea | $38. \times 10^{-10}$ | $135 \times 85 \times 75$ | (S) | 0.05 | 14.1 | 0.498 179 | 59 | 181 | 0.003 | 0.40 |
| VI Himalia | $50. \times 10^{-10}$ | 90 | 0.4 | 0.03 | 14.84 | 250.566 2 | 1 024 46 | 11 480 | 0.158 | 27.63 (1) (2) |
| VII Elara | $4. \times 10^{-10}$ | 40 | 0.5 | 0.03 | 16.77 | 259.652 8 | 1 0410 | 11 737 | 0.207 | 24.77 (1) (2) |
| VIII Pasiphae | $1. \times 10^{-10}$ | | | | 17.0 | 735. (R) | 2 0826 | 23 500 | 0.378 | 145. (1) (2) |
| IX Sinope | 0.4×10^{-10} | 15 | | | 18.3 | 758. (R) | 2 0931 | 23 700 | 0.275 | 153. (1) (2) |
| X Lysithea | 0.4×10^{-10} | 10 | | | 18.4 | 259.22 | 1 0404 | 11 720 | 0.107 | 29.02 (2) |
| XI Carme | 0.5×10^{-10} | 15 | | | 18.0 | 692. (R) | 2 0331 | 22 600 | 0.207 | 164. (2) |
| XII Ananke | 0.2×10^{-10} | 10 | | | 18.9 | 631. (R) | 1 5552 | 21 200 | 0.169 | 147. (2) |
| XIII Leda | 0.03×10^{-10} | 8 | | | 20. | 238.72 | 1 0039 | 11 094 | 0.148 | 26.07 (2) |
| XIV Thebe | $4. \times 10^{-10}$ | 40 | | 0.05 | 16.0 | 0.674 55 | 1 13 | 221 | | |
| XV Adrastea | 0.1×10^{-10} | 10 | | 0.05 | 18.9 | 0.298 | 42 | 129 | | |
| XVI Metis | 0.5×10^{-10} | 20 | | 0.05 | 17.5 | 0.294 79 | 42 | 128 | | |

| NAME | mass | radius | sidereal rotation | geometrical albedo | visual magnitude | orbital period | greatest elongation | semi major axis | eccentricity | inclination on Jupiter's equator |
|-----------------------|------|--------|----------------------|-----------------------|---------------------|-------------------|------------------------|-----------------------|--------------|--|
| unit → Jupiter's mass | | km | day | | | day | (°) (') (") | 10 ³ km | | degree |

NOTES

(S) : révolution synchrone

(R) : révolution rétrograde

(1) : les éphémérides des satellites VI, VII, VIII et IX sont données sous forme de coefficients de Tchébycheff dans le « *Supplément à la Connaissance des Temps : Satellites faibles...* »

(2) : inclinaison sur l'orbite de Jupiter

(S) : synchronous revolution

(R) : retrograde revolution

(1) : the ephemerides for satellites VI, VII, VIII and IX are given as Chebychev coefficients in the « *Supplément à la Connaissance des Temps : Faint satellites...* »

(2) : inclination on Jupiter's orbit

Données extraites de l'*Encyclopédie du Bureau des Longitudes*.

Data from the *Encyclopédie du Bureau des Longitudes*.

ÉPHÉMÉRIDES DES SATELLITES GALILÉENS

EPHEMERIDES OF THE GALILEAN SATELLITES

Coordonnées différentielles tangentielles données en secondes de degré dans le repère équatorial moyen J2000. On a, au premier ordre (voir note) :

Differential tangential coordinates given in arcsecond in the mean equatorial frame J2000. We have, at the first order (cf. note below) :

$$\begin{aligned}\Delta\alpha \cos \delta &= X \\ \Delta\delta &= Y\end{aligned}$$

$$\left. \begin{matrix} X \\ Y \end{matrix} \right\} = A0 + A1 \cdot t + B0 \sin(Nt + F0) + B1 \cdot t \sin(Nt + F1) + B2 \cdot t^2 \sin(Nt + F2) + C0 \sin(2Nt + P0)$$

où $t = T - T0$ avec $T0$ date du début de l'intervalle et T date du calcul

where $t = T - T0$ with $T0$ date of beginning of the interval and T the date for the calculation

| satellite | intervalle Δt (jours) | N (rad/j) | page |
|-----------|-------------------------------------|----------------|------|
| Io | 3 | 3.551 6 | 30 |
| Europe | 4 | 1.769 3 | 38 |
| Ganymède | 9 | 0.878 2 | 44 |
| Callisto | 10 | 0.376 5 | 47 |
| | (days) | (rad/d) | |

Note : le premier ordre n'est pas suffisant lorsque le satellite s'éloigne beaucoup de la planète (tel Callisto).
On a alors :

Note : the first order is not sufficient for satellite with large elongation (such as Callisto). So, we have then :

$$\begin{aligned}\Delta\alpha \cos \delta - \Delta\alpha \Delta\delta \sin \delta &= X \\ \Delta\delta + \frac{(\Delta\alpha)^2}{2} \sin \delta \cos \delta &= Y\end{aligned}$$

ou bien :

or :

$$\begin{aligned}\Delta\alpha \cos \delta &= X + XY \operatorname{tg} \delta \\ \Delta\delta &= Y - \frac{X^2}{2} \operatorname{tg} \delta\end{aligned}$$

| 1994 | | COORDONNÉES EQUATORIALES DIFFÉRENTIELLES | | | | | |
|--------------|----------------|--|-----------------------|-----------------------|---------------------|-------------------|-------------------|
| | | DU SATELLITE 1 DE JUPITER: IO | | | | N=3.5516 | |
| | | A0 | A1 | B0 F0 | B1 F1 | B2 F2 | C0 P0 |
| JAN. 1 (OH) | X: -0.0960 | +0.01494 | + 93.6422 4.264690 | +0.38315 3.5547 | +0.013825 0.6633 | +0.1731 2.0950 | |
| (2449353.5) | A JAN. 4 (OH) | Y: +0.0633 | -0.00132 | + 33.2161 1.293309 | +0.06029 6.2205 | | +0.0607 5.4148 |
| JAN. 4 (OH) | X: -0.0645 | +0.01467 | + 94.4489 2.345994 | +0.34522 1.5189 | +0.015437 3.3603 | +0.1740 4.5964 | |
| (2449356.5) | A JAN. 7 (OH) | Y: +0.0642 | -0.00894 | + 33.2522 5.659556 | +0.05859 4.4071 | | +0.0603 1.6365 |
| JAN. 7 (OH) | X: -0.0023 | +0.01672 | + 95.2387 0.427315 | +0.30412 6.0198 | +0.013964 0.2161 | +0.1744 0.8067 | |
| (2449359.5) | A JAN. 10 (OH) | Y: +0.0305 | -0.00115 | + 33.3020 3.743042 | +0.05934 2.5850 | | +0.0600 4.1217 |
| JAN. 10 (OH) | X: +0.0212 | -0.00305 | + 96.0399 4.792577 | +0.35562 4.2281 | +0.006202 2.1579 | +0.1754 3.3066 | |
| (2449362.5) | A JAN. 13 (OH) | Y: +0.0320 | +0.00150 | + 33.3711 1.826705 | +0.05703 0.7203 | | +0.0602 0.3421 |
| JAN. 13 (OH) | X: +0.0215 | +0.00842 | + 96.8929 2.874986 | +0.35101 2.2357 | +0.007868 4.4589 | +0.1776 5.8020 | |
| (2449365.5) | A JAN. 16 (OH) | Y: +0.0341 | -0.00482 | + 33.4491 6.193813 | +0.05480 5.1960 | | +0.0608 2.8404 |
| JAN. 16 (OH) | X: +0.0414 | +0.00395 | + 97.7656 0.957459 | +0.31807 0.3771 | +0.009510 1.1249 | +0.1782 2.0249 | |
| (2449368.5) | A JAN. 19 (OH) | Y: +0.0215 | +0.00117 | + 33.5401 4.278118 | +0.05435 3.3931 | | +0.0605 5.3441 |
| JAN. 19 (OH) | X: +0.0461 | +0.02466 | + 98.6217 5.323714 | +0.35342 4.8726 | +0.005178 3.1011 | +0.1804 4.5302 | |
| (2449371.5) | A JAN. 22 (OH) | Y: +0.0235 | -0.00958 | + 33.6432 2.362805 | +0.05655 1.6082 | | +0.0612 1.5717 |
| JAN. 22 (OH) | X: +0.1360 | +0.01219 | + 99.5317 3.407423 | +0.38262 2.8938 | +0.012606 5.7234 | +0.1810 0.7437 | |
| (2449374.5) | A JAN. 25 (OH) | Y: -0.0096 | -0.00278 | + 33.7663 0.447842 | +0.05722 6.0431 | | +0.0605 4.0752 |
| JAN. 25 (OH) | X: +0.1448 | +0.01194 | +100.4943 1.491008 | +0.30983 0.9835 | +0.015311 1.7619 | +0.1822 3.2452 | |
| (2449377.5) | A JAN. 28 (OH) | Y: -0.0115 | -0.00129 | + 33.9011 4.816333 | +0.05804 4.2445 | | +0.0603 0.2937 |
| JAN. 28 (OH) | X: +0.1953 | -0.00096 | +101.4178 5.858203 | +0.31757 5.5620 | +0.014329 4.8720 | +0.1842 5.7430 | |
| (2449380.5) | A JAN. 31 (OH) | Y: -0.0226 | -0.00122 | + 34.0484 2.902012 | +0.06180 2.4604 | | +0.0608 2.7813 |
| JAN. 31 (OH) | X: +0.1737 | +0.00454 | +102.3471 3.943115 | +0.39365 3.6538 | +0.016534 1.0798 | +0.1864 1.9674 | |
| (2449383.5) | A FEV. 3 (OH) | Y: -0.0209 | +0.00160 | + 34.2146 0.988105 | +0.06601 0.6304 | | +0.0615 5.2932 |
| FEV. 3 (OH) | X: +0.1802 | +0.02374 | +103.3660 2.028195 | +0.34969 1.6558 | +0.008343 3.6635 | +0.1885 4.4667 | |
| (2449386.5) | A FEV. 6 (OH) | Y: -0.0179 | -0.01002 | + 34.3991 5.357644 | +0.06843 5.0842 | | +0.0622 1.5159 |
| FEV. 6 (OH) | X: +0.2631 | +0.00782 | +104.3556 0.113467 | +0.32995 6.1442 | +0.005052 0.0367 | +0.1892 0.6908 | |
| (2449389.5) | A FEV. 9 (OH) | Y: -0.0506 | -0.00069 | + 34.5954 3.444422 | +0.07422 3.2477 | | +0.0622 4.0221 |
| FEV. 9 (OH) | X: +0.2679 | +0.02357 | +105.3297 4.482708 | +0.37766 4.2682 | +0.009542 1.1967 | +0.1922 3.1965 | |
| (2449392.5) | A FEV. 12 (OH) | Y: -0.0516 | -0.00595 | + 34.8100 1.531558 | +0.07977 1.4010 | | +0.0632 0.2498 |
| FEV. 12 (OH) | X: +0.3655 | -0.01063 | +106.3648 2.569443 | +0.37355 2.2138 | +0.022592 4.4152 | +0.1937 5.6957 | |
| (2449395.5) | A FEV. 15 (OH) | Y: -0.0725 | -0.00091 | + 35.0423 5.902375 | +0.08569 5.7928 | | +0.0628 2.7505 |
| FEV. 15 (OH) | X: +0.3114 | +0.00611 | +107.4245 0.655859 | +0.28121 0.4307 | +0.021223 1.1028 | +0.1958 1.9240 | |
| (2449398.5) | A FEV. 18 (OH) | Y: -0.0679 | +0.00302 | + 35.2968 3.990231 | +0.08688 3.9290 | | +0.0633 5.2556 |

| COORDONNEES EQUATORIALES DIFFERENTIELLES DU SATELLITE 1 DE JUPITER: IO N=3.5516 | | | | | | |
|---|----|---------|----------|-----------------------|--------------------|---------------------|
| | | A0 | A1 | B0 F0 | B1 F1 | B2 F2 |
| FEV.18 (OH) (2449401.5) | X: | +0.3391 | +0.00942 | +108.4062 5.026033 | +0.31965 5.0788 | +0.014917 4.0778 |
| A FEV.21 (OH) | Y: | -0.0658 | -0.00753 | + 35.5617 2.078373 | +0.09259 2.0982 | +0.0644 1.4684 |
| FEV.21 (OH) (2449404.5) | X: | +0.3740 | +0.00515 | +109.4076 3.114083 | +0.36307 3.0714 | +0.007796 5.9064 |
| A FEV.24 (OH) | Y: | -0.0838 | -0.00179 | + 35.8419 0.166959 | +0.10018 0.2348 | +0.0651 3.9835 |
| FEV.24 (OH) (2449407.5) | X: | +0.3831 | +0.03207 | +110.4507 1.202266 | +0.32648 1.1953 | +0.005543 2.2162 |
| A FEV.27 (OH) | Y: | -0.0899 | -0.00942 | + 36.1426 4.539094 | +0.10474 4.6415 | +0.0660 0.2033 |
| FEV.27 (OH) (2449410.5) | X: | +0.4999 | -0.01012 | +111.4550 5.573655 | +0.32640 5.7495 | +0.009390 4.6707 |
| A MAR. 2 (OH) | Y: | -0.1229 | +0.00226 | + 36.4554 2.628298 | +0.11123 2.7869 | +0.0663 2.7106 |
| MAR. 2 (OH) (2449413.5) | X: | +0.4462 | +0.00915 | +112.4158 3.663266 | +0.38491 3.7804 | +0.014003 0.6361 |
| A MAR. 5 (OH) | Y: | -0.1097 | -0.00107 | + 36.7815 0.718045 | +0.11910 0.8911 | +0.0677 5.2266 |
| MAR. 5 (OH) (2449416.5) | X: | +0.4920 | -0.00250 | +113.4365 1.753212 | +0.34349 1.7598 | +0.017871 3.6959 |
| A MAR. 8 (OH) | Y: | -0.1170 | -0.00305 | + 37.1267 5.091323 | +0.12398 5.2776 | +0.0677 1.4461 |
| MAR. 8 (OH) (2449419.5) | X: | +0.4784 | +0.00061 | +114.4322 6.126163 | +0.30808 0.0746 | +0.004239 0.0611 |
| A MAR.11 (OH) | Y: | -0.1203 | -0.00055 | + 37.4901 3.181734 | +0.12525 3.3879 | +0.0687 3.9537 |
| MAR.11 (OH) (2449422.5) | X: | +0.4885 | +0.03590 | +115.3627 4.216547 | +0.34027 4.5478 | +0.007444 1.7443 |
| A MAR.14 (OH) | Y: | -0.1277 | -0.01143 | + 37.8609 1.272327 | +0.13000 1.5291 | +0.0701 0.1686 |
| MAR.14 (OH) (2449425.5) | X: | +0.6098 | -0.01392 | +116.2866 2.307872 | +0.33069 2.4983 | +0.020260 4.4870 |
| A MAR.17 (OH) | Y: | -0.1597 | +0.00055 | + 38.2399 5.646569 | +0.13685 5.9208 | +0.0707 2.6803 |
| MAR.17 (OH) (2449428.5) | X: | +0.5651 | +0.01500 | +117.2012 0.399044 | +0.29614 0.7913 | +0.008110 1.6837 |
| A MAR.20 (OH) | Y: | -0.1540 | -0.00351 | + 38.6351 3.737885 | +0.13861 4.0398 | +0.0722 5.1856 |
| MAR.20 (OH) (2449431.5) | X: | +0.6286 | -0.01407 | +118.0521 4.773814 | +0.31110 5.3453 | +0.004227 4.0182 |
| A MAR.23 (OH) | Y: | -0.1707 | +0.00294 | + 39.0344 1.829420 | +0.14205 2.1718 | +0.0731 1.4157 |
| MAR.23 (OH) (2449434.5) | X: | +0.5749 | -0.00302 | +118.8482 2.866257 | +0.30935 3.3672 | +0.009419 4.7832 |
| A MAR.26 (OH) | Y: | -0.1527 | -0.00315 | + 39.4323 6.204559 | +0.14884 0.2771 | +0.0744 3.9302 |
| MAR.26 (OH) (2449437.5) | X: | +0.5796 | +0.03388 | +119.6459 0.958943 | +0.26937 1.5974 | +0.013308 1.6453 |
| A MAR.29 (OH) | Y: | -0.1688 | -0.00838 | + 39.8445 4.296903 | +0.14811 4.6545 | +0.0746 0.1446 |
| MAR.29 (OH) (2449440.5) | X: | +0.6805 | -0.01437 | +120.3636 5.334778 | +0.32467 6.2075 | +0.018542 4.1875 |
| A AVR. 1 (OH) | Y: | -0.1903 | -0.00098 | + 40.2606 2.389311 | +0.14594 2.7842 | +0.0758 2.6548 |
| AVR. 1 (OH) (2449443.5) | X: | +0.6414 | +0.03261 | +121.0008 3.428283 | +0.35281 4.1690 | +0.021078 0.8513 |
| A AVR. 4 (OH) | Y: | -0.1956 | -0.00607 | + 40.6704 0.481899 | +0.14703 0.9193 | +0.0773 5.1559 |
| AVR. 4 (OH) (2449446.5) | X: | +0.7372 | -0.02419 | +121.6306 1.522195 | +0.29403 2.2447 | +0.014377 4.0284 |
| A AVR. 7 (OH) | Y: | -0.2146 | +0.00490 | + 41.0716 4.858017 | +0.15007 5.3078 | +0.0783 1.3816 |

| COORDONNÉES EQUATORIALES DIFFÉRENTIELLES DU SATELLITE 1 DE JUPITER: IO N=3.5516 | | | | | | | |
|---|----|---------|----------|-----------------------|--------------------|---------------------|-------------------|
| | | AO | A1 | B0 F0 | B1 F1 | B2 F2 | CO FO |
| AVR. 7 (OH) (2449449.5) | X: | +0.6529 | +0.00094 | +122.1983 5.899217 | +0.29125 0.4958 | +0.006233 2.5386 | +0.2354 0.5569 |
| A AVR. 10 (OH) | Y: | -0.1914 | -0.00283 | + 41.4774 2.951168 | +0.14488 3.4200 | | +0.0805 3.8895 |
| AVR. 10 (OH) (2449452.5) | X: | +0.6691 | +0.01641 | +122.6774 3.99326 | +0.30441 4.9320 | +0.014539 0.9336 | +0.2370 3.0642 |
| A AVR. 13 (OH) | Y: | -0.2098 | -0.00264 | + 41.8678 1.044261 | +0.14410 1.5669 | | +0.0809 0.1205 |
| AVR. 13 (OH) (2449455.5) | X: | +0.7126 | -0.00967 | +123.1130 2.088060 | +0.22812 3.0244 | +0.025195 4.0405 | +0.2402 5.5718 |
| A AVR. 16 (OH) | Y: | -0.2106 | -0.00508 | + 42.2401 5.420857 | +0.14430 5.9605 | | +0.0819 2.6295 |
| AVR. 16 (OH) (2449458.5) | X: | +0.6983 | +0.03849 | +123.4995 0.182450 | +0.23231 1.5883 | +0.021520 0.8481 | +0.2410 1.7936 |
| A AVR. 19 (OH) | Y: | -0.2311 | -0.00726 | + 42.6045 3.514495 | +0.13868 4.0640 | | +0.0825 5.1270 |
| AVR. 19 (OH) (2449461.5) | X: | +0.8033 | -0.02980 | +123.7599 4.560071 | +0.30866 5.9910 | +0.013678 3.5423 | +0.2421 4.3084 |
| A AVR. 22 (OH) | Y: | -0.2508 | +0.00640 | + 42.9585 1.608047 | +0.12962 2.2124 | | +0.0835 1.3565 |
| AVR. 22 (OH) (2449464.5) | X: | +0.7109 | +0.00758 | +123.9307 2.655043 | +0.29723 3.9914 | +0.011040 0.0090 | +0.2443 0.5242 |
| A AVR. 25 (OH) | Y: | -0.2305 | -0.00238 | + 43.2841 5.984757 | +0.12548 0.3660 | | +0.0849 3.8516 |
| AVR. 25 (OH) (2449467.5) | X: | +0.7346 | -0.00207 | +124.0758 0.750071 | +0.26664 2.2895 | +0.005135 1.6289 | +0.2451 3.0305 |
| A AVR. 28 (OH) | Y: | -0.2413 | +0.00101 | + 43.5833 4.078408 | +0.12140 4.7711 | | +0.0860 0.0756 |
| AVR. 28 (OH) (2449470.5) | X: | +0.7064 | +0.00387 | +124.1049 5.128156 | +0.29634 0.3626 | +0.011101 3.0412 | +0.2477 5.5397 |
| A MAI 1 (OH) | Y: | -0.2297 | -0.00559 | + 43.8621 2.172138 | +0.11219 2.8883 | | +0.0880 2.5912 |
| MAI 1 (OH) (2449473.5) | X: | +0.7316 | +0.03203 | +124.0535 3.223164 | +0.28889 4.6601 | +0.024976 0.4803 | +0.2485 1.7646 |
| A MAI 4 (OH) | Y: | -0.2600 | -0.00471 | + 44.1181 0.265583 | +0.10304 1.0836 | | +0.0876 5.0987 |
| MAI 4 (OH) (2449476.5) | X: | +0.8057 | -0.01962 | +123.9802 1.318316 | +0.22474 3.0529 | +0.014647 3.4534 | +0.2492 4.2735 |
| A MAI 7 (OH) | Y: | -0.2684 | +0.00254 | + 44.3317 4.642249 | +0.09857 5.5037 | | +0.0885 1.3154 |
| MAI 7 (OH) (2449479.5) | X: | +0.7549 | +0.00750 | +123.8276 5.696135 | +0.27290 1.3828 | +0.007394 5.8736 | +0.2486 0.4903 |
| A MAI 10 (OH) | Y: | -0.2610 | -0.00305 | + 44.5226 2.735596 | +0.08845 3.6654 | | +0.0891 3.8125 |
| MAI 10 (OH) (2449482.5) | X: | +0.7660 | -0.01471 | +123.5466 3.790686 | +0.28974 5.6115 | +0.018824 1.4605 | +0.2501 2.9955 |
| A MAI 13 (OH) | Y: | -0.2717 | +0.00910 | + 44.6833 0.828866 | +0.08020 1.8822 | | +0.0896 0.0372 |
| MAI 13 (OH) (2449485.5) | X: | +0.7055 | +0.00232 | +123.2390 1.885338 | +0.24251 3.9213 | +0.014735 4.4383 | +0.2520 5.4932 |
| A MAI 16 (OH) | Y: | -0.2423 | -0.00722 | + 44.8067 5.205025 | +0.07372 0.1075 | | +0.0910 2.5275 |
| MAI 16 (OH) (2449488.5) | X: | +0.7360 | +0.01715 | +122.8624 6.262687 | +0.28408 2.2256 | +0.009158 0.6494 | +0.2513 1.7191 |
| A MAI 19 (OH) | Y: | -0.2692 | -0.00420 | + 44.8915 3.297864 | +0.06757 4.5863 | | +0.0917 5.0374 |
| MAI 19 (OH) (2449491.5) | X: | +0.7632 | -0.00596 | +122.3805 4.356591 | +0.29797 0.2423 | +0.008959 2.7843 | +0.2523 4.2275 |
| A MAI 22 (OH) | Y: | -0.2747 | +0.00062 | + 44.9442 1.390502 | +0.05964 2.8165 | | +0.0924 1.2664 |
| MAI 22 (OH) (2449494.5) | X: | +0.7677 | +0.00429 | +121.8382 2.450511 | +0.24872 4.6313 | +0.016530 5.7329 | +0.2514 0.4452 |
| A MAI 25 (OH) | Y: | -0.2837 | -0.00091 | + 44.9670 5.766068 | +0.05200 1.1593 | | +0.0915 3.7627 |

| COORDONNEES EQUATORIALES DIFFERENTIELLES DU SATELLITE 1 DE JUPITER: IO N=3.5516 | | | | | | |
|---|------------|----------|-----------------------|--------------------|---------------------|-------------------|
| | A0 | A1 | B0 F0 | B1 F1 | B2 F2 | C0 F0 |
| MAI 25 (OH) (2449497.5) | X: +0.7545 | -0.01755 | +121.3105 0.543965 | +0.29753 3.1032 | +0.015161 1.2807 | +0.2517 2.9458 |
| A MAI 28 (OH) | Y: -0.2803 | +0.00894 | + 44.9501 3.858033 | +0.05147 5.7677 | | +0.0927 6.2820 |
| MAI 28 (OH) (2449500.5) | X: +0.6992 | -0.00449 | +120.6618 4.919956 | +0.33863 1.0713 | +0.020427 4.0644 | +0.2515 5.4427 |
| A MAI 31 (OH) | Y: -0.2513 | -0.00572 | + 44.9003 1.949819 | +0.05010 4.1104 | | +0.0930 2.4762 |
| MAI 31 (OH) (2449503.5) | X: +0.6953 | +0.00927 | +119.9381 3.012707 | +0.28451 5.3165 | +0.026779 0.6360 | +0.2517 1.6651 |
| A JUN. 3 (OH) | Y: -0.2753 | +0.00410 | + 44.8228 0.041077 | +0.05740 2.4371 | | +0.0929 4.9766 |
| JUN. 3 (OH) (2449506.5) | X: +0.6970 | +0.00330 | +119.2356 1.105309 | +0.25609 3.7519 | +0.013712 3.9677 | +0.2516 4.1606 |
| A JUN. 6 (OH) | Y: -0.2591 | -0.00710 | + 44.7044 4.415194 | +0.06198 0.6695 | | +0.0939 1.1813 |
| JUN. 6 (OH) (2449509.5) | X: +0.7376 | +0.00146 | +118.4869 5.480184 | +0.31675 1.9236 | +0.006424 5.4757 | +0.2495 0.3809 |
| A JUN. 9 (OH) | Y: -0.2848 | -0.00014 | + 44.5543 2.505798 | +0.06685 5.1779 | | +0.0936 3.6898 |
| JUN. 9 (OH) (2449512.5) | X: +0.7158 | -0.01964 | +117.6493 3.571622 | +0.28758 6.2410 | +0.011686 1.5194 | +0.2504 2.8826 |
| A JUN. 12 (OH) | Y: -0.2787 | +0.00978 | + 44.3745 C.596078 | +0.07075 3.4026 | | +0.0939 6.1920 |
| JUN. 12 (OH) (2449515.5) | X: +0.6782 | -0.01230 | +116.8075 1.662999 | +0.24484 4.6164 | +0.019708 4.3391 | +0.2494 5.3764 |
| A JUN. 15 (OH) | Y: -0.2553 | -0.00231 | + 44.1682 4.969161 | +0.07700 1.6333 | | +0.0932 2.3971 |
| JUN. 15 (OH) (2449518.5) | X: +0.6410 | -0.00586 | +115.9931 6.036629 | +0.33629 2.8094 | +0.015206 0.6238 | +0.2484 1.5944 |
| A JUN. 18 (OH) | Y: -0.2579 | +0.00534 | + 43.9381 3.058629 | +0.08654 6.1166 | | +0.0935 4.8988 |
| JUN. 18 (OH) (2449521.5) | X: +0.6182 | +0.00532 | +115.0964 4.126291 | +0.36034 0.7448 | +0.020412 3.5287 | +0.2470 4.0876 |
| A JUN. 21 (OH) | Y: -0.2396 | -0.00786 | + 43.6786 1.147670 | +0.09320 4.2801 | | +0.0927 1.1075 |
| JUN. 21 (OH) (2449524.5) | X: +0.6651 | -0.00279 | +114.1456 2.216059 | +0.27310 5.1735 | +0.016199 6.0508 | +0.2459 0.3004 |
| A JUN. 24 (OH) | Y: -0.2717 | +0.00359 | + 43.4017 5.519478 | +0.10260 2.4412 | | +0.0921 3.6010 |
| JUN. 24 (OH) (2449527.5) | X: +0.6338 | -0.00992 | +113.2503 0.305236 | +0.30573 3.4511 | +0.004276 2.7435 | +0.2457 2.7922 |
| A JUN. 27 (OH) | Y: -0.2523 | +0.00220 | + 43.1002 3.607488 | +0.11053 0.5462 | | +0.0932 6.0902 |
| JUN. 27 (OH) (2449530.5) | X: +0.6247 | -0.01369 | +112.3291 4.676815 | +0.34078 1.5142 | +0.009678 4.3005 | +0.2440 5.2919 |
| A JUN. 30 (OH) | Y: -0.2495 | +0.00299 | + 42.7747 1.695194 | +0.11575 4.9589 | | +0.0925 2.3096 |
| JUN. 30 (OH) (2449533.5) | X: +0.5676 | -0.01670 | +111.3546 2.764879 | +0.29841 5.8766 | +0.011971 1.0241 | +0.2441 1.5064 |
| A JUL. 3 (OH) | Y: -0.2357 | +0.00878 | + 42.4303 6.065678 | +0.11971 3.0852 | | +0.0924 4.8048 |
| JUL. 3 (OH) (2449536.5) | X: +0.5230 | +0.00709 | +110.4126 0.852893 | +0.29169 4.2376 | +0.011292 3.5285 | +0.2416 3.9950 |
| A JUL. 6 (OH) | Y: -0.2126 | -0.00705 | + 42.0740 4.152627 | +0.12640 1.2255 | | +0.0913 1.0090 |
| JUL. 6 (OH) (2449539.5) | X: +0.5641 | -0.01079 | +109.5058 5.222983 | +0.35224 2.2507 | +0.010798 5.0924 | +0.2397 0.2053 |
| A JUL. 9 (OH) | Y: -0.2340 | +0.00312 | + 41.7039 2.239102 | +0.13394 5.6276 | | +0.0906 3.5061 |
| JUL. 9 (OH) (2449542.5) | X: +0.5188 | +0.00524 | +108.5479 3.309471 | +0.32429 0.2911 | +0.014806 2.0163 | +0.2392 2.6930 |
| A JUL. 12 (OH) | Y: -0.2206 | -0.00011 | + 41.3168 0.325145 | +0.13801 3.7396 | | +0.0900 5.9875 |

ÉPHÉMÉRIDES DES SATELLITES NATURELS

1994

COORDONNÉES EQUATORIALES DIFFÉRENTIELLES

DU SATELLITE 1 DE JUPITER: IO

N=3.5516

| | | A0 | A1 | B0 F0 | B1 F1 | B2 F2 | C0 F0 |
|----------------------------|----|---------|----------|-----------------------|--------------------|---------------------|-------------------|
| JUL.12 (OH) (2449545.5) | X: | +0.5575 | -0.02392 | +107.5831 1.395916 | +0.27814 4.6839 | +0.015887 4.7838 | +0.2384 5.1871 |
| A JUL.15 (OH) | Y: | -0.2280 | +0.00582 | + 40.9171 4.694038 | +0.14079 1.8654 | | +0.0897 2.1932 |
| JUL.15 (OH) (2449548.5) | X: | +0.4736 | -0.01907 | +106.6852 5.764802 | +0.32265 3.0251 | +0.005645 2.0082 | +0.2373 1.3937 |
| A JUL.18 (OH) | Y: | -0.1997 | +0.00687 | + 40.5154 2.779287 | +0.14874 6.2581 | | +0.0902 4.6845 |
| JUL.18 (OH) (2449551.5) | X: | +0.4294 | -0.00031 | +105.7810 3.849805 | +0.34498 1.0532 | +0.007305 3.6103 | +0.2349 3.8879 |
| A JUL.21 (OH) | Y: | -0.1840 | -0.00181 | + 40.0964 0.864049 | +0.15097 4.3528 | | +0.0887 0.9004 |
| JUL.21 (OH) (2449554.5) | X: | +0.4340 | -0.01413 | +104.8527 1.934667 | +0.31624 5.5301 | +0.003542 5.2624 | +0.2345 0.0946 |
| A JUL.24 (OH) | Y: | -0.1876 | +0.00430 | + 39.6694 5.231716 | +0.15280 2.4621 | | +0.0882 3.3921 |
| JUL.24 (OH) (2449557.5) | X: | +0.3826 | +0.01803 | +103.9850 0.019200 | +0.35914 3.7076 | +0.011466 1.2045 | +0.2323 2.5779 |
| A JUL.27 (OH) | Y: | -0.1754 | -0.00376 | + 39.2396 3.315913 | +0.15670 0.5787 | | +0.0869 5.8751 |
| JUL.27 (OH) (2449560.5) | X: | +0.4520 | -0.02747 | +103.1357 4.385993 | +0.37485 1.6785 | +0.016685 4.2910 | +0.2912 5.0730 |
| A JUL.30 (OH) | Y: | -0.1901 | +0.00693 | + 38.8099 1.399647 | +0.16332 4.9531 | | +0.0862 2.0834 |
| JUL.30 (OH) (2449563.5) | X: | +0.3504 | -0.00701 | +102.2462 2.469272 | +0.31682 6.0162 | +0.018080 1.2264 | +0.2305 1.2743 |
| A AOU. 2 (OH) | Y: | -0.1628 | +0.00685 | + 38.3684 5.766154 | +0.16401 3.0381 | | +0.0859 4.5623 |
| AOU. 2 (OH) (2449566.5) | X: | +0.3351 | -0.01134 | +101.3969 0.552571 | +0.31253 4.3206 | +0.006092 4.2529 | +0.2284 3.7612 |
| A AOU. 5 (OH) | Y: | -0.1491 | +0.00218 | + 37.9214 3.849255 | +0.16347 1.1449 | | +0.0851 0.7705 |
| AOU. 5 (OH) (2449569.5) | X: | +0.2894 | -0.01296 | +100.5898 4.918594 | +0.32362 2.4530 | +0.004056 2.1493 | +0.2274 6.2477 |
| A AOU. 8 (OH) | Y: | -0.1354 | +0.00479 | + 37.4759 1.932095 | +0.16622 5.5398 | | +0.0849 3.2610 |
| AOU. 8 (OH) (2449572.5) | X: | +0.2515 | +0.01630 | + 99.8011 3.000742 | +0.32297 0.5097 | +0.006232 1.4674 | +0.2257 2.4542 |
| A AOU.11 (OH) | Y: | -0.1261 | -0.00434 | + 37.0298 0.014457 | +0.16891 3.6228 | | +0.0833 5.7515 |
| AOU.11 (OH) (2449575.5) | X: | +0.3103 | -0.02375 | + 99.0095 1.082883 | +0.31938 5.0313 | +0.007941 4.1549 | +0.2254 4.9436 |
| A AOU.14 (OH) | Y: | -0.1400 | +0.00674 | + 36.5756 4.379811 | +0.16752 1.7241 | | +0.0826 1.9572 |
| AOU.14 (OH) (2449578.5) | X: | +0.2262 | -0.00070 | + 98.2910 5.447816 | +0.36523 3.1314 | +0.009647 0.6200 | +0.2229 1.1427 |
| A AOU.17 (OH) | Y: | -0.1164 | +0.00316 | + 36.1271 2.461776 | +0.16999 6.1110 | | +0.0813 4.4376 |
| AOU.17 (OH) (2449581.5) | X: | +0.2326 | -0.02137 | + 97.5819 3.526813 | +0.35381 1.1436 | +0.005946 3.3632 | +0.2212 3.6306 |
| A AOU.20 (OH) | Y: | -0.1120 | +0.00701 | + 35.6825 0.543389 | +0.17391 4.1959 | | +0.0804 0.6435 |
| AOU.20 (OH) (2449584.5) | X: | +0.1512 | -0.01464 | + 96.8749 1.609570 | +0.33407 5.5346 | +0.004066 0.4634 | +0.2209 6.1087 |
| A AOU.23 (OH) | Y: | -0.0843 | +0.00501 | + 35.2341 4.907800 | +0.17393 2.2674 | | +0.0800 3.1217 |
| AOU.23 (OH) (2449587.5) | X: | +0.1159 | +0.01211 | + 96.1977 5.973520 | +0.34835 3.7045 | +0.004500 0.8409 | +0.2193 2.3113 |
| A AOU.26 (OH) | Y: | -0.0760 | -0.00286 | + 34.7814 2.988940 | +0.17114 0.3658 | | +0.0788 5.6107 |
| AOU.26 (OH) (2449590.5) | X: | +0.1424 | -0.01447 | + 95.5481 4.053784 | +0.33856 1.8126 | +0.000888 4.2300 | +0.2186 4.8003 |
| A AOU.29 (OH) | Y: | -0.0823 | +0.00544 | + 34.3356 1.069857 | +0.17203 4.7415 | | +0.0783 1.8159 |

1994

COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 1 DE JUPITER: IO

N=3.5516

| | | AO | A1 | BO FO | B1 F1 | B2 F2 | CO PO |
|----------------------------|----|---------|----------|-----------------------|--------------------|---------------------|-------------------|
| AOU.29 (OH) (2449593.5) | X: | +0.0922 | +0.00599 | + 94.9221 2.133642 | +0.31981 6.1744 | +0.006819 0.6950 | +0.2169 1.0043 |
| A SEP. 1 (OH) | Y: | -0.0670 | -0.00021 | + 33.8909 5.433722 | +0.17282 2.8288 | | +0.0769 4.3039 |
| SEP.1 (OH) (2449596.5) | X: | +0.1098 | -0.02258 | + 94.3289 0.213562 | +0.34717 4.3209 | +0.004800 0.9800 | +0.2159 3.4872 |
| A SEP. 4 (OH) | Y: | -0.0705 | +0.00980 | + 33.4435 3.514215 | +0.17082 0.9198 | | +0.0761 0.5077 |
| SEP.4 (OH) (2449599.5) | X: | +0.0255 | -0.01680 | + 93.7626 4.576244 | +0.34037 2.4014 | +0.006906 4.1893 | +0.2139 5.9644 |
| A SEP. 7 (OH) | Y: | -0.0357 | +0.00364 | + 33.0024 1.594650 | +0.17158 5.3021 | | +0.0748 2.9847 |
| SEP.7 (OH) (2449602.5) | X: | -0.0137 | +0.00483 | + 93.2196 2.655334 | +0.31201 0.5004 | +0.012142 1.1614 | +0.2134 2.1690 |
| A SEP.10 (OH) | Y: | -0.0312 | +0.00143 | + 32.5685 5.957928 | +0.17387 3.3741 | | +0.0738 5.4720 |
| SEP.10 (OH) (2449605.5) | X: | -0.0133 | -0.01569 | + 92.7014 0.734487 | +0.32710 4.9898 | +0.008225 4.1720 | +0.2131 4.6486 |
| A SEP.13 (OH) | Y: | -0.0223 | +0.00254 | + 32.1319 4.037793 | +0.17243 1.4448 | | +0.0732 1.6677 |
| SEP.13 (OH) (2449608.5) | X: | -0.0453 | +0.00930 | + 92.2264 5.096455 | +0.34716 3.0457 | +0.003485 6.2460 | +0.2109 0.8516 |
| A SEP.16 (OH) | Y: | -0.0186 | -0.00163 | + 31.6941 2.117604 | +0.16514 5.8138 | | +0.0719 4.1566 |
| SEP.16 (OH) (2449611.5) | X: | -0.0185 | -0.02441 | + 91.7636 3.175056 | +0.34229 1.1762 | +0.001960 5.4493 | +0.2104 3.3380 |
| A SEP.19 (OH) | Y: | -0.0232 | +0.00858 | + 31.2640 0.197406 | +0.16953 3.9063 | | +0.0716 0.3607 |
| SEP.19 (OH) (2449614.5) | X: | -0.0964 | -0.01318 | + 91.3279 1.253435 | +0.34090 5.5936 | +0.005722 4.0454 | +0.2091 5.8183 |
| A SEP.22 (OH) | Y: | +0.0066 | +0.00214 | + 30.8362 4.560103 | +0.16863 1.9784 | | +0.0701 2.8458 |
| SEP.22 (OH) (2449617.5) | X: | -0.1284 | -0.00700 | + 90.9405 5.614953 | +0.37504 3.6413 | +0.012101 0.4837 | +0.2085 2.0187 |
| A SEP.25 (OH) | Y: | +0.0082 | +0.00575 | + 30.4070 2.639644 | +0.16605 0.0673 | | +0.0689 5.3326 |
| SEP.25 (OH) (2449620.5) | X: | -0.1634 | -0.01411 | + 90.5664 3.692749 | +0.34850 1.6534 | +0.014038 3.6712 | +0.2069 4.4990 |
| A SEP.28 (OH) | Y: | +0.0305 | +0.00041 | + 29.9835 0.719184 | +0.16528 4.4425 | | +0.0676 1.5256 |
| SEP.28 (OH) (2449623.5) | X: | -0.1857 | +0.01202 | + 90.1967 1.770548 | +0.31161 6.1241 | +0.010216 0.2736 | +0.2058 0.7024 |
| A OCT. 1 (OH) | Y: | +0.0263 | -0.00156 | + 29.5688 5.081735 | +0.16681 2.5162 | | +0.0666 4.0132 |
| OCT.1 (OH) (2449626.5) | X: | -0.1596 | -0.01861 | + 89.8745 6.131572 | +0.33314 4.2649 | +0.002236 3.4974 | +0.2057 3.1791 |
| A OCT. 4 (OH) | Y: | +0.0243 | +0.00579 | + 29.1526 3.160872 | +0.16470 0.5786 | | +0.0662 0.2078 |
| OCT.4 (OH) (2449629.5) | X: | -0.2134 | -0.00568 | + 89.5828 4.209149 | +0.33769 2.3335 | +0.003529 4.1933 | +0.2039 5.6635 |
| A OCT. 7 (OH) | Y: | +0.0415 | +0.00127 | + 28.7366 1.240100 | +0.16196 4.9428 | | +0.0649 2.6944 |
| OCT.7 (OH) (2449632.5) | X: | -0.2243 | -0.02083 | + 89.3025 2.286647 | +0.33025 0.4851 | +0.002805 0.3650 | +0.2040 1.8669 |
| A OCT.10 (OH) | Y: | +0.0446 | +0.00686 | + 28.3251 5.602545 | +0.16038 3.0281 | | +0.0643 5.1851 |
| OCT.10 (OH) (2449635.5) | X: | -0.2952 | -0.01026 | + 89.0514 0.364178 | +0.34680 4.9522 | +0.010646 3.3141 | +0.2027 4.3474 |
| A OCT.13 (OH) | Y: | +0.0705 | +0.00005 | + 27.9210 3.681711 | +0.16103 1.0976 | | +0.0626 1.3878 |
| OCT.13 (OH) (2449638.5) | X: | -0.3015 | +0.00268 | + 88.8639 4.724562 | +0.35872 2.9110 | +0.008651 5.4238 | +0.2013 0.5481 |
| A OCT.16 (OH) | Y: | +0.0646 | -0.00030 | + 27.5138 1.760847 | +0.15789 5.4535 | | +0.0613 3.8719 |

ÉPHÉMÉRIDES DES SATELLITES NATURELS

| 1994 | | COORDONNEES EQUATORIALES DIFFERENTIELLES DU SATELLITE 1 DE JUPITER: IO | | | | | | N=3.5516 |
|-----------------------------|----|---|----------|-----------------------|--------------------|---------------------|-------------------|----------|
| | | A0 | A1 | B0 F0 | B1 F1 | B2 F2 | C0 P0 | |
| OCT. 16 (OH) (2449641.5) | X: | -0.3028 | -0.00871 | + 88.6730 2.801614 | +0.33455 0.9977 | +0.008213 2.4455 | +0.2004 3.0267 | |
| A OCT. 19 (OH) | Y: | +0.0682 | +0.00198 | + 27.1105 6.123312 | +0.15562 3.5383 | | +0.0605 0.0626 | |
| OCT. 19 (OH) (2449644.5) | X: | -0.3134 | -0.00441 | + 88.4872 0.878741 | +0.32154 5.5218 | +0.010411 4.7478 | +0.2004 5.5109 | |
| A OCT. 22 (OH) | Y: | +0.0719 | -0.00028 | + 26.7136 4.202537 | +0.15448 1.6104 | | +0.0596 2.5499 | |
| OCT. 22 (OH) (2449647.5) | X: | -0.3225 | -0.02237 | + 88.3727 5.239019 | +0.34795 3.5558 | +0.003655 0.9650 | +0.2001 1.7062 | |
| A OCT. 25 (OH) | Y: | +0.0721 | +0.00787 | + 26.3194 2.281732 | +0.15313 5.9598 | | +0.0590 5.0315 | |
| OCT. 25 (OH) (2449650.5) | X: | -0.4001 | -0.00564 | + 88.2650 3.315661 | +0.33504 1.6118 | +0.005413 3.3311 | +0.1983 4.1929 | |
| A OCT. 28 (OH) | Y: | +0.0980 | -0.00050 | + 25.9242 0.361039 | +0.14996 4.0363 | | +0.0577 1.2382 | |
| OCT. 28 (OH) (2449653.5) | X: | -0.4012 | -0.00527 | + 88.1675 1.392838 | +0.33079 6.0700 | +0.003068 5.6188 | +0.1984 0.3965 | |
| A OCT. 31 (OH) | Y: | +0.0940 | +0.00125 | + 25.5348 4.723639 | +0.14846 2.1134 | | +0.0569 3.7298 | |
| OCT. 31 (OH) (2449656.5) | X: | -0.4365 | +0.00392 | + 88.1156 5.753184 | +0.36747 4.1879 | +0.009458 1.6313 | +0.1972 2.8747 | |
| A NOV. 3 (OH) | Y: | +0.1011 | +0.00001 | + 25.1491 2.803164 | +0.14782 0.1916 | | +0.0553 6.2100 | |
| NOV. 3 (OH) (2449659.5) | X: | -0.4057 | -0.00192 | + 88.1183 3.829875 | +0.35748 2.1383 | +0.013097 4.3176 | +0.1966 5.3606 | |
| A NOV. 6 (OH) | Y: | +0.0960 | -0.00150 | + 24.7676 0.882682 | +0.14749 4.5377 | | +0.0543 2.4111 | |
| NOV. 6 (OH) (2449662.5) | X: | -0.4200 | -0.01323 | + 88.0971 1.906475 | +0.31001 0.2762 | +0.013402 1.1579 | +0.1963 1.5573 | |
| A NOV. 9 (OH) | Y: | +0.0955 | +0.00586 | + 24.3856 5.245499 | +0.14444 2.6047 | | +0.0536 4.8902 | |
| NOV. 9 (OH) (2449665.5) | X: | -0.4648 | -0.00676 | + 88.0998 6.266705 | +0.33043 4.8090 | +0.008479 3.7543 | +0.1955 4.0415 | |
| A NOV. 12 (OH) | Y: | +0.1126 | -0.00036 | + 24.0088 3.325264 | +0.14253 0.6720 | | +0.0525 1.1003 | |
| NOV. 12 (OH) (2449668.5) | X: | -0.4738 | -0.01375 | + 88.1683 4.343613 | +0.34520 2.8427 | +0.002050 0.2447 | +0.1953 0.2388 | |
| A NOV. 15 (OH) | Y: | +0.1101 | +0.00402 | + 23.6337 1.405128 | +0.13989 5.0214 | | +0.0518 3.5834 | |
| NOV. 15 (OH) (2449671.5) | X: | -0.5304 | +0.00708 | + 88.2496 2.420332 | +0.32936 0.8998 | +0.005563 2.1823 | +0.1940 2.7267 | |
| A NOV. 18 (OH) | Y: | +0.1251 | -0.00318 | + 23.2605 5.766348 | +0.13686 3.0889 | | +0.0505 6.0728 | |
| NOV. 18 (OH) (2449674.5) | X: | -0.4877 | +0.00145 | + 88.3258 0.497319 | +0.33158 5.3965 | +0.005984 4.4716 | +0.1946 5.2149 | |
| A NOV. 21 (OH) | Y: | +0.1118 | -0.00098 | + 22.8905 3.848664 | +0.13415 1.1667 | | +0.0498 2.2846 | |
| NOV. 21 (OH) (2449677.5) | X: | -0.5009 | -0.00388 | + 88.4682 4.857798 | +0.37662 3.4606 | +0.010274 0.6890 | +0.1935 1.4108 | |
| A NOV. 24 (OH) | Y: | +0.1114 | +0.00320 | + 22.5258 1.929136 | +0.13271 5.5223 | | +0.0484 4.7666 | |
| NOV. 24 (OH) (2449680.5) | X: | -0.5102 | -0.00234 | + 88.6470 2.934594 | +0.34961 1.4699 | +0.006581 3.3717 | +0.1924 3.8977 | |
| A NOV. 27 (OH) | Y: | +0.1185 | -0.00096 | + 22.1656 0.009835 | +0.13235 3.5934 | | +0.0475 0.9715 | |
| NOV. 27 (OH) (2449683.5) | X: | -0.5210 | -0.01814 | + 88.8229 1.011431 | +0.32174 5.8829 | +0.007440 0.2070 | +0.1925 0.0936 | |
| A NOV. 30 (OH) | Y: | +0.1179 | +0.00492 | + 21.8079 4.373815 | +0.13081 1.6512 | | +0.0468 3.4537 | |
| NOV. 30 (OH) (2449686.5) | X: | -0.5912 | +0.01229 | + 89.0155 5.372023 | +0.36201 4.0696 | +0.008070 1.7778 | +0.1923 2.5788 | |
| A DEC. 3 (OH) | Y: | +0.1321 | -0.00280 | + 21.4514 2.454903 | +0.12770 6.0036 | | +0.0455 5.9454 | |

1994

COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 1 DE JUPITER: IO

N=3.5516

| | | A0 | A1 | B0 FO | B1 F1 | B2 F2 | CO PO |
|-----------------------------|----|---------|----------|-----------------------|--------------------|---------------------|-------------------|
| DEC. 3 (OH) (2449689.5) | X: | -0.5455 | +0.00112 | + 89.2654 3.449120 | +0.35230 2.1206 | +0.003110 5.3524 | +0.1923 5.0656 |
| A DEC. 6 (OH) | Y: | +0.1202 | -0.00046 | + 21.1013 0.536166 | +0.12641 4.0635 | | +0.0449 2.1486 |
| DEC. 6 (OH) (2449692.5) | X: | -0.5595 | +0.00516 | + 89.5319 1.526221 | +0.33146 0.1938 | +0.005207 1.3366 | +0.1913 1.2721 |
| A DEC. 9 (OH) | Y: | +0.1226 | -0.00114 | + 20.7520 4.900857 | +0.12353 2.1226 | | +0.0439 4.6432 |
| DEC. 9 (OH) (2449695.5) | X: | -0.5342 | +0.00305 | + 89.8046 5.886870 | +0.34449 4.6278 | +0.001622 0.7237 | +0.1916 3.7589 |
| A DEC. 12 (OH) | Y: | +0.1149 | +0.00029 | + 20.4045 2.982726 | +0.11950 0.1915 | | +0.0431 0.8591 |
| DEC. 12 (OH) (2449698.5) | X: | -0.5342 | -0.02206 | + 90.1309 3.964517 | +0.35472 2.6854 | +0.006483 4.7328 | +0.1905 6.2373 |
| A DEC. 15 (OH) | Y: | +0.1185 | +0.00361 | + 20.0650 1.064995 | +0.11800 4.5502 | | +0.0416 3.3411 |
| DEC. 15 (OH) (2449701.5) | X: | -0.6060 | +0.01391 | + 90.4846 2.041874 | +0.31512 0.7718 | +0.012101 1.4491 | +0.1905 2.4448 |
| A DEC. 18 (OH) | Y: | +0.1290 | -0.00264 | + 19.7307 5.430610 | +0.11695 2.6084 | | +0.0407 5.8321 |
| DEC. 18 (OH) (2449704.5) | X: | -0.5582 | -0.01108 | + 90.6316 0.119647 | +0.32459 5.2824 | +0.010523 4.5756 | +0.1913 4.9290 |
| A DEC. 21 (OH) | Y: | +0.1202 | +0.00074 | + 19.3988 3.513384 | +0.11457 0.6693 | | +0.0402 2.0372 |
| DEC. 21 (OH) (2449707.5) | X: | -0.5969 | +0.01656 | + 91.2270 4.480962 | +0.35965 3.3618 | +0.005164 1.1212 | +0.1904 1.1351 |
| A DEC. 24 (OH) | Y: | +0.1231 | -0.00306 | + 19.0701 1.596511 | +0.11109 5.0162 | | +0.0392 4.5348 |
| DEC. 24 (OH) (2449710.5) | X: | -0.5350 | +0.00485 | + 91.6580 2.555991 | +0.35822 1.4576 | +0.004593 5.6587 | +0.1906 3.6230 |
| A DEC. 27 (OH) | Y: | +0.1107 | -0.00080 | + 18.7489 5.963277 | +0.10964 3.0914 | | +0.0388 0.7435 |
| DEC. 27 (OH) (2449713.5) | X: | -0.5336 | -0.01391 | + 92.1129 0.637080 | +0.34867 5.8339 | +0.002233 4.1024 | +0.1901 6.1118 |
| A DEC. 30 (OH) | Y: | +0.1126 | +0.00205 | + 18.4321 4.047020 | +0.10783 1.1424 | | +0.0377 3.2426 |
| DEC. 30 (OH) (2449716.5) | X: | -0.5758 | +0.01213 | + 92.5871 4.998883 | +0.38293 3.9089 | +0.011155 0.6577 | +0.1909 2.3187 |
| A JAN. 2 (OH) | Y: | +0.1150 | -0.00064 | + 18.1170 2.131224 | +0.10356 5.4849 | | +0.0368 5.7451 |

| 1994 COORDONNÉES EQUATORIALES DIFFÉRENTIELLES DU SATELLITE 2 DE JUPITER: EUROPE N=1.7693 | | | | | | | |
|---|----|---------|----------|-----------------------|--------------------|---------------------|-------------------|
| | | AO | A1 | BO FO | B1 F1 | B2 F2 | CO PO |
| JAN. 1 (OH) (2449353.5) | X: | +0.0000 | +0.13446 | +149.0278 5.334273 | +0.60698 5.3623 | +0.114942 3.6899 | +0.7689 1.1382 |
| A JAN. 5 (OH) | Y: | -0.1843 | +0.00130 | + 52.1411 2.386087 | +0.10280 0.9657 | | +0.2606 4.4938 |
| JAN. 5 (OH) (2449357.5) | X: | +1.9082 | -0.96766 | +151.2184 6.107387 | +1.34941 2.4389 | +0.433636 6.0455 | +0.8220 2.7787 |
| A JAN. 9 (OH) | Y: | -0.1256 | -0.01551 | + 52.2334 3.168268 | +0.12259 1.7613 | | +0.2643 6.1160 |
| JAN. 9 (OH) (2449361.5) | X: | -1.5797 | +0.74354 | +153.8251 0.628445 | +1.97310 5.5537 | +0.342444 2.6910 | +0.7942 4.4635 |
| A JAN. 13 (OH) | Y: | -0.1656 | +0.02770 | + 52.2703 3.954509 | +0.09386 2.9832 | | +0.2634 1.4769 |
| JAN. 13 (OH) (2449365.5) | X: | +1.0476 | -0.59426 | +153.1363 1.407997 | +1.53609 1.5875 | +0.239235 5.5427 | +0.7684 6.0951 |
| A JAN. 17 (OH) | Y: | -0.0827 | +0.01498 | + 52.4404 4.742062 | +0.08978 3.7789 | | +0.2629 3.1105 |
| JAN. 17 (OH) (2449369.5) | X: | -0.8481 | +0.20354 | +156.5859 2.189226 | +0.08794 0.0712 | +0.115445 2.2563 | +0.7662 1.3810 |
| A JAN. 21 (OH) | Y: | -0.0409 | +0.01273 | + 52.6325 5.530648 | +0.09039 4.6628 | | +0.2634 4.7231 |
| JAN. 21 (OH) (2449373.5) | X: | -1.0381 | +0.31985 | +158.3712 2.975542 | +0.12272 0.1218 | +0.158112 3.1911 | +0.7726 3.0215 |
| A JAN. 25 (OH) | Y: | +0.0065 | +0.00712 | + 52.8527 0.036069 | +0.08849 5.6235 | | +0.2657 0.0848 |
| JAN. 25 (OH) (2449377.5) | X: | +1.0182 | -0.86393 | +161.0936 3.774609 | +1.97428 2.6599 | +0.365213 6.1332 | +0.8010 4.5793 |
| A JAN. 29 (OH) | Y: | +0.0321 | +0.01248 | + 53.1258 0.825742 | +0.08645 0.2366 | | +0.2680 1.6994 |
| JAN. 29 (OH) (2449381.5) | X: | -2.5370 | +0.87362 | +160.2772 4.554973 | +2.14516 5.0974 | +0.402978 2.7023 | +0.8580 6.2303 |
| A FEV. 2 (OH) | Y: | +0.0615 | +0.02610 | + 53.4544 1.615397 | +0.08104 1.1301 | | +0.2715 3.3330 |
| FEV. 2 (OH) (2449385.5) | X: | +0.9123 | -0.83696 | +165.4014 5.334811 | +1.31379 2.0312 | +0.387546 5.5604 | +0.8953 1.6364 |
| A FEV. 6 (OH) | Y: | +0.2021 | -0.02192 | + 53.7877 2.408204 | +0.12946 1.7992 | | +0.2761 4.9809 |
| FEV. 6 (OH) (2449389.5) | X: | -0.8349 | -0.15027 | +166.6424 6.133058 | +0.36217 4.8695 | +0.122564 0.6307 | +0.8716 3.2702 |
| A FEV. 10 (OH) | Y: | +0.1773 | +0.00209 | + 54.1751 3.198194 | +0.11932 2.9099 | | +0.2742 0.3250 |
| FEV. 10 (OH) (2449393.5) | X: | -2.6743 | +0.80547 | +169.4935 0.648595 | +2.00895 5.7672 | +0.387520 2.8684 | +0.8919 4.9476 |
| A FEV. 14 (OH) | Y: | +0.1524 | +0.03579 | + 54.5616 3.990179 | +0.15270 3.8845 | | +0.2792 1.9744 |
| FEV. 14 (OH) (2449397.5) | X: | +0.4307 | -0.86128 | +168.9482 1.431973 | +1.99624 2.0013 | +0.347975 5.8981 | +0.8397 0.2847 |
| A FEV. 18 (OH) | Y: | +0.2566 | +0.00971 | + 55.1209 4.782421 | +0.13393 4.7525 | | +0.2783 3.5971 |
| FEV. 18 (OH) (2449401.5) | X: | -2.9881 | +0.75833 | +173.8930 2.216656 | +1.02614 5.3074 | +0.337271 2.6821 | +0.8316 1.8701 |
| A FEV. 22 (OH) | Y: | +0.2946 | +0.01590 | + 55.6592 5.576082 | +0.15273 5.5455 | | +0.2799 5.2374 |
| FEV. 22 (OH) (2449405.5) | X: | -0.0486 | -0.69616 | +175.1872 3.025444 | +1.83846 2.3037 | +0.313059 5.6847 | +0.8868 3.4550 |
| A FEV. 26 (OH) | Y: | +0.3676 | -0.00746 | + 56.2327 0.086327 | +0.16442 0.2458 | | +0.2850 0.5675 |
| FEV. 26 (OH) (2449409.5) | X: | -1.5076 | -0.12982 | +176.9566 3.811767 | +0.98277 3.7474 | +0.122547 0.8100 | +0.9038 5.1182 |
| A MAR. 2 (OH) | Y: | +0.3577 | +0.01606 | + 56.9092 0.881217 | +0.16178 0.9981 | | +0.2892 2.2216 |
| MAR. 2 (OH) (2449413.5) | X: | -3.5982 | +0.99649 | +177.3798 4.603730 | +2.38257 5.4607 | +0.479481 3.0282 | +0.9625 0.4484 |
| A MAR. 6 (OH) | Y: | +0.3943 | +0.02610 | + 57.5965 1.676776 | +0.16413 1.7984 | | +0.2923 3.8471 |

| COORDONNEES EQUATORIALES DIFFERENTIELLES DU SATELLITE 2 DE JUPITER: EUROPE | | | | | | | |
|---|----|---------|----------|-----------------------|--------------------|---------------------|-------------------|
| | | A0 | A1 | B0 F0 | B1 F1 | B2 F2 | CO PO |
| MAR. 6 (OH) (2449417.5) | X: | +0.4013 | -1.14562 | +182.9646 5.391209 | +1.78798 2.1697 | +0.500645 5.8856 | +0.9828 2.1547 |
| A MAR.10 (OH) | Y: | +0.5202 | -0.01819 | + 58.2938 2.473516 | +0.19852 2.5245 | | +0.2981 5.4962 |
| MAR.10 (OH) (2449421.5) | X: | -4.0460 | +0.94818 | +183.8824 6.209104 | +2.35673 5.3282 | +0.443105 2.4249 | +0.9566 3.8496 |
| A MAR.14 (OH) | Y: | +0.4683 | +0.02182 | + 58.9969 3.269058 | +0.22558 3.4886 | | +0.2985 0.8695 |
| MAR.14 (OH) (2449425.5) | X: | -1.4374 | -0.25370 | +184.7397 0.709443 | +1.10223 1.3528 | +0.120007 5.0826 | +0.9194 5.4439 |
| A MAR.18 (OH) | Y: | +0.5158 | +0.01556 | + 59.8305 4.066015 | +0.22091 4.3474 | | +0.3008 2.4922 |
| MAR.18 (OH) (2449429.5) | X: | -1.2654 | -0.50038 | +186.3892 1.507786 | +1.38806 2.2973 | +0.210124 6.1635 | +0.9203 0.8177 |
| A MAR.22 (OH) | Y: | +0.5798 | +0.01017 | + 60.6644 4.863601 | +0.22584 5.1798 | | +0.3044 4.1455 |
| MAR.22 (OH) (2449433.5) | X: | -3.6079 | +0.71073 | +190.0955 2.302075 | +0.94375 5.3744 | +0.314621 3.0281 | +0.9073 2.3903 |
| A MAR.26 (OH) | Y: | +0.6335 | +0.00493 | + 61.5153 5.661756 | +0.22841 6.0477 | | +0.3085 5.7662 |
| MAR.26 (OH) (2449437.5) | X: | -0.1423 | -1.11889 | +190.9716 3.118215 | +2.33190 2.4681 | +0.496239 5.9210 | +0.9480 3.9979 |
| A MAR.30 (OH) | Y: | +0.7016 | -0.01486 | + 62.3521 0.177141 | +0.24469 0.6119 | | +0.3111 1.1274 |
| MAR.30 (OH) (2449441.5) | X: | -5.0934 | +1.29341 | +189.9417 3.898040 | +3.18623 5.1924 | +0.599786 2.6178 | +1.0390 5.6670 |
| A AVR. 3 (OH) | Y: | +0.6053 | +0.04842 | + 63.3290 0.976923 | +0.18808 1.4068 | | +0.3221 2.7644 |
| AVR. 3 (OH) (2449445.5) | X: | -1.8425 | -0.23257 | +194.2897 4.704831 | +0.64358 0.8531 | +0.165615 4.9243 | +1.0056 1.0677 |
| A AVR. 7 (OH) | Y: | +0.7376 | +0.00163 | + 64.1006 1.777036 | +0.23213 2.1648 | | +0.3216 4.4197 |
| AVR. 7 (OH) (2449449.5) | X: | -1.0410 | -0.86424 | +196.0318 5.503853 | +1.41350 2.4021 | +0.418813 6.2558 | +1.0340 2.7336 |
| A AVR.11 (OH) | Y: | +0.8136 | -0.01590 | + 64.9279 2.577782 | +0.23507 2.8986 | | +0.3262 6.0617 |
| AVR.11 (OH) (2449453.5) | X: | -4.7456 | +1.07089 | +196.1613 0.038066 | +2.07264 5.6124 | +0.486743 2.7768 | +0.9910 4.4106 |
| A AVR.15 (OH) | Y: | +0.7513 | +0.02954 | + 65.7216 3.376689 | +0.25134 3.9280 | | +0.3272 1.4280 |
| AVR.15 (OH) (2449457.5) | X: | -0.4662 | -1.05670 | +194.6404 0.823286 | +2.60562 2.0731 | +0.444003 5.7391 | +0.9265 6.0576 |
| A AVR.19 (OH) | Y: | +0.8300 | +0.00429 | + 66.5500 4.177571 | +0.22580 4.7508 | | +0.3264 3.0790 |
| AVR.19 (OH) (2449461.5) | X: | -4.2625 | +0.75736 | +198.9141 1.628932 | +1.31674 4.9820 | +0.329291 2.6386 | +0.9325 1.3269 |
| A AVR.23 (OH) | Y: | +0.8406 | +0.01362 | + 67.2973 4.978596 | +0.21473 5.6099 | | +0.3288 4.7019 |
| AVR.23 (OH) (2449465.5) | X: | -2.1917 | -0.22420 | +197.5780 2.437411 | +0.54997 2.4361 | +0.144865 5.2096 | +0.9614 2.9870 |
| A AVR.27 (OH) | Y: | +0.9332 | -0.01492 | + 67.9815 5.773977 | +0.20996 0.2641 | | +0.3336 0.0732 |
| AVR.27 (OH) (2449469.5) | X: | -2.0297 | -0.47999 | +197.6988 3.240924 | +0.93026 3.4212 | +0.261606 0.3283 | +0.9846 4.6061 |
| A MAI 1 (OH) | Y: | +0.8918 | +0.01369 | + 68.6478 0.297678 | +0.16576 1.1016 | | +0.3361 1.7141 |
| MAI 1 (OH) (2449473.5) | X: | -4.9283 | +1.12585 | +196.0905 4.033660 | +2.65533 5.5272 | +0.500181 2.8648 | +1.0210 6.2730 |
| A MAI 5 (OH) | Y: | +0.8839 | +0.02390 | + 69.2085 1.098558 | +0.14714 2.0079 | | +0.3398 3.3580 |
| MAI 5 (OH) (2449477.5) | X: | +0.4969 | -1.58918 | +200.8588 4.837844 | +3.29291 2.0239 | +0.716163 5.7840 | +1.0491 1.7178 |
| A MAI 9 (OH) | Y: | +1.0261 | -0.03475 | + 69.5656 1.901114 | +0.15082 2.4659 | | +0.3446 5.0197 |

| 1994 | | COORDONNEES EQUATORIALES DIFFERENTIELLES DU SATELLITE 2 DE JUPITER: EUROPE | | | | | | N=1.7693 |
|-----------------------------|----|---|----------|-----------------------|--------------------|---------------------|-------------------|----------|
| | | A0 | A1 | B0 F0 | B1 F1 | B2 F2 | C0 P0 | |
| MAI 9 (OH) (2449481.5) | X: | -4.1564 | +0.61074 | +196.7396 5.653127 | +1.12641 5.2745 | +0.299348 2.3419 | +0.9555 3.3651 | |
| A MAI 13 (OH) | Y: | +0.9286 | +0.02394 | + 69.9703 2.699917 | +0.15205 3.7540 | | +0.3371 0.3733 | |
| MAI 13 (OH) (2449485.5) | X: | -3.2352 | +0.28964 | +196.2057 0.167362 | +0.55083 0.4959 | +0.188767 3.4127 | +0.9450 5.0165 | |
| A MAI 17 (OH) | Y: | +0.9536 | +0.02360 | + 70.2129 3.500521 | +0.14689 4.5873 | | +0.3385 2.0273 | |
| MAI 17 (OH) (2449489.5) | X: | -1.8060 | -0.51130 | +194.8560 0.964035 | +1.41331 2.6386 | +0.229529 6.0917 | +0.9050 0.3435 | |
| A MAI 21 (OH) | Y: | +1.0069 | -0.00393 | + 70.4709 4.300791 | +0.11422 5.7507 | | +0.3348 3.6558 | |
| MAI 21 (OH) (2449493.5) | X: | -4.5427 | +0.93342 | +196.3556 1.765712 | +1.90821 5.1723 | +0.386997 2.8280 | +0.8778 1.9530 | |
| A MAI 25 (OH) | Y: | +1.0039 | -0.00266 | + 70.5398 5.100695 | +0.10257 0.4056 | | +0.3326 5.3119 | |
| MAI 25 (OH) (2449497.5) | X: | -0.2520 | -1.24535 | +192.3628 2.581804 | +2.05457 2.3811 | +0.553374 5.9497 | +0.9466 3.5436 | |
| A MAI 29 (OH) | Y: | +1.0502 | -0.02299 | + 70.5386 5.899491 | +0.12043 1.5674 | | +0.3343 0.6498 | |
| MAI 29 (OH) (2449501.5) | X: | -4.2387 | +0.71923 | +191.2526 3.363178 | +1.98643 5.2972 | +0.333963 2.4488 | +0.9528 5.2540 | |
| A JUN. 2 (OH) | Y: | +0.9705 | +0.01818 | + 70.4773 0.416018 | +0.09525 2.8379 | | +0.3355 2.3151 | |
| JUN. 2 (OH) (2449505.5) | X: | -2.5092 | +0.05883 | +190.9843 4.169089 | +1.22584 0.7000 | +0.190876 4.2160 | +0.9470 0.6386 | |
| A JUN. 6 (OH) | Y: | +1.0212 | -0.00833 | + 70.2075 1.214589 | +0.08405 3.7547 | | +0.3313 3.9610 | |
| JUN. 6 (OH) (2449509.5) | X: | -1.0576 | -0.79425 | +190.4086 4.968223 | +1.86056 2.2220 | +0.367207 6.1225 | +0.9318 2.3039 | |
| A JUN. 10 (OH) | Y: | +1.0054 | -0.01317 | + 69.9137 2.012045 | +0.09215 4.6595 | | +0.3304 5.5973 | |
| JUN. 10 (OH) (2449513.5) | X: | -5.0020 | +1.22696 | +186.2797 5.781702 | +2.06203 5.3111 | +0.542334 2.6845 | +0.8814 4.0101 | |
| A JUN. 14 (OH) | Y: | +0.9187 | +0.03153 | + 69.4954 2.807726 | +0.12370 5.3257 | | +0.3240 0.9791 | |
| JUN. 14 (OH) (2449517.5) | X: | -0.8531 | -0.77597 | +184.5303 0.275097 | +1.93533 2.2977 | +0.339579 5.7162 | +0.8143 5.5793 | |
| A JUN. 18 (OH) | Y: | +0.9965 | -0.00737 | + 69.1174 3.604766 | +0.14471 0.2420 | | +0.3168 2.5953 | |
| JUN. 18 (OH) (2449521.5) | X: | -3.1857 | +0.37027 | +184.3025 1.080621 | +1.07020 4.6255 | +0.147899 2.3774 | +0.8242 0.9134 | |
| A JUN. 22 (OH) | Y: | +0.9763 | -0.01228 | + 68.5655 4.400238 | +0.15090 1.1094 | | +0.3137 4.2490 | |
| JUN. 22 (OH) (2449525.5) | X: | -2.0565 | -0.04703 | +181.4123 1.878268 | +0.18722 5.8193 | +0.101322 4.8472 | +0.8375 2.5258 | |
| A JUN. 26 (OH) | Y: | +0.9741 | -0.02826 | + 67.9984 5.194681 | +0.18813 1.9506 | | +0.3131 5.8723 | |
| JUN. 26 (OH) (2449529.5) | X: | -1.1972 | -0.54972 | +179.0875 2.676726 | +0.58141 2.4794 | +0.258128 6.2363 | +0.8333 4.1671 | |
| A JUN. 30 (OH) | Y: | +0.9147 | -0.00949 | + 67.3201 5.989263 | +0.18278 2.8718 | | +0.3066 1.2428 | |
| JUN. 30 (OH) (2449533.5) | X: | -4.7602 | +1.33477 | +176.5763 3.452676 | +2.89912 5.6156 | +0.599264 2.8182 | +0.8917 5.8283 | |
| A JUL. 4 (OH) | Y: | +0.8266 | +0.03089 | + 66.6758 0.500230 | +0.22649 3.6898 | | +0.3082 2.8736 | |
| JUL. 4 (OH) (2449537.5) | X: | -0.4106 | -0.77105 | +177.3196 4.262185 | +2.05784 1.9055 | +0.357045 5.7225 | +0.8322 1.2525 | |
| A JUL. 8 (OH) | Y: | +0.9012 | -0.02818 | + 65.8107 1.292601 | +0.18313 4.6412 | | +0.3007 4.5316 | |
| JUL. 8 (OH) (2449541.5) | X: | -2.5396 | +0.23597 | +173.1583 5.056520 | +0.50822 3.8321 | +0.155485 1.6805 | +0.7980 2.9005 | |
| A JUL. 12 (OH) | Y: | +0.8232 | -0.01167 | + 65.0206 2.084017 | +0.20113 5.4370 | | +0.2938 6.1709 | |

| COORDONNEES EQUATORIALES DIFFERENTIELLES DU SATELLITE 2 DE JUPITER: EUROPE N=1.7693 | | | | | | |
|---|----|---------|----------|-----------------------|--------------------|---------------------|
| | | A0 | A1 | B0 F0 | B1 F1 | B2 F2 |
| JUL.12 (OH) (2449545.5) | X: | -2.3022 | +0.28801 | +171.2840 5.846770 | +0.13605 5.0341 | +0.144490 3.2243 |
| A JUL.16 (OH) | Y: | +0.7590 | +0.00919 | + 64.2106 2.874874 | +0.22038 6.1958 | +0.2888 1.5141 |
| JUL.16 (OH) (2449549.5) | X: | -0.4255 | -0.65993 | +168.9964 0.345030 | +1.47632 2.6059 | +0.296715 5.9287 |
| A JUL.20 (OH) | Y: | +0.7848 | -0.01727 | + 63.3692 3.665649 | +0.23732 0.7939 | +0.2807 3.1672 |
| JUL.20 (OH) (2449553.5) | X: | -3.1756 | +0.80139 | +169.1684 1.145661 | +1.86136 5.2356 | +0.320965 2.8482 |
| A JUL.24 (OH) | Y: | +0.7389 | -0.01549 | + 62.4813 4.455595 | +0.24545 1.6111 | +0.2775 4.7828 |
| JUL.24 (OH) (2449557.5) | X: | -0.2413 | -0.58635 | +164.6765 1.936680 | +0.80408 2.0141 | +0.278049 5.7878 |
| A JUL.28 (OH) | Y: | +0.7041 | -0.02761 | + 61.5690 5.244269 | +0.25146 2.3830 | +0.2743 0.1431 |
| JUL.28 (OH) (2449561.5) | X: | -2.3443 | +0.42980 | +164.0125 2.714727 | +1.28360 5.3835 | +0.226889 2.2083 |
| A AOU. 1 (OH) | Y: | +0.5761 | +0.01702 | + 60.6742 6.034322 | +0.27400 3.3557 | +0.2721 1.7866 |
| AOU. 1 (OH) (2449565.5) | X: | -1.8709 | +0.36379 | +162.0922 3.505535 | +0.97290 0.1332 | +0.177258 3.2476 |
| A AOU. 5 (OH) | Y: | +0.5882 | -0.00421 | + 59.7031 0.538229 | +0.25754 4.0912 | +0.2647 3.4202 |
| AOU. 5 (OH) (2449569.5) | X: | +0.6970 | -0.92675 | +162.2671 4.300445 | +2.45029 2.1798 | +0.438069 5.9274 |
| A AOU. 9 (OH) | Y: | +0.6224 | -0.04490 | + 58.6876 1.325981 | +0.23149 4.9658 | +0.2629 5.0704 |
| AOU. 9 (OH) (2449573.5) | X: | -2.4466 | +0.71848 | +157.4974 5.088177 | +0.98825 5.0585 | +0.301638 2.6465 |
| A AOU. 13 (OH) | Y: | +0.4671 | +0.00355 | + 57.8135 2.111533 | +0.26310 5.6159 | +0.2532 0.4150 |
| AOU. 13 (OH) (2449577.5) | X: | -0.1882 | -0.28518 | +157.1301 5.864038 | +0.86557 2.4749 | +0.140165 5.4541 |
| A AOU. 17 (OH) | Y: | +0.4399 | -0.00594 | + 56.8500 2.898105 | +0.26149 0.1757 | +0.2486 2.0534 |
| AOU. 17 (OH) (2449581.5) | X: | -1.0922 | +0.14405 | +155.8802 0.372780 | +0.82726 4.4654 | +0.069412 2.0243 |
| A AOU. 21 (OH) | Y: | +0.4086 | -0.00674 | + 55.9058 3.684215 | +0.26756 0.9887 | +0.2438 3.6682 |
| AOU. 21 (OH) (2449585.5) | X: | -1.2404 | +0.34770 | +154.6124 1.157707 | +1.04810 5.4062 | +0.137266 3.1007 |
| A AOU. 25 (OH) | Y: | +0.3768 | -0.01634 | + 54.9541 4.469427 | +0.27030 1.7884 | +0.2397 5.3191 |
| AOU. 25 (OH) (2449589.5) | X: | +1.0295 | -0.78026 | +151.2697 1.944738 | +1.14501 2.2100 | +0.369456 6.0718 |
| A AOU. 29 (OH) | Y: | +0.3343 | -0.02470 | + 54.0173 5.254409 | +0.28148 2.5796 | +0.2367 0.6520 |
| AOU. 29 (OH) (2449593.5) | X: | -1.6393 | +0.65165 | +151.6852 2.715512 | +1.45500 5.6628 | +0.281749 2.6607 |
| A SEP. 2 (OH) | Y: | +0.2261 | +0.00581 | + 53.0607 6.039544 | +0.27637 3.4454 | +0.2336 2.3008 |
| SEP. 2 (OH) (2449597.5) | X: | +0.6471 | -0.35431 | +150.8600 3.512330 | +1.50495 1.6108 | +0.202716 5.2740 |
| A SEP. 6 (OH) | Y: | +0.2527 | -0.02416 | + 52.0634 0.540094 | +0.25368 4.2281 | +0.2276 3.9467 |
| SEP. 6 (OH) (2449601.5) | X: | +0.0936 | -0.12752 | +149.0921 4.291488 | +0.80367 2.4790 | +0.093460 0.2735 |
| A SEP. 10 (OH) | Y: | +0.1885 | -0.01587 | + 51.1559 1.323622 | +0.25969 4.9766 | +0.2230 5.5661 |
| SEP. 10 (OH) (2449605.5) | X: | -1.2314 | +0.66333 | +146.6924 5.076052 | +0.92562 5.0548 | +0.274733 2.7975 |
| A SEP. 14 (OH) | Y: | +0.1012 | -0.00023 | + 50.2414 2.106401 | +0.26490 5.7126 | +0.2183 0.9371 |

ÉPHÉMÉRIDES DES SATELLITES NATURELS

| COORDONNÉES EQUATORIALES DIFFÉRENTIELLES DU SATELLITE 2 DE JUPITER: EUROPE | | | | | | | N=1.7693 |
|---|----|---------|----------|-----------------------|--------------------|---------------------|-------------------|
| | | A0 | A1 | B0 FO | B1 F1 | B2 F2 | CO PO |
| SEP.14 (OH) (2449609.5) | X: | +1.2341 | -0.51737 | +147.1376 5.846865 | +1.20574 2.6738 | +0.233535 5.9132 | +0.6118 5.5005 |
| A SEP.18 (OH) | Y: | +0.0812 | -0.01181 | + 49.3253 2.890426 | +0.26821 0.2651 | | +0.2133 2.5429 |
| SEP.18 (OH) (2449613.5) | X: | -0.6791 | +0.48696 | +146.4269 0.358164 | +1.40267 5.0319 | +0.202677 2.6177 | +0.6271 0.8236 |
| A SEP.22 (OH) | Y: | +0.0245 | -0.00325 | + 48.3955 3.673203 | +0.26027 1.0490 | | +0.2095 4.1846 |
| SEP.22 (OH) (2449617.5) | X: | +1.1931 | -0.33972 | +144.1091 1.133038 | +0.42866 1.5692 | +0.189257 5.5451 | +0.6589 2.4526 |
| A SEP.26 (OH) | Y: | +0.0375 | -0.02747 | + 47.5301 4.456036 | +0.28040 1.8179 | | +0.2089 5.8065 |
| SEP.26 (OH) (2449621.5) | X: | +0.8607 | -0.18829 | +143.8270 1.914488 | +0.13565 0.9826 | +0.118249 0.2326 | +0.6485 4.0967 |
| A SEP.30 (OH) | Y: | -0.0489 | -0.00724 | + 46.5927 5.238937 | +0.26112 2.6462 | | +0.2034 1.1665 |
| SEP.30 (OH) (2449625.5) | X: | -0.9346 | +0.85278 | +144.1032 2.684968 | +1.73151 5.8089 | +0.376605 2.8697 | +0.6841 5.7511 |
| A OCT. 4 (OH) | Y: | -0.1209 | +0.00831 | + 45.7050 6.022232 | +0.26702 3.4998 | | +0.2019 2.7936 |
| OCT. 4 (OH) (2449629.5) | X: | +2.0724 | -0.61529 | +143.5051 3.483540 | +1.77846 2.0123 | +0.281220 5.8053 | +0.6448 1.1493 |
| A OCT. 8 (OH) | Y: | -0.0940 | -0.02182 | + 44.7789 0.520068 | +0.23657 4.1850 | | +0.1962 4.4386 |
| OCT. 8 (OH) (2449633.5) | X: | +0.0734 | +0.37418 | +141.3731 4.255038 | +0.49067 4.2980 | +0.158735 2.2758 | +0.6182 2.7763 |
| A OCT.12 (OH) | Y: | -0.1513 | -0.00940 | + 43.9306 1.302343 | +0.24629 4.9689 | | +0.1913 6.0734 |
| OCT. 12 (OH) (2449637.5) | X: | +1.1375 | -0.02504 | +141.9016 5.033440 | +0.47907 2.7005 | +0.057455 4.7283 | +0.6085 4.3554 |
| A OCT.16 (OH) | Y: | -0.1862 | -0.00738 | + 43.0756 2.084568 | +0.24886 5.7301 | | +0.1876 1.4055 |
| OCT. 16 (OH) (2449641.5) | X: | +1.7564 | -0.32467 | +141.6806 5.810512 | +0.82942 3.1202 | +0.154978 6.1394 | +0.6007 5.9909 |
| A OCT.20 (OH) | Y: | -0.2222 | -0.00910 | + 42.2197 2.866871 | +0.24791 0.2439 | | +0.1841 3.0510 |
| OCT. 20 (OH) (2449645.5) | X: | -0.1048 | +0.71152 | +141.5171 0.319800 | +1.75763 5.3454 | +0.299231 2.9369 | +0.6177 1.2560 |
| A OCT.24 (OH) | Y: | -0.2512 | -0.00595 | + 41.3689 3.649137 | +0.24613 1.0104 | | +0.1811 4.6626 |
| OCT. 24 (OH) (2449649.5) | X: | +2.5361 | -0.59464 | +139.5475 1.087592 | +0.79775 1.9246 | +0.270733 5.8205 | +0.6510 2.9222 |
| A OCT.28 (OH) | Y: | -0.2641 | -0.00970 | + 40.5345 4.431193 | +0.24601 1.7859 | | +0.1791 0.0187 |
| OCT. 28 (OH) (2449653.5) | X: | +0.2109 | +0.54062 | +141.6096 1.864413 | +1.39954 5.4367 | +0.255571 2.3250 | +0.6691 4.5986 |
| A NOV. 1 (OH) | Y: | -0.3324 | +0.01191 | + 39.6719 5.214949 | +0.23684 2.6725 | | +0.1775 1.6609 |
| NOV. 1 (OH) (2449657.5) | X: | +1.2986 | +0.15279 | +140.7067 2.648197 | +0.77084 0.6636 | +0.091621 3.6120 | +0.6447 6.2259 |
| A NOV. 5 (OH) | Y: | -0.3155 | -0.00728 | + 38.8489 5.995911 | +0.22733 3.3429 | | +0.1715 3.2835 |
| NOV. 5 (OH) (2449661.5) | X: | +2.9449 | -0.69109 | +140.8839 3.437231 | +1.92964 2.2127 | +0.318478 5.9869 | +0.6534 1.6244 |
| A NOV. 9 (OH) | Y: | -0.3109 | -0.02082 | + 37.9945 0.495140 | +0.20754 4.1106 | | +0.1701 4.9329 |
| NOV. 9 (OH) (2449665.5) | X: | +0.3998 | +0.62923 | +139.2920 4.203363 | +0.78889 5.0833 | +0.265563 2.7583 | +0.6049 3.2213 |
| A NOV.13 (OH) | Y: | -0.3674 | +0.00297 | + 37.2415 1.277753 | +0.22848 4.8518 | | +0.1642 0.2667 |
| NOV.13 (OH) (2449669.5) | X: | +2.8257 | -0.53414 | +141.6212 4.981427 | +1.32740 2.5013 | +0.239319 5.7458 | +0.6014 4.8005 |
| A NOV.17 (OH) | Y: | -0.3620 | -0.00600 | + 36.4259 2.061168 | +0.21921 5.6634 | | +0.1612 1.9031 |

1994

COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 2 DE JUPITER: EUROPE

N=1.7693

| | | AO | A1 | B0 F0 | B1 F1 | B2 F2 | CO PO |
|----------------------------|----|---------|----------|-----------------------|--------------------|---------------------|-------------------|
| NOV.17 (OH) (2449673.5) | X: | +0.8700 | +0.42581 | +140.5823 5.771102 | +1.31147 4.8349 | +0.189786 2.4667 | +0.6385 0.1004 |
| A NOV.21 (OH) | Y: | -0.3909 | +0.00089 | + 35.6354 2.843992 | +0.21780 0.1061 | | +0.1595 3.5125 |
| NOV.21 (OH) (2449677.5) | X: | +1.5727 | +0.18965 | +140.9522 0.262426 | +0.80847 5.5782 | +0.108012 3.5300 | +0.6420 1.7481 |
| A NOV.25 (OH) | Y: | -0.3957 | -0.00238 | + 34.8564 3.627788 | +0.21566 0.9089 | | +0.1566 5.1591 |
| NOV.25 (OH) (2449681.5) | X: | +3.3990 | -0.80237 | +140.0495 1.034044 | +1.10640 2.2727 | +0.371705 6.1069 | +0.6878 3.3594 |
| A NOV.29 (OH) | Y: | -0.3953 | -0.00477 | + 34.0828 4.411888 | +0.21671 1.6927 | | +0.1539 0.4976 |
| NOV.29 (OH) (2449685.5) | X: | +0.3609 | +0.76569 | +143.2535 1.814299 | +1.72946 5.6613 | +0.335508 2.7165 | +0.6903 5.0604 |
| A DEC. 3 (OH) | Y: | -0.4236 | +0.01223 | + 33.2964 5.196477 | +0.19906 2.5013 | | +0.1524 2.1398 |
| DEC. 3 (OH) (2449689.5) | X: | +3.1900 | -0.56209 | +141.9528 2.607415 | +1.76117 1.7425 | +0.258924 5.5287 | +0.6651 0.4413 |
| A DEC. 7 (OH) | Y: | -0.3855 | -0.01007 | + 32.5238 5.979922 | +0.18923 3.1847 | | +0.1474 3.7868 |
| DEC. 7 (OH) (2449693.5) | X: | +1.6131 | +0.14934 | +142.5047 3.374988 | +0.28088 3.0120 | +0.087101 1.9080 | +0.6424 2.0228 |
| A DEC.11 (OH) | Y: | -0.4072 | -0.00226 | + 31.8021 0.481933 | +0.19411 3.9487 | | +0.1439 5.4009 |
| DEC.11 (OH) (2449697.5) | X: | +1.3345 | +0.36378 | +142.8766 4.153888 | +0.32183 4.8164 | +0.165204 3.0371 | +0.6437 3.6639 |
| A DEC.15 (OH) | Y: | -0.4192 | +0.00617 | + 31.0715 1.267422 | +0.19267 4.7181 | | +0.1414 0.7675 |
| DEC.15 (OH) (2449701.5) | X: | +3.2593 | -0.67420 | +145.4388 4.934012 | +1.52198 2.7484 | +0.294314 6.0898 | +0.6372 5.2077 |
| A DEC.19 (OH) | Y: | -0.3967 | -0.00073 | + 30.3443 2.053731 | +0.18809 5.4911 | | +0.1385 2.3755 |
| DEC.19 (OH) (2449705.5) | X: | +0.4631 | +0.75987 | +144.3449 5.726180 | +1.95689 5.1516 | +0.333628 2.7276 | +0.6827 0.5365 |
| A DEC.23 (OH) | Y: | -0.4043 | +0.00406 | + 29.6262 2.840057 | +0.18083 6.2410 | | +0.1364 4.0141 |
| DEC.23 (OH) (2449709.5) | X: | +3.6723 | -0.77592 | +145.0645 0.202237 | +1.19049 1.9892 | +0.366285 5.6588 | +0.7371 2.1971 |
| A DEC.27 (OH) | Y: | -0.3681 | -0.01429 | + 28.9593 3.628011 | +0.19321 0.7855 | | +0.1361 5.6408 |
| DEC.27 (OH) (2449713.5) | X: | +1.8997 | -0.01065 | +147.0279 0.992494 | +0.46685 5.4706 | +0.086786 1.1346 | +0.7147 3.8523 |
| A DEC.31 (OH) | Y: | -0.4050 | +0.01067 | + 28.2296 4.415642 | +0.16556 1.5262 | | +0.1314 1.0066 |
| DEC.31 (OH) (2449717.5) | X: | +0.5987 | +0.71744 | +149.1643 1.772528 | +1.68242 5.9190 | +0.344352 2.9470 | +0.7475 5.5093 |
| A JAN. 4 (OH) | Y: | -0.4014 | +0.01655 | + 27.5501 5.204635 | +0.15648 2.3347 | | +0.1301 2.6398 |

1994

COORDONNEES EQUATORIALES DIFFÉRENTIELLES

DU SATELLITE 3 DE JUPITER: GANYMEDE

N=0.8782

| | | A0 | A1 | B0 F0 | B1 F1 | B2 F2 | C0 P0 |
|-----------------------------|----|---------|----------|-----------------------|--------------------|---------------------|-------------------|
| JAN. 1 (OH) (2449353.5) | X: | -0.2337 | -0.02211 | +237.5195 4.301519 | +0.92484 3.4736 | +0.010316 5.8246 | +0.1217 1.2111 |
| A JAN. 10 (OH) | Y: | +0.2007 | -0.01060 | + 84.9669 1.320582 | +0.17012 0.0501 | | +0.0413 4.4634 |
| JAN. 10 (OH) (2449362.5) | X: | -0.1769 | -0.02517 | +243.4342 5.699407 | +0.84163 5.2671 | +0.006709 5.7190 | +0.0999 4.1576 |
| A JAN. 19 (OH) | Y: | +0.1497 | -0.00322 | + 85.4065 2.924460 | +0.16071 1.8767 | | +0.0359 1.2609 |
| JAN. 19 (OH) (2449371.5) | X: | -0.3916 | +0.01734 | +250.0874 1.218687 | +0.92670 0.5916 | +0.011137 2.6741 | +0.1206 0.9432 |
| A JAN. 28 (OH) | Y: | +0.0902 | +0.01331 | + 86.0896 4.531385 | +0.17088 3.7979 | | +0.0431 4.3068 |
| JAN. 28 (OH) (2449380.5) | X: | -0.6994 | +0.07504 | +257.0638 2.821878 | +0.73961 2.4988 | +0.018442 2.4913 | +0.1389 4.3078 |
| A FEV. 6 (OH) | Y: | +0.1441 | +0.00720 | + 87.1927 6.140895 | +0.17761 5.6334 | | +0.0432 1.2456 |
| FEV. 6 (OH) (2449389.5) | X: | -0.2662 | -0.00766 | +264.5642 4.432291 | +0.90941 4.0443 | +0.012083 6.0570 | +0.1178 1.4661 |
| A FEV. 15 (OH) | Y: | +0.2169 | -0.01553 | + 88.5551 1.470655 | +0.21575 1.2206 | | +0.0369 4.7618 |
| FEV. 15 (OH) (2449398.5) | X: | +0.0181 | -0.04674 | +272.1327 6.043635 | +0.81755 5.9951 | +0.009351 5.6696 | +0.0678 4.7726 |
| A FEV. 24 (OH) | Y: | +0.1360 | -0.00627 | + 90.3942 3.086447 | +0.24299 3.0168 | | +0.0264 1.8911 |
| FEV. 24 (OH) (2449407.5) | X: | -0.4552 | +0.06710 | +280.2933 1.378394 | +0.71440 1.1834 | +0.024247 2.4863 | +0.0442 1.0818 |
| A MAR. 5 (OH) | Y: | +0.0173 | +0.01785 | + 92.5172 4.706577 | +0.29535 4.7367 | | +0.0200 4.4806 |
| MAR. 5 (OH) (2449416.5) | X: | +0.0743 | -0.06060 | +287.6074 3.000577 | +0.90794 2.9801 | +0.021751 5.3663 | +0.0673 3.8628 |
| A MAR. 14 (OH) | Y: | +0.1326 | -0.00237 | + 95.0787 0.045377 | +0.32607 0.2293 | | +0.0260 0.9036 |
| MAR. 14 (OH) (2449425.5) | X: | -0.3731 | +0.02956 | +294.6390 4.625282 | +0.88552 4.9387 | +0.010443 1.3884 | +0.0986 0.9404 |
| A MAR. 23 (OH) | Y: | +0.1499 | -0.00554 | + 97.9343 1.671662 | +0.35621 1.9298 | | +0.0335 4.2478 |
| MAR. 23 (OH) (2449434.5) | X: | -0.4277 | +0.04067 | +301.2917 6.285409 | +0.78819 0.3587 | +0.019790 2.4211 | +0.1008 4.4528 |
| A AVR. 1 (OH) | Y: | +0.0965 | +0.00805 | +100.9566 3.300471 | +0.38181 3.6591 | | +0.0310 1.5052 |
| AVR. 1 (OH) (2449443.5) | X: | -0.2204 | +0.00105 | +306.8317 1.604838 | +0.75304 2.4277 | +0.004043 4.7392 | +0.0747 1.4223 |
| A AVR. 10 (OH) | Y: | +0.1271 | -0.00013 | +104.1402 4.932512 | +0.37530 5.3687 | | +0.0260 4.7197 |
| AVR. 10 (OH) (2449452.5) | X: | +0.1512 | -0.05958 | +311.1554 3.242676 | +0.61469 4.0374 | +0.028174 5.6839 | +0.0606 3.9925 |
| A AVR. 19 (OH) | Y: | +0.1616 | -0.01734 | +107.1526 0.283070 | +0.37138 0.8355 | | +0.0249 1.2380 |
| AVR. 19 (OH) (2449461.5) | X: | -0.1897 | +0.01913 | +313.5563 4.880574 | +0.77480 6.1115 | +0.016647 2.1470 | +0.1147 0.7309 |
| A AVR. 28 (OH) | Y: | +0.0007 | +0.01778 | +109.9829 1.918412 | +0.32791 2.6269 | | +0.0435 4.0786 |
| AVR. 28 (OH) (2449470.5) | X: | -0.5846 | +0.07953 | +314.9698 0.239014 | +0.46463 1.8725 | +0.026582 2.4369 | +0.1636 4.2049 |
| A MAI 7 (OH) | Y: | +0.0705 | +0.01295 | +112.2359 3.555388 | +0.28251 4.3812 | | +0.0540 1.1432 |

| 1994 | COORDONNEES EQUATORIALES DIFFERENTIELLES DU SATELLITE 3 DE JUPITER: GANYMEDE | | | | | | N=0.8782 |
|-----------------------------|---|----------|-----------------------|--------------------|---------------------|-------------------|----------|
| | A0 | A1 | B0 FO | B1 F1 | B2 F2 | CO PO | |
| MAI 7 (OH) (2449479.5) | X: +0.0371 | -0.06877 | +313.6125 1.878774 | +0.71448 3.4955 | +0.027595 5.4673 | +0.1670 1.3579 | |
| A MAI 16 (OH) | Y: +0.2447 | -0.02338 | +113.9552 5.190988 | +0.23242 0.0756 | | +0.0544 4.6557 | |
| MAI 16 (OH) (2449488.5) | X: -0.2068 | -0.00780 | +311.4615 3.518175 | +0.70734 5.6360 | +0.010133 0.5971 | +0.1344 4.7270 | |
| A MAI 25 (OH) | Y: +0.1080 | -0.00039 | +114.8817 0.543953 | +0.17554 2.0665 | | +0.0530 1.8904 | |
| MAI 25 (OH) (2449497.5) | X: -0.3839 | +0.04536 | +307.2866 5.156136 | +0.69363 1.0799 | +0.020331 2.6265 | +0.1130 1.4908 | |
| A JUN. 3 (OH) | Y: +0.0174 | +0.02200 | +114.9744 2.176935 | +0.17705 4.2139 | | +0.0486 4.8473 | |
| JUN. 3 (OH) (2449506.5) | X: -0.0176 | -0.03262 | +302.2573 0.507267 | +0.86109 3.0120 | +0.015351 5.4925 | +0.1324 4.5487 | |
| A JUN. 12 (OH) | Y: +0.1565 | -0.01196 | +114.3624 3.808772 | +0.19196 0.1308 | | +0.0534 1.5221 | |
| JUN. 12 (OH) (2449515.5) | X: -0.1781 | -0.00058 | +296.1782 2.139354 | +0.78020 4.9091 | +0.006308 0.0159 | +0.1658 1.5464 | |
| A JUN. 21 (OH) | Y: +0.1591 | -0.01603 | +112.9364 5.436356 | +0.23561 2.0056 | | +0.0608 4.8124 | |
| JUN. 21 (OH) (2449524.5) | X: -0.3118 | +0.01015 | +289.3417 3.766754 | +0.78839 0.3554 | +0.013233 2.1122 | +0.1894 4.9800 | |
| A JUN. 30 (OH) | Y: +0.0354 | +0.01662 | +111.0016 0.778056 | +0.28887 3.8872 | | +0.0721 2.0590 | |
| JUN. 30 (OH) (2449533.5) | X: -0.2767 | -0.01386 | +282.3814 5.390591 | +0.83676 2.2809 | +0.003936 5.3095 | +0.1773 2.1161 | |
| A JUL. 9 (OH) | Y: +0.1205 | +0.00689 | +108.4455 2.399063 | +0.31867 5.6416 | | +0.0683 5.4018 | |
| JUL. 9 (OH) (2449542.5) | X: -0.0117 | -0.05476 | +274.8757 0.725990 | +0.71346 3.8314 | +0.022193 5.3623 | +0.1462 5.4236 | |
| A JUL. 18 (OH) | Y: +0.2018 | -0.01506 | +105.6632 4.016278 | +0.36889 1.0801 | | +0.0573 2.3280 | |
| JUL. 18 (OH) (2449551.5) | X: -0.3783 | +0.03540 | +268.2103 2.341074 | +0.86661 5.7406 | +0.009724 1.9952 | +0.1325 2.1661 | |
| A JUL. 27 (OH) | Y: +0.1210 | -0.00486 | +102.4883 5.630138 | +0.38462 2.7794 | | +0.0506 5.4274 | |
| JUL. 27 (OH) (2449560.5) | X: -0.4542 | +0.04785 | +261.0596 3.952100 | +0.67755 1.1556 | +0.017631 2.2939 | +0.1653 5.2347 | |
| A AOU. 5 (OH) | Y: +0.0572 | +0.00903 | + 99.2122 0.957199 | +0.40745 4.4481 | | +0.0606 2.3094 | |
| AOU. 5 (OH) (2449569.5) | X: +0.0418 | -0.07722 | +255.1884 5.558547 | +0.92208 2.8323 | +0.021576 5.3907 | +0.1894 2.2747 | |
| A AOU. 14 (OH) | Y: +0.1314 | -0.00134 | + 95.8149 2.564847 | +0.42090 6.1251 | | +0.0676 5.6092 | |
| AOU. 14 (OH) (2449578.5) | X: -0.3426 | -0.00345 | +249.1472 0.880246 | +0.79941 4.7400 | +0.002165 5.6150 | +0.1880 5.6704 | |
| A AOU. 23 (OH) | Y: +0.1510 | -0.00052 | + 92.3878 4.168894 | +0.42682 1.4683 | | +0.0678 2.6688 | |
| AOU. 23 (OH) (2449587.5) | X: -0.3590 | -0.00407 | +243.8433 2.480844 | +0.79767 0.1623 | +0.003539 1.2740 | +0.1667 2.7397 | |
| A SEP. 1 (OH) | Y: +0.1485 | -0.00006 | + 88.9545 5.771037 | +0.42866 3.1105 | | +0.0594 6.0380 | |
| SEP. 1 (OH) (2449596.5) | X: -0.2060 | -0.03219 | +239.2690 4.078896 | +0.89575 1.8888 | +0.008316 5.3461 | +0.1406 5.9655 | |
| A SEP. 10 (OH) | Y: +0.1596 | -0.00521 | + 85.5336 1.087710 | +0.42316 4.7994 | | +0.0515 2.9444 | |

| 1994 | | COORDONNÉES EQUATORIALES DIFFÉRENTIELLES DU SATELLITE 3 DE JUPITER: GANYMEDE | | | | | | N=0.8782 |
|-----------------------------|------------|---|-----------------------|--------------------|---------------------|-------------------|--|----------|
| A0 | A1 | B0 F0 | B1 F1 | B2 F2 | C0 P0 | | | |
| SEP. 10 (OH) (2449605.5) | X: -0.3884 | +0.02281 | +234.9685 5.673954 | +0.76862 3.5948 | +0.006991 3.7123 | +0.1364 2.7679 | | |
| A SEP. 19 (OH) | Y: +0.1281 | -0.00193 | + 82.2153 2.685711 | +0.42521 0.0633 | | +0.0497 6.0683 | | |
| SEP. 19 (OH) (2449614.5) | X: -0.4947 | +0.02969 | +231.7266 0.983998 | +0.90175 5.2247 | +0.009166 1.9854 | +0.1625 5.8906 | | |
| A SEP. 28 (OH) | Y: +0.1080 | +0.00533 | + 78.9146 4.282388 | +0.41438 1.6762 | | +0.0539 2.9558 | | |
| SEP. 28 (OH) (2449623.5) | X: -0.4268 | -0.00328 | +228.6254 2.574846 | +0.77902 0.6511 | +0.004837 1.3482 | +0.1854 2.9873 | | |
| A OCT. 7 (OH) | Y: +0.1479 | +0.00104 | + 75.7058 5.877752 | +0.40743 3.2701 | | +0.0597 0.0154 | | |
| OCT. 7 (OH) (2449632.5) | X: -0.1608 | -0.06451 | +226.7784 4.165066 | +0.96722 2.2179 | +0.017745 5.0334 | +0.1815 0.1118 | | |
| A OCT. 16 (OH) | Y: +0.1968 | -0.00757 | + 72.5317 1.189748 | +0.39467 4.8808 | | +0.0548 3.3712 | | |
| OCT. 16 (OH) (2449641.5) | X: -0.5190 | +0.01926 | +224.7631 5.753760 | +0.83642 4.0515 | +0.002477 2.7302 | +0.1600 3.3898 | | |
| A OCT. 25 (OH) | Y: +0.1374 | +0.00189 | + 69.4783 2.783596 | +0.38432 0.1614 | | +0.0475 0.4221 | | |
| OCT. 25 (OH) (2449650.5) | X: -0.4194 | +0.00365 | +223.7854 1.057911 | +0.82879 5.6678 | +0.002930 0.6823 | +0.1379 0.2564 | | |
| A NOV. 3 (OH) | Y: +0.1263 | +0.00224 | + 66.4770 4.378257 | +0.37373 1.7527 | | +0.0404 3.6073 | | |
| NOV. 3 (OH) (2449659.5) | X: -0.2547 | -0.02909 | +223.3156 2.645570 | +0.89548 1.1136 | +0.004741 5.0706 | +0.1410 3.3208 | | |
| A NOV. 12 (OH) | Y: +0.1415 | -0.00200 | + 63.5263 5.972743 | +0.35802 3.3233 | | +0.0419 0.3920 | | |
| NOV. 12 (OH) (2449668.5) | X: -0.6785 | +0.05266 | +223.2991 4.231202 | +0.74048 2.8332 | +0.015355 2.6708 | +0.1582 0.2344 | | |
| A NOV. 21 (OH) | Y: +0.1520 | -0.00362 | + 60.6721 1.285227 | +0.34661 4.9001 | | +0.0418 3.6340 | | |
| NOV. 21 (OH) (2449677.5) | X: -0.4699 | -0.00767 | +224.3758 5.818008 | +0.86964 4.3737 | +0.003701 0.0521 | +0.1754 3.6159 | | |
| A NOV. 30 (OH) | Y: +0.1203 | +0.00412 | + 57.8721 2.881261 | +0.32966 0.1681 | | +0.0421 0.7376 | | |
| NOV. 30 (OH) (2449686.5) | X: -0.3755 | -0.02238 | +225.5906 1.121309 | +0.82999 6.1361 | +0.007347 5.6670 | +0.1677 0.7642 | | |
| A DEC. 9 (OH) | Y: +0.1312 | +0.00222 | + 55.1564 4.479497 | +0.31539 1.7367 | | +0.0421 0.7376 | | |
| DEC. 9 (OH) (2449695.5) | X: -0.5449 | +0.03445 | +227.8404 2.708206 | +0.85371 1.3479 | +0.011877 2.9228 | +0.1432 4.0765 | | |
| A DEC. 18 (OH) | Y: +0.1404 | -0.00230 | + 52.5136 6.079387 | +0.29912 3.2953 | | +0.0335 1.0551 | | |
| DEC. 18 (OH) (2449704.5) | X: -0.4763 | +0.01954 | +230.2763 4.296482 | +0.90045 3.1648 | +0.003986 1.8094 | +0.1217 0.9197 | | |
| A DEC. 27 (OH) | Y: +0.1357 | -0.00689 | + 49.9675 1.398495 | +0.28099 4.8479 | | +0.0262 4.2747 | | |
| DEC. 27 (OH) (2449713.5) | X: -0.2731 | -0.02712 | +233.6423 5.884787 | +0.85703 4.7422 | +0.007601 5.8303 | +0.1303 3.9609 | | |
| A JAN. 5 (OH) | Y: +0.0910 | +0.00161 | + 47.5260 3.003248 | +0.26287 0.1069 | | +0.0252 1.2083 | | |

1994

COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 4 DE JUPITER: CALLISTO

N=0.3765

| | | AO | A1 | B0 F0 | B1 F1 | CO PO |
|----------------------------|----|----------|-----------|-----------------------|---------------------|-------------------|
| JAN. 1 (OH) (2449353.5) | X: | - 1.5802 | - 0.40471 | +415.9087 1.825630 | + 1.58179 1.2787 | +1.8735 1.2825 |
| A JAN.11 (OH) | Y: | + 0.2328 | + 0.16688 | +146.9357 5.130799 | + 0.26364 4.2832 | +0.6651 4.6178 |
| JAN.11 (OH) (2449363.5) | X: | - 3.7927 | + 0.01128 | +429.8042 5.565456 | + 1.54640 4.9887 | +1.9558 2.3450 |
| A JAN.21 (OH) | Y: | + 1.0540 | + 0.02917 | +148.8037 2.592165 | + 0.26533 1.5232 | +0.6772 5.6683 |
| JAN.21 (OH) (2449373.5) | X: | - 4.1984 | + 0.10178 | +443.6016 3.027071 | + 1.56196 2.4383 | +1.8641 3.6637 |
| A JAN.31 (OH) | Y: | + 1.0849 | - 0.01580 | +150.3703 0.060021 | + 0.30193 5.4651 | +0.6335 0.7127 |
| JAN.31 (OH) (2449383.5) | X: | - 5.2181 | + 0.18973 | +457.2393 0.495045 | + 1.72994 0.0577 | +2.1496 4.8315 |
| A FEV.10 (OH) | Y: | + 1.9882 | - 0.14001 | +152.6075 3.817935 | + 0.42707 3.2157 | +0.7180 1.8929 |
| FEV.10 (OH) (2449393.5) | X: | - 5.4148 | + 0.02717 | +470.3449 4.245253 | + 1.77496 4.0829 | +2.1347 6.0288 |
| A FEV.20 (OH) | Y: | + 1.5467 | + 0.00142 | +154.9453 1.267423 | + 0.46523 1.1312 | +0.7056 3.0611 |
| FEV.20 (OH) (2449403.5) | X: | - 1.1462 | - 0.59732 | +483.3960 1.718311 | + 1.83391 1.8762 | +2.2471 1.1070 |
| A MAR. 2 (OH) | Y: | + 0.3214 | + 0.16300 | +158.1602 5.047878 | + 0.57490 5.1833 | +0.7399 4.4516 |
| MAR. 2 (OH) (2449413.5) | X: | - 5.3808 | + 0.22724 | +500.7246 5.481578 | + 1.61587 5.7487 | +2.3877 2.2152 |
| A MAR.12 (OH) | Y: | + 1.3188 | + 0.00351 | +163.7820 2.528449 | + 0.53777 2.7160 | +0.7853 5.5324 |
| MAR.12 (OH) (2449423.5) | X: | - 5.2906 | + 0.05807 | +516.3926 2.967084 | + 1.37646 3.3372 | +2.2548 3.5561 |
| A MAR.22 (OH) | Y: | + 1.2269 | + 0.01065 | +169.1637 0.016652 | + 0.60072 0.2009 | +0.7512 0.5972 |
| MAR.22 (OH) (2449433.5) | X: | - 5.3699 | + 0.16703 | +529.3382 0.460502 | + 1.36589 0.9525 | +2.6706 4.7632 |
| A AVR. 1 (OH) | Y: | + 2.0568 | - 0.12575 | +175.1995 3.793568 | + 0.66238 3.9669 | +0.8871 1.8078 |
| AVR. 1 (OH) (2449443.5) | X: | - 7.5736 | + 0.34833 | +537.9416 4.234377 | + 1.64846 5.1581 | +2.5489 6.0097 |
| A AVR.11 (OH) | Y: | + 2.3269 | - 0.11638 | +180.1457 1.281033 | + 0.77099 1.7952 | +0.8660 3.0268 |
| AVR.11 (OH) (2449453.5) | X: | - 0.0099 | - 0.95915 | +542.9419 1.733321 | + 2.02643 2.8600 | +2.7161 1.1129 |
| A AVR.21 (OH) | Y: | - 0.0519 | + 0.30471 | +185.1554 5.061514 | + 0.85458 5.7067 | +0.9359 4.4248 |
| AVR.21 (OH) (2449463.5) | X: | - 4.0183 | + 0.07185 | +552.8757 5.518759 | + 1.50966 0.8164 | +2.7353 2.2826 |
| A MAI 1 (OH) | Y: | + 0.9350 | + 0.02375 | +192.2964 2.557402 | + 0.57560 3.4599 | +0.9663 5.5856 |
| MAI 1 (OH) (2449473.5) | X: | - 7.7322 | + 0.47366 | +555.2254 3.020085 | + 1.55649 5.0254 | +2.5035 3.6247 |
| A MAI 11 (OH) | Y: | + 2.3519 | - 0.13202 | +196.5075 0.055941 | + 0.45988 1.2324 | +0.8917 0.6361 |
| MAI 11 (OH) (2449483.5) | X: | - 5.3656 | + 0.13499 | +551.7160 0.530310 | + 1.17609 2.6627 | +2.8645 4.8860 |
| A MAI 21 (OH) | Y: | + 1.7014 | - 0.05080 | +199.2346 3.843845 | + 0.29985 5.0518 | +1.0526 1.8999 |

1994

COORDONNÉES EQUATORIALES DIFFÉRENTIELLES

DU SATELLITE 4 DE JUPITER: CALLISTO

N=0.3765

| | | A0 | A1 | B0 FO | B1 F1 | CO PO |
|-----------------------------|----|----------|-----------|-----------------------|---------------------|-------------------|
| MAI 21 (OH) (2449493.5) | X: | - 5.9773 | + 0.31704 | +543.8591 4.311422 | + 1.53118 0.2719 | +2.5435 6.0958 |
| A MAI 31 (OH) | Y: | + 2.3596 | - 0.18821 | +199.2453 1.336151 | + 0.42491 3.0194 | +0.9363 3.1042 |
| MAI 31 (OH) (2449503.5) | X: | - 0.7866 | - 0.80660 | +531.3036 1.810122 | + 1.59160 3.9603 | +2.6986 1.2378 |
| A JUN. 10 (OH) | Y: | + 0.0160 | + 0.33407 | +197.5737 5.115308 | + 0.44522 0.5902 | +1.0173 4.5230 |
| JUN. 10 (OH) (2449513.5) | X: | - 2.2756 | - 0.24022 | +525.6237 5.588633 | + 1.68379 2.1358 | +2.5014 2.3733 |
| A JUN. 20 (OH) | Y: | + 0.4791 | + 0.10247 | +197.6122 2.604627 | + 0.50931 5.4100 | +0.9495 5.6747 |
| JUN. 20 (OH) (2449523.5) | X: | - 7.0378 | + 0.63137 | +513.3687 3.076248 | + 1.94676 6.0799 | +2.2714 3.7169 |
| A JUN. 30 (OH) | Y: | + 2.4525 | - 0.21965 | +194.0790 0.089640 | + 0.65926 3.0971 | +0.8560 0.7182 |
| JUN. 30 (OH) (2449533.5) | X: | - 5.7883 | + 0.27793 | +498.1630 0.570760 | + 1.39481 3.9449 | +2.4356 4.9473 |
| A JUL. 10 (OH) | Y: | + 1.8636 | - 0.09870 | +189.0633 3.864165 | + 0.55368 0.9806 | +0.9364 1.9558 |
| JUL. 10 (OH) (2449543.5) | X: | - 3.2851 | - 0.07398 | +483.6613 4.331620 | + 1.44356 1.4742 | +2.1302 6.1114 |
| A JUL. 20 (OH) | Y: | + 1.3613 | - 0.02657 | +183.1089 1.339131 | + 0.62155 4.6881 | +0.8027 3.1237 |
| JUL. 20 (OH) (2449553.5) | X: | - 1.2199 | - 0.54959 | +466.5942 1.803637 | + 1.11478 5.0568 | +2.2097 1.2315 |
| A JUL. 30 (OH) | Y: | + 0.1452 | + 0.24244 | +175.7668 5.094547 | + 0.53634 2.0123 | +0.3391 4.5218 |
| JUL. 30 (OH) (2449563.5) | X: | - 3.1771 | - 0.06900 | +457.0060 5.558043 | + 1.48992 2.9103 | +2.0318 2.3089 |
| A AOU. 9 (OH) | Y: | + 0.9839 | + 0.02227 | +170.7767 2.564421 | + 0.73558 6.0429 | +0.7598 5.6169 |
| AOU. 9 (OH) (2449573.5) | X: | - 5.4242 | + 0.43115 | +446.3263 3.020911 | + 1.74849 0.4240 | +1.8606 3.6393 |
| A AOU. 19 (OH) | Y: | + 1.8091 | - 0.14137 | +164.5551 0.027610 | + 0.84446 3.5135 | +0.6811 0.6564 |
| AOU. 19 (OH) (2449583.5) | X: | - 5.1205 | + 0.23255 | +434.0041 0.489448 | + 1.51155 4.5573 | +1.9768 4.8214 |
| A AOU. 29 (OH) | Y: | + 1.7044 | - 0.10799 | +157.5230 3.780989 | + 0.73926 1.2201 | +0.7225 1.8450 |
| AOU. 29 (OH) (2449593.5) | X: | - 2.7052 | - 0.19504 | +424.2483 4.229686 | + 1.52891 2.1123 | +1.7615 5.9739 |
| A SEP. 8 (OH) | Y: | + 0.9938 | + 0.04197 | +150.8191 1.238684 | + 0.74942 4.9378 | +0.6199 3.0110 |
| SEP. 8 (OH) (2449603.5) | X: | - 1.5277 | - 0.42795 | +413.1756 1.679602 | + 1.07943 5.8202 | +1.8180 1.0546 |
| A SEP. 18 (OH) | Y: | + 0.1609 | + 0.18763 | +143.1484 4.975467 | + 0.60238 2.2275 | +0.6308 4.3733 |
| SEP. 18 (OH) (2449613.5) | X: | - 4.1113 | + 0.10643 | +407.8188 5.416581 | + 1.34393 3.4324 | +1.7108 2.1082 |
| A SEP. 28 (OH) | Y: | + 1.3258 | - 0.05081 | +137.5324 2.432883 | + 0.69051 6.1021 | +0.5738 5.4431 |
| SEP. 28 (OH) (2449623.5) | X: | - 5.0926 | + 0.33399 | +404.3094 2.863542 | + 1.61356 0.8034 | +1.5939 3.4233 |
| A OCT. 8 (OH) | Y: | + 1.4622 | - 0.08629 | +131.8806 6.166705 | + 0.78077 3.5048 | +0.5134 0.4786 |

1994

COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 4 DE JUPITER: CALLISTO

N=0.3765

| | | A0 | A1 | B0 F0 | B1 F1 | C0 P0 |
|-----------------------------|----|----------|-----------|-----------------------|---------------------|-------------------|
| OCT. 8 (OH) (2449633.5) | X: | - 4.4588 | + 0.09983 | +398.5681 0.315613 | + 1.53707 4.8375 | +1.7144 4.5774 |
| A OCT. 18 (OH) | Y: | + 1.4404 | - 0.08717 | +125.3770 3.626022 | + 0.67566 1.1148 | +0.5415 1.6411 |
| OCT. 18 (OH) (2449643.5) | X: | - 2.7348 | - 0.23297 | +395.5891 4.046336 | + 1.63925 2.4200 | +1.5710 5.7330 |
| A OCT. 28 (OH) | Y: | + 0.8259 | + 0.05897 | +119.4692 1.077586 | + 0.67442 4.8284 | +0.4665 2.8190 |
| OCT. 28 (OH) (2449653.5) | X: | - 2.1946 | - 0.32814 | +392.0332 1.485601 | + 1.23072 6.2033 | +1.6324 0.7831 |
| A NOV. 7 (OH) | Y: | + 0.2061 | + 0.13880 | +112.7741 4.807688 | + 0.54649 2.0626 | +0.4660 4.1567 |
| NOV. 7 (OH) (2449663.5) | X: | - 4.9278 | + 0.21118 | +392.0477 5.214890 | + 1.37174 3.7727 | +1.5778 1.8332 |
| A NOV. 17 (OH) | Y: | + 1.3748 | - 0.07582 | +107.4915 2.263602 | + 0.56556 5.8868 | +0.4279 5.2205 |
| NOV. 17 (OH) (2449673.5) | X: | - 5.3474 | + 0.30226 | +395.8167 2.657007 | + 1.60045 1.0464 | +1.4992 3.1439 |
| A NOV. 27 (OH) | Y: | + 1.1748 | - 0.05299 | +102.6151 5.997442 | + 0.63899 3.2760 | +0.3815 0.2665 |
| NOV. 27 (OH) (2449683.5) | X: | - 4.1314 | - 0.03224 | +396.7610 0.102800 | + 1.57060 5.0024 | +1.6350 4.2815 |
| A DEC. 7 (OH) | Y: | + 1.2178 | - 0.07026 | + 96.9051 3.458403 | + 0.53608 0.8159 | +0.3992 1.4165 |
| DEC. 7 (OH) (2449693.5) | X: | - 2.9159 | - 0.27359 | +400.1071 3.833869 | + 1.79433 2.6104 | +1.5464 5.4528 |
| A DEC. 17 (OH) | Y: | + 0.6257 | + 0.06417 | + 91.8406 0.916131 | + 0.52422 4.5330 | +0.3467 2.6145 |
| DEC. 17 (OH) (2449703.5) | X: | - 3.0880 | - 0.22934 | +403.9047 1.272962 | + 1.44153 0.1522 | +1.6214 0.4817 |
| A DEC. 27 (OH) | Y: | + 0.2832 | + 0.08265 | + 86.2139 4.652956 | + 0.44140 1.7167 | +0.3402 3.9458 |
| DEC. 27 (OH) (2449713.5) | X: | - 5.9371 | + 0.29796 | +409.4144 5.003114 | + 1.50359 4.0539 | +1.6123 1.5386 |
| A JAN. 6 (OH) | Y: | + 1.1681 | - 0.05962 | + 81.6120 2.119448 | + 0.42046 5.5002 | +0.3163 5.0133 |

PHÉNOMÈNES DES SATELLITES GALILÉENS

DESCRIPTION

Les satellites galiléens, dont les orbites sont faiblement inclinées sur l'équateur et sur l'écliptique, présentent de nombreux phénomènes. Au cours de chaque révolution, les trois premiers satellites, et en général le quatrième satellite, traversent le cône de visibilité et le cône d'ombre qui s'appuient sur la planète. On peut alors observer les passages des satellites devant Jupiter et les occultations par Jupiter lors de la traversée du cône de visibilité, ou les éclipses ou les passages d'ombre sur la planète lors de la traversée du cône d'ombre. Au cours d'une année, environ 3 000 tels événements (passages début ou fin, éclipses début ou fin, occultations début ou fin, passages d'ombre début ou fin) sont calculables (mais environ 2 200 seulement sont observables). Nous donnons ici une représentation compacte de ces prédictions utilisant un développement polynômial.

MÉTHODE DE CALCUL

Les tables des pages 53 et 54 permettent de calculer les dates en TDT des phénomènes des satellites galiléens de la manière suivante.

Soit P la période synodique moyenne d'un satellite ; la date approchée $T1$ du phénomène proche de la date T est donnée par la relation :

$$T1 = K \times P + \tau/24 + T0 \quad (2)$$

où K représente la partie entière de la quantité $(T - T0)/P$ et où τ est donné, sur l'intervalle $T0$, $T0 + DT$ par un polynôme de la forme :

$$\tau = C0 + C1 x + C2 x^2 + \dots + Cn x^n \quad (3)$$

$$\text{avec } x = \{2(T - T0)/DT\} - 1 \quad (4)$$

$T1$ ayant été obtenu par la relation (2), on peut réitérer le calcul en substituant $T1$ à T dans la formule (4) pour obtenir une date $T2$ plus proche du phénomène recherché que $T1$. La précision de ce type de prédiction est meilleure que 60 secondes de temps.

Les tables donnent les coefficients Ci de la formule (3), numérotés de $C0$ à CII pour les quatre satellites et pour les phénomènes :

- débuts et fins des éclipses des satellites par Jupiter (notées respectivement EC.D et EC.F),
- débuts et fins des occultations des satellites par Jupiter (notées OC.D et OC.F),
- débuts et fins des passages de l'ombre des satellites sur le disque de Jupiter (OM.D et OM.F),
- débuts et fins des passages des satellites devant la planète (PA.D et PA.F).

EXEMPLE D'UTILISATION

Déterminons les dates des phénomènes du satellite I (Io) au voisinage du 30 juin 1994.

PHENOMENA OF THE GALILEAN SATELLITES

DESCRIPTION

The Galilean satellites which orbits have low inclinations upon the equator and the ecliptic, display many phenomena. During each revolution, the first three satellites and, often the fourth one, pass through the visibility and shadow cones which are tangent to the planet. It is then possible to observe the transits of the satellites across Jupiter and their occultations by Jupiter when they pass through the visibility cone, or the eclipses and the shadow transits when the shadow cone is involved. In the course of a year 3 000 such events may be computed (transits ingress and egress, eclipses disappearance and reappearance, occultations disappearance and reappearance, transits of the shadow ingress and egress). Only about 2 200 are observable. A compact representation of these predictions using a polynomial approximation is given here.

COMPUTATIONAL METHOD

The tables on p. 53 and 54 permit the computation of the dates in TDT of phenomena of the satellites of Jupiter in the following way.

Let P be the mean synodic period of a satellite ; the approximate date $T1$ of a phenomenon close to a date T is given by :

$$T1 = K \times P + \tau/24 + T0 \quad (2)$$

where K is the integer part of $(T - T0)/P$ and where τ is given (on the interval $T0$, $T0 + DT$) by a polynomial :

$$\tau = C0 + C1 x + C2 x^2 + \dots + Cn x^n \quad (3)$$

$$\text{with } x = \{2(T - T0)/DT\} - 1 \quad (4)$$

The value $T1$ deduced from equation (2) is then substituted in place of T in equation (4). The new iteration yields a date $T2$ closer to the date of the phenomenon than $T1$. The precision of this type of prediction is better than 60 seconds of time. The tables give the coefficients Ci in formula (3), numbered from $C0$ to CII , for the four satellites and for the following phenomena :

- disappearance and reappearance of the satellites eclipsed by Jupiter (denoted respectively by EC.D and EC.F),
- disappearance and reappearance of the satellites occulted by Jupiter (denoted OC.D and OC.F),
- ingress and egress of the transits of the satellites shadow across the disc of Jupiter (OM.D and OM.F),
- ingress and egress of the satellites transits across the planet (PA.D and PA.F).

EXAMPLE

Let us find the dates of the phenomena of satellite I (Io) which takes place near the 30th of June 1994.

Voyons tout d'abord le calcul pour le début d'occultation pour lequel les tables donnent :

$$T_0 = 0 ; P = 1,769\,860\,5 ; DT = 366$$

Du 0 janvier au 30 juin 1994, 181 jours se sont écoulés, on a donc :

$T = 181$ et la formule (4) donne alors :

$$x = 2(181 - 0)/366 - 1 = -0,010\,928\,962$$

La formule (3) donne ensuite :

$$\begin{aligned} \tau = & 35.044\,215 & + 0.300\,267 & x \\ & - 0.116\,584 & x^4 & + 0.351\,586 & x^5 \\ & + 0.083\,503 & x^8 & - 0.337\,294 & x^9 \end{aligned}$$

$$\begin{aligned} & + 0.421\,772 & x^2 & - 0.703\,349 & x^3 \\ & - 0.143\,326 & x^6 & + 0.138\,360 & x^7 \\ & - 0.004\,582 & x^{10} & + 0.148\,354 & x^{11} \end{aligned}$$

d'où $\tau = 35,040\,984\,7$

On a d'autre part :

$$\begin{aligned} K &= \text{partie entière de} \\ (181 - 0)/1,769\,860\,5 &= 102 \end{aligned}$$

La formule (2) donne alors :

$$T_1 = 102 \times 1,769\,860\,5 + 35,040\,984\,7/24 + 0$$

$T_1 = 181,985\,812$ jours depuis le 0 janvier (début de l'intervalle pour les occultations) soit EC.D le 30 juin 1994 à 23 h 39 m 34 s TDT. Le calcul réitéré donne $T_2 = 181,985\,877\,8$ jours soit le 30 juin 1994 à 23 h 39 m 39 s TDT.

On trouverait de même pour les autres phénomènes :

| | |
|------|-----------------------------|
| PA.D | le 30 juin à 1 h 23 m 23 s |
| OM.D | le 30 juin à 2 h 30 m 47 s |
| PA.F | le 30 juin à 3 h 32 m 22 s |
| OM.F | le 30 juin à 4 h 39 m 26 s |
| OC.D | le 30 juin à 22 h 30 m 45 s |
| OC.F | le 1 juil. à 0 h 41 m 17 s |
| EC.F | le 1 juil. à 1 h 49 m 52 s |

IMPORTANT : Conditions d'existence des phénomènes

Le recouvrement des cônes d'ombre et de visibilité, rend inexistants certains phénomènes. Ainsi, avant (ou après) l'opposition de Jupiter, les fins (respectivement débuts) d'éclipses et les débuts (respectivement fins) d'occultations sont inobservables. Ceci ne pouvant être pris en compte dans la représentation, il est nécessaire que l'utilisateur vérifie les conditions d'existence pour les éclipses et les occultations en calculant les quatre phases EC.D, EC.F, OC.D et OC.F. Ainsi, dans l'exemple précédent, on a dans l'ordre chronologique :

| | |
|------|--|
| OC.D | le 30 juin à 22 h 30 m 45 s observable |
| EC.D | le 30 juin à 23 h 39 m 34 s inobservable car déjà occulté |
| OC.F | le 1 juil. à 0 h 41 m 17 s inobservable car éclipsé |
| EC.F | le 1 juil. à 1 h 49 m 52 s observable. |

D'autre part, les caractéristiques de l'orbite du satellite IV (Callisto) font qu'il n'existe pas toujours de phénomènes. Les coefficients relatifs à ce satellite ne sont donc donnés que sur l'intervalle où ils existent.

Let us start with the computation of the disappearance for the occultation of the satellite for which the tables give :

$$T_0 = 0 ; P = 1,769\,860\,5 ; DT = 366$$

Between January 0 to June the 30 th 1994, 181 days have elapsed

$T = 181$ and formula (4) gives :

$$x = 2(181 - 0)/366 - 1 = -0,010\,928\,962$$

Formula (3) then gives :

$$\begin{aligned} & + 0.421\,772 & x^2 & - 0.703\,349 & x^3 \\ & - 0.143\,326 & x^6 & + 0.138\,360 & x^7 \\ & - 0.004\,582 & x^{10} & + 0.148\,354 & x^{11} \end{aligned}$$

therefore $\tau = 35,040\,984\,7$

On the other hand,

$$\begin{aligned} K &= \text{integer part of} \\ (181 - 0)/1,769\,860\,5 &= 102 \end{aligned}$$

Formula (2) then gives :

$$T_1 = 102 \times 1,769\,860\,5 + 35,040\,984\,7/24 + 0$$

$T_1 = 181,985\,812$ days from January 0 (beginning of the interval for the occultations) that is June the 30th 1994 at 23 h 39 m 34 s TDT. Another iteration gives $T_2 = 181,985\,877\,8$ days that is June the 30th 1994 at 23 h 39 m 39 s TDT.

One would find as well for the other phenomena :

| | |
|------|---------------------------------|
| PA.D | the June 30th at 1 h 23 m 23 s |
| OM.D | the June 30th at 2 h 30 m 47 s |
| PA.F | the June 30th at 3 h 32 m 22 s |
| OM.F | the June 30th at 4 h 39 m 26 s |
| OC.D | the June 30th at 22 h 30 m 45 s |
| OC.F | the July 1st at 0 h 41 m 17 s |
| EC.F | the July 1st at 1 h 49 m 52 s |

IMPORTANT : Conditions for the existence of the phenomena

As the visibility and shadow cones may sometimes overlap, some of the computed phenomena may not exist. Thus, before (or after) the opposition of Jupiter, the reappearances (respectively the disappearances) for the eclipses, and the disappearances (respectively reappearances) for the occultations are not observable. This could not be taken into account in the representation ; so the user will have to check the existence conditions of the eclipses and occultations by computing the four steps EC.D, EC.F, OC.D and OC.F For instance, in the example above one has, in chronological order :

| | |
|------|---|
| OC.D | June 30th at 22 h 30 m 45 s observable |
| EC.D | June 30th at 23 h 39 m 34 s unobservable as occulted |
| OC.F | July 1st at 0 h 41 m 17 s unobservable as eclipsed |
| EC.F | July 1st at 1 h 49 m 52 s observable. |

Moreover, the orbit of satellite IV (Callisto) is such that phenomena are not always present. The coefficients for this satellite are given on the interval for which they exist.

| Année | 1994 | Satellite | 1 | P = 1.7698605 | jours | T0 = 0.0 | DT | = 366. jours |
|-------|------------|-----------|------------|---------------|------------|----------|------------|--------------|
| | | EC.D | | EC.F | | OM.D | | OM.F |
| O | 35.044215 | O | 37.216016 | O | 13.895868 | O | 16.039398 | |
| 1 | 0.300267 | 1 | 0.312311 | 1 | 0.124244 | 1 | 0.061501 | |
| 2 | 0.421772 | 2 | 0.415487 | 2 | 0.088967 | 2 | 0.238300 | |
| 3 | -0.703349 | 3 | -0.707526 | 3 | -0.479764 | 3 | -0.207509 | |
| 4 | -0.116584 | 4 | -0.120108 | 4 | 0.342851 | 4 | -0.200093 | |
| 5 | 0.351586 | 5 | 0.305662 | 5 | -0.018027 | 5 | -0.351530 | |
| 6 | -0.143326 | 6 | -0.125009 | 6 | -0.823748 | 6 | 0.142969 | |
| 7 | 0.138360 | 7 | 0.234506 | 7 | 0.760120 | 7 | 0.780781 | |
| 8 | 0.083503 | 8 | 0.070275 | 8 | 0.683609 | 8 | -0.119832 | |
| 9 | -0.337294 | 9 | -0.422426 | 9 | -0.791985 | 9 | -0.594416 | |
| 10 | -0.004582 | 10 | -0.001711 | 10 | -0.207456 | 10 | 0.045927 | |
| 11 | 0.148354 | 11 | 0.176599 | 11 | 0.265425 | 11 | 0.170129 | |
| | | OC.D | | OC.F | | PA.D | | PA.F |
| O | 33.877602 | O | 36.054202 | O | 12.754145 | O | 14.903951 | |
| 1 | -1.428028 | 1 | -1.338734 | 1 | -1.499611 | 1 | -1.489332 | |
| 2 | 6.495966 | 2 | 6.396046 | 2 | 6.072863 | 2 | 6.101557 | |
| 3 | -0.684506 | 3 | -0.827324 | 3 | -1.120798 | 3 | -0.935487 | |
| 4 | -7.905656 | 4 | -7.606159 | 4 | -7.306318 | 4 | -7.459856 | |
| 5 | 7.168219 | 5 | 7.167040 | 5 | 8.563016 | 5 | 8.070227 | |
| 6 | 5.527180 | 6 | 5.087439 | 6 | 4.661812 | 6 | 5.059327 | |
| 7 | -10.521510 | 7 | -10.306328 | 7 | -12.368913 | 7 | -11.853473 | |
| 8 | -2.146773 | 8 | -1.814366 | 8 | -1.354311 | 8 | -1.745963 | |
| 9 | 7.086956 | 9 | 6.857250 | 9 | 8.382997 | 9 | 8.112492 | |
| 10 | 0.320623 | 10 | 0.220645 | 10 | 0.034254 | 10 | 0.170336 | |
| 11 | -1.895076 | 11 | -1.817369 | 11 | -2.272296 | 11 | -2.213289 | |

| Année | 1994 | Satellite | 2 | P = 3.5540942 | jours | T0 = 0.0 | DT = 366. | jours |
|-------|------------|-----------|------------|---------------|------------|----------|------------|-------|
| | | EC.D | | EC.F | | OM.D | | OM.F |
| 0 | 33.040517 | 0 | 35.406568 | 0 | 75.301583 | 0 | 77.658843 | |
| 1 | -0.342235 | 1 | -0.327495 | 1 | 0.521236 | 1 | 0.530947 | |
| 2 | -0.353779 | 2 | -0.308241 | 2 | 0.878268 | 2 | 1.025763 | |
| 3 | -0.193871 | 3 | -0.157249 | 3 | -1.255104 | 3 | -1.001018 | |
| 4 | 0.197539 | 4 | 0.252173 | 4 | 0.154756 | 4 | -0.423948 | |
| 5 | 0.472346 | 5 | 0.372620 | 5 | 0.972188 | 5 | 0.605954 | |
| 6 | 0.062049 | 6 | -0.125107 | 6 | -1.554962 | 6 | -0.473316 | |
| 7 | -0.587637 | 7 | -0.307647 | 7 | -1.024982 | 7 | -0.950567 | |
| 8 | -0.227461 | 8 | 0.021433 | 8 | 1.642677 | 8 | 0.730531 | |
| 9 | 0.428546 | 9 | 0.070804 | 9 | 1.002321 | 9 | 1.149810 | |
| 10 | 0.120267 | 10 | 0.006636 | 10 | -0.594251 | 10 | -0.304176 | |
| 11 | -0.131943 | 11 | 0.025910 | 11 | -0.406780 | 11 | -0.482211 | |
| | | OC.D | | OC.F | | PA.D | | PA.F |
| 0 | 30.738231 | 0 | 33.106459 | 0 | 72.964219 | 0 | 75.320032 | |
| 1 | -3.693120 | 1 | -3.414823 | 1 | -3.031602 | 1 | -2.748246 | |
| 2 | 11.833213 | 2 | 11.517307 | 2 | 13.097743 | 2 | 12.931441 | |
| 3 | -0.990960 | 3 | -1.363655 | 3 | -1.088970 | 3 | -1.311219 | |
| 4 | -15.414044 | 4 | -14.029399 | 4 | -15.865226 | 4 | -15.161592 | |
| 5 | 15.612593 | 5 | 15.258557 | 5 | 15.349786 | 5 | 14.851571 | |
| 6 | 11.292179 | 6 | 9.102278 | 6 | 10.533927 | 6 | 9.518023 | |
| 7 | -23.164456 | 7 | -21.568472 | 7 | -24.313163 | 7 | -22.997949 | |
| 8 | -4.481591 | 8 | -2.778956 | 8 | -3.349504 | 8 | -2.622956 | |
| 9 | 15.794668 | 9 | 14.114277 | 9 | 17.585224 | 9 | 16.379633 | |
| 10 | 0.671216 | 10 | 0.148306 | 10 | 0.191427 | 10 | -0.015042 | |
| 11 | -4.290294 | 11 | -3.695953 | 11 | -5.031935 | 11 | -4.632942 | |

| Année | 1994 | Satellite | 3 | P = 7.1663872 | jours | T0 = 0.0 | DT = 366. | jours |
|-------|------------|-----------|------------|---------------|------------|----------|------------|-------|
| | | EC.D | | EC.F | | OM.D | | OM.F |
| O | 71.685565 | O | 73.745439 | O | 157.640619 | O | 159.666385 | |
| 1 | -0.124599 | 1 | -0.247552 | 1 | -0.220436 | 1 | -0.380057 | |
| 2 | 0.396422 | 2 | 0.536898 | 2 | 0.075673 | 2 | 0.324115 | |
| 3 | -0.652139 | 3 | -0.644068 | 3 | -0.425431 | 3 | -0.211909 | |
| 4 | -0.721677 | 4 | -0.773203 | 4 | 0.801708 | 4 | 0.250814 | |
| 5 | 0.302048 | 5 | 0.325140 | 5 | -0.452422 | 5 | -0.603207 | |
| 6 | 1.923840 | 6 | 1.992555 | 6 | -2.367433 | 6 | -1.372510 | |
| 7 | 0.212199 | 7 | 0.162151 | 7 | 1.761035 | 7 | 1.488541 | |
| 8 | -2.529310 | 8 | -2.576944 | 8 | 2.605715 | 8 | 1.780825 | |
| 9 | -0.390215 | 9 | -0.326890 | 9 | -1.751031 | 9 | -1.336656 | |
| 10 | 1.104233 | 10 | 1.116538 | 10 | -1.013895 | 10 | -0.756255 | |
| 11 | 0.156379 | 11 | 0.125379 | 11 | 0.591183 | 11 | 0.439653 | |
| | | OC.D | | OC.F | | PA.D | | PA.F |
| O | 66.931625 | O | 69.127749 | O | 152.889333 | O | 155.050576 | |
| 1 | -7.480653 | 1 | -6.363749 | 1 | -7.523163 | 1 | -6.435869 | |
| 2 | 25.821871 | 2 | 23.730335 | 2 | 25.546478 | 2 | 23.473177 | |
| 3 | -1.001438 | 3 | -1.594965 | 3 | -1.435934 | 3 | -1.594609 | |
| 4 | -34.547865 | 4 | -28.250387 | 4 | -33.238726 | 4 | -27.019578 | |
| 5 | 31.514635 | 5 | 25.533619 | 5 | 32.927951 | 5 | 25.643664 | |
| 6 | 27.552531 | 6 | 19.513140 | 6 | 23.656295 | 6 | 15.815263 | |
| 7 | -49.414030 | 7 | -36.281596 | 7 | -51.168218 | 7 | -36.139240 | |
| 8 | -12.994317 | 8 | -7.978767 | 8 | -8.172425 | 8 | -3.373320 | |
| 9 | 34.759678 | 9 | 23.686201 | 9 | 35.900995 | 9 | 23.380426 | |
| 10 | 2.699708 | 10 | 1.467795 | 10 | 0.674463 | 10 | -0.474738 | |
| 11 | -9.628548 | 11 | -6.214239 | 11 | -9.957414 | 11 | -6.089650 | |

TO = O CORRESPOND AU O JANVIER 1994 à O H SOIT LA DATE JULIENNE 2449352.5

SATELLITES DE SATURNE

SATELLITES OF SATURN

DONNÉES SUR LES SATELLITES DE SATURNE

DATA ON THE SATELLITES OF SATURN

| NOM | masse | rayon | période rotation sidérale | albédo géométrique | magnitude visuelle | période orbitale | élongation maximale | 1/2 grand axe | excentricité | inclinaison sur l'équateur de Saturne |
|-------------------|------------------------|-----------------|---------------------------------|-----------------------|-----------------------|---------------------|------------------------|---------------------|--------------|---|
| unité → | masse de Saturne | km | jour | | | jour | (') ('") | 10^3 km | | degré |
| I Mimas | 6.5×10^{-8} | 199 | (S) | 0.53 | 12.9 | 0.942 421 95 | 30 | 184.85 | 0.0191 | 1.56 |
| II Enceladus | 2.1×10^{-7} | 251 | (S) | 0.99 | 11.7 | 1.370 218 081 | 38 | 237.39 | 0.0049 | 0.026 |
| III Tethys | 1.09×10^{-6} | 524 | (S) | 0.88 | 10.2 | 1.887 802 524 | 48 | 293.99 | 0. | 1.098 |
| IV Dione | 1.95×10^{-6} | 559 | (S) | 0.65 | 10.4 | 2.736 915 55 | 1 01 | 376.37 | 0.00216 | 0.014 |
| V Rhea | 4.1×10^{-6} | 764 | (S) | 0.67 | 9.7 | 4.517 502 66 | 1 25 | 525.58 | 0.000 27 (6) | 0.347 |
| VI Titan | 2.367×10^{-4} | 2 575 | (S) | 0.21 | 8.28 | 15.945 446 3 | 3 17 | 1 217.66 | 0.029 09 | 0.30 |
| VII Hyperion | $3. \times 10^{-8}$ | 370 x 280 x 225 | | 0.3 | 14.19 | 21.276 673 3 | 3 59 | 1 476.0 | 0.103 46 | 0.644 |
| VIII Iapetus | 2.8×10^{-6} | 718 | (S) | 0.5-0.05 | 11.2 | 79.330 954 | 9 34 | 3 549.77 | 0.028 30 | 18.460 (1) |
| IX Phœbe | $7. \times 10^{-10}$ | 221 x 212 | 0.4 | 0.06 | 16.45 | (R) 550.48 | 34 51 | 12 952. | 0.163 2 | 177. (1) |
| X Janus (5) | | 110 x 100 x 80 | (S) | 0.4 | 14. | 0.694 5 | 24 | 151.472 | 0.007 | 0.14 |
| XI Epimetheus (5) | | 70 x 60 x 50 | (S) | 0.4 | 15. | 0.694 2 | 24 | 151.422 | 0.009 | 0.34 |
| XII Hélène (2) | | 18 x 16 x 15 | | 0.5 | 17. | 2.736 9 | 1 01 | 377.40 | 0.005 | 0.2 |
| XIII Telesto (3) | | 17 x 14 x 13 | | 0.6 | 18. | 1.887 8 | 48 | 294.66 | | |
| XIV Calypso (3) | | 17 x 11 x 11 | | 0.8 | 18.5 | 1.887 8 | 48 | 294.66 | | |
| XV Atlas | | 20 x 10 | | 0.4 | 18. | 0.601 9 | 22 | 137.670 | | 0.3 |
| XVI Prométhée (4) | | 70 x 11 x 40 | | 0.6 | 15. | 0.613 0 | 23 | 139.353 | | 0. |
| XVII Pandora (4) | | 55 x 45 x 35 | | 0.6 | 15.5 | 0.628 5 | 23 | 141.700 | 0.004 | 0.1 |

| NAME | mass | radius | sidereal period | geometrical albedo | visual magnitude | orbital period | greatest elongation | semi major axis | eccentricity | inclination on Saturn's equator |
|--------|------------------|--------|--------------------|-----------------------|---------------------|-------------------|------------------------|-----------------------|--------------|---------------------------------------|
| unit → | Saturn's mass | km | day | | | day | (') ('") | 10^3 km | | degree |

NOTES

(S) : révolution synchrone

(R) : révolution rétrograde

(1) : inclinaison par rapport à l'écliptique.

Les éphémérides de Phœbe sont données sous la forme de coefficients de Tchébycheff dans le « *Supplément à la Connaissance des Temps : Satellites faibles...* »

(2) : Hélène : même orbite que Dioné

(3) : Telesto et Calypso : même orbite que Téthys

(4) : satellites coorbitaux « gardiens » de l'anneau F

(5) : Janus et Epimetheus : même orbite

(6) : excentricité propre. L'excentricité forcée due à Titan est de 0,0010

(S) : synchronous revolution

(R) : retrograde revolution

(1) : inclination on the ecliptic.

The ephemerides of Phœbe are given as Chebychev coefficients in the « *Supplément à la Connaissance des Temps : Faint Satellites...* »

(2) : Helene : same orbit as Dione

(3) : Telesto and Calypso : same orbit as Tethys

(4) : satellites on the same orbit « shepherding » F ring

(5) : Janus and Epimetheus : same orbit

(6) : proper eccentricity. The forced eccentricity due to Titan is 0.0010

ÉPHÉMÉRIDES DES HUIT PREMIERS SATELLITES DE SATURNE

EPHEMERIDES OF THE FIRST EIGHT SATELLITES OF SATURN

Coordonnées différentielles tangentielles données en secondes de degré dans le repère équatorial moyen J2000. On a, au premier ordre (voir note) :

Differential tangential coordinates given in arcsecond in the mean equatorial frame J2000. We have, at the first order (cf. note) :

$$\begin{aligned}\Delta\alpha \cos \delta &= X \\ \Delta\delta &= Y\end{aligned}$$

$$\begin{matrix} X \\ Y \end{matrix} = A0 + A1 \cdot t + B0 \sin(Nt + F0) + B1 \cdot t \sin(Nt + F1) + B2 \cdot t^2 \sin(Nt + F2) + C0 \sin(2Nt + P0)$$

où $t = T - T_0$ avec T_0 date du début de l'intervalle et T date du calcul

where $t = T - T_0$ with T_0 date of the beginning of the interval and T the date for the calculation

| satellite | intervalle Δt (jours) | N (rad/j) | page |
|---------------|-------------------------------------|----------------|------|
| Mimas | 4 | 6.667 0 | 58 |
| Encelade | 16 | 4.586 0 | 64 |
| Téthys | 16 | 3.328 0 | 66 |
| Dioné | 16 | 2.296 0 | 68 |
| Rhéa | 16 | 1.391 0 | 70 |
| Titan | 11 | 0.394 0 | 72 |
| Hypérion | 8 | 0.394 0 | 75 |
| Japet | 16 | 0.079 0 | 78 |
| <i>(days)</i> | | <i>(rad/d)</i> | |

Note : le premier ordre n'est pas suffisant lorsque le satellite s'éloigne beaucoup de la planète (tel Japet). On a alors :

Note : the first order is not sufficient for satellite with large elongation (such as Iapetus). So, we have then :

$$\begin{aligned}\Delta\alpha \cos \delta - \Delta\alpha \Delta\delta \sin \delta &= X \\ \Delta\delta + \frac{(\Delta\alpha)^2}{2} \sin \delta \cos \delta &= Y\end{aligned}$$

ou bien :

or :

$$\begin{aligned}\Delta\alpha \cos \delta &= X + XY \operatorname{tg} \delta \\ \Delta\delta &= Y - \frac{X^2}{2} \operatorname{tg} \delta\end{aligned}$$

ÉPHÉMÉRIDES DES SATELLITES NATURELS

| 1994 COORDONNEES EQUATORIALES DIFFERENTIELLES DU SATELLITE 1 DE SATURNE: MIMAS N=6.667 | | | | | | |
|--|----|---------|----------|-----------------------|--------------------|---------------------|
| | | A0 | A1 | B0 FO | B1 F1 | B2 F2 |
| JAN. 1 (OH) (2449353.6) | X: | +0.6974 | -0.00053 | +24.4507 3.445623 | +0.06001 1.4320 | +0.001089 5.4779 |
| A JAN. 5 (OH) | Y: | -0.0538 | -0.00216 | + 5.2746 5.387651 | +0.01574 2.9931 | +0.000210 1.8784 |
| JAN. 5 (OH) (2449357.6) | X: | +0.6956 | -0.00229 | +24.3381 4.972470 | +0.05269 3.0069 | +0.001199 2.2745 |
| A JAN. 9 (OH) | Y: | -0.0624 | -0.00191 | + 5.2262 0.631765 | +0.01501 4.4345 | +0.000045 5.0076 |
| JAN. 9 (OH) (2449361.6) | X: | +0.6860 | -0.00158 | +24.2444 0.216039 | +0.05198 4.3983 | +0.001589 5.5100 |
| A JAN. 13 (OH) | Y: | -0.0701 | -0.00195 | + 5.1791 2.159818 | +0.01499 5.8878 | +0.000188 2.2977 |
| JAN. 13 (OH) (2449365.6) | X: | +0.6797 | -0.00359 | +24.1546 1.743206 | +0.06089 6.0068 | +0.001647 2.5038 |
| A JAN. 17 (OH) | Y: | -0.0779 | -0.00173 | + 5.1320 3.668793 | +0.01453 1.1485 | +0.000265 4.9949 |
| JAN. 17 (OH) (2449369.6) | X: | +0.6656 | -0.00284 | +24.0642 3.270021 | +0.05742 1.4088 | +0.001264 5.5956 |
| A JAN. 21 (OH) | Y: | -0.0850 | -0.00173 | + 5.0855 5.218369 | +0.01322 2.6090 | +0.000139 0.7977 |
| JAN. 21 (OH) (2449373.6) | X: | +0.6540 | -0.00457 | +23.9861 4.796542 | +0.05052 2.9616 | +0.001138 2.3335 |
| A JAN. 25 (OH) | Y: | -0.0918 | -0.00158 | + 5.0398 0.465646 | +0.01264 4.0739 | +0.000153 1.8186 |
| JAN. 25 (OH) (2449377.6) | X: | +0.6356 | -0.00393 | +23.9238 0.039903 | +0.04863 4.3881 | +0.001459 5.2619 |
| A JAN. 29 (OH) | Y: | -0.0983 | -0.00143 | + 4.9949 1.996817 | +0.01168 5.4809 | +0.000046 3.0945 |
| JAN. 29 (OH) (2449381.6) | X: | +0.6196 | -0.00567 | +23.8683 1.566882 | +0.05632 5.9517 | +0.001486 2.1513 |
| A FEV. 2 (OH) | Y: | -0.1040 | -0.00136 | + 4.9514 3.529088 | +0.01192 0.6508 | +0.000216 4.2809 |
| FEV. 2 (OH) (2449385.6) | X: | +0.5974 | -0.00501 | +23.8127 3.093663 | +0.05389 1.3591 | +0.000978 5.4362 |
| A FEV. 6 (OH) | Y: | -0.1095 | -0.00116 | + 4.9078 5.062363 | +0.01136 2.1345 | +0.000265 0.1025 |
| FEV. 6 (OH) (2449389.6) | X: | +0.5767 | -0.00640 | +23.7707 4.620316 | +0.04849 2.8964 | +0.000720 2.6581 |
| A FEV. 10 (OH) | Y: | -0.1142 | -0.00111 | + 4.8644 0.313388 | +0.01065 3.5891 | +0.000285 1.9040 |
| FEV. 10 (OH) (2449393.6) | X: | +0.5514 | -0.00618 | +23.7394 6.147093 | +0.04691 4.4108 | +0.000901 5.1711 |
| A FEV. 14 (OH) | Y: | -0.1187 | -0.00082 | + 4.8214 1.8486329 | +0.00985 4.9052 | +0.000133 4.5252 |
| FEV. 14 (OH) (2449397.6) | X: | +0.5265 | -0.00722 | +23.7187 1.390966 | +0.04995 5.9345 | +0.001105 1.6454 |
| A FEV. 16 (OH) | Y: | -0.1220 | -0.00083 | + 4.7808 3.384447 | +0.01118 0.0392 | +0.000185 3.5734 |
| FEV. 18 (OH) (2449401.6) | X: | +0.4978 | -0.00709 | +23.7011 2.918114 | +0.05015 1.2993 | +0.000609 4.5141 |
| A FEV. 22 (OH) | Y: | -0.1254 | -0.00050 | + 4.7396 4.921890 | +0.01089 1.5746 | +0.000361 6.1846 |
| FEV. 22 (OH) (2449405.6) | X: | +0.4689 | -0.00786 | +23.6947 4.445288 | +0.04703 2.8581 | +0.000270 3.9182 |
| A FEV. 26 (OH) | Y: | -0.1274 | -0.00049 | + 4.6983 0.177017 | +0.01028 2.9788 | +0.000322 2.0296 |
| FEV. 26 (OH) (2449409.6) | X: | +0.4380 | -0.00819 | +23.6952 5.972631 | +0.04623 4.4618 | +0.000130 5.8990 |
| A MAR. 2 (OH) | Y: | -0.1295 | -0.00013 | + 4.6576 1.716146 | +0.01066 4.2926 | +0.000189 4.5791 |
| MAR. 2 (OH) (2449413.6) | X: | +0.4049 | -0.00838 | +23.7091 1.216688 | +0.04334 5.9872 | +0.000727 0.8069 |
| A MAR. 6 (OH) | Y: | -0.1300 | -0.00016 | + 4.6194 3.256429 | +0.01261 5.7702 | +0.000150 2.9304 |

| COORDONNEES EQUATORIALES DIFFERENTIELLES DU SATELLITE 1 DE SATURNE: MIMAS N=6.667 | | | | | | |
|--|------------|----------|----------------------|--------------------|---------------------|-------------------|
| | A0 | A1 | B0 FO | B1 F1 | B2 F2 | CO PO |
| MAR. 6 (OH) (2449417.6) | X: +0.3714 | -0.00898 | +23.7307 2.744744 | +0.04588 1.2548 | +0.000980 3.4220 | +0.2259 6.0304 |
| A MAR. 10 (OH) | Y: -0.1306 | +0.00023 | + 4.5808 4.798175 | +0.01231 1.0490 | +0.000358 6.0179 | +0.0431 1.8143 |
| MAR. 10 (OH) (2449421.6) | X: +0.3352 | -0.00900 | +23.7580 4.272748 | +0.04606 2.8706 | +0.000719 5.4231 | +0.2253 2.7377 |
| A MAR. 14 (OH) | Y: -0.1298 | +0.00023 | + 4.5418 0.057522 | +0.01220 2.4461 | +0.000287 2.1455 | +0.0430 4.8210 |
| MAR. 14 (OH) (2449425.6) | X: +0.2997 | -0.00983 | +23.7913 5.800880 | +0.04551 4.5370 | +0.000637 1.7881 | +0.2245 5.7352 |
| A MAR. 18 (OH) | Y: -0.1288 | +0.00058 | + 4.5041 1.600940 | +0.01338 3.8619 | +0.000150 4.6057 | +0.0426 1.5420 |
| MAR. 18 (OH) (2449429.6) | X: +0.2599 | -0.00931 | +23.8397 1.045851 | +0.03852 6.1191 | +0.000776 5.9820 | +0.2250 2.4523 |
| A MAR. 22 (OH) | Y: -0.1265 | +0.00060 | + 4.4684 3.145413 | +0.01505 5.3769 | +0.000118 2.3593 | +0.0420 4.5508 |
| MAR. 22 (OH) (2449433.6) | X: +0.2227 | -0.01053 | +23.8999 2.574675 | +0.04082 1.2607 | +0.001444 2.9567 | +0.2267 5.4482 |
| A MAR. 26 (OH) | Y: -0.1241 | +0.00097 | + 4.4332 4.691256 | +0.01485 0.6563 | +0.000277 5.7662 | +0.0415 1.2835 |
| MAR. 26 (OH) (2449437.6) | X: +0.1806 | -0.00963 | +23.9599 4.103764 | +0.04502 2.9275 | +0.001290 5.6621 | +0.2282 2.1556 |
| A MAR. 30 (OH) | Y: -0.1203 | +0.00099 | + 4.3978 6.237831 | +0.01505 2.0936 | +0.000214 2.1574 | +0.0414 4.3019 |
| MAR. 30 (OH) (2449441.6) | X: +0.1414 | -0.01100 | +24.0270 5.632896 | +0.04405 4.6349 | +0.001001 2.0229 | +0.2283 5.1466 |
| A AVR. 3 (OH) | Y: -0.1163 | +0.00129 | + 4.3642 1.502061 | +0.01628 3.5837 | +0.000064 4.8056 | +0.0413 1.0327 |
| AVR. 3 (OH) (2449445.6) | X: +0.0969 | -0.01008 | +24.1090 0.878936 | +0.03669 6.2792 | +0.001058 5.4560 | +0.2277 1.8602 |
| A AVR. 7 (OH) | Y: -0.1111 | +0.00136 | + 4.3320 3.050374 | +0.01729 5.1027 | +0.000076 1.9602 | +0.0410 4.0426 |
| AVR. 7 (OH) (2449449.6) | X: +0.0567 | -0.01154 | +24.2045 2.408904 | +0.03611 1.3479 | +0.001627 2.5953 | +0.2282 4.8616 |
| A AVR. 11 (OH) | Y: -0.1057 | +0.00163 | + 4.3013 4.599743 | +0.01738 0.3757 | +0.000176 5.3260 | +0.0406 0.7719 |
| AVR. 11 (OH) (2449453.6) | X: +0.0107 | -0.01039 | +24.2964 3.939251 | +0.04371 3.0075 | +0.001548 5.6259 | +0.2302 1.5786 |
| A AVR. 15 (OH) | Y: -0.0992 | +0.00168 | + 4.2709 6.149792 | +0.01747 1.8583 | +0.000130 1.8567 | +0.0401 3.7921 |
| AVR. 15 (OH) (2449457.6) | X: -0.0311 | -0.01165 | +24.3969 5.469588 | +0.04254 4.7482 | +0.001026 2.2530 | +0.2325 4.5735 |
| A AVR. 19 (OH) | Y: -0.0924 | +0.00189 | + 4.2426 1.417290 | +0.01833 3.3784 | +0.000026 0.5959 | +0.0399 0.5329 |
| AVR. 19 (OH) (2449461.6) | X: -0.0778 | -0.01064 | +24.5108 0.717007 | +0.03728 0.1200 | +0.001031 5.3277 | +0.2335 1.2828 |
| A AVR. 23 (OH) | Y: -0.0849 | +0.00199 | + 4.2155 2.968631 | +0.01865 4.8926 | +0.000022 1.7591 | +0.0399 3.5525 |
| AVR. 23 (OH) (2449465.6) | X: -0.1202 | -0.01185 | +24.6370 2.248266 | +0.03403 1.5265 | +0.001510 2.2614 | +0.2334 4.2792 |
| A AVR. 27 (OH) | Y: -0.0769 | +0.00212 | + 4.1906 4.520546 | +0.01902 0.1562 | +0.000102 4.4878 | +0.0398 0.2631 |
| AVR. 27 (OH) (2449469.6) | X: -0.1676 | -0.01065 | +24.7601 3.780008 | +0.04207 3.1044 | +0.001420 5.3771 | +0.2339 0.9989 |
| A MAI 1 (OH) | Y: -0.0684 | +0.00220 | + 4.1668 6.073015 | +0.01877 1.6784 | +0.000086 0.9560 | +0.0394 3.2984 |
| MAI 1 (OH) (2449473.6) | X: -0.2107 | -0.01167 | +24.8912 5.311766 | +0.04199 4.8501 | +0.000759 2.3777 | +0.2360 4.0033 |
| A MAI 5 (OH) | Y: -0.0596 | +0.00230 | + 4.1447 1.342590 | +0.01906 3.2046 | +0.000046 1.2825 | +0.0390 0.0380 |
| MAI 5 (OH) (2449477.6) | X: -0.2570 | -0.01079 | +25.0331 0.560760 | +0.03921 0.1860 | +0.000623 5.5637 | +0.2389 0.7196 |
| A MAI 9 (OH) | Y: -0.0504 | +0.00239 | + 4.1240 2.895648 | +0.01885 4.7167 | +0.000024 5.0127 | +0.0389 3.0649 |

| COORDONNEES EQUATORIALES DIFFÉRENTIELLES DU SATELLITE 1 DE SATURNE: MIMAS | | | | | | | N=6.667 |
|--|----|---------|----------|----------------------|--------------------|---------------------|-------------------|
| | | A0 | A1 | B0 F0 | B1 F1 | B2 F2 | C0 F0 |
| MAI 9 (OH) (2449481.6) | X: | -0.3003 | -0.01136 | +25.1841 2.093414 | +0.03651 1.7247 | +0.001091 1.9823 | +0.2407 3.7143 |
| A MAI 13 (OH) | Y: | -0.0408 | +0.00239 | + 4.1057 4.448725 | +0.01933 6.2529 | +0.000110 3.3027 | +0.0389 6.0872 |
| MAI 13 (OH) (2449485.6) | X: | -0.3457 | -0.01050 | +25.3363 3.626628 | +0.04089 3.2328 | +0.001138 4.8762 | +0.2412 0.4281 |
| A MAI 17 (OH) | Y: | -0.0313 | +0.00247 | + 4.0894 6.002083 | +0.01871 1.5236 | +0.000111 6.2136 | +0.0389 2.8195 |
| MAI 17 (OH) (2449489.6) | X: | -0.3882 | -0.01090 | +25.4932 5.160006 | +0.04279 4.9228 | +0.000311 1.6914 | +0.2417 3.4323 |
| A MAI 21 (OH) | Y: | -0.0213 | +0.00244 | + 4.0742 1.272135 | +0.01824 3.0421 | +0.000035 1.9809 | +0.0387 5.8354 |
| MAI 21 (OH) (2449493.6) | X: | -0.4312 | -0.01028 | +25.6574 0.410670 | +0.04204 0.2260 | +0.000338 0.7605 | +0.2436 0.1571 |
| A MAI 25 (OH) | Y: | -0.0116 | +0.00250 | + 4.0605 2.825159 | +0.01771 4.5529 | +0.000052 5.5792 | +0.0383 2.5747 |
| MAI 25 (OH) (2449497.6) | X: | -0.4728 | -0.01002 | +25.6265 1.944821 | +0.04244 1.8639 | +0.000378 1.6753 | +0.2466 3.1608 |
| A MAI 29 (OH) | Y: | -0.0016 | +0.00238 | + 4.0491 4.377655 | +0.01809 6.0825 | +0.000180 2.6549 | +0.0382 5.6009 |
| MAI 29 (OH) (2449501.6) | X: | -0.5126 | -0.00968 | +26.0020 3.479551 | +0.04128 3.3966 | +0.000937 4.1472 | +0.2492 6.1584 |
| A JUN. 2 (OH) | Y: | +0.0078 | +0.00245 | + 4.099 5.930017 | +0.01716 1.3823 | +0.000169 5.5222 | +0.0384 2.3395 |
| JUN. 2 (OH) (2449505.6) | X: | -0.5518 | -0.00918 | +26.1773 5.014666 | +0.04421 4.9708 | +0.000754 0.2117 | +0.2502 2.8733 |
| A JUN. 6 (OH) | Y: | +0.0176 | +0.00229 | + 4.0312 1.198682 | +0.01586 2.8874 | +0.000039 2.8683 | +0.0385 5.3541 |
| JUN. 6 (OH) (2449509.6) | X: | -0.5880 | -0.00889 | +26.3553 0.266984 | +0.04571 0.2700 | +0.000789 1.8144 | +0.2507 5.8784 |
| A JUN. 10 (OH) | Y: | +0.0268 | +0.00232 | + 4.0239 2.749719 | +0.01519 4.3898 | +0.000103 6.2614 | +0.0383 2.0843 |
| JUN. 10 (OH) (2449513.6) | X: | -0.6243 | -0.00781 | +26.5348 1.802689 | +0.04912 1.9481 | +0.000474 5.0728 | +0.2521 2.6051 |
| A JUN. 14 (OH) | Y: | +0.0361 | +0.00210 | + 4.0184 4.299760 | +0.01521 5.9175 | +0.000263 2.4285 | +0.0381 5.1026 |
| JUN. 14 (OH) (2449517.6) | X: | -0.6553 | -0.00792 | +26.7240 3.338945 | +0.04404 3.5715 | +0.000862 3.3017 | +0.2552 5.6123 |
| A JUN. 18 (OH) | Y: | +0.0445 | +0.00216 | + 4.0152 5.849153 | +0.01403 1.2433 | +0.000253 5.0475 | +0.0380 1.8415 |
| JUN. 18 (OH) (2449521.6) | X: | -0.6870 | -0.00644 | +26.9075 4.875819 | +0.04506 5.0293 | +0.001409 6.2597 | +0.2582 2.3298 |
| A JUN. 22 (OH) | Y: | +0.0531 | +0.00189 | + 4.0119 1.114515 | +0.01194 2.7325 | +0.000035 2.9876 | +0.0382 4.8599 |
| JUN. 22 (OH) (2449525.6) | X: | -0.7127 | -0.00644 | +27.0876 0.129716 | +0.04927 0.3339 | +0.001269 2.2419 | +0.2598 5.3295 |
| A JUN. 26 (OH) | Y: | +0.0607 | +0.00191 | + 4.0096 2.661681 | +0.01124 4.2108 | +0.000189 0.2414 | +0.0384 1.5878 |
| JUN. 26 (OH) (2449529.6) | X: | -0.7391 | -0.00470 | +27.2672 1.666961 | +0.05365 2.0166 | +0.001114 4.9904 | +0.2600 2.0512 |
| A JUN. 30 (OH) | Y: | +0.0664 | +0.00165 | + 4.0086 4.207524 | +0.01077 5.7466 | +0.000321 2.3917 | +0.0383 4.5954 |
| JUN. 30 (OH) (2449533.6) | X: | -0.7575 | -0.00498 | +27.4549 3.204679 | +0.04797 3.7148 | +0.000962 2.4841 | +0.2610 5.0619 |
| A JUL. 4 (OH) | Y: | +0.0749 | +0.00167 | + 4.0096 5.752253 | +0.00937 1.0949 | +0.000330 4.7384 | +0.0381 1.3231 |
| JUL. 4 (OH) (2449537.6) | X: | -0.7775 | -0.00276 | +27.6331 4.743138 | +0.04460 5.1268 | +0.001683 6.0820 | +0.2638 1.7885 |
| A JUL. 8 (OH) | Y: | +0.0816 | +0.00136 | + 4.0101 1.012690 | +0.00680 2.5585 | +0.000027 0.8776 | +0.0380 4.3381 |
| JUL. 8 (OH) (2449541.6) | X: | -0.7888 | -0.00293 | +27.8012 6.281644 | +0.05112 0.4178 | +0.001633 2.4867 | +0.2672 4.7928 |
| A JUL. 12 (OH) | Y: | +0.0871 | +0.00138 | + 4.0111 2.554551 | +0.00603 3.9559 | +0.000242 0.3412 | +0.0382 1.0680 |

| 1994 COORDONNEES EQUATORIALES DIFFERENTIELLES DU SATELLITE 1 DE SATURNE: MIMAS N=6.667 | | | | | | |
|--|------------|----------|----------------------|--------------------|---------------------|-------------------|
| | A0 | A1 | B0 F0 | B1 F1 | B2 F2 | C0 PO |
| JUL.12 (OH) (2449545.6) | X: -0.8006 | -0.00078 | +27.9675 1.537116 | +0.05445 2.1033 | +0.001353 5.0676 | +0.2689 1.5104 |
| A JUL.16 (OH) | Y: +0.0926 | +0.00111 | + 4.0134 4.094907 | +0.00505 5.4968 | +0.000328 2.4454 | +0.0385 4.0735 |
| JUL.16 (OH) (2449549.6) | X: -0.8035 | -0.00088 | +28.1353 3.076144 | +0.05049 3.2203 | +0.001099 1.8939 | +0.2691 4.5148 |
| A JUL.20 (OH) | Y: +0.0971 | +0.00109 | + 4.0168 5.633622 | +0.00351 0.6327 | +0.000341 4.4761 | +0.0385 0.7902 |
| JUL.20 (OH) (2449553.6) | X: -0.8072 | +0.00155 | +28.2915 4.615849 | +0.04301 5.2805 | +0.001456 5.8441 | +0.2695 1.2420 |
| A JUL.24 (OH) | Y: +0.1014 | +0.00083 | + 4.0202 0.868279 | +0.00112 1.9281 | +0.000103 0.1931 | +0.0384 3.7916 |
| JUL.24 (OH) (2449557.6) | X: -0.8012 | +0.00147 | +28.4314 6.155505 | +0.04924 0.5280 | +0.001664 2.5538 | +0.2717 4.2543 |
| A JUL.28 (OH) | Y: +0.1048 | +0.00082 | + 4.0236 2.424141 | +0.00133 2.2890 | +0.000210 0.4102 | +0.0383 0.5150 |
| JUL.28 (OH) (2449561.6) | X: -0.7948 | +0.00368 | +28.5673 1.412073 | +0.05106 2.2233 | +0.001188 5.2216 | +0.2748 0.9782 |
| A AOU. 1 (OH) | Y: +0.1080 | +0.00061 | + 4.0280 3.958492 | +0.00185 3.0252 | +0.000261 2.5159 | +0.0365 3.5215 |
| AOU. 1 (OH) (2449565.6) | X: -0.7802 | +0.00399 | +28.6958 2.952075 | +0.04918 3.9044 | +0.000966 1.4350 | +0.2766 3.9802 |
| A AOU. 5 (OH) | Y: +0.1105 | +0.00052 | + 4.0328 5.491296 | +0.00305 4.3222 | +0.000272 4.1171 | +0.0386 0.2377 |
| AOU. 5 (OH) (2449569.6) | X: -0.7643 | +0.00609 | +28.8127 4.492506 | +0.04143 5.4781 | +0.000851 5.4768 | +0.2765 0.7001 |
| A AOU. 9 (OH) | Y: +0.1125 | +0.00038 | + 4.0386 0.739600 | +0.00477 5.6547 | +0.000186 6.0992 | +0.0389 3.2296 |
| AOU. 9 (OH) (2449573.6) | X: -0.7402 | +0.00634 | +28.9095 6.032902 | +0.04351 0.6968 | +0.001266 2.4272 | +0.2762 3.7099 |
| A AOU.13 (OH) | Y: +0.1141 | +0.00028 | + 4.0441 2.269671 | +0.00645 0.9178 | +0.000102 0.7150 | +0.0388 6.2220 |
| AOU.13 (OH) (2449577.6) | X: -0.7141 | +0.00816 | +28.9976 1.290095 | +0.04441 2.3922 | +0.000778 5.3097 | +0.2774 0.4401 |
| A AOU.17 (OH) | Y: +0.1151 | +0.00018 | + 4.0501 3.798377 | +0.00782 2.4216 | +0.000110 2.3830 | +0.0387 2.9364 |
| AOU.17 (OH) (2449581.6) | X: -0.6821 | +0.00890 | +29.0700 2.830557 | +0.04333 4.0080 | +0.000646 0.6379 | +0.2796 3.4491 |
| A AOU.21 (OH) | Y: +0.1159 | +0.00001 | + 4.0559 5.325659 | +0.00873 4.0003 | +0.000205 3.3019 | +0.0388 5.9360 |
| AOU.21 (OH) (2449585.6) | X: -0.6463 | +0.01013 | +29.1318 4.371071 | +0.03994 5.6928 | +0.000257 3.7896 | +0.2811 0.1679 |
| A AOU.25 (OH) | Y: +0.1159 | +0.00002 | + 4.0634 0.568610 | +0.00935 5.4215 | +0.000259 5.6860 | +0.0390 2.6470 |
| AOU.25 (OH) (2449589.6) | X: -0.6059 | +0.01091 | +29.1741 5.911619 | +0.03634 0.9840 | +0.000622 1.8747 | +0.2807 3.1695 |
| A AOU.29 (OH) | Y: +0.1160 | -0.00020 | + 4.0704 2.093977 | +0.01141 0.6310 | +0.000095 2.3383 | +0.0393 5.6335 |
| AOU.29 (OH) (2449593.6) | X: -0.5617 | +0.01186 | +29.2010 1.168815 | +0.03614 2.6347 | +0.000337 4.4689 | +0.2795 6.1773 |
| A AOU. 2 (OH) | Y: +0.1151 | -0.00016 | + 4.0767 3.618227 | +0.01266 2.2033 | +0.000104 0.0167 | +0.0393 2.3350 |
| SEP. 2 (OH) (2449597.6) | X: -0.5150 | +0.01292 | +29.2084 2.709064 | +0.03494 4.1894 | +0.000918 5.8631 | +0.2792 2.9065 |
| A SEP. 6 (OH) | Y: +0.1145 | -0.00042 | + 4.0827 5.141326 | +0.01279 3.7791 | +0.000275 2.5474 | +0.0391 5.3239 |
| SEP. 6 (OH) (2449601.6) | X: -0.4628 | +0.01304 | +29.2063 4.249003 | +0.03808 5.9160 | +0.001013 2.3959 | +0.2804 5.9155 |
| A SEP.10 (OH) | Y: +0.1127 | -0.00030 | + 4.0904 0.380440 | +0.01249 5.1987 | +0.000308 5.2801 | +0.0391 2.0337 |
| SEP.10 (OH) (2449605.6) | X: -0.4107 | +0.01431 | +29.1888 5.789027 | +0.03302 1.4185 | +0.000504 0.1206 | +0.2814 2.6338 |
| A SEP.14 (OH) | Y: +0.1115 | -0.00063 | + 4.0971 1.902604 | +0.01469 0.3769 | +0.000180 2.5917 | +0.0393 5.0245 |

| COORDONNEES EQUATORIALES DIFFÉRENTIELLES DU SATELLITE 1 DE SATURNE: 'MIMAS' N=6.667 | | | | | | |
|--|------------|----------|----------------------|--------------------|---------------------|-------------------|
| | AO | A1 | B0 F0 | B1 F1 | B2 F2 | CO PO |
| SEP. 14 (OH) (2449609.6) | X: -0.3533 | +0.01411 | +29.1492 1.045566 | +0.02932 3.0210 | +0.000793 3.3298 | +0.2806 5.6331 |
| A SEP. 18 (OH) | Y: +0.1090 | -0.00049 | + 4.1015 3.423960 | +0.01552 1.9728 | +0.000261 6.0404 | +0.0395 1.7258 |
| SEP. 18 (OH) (2449613.6) | X: -0.2974 | +0.01529 | +29.0914 2.584876 | +0.02810 4.5373 | +0.001471 5.6293 | +0.2784 2.3540 |
| A SEP. 22 (OH) | Y: +0.1070 | -0.00080 | + 4.1056 4.944533 | +0.01485 3.5124 | +0.000331 2.3037 | +0.0396 4.7061 |
| SEP. 22 (OH) (2449617.6) | X: -0.2357 | +0.01441 | +29.0257 4.123631 | +0.03562 6.1834 | +0.001775 2.1159 | +0.2768 5.3630 |
| A SEP. 26 (OH) | Y: +0.1038 | -0.00065 | + 4.1103 0.181546 | +0.01432 4.9328 | +0.000297 4.9446 | +0.0394 1.4052 |
| SEP. 26 (OH) (2449621.6) | X: -0.1782 | +0.01585 | +28.9507 5.662439 | +0.03618 1.8328 | +0.001015 5.5484 | +0.2768 2.0872 |
| A SEP. 30 (OH) | Y: +0.1011 | -0.00099 | + 4.1136 1.701952 | +0.01619 0.1041 | +0.000185 2.4314 | +0.0393 4.3926 |
| SEP. 30 (OH) (2449625.6) | X: -0.1149 | +0.01456 | +28.8503 0.917698 | +0.02893 3.5230 | +0.001258 3.1332 | +0.2774 5.0879 |
| A OCT. 4 (OH) | Y: +0.0972 | -0.00083 | + 4.1137 3.221891 | +0.01656 1.6916 | +0.000295 5.8722 | +0.0393 1.0992 |
| OCT. 4 (OH) (2449629.6) | X: -0.0565 | +0.01568 | +28.7364 2.455464 | +0.02790 5.0075 | +0.001765 5.7090 | +0.2764 1.8012 |
| A OCT. 8 (OH) | Y: +0.0937 | -0.00111 | + 4.1132 4.741419 | +0.01562 3.1876 | +0.000270 2.1861 | +0.0395 4.0847 |
| OCT. 8 (OH) (2449633.6) | X: +0.0064 | +0.01418 | +28.6167 3.992604 | +0.03502 0.2499 | +0.002091 1.9947 | +0.2736 4.8001 |
| A OCT. 12 (OH) | Y: +0.0893 | -0.00103 | + 4.1117 6.260919 | +0.01538 4.6341 | +0.000187 4.5231 | +0.0396 0.7812 |
| OCT. 12 (OH) (2449637.6) | X: +0.0630 | +0.01533 | +28.4925 5.529637 | +0.04222 2.1049 | +0.001400 5.0594 | +0.2710 1.5211 |
| A OCT. 16 (OH) | Y: +0.0851 | -0.00126 | + 4.1085 1.497461 | +0.01632 6.0919 | +0.000104 2.1164 | +0.0395 3.7598 |
| OCT. 16 (OH) (2449641.6) | X: +0.1241 | +0.01347 | +28.3455 0.783109 | +0.03605 3.8887 | +0.001181 2.9350 | +0.2701 4.5263 |
| A OCT. 20 (OH) | Y: +0.0801 | -0.00120 | + 4.1022 3.017147 | +0.01652 1.3524 | +0.000200 5.4757 | +0.0392 0.4605 |
| OCT. 20 (OH) (2449645.6) | X: +0.1785 | +0.01425 | +28.1906 2.318925 | +0.03434 5.3684 | +0.001653 5.8676 | +0.2702 1.2431 |
| A OCT. 24 (OH) | Y: +0.0751 | -0.00136 | + 4.0946 4.536761 | +0.01595 2.8325 | +0.000117 1.6903 | +0.0390 3.4499 |
| OCT. 24 (OH) (2449649.6) | X: +0.2353 | +0.01263 | +28.0327 3.854189 | +0.03908 0.6079 | +0.001757 1.9826 | +0.2692 4.2371 |
| A OCT. 28 (OH) | Y: +0.0698 | -0.00139 | + 4.0847 6.056526 | +0.01582 4.3292 | +0.000104 2.9807 | +0.0391 0.1348 |
| OCT. 28 (OH) (2449653.6) | X: +0.2858 | +0.01306 | +27.8728 5.389113 | +0.04705 2.2801 | +0.001449 4.6353 | +0.2664 0.9476 |
| A NOV. 1 (OH) | Y: +0.0641 | -0.00143 | + 4.0737 1.293214 | +0.01550 5.7842 | +0.000034 5.8242 | +0.0391 3.1365 |
| NOV. 1 (OH) (2449657.6) | X: +0.3379 | +0.01132 | +27.6989 0.640504 | +0.04570 4.0403 | +0.000611 2.4382 | +0.2633 3.9465 |
| A NOV. 5 (OH) | Y: +0.0584 | -0.00153 | + 4.0605 2.813527 | +0.01596 0.9842 | +0.000129 4.2988 | +0.0390 6.1145 |
| NOV. 5 (OH) (2449661.6) | X: +0.3638 | +0.01148 | +27.5206 2.174269 | +0.04381 5.5706 | +0.001084 6.0197 | +0.2615 0.6661 |
| A NOV. 9 (OH) | Y: +0.0522 | -0.00151 | + 4.0448 4.334074 | +0.01590 2.4916 | +0.000171 0.0213 | +0.0386 2.8130 |
| NOV. 9 (OH) (2449665.6) | X: +0.4290 | +0.01017 | +27.3414 3.707557 | +0.04701 0.8600 | +0.000934 2.1079 | +0.2611 3.6655 |
| A NOV. 13 (OH) | Y: +0.0462 | -0.00166 | + 4.0265 5.854822 | +0.01530 4.0225 | +0.000247 2.1575 | +0.0583 5.8013 |
| NOV. 13 (OH) (2449669.6) | X: +0.4700 | +0.00969 | +27.1615 5.240278 | +0.04981 2.4194 | +0.001133 4.1092 | +0.2602 0.3746 |
| A NOV. 17 (OH) | Y: +0.0394 | -0.00153 | + 4.0077 1.092497 | +0.01401 5.4528 | +0.000146 5.1091 | +0.0381 2.5082 |

1994

COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 1 DE SATURNE: MIMAS

N=6.667

| | | A0 | A1 | B0 F0 | B1 F1 | B2 F2 | CO PO |
|----------------------------|----|---------|----------|----------------------|--------------------|---------------------|-------------------|
| NOV.17 (OH) (2449673.6) | X: | +0.5086 | +0.00864 | +26.9601 0.489503 | +0.05333 4.0745 | +0.000522 0.4990 | +0.2579 3.3640 |
| A NOV.21 (OH) | Y: | +0.0333 | -0.00175 | + 3.9877 2.614232 | +0.01491 0.6046 | +0.000196 3.3307 | +0.0381 5.4936 |
| NOV.21 (OH) (2449677.6) | X: | +0.5435 | +0.00796 | +26.7961 2.021338 | +0.05310 5.6747 | +0.000143 0.2207 | +0.2547 0.0749 |
| A NOV.25 (OH) | Y: | +0.0262 | -0.00159 | + 3.9645 4.136481 | +0.01494 2.1614 | +0.000322 5.9947 | +0.0379 2.1908 |
| NOV.25 (OH) (2449681.6) | X: | +0.5747 | +0.00724 | +26.6119 3.552714 | +0.05452 0.9958 | +0.000094 3.8456 | +0.2522 3.0745 |
| A NOV.29 (OH) | Y: | +0.0199 | -0.00179 | + 3.9393 5.658972 | +0.01364 3.6866 | +0.000324 2.0235 | +0.0376 5.1721 |
| NOV.29 (OH) (2449685.6) | X: | +0.6043 | +0.00594 | +26.4286 5.083396 | +0.05124 2.5290 | +0.000924 3.1677 | +0.2511 6.0730 |
| A DEC. 3 (OH) | Y: | +0.0126 | -0.00158 | + 3.9138 0.898627 | +0.01222 5.0771 | +0.000190 4.8347 | +0.0371 1.8761 |
| DEC. 3 (OH) (2449689.6) | X: | +0.6278 | +0.00578 | +26.2554 0.330617 | +0.05705 4.0541 | +0.001163 6.0342 | +0.2506 2.7813 |
| A DEC. 7 (OH) | Y: | +0.0063 | -0.00182 | + 3.6878 2.422604 | +0.01332 0.2069 | +0.000223 2.9343 | +0.0367 4.8681 |
| DEC. 7 (OH) (2449693.6) | X: | +0.6510 | +0.00424 | +26.0800 1.660794 | +0.06031 5.7116 | +0.000868 2.7321 | +0.2490 5.7681 |
| A DEC.11 (OH) | Y: | -0.0009 | -0.00159 | + 3.8583 3.947381 | +0.01306 1.7880 | +0.000366 5.8163 | +0.0366 1.5758 |
| DEC.11 (OH) (2449697.6) | X: | +0.6676 | +0.00422 | +25.9043 3.390449 | +0.05878 1.0560 | +0.000774 5.3880 | +0.2461 2.4746 |
| A DEC.15 (OH) | Y: | -0.0074 | -0.00177 | + 3.8276 5.472555 | +0.01146 3.2598 | +0.000281 1.9398 | +0.0365 4.5618 |
| DEC.15 (OH) (2449701.6) | X: | +0.6850 | +0.00239 | +25.7332 4.919422 | +0.05211 2.5904 | +0.001244 2.4696 | +0.2432 5.4700 |
| A DEC.19 (OH) | Y: | -0.0145 | -0.00157 | + 3.7966 0.715291 | +0.01066 4.6269 | +0.000127 4.5198 | +0.0361 1.2626 |
| DEC.19 (OH) (2449705.6) | X: | +0.6942 | +0.00289 | +25.5789 0.164994 | +0.05706 4.0180 | +0.001634 5.6363 | +0.2417 2.1839 |
| A DEC.23 (OH) | Y: | -0.0208 | -0.00172 | + 3.7651 2.242406 | +0.01142 6.0417 | +0.000177 2.7158 | +0.0356 4.2507 |
| DEC.23 (OH) (2449709.6) | X: | +0.7057 | +0.00078 | +25.4235 1.693848 | +0.06389 5.6949 | +0.001469 2.6202 | +0.2415 5.1758 |
| A DEC.27 (OH) | Y: | -0.0277 | -0.00151 | + 3.7311 3.770622 | +0.01098 1.3069 | +0.000306 5.5417 | +0.0352 0.9626 |
| DEC.27 (OH) (2449713.6) | X: | +0.7090 | +0.00130 | +25.2673 3.222126 | +0.05951 1.0607 | +0.001195 5.6100 | +0.2408 1.8790 |
| A DEC.31 (OH) | Y: | -0.0339 | -0.00160 | + 3.6960 5.299552 | +0.00988 2.7076 | +0.000180 1.6060 | +0.0349 3.9606 |
| DEC.31 (OH) (2449717.6) | X: | +0.7143 | -0.00066 | +25.1203 4.749859 | +0.05271 2.5855 | +0.001403 2.8099 | +0.2386 4.8651 |
| A JAN. 4 (OH) | Y: | -0.0403 | -0.00146 | + 3.6604 0.546430 | +0.00976 4.0963 | +0.000064 2.8179 | +0.0347 0.6716 |

1994

COORDONNÉES EQUATORIALES DIFFÉRENTIELLES

DU SATELLITE 2 DE SATURNE: ENCELADE

N=4.586

| | | AO | A1 | B0 F0 | B1 F1 | B2 F2 | CO PO |
|-----------------------------|----|---------|----------|----------------------|--------------------|---------------------|-------------------|
| JAN. 1 (OH) (2449353.9) | X: | +0.1694 | -0.00085 | +31.3179 3.319344 | +0.08428 1.3085 | +0.000238 3.1807 | +0.0733 1.1446 |
| A JAN. 17 (OH) | Y: | -0.0489 | +0.00010 | + 7.1868 5.364751 | +0.03072 2.4767 | +0.000064 0.6083 | +0.0164 3.2036 |
| JAN. 17 (OH) (2449369.9) | X: | +0.1580 | -0.00078 | +30.8248 1.257243 | +0.08294 5.6636 | +0.000243 1.3777 | +0.0721 3.2348 |
| A FEV. 2 (OH) | Y: | -0.0473 | +0.00016 | + 6.7134 3.326600 | +0.03003 0.3814 | +0.000082 4.4767 | +0.0153 5.3168 |
| FEV. 1 (OH) (2449364.9) | X: | +0.1465 | -0.00077 | +30.5244 0.893468 | +0.08026 5.4286 | +0.000240 1.1579 | +0.0716 2.4455 |
| A FEV. 17 (OH) | Y: | -0.0450 | +0.00016 | + 6.2806 2.990277 | +0.02867 6.2646 | +0.000102 3.8905 | +0.0143 4.5617 |
| FEV. 17 (OH) (2449400.9) | X: | +0.1342 | -0.00059 | +30.3827 5.113310 | +0.07754 3.5095 | +0.000278 5.6025 | +0.0714 4.5420 |
| A MAR. 5 (OH) | Y: | -0.0427 | +0.00018 | + 5.8429 0.961215 | +0.02647 4.1525 | +0.000114 1.6714 | +0.0133 0.4084 |
| MAR. 1 (OH) (2449412.9) | X: | +0.1263 | -0.00075 | +30.4010 3.566717 | +0.07540 2.0689 | +0.000340 4.0987 | +0.0717 1.4005 |
| A MAR. 17 (OH) | Y: | -0.0403 | +0.00017 | + 5.5382 5.726771 | +0.02442 2.5604 | +0.000115 0.0338 | +0.0126 3.5834 |
| MAR. 17 (OH) (2449428.9) | X: | +0.1162 | -0.00070 | +30.5828 1.506618 | +0.07180 0.1763 | +0.000347 2.1354 | +0.0721 3.5021 |
| A AVR. 2 (OH) | Y: | -0.0377 | +0.00019 | + 5.1723 3.709493 | +0.02141 0.4336 | +0.000121 4.0879 | +0.0118 5.7273 |
| AVR. 1 (OH) (2449443.9) | X: | +0.1058 | -0.00080 | +30.9154 1.149233 | +0.06893 6.2770 | +0.000350 1.9281 | +0.0731 2.7265 |
| A AVR. 17 (OH) | Y: | -0.0350 | +0.00018 | + 4.8802 3.395247 | +0.01833 0.0053 | +0.000134 3.5466 | +0.0112 4.9975 |
| AVR. 17 (OH) (2449459.9) | X: | +0.0923 | -0.00075 | +31.4267 5.380100 | +0.06672 4.4159 | +0.000368 0.0176 | +0.0745 4.8413 |
| A MAI 3 (OH) | Y: | -0.0323 | +0.00016 | + 4.6307 1.389671 | +0.01448 4.1455 | +0.000147 1.3360 | +0.0106 0.8731 |
| MAI 1 (OH) (2449473.9) | X: | +0.0812 | -0.00100 | +32.0222 0.446887 | +0.06447 5.9505 | +0.000366 1.4532 | +0.0758 1.1972 |
| A MAI 17 (OH) | Y: | -0.0299 | +0.00014 | + 4.4724 2.778553 | +0.01073 5.3900 | +0.000166 2.5648 | +0.0103 3.5469 |
| MAI 17 (OH) (2449489.9) | X: | +0.0667 | -0.00109 | +32.8147 4.688149 | +0.06312 4.1236 | +0.000378 5.8983 | +0.0779 3.3204 |
| A JUN. 2 (OH) | Y: | -0.0278 | +0.00013 | + 4.3667 0.774141 | +0.00596 3.0952 | +0.000186 0.3996 | +0.0102 5.7038 |
| JUN. 1 (OH) (2449504.9) | X: | +0.0505 | -0.00133 | +33.6503 4.350431 | +0.06173 3.9869 | +0.000399 5.7541 | +0.0799 2.5698 |
| A JUN. 17 (OH) | Y: | -0.0259 | +0.00011 | + 4.3449 0.460700 | +0.00254 1.5895 | +0.000201 6.2750 | +0.0102 4.9689 |
| JUN. 17 (OH) (2449520.9) | X: | +0.0287 | -0.00140 | +34.5921 2.320995 | +0.05990 2.1853 | +0.000405 4.0752 | +0.0821 4.7037 |
| A JUL. 3 (OH) | Y: | -0.0243 | +0.00007 | + 4.4081 4.724712 | +0.00678 4.6207 | +0.000204 4.1780 | +0.0105 0.8235 |

1994

 COORDONNEES EQUATORIALES DIFFERENTIELLES
 DU SATELLITE 2 DE SATURNE: ENCELADE

N=4.586

| | | A0 | A1 | B0 F0 | B1 F1 | B2 F2 | CO PO |
|-----------------------------|----|---------|----------|----------------------|--------------------|---------------------|-------------------|
| JUL. 1 (OH) (2449534.9) | X: | +0.0085 | -0.00169 | +35.4085 3.692241 | +0.05761 3.7476 | +0.000478 5.7566 | +0.0839 1.0802 |
| A JUL. 17 (OH) | Y: | -0.0231 | +0.00005 | + 4.5362 6.090159 | +0.01230 5.7903 | +0.000181 5.5033 | +0.0109 3.4681 |
| JUL. 17 (OH) (2449550.9) | X: | -0.0171 | -0.00180 | +36.2671 1.674393 | +0.05251 1.9852 | +0.000521 4.1523 | +0.0855 3.2253 |
| A AOU. 2 (OH) | Y: | -0.0226 | +0.00005 | + 4.7628 4.050314 | +0.01810 3.6745 | +0.000130 3.4095 | +0.0115 5.5825 |
| AOU. 1 (OH) (2449565.9) | X: | -0.0442 | -0.00191 | +36.9224 1.357799 | +0.04592 1.9452 | +0.000608 4.2034 | +0.0870 2.4889 |
| A AOU. 17 (OH) | Y: | -0.0220 | +0.00007 | + 5.0397 3.701952 | +0.02216 3.3054 | +0.000056 2.7232 | +0.0122 4.8141 |
| AOU. 17 (OH) (2449581.9) | X: | -0.0754 | -0.00178 | +37.3856 5.630817 | +0.03632 0.3285 | +0.000654 2.5054 | +0.0879 4.6382 |
| A SEP. 2 (OH) | Y: | -0.0211 | +0.00007 | + 5.3764 1.652025 | +0.02385 1.2470 | +0.000065 4.9148 | +0.0130 0.6367 |
| SEP. 1 (OH) (2449596.9) | X: | -0.1027 | -0.00169 | +37.5426 5.317689 | +0.02977 0.5728 | +0.000712 2.5163 | +0.0882 3.8992 |
| A SEP. 17 (OH) | Y: | -0.0200 | +0.00013 | + 5.6925 1.301643 | +0.02229 0.8825 | +0.000157 4.3577 | +0.0138 6.1495 |
| SEP. 17 (OH) (2449612.9) | X: | -0.1319 | -0.00143 | +37.3892 3.306458 | +0.02984 5.6008 | +0.000719 0.7856 | +0.0877 6.0401 |
| A OCT. 3 (OH) | Y: | -0.0176 | +0.00017 | + 5.9799 5.539089 | +0.01743 5.0581 | +0.000232 2.2914 | +0.0144 1.9729 |
| OCT. 1 (OH) (2449626.9) | X: | -0.1512 | -0.00132 | +37.0030 4.664832 | +0.03827 1.2503 | +0.000665 2.4652 | +0.0868 2.4098 |
| A OCT. 17 (OH) | Y: | -0.0152 | +0.00025 | + 6.1523 0.610611 | +0.01161 6.2202 | +0.000267 3.6113 | +0.0147 4.6083 |
| OCT. 17 (OH) (2449642.9) | X: | -0.1717 | -0.00089 | +35.3163 2.663794 | +0.05041 5.9096 | +0.000610 0.6843 | +0.0852 4.5379 |
| A NOV. 2 (OH) | Y: | -0.0116 | +0.00027 | + 6.2301 4.854575 | +0.00616 3.3692 | +0.000266 1.5727 | +0.0147 0.4400 |
| NOV. 1 (OH) (2449657.9) | X: | -0.1852 | -0.00068 | +35.5127 2.333096 | +0.06181 5.8445 | +0.000502 0.6027 | +0.0833 3.7755 |
| A NOV. 17 (OH) | Y: | -0.0076 | +0.00029 | + 6.1786 4.515995 | +0.00902 1.9884 | +0.000241 1.1969 | +0.0145 5.9574 |
| NOV. 17 (OH) (2449673.9) | X: | -0.1980 | -0.00037 | +34.5752 0.296978 | +0.07197 4.0166 | +0.000410 5.1828 | +0.0816 5.8877 |
| A DEC. 3 (OH) | Y: | -0.0030 | +0.00025 | + 6.0006 2.461737 | +0.01539 5.8971 | +0.000189 5.3256 | +0.0140 1.7957 |
| DEC. 1 (OH) (2449687.9) | X: | -0.2027 | -0.00039 | +33.7466 1.650507 | +0.07742 5.5290 | +0.000311 0.3938 | +0.0799 2.2306 |
| A DEC. 17 (OH) | Y: | +0.0008 | +0.00026 | + 5.7583 3.845560 | +0.02019 0.8437 | +0.000141 0.2674 | +0.0134 4.4376 |
| DEC. 17 (OH) (2449703.9) | X: | -0.2081 | -0.00013 | +32.8660 5.883798 | +0.08210 3.6311 | +0.000255 5.0531 | +0.0781 4.3302 |
| A JAN. 2 (OH) | Y: | +0.0046 | +0.00023 | + 5.4069 1.817646 | +0.02406 4.9977 | +0.000100 4.1653 | +0.0125 0.2814 |

1994

COORDONNÉES EQUATORIALES DIFFÉRENTIELLES

DU SATELLITE 3 DE SATURNE: TETHYS

N=3.328

| | A0 | A1 | B0 F0 | B1 F1 | B2 F2 | CO PO |
|-----------------------------|------------|----------|----------------------|--------------------|---------------------|-------------------|
| JAN. 1 (OH) (2449353.9) | X: -0.0008 | +0.00000 | +38.7248 0.368345 | +0.07473 4.4466 | +0.000387 0.0050 | +0.0035 4.0379 |
| A JAN. 17 (OH) | Y: -0.0005 | +0.00000 | + 8.7031 2.497069 | +0.03927 5.6452 | +0.000054 3.8264 | +0.0008 6.2003 |
| JAN. 17 (OH) (2449369.9) | X: -0.0008 | +0.00000 | +38.1222 3.324691 | +0.07230 1.3124 | +0.000382 3.2260 | +0.0034 3.6842 |
| A FEV. 2 (OH) | Y: -0.0005 | +0.00001 | + 8.0784 5.480767 | +0.03885 2.3004 | +0.000082 0.0906 | +0.0007 5.8379 |
| FEV. 1 (OH) (2449384.9) | X: -0.0008 | +0.00000 | +37.7573 2.953023 | +0.06937 1.1234 | +0.000394 3.0438 | +0.0034 2.9439 |
| A FEV. 17 (OH) | Y: -0.0004 | +0.00000 | + 7.5078 5.140207 | +0.03749 1.9021 | +0.000103 5.8326 | +0.0007 5.1369 |
| FEV. 17 (OH) (2449400.9) | X: -0.0008 | +0.00000 | +37.5888 5.907250 | +0.06603 4.2865 | +0.000408 6.1758 | +0.0034 2.5684 |
| A MAR. 5 (OH) | Y: -0.0004 | +0.00000 | + 6.9315 1.850293 | +0.03523 4.8181 | +0.000118 2.3618 | +0.0006 4.8111 |
| MAR. 1 (OH) (2449412.9) | X: -0.0008 | +0.00000 | +37.6139 1.840330 | +0.06383 0.3858 | +0.000426 2.2187 | +0.0034 0.7164 |
| A MAR. 17 (OH) | Y: -0.0003 | +0.00000 | + 6.5305 4.099633 | +0.03316 0.7166 | +0.000127 4.4640 | +0.0006 3.0024 |
| MAR. 17 (OH) (2449426.9) | X: -0.0008 | +0.00000 | +37.8466 4.797129 | +0.06167 3.5848 | +0.000447 5.3256 | +0.0034 0.3564 |
| A AVR. 2 (OH) | Y: -0.0003 | +0.00000 | + 6.0474 0.821821 | +0.02988 3.6209 | +0.000139 0.9803 | +0.0005 2.7023 |
| AVR. 1 (OH) (2449443.9) | X: -0.0008 | +0.00000 | +38.2667 4.430345 | +0.06096 3.4576 | +0.000475 5.0926 | +0.0035 5.9041 |
| A AVR. 17 (OH) | Y: -0.0002 | +0.00000 | + 5.6584 0.503794 | +0.02635 3.1978 | +0.000155 0.4581 | +0.0005 2.0314 |
| AVR. 17 (OH) (2449459.9) | X: -0.0008 | +0.00000 | +38.9184 1.110902 | +0.06187 0.4047 | +0.000495 1.9358 | +0.0037 5.5621 |
| A MAI 3 (OH) | Y: -0.0002 | +0.00000 | + 5.3212 3.520219 | +0.02188 6.0909 | +0.000174 3.2712 | +0.0005 1.6886 |
| MAI 1 (OH) (2449473.9) | X: -0.0009 | +0.00000 | +39.6462 3.708235 | +0.06417 3.2315 | +0.000522 4.6980 | +0.0039 4.4621 |
| A MAI 17 (OH) | Y: -0.0001 | +0.00000 | + 5.0990 6.160717 | +0.01740 2.3269 | +0.000199 5.7584 | +0.0005 0.6437 |
| MAI 17 (OH) (2449489.9) | X: -0.0008 | +0.00000 | +40.6325 0.398738 | +0.06803 0.1776 | +0.000542 1.6124 | +0.0040 4.1431 |
| A JUN. 2 (OH) | Y: -0.0001 | +0.00000 | + 4.9341 2.891980 | +0.01144 5.1515 | +0.000225 2.3550 | +0.0005 0.3798 |
| JUN. 1 (OH) (2449504.9) | X: -0.0008 | +0.00000 | +41.6699 0.050636 | +0.07236 0.0566 | +0.000573 1.5185 | +0.0042 3.2407 |
| A JUN. 17 (OH) | Y: -0.0001 | +0.00000 | + 4.8697 2.568382 | +0.00558 4.3863 | +0.000248 1.9501 | +0.0005 5.9717 |
| JUN. 17 (OH) (2449520.9) | X: -0.0010 | +0.00001 | +42.8413 3.036725 | +0.07664 3.2795 | +0.000604 4.8152 | +0.0046 3.1391 |
| A JUL. 3 (OH) | Y: -0.0001 | +0.00000 | + 4.8998 5.561048 | +0.00517 5.7000 | +0.000253 4.9034 | +0.0005 5.6557 |

1994

COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 3 DE SATURNE: TETHYS

N=3.328

| | A0 | A1 | B0 F0 | B1 F1 | B2 F2 | C0 F0 |
|-----------------------------|------------|----------|----------------------|--------------------|---------------------|-------------------|
| JUL. 1 (OH) (2449534.9) | X: -0.0009 | -0.00001 | +43.8589 5.654942 | +0.07963 6.1033 | +0.000652 1.4630 | +0.0048 2.0709 |
| A JUL. 17 (OH) | Y: -0.0001 | +0.00000 | + 5.0108 1.883529 | +0.01143 1.5595 | +0.000237 1.2271 | +0.0006 4.6011 |
| JUL. 17 (OH) (2449550.9) | X: -0.0012 | +0.00001 | +44.9273 2.369771 | +0.08096 3.0640 | +0.000714 4.8208 | +0.0050 1.8246 |
| A AOU. 2 (OH) | Y: -0.0002 | +0.00000 | + 5.2326 4.847914 | +0.01880 4.4098 | +0.000178 4.2233 | +0.0006 4.2209 |
| AOU. 1 (OH) (2449565.9) | X: -0.0012 | +0.00001 | +45.7441 2.043480 | +0.08027 2.9862 | +0.000791 4.8361 | +0.0050 1.1698 |
| A AOU. 17 (OH) | Y: -0.0003 | +0.00000 | + 5.5218 4.476598 | +0.02421 4.0233 | +0.000083 3.8768 | +0.0007 3.5105 |
| AOU. 17 (OH) (2449581.9) | X: -0.0010 | -0.00001 | +46.3208 5.049877 | +0.07721 0.0077 | +0.000849 1.8960 | +0.0053 0.8696 |
| A SEP. 2 (OH) | Y: -0.0002 | +0.00000 | + 5.8895 1.145175 | +0.02681 0.7090 | +0.000045 3.9881 | +0.0006 3.2665 |
| SEP. 1 (OH) (2449596.9) | X: -0.0011 | -0.00001 | +46.5178 4.727966 | +0.07365 0.0015 | +0.000890 1.8825 | +0.0053 0.2337 |
| A SEP. 17 (OH) | Y: -0.0003 | +0.00000 | + 6.2459 0.773012 | +0.02555 0.3569 | +0.000170 3.5922 | +0.0007 2.5165 |
| SEP. 17 (OH) (2449612.9) | X: -0.0013 | +0.00001 | +46.3309 1.451251 | +0.07021 3.3818 | +0.000860 5.1906 | +0.0050 6.2538 |
| A OCT. 3 (OH) | Y: -0.0004 | +0.00000 | + 6.5794 3.732544 | +0.02001 3.3131 | +0.000268 0.3339 | +0.0008 2.2547 |
| OCT. 1 (OH) (2449626.9) | X: -0.0011 | +0.00000 | +45.8506 4.078891 | +0.06908 0.0680 | +0.000846 1.8013 | +0.0051 5.2338 |
| A OCT. 17 (OH) | Y: -0.0004 | +0.00000 | + 6.7851 0.044213 | +0.01265 5.8270 | +0.000318 2.9802 | +0.0008 1.1593 |
| OCT. 17 (OH) (2449642.9) | X: -0.0013 | +0.00001 | +45.0038 0.793313 | +0.06975 3.4436 | +0.000765 5.0818 | +0.0048 4.9151 |
| A NOV. 2 (OH) | Y: -0.0004 | +0.00000 | + 6.8835 3.015029 | +0.00413 1.7113 | +0.000318 5.9871 | +0.0007 0.8574 |
| NOV. 1 (OH) (2449657.9) | X: -0.0013 | +0.00001 | +44.0130 0.455480 | +0.07202 3.4253 | +0.000679 5.0205 | +0.0046 4.2346 |
| A NOV. 17 (OH) | Y: -0.0004 | +0.00000 | + 6.8298 2.662562 | +0.00878 6.0849 | +0.000282 5.6346 | +0.0007 0.1860 |
| NOV. 17 (OH) (2449673.9) | X: -0.0011 | +0.00000 | +42.8536 3.438599 | +0.07448 0.4204 | +0.000580 2.0054 | +0.0043 3.9477 |
| A DEC. 3 (OH) | Y: -0.0004 | +0.00001 | + 6.6243 5.641051 | +0.01738 2.5566 | +0.000222 2.2748 | +0.0007 6.1145 |
| DEC. 1 (OH) (2449687.9) | X: -0.0012 | +0.00001 | +41.8357 6.042552 | +0.07620 3.2480 | +0.000510 4.8869 | +0.0042 2.8579 |
| A DEC. 17 (OH) | Y: -0.0003 | +0.00000 | + 6.3391 1.966921 | +0.02359 5.0936 | +0.000166 4.7559 | +0.0006 5.0957 |
| DEC. 17 (OH) (2449703.9) | X: -0.0011 | +0.00000 | +40.7459 2.728803 | +0.07667 0.1601 | +0.000445 1.8732 | +0.0039 2.5108 |
| A JAN. 2 (OH) | Y: -0.0003 | +0.00000 | + 5.9222 4.952889 | +0.02865 1.7323 | +0.000115 1.1791 | +0.0006 4.7415 |

| COORDONNÉES EQUATORIALES DIFFÉRENTIELLES DU SATELLITE 4 DE SATURNE: DIONE | | | | | | | N=2.296 |
|--|------------|----------|----------------------|--------------------|---------------------|-------------------|---------|
| | A0 | A1 | B0 F0 | B1 F1 | B2 F2 | CO PO | |
| JAN. 1 (OH) (2449353.9) | X: +0.0402 | -0.00008 | +49.6551 1.236957 | +0.11768 5.4395 | +0.000461 0.8531 | +0.0589 5.3656 | |
| A JAN. 17 (OH) | Y: +0.0263 | -0.00012 | +11.3809 3.283304 | +0.04798 0.3168 | +0.000080 4.7067 | +0.0130 1.1333 | |
| JAN. 17 (OH) (2449369.9) | X: +0.0388 | -0.00009 | +48.8749 0.239303 | +0.11670 4.5997 | +0.000448 0.0576 | +0.0579 3.3648 | |
| A FEV. 2 (OH) | Y: +0.0242 | -0.00013 | +10.6290 2.309521 | +0.04723 5.5831 | +0.000116 3.3303 | +0.0122 5.4600 | |
| FEV. 1 (OH) (2449384.9) | X: +0.0374 | -0.00008 | +48.3983 3.229066 | +0.11527 1.4563 | +0.000438 3.2954 | +0.0576 3.0666 | |
| A FEV. 17 (OH) | Y: +0.0222 | -0.00012 | + 9.9408 5.326464 | +0.04519 2.2639 | +0.000146 6.1609 | +0.0114 5.1947 | |
| FEV. 17 (OH) (2449400.9) | X: +0.0359 | -0.00006 | +48.1741 2.228591 | +0.11261 0.6156 | +0.000459 2.4604 | +0.0570 1.0806 | |
| A MAR. 5 (OH) | Y: +0.0201 | -0.00011 | + 9.2456 4.360157 | +0.04192 1.2254 | +0.000168 5.0077 | +0.0107 3.2302 | |
| MAR. 1 (OH) (2449412.9) | X: +0.0350 | -0.00005 | +48.1995 4.620135 | +0.11026 3.1324 | +0.000462 4.9367 | +0.0578 5.8673 | |
| A MAR. 17 (OH) | Y: +0.0186 | -0.00011 | + 8.7618 0.497496 | +0.03888 3.5816 | +0.000178 1.0137 | +0.0100 1.7705 | |
| MAR. 17 (OH) (2449428.9) | X: +0.0339 | -0.00003 | +48.4891 3.621529 | +0.10768 2.3070 | +0.000492 4.1113 | +0.0578 3.8806 | |
| A AVR. 2 (OH) | Y: +0.0167 | -0.00010 | + 8.1809 5.824561 | +0.03417 2.5289 | +0.000193 6.1546 | +0.0095 6.1130 | |
| AVR. 1 (OH) (2449443.9) | X: +0.0334 | +0.00000 | +49.0200 0.331601 | +0.10539 5.4677 | +0.000535 0.9432 | +0.0588 3.5907 | |
| A AVR. 17 (OH) | Y: +0.0151 | -0.00009 | + 7.7163 2.577531 | +0.02921 5.4596 | +0.000212 2.6980 | +0.0090 5.8646 | |
| AVR. 17 (OH) (2449459.9) | X: +0.0333 | +0.00005 | +49.8468 5.622411 | +0.10325 4.6667 | +0.000558 0.1026 | +0.0603 1.6194 | |
| A MAI 3 (OH) | Y: +0.0135 | -0.00007 | + 7.3197 1.631636 | +0.02301 4.3851 | +0.000232 1.5511 | +0.0086 3.9276 | |
| MAI 1 (OH) (2449473.9) | X: +0.0340 | +0.00010 | +50.7719 0.045541 | +0.10209 5.5461 | +0.000592 0.9954 | +0.0617 3.0271 | |
| A MAI 17 (OH) | Y: -0.0123 | -0.00006 | + 7.0680 2.376410 | +0.01699 4.9928 | +0.000262 2.1401 | +0.0084 5.3806 | |
| MAI 17 (OH) (2449489.9) | X: +0.0356 | +0.00018 | +52.0278 5.345853 | +0.10046 4.7705 | +0.000620 0.2377 | +0.0632 1.0672 | |
| A JUN. 2 (OH) | Y: +0.0112 | -0.00004 | + 6.8992 1.430711 | +0.00924 3.7671 | +0.000291 1.0450 | +0.0083 3.4450 | |
| JUN. 1 (OH) (2449504.9) | X: +0.0382 | +0.00026 | +53.3489 2.073788 | +0.09913 1.6993 | +0.000672 3.5400 | +0.0651 0.7996 | |
| A JUN. 17 (OH) | Y: +0.0105 | -0.00002 | + 6.8641 4.465738 | +0.00380 5.5598 | +0.000316 3.9875 | +0.0083 3.1958 | |
| JUN. 17 (OH) (2449520.9) | X: +0.0423 | +0.00034 | +54.8432 1.103219 | +0.09574 0.9534 | +0.000730 2.8596 | +0.0673 5.1302 | |
| A JUL. 3 (OH) | Y: +0.0101 | +0.00000 | + 6.9639 3.505014 | +0.01085 3.3766 | +0.000316 2.9716 | +0.0085 1.2487 | |

1994

COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 4 DE SATURNE: DIONE

N=2.296

| | A0 | A1 | B0 F0 | B1 F1 | B2 F2 | CO PO |
|-----------------------------|------------|----------|----------------------|--------------------|---------------------|-------------------|
| JUL. 1 (OH) (2449534.9) | X: +0.0468 | +0.00042 | +56.1405 1.830217 | +0.09165 1.8955 | +0.000794 3.9075 | +0.0688 0.2857 |
| A JUL. 17 (OH) | Y: +0.0101 | +0.00002 | + 7.1678 4.225990 | +0.01947 3.9182 | +0.000289 3.6725 | +0.0089 2.6662 |
| JUL. 17 (OH) (2449550.9) | X: +0.0534 | +0.00048 | +57.5037 0.871847 | +0.08392 1.2115 | +0.000876 3.2829 | +0.0703 4.6307 |
| A AOU. 2 (OH) | Y: +0.0104 | +0.00004 | + 7.5279 3.248225 | +0.02864 2.6726 | +0.000204 2.6807 | +0.0094 0.7052 |
| AOU. 1 (OH) (2449565.9) | X: +0.0606 | +0.00049 | +58.5448 3.905284 | +0.07521 4.5540 | +0.000967 0.3777 | +0.0716 4.3849 |
| A AOU. 17 (OH) | Y: +0.0110 | +0.00004 | + 7.9681 6.246608 | +0.03499 5.8631 | +0.000080 5.5102 | +0.0098 0.4165 |
| AOU. 17 (OH) (2449581.9) | X: +0.0665 | +0.00049 | +59.2785 2.955960 | +0.06494 4.0168 | +0.001041 6.0335 | +0.0720 2.4526 |
| A SEP. 2 (OH) | Y: +0.0117 | +0.00003 | + 8.5039 5.257308 | +0.03748 4.8800 | +0.000094 2.0104 | +0.0107 4.7313 |
| SEP. 1 (OH) (2449596.9) | X: +0.0761 | +0.00046 | +59.5270 5.994524 | +0.05895 1.2651 | +0.001076 3.1009 | +0.0719 2.2063 |
| A SEP. 17 (OH) | Y: +0.0123 | +0.00003 | + 9.0072 1.975458 | +0.03486 1.6017 | +0.000246 4.9020 | +0.0111 4.4613 |
| SEP. 17 (OH) (2449612.9) | X: +0.0834 | +0.00037 | +59.2633 5.046123 | +0.05980 0.8933 | +0.001066 2.4555 | +0.0711 0.2693 |
| A OCT. 3 (OH) | Y: +0.0127 | +0.00000 | + 9.4656 0.992269 | +0.02689 0.5936 | +0.000371 3.9456 | +0.0116 2.4806 |
| OCT. 1 (OH) (2449626.9) | X: +0.0885 | +0.00028 | +58.6655 5.784405 | +0.06758 2.0845 | +0.001009 3.4715 | +0.0697 1.7107 |
| A OCT. 17 (OH) | Y: +0.0127 | -0.00001 | + 9.7420 1.706731 | +0.01682 1.1948 | +0.000429 4.6891 | +0.0117 3.9054 |
| OCT. 17 (OH) (2449642.9) | X: +0.0930 | +0.00017 | +57.5771 4.827910 | +0.07969 1.5326 | +0.000917 2.7923 | +0.0682 6.0446 |
| A NOV. 2 (OH) | Y: +0.0123 | -0.00004 | + 9.8689 0.732014 | +0.00611 5.6218 | +0.000424 3.7327 | +0.0117 1.9455 |
| NOV. 1 (OH) (2449657.9) | X: +0.0955 | +0.00006 | +56.3062 1.566780 | +0.09215 4.8498 | +0.000800 6.1273 | +0.0662 5.7761 |
| A NOV. 17 (OH) | Y: +0.0116 | -0.00005 | + 9.7913 3.748230 | +0.01242 0.9598 | +0.000371 0.4501 | +0.0115 1.6745 |
| NOV. 17 (OH) (2449673.9) | X: +0.0964 | -0.00001 | +54.8178 0.598237 | +0.10247 4.1272 | +0.000707 5.4312 | +0.0640 3.8040 |
| A DEC. 3 (OH) | Y: +0.0106 | -0.00007 | + 9.5119 2.779448 | +0.02358 6.0290 | +0.000288 5.6915 | +0.0111 5.9936 |
| DEC. 1 (OH) (2449687.9) | X: +0.0964 | -0.00007 | +53.5115 1.313632 | +0.10980 5.0310 | +0.000607 0.1563 | +0.0624 5.2236 |
| A DEC. 17 (OH) | Y: +0.0095 | -0.00008 | + 9.1292 3.505019 | +0.03155 0.3863 | +0.000214 6.2779 | +0.0104 1.1347 |
| DEC. 17 (OH) (2449703.9) | X: +0.0952 | -0.00010 | +52.1127 0.329433 | +0.11442 4.2334 | +0.000546 5.7128 | +0.0608 3.2345 |
| A JAN. 2 (OH) | Y: +0.0061 | -0.00009 | + 8.5744 2.542880 | +0.03794 5.6353 | +0.000150 4.9785 | +0.0097 5.4714 |

1994

COORDONNEES EQUATORIALES DIFFÉRENTIELLES

DU SATELLITE 5 DE SATURNE: RHEA

N=1.391

| | A0 | A1 | B0 F0 | B1 F1 | B2 F2 | C0 P0 |
|-----------------------------|------------|----------|----------------------|--------------------|---------------------|-------------------|
| JAN. 1 (OH) (2449353.9) | X: +0.0016 | +0.00020 | +69.3018 2.920521 | +0.15207 0.7968 | +0.000677 2.4471 | +0.0319 5.8357 |
| A JAN. 17 (OH) | Y: -0.0295 | +0.00013 | +16.2207 4.979329 | +0.06687 1.9561 | +0.000100 0.0835 | +0.0073 1.6215 |
| JAN. 17 (OH) (2449369.9) | X: +0.0049 | +0.00022 | +68.2122 0.012281 | +0.15171 4.3469 | +0.000644 6.0757 | +0.0316 0.0501 |
| A FEV. 2 (OH) | Y: -0.0275 | +0.00011 | +15.1639 2.095924 | +0.06594 5.3163 | +0.000152 3.0266 | +0.0068 2.1512 |
| FEV. 1 (OH) (2449384.9) | X: +0.0084 | +0.00023 | +67.5486 1.995942 | +0.15004 0.2067 | +0.000646 1.9541 | +0.0315 4.0537 |
| A FEV. 17 (OH) | Y: -0.0257 | +0.00011 | +14.1986 4.107822 | +0.06311 0.9935 | +0.000192 4.6588 | +0.0064 6.1859 |
| FEV. 17 (OH) (2449400.9) | X: +0.0120 | +0.00025 | +67.2347 5.367429 | +0.14770 3.7517 | +0.000649 5.5111 | +0.0315 4.5538 |
| A MAR. 5 (OH) | Y: -0.0238 | +0.00011 | +13.2257 1.231530 | +0.05859 4.8304 | +0.000226 1.8132 | +0.0060 0.4368 |
| MAR. 1 (OH) (2449412.9) | X: +0.0150 | +0.00024 | +67.2705 3.183750 | +0.14584 1.6990 | +0.000666 3.4442 | +0.0315 0.2187 |
| A MAR. 17 (OH) | Y: -0.0225 | +0.00010 | +12.5505 5.360969 | +0.05443 2.1134 | +0.000246 5.8140 | +0.0057 2.4141 |
| MAR. 17 (OH) (2449428.9) | X: +0.0190 | +0.00023 | +67.6745 0.273311 | +0.14363 5.2533 | +0.000690 0.7062 | +0.0317 0.7211 |
| A AVR. 2 (OH) | Y: -0.0209 | +0.00009 | +11.7425 2.494397 | +0.04790 5.4326 | +0.000271 2.7643 | +0.0053 2.9699 |
| AVR. 1 (OH) (2449443.9) | X: +0.0226 | +0.00022 | +68.4149 2.259335 | +0.14189 1.1299 | +0.000731 2.8365 | +0.0320 4.7314 |
| A AVR. 17 (OH) | Y: -0.0194 | +0.00007 | +11.0989 4.524355 | +0.04090 1.0724 | +0.000296 4.6103 | +0.0050 0.7380 |
| AVR. 17 (OH) (2449459.9) | X: +0.0262 | +0.00021 | +69.5682 5.637749 | +0.14064 4.7028 | +0.000764 0.1254 | +0.0325 5.2410 |
| A MAI 3 (OH) | Y: -0.0183 | +0.00006 | +10.5537 1.667119 | +0.03233 4.3657 | +0.000329 1.5652 | +0.0048 1.2948 |
| MAI 1 (OH) (2449473.9) | X: +0.0293 | +0.00017 | +70.8597 6.241312 | +0.13969 5.4800 | +0.000819 0.9130 | +0.0329 0.1936 |
| A MAI 17 (OH) | Y: -0.0175 | +0.00004 | +10.2108 2.309898 | +0.02397 4.8600 | +0.000369 2.0531 | +0.0046 2.5725 |
| MAI 17 (OH) (2449489.9) | X: +0.0319 | +0.00017 | +72.6128 3.345674 | +0.13868 2.7915 | +0.000873 4.5382 | +0.0336 0.7150 |
| A JUN. 2 (OH) | Y: -0.0168 | +0.00001 | + 9.9859 5.735296 | +0.01336 1.6911 | +0.000407 5.3334 | +0.0045 3.1144 |
| JUN. 1 (OH) (2449504.9) | X: +0.0345 | +0.00008 | +74.4578 5.348870 | +0.13708 4.9980 | +0.000945 0.5286 | +0.0342 4.7394 |
| A JUN. 17 (OH) | Y: -0.0166 | +0.00000 | + 9.9467 1.479738 | +0.00644 2.5542 | +0.000440 0.9833 | +0.0045 0.8760 |
| JUN. 17 (OH) (2449520.9) | X: +0.0358 | +0.00007 | +76.5426 2.465427 | +0.13330 2.3451 | +0.001034 4.2316 | +0.0346 5.2697 |
| A JUL. 3 (OH) | Y: -0.0166 | -0.00003 | +10.0949 4.889803 | +0.01555 4.8144 | +0.000441 4.3307 | +0.0046 1.4074 |

1994

COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 5 DE SATURNE: RHEA

N=1.391

| | | A0 | A1 | B0 F0 | B1 F1 | B2 F2 | CO PO |
|----------------------------|----|---------|----------|----------------------|--------------------|---------------------|-------------------|
| JUL. 1 (OH) (2449534.9) | X: | +0.0362 | +0.00003 | +78.3541 3.089549 | +0.12815 3.1881 | +0.001147 5.1416 | +0.0351 0.2350 |
| A JUL.17 (OH) | Y: | -0.0173 | -0.00006 | +10.3851 5.508261 | +0.02733 5.2249 | +0.000399 4.9264 | +0.0047 2.6510 |
| JUL.17 (OH) (2449550.9) | X: | +0.0366 | -0.00011 | +80.2559 0.218544 | +0.11923 0.6030 | +0.001261 2.6091 | +0.0357 0.7718 |
| A AOU. 2 (OH) | Y: | -0.0185 | -0.00007 | +10.8908 2.615176 | +0.0389 2.2534 | +0.000281 2.0304 | +0.0049 3.1426 |
| AOU. 1 (OH) (2449565.9) | X: | +0.0344 | -0.00008 | +81.7083 2.244540 | +0.10938 2.9431 | +0.001392 4.9536 | +0.0359 4.8059 |
| A AOU.17 (OH) | Y: | -0.0200 | -0.00008 | +11.5049 4.609209 | +0.04848 4.2303 | +0.000106 3.9061 | +0.0051 0.8619 |
| AOU.17 (OH) (2449581.9) | X: | +0.0328 | -0.00023 | +82.7325 5.666341 | +0.09874 0.4901 | +0.001463 2.4187 | +0.0359 5.3447 |
| A SEP. 2 (OH) | Y: | -0.0215 | -0.00009 | +12.2485 1.707648 | +0.05175 1.3357 | +0.000133 4.6583 | +0.0056 1.3610 |
| SEP. 1 (OH) (2449596.9) | X: | +0.0289 | -0.00015 | +83.0785 1.414915 | +0.09347 2.9696 | +0.001507 4.7637 | +0.0359 3.0939 |
| A SEP.17 (OH) | Y: | -0.0233 | -0.00005 | +12.9441 3.701782 | +0.04800 3.3361 | +0.000354 0.2895 | +0.0058 5.3565 |
| SEP.17 (OH) (2449612.9) | X: | +0.0263 | -0.00023 | +82.7389 4.838420 | +0.09491 0.6145 | +0.001457 2.2187 | +0.0356 3.6212 |
| A OCT. 3 (OH) | Y: | -0.0243 | -0.00006 | +13.5754 0.806728 | +0.03649 0.4330 | +0.000521 3.7200 | +0.0060 5.6670 |
| OCT. 1 (OH) (2449626.9) | X: | +0.0229 | -0.00014 | +81.8765 5.475442 | +0.10296 1.6559 | +0.001383 3.1487 | +0.0353 4.8725 |
| A OCT.17 (OH) | Y: | -0.0252 | -0.00001 | +13.9522 1.419455 | +0.02207 0.9645 | +0.000602 4.3712 | +0.0062 0.8053 |
| OCT.17 (OH) (2449642.9) | X: | +0.0205 | -0.00014 | +80.3580 2.608335 | +0.11520 5.4591 | +0.001262 0.5881 | +0.0350 5.3924 |
| A NOV. 2 (OH) | Y: | -0.0256 | +0.00002 | +14.1187 4.816969 | +0.00611 3.3730 | +0.000592 1.5045 | +0.0062 1.3142 |
| NOV. 1 (OH) (2449657.9) | X: | +0.0184 | -0.00003 | +78.5822 4.626838 | +0.12722 1.4945 | +0.001127 2.9008 | +0.0345 3.1274 |
| A NOV.17 (OH) | Y: | -0.0254 | +0.00006 | +13.9998 0.544336 | +0.01723 3.8692 | +0.000520 3.5123 | +0.0062 5.3291 |
| NOV.17 (OH) (2449673.9) | X: | +0.0178 | +0.00000 | +76.5053 1.746135 | +0.13766 5.1643 | +0.000991 0.3100 | +0.0340 3.6469 |
| A DEC. 3 (OH) | Y: | -0.0244 | +0.00007 | +13.5988 3.948775 | +0.03327 0.8189 | +0.000406 0.5660 | +0.0060 5.8603 |
| DEC. 1 (OH) (2449687.9) | X: | +0.0181 | +0.00004 | +74.6819 2.360960 | +0.14467 5.9821 | +0.000893 1.1890 | +0.0335 4.8774 |
| A DEC.17 (OH) | Y: | -0.0233 | +0.00010 | +13.0563 4.574264 | +0.04460 1.3818 | +0.000299 1.0510 | +0.0058 0.8217 |
| DEC.17 (OH) (2449703.9) | X: | +0.0188 | +0.00014 | +72.7298 5.749846 | +0.14945 3.2968 | +0.000790 4.8546 | +0.0330 5.3819 |
| A JAN. 2 (OH) | Y: | -0.0217 | +0.00011 | +12.2740 1.702803 | +0.05368 4.7320 | +0.000201 4.1487 | +0.0054 1.3527 |

| 1994 | | COORDONNEES EQUATORIALES DIFFERENTIELLES | | | | N=0.394 |
|-----------------------------|----|--|-----------|-----------------------|---------------------|-------------------|
| | | DU SATELLITE 6 DE SATURNE : TITAN | | B1 F1 | C0 PO | |
| JAN. 1 (OH) (2449353.7) | X: | + 4.0912 | - 0.88248 | +162.4671 0.134630 | + 0.88480 3.1784 | +2.0300 0.4911 |
| A JAN. 12 (OH) | Y: | - 2.8384 | + 0.25391 | + 37.3451 2.183438 | + 0.36780 5.4811 | +0.4111 2.5392 |
| JAN. 12 (OH) (2449364.7) | X: | + 2.3380 | - 0.56525 | +160.7540 4.497286 | + 0.84092 2.8393 | +2.5727 2.6843 |
| A JAN. 23 (OH) | Y: | - 2.8850 | + 0.29586 | + 34.1620 0.301573 | + 0.18707 5.0889 | +0.5849 4.8236 |
| JAN. 23 (OH) (2449375.7) | X: | + 0.6812 | - 0.23784 | +155.6799 2.507553 | + 0.11836 2.3035 | +2.1297 4.8764 |
| A FEV. 3 (OH) | Y: | - 2.3720 | + 0.21654 | + 31.4507 4.564124 | + 0.18224 0.3287 | +0.4353 0.6268 |
| FEV. 1 (OH) (2449384.7) | X: | + 6.5826 | - 1.10291 | +159.7860 6.000064 | + 0.93591 2.7779 | +1.9385 6.0352 |
| A FEV. 12 (OH) | Y: | - 1.5572 | + 0.03815 | + 31.5792 1.833284 | + 0.20434 4.8243 | +0.4026 1.8019 |
| FEV. 12 (OH) (2449395.7) | X: | + 7.4044 | - 1.26428 | +160.9289 4.107435 | + 1.39551 2.5128 | +2.7105 1.9007 |
| A FEV. 23 (OH) | Y: | - 2.0810 | + 0.14997 | + 29.5642 6.212985 | + 0.10390 4.1573 | +0.4808 4.0944 |
| FEV. 23 (OH) (2449406.7) | X: | + 6.6048 | - 1.13072 | +149.0115 2.106996 | + 0.90256 2.2925 | +1.9512 4.0313 |
| A MAR. 6 (OH) | Y: | - 1.9375 | + 0.14319 | + 27.4279 4.215074 | + 0.14964 0.1060 | +0.3793 6.2420 |
| MAR. 1 (OH) (2449412.7) | X: | + 2.3386 | - 0.45463 | +157.2004 4.465780 | + 0.78863 3.0947 | +2.5156 2.7220 |
| A MAR. 12 (OH) | Y: | - 2.2785 | + 0.23640 | + 27.4197 0.366782 | + 0.13110 5.1495 | +0.4697 4.9548 |
| MAR. 12 (OH) (2449423.7) | X: | + 0.7359 | - 0.13880 | +155.2485 2.472515 | + 0.20001 2.4671 | +2.1731 4.9047 |
| A MAR. 23 (OH) | Y: | - 1.7657 | + 0.15414 | + 25.3176 4.642385 | + 0.15266 0.3683 | +0.3521 0.7825 |
| MAR. 23 (OH) (2449434.7) | X: | - 2.9270 | + 0.56322 | +159.7461 0.531549 | + 0.83634 5.3501 | +1.8411 1.1493 |
| A AVR. 3 (OH) | Y: | - 1.2918 | + 0.08955 | + 25.3760 2.710076 | + 0.17806 5.8655 | +0.3015 3.4967 |
| AVR. 1 (OH) (2449443.7) | X: | + 8.1684 | - 1.30254 | +163.3659 4.079595 | + 1.40353 2.6495 | +2.7784 1.9360 |
| A AVR. 12 (OH) | Y: | - 1.8672 | + 0.15775 | + 23.9340 0.033292 | + 0.07543 4.7901 | +0.3997 4.2697 |
| AVR. 12 (OH) (2449454.7) | X: | + 7.2947 | - 1.16369 | +153.3362 2.078230 | + 1.09348 2.3633 | +2.0442 4.0684 |
| A AVR. 23 (OH) | Y: | - 1.6658 | + 0.13927 | + 22.3444 4.316230 | + 0.14112 6.1153 | +0.3154 0.1027 |
| AVR. 23 (OH) (2449465.7) | X: | + 4.0015 | - 0.62016 | +164.3852 0.087546 | + 0.35033 3.4076 | +2.0494 0.5315 |
| A MAI 4 (OH) | Y: | - 1.7156 | + 0.16822 | + 23.2079 2.382069 | + 0.19414 5.5254 | +0.2637 2.9029 |

| 1994 | | COORDONNEES EQUATORIALES DIFFERENTIELLES | | | | |
|-----------------------------|----|--|-----------|-----------------------|---------------------|-------------------|
| | | DU SATELLITE 6 DE SATURNE: TITAN | | | N=0.394 | |
| | | A0 | A1 | B0 F0 | B1 F1 | C0 P0 |
| MAI 1 (OH) (2449473.7) | X: | - 2.9763 | + 0.91957 | +166.4556 3.218743 | + 0.51454 0.1249 | +2.5963 0.2383 |
| A MAI 12 (OH) | Y: | + 0.1439 | - 0.17934 | + 22.8293 5.543228 | + 0.19282 2.4438 | +0.3658 2.6019 |
| MAI 12 (OH) (2449484.7) | X: | + 0.6273 | + 0.33352 | +167.1680 1.299112 | + 0.71408 0.4869 | +2.0300 2.7075 |
| A MAI 23 (OH) | Y: | - 0.0506 | - 0.13815 | + 21.5524 3.670503 | + 0.08995 2.5935 | +0.2424 5.0586 |
| MAI 23 (OH) (2449495.7) | X: | + 4.2723 | - 0.33824 | +171.2549 5.593795 | + 0.15022 1.0325 | +2.2884 5.2900 |
| A JUN. 3 (OH) | Y: | - 0.5090 | - 0.06382 | + 20.8955 1.664011 | + 0.07859 3.1459 | +0.3058 1.4162 |
| JUN. 1 (OH) (2449504.7) | X: | - 6.1578 | + 1.37425 | +176.8584 2.824436 | + 0.87301 5.5508 | +2.8267 5.7668 |
| A JUN. 12 (OH) | Y: | - 0.1171 | - 0.10454 | + 21.8021 5.232992 | + 0.08101 2.1591 | +0.3374 1.9352 |
| JUN. 12 (OH) (2449515.7) | X: | - 4.6194 | + 1.21796 | +179.7794 0.948243 | + 1.16011 6.0598 | +1.9373 2.0286 |
| A JUN. 23 (OH) | Y: | + 0.0841 | - 0.14179 | + 21.3470 3.346360 | + 0.14783 2.5286 | +0.2431 4.3418 |
| JUN. 23 (OH) (2449526.7) | X: | - 3.2609 | + 1.02203 | +173.2792 5.248755 | + 1.16571 5.7858 | +2.7756 4.6002 |
| A JUL. 4 (OH) | Y: | + 0.0440 | - 0.15422 | + 20.6685 1.332035 | + 0.14515 2.1741 | +0.3267 0.7587 |
| JUL. 1 (OH) (2449534.7) | X: | + 7.4714 | - 1.16321 | +174.8799 2.19659 | + 1.30071 2.6904 | +2.3788 4.2547 |
| A JUL. 12 (OH) | Y: | - 1.7204 | + 0.16229 | + 21.1792 4.476898 | + 0.16570 5.2277 | +0.3060 0.2904 |
| JUL. 12 (OH) (2449545.7) | X: | + 3.2024 | - 0.40777 | +186.4723 0.162512 | + 0.25397 2.5851 | +2.3331 0.6780 |
| A JUL. 23 (OH) | Y: | - 1.5649 | + 0.14423 | + 23.5820 2.523526 | + 0.07053 0.3263 | +0.2746 3.0725 |
| JUL. 23 (OH) (2449556.7) | X: | - 0.2716 | + 0.15642 | +185.0427 4.519266 | + 0.62265 4.7578 | +2.9682 3.0449 |
| A AOU. 3 (OH) | Y: | - 1.5421 | + 0.12900 | + 23.8761 0.612171 | + 0.21052 6.1923 | +0.3988 5.3428 |
| AOU. 1 (OH) (2449565.7) | X: | + 9.5056 | - 1.38461 | +180.7733 1.783703 | + 1.45093 2.5120 | +2.4771 3.5625 |
| A AOU. 12 (OH) | Y: | - 1.4356 | + 0.06517 | + 24.1172 4.102258 | + 0.15562 4.2784 | +0.3340 5.9124 |
| AOU. 12 (OH) (2449576.7) | X: | + 8.9600 | - 1.35774 | +194.9769 6.092153 | + 1.18988 2.3578 | +2.4080 0.1076 |
| A AOU. 23 (OH) | Y: | - 1.8803 | + 0.14840 | + 26.7316 2.132842 | + 0.07020 0.2940 | +0.3092 2.3047 |
| AOU. 23 (OH) (2449587.7) | X: | + 7.9915 | - 1.30879 | +196.8150 4.226050 | + 0.89165 2.8062 | +3.3357 2.3054 |
| A SEP. 3 (OH) | Y: | - 2.2187 | + 0.20436 | + 27.0585 0.232797 | + 0.27664 5.8139 | +0.4722 4.6054 |

1994

COORDONNEES EQUATORIALES DIFFÉRENTIELLES

DU SATELLITE € DE SATURNE: TITAN

N=0.394

| | | AO | A1 | B0 FO | B1 F1 | CO PO |
|-----------------------------|----|----------|-----------|-----------------------|---------------------|-------------------|
| SEP. 1 (OH) (2449596.7) | X: | + 4.1658 | - 0.35434 | +189.4813 1.471343 | + 0.52796 2.2489 | +2.4454 3.0110 |
| A SEP. 12 (OH) | Y: | - 0.5246 | - 0.13013 | + 27.9679 3.744956 | + 0.21326 3.1950 | +0.3308 5.2514 |
| SEP. 12 (OH) (2449607.7) | X: | + 7.8779 | - 1.04785 | +195.8767 5.785142 | + 1.13780 2.0830 | +2.4538 5.6989 |
| A SEP. 23 (OH) | Y: | - 1.0735 | - 0.04027 | + 28.9891 1.749411 | + 0.07554 2.2981 | +0.3987 1.5695 |
| SEP. 23 (OH) (2449618.7) | X: | + 9.6660 | - 1.47488 | +196.1621 3.921443 | + 1.05174 2.2885 | +3.3377 1.6535 |
| A OCT. 4 (OH) | Y: | - 1.5039 | + 0.03758 | + 30.0520 6.100311 | + 0.09698 5.2550 | +0.4897 3.8172 |
| OCT. 1 (OH) (2449626.7) | X: | - 5.7910 | + 1.16712 | +194.1070 0.790918 | + 0.85095 5.3137 | +2.0844 1.6524 |
| A OCT. 12 (OH) | Y: | - 0.7733 | - 0.05533 | + 30.4411 2.966458 | + 0.08953 2.1206 | +0.3628 3.8245 |
| OCT. 12 (OH) (2449637.7) | X: | - 7.0694 | + 1.50246 | +178.3726 5.106063 | + 1.19090 5.9479 | +2.9812 4.2583 |
| A OCT. 23 (OH) | Y: | - 0.0353 | - 0.18574 | + 29.6076 0.972669 | + 0.16374 2.2357 | +0.4525 0.1282 |
| OCT. 23 (OH) (2449648.7) | X: | - 5.9189 | + 1.33627 | +187.7801 3.121324 | + 1.44089 5.8891 | +2.9044 6.2761 |
| A NOV. 3 (OH) | Y: | + 0.0640 | - 0.21021 | + 32.0612 5.310629 | + 0.20861 2.3303 | +0.5130 2.2159 |
| NOV. 1 (OH) (2449657.7) | X: | - 1.1997 | + 0.19397 | +184.3493 0.435291 | + 0.58720 4.0924 | +2.1926 1.0315 |
| A NOV. 12 (OH) | Y: | - 1.9718 | + 0.15671 | + 31.4019 2.577701 | + 0.18504 5.8252 | +0.3634 3.2829 |
| NOV. 12 (OH) (2449668.7) | X: | - 4.9264 | + 0.91899 | +172.5436 4.761891 | + 0.57444 5.6183 | +2.7497 3.5239 |
| A NOV. 23 (OH) | Y: | - 1.3089 | + 0.06337 | + 29.8633 0.657173 | + 0.02033 5.4378 | +0.4746 5.6175 |
| NOV. 23 (OH) (2449679.7) | X: | - 5.7424 | + 1.11948 | +179.0002 2.774622 | + 1.21993 5.6928 | +2.7321 5.5819 |
| A DEC. 4 (OH) | Y: | - 0.9779 | + 0.00604 | + 29.2645 4.972262 | + 0.13868 1.4555 | +0.4276 1.5275 |
| DEC. 1 (OH) (2449687.7) | X: | + 8.0481 | - 1.22802 | +177.1228 5.919373 | + 1.30903 2.5694 | +2.1362 5.9741 |
| A DEC. 12 (OH) | Y: | - 1.4195 | + 0.03035 | + 28.8064 1.842075 | + 0.16793 4.7048 | +0.3684 1.8117 |
| DEC. 12 (OH) (2449698.7) | X: | + 8.6944 | - 1.38979 | +174.9564 4.041428 | + 1.36350 2.3177 | +2.9434 1.8648 |
| A DEC. 23 (OH) | Y: | - 1.8971 | + 0.13990 | + 27.2176 6.227207 | + 0.07983 4.1511 | +0.4467 4.1219 |
| DEC. 23 (OH) (2449709.7) | X: | + 7.2083 | - 1.15600 | +160.0617 2.046923 | + 0.68419 2.5324 | +2.0854 4.0009 |
| A JAN. 3 (OH) | Y: | - 1.8411 | + 0.14581 | + 25.2510 4.232353 | + 0.16534 0.1144 | +0.3491 6.2762 |

| COORDONNEES EQUATORIALES DIFFERENTIELLES DU SATELLITE 7 DE SATURNE: HYPERION | | | | | | N=0.394 |
|---|----|----------|-----------|-----------------------|---------------------|-------------------|
| | | AO | A1 | B0 FO | B1 F1 | CO PO |
| JAN. 1 (OH) (2449353.7) | X: | +28.2621 | - 6.63290 | +161.3736 1.219609 | + 8.51380 5.6573 | +2.9004 6.0210 |
| A JAN. 9 (OH) | Y: | + 0.4776 | - 0.58792 | + 35.2171 3.388876 | + 2.02398 1.6365 | +0.6624 1.9069 |
| JAN. 9 (OH) (2449361.7) | X: | -51.6862 | + 2.68136 | +172.4593 3.670798 | +13.19368 1.6518 | +0.5208 1.1970 |
| A JAN. 17 (OH) | Y: | + 4.8564 | + 0.76850 | + 34.2072 5.609475 | + 2.55843 3.8135 | +0.0740 3.5042 |
| JAN. 17 (OH) (2449369.7) | X: | -26.4596 | + 9.01534 | +134.6563 6.131107 | + 9.57825 4.7736 | +0.6357 1.8283 |
| A JAN. 25 (OH) | Y: | +14.9966 | - 2.26407 | + 24.6692 1.719722 | + 1.15798 0.3184 | +0.2770 4.0694 |
| JAN. 25 (OH) (2449377.7) | X: | +19.3348 | -11.88958 | +135.5873 2.041691 | + 4.95848 0.1242 | +1.8171 2.1210 |
| A FEV. 2 (OH) | Y: | - 7.6863 | + 1.84773 | + 30.4433 3.989248 | + 1.49666 1.7054 | +0.1996 4.2580 |
| FEV. 1 (OH) (2449384.7) | X: | -51.9590 | + 4.04463 | +159.7584 4.169235 | +12.62906 2.2531 | +0.4948 2.0556 |
| A FEV. 9 (OH) | Y: | + 6.3294 | + 0.43442 | + 30.2342 0.080047 | + 2.40837 4.4631 | +0.0974 4.4840 |
| FEV. 9 (OH) (2449392.7) | X: | +18.3451 | - 0.41260 | +160.2568 0.146946 | + 8.92089 4.6965 | +2.3412 3.6329 |
| A FEV. 17 (OH) | Y: | + 8.8797 | - 1.85852 | + 23.6571 2.339503 | + 1.08021 0.8894 | +0.3080 5.6304 |
| FEV. 17 (OH) (2449400.7) | X: | -27.1606 | - 3.88172 | +167.4282 2.594506 | +10.38240 0.5352 | +0.5308 2.7371 |
| A FEV. 25 (OH) | Y: | - 3.3206 | + 1.57025 | + 26.4306 4.647901 | + 1.44489 2.4397 | +0.1404 5.7246 |
| FEV. 25 (OH) (2449408.7) | X: | -48.2565 | + 6.30110 | +143.0455 4.969504 | +11.07502 3.2811 | +0.1207 4.6089 |
| A MAR. 5 (OH) | Y: | + 8.0403 | - 0.10048 | + 25.9661 0.690063 | + 2.07254 5.4340 | +0.0474 5.6322 |
| MAR. 1 (OH) (2449412.7) | X: | -16.2228 | + 6.93288 | +140.4947 6.184369 | + 8.99244 4.7695 | +1.0467 2.7373 |
| A MAR. 9 (OH) | Y: | +11.6468 | - 2.05285 | + 19.2540 1.932088 | + 0.77188 0.6696 | +0.2514 4.4978 |
| MAR. 9 (OH) (2449420.7) | X: | + 2.7527 | - 9.49142 | +146.2507 2.178169 | + 6.79349 0.1873 | +1.4040 2.3886 |
| A MAR. 17 (OH) | Y: | - 5.7284 | + 1.67262 | + 23.9682 4.206536 | + 1.19698 1.8723 | +0.1621 5.1065 |
| MAR. 17 (OH) (2449428.7) | X: | -51.7206 | + 5.01125 | +151.8767 4.575279 | +12.06093 2.7893 | +0.3018 3.0040 |
| A MAR. 25 (OH) | Y: | + 6.3933 | + 0.10925 | + 24.0178 0.578923 | + 1.94634 5.0626 | +0.0682 5.2787 |
| MAR. 25 (OH) (2449436.7) | X: | +28.1310 | - 4.63890 | +168.0330 0.507467 | + 9.20656 4.9024 | +3.0732 4.6830 |
| A AVR. 2 (OH) | Y: | + 1.4311 | - 0.46931 | + 23.8075 2.856687 | + 1.32678 1.0465 | +0.4442 0.7646 |
| AVR. 1 (OH) (2449443.7) | X: | -37.7910 | - 2.10168 | +176.4403 2.710535 | +11.97058 0.6435 | +0.0913 2.4610 |
| A AVR. 9 (OH) | Y: | - 0.4869 | + 0.98008 | + 22.4660 4.950876 | + 1.37637 2.8315 | +0.0619 6.1257 |
| AVR. 9 (OH) (2449451.7) | X: | -52.3833 | + 7.38418 | +141.8612 5.079084 | +10.59888 3.4843 | +0.2893 6.1510 |
| A AVR. 17 (OH) | Y: | + 7.2046 | - 0.28402 | + 20.9571 1.099492 | + 1.60639 5.7026 | +0.0084 4.7008 |
| AVR. 17 (OH) (2449459.7) | X: | +25.5612 | - 6.27841 | +164.6901 1.050446 | + 8.59958 5.4886 | +2.8409 6.0774 |
| A AVR. 25 (OH) | Y: | + 0.1147 | - 0.31318 | + 21.7100 3.486887 | + 1.22654 1.7508 | +0.4092 2.2302 |
| AVR. 25 (OH) (2449467.7) | X: | -54.4175 | + 1.75539 | +176.9021 3.526805 | +13.83389 1.5520 | +0.5684 1.3033 |
| A MAI 3 (OH) | Y: | + 3.4771 | + 0.39762 | + 21.3234 5.919166 | + 1.62661 3.9570 | +0.0527 3.8003 |

| 1994 COORDONNEES EQUATORIALES DIFFERENTIELLES DU SATELLITE 7 DE SATURNE: HYPERION N=0.394 | | | | | | |
|--|----|----------|-----------|-----------------------|---------------------|-------------------|
| | | A0 | A1 | B0 F0 | B1 F1 | C0 P0 |
| MAI 1 (OH) (2449473.7) | X: | -56.3498 | + 9.58151 | +136.4195 5.298346 | + 9.57199 3.8552 | +0.7153 0.4273 |
| A MAI 9 (OH) | Y: | + 7.7385 | - 0.63098 | + 18.5324 1.319410 | + 1.27824 5.9974 | +0.0652 3.5428 |
| MAI 9 (OH) (2449481.7) | X: | +35.6028 | -10.58242 | +158.3637 1.199510 | + 6.69273 5.5062 | +2.1308 0.5075 |
| A MAI 17 (OH) | Y: | - 1.9888 | + 0.22771 | + 20.7318 3.662383 | + 1.08814 1.8083 | +0.3140 2.7888 |
| MAI 17 (OH) (2449489.7) | X: | -57.9554 | + 2.52406 | +178.9650 3.745666 | +14.25687 1.8169 | +0.6021 1.6758 |
| A MAI 25 (OH) | Y: | + 4.2228 | + 0.27055 | + 20.2638 6.193722 | + 1.60732 4.2818 | +0.0635 4.3069 |
| MAI 25 (OH) (2449497.7) | X: | -15.5857 | + 6.30590 | +159.9678 6.100934 | + 9.25544 4.6282 | +1.7995 2.9890 |
| A JUN. 2 (OH) | Y: | + 7.3002 | - 1.47054 | + 15.0375 2.153335 | + 0.64432 0.9139 | +0.1978 5.0174 |
| JUN. 1 (OH) (2449504.7) | X: | +22.3898 | -13.49797 | +152.6799 1.769350 | + 5.70620 5.9575 | +1.8045 2.1539 |
| A JUN. 9 (OH) | Y: | - 4.9266 | + 1.39261 | + 19.0262 4.061534 | + 0.93294 1.7410 | +0.1295 4.7442 |
| JUN. 9 (OH) (2449512.7) | X: | -60.9317 | + 4.22006 | +175.9976 4.264011 | +14.17555 2.4527 | +0.4526 2.6197 |
| A JUN. 17 (OH) | Y: | + 5.6149 | + 0.02324 | + 19.7670 0.441222 | + 1.63508 4.9159 | +0.0651 5.1831 |
| JUN. 17 (OH) (2449520.7) | X: | +25.3525 | - 3.76595 | +194.4586 0.202659 | +10.71461 4.5964 | +3.7208 4.1958 |
| A JUN. 25 (OH) | Y: | + 1.1985 | - 0.41760 | + 20.2403 2.706081 | + 1.13807 0.9398 | +0.3842 0.4330 |
| JUN. 25 (OH) (2449528.7) | X: | -46.6076 | - 1.89010 | +202.4119 2.721006 | +14.26206 0.6614 | +0.1461 0.2348 |
| A JUL. 3 (OH) | Y: | + 0.9535 | + 0.80280 | + 20.3616 5.121292 | + 1.36123 3.0679 | +0.0185 0.0679 |
| JUL. 1 (OH) (2449534.7) | X: | -62.5046 | + 4.97540 | +178.1487 4.500513 | +14.27465 2.7547 | +0.3284 3.2091 |
| A JUL. 9 (OH) | Y: | + 6.3659 | - 0.08760 | + 20.2554 0.650826 | + 1.69429 5.1857 | +0.0595 5.6494 |
| JUL. 9 (OH) (2449542.7) | X: | +21.2438 | - 3.59662 | +198.8210 0.483695 | +11.10329 4.9270 | +3.9181 4.8636 |
| A JUL. 17 (OH) | Y: | + 0.2239 | - 0.27811 | + 21.8147 2.929192 | + 1.27219 1.1545 | +0.4369 1.0041 |
| JUL. 17 (OH) (2449550.7) | X: | -55.1872 | - 0.46305 | +209.4145 2.969316 | +15.51707 0.9297 | +0.4376 0.4669 |
| A JUL. 25 (OH) | Y: | + 2.2900 | + 0.70098 | + 22.0561 5.355909 | + 1.59939 3.3492 | +0.0232 3.1535 |
| JUL. 25 (OH) (2449558.7) | X: | -71.0712 | +12.25690 | +150.4079 5.333803 | +10.02290 4.0020 | +1.1743 0.6052 |
| A AOU. 2 (OH) | Y: | + 9.1702 | - 0.92242 | + 19.6488 1.318912 | + 1.32982 6.0820 | +0.1060 3.4154 |
| AOU. 1 (OH) (2449565.7) | X: | +28.4212 | - 7.47267 | +193.9253 1.013906 | + 9.62417 5.4345 | +3.3679 6.2449 |
| A AOU. 9 (OH) | Y: | - 0.7374 | - 0.22916 | + 23.4607 3.467081 | + 1.35770 1.7711 | +0.4622 2.3534 |
| AOU. 9 (OH) (2449573.7) | X: | -63.5472 | + 1.49976 | +206.8644 3.522934 | +16.35143 1.5623 | +0.6906 1.3600 |
| A AOU. 17 (OH) | Y: | + 4.6399 | + 0.48867 | + 24.2843 5.871622 | + 1.94709 3.9538 | +0.0796 4.0538 |
| AOU. 17 (OH) (2449581.7) | X: | -47.8277 | +12.29555 | +159.2242 5.922841 | + 9.72648 4.6866 | +1.4883 2.1165 |
| A AOU. 25 (OH) | Y: | +11.7909 | - 2.10327 | + 17.9994 1.698479 | + 0.68157 0.5559 | +0.2947 4.2126 |
| AOU. 25 (OH) (2449589.7) | X: | +14.5511 | -13.69497 | +176.0987 1.870010 | + 7.25908 6.0273 | +1.9399 2.3709 |
| A SEP. 2 (OH) | Y: | - 7.0902 | + 1.93114 | + 25.3566 3.977111 | + 1.33510 1.6572 | +0.1588 4.9495 |

| COORDONNEES EQUATORIALES DIFFERENTIELLES DU SATELLITE 7 DE SATURNE: HYPERION | | | | | | N=0.394 |
|---|----|----------|-----------|-----------------------|---------------------|-------------------|
| | | AO | A1 | BO FO | B1 F1 | CO PO |
| SEP. 1 (OH) (2449596.7) | X: | -68.0964 | + 3.53771 | +198.1190 4.055844 | +16.05424 2.1897 | +0.6264 2.2009 |
| A SEP. 9 (OH) | Y: | + 6.7763 | + 0.24661 | + 26.5559 0.066165 | + 2.23546 4.5164 | +0.1044 4.7813 |
| SEP. 9 (OH) (2449604.7) | X: | +17.0050 | - 1.44304 | +207.8440 0.001016 | +11.22782 4.4337 | +3.9876 3.7136 |
| A SEP. 17 (OH) | Y: | + 6.0834 | - 1.42602 | + 24.3563 2.294386 | + 1.18006 0.7224 | +0.4341 5.9375 |
| SEP. 17 (OH) (2449612.7) | X: | -39.3183 | - 4.12350 | +211.9465 2.500040 | +14.00485 0.4035 | +0.2570 3.3565 |
| A SEP. 25 (OH) | Y: | - 2.5656 | + 1.56165 | + 27.3597 4.630710 | + 1.66890 2.4854 | +0.0983 5.9891 |
| SEP. 25 (OH) (2449620.7) | X: | -69.0685 | + 7.23264 | +175.4697 4.670472 | +13.53264 3.2278 | +0.2071 5.5712 |
| A OCT. 3 (OH) | Y: | + 8.8532 | - 0.08723 | + 27.5392 0.828622 | + 2.30066 5.4565 | +0.0563 0.1214 |
| OCT. 1 (OH) (2449626.7) | X: | +25.3577 | - 4.07497 | +208.4130 0.211306 | +11.46363 4.5637 | +4.3182 4.2222 |
| A OCT. 9 (OH) | Y: | + 3.1571 | - 0.84872 | + 28.9380 2.497841 | + 1.60016 0.7348 | +0.6048 0.2325 |
| OCT. 9 (OH) (2449634.7) | X: | -49.5226 | - 1.96197 | +211.8244 2.736310 | +15.13391 0.6444 | +0.2708 5.9590 |
| A OCT. 17 (OH) | Y: | - 0.5402 | + 1.27413 | + 29.2335 4.890964 | + 1.95876 2.7986 | +0.0456 0.4788 |
| OCT. 17 (OH) (2449642.7) | X: | -71.4098 | + 9.38239 | +160.2324 5.085640 | +11.68097 3.5494 | +0.6122 0.1393 |
| A OCT. 25 (OH) | Y: | + 9.8406 | - 0.28237 | + 27.7768 1.002520 | + 2.21470 5.6727 | +0.0198 1.7708 |
| OCT. 25 (OH) (2449650.7) | X: | +29.2492 | - 7.67281 | +185.4278 1.049007 | + 9.01304 5.4382 | +3.3162 0.0866 |
| A NOV. 2 (OH) | Y: | + 0.8103 | - 0.77000 | + 29.0456 3.392392 | + 1.63806 1.7358 | +0.6249 2.3639 |
| NOV. 1 (OH) (2449657.7) | X: | -57.5037 | - 0.06271 | +199.4086 3.265181 | +15.58668 1.2443 | +0.6434 0.8641 |
| A NOV. 9 (OH) | Y: | + 2.4420 | + 0.89567 | + 29.2293 5.459713 | + 2.21490 3.4590 | +0.0650 3.0829 |
| NOV. 9 (OH) (2449665.7) | X: | -70.6684 | +14.35963 | +132.7021 5.635238 | + 8.84749 4.4855 | +1.4375 1.0070 |
| A NOV. 17 (OH) | Y: | +13.7627 | - 1.63809 | + 23.6341 1.326352 | + 1.22632 6.1292 | +0.2719 3.7122 |
| NOV. 17 (OH) (2449673.7) | X: | -41.7201 | -16.01080 | +151.1721 1.434699 | + 4.96436 5.3414 | +2.1591 1.8740 |
| A NOV. 25 (OH) | Y: | - 6.7784 | + 1.21668 | + 29.4715 3.643836 | + 1.51842 1.4269 | +0.2393 3.6421 |
| NOV. 25 (OH) (2449681.7) | X: | -65.4590 | + 3.08236 | +178.1549 4.023576 | +14.75512 2.1382 | +0.6579 2.1120 |
| A DEC. 3 (OH) | Y: | + 5.3179 | + 0.53052 | + 27.1025 0.001351 | + 2.25955 4.4280 | +0.1023 4.6305 |
| DEC. 1 (OH) (2449687.7) | X: | -58.4589 | +13.48983 | +131.6820 5.830860 | + 8.50371 4.6689 | +1.3767 1.5995 |
| A DEC. 9 (OH) | Y: | +14.2121 | - 2.12637 | + 20.2632 1.466061 | + 0.71298 0.0848 | +0.3458 4.0069 |
| DEC. 9 (OH) (2449695.7) | X: | +26.0052 | -14.28307 | +148.5404 1.676953 | + 5.57270 5.6834 | +1.9520 2.2943 |
| A DEC. 17 (OH) | Y: | - 7.3994 | + 1.62937 | + 26.8464 3.789923 | + 1.46661 1.4175 | +0.1724 4.6842 |
| DEC. 17 (OH) (2449703.7) | X: | -64.9386 | + 3.61893 | +167.8071 4.184857 | +13.98528 2.3442 | +0.5601 2.4441 |
| A DEC. 25 (OH) | Y: | + 5.3551 | + 0.42318 | + 24.6566 0.204229 | + 2.07513 4.6655 | +0.0911 4.9518 |
| DEC. 25 (OH) (2449711.7) | X: | +19.4909 | - 2.81845 | +183.1224 0.079429 | +10.35933 4.4271 | +3.9553 4.0145 |
| A JAN. 2 (OH) | Y: | + 4.1517 | - 0.87486 | + 23.7525 2.414085 | + 1.26208 0.6131 | +0.5137 0.0839 |

| 1994 | | COORDONNÉES EQUATORIALES DIFFÉRENTIELLES DU SATELLITE 8 DE SATURNE: JAPET | | | | N=0.079 |
|-----------------------------|----|--|-----------|-----------------------|--------------------|---------|
| | | AO | A1 | BO FO | CO PO | |
| JAN. 1 (OH) (2449353.9) | X: | + 8.1329 | - 1.52723 | +472.8581 0.368168 | + 9.5423 1.1972 | |
| A JAN. 17 (OH) | Y: | + 9.4676 | - 0.95678 | + 40.7414 6.100542 | + 3.0122 2.6038 | |
| JAN. 17 (OH) (2449369.9) | X: | +22.3114 | - 2.62352 | +421.7348 1.600599 | +11.3750 2.5278 | |
| A FEV. 2 (OH) | Y: | -10.4287 | + 1.48455 | + 43.9471 1.821808 | + 4.8573 4.9013 | |
| FEV. 1 (OH) (2449384.9) | X: | +10.3984 | - 2.50089 | +413.6075 2.868974 | + 4.0545 5.4521 | |
| A FEV. 17 (OH) | Y: | + 9.0126 | - 1.69827 | + 10.3788 1.328419 | + 2.7298 1.6677 | |
| FEV. 17 (OH) (2449400.9) | X: | -12.1280 | - 1.28305 | +447.6501 4.111489 | +10.8523 1.0992 | |
| A MAR. 5 (OH) | Y: | -14.2043 | + 0.43063 | + 37.4700 3.157934 | + 0.5456 3.7362 | |
| MAR. 1 (OH) (2449412.9) | X: | -36.9099 | + 2.78410 | +417.6058 4.918163 | + 3.1775 3.5271 | |
| A MAR. 17 (OH) | Y: | - 8.7833 | + 0.68545 | + 38.2475 4.124989 | + 1.2802 2.7727 | |
| MAR. 17 (OH) (2449428.9) | X: | -14.1240 | + 2.27534 | +418.7582 6.250710 | + 8.9026 5.2856 | |
| A AVR. 2 (OH) | Y: | + 9.8301 | - 0.10349 | + 52.6981 5.449058 | + 0.5093 1.6281 | |
| AVR. 1 (OH) (2449443.9) | X: | + 1.2981 | - 0.02394 | +456.2306 1.105206 | + 2.6392 1.9765 | |
| A AVR. 17 (OH) | Y: | +26.9391 | - 2.76088 | + 86.7947 6.206455 | + 6.0858 1.9183 | |
| AVR. 17 (OH) (2449459.9) | X: | - 9.0041 | - 1.11377 | +455.6673 2.326738 | + 5.8972 4.5932 | |
| A MAI 3 (OH) | Y: | - 8.7850 | + 0.82228 | + 71.5452 1.812658 | + 3.3518 4.9032 | |
| MAI 1 (OH) (2449473.9) | X: | -33.8348 | + 1.02625 | +484.5278 3.387644 | + 8.2486 6.2096 | |
| A MAI 17 (OH) | Y: | - 4.4498 | + 0.44742 | + 71.9162 2.771192 | + 3.2373 6.1064 | |
| MAI 17 (OH) (2449489.9) | X: | -18.9605 | + 1.70373 | +482.2833 4.632857 | + 7.3389 2.5801 | |
| A JUN. 2 (OH) | Y: | +13.1079 | - 1.69591 | + 72.8430 4.449566 | + 6.4733 1.8669 | |
| JUN. 1 (OH) (2449504.9) | X: | - 6.8990 | + 1.22022 | +485.1750 5.862890 | +12.1403 4.6097 | |
| A JUN. 17 (OH) | Y: | -11.3841 | + 1.78316 | + 46.2544 4.888550 | + 5.1701 4.7189 | |
| JUN. 17 (OH) (2449520.9) | X: | - 8.7560 | - 0.46564 | +526.8147 0.836181 | + 3.6566 0.5674 | |
| A JUL. 3 (OH) | Y: | +15.9260 | - 1.28475 | + 86.5157 6.240711 | + 3.6807 1.0121 | |

1994

COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 8 DE SATURNE: JAPET

N=0.079

| | | A0 | A1 | B0 FO | CO PO |
|----------------------------|----|----------|-----------|-----------------------|--------------------|
| JUL. 1 (OH) (2449534.9) | X: | -43.4616 | + 2.11849 | +573.9673 1.975569 | + 7.5525 4.3786 |
| A JUL.17 (OH) | Y: | +10.3341 | - 1.40645 | + 70.7556 0.990027 | + 3.9863 1.9013 |
| JUL.17 (OH) (2449550.9) | X: | -43.2185 | + 3.13593 | +583.2002 3.164126 | + 7.4920 5.5611 |
| A AOU. 2 (OH) | Y: | -22.5670 | + 3.15911 | +129.2876 2.583463 | + 7.4891 5.0652 |
| AOU. 1 (OH) (2449565.9) | X: | -10.1714 | + 1.07909 | +553.4578 4.405849 | + 8.5562 2.6587 |
| A AOU.17 (OH) | Y: | + 5.3647 | + 0.35492 | + 82.2913 3.786148 | + 1.2589 6.2078 |
| AOU.17 (OH) (2449581.9) | X: | -23.1959 | + 0.73938 | +546.4326 5.745080 | +15.9875 4.5808 |
| A SEP. 2 (OH) | Y: | - 0.3873 | - 0.50202 | + 74.5210 5.256148 | + 2.0469 4.0774 |
| SEP. 1 (OH) (2449596.9) | X: | -25.3424 | - 0.48695 | +578.0189 0.641145 | + 9.6304 0.7760 |
| A SEP.17 (OH) | Y: | -28.5737 | + 2.97419 | + 46.3827 0.996001 | + 7.5474 5.3145 |
| SEP.17 (OH) (2449612.9) | X: | -41.0056 | + 2.98021 | +603.5898 1.971586 | + 9.0130 3.5327 |
| A OCT. 3 (OH) | Y: | + 7.3096 | - 0.76135 | + 55.2767 1.195619 | + 3.8267 1.9041 |
| OCT. 1 (OH) (2449626.9) | X: | +24.5238 | - 3.17048 | +505.5417 3.126555 | + 3.1393 2.1800 |
| A OCT.17 (OH) | Y: | + 7.7198 | - 0.94520 | + 42.3637 2.478874 | + 2.8239 2.8331 |
| OCT.17 (OH) (2449642.9) | X: | +19.4778 | - 3.92994 | +557.6403 4.454581 | +11.5024 1.9196 |
| A NOV. 2 (OH) | Y: | -17.0803 | + 2.35171 | + 78.2967 3.276309 | + 6.4410 5.0769 |
| NOV. 1 (OH) (2449657.9) | X: | + 9.0000 | - 4.59146 | +603.2762 5.563133 | + 6.0399 2.3670 |
| A NOV.17 (OH) | Y: | + 9.9391 | - 1.22726 | + 71.8364 5.173600 | + 2.7270 1.7850 |
| NOV.17 (OH) (2449673.9) | X: | + 1.9496 | - 2.24245 | +531.1869 0.439012 | +14.6350 1.2954 |
| A DEC. 3 (OH) | Y: | - 9.6560 | + 0.77164 | + 46.0458 0.224640 | + 1.8655 4.3682 |
| DEC. 1 (OH) (2449687.9) | X: | +10.3192 | - 0.85086 | +479.1259 1.596020 | +11.6177 2.4875 |
| A DEC.17 (OH) | Y: | -15.3889 | + 1.98008 | + 66.3842 1.587734 | + 4.5405 4.7542 |
| DEC.17 (OH) (2449703.9) | X: | +22.4206 | - 2.42703 | +448.9792 2.919915 | + 3.8666 5.2597 |
| A JAN. 2 (OH) | Y: | +15.0772 | - 2.06896 | + 21.4232 1.818901 | + 3.4517 1.9215 |

SATELLITES D'URANUS

SATELLITES OF URANUS

DONNÉES SUR LES SATELLITES D'URANUS***DATA ON THE SATELLITES OF URANUS***

| NOM | masse | rayon | période rotation sidérale | albédo géométrique | magnitude visuelle | période orbitale | élongation maximale | 1/2 grand axe | excentricité | inclinaison sur l'équateur d'Uranus |
|-------------|------------------------|--------|---------------------------------|-----------------------|-----------------------|---------------------|------------------------|-----------------------|--------------|---|
| unité → | masse d'Uranus | km | jour | | | jour | (") | 10^3 km | | degré |
| I Ariel | 1.49×10^{-5} | 580 | | 0.40 | 14.4 | 2.520 379 05 | 14 | 190.945 | 0.001 78 | 0.071 |
| II Umbriel | 1.45×10^{-5} | 595 | | 0.19 | 15.3 | 4.144 176 46 | 20 | 265.998 | 0.004 33 | 0.128 |
| III Titania | 3.97×10^{-5} | 805 | | 0.28 | 14.0 | 8.705 866 94 | 33 | 436.298 | 0.002 15 | 0.047 |
| IV Oberon | 3.45×10^{-5} | 775 | (S) | 0.24 | 14.2 | 13.463 234 20 | 44 | 583.519 | 0.001 56 | 0.117 |
| V Miranda | 0.075×10^{-5} | 242 | | 0.34 | 16.5 | 1.413 479 41 | 10 | 129.872 | 0.001 52 | 4.339 |
| NAME | mass | radius | sidereal rotation | geometrical albedo | visual magnitude | orbital period | greatest elongation | semi major axis | eccentricity | inclination on Uranus' equator |
| unit → | Uranus' mass | km | day | | | day | (") | 10^3 km | | degree |

NOTES

(S) : rotation synchrone

(S) synchronous rotation

Données extraites de *Science* (vol. 233, 1986, p. 41) pour les valeurs des rayons et des albédos, et de *Astronomy and Astrophysics* (vol. 188, 1987, p. 212 : GUST86, J. Laskar et R.A. Jacobson) pour les autres données.

Data from Science (vol. 233, 1986, p. 41) for the values of the radii and the albedoes, and from *Astronomy and Astrophysics* (vol. 188, 1987, p. 212 : GUST86, J. Laskar and R.A. Jacobson) for the other data.

ÉPHÉMÉRIDES DES CINQ PREMIERS SATELLITES D'URANUS

EPHEMERIDES OF THE FIRST FIVE SATELLITES OF URANUS

Coordonnées différentielles tangentielles données en secondes de degré dans le repère équatorial moyen J2000. On a, au premier ordre :

Differential tangential coordinates given in arcsecond in the mean equatorial frame J2000. We have, at the first order :

$$\begin{aligned}\Delta\alpha \cos \delta &= X \\ \Delta\delta &= Y\end{aligned}$$

$$\left. \begin{matrix} X \\ Y \end{matrix} \right\} = A0 + AI \cdot t + B0 \sin(Nt + F0) + BI \cdot t \sin(Nt + FI) + B2 \cdot t^2 \sin(Nt + F2) + C0 \sin(2Nt + P0)$$

où $t = T - T0$ avec $T0$ date du début de l'intervalle et T date du calcul

where $t = T - T0$ with $T0$ date of the beginning of the interval and T the date for the calculation

| satellite | intervalle Δt (jours) | N (rad/j) | page |
|-----------|-------------------------------------|----------------|------|
| Miranda | 9 | 4.488 0 | 84 |
| Ariel | 31 | 2.493 0 | 87 |
| Umbriel | 27 | 1.516 2 | 88 |
| Titania | 17 | 0.721 7 | 89 |
| Obéron | 22 | 0.466 7 | 91 |
| (days) | | (rad/d) | |

1994

COORDONNEES EQUATORIALES DIFFÉRENTIELLES

DU SATELLITE 5 D'URANUS: MIRANDA

N=4.4880

| | | AO | A1 | BO FO | B1 F1 | B2 F2 | CO PO |
|-----------------------------|----|---------|----------|----------------------|--------------------|---------------------|-------------------|
| JAN. 1 (OH) (2449353.5) | X: | -0.0059 | -0.00014 | + 6.9517 0.715017 | +0.30659 5.4036 | +0.006463 3.6220 | +0.0043 0.5013 |
| A JAN. 10 (OH) | Y: | -0.0160 | +0.00041 | + 8.6919 2.296026 | +0.38052 0.7188 | +0.007999 5.2335 | +0.0052 2.2018 |
| JAN. 10 (OH) (2449362.5) | X: | -0.0037 | -0.00052 | + 6.9000 3.016715 | +0.30397 1.4270 | +0.006497 5.9284 | +0.0035 5.0683 |
| A JAN. 19 (OH) | Y: | -0.0149 | +0.00008 | + 8.6836 4.601004 | +0.38029 3.0264 | +0.008000 1.2497 | +0.0063 0.5021 |
| JAN. 19 (OH) (2449371.5) | X: | -0.0061 | +0.00007 | + 6.8565 5.818935 | +0.30122 3.7293 | +0.006322 1.9583 | +0.0038 3.4698 |
| A JAN. 28 (OH) | Y: | -0.0112 | -0.00059 | + 8.6823 0.623084 | +0.37876 5.3371 | +0.008048 3.5769 | +0.0057 5.0595 |
| JAN. 28 (OH) (2449380.5) | X: | -0.0077 | +0.00033 | + 6.8198 1.338762 | +0.29974 0.0356 | +0.006294 4.2553 | +0.0038 1.8002 |
| A FEV. 6 (OH) | Y: | -0.0123 | -0.00021 | + 8.6939 2.929254 | +0.37934 1.3603 | +0.007946 5.8746 | +0.0059 3.3744 |
| FEV. 6 (OH) (2449389.5) | X: | -0.0072 | +0.00013 | + 6.7898 3.642241 | +0.29785 2.0642 | +0.006409 0.2890 | +0.0042 0.2864 |
| A FEV. 15 (OH) | Y: | -0.0166 | +0.00064 | + 8.7141 5.235899 | +0.37844 3.6691 | +0.007903 1.9196 | +0.0053 1.5501 |
| FEV. 15 (OH) (2449398.5) | X: | -0.0050 | -0.00032 | + 6.7726 5.946472 | +0.29640 4.3665 | +0.006180 2.5966 | +0.0041 4.7061 |
| A FEV. 24 (OH) | Y: | -0.0150 | +0.00015 | + 8.7417 1.260206 | +0.37922 5.9796 | +0.007919 4.2293 | +0.0053 0.0151 |
| FEV. 24 (OH) (2449407.5) | X: | -0.0042 | -0.00039 | + 6.7629 1.965303 | +0.29551 0.3926 | +0.006183 4.9062 | +0.0048 3.1422 |
| A MAR. 5 (OH) | Y: | -0.0120 | -0.00046 | + 8.7765 3.568359 | +0.38103 2.0105 | +0.008097 0.2482 | +0.0045 4.5244 |
| MAR. 5 (OH) (2449416.5) | X: | -0.0077 | +0.00036 | + 6.7616 4.274008 | +0.29459 2.7035 | +0.006202 0.9423 | +0.0045 1.3263 |
| A MAR. 14 (OH) | Y: | -0.0119 | -0.00034 | + 8.8226 5.876823 | +0.38067 4.3191 | +0.007991 2.5846 | +0.0048 3.0090 |
| MAR. 14 (OH) (2449425.5) | X: | -0.0082 | +0.00035 | + 6.7707 0.297546 | +0.29495 5.0123 | +0.006148 3.2450 | +0.0044 5.9937 |
| A MAR. 23 (OH) | Y: | -0.0141 | +0.00014 | + 8.8752 1.903267 | +0.38388 0.3460 | +0.008000 4.8780 | +0.0051 1.2973 |
| MAR. 23 (OH) (2449434.5) | X: | -0.0055 | -0.00029 | + 6.7882 2.604652 | +0.29375 1.0423 | +0.006194 5.5852 | +0.0043 4.1212 |
| A AVR. 1 (OH) | Y: | -0.0166 | +0.00057 | + 8.9316 4.213066 | +0.38625 2.6604 | +0.008166 0.9055 | +0.0054 6.0880 |
| AVR. 1 (OH) (2449443.5) | X: | -0.0051 | -0.00031 | + 6.8164 4.913124 | +0.29514 3.3519 | +0.006148 1.6005 | +0.0040 2.6104 |
| A AVR. 10 (OH) | Y: | -0.0136 | -0.00018 | + 8.9969 0.239992 | +0.38762 4.9683 | +0.008061 3.2302 | +0.0058 4.1999 |
| AVR. 10 (OH) (2449452.5) | X: | -0.0063 | +0.00001 | + 6.8508 0.939186 | +0.29709 5.6663 | +0.006236 3.9002 | +0.0037 0.8340 |
| A AVR. 19 (OH) | Y: | -0.0105 | -0.00074 | + 9.0630 2.550481 | +0.39014 0.9991 | +0.008233 5.5454 | +0.0063 2.6596 |
| AVR. 19 (OH) (2449461.5) | X: | -0.0087 | +0.00041 | + 6.8952 3.248614 | +0.29685 1.6956 | +0.006234 6.2436 | +0.0037 5.5821 |
| A AVR. 28 (OH) | Y: | -0.0137 | +0.00009 | + 9.1329 4.861219 | +0.39281 3.3093 | +0.008260 1.5729 | +0.0063 0.8454 |
| AVR. 28 (OH) (2449470.5) | X: | -0.0081 | +0.00015 | + 6.9479 5.559384 | +0.29947 4.0063 | +0.006217 2.2612 | +0.0041 3.9157 |
| A MAI 7 (OH) | Y: | -0.0159 | +0.00047 | + 9.2029 0.889327 | +0.39698 5.6193 | +0.008323 3.8687 | +0.0057 5.4888 |

1994

COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 5 D'URANUS: MIRANDA

N=4.4880

| | | AO | A1 | B0 FO | B1 F1 | B2 F2 | CO PO |
|-----------------------------|----|---------|----------|----------------------|--------------------|---------------------|-------------------|
| MAI 7 (OH) (2449479.5) | X: | -0.0050 | -0.00052 | + 7.0044 1.587194 | +0.30141 0.0371 | +0.006275 4.5794 | +0.0041 2.3669 |
| A MAI 16 (OH) | Y: | -0.0149 | +0.00011 | + 9.2694 3.200110 | +0.39868 1.6511 | +0.008559 6.1969 | +0.0060 3.6811 |
| MAI 16 (OH) (2449488.5) | X: | -0.0063 | -0.00013 | + 7.0673 3.898686 | +0.30330 2.3495 | +0.006326 0.6177 | +0.0048 0.5685 |
| A MAI 25 (OH) | Y: | -0.0124 | -0.00042 | + 9.3394 5.511288 | +0.40227 3.9561 | +0.008439 2.2090 | +0.0053 2.1397 |
| MAI 25 (OH) (2449497.5) | X: | -0.0092 | +0.00044 | + 7.1308 6.210576 | +0.30606 4.6658 | +0.006516 2.9317 | +0.0048 5.2300 |
| A JUN. 3 (OH) | Y: | -0.0110 | -0.00053 | + 9.4012 1.539294 | +0.40592 6.2653 | +0.008501 4.5090 | +0.0050 0.4319 |
| JUN. 3 (OH) (2449506.5) | X: | -0.0091 | +0.00022 | + 7.1982 2.239368 | +0.30849 0.6925 | +0.006493 5.2457 | +0.0050 3.4943 |
| A JUN. 12 (OH) | Y: | -0.0154 | +0.00045 | + 9.4562 3.849773 | +0.40718 2.2926 | +0.008624 0.5494 | +0.0050 5.0953 |
| JUN. 12 (OH) (2449515.5) | X: | -0.0076 | -0.00016 | + 7.2651 4.551983 | +0.31252 3.0024 | +0.006557 1.2548 | +0.0045 1.7467 |
| A JUN. 21 (OH) | Y: | -0.0167 | +0.00055 | + 9.5059 6.160432 | +0.41011 4.5996 | +0.008676 2.8495 | +0.0057 3.5134 |
| JUN. 21 (OH) (2449524.5) | X: | -0.0060 | -0.00041 | + 7.3261 0.580794 | +0.31503 5.3166 | +0.006729 3.5725 | +0.0047 0.0595 |
| A JUN. 30 (OH) | Y: | -0.0124 | -0.00041 | + 9.5441 2.187280 | +0.41122 0.6288 | +0.008688 5.1684 | +0.0056 1.8591 |
| JUN. 30 (OH) (2449533.5) | X: | -0.0083 | +0.00011 | + 7.3868 2.892622 | +0.31766 1.3391 | +0.006670 5.8770 | +0.0042 4.7083 |
| A JUL. 9 (OH) | Y: | -0.0115 | -0.00043 | + 9.5731 4.497158 | +0.41372 2.9309 | +0.008787 1.1759 | +0.0064 0.1651 |
| JUL. 9 (OH) (2449542.5) | X: | -0.0114 | +0.00062 | + 7.4395 5.204204 | +0.32001 3.6472 | +0.006724 1.9074 | +0.0039 3.0624 |
| A JUL. 18 (OH) | Y: | -0.0133 | +0.00009 | + 9.5877 0.523366 | +0.41564 5.2402 | +0.008987 3.4753 | +0.0066 4.7061 |
| JUL. 18 (OH) (2449551.5) | X: | -0.0089 | -0.00007 | + 7.4819 1.231899 | +0.32218 5.9559 | +0.006811 4.2134 | +0.0042 1.3782 |
| A JUL. 27 (OH) | Y: | -0.0159 | +0.00053 | + 9.5935 2.831931 | +0.41559 1.2596 | +0.008848 5.7854 | +0.0065 3.0612 |
| JUL. 27 (OH) (2449560.5) | X: | -0.0068 | -0.00044 | + 7.5151 3.542388 | +0.32482 1.9809 | +0.006953 0.2254 | +0.0043 6.1566 |
| A AOU. 5 (OH) | Y: | -0.0153 | +0.00030 | + 9.5885 5.140378 | +0.41695 3.5626 | +0.008834 1.7900 | +0.0062 1.2252 |
| AOU. 5 (OH) (2449569.5) | X: | -0.0084 | -0.00002 | + 7.5373 5.851800 | +0.32524 4.2863 | +0.006968 2.5491 | +0.0046 4.4186 |
| A AOU. 14 (OH) | Y: | -0.0105 | -0.00062 | + 9.5671 1.164725 | +0.41650 5.8682 | +0.008865 4.0969 | +0.0058 5.8795 |
| AOU. 14 (OH) (2449578.5) | X: | -0.0104 | +0.00033 | + 7.5489 1.877567 | +0.32768 0.3063 | +0.006982 4.8258 | +0.0047 2.7814 |
| A AOU. 23 (OH) | Y: | -0.0113 | -0.00022 | + 9.5364 3.471604 | +0.41573 1.8878 | +0.008809 0.1125 | +0.0055 4.1850 |
| AOU. 23 (OH) (2449587.5) | X: | -0.0113 | +0.00037 | + 7.5463 4.185560 | +0.32892 2.6121 | +0.007099 0.8375 | +0.0054 1.0065 |
| A SEP. 1 (OH) | Y: | -0.0156 | +0.00070 | + 9.4950 5.777724 | +0.41326 4.1924 | +0.008837 2.4319 | +0.0046 2.5431 |
| SEP. 1 (OH) (2449596.5) | X: | -0.0082 | -0.00030 | + 7.5333 0.209135 | +0.32832 4.9124 | +0.007005 3.1476 | +0.0048 5.6514 |
| A SEP. 10 (OH) | Y: | -0.0146 | +0.00035 | + 9.4439 1.800291 | +0.41224 0.2113 | +0.008733 4.7248 | +0.0055 0.8767 |

1994

COORDONNÉES EQUATORIALES DIFFÉRENTIELLES

DU SATELLITE 5 D'URANUS: MIRANDA

N=4.4880

| | A0 | A1 | B0 F0 | B1 F1 | B2 F2 | C0 PO |
|----------------------------|------------|----------|----------------------|--------------------|---------------------|-------------------|
| SEP.10 (OH) (2449605.5) | X: -0.0069 | -0.00048 | + 7.5089 2.515148 | +0.32822 0.9312 | +0.007023 5.4412 | +0.0051 3.8129 |
| A SEP.19 (OH) | Y: -0.0119 | -0.00019 | + 9.3838 4.105654 | +0.41191 2.5166 | +0.008832 0.7246 | +0.0050 5.6289 |
| SEP.19 (OH) (2449614.5) | X: -0.0106 | +0.00035 | + 7.4726 4.820167 | +0.32703 3.2320 | +0.006974 1.4624 | +0.0043 2.1325 |
| A SEP.28 (OH) | Y: -0.0101 | -0.00039 | + 9.3192 0.126685 | +0.40766 4.8197 | +0.008756 3.0522 | +0.0059 3.8981 |
| SEP.28 (OH) (2449623.5) | X: -0.0114 | +0.00040 | + 7.4262 0.841347 | +0.32649 5.5331 | +0.006971 3.7470 | +0.0044 0.4702 |
| A OCT. 7 (OH) | Y: -0.0120 | +0.00012 | + 9.2517 2.430830 | +0.40642 0.8371 | +0.008613 5.3344 | +0.0055 2.2033 |
| OCT. 7 (OH) (2449632.5) | X: -0.0092 | -0.00015 | + 7.3707 3.144420 | +0.32360 1.5540 | +0.007044 6.0641 | +0.0035 5.0176 |
| A OCT.16 (OH) | Y: -0.0155 | +0.00081 | + 9.1800 4.734399 | +0.40391 3.1409 | +0.008596 1.3519 | +0.0068 0.5081 |
| OCT.16 (OH) (2449641.5) | X: -0.0078 | -0.00035 | + 7.3111 5.447192 | +0.32182 3.8506 | +0.006865 2.0716 | +0.0042 3.4649 |
| A OCT.25 (OH) | Y: -0.0122 | +0.00002 | + 9.1085 0.754264 | +0.40021 5.4425 | +0.008462 3.6647 | +0.0055 5.0505 |
| OCT.25 (OH) (2449650.5) | X: -0.0082 | -0.00016 | + 7.2444 1.466404 | +0.32082 6.1513 | +0.006853 4.3461 | +0.0037 1.8204 |
| A NOV. 3 (OH) | Y: -0.0088 | -0.00058 | + 9.0355 3.057158 | +0.39761 1.4657 | +0.008533 5.9658 | +0.0062 3.2943 |
| NOV. 3 (OH) (2449659.5) | X: -0.0112 | +0.00044 | + 7.1740 3.767517 | +0.31652 2.1697 | +0.006813 0.3889 | +0.0044 0.2000 |
| A NOV.12 (OH) | Y: -0.0109 | +0.00005 | + 8.9679 5.359760 | +0.39387 3.7671 | +0.008357 1.9949 | +0.0053 1.5343 |
| NOV.12 (OH) (2449668.5) | X: -0.0108 | +0.00024 | + 7.1023 6.068702 | +0.31424 4.4683 | +0.006705 2.6775 | +0.0043 4.6933 |
| A NOV.21 (OH) | Y: -0.0127 | +0.00045 | + 8.9037 1.379605 | +0.39247 6.0701 | +0.008280 4.2795 | +0.0052 6.2179 |
| NOV.21 (OH) (2449677.5) | X: -0.0071 | -0.00053 | + 7.0293 2.086157 | +0.31087 0.4857 | +0.006625 4.9821 | +0.0050 3.1140 |
| A NOV.30 (OH) | Y: -0.0129 | +0.00037 | + 8.8410 3.682157 | +0.38910 2.0961 | +0.008389 0.3124 | +0.0045 4.4205 |
| NOV.30 (OH) (2449686.5) | X: -0.0078 | -0.00023 | + 6.9573 4.386684 | +0.30751 2.7858 | +0.006542 1.0019 | +0.0043 1.2525 |
| A DEC. 9 (OH) | Y: -0.0098 | -0.00027 | + 8.7910 5.985081 | +0.38623 4.3964 | +0.008136 2.6197 | +0.0049 2.9201 |
| DEC. 9 (OH) (2449695.5) | X: -0.0100 | +0.00027 | + 6.8843 0.404199 | +0.30529 5.0913 | +0.006618 3.2938 | +0.0046 5.8554 |
| A DEC.18 (OH) | Y: -0.0077 | -0.00054 | + 8.7459 2.005335 | +0.38454 0.4177 | +0.008042 4.9197 | +0.0048 1.2377 |
| DEC.18 (OH) (2449704.5) | X: -0.0104 | +0.00025 | + 6.8182 2.704503 | +0.30125 1.1069 | +0.006423 5.6074 | +0.0043 4.0836 |
| A DEC.27 (OH) | Y: -0.0116 | +0.00039 | + 8.7070 4.308644 | +0.38137 2.7262 | +0.008062 0.9586 | +0.0052 5.9446 |
| DEC.27 (OH) (2449713.5) | X: -0.0091 | -0.00008 | + 6.7565 5.005516 | +0.29905 3.4072 | +0.006315 1.6127 | +0.0038 2.4482 |
| A JAN. 5 (OH) | Y: -0.0129 | +0.00054 | + 8.6782 0.329691 | +0.38040 5.0328 | +0.008048 3.2580 | +0.0057 4.1520 |

1994

COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 1 D'URANUS: ARIEL

N=2.4930

| | AQ | A1 | B0 FO | B1 F1 | B2 F2 | CO PO |
|----------------------------|------------|----------|----------------------|--------------------|---------------------|-------------------|
| JAN. 1 (OH) (2449353.5) | X: +0.0248 | +0.00000 | +10.5100 4.554325 | +0.01095 1.9509 | +0.000073 4.9368 | +0.0085 4.2897 |
| A FEV. 1 (OH) | Y: -0.0023 | +0.00007 | +12.7638 6.088935 | +0.00474 4.0899 | +0.000092 0.1231 | +0.0105 5.8100 |
| FEV. 1 (OH) (2449384.5) | X: +0.0253 | -0.00003 | +10.2846 0.141424 | +0.00636 3.9577 | +0.000084 0.4642 | +0.0091 1.7727 |
| A MAR. 4 (OH) | Y: -0.0013 | +0.00000 | +12.7870 1.662199 | +0.00418 1.0796 | +0.000085 2.0942 | +0.0107 3.2618 |
| MAR. 4 (OH) (2449415.5) | X: +0.0242 | +0.00004 | +10.2078 2.016694 | +0.00204 0.5125 | +0.000090 2.3867 | +0.0089 5.4856 |
| A AVR. 4 (OH) | Y: -0.0008 | -0.00001 | +12.9680 3.563676 | +0.00819 3.5125 | +0.000063 4.1743 | +0.0110 0.8566 |
| AVR. 4 (OH) (2449446.5) | X: +0.0245 | +0.00004 | +10.2914 3.898461 | +0.00550 3.9141 | +0.000073 4.4348 | +0.0083 3.0131 |
| A MAI 5 (OH) | Y: -0.0020 | +0.00004 | +13.2689 5.450230 | +0.01156 5.5859 | +0.000018 0.7673 | +0.0121 4.5793 |
| MAI 5 (OH) (2449477.5) | X: +0.0257 | +0.00001 | +10.5213 5.786868 | +0.00974 6.0180 | +0.000032 0.3563 | +0.0094 0.5956 |
| A JUN. 5 (OH) | Y: -0.0014 | +0.00000 | +13.6228 1.056496 | +0.01193 1.3153 | +0.000051 4.3573 | +0.0116 1.9782 |
| JUN. 5 (OH) (2449508.5) | X: +0.0255 | +0.00005 | +10.8343 1.397017 | +0.01133 1.7147 | +0.000044 4.4444 | +0.0097 4.2804 |
| A JUL. 6 (OH) | Y: -0.0017 | +0.00002 | +13.9310 2.947586 | +0.00880 3.2642 | +0.000097 6.2096 | +0.0119 5.9179 |
| JUL. 6 (OH) (2449539.5) | X: +0.0265 | +0.00000 | +11.1248 3.291808 | +0.00882 3.7148 | +0.000103 0.4498 | +0.0094 1.8226 |
| A AOU. 6 (OH) | Y: -0.0036 | +0.00008 | +14.0971 4.837544 | +0.00279 5.5579 | +0.000111 1.9271 | +0.0117 3.3444 |
| AOU. 6 (OH) (2449570.5) | X: +0.0280 | -0.00006 | +11.2801 5.183835 | +0.00261 5.9901 | +0.000119 2.4506 | +0.0089 5.5319 |
| A SEP. 6 (OH) | Y: -0.0031 | +0.00000 | +14.0588 0.441366 | +0.00482 3.5361 | +0.000093 4.0229 | +0.0123 0.8755 |
| SEP. 6 (OH) (2449601.5) | X: +0.0272 | -0.00004 | +11.2310 0.786720 | +0.00543 4.1687 | +0.000087 4.3066 | +0.0095 3.1647 |
| A OCT. 7 (OH) | Y: -0.0027 | -0.00001 | +13.8297 2.324019 | +0.01031 5.6649 | +0.000046 6.1522 | +0.0109 4.4540 |
| OCT. 7 (OH) (2449632.5) | X: +0.0268 | -0.00007 | +10.9910 2.664976 | +0.01112 6.1412 | +0.000046 0.1261 | +0.0092 0.4205 |
| A NOV. 7 (OH) | Y: -0.0029 | -0.00001 | +13.4852 4.201465 | +0.01254 1.3781 | +0.000029 3.2431 | +0.0102 2.1384 |
| NOV. 7 (OH) (2449663.5) | X: +0.0256 | -0.00004 | +10.6310 4.536853 | +0.01389 1.7940 | +0.000008 3.5298 | +0.0079 4.2613 |
| A DEC. 8 (OH) | Y: -0.0019 | -0.00007 | +13.1353 6.075445 | +0.01200 3.8998 | +0.000065 6.2400 | +0.0109 5.7655 |
| DEC. 8 (OH) (2449694.5) | X: +0.0233 | +0.00002 | +10.2411 0.121513 | +0.01363 3.7115 | +0.000041 0.3097 | +0.0078 1.6943 |
| A JAN. 8 (OH) | Y: -0.0023 | -0.00001 | +12.8658 1.664851 | +0.00846 5.4529 | +0.000087 2.0018 | +0.0101 3.2488 |

| COORDONNEES EQUATORIALES DIFFÉRENTIELLES DU SATELLITE 2 D'URANUS: UMBRIEL N=1.5162 | | | | | | |
|--|------------|----------|----------------------|--------------------|---------------------|-------------------|
| | · AO | A1 | B0 FO | B1 F1 | B2 F2 | CO PO |
| JAN. 1 (OH) (2449353.5) | X: +0.0672 | +0.00006 | +14.6345 3.612013 | +0.01527 0.9555 | +0.000108 3.7274 | +0.0290 3.1729 |
| A JAN.28 (OH) | Y: +0.0577 | +0.00082 | +17.7821 5.148028 | +0.00688 3.2241 | +0.000122 5.6196 | +0.0356 4.7396 |
| JAN.28 (OH) (2449380.5) | X: +0.0672 | -0.00080 | +14.3486 0.554305 | +0.01008 4.3462 | +0.000119 0.7244 | +0.0266 3.4980 |
| A FEV.24 (OH) | Y: +0.0851 | -0.00012 | +17.7978 2.095626 | +0.00609 1.2037 | +0.000128 2.5658 | +0.0364 5.0374 |
| FEV.24 (OH) (2449407.5) | X: +0.0450 | +0.00030 | +14.2175 3.782188 | +0.00569 1.8793 | +0.000138 4.2416 | +0.0244 3.6145 |
| A MAR.23 (OH) | Y: +0.0765 | -0.00073 | +17.9811 5.328935 | +0.01054 5.1054 | +0.000078 5.7243 | +0.0314 5.1916 |
| MAR.23 (OH) (2449434.5) | X: +0.0600 | +0.00038 | +14.2557 0.730216 | +0.00576 0.2167 | +0.000116 1.3075 | +0.0282 3.6981 |
| A AVR.19 (OH) | Y: +0.0551 | +0.00092 | +18.3087 2.281583 | +0.01441 2.3091 | +0.000036 2.2614 | +0.0365 5.2899 |
| AVR.19 (OH) (2449461.5) | X: +0.0693 | -0.00062 | +14.4636 3.966395 | +0.01053 3.9828 | +0.000084 4.6017 | +0.0304 4.0230 |
| A MAI 16 (OH) | Y: +0.0825 | +0.00039 | +18.7216 5.520626 | +0.01658 5.6261 | +0.000029 2.4194 | +0.0392 5.5834 |
| MAI 16 (OH) (2449488.5) | X: +0.0471 | +0.00026 | +14.7974 0.924129 | +0.01460 1.1374 | +0.000012 2.0991 | +0.0260 4.2148 |
| A JUN.12 (OH) | Y: +0.0867 | -0.00089 | +19.1463 2.478162 | +0.01509 2.6225 | +0.000093 5.6262 | +0.0335 5.8010 |
| JUN.12 (OH) (2449515.5) | X: +0.0571 | +0.00078 | +15.1836 4.168459 | +0.01544 4.4575 | +0.000087 1.0246 | +0.0288 4.2832 |
| A JUL. 9 (OH) | Y: +0.0598 | +0.00051 | +19.4851 5.719558 | +0.00931 5.8968 | +0.000115 2.3443 | +0.0366 5.8503 |
| JUL. 9 (OH) (2449542.5) | X: +0.0771 | -0.00050 | +15.5198 1.131088 | +0.01152 1.5762 | +0.000138 4.5431 | +0.0325 4.5814 |
| A AOU. 5 (OH) | Y: +0.0809 | +0.00050 | +19.6485 2.677794 | +0.00257 3.3966 | +0.000147 5.8433 | +0.0404 6.1307 |
| AOU. 5 (OH) (2449569.5) | X: +0.0573 | -0.00015 | +15.7024 4.376250 | +0.00385 5.1438 | +0.000155 1.5312 | +0.0281 4.8464 |
| A SEP. 1 (OH) | Y: +0.0942 | -0.00113 | +19.5898 5.918077 | +0.00599 2.5866 | +0.000148 3.1415 | +0.0340 0.1135 |
| SEP. 1 (OH) (2449596.5) | X: +0.0573 | +0.00067 | +15.6701 1.333916 | +0.00606 4.5231 | +0.000122 4.7642 | +0.0285 4.8850 |
| A SEP.28 (OH) | Y: +0.0620 | +0.00000 | +19.3293 2.872951 | +0.01250 6.1439 | +0.000092 0.0835 | +0.0340 0.1378 |
| SEP.28 (OH) (2449623.5) | X: +0.0799 | -0.00051 | +15.4239 4.569906 | +0.01318 1.6037 | +0.000088 2.1080 | +0.0322 5.1132 |
| A OCT.25 (OH) | Y: +0.0685 | +0.00077 | +18.9341 6.107669 | +0.01625 3.1377 | +0.000049 4.2294 | +0.0387 0.3625 |
| OCT.25 (OH) (2449650.5) | X: +0.0622 | -0.00054 | +15.0244 1.518383 | +0.01767 4.9794 | +0.000034 5.2544 | +0.0280 5.3985 |
| A NOV.21 (OH) | Y: +0.0882 | -0.00078 | +18.4990 3.056921 | +0.01728 0.2002 | +0.000085 2.7516 | +0.0337 0.6627 |
| NOV.21 (OH) (2449677.5) | X: +0.0498 | +0.00059 | +14.5526 4.745190 | +0.01867 1.9788 | +0.000020 3.7993 | +0.0257 5.4355 |
| A DEC.18 (OH) | Y: +0.0598 | -0.00015 | +18.1145 0.003735 | +0.01496 3.5705 | +0.000134 0.0834 | +0.0314 0.6927 |
| DEC.18 (OH) (2449704.5) | X: +0.0692 | -0.00017 | +14.0952 1.686474 | +0.01797 5.2802 | +0.000069 1.8941 | +0.0291 5.6054 |
| A JAN.14 (OH) | Y: +0.0574 | +0.00097 | +17.8394 3.233101 | +0.00894 0.7430 | +0.000120 3.4174 | +0.0369 0.8505 |

| COORDONNEES EQUATORIALES DIFFERENTIELLES DU SATELLITE 3 D'URANUS: TITANIA | | | | | | | N=0.7217 |
|--|------------|----------|----------------------|--------------------|---------------------|-------------------|----------|
| | A0 | A1 | B0 FO | B1 F1 | B2 F2 | CO PO | |
| JAN. 1 (OH) (2449353.5) | X: -0.0828 | +0.00014 | +23.9879 4.787673 | +0.02617 2.2776 | +0.000380 6.0397 | +0.0254 1.4963 | |
| A JAN.18 (OH) | Y: +0.0479 | -0.00359 | +29.1541 0.039031 | +0.01575 4.8103 | +0.000525 1.9576 | +0.0321 3.0344 | |
| JAN.18 (OH) (2449370.5) | X: -0.0924 | +0.00178 | +23.6602 4.482002 | +0.01474 1.4161 | +0.000597 3.1411 | +0.0248 0.8714 | |
| A FEV. 4 (OH) | Y: +0.0157 | +0.00001 | +29.1420 6.019562 | +0.00396 0.0538 | +0.000511 4.7036 | +0.0316 2.4048 | |
| FEV. 4 (OH) (2449387.5) | X: -0.0499 | -0.00032 | +23.4416 4.178347 | +0.01436 1.7643 | +0.000229 4.6679 | +0.0163 0.4225 | |
| A FEV.21 (OH) | Y: +0.0000 | +0.00041 | +29.2493 5.719291 | +0.01078 5.0164 | +0.000283 0.2242 | +0.0210 1.9401 | |
| FEV.21 (OH) (2449404.5) | X: -0.0495 | +0.00166 | +23.3182 3.874841 | +0.01117 1.9902 | +0.000302 5.0464 | +0.0161 5.3650 | |
| A MAR.10 (OH) | Y: +0.0429 | -0.00023 | +29.4393 5.418204 | +0.01682 5.4326 | +0.000109 4.6391 | +0.0193 0.5900 | |
| MAR.10 (OH) (2449421.5) | X: -0.0199 | -0.00308 | +23.3268 3.572320 | +0.00462 0.9320 | +0.000634 3.2264 | +0.0196 4.8548 | |
| A MAR.27 (OH) | Y: +0.0245 | +0.00286 | +29.7478 5.120397 | +0.02099 5.1914 | +0.000352 3.8571 | +0.0244 0.1990 | |
| MAR.27 (OH) (2449438.5) | X: -0.0466 | -0.00030 | +23.4074 3.271817 | +0.00953 2.7531 | +0.000309 4.0874 | +0.0242 4.0416 | |
| A AVR.13 (OH) | Y: +0.0795 | -0.00055 | +30.1282 4.822012 | +0.02361 4.7651 | +0.000211 5.9657 | +0.0319 5.5924 | |
| AVR.13 (OH) (2449455.5) | X: -0.0824 | -0.00005 | +23.6066 2.971857 | +0.01583 3.1708 | +0.000159 2.4962 | +0.0327 3.7307 | |
| A AVR.30 (OH) | Y: +0.0681 | +0.00070 | +30.5546 4.524077 | +0.02625 4.6783 | +0.000041 3.4953 | +0.0427 5.2718 | |
| AVR.30 (OH) (2449472.5) | X: -0.0565 | -0.00316 | +23.9366 2.677159 | +0.01405 2.3183 | +0.000607 3.3586 | +0.0292 3.3218 | |
| A MAI 17 (OH) | Y: +0.0844 | -0.00405 | +31.0124 4.229101 | +0.02368 4.2066 | +0.000108 4.5466 | +0.0359 4.8516 | |
| MAI 17 (OH) (2449489.5) | X: -0.1063 | +0.00119 | +24.2719 2.380181 | +0.02496 2.7008 | +0.000062 1.2189 | +0.0335 2.7930 | |
| A JUN. 3 (OH) | Y: +0.0382 | +0.00083 | +31.4233 3.932673 | +0.02603 4.0207 | +0.000347 0.1456 | +0.0433 4.3622 | |
| JUN. 3 (OH) (2449506.5) | X: -0.0788 | -0.00052 | +24.6757 2.086473 | +0.02625 2.4657 | +0.000106 6.1157 | +0.0265 2.5177 | |
| A JUN.20 (OH) | Y: +0.0123 | -0.00038 | +31.7969 3.636637 | +0.02089 4.0781 | +0.000216 1.3675 | +0.0337 4.0522 | |
| JUN.20 (OH) (2449523.5) | X: -0.0771 | +0.00168 | +25.0793 1.796695 | +0.02262 1.5753 | +0.000680 3.6495 | +0.0196 1.7086 | |
| A JUL. 7 (OH) | Y: +0.0315 | -0.00135 | +32.0852 3.343611 | +0.01017 2.8456 | +0.000494 4.9787 | +0.0258 3.2230 | |
| JUL. 7 (OH) (2449540.5) | X: -0.0567 | -0.00024 | +25.4066 1.502293 | +0.02168 2.1011 | +0.000291 5.2862 | +0.0191 1.2485 | |
| A JUL.24 (OH) | Y: -0.0147 | +0.00337 | +32.1876 3.047003 | +0.01824 3.9417 | +0.000799 0.6619 | +0.0237 2.7165 | |
| JUL.24 (OH) (2449557.5) | X: -0.0400 | +0.00041 | +25.6454 1.210324 | +0.01488 1.9361 | +0.000287 4.7773 | +0.0170 6.2468 | |
| A AOU.10 (OH) | Y: +0.0539 | -0.00087 | +32.2269 2.752554 | +0.00817 5.1532 | +0.000145 5.9908 | +0.0206 1.4943 | |
| AOU.10 (OH) (2449574.5) | X: -0.0444 | -0.00140 | +25.7545 0.919231 | +0.00590 0.1674 | +0.000696 3.1438 | +0.0267 5.7085 | |
| A AOU.27 (OH) | Y: +0.0464 | +0.00310 | +32.0752 2.458673 | +0.01170 6.1548 | +0.000632 4.7169 | +0.0336 0.9782 | |

1994

COORDONNEES EQUATORIALES DIFFÉRENTIELLES

DU SATELLITE 3 D'URANUS: TITANIA

N=0.7217

| | A0 | A1 | B0 F0 | B1 F1 | B2 F2 | CO PO |
|----------------------------|------------|----------|----------------------|--------------------|---------------------|-------------------|
| AOU.27 (OH) (2449591.5) | X: -0.0378 | -0.00252 | +25.7075 0.623750 | +0.01258 2.4375 | +0.000697 4.7540 | +0.0267 5.1273 |
| A SEP.13 (OH) | Y: +0.0757 | -0.00003 | +31.7930 2.161100 | +0.02162 4.5830 | +0.000851 0.2330 | +0.0339 0.3793 |
| SEP.13 (OH) (2449608.5) | X: -0.0940 | +0.00066 | +25.5486 0.328885 | +0.01599 3.3583 | +0.000125 3.6607 | +0.0360 4.6941 |
| A SEP.30 (OH) | Y: +0.0809 | -0.00006 | +31.4355 1.865447 | +0.02393 4.9888 | +0.000105 4.9863 | +0.0439 6.2120 |
| SEP.30 (OH) (2449625.5) | X: -0.0790 | -0.00218 | +25.2269 0.032221 | +0.01744 3.4669 | +0.000457 2.8173 | +0.0325 4.4153 |
| A OCT.17 (OH) | Y: +0.0473 | -0.00117 | +31.0092 1.567506 | +0.02858 4.8070 | +0.000165 2.7050 | +0.0394 5.9969 |
| OCT.17 (OH) (2449642.5) | X: -0.1107 | +0.00276 | +24.8502 6.016176 | +0.02832 2.9242 | +0.000315 4.6124 | +0.0286 3.7723 |
| A NOV. 3 (OH) | Y: +0.0410 | -0.00091 | +30.5467 1.268525 | +0.02921 2.1183 | +0.000879 6.2287 | +0.0365 5.3409 |
| NOV. 3 (OH) (2449659.5) | X: -0.0802 | +0.00029 | +24.3817 5.715318 | +0.03060 2.8360 | +0.000109 0.8151 | +0.0252 3.4607 |
| A NOV.20 (OH) | Y: +0.0005 | +0.00076 | +30.1134 0.969528 | +0.02609 4.3190 | +0.000177 1.5162 | +0.0308 5.0074 |
| NOV.20 (OH) (2449676.5) | X: -0.0455 | +0.00013 | +23.8856 5.411610 | +0.02967 2.4008 | +0.000204 4.1406 | +0.0141 2.6303 |
| A DEC. 7 (OH) | Y: +0.0265 | -0.00111 | +29.7178 0.668741 | +0.01981 4.0709 | +0.000054 1.2355 | +0.0175 4.1514 |
| DEC. 7 (OH) (2449693.5) | X: -0.0589 | +0.00123 | +23.4088 5.109909 | +0.03201 2.3537 | +0.000170 5.0819 | +0.0193 1.7965 |
| A DEC.24 (OH) | Y: -0.0108 | +0.00543 | +29.4471 0.368685 | +0.02520 3.7448 | +0.000727 0.1929 | +0.0227 3.3434 |
| DEC.24 (OH) (2449710.5) | X: -0.0310 | -0.00055 | +22.9514 4.804089 | +0.02808 2.0257 | +0.000185 5.1396 | +0.0159 0.8605 |
| A JAN.10 (OH) | Y: +0.0527 | -0.00076 | +29.1954 0.067441 | +0.01017 3.9082 | +0.000156 1.1040 | +0.0201 2.4270 |

1994

COORDONNEES EQUATORIALES DIFFERENTIELLES

DU SATELLITE 4 D'URANUS: OBERON

N=0.4667

| | A0 | A1 | B0 F0 | B1 F1 | B2 F2 | C0 PO |
|-----------------------------|------------|----------|----------------------|--------------------|---------------------|-------------------|
| JAN. 1 (OH) (2449353.5) | X: -0.0180 | +0.00013 | +32.1643 5.743995 | +0.03651 3.0324 | +0.000369 5.8323 | +0.0077 2.3482 |
| A JAN.23 (OH) | Y: -0.0188 | +0.00399 | +39.0335 0.993466 | +0.01605 4.5562 | +0.000687 0.8969 | +0.0099 3.7570 |
| JAN. 23 (OH) (2449375.5) | X: -0.0271 | -0.00182 | +31.6129 3.434003 | +0.02295 0.5530 | +0.000469 2.8052 | +0.0182 4.6315 |
| A FEV. 14 (OH) | Y: +0.0704 | -0.00306 | +39.0226 4.970711 | +0.00701 0.4924 | +0.000850 4.2724 | +0.0230 6.1734 |
| FEV. 14 (OH) (2449397.5) | X: -0.0394 | -0.00346 | +31.2623 1.126572 | +0.00762 5.7057 | +0.000201 5.1979 | +0.0237 0.5454 |
| A MAR. 8 (OH) | Y: -0.0132 | +0.00164 | +39.1880 2.667184 | +0.02868 3.1351 | +0.000772 1.0950 | +0.0320 2.0839 |
| MAR. 8 (OH) (2449419.5) | X: -0.1244 | +0.00452 | +31.1919 5.105161 | +0.02206 4.1499 | +0.000528 0.9650 | +0.0261 2.6321 |
| A MAR.30 (OH) | Y: +0.0387 | -0.00604 | +39.6530 0.367006 | +0.04189 0.3155 | +0.000479 3.6528 | +0.0331 4.2981 |
| MAR.30 (OH) (2449441.5) | X: -0.0372 | -0.00152 | +31.4381 2.801154 | +0.02268 1.6584 | +0.000898 4.0598 | +0.0245 4.5793 |
| A AVR. 21 (OH) | Y: -0.0722 | +0.00076 | +40.3691 4.350364 | +0.03857 4.0585 | +0.000472 6.1228 | +0.0277 0.0823 |
| AVR. 21 (OH) (2449463.5) | X: -0.0622 | +0.00388 | +31.8682 0.498864 | +0.01577 6.1721 | +0.000793 1.2430 | +0.0143 0.8739 |
| A MAI 13 (OH) | Y: -0.0924 | +0.00380 | +41.1678 2.049616 | +0.02756 2.0447 | +0.000380 2.4403 | +0.0210 2.3239 |
| MAI 13 (OH) (2449465.5) | X: +0.0157 | -0.00163 | +32.4282 4.483292 | +0.02638 4.6019 | +0.000269 5.0091 | +0.0035 3.4933 |
| A JUN. 4 (OH) | Y: -0.0062 | -0.00036 | +41.8935 6.034691 | +0.03369 6.2001 | +0.000221 3.9635 | +0.0058 5.2342 |
| JUN. 4 (OH) (2449507.5) | X: -0.0092 | -0.00146 | +33.0969 2.168895 | +0.03462 2.3275 | +0.000238 4.8514 | +0.0114 1.6305 |
| A JUN.26 (OH) | Y: +0.0287 | +0.00087 | +42.5420 3.737918 | +0.02768 3.8535 | +0.000352 0.5913 | +0.0150 3.2571 |
| JUN.26 (OH) (2449529.5) | X: -0.0629 | -0.00057 | +33.7579 6.179032 | +0.03048 0.1301 | +0.000313 2.7494 | +0.0239 4.0416 |
| A JUL. 18 (OH) | Y: +0.0480 | -0.00097 | +42.9747 1.441857 | +0.01507 1.6354 | +0.000412 4.4750 | +0.0295 5.5861 |
| JUL. 18 (OH) (2449551.5) | X: -0.0676 | -0.00232 | +34.2982 3.685876 | +0.01588 4.6822 | +0.000047 1.6739 | +0.0291 0.0040 |
| A AOU. 9 (OH) | Y: -0.0114 | -0.00023 | +43.1243 5.429450 | +0.00350 2.1881 | +0.000309 1.8244 | +0.0373 1.5563 |
| AOU. 9 (OH) (2449573.5) | X: -0.1263 | +0.00460 | +34.5410 1.591366 | +0.02211 3.4763 | +0.000576 0.3633 | +0.0291 2.1909 |
| A AOU.31 (OH) | Y: -0.0269 | -0.00236 | +42.9404 3.131482 | +0.02562 5.7954 | +0.000312 1.6295 | +0.0340 3.7857 |
| AOU.31 (OH) (2449595.5) | X: -0.0175 | -0.00166 | +34.3887 5.576808 | +0.02737 1.2477 | +0.000953 3.7937 | +0.0211 4.4910 |
| A SEP. 22 (OH) | Y: -0.0336 | -0.00275 | +42.3867 0.834487 | +0.02139 3.3701 | +0.000843 4.7412 | +0.0247 5.8466 |
| SEP. 22 (OH) (2449617.5) | X: -0.0615 | +0.00427 | +33.9600 3.283449 | +0.01385 5.8791 | +0.000835 0.6905 | +0.0075 0.3485 |
| A OCT. 14 (OH) | Y: -0.1189 | +0.00826 | +41.6773 4.820796 | +0.01852 2.1155 | +0.000957 1.5060 | +0.0142 1.8681 |
| OCT. 14 (OH) (2449639.5) | X: +0.0176 | -0.00239 | +33.3549 0.984377 | +0.03003 4.4310 | +0.000356 3.6976 | +0.0024 5.3256 |
| A NOV. 5 (OH) | Y: +0.0408 | -0.00296 | +40.9816 2.521472 | +0.04282 0.0192 | +0.000974 4.3239 | +0.0057 0.0216 |

1994

COORDONNEES EQUATORIALES DIFFÉRENTIELLES

DU SATELLITE 4 D'URANUS: OBERON

N=0.4667

| | | A0 | A1 | B0 F0 | B1 F1 | B2 F2 | C0 PO |
|----------------------------|----|---------|----------|----------------------|--------------------|---------------------|-------------------|
| NOV. 5 (OH) (2449661.5) | X: | -0.0046 | -0.00317 | +32.6078 4.963721 | +0.04652 2.0633 | +0.000320 5.3501 | +0.0149 1.1644 |
| A NOV.27 (OH) | Y: | +0.0032 | +0.00301 | +40.2541 0.216491 | +0.04643 3.7610 | +0.000816 1.0559 | +0.0190 2.7591 |
| NOV.27 (OH) (2449683.5) | X: | -0.0804 | +0.00092 | +31.7346 2.657780 | +0.04220 6.0305 | +0.000297 2.0825 | +0.0234 3.4120 |
| A DEC.19 (OH) | Y: | +0.0592 | -0.00319 | +39.5996 4.197961 | +0.03397 1.3370 | +0.000525 4.3693 | +0.0297 4.9537 |
| DEC.19 (OH) (2449705.5) | X: | -0.0826 | -0.00009 | +30.9157 0.350437 | +0.03643 3.8904 | +0.000097 5.9916 | +0.0266 5.6084 |
| A JAN.10 (OH) | Y: | -0.0216 | -0.00036 | +39.1195 1.894613 | +0.01740 5.4682 | +0.000320 1.5752 | +0.0342 0.9067 |

— EUROPE MEDIA DUPLICATION S.A. —
53110 Lassay-les-Châteaux
N° 2888 – Dépôt légal : août 1993
Imprimé en France

Ces éphémérides donnent les positions des satellites de Mars, des satellites galiléens de Jupiter, des huit premiers satellites de Saturne et des cinq satellites d'Uranus pour 1994 avec une précision de 0.01 seconde de degré (''). Elles sont ainsi très utiles aux astronomes pour préparer ou réduire des observations de haute précision ainsi que pour étudier les mouvements des satellites naturels des planètes.

Les positions sont données sous forme de coefficients de fonctions élémentaires dépendant directement du temps. Les calculs sont faciles à programmer sur une calculatrice de poche ou sur un micro-ordinateur.

Cet ouvrage donne aussi une méthode pour effectuer les prédictions des phénomènes des satellites de Jupiter en 1994.

De telles éphémérides, uniques par leur contenu, méritent de figurer dans les bibliothèques des Universités et des Observatoires.

These ephemerides give the positions of the satellites of Mars, of the Galilean satellites of Jupiter, of the first eight satellites of Saturn and of the five satellites of Uranus for 1994 with an accuracy of 0.01 arcsecond ('').

Thus, they are very useful to astronomers in order to prepare or reduce precise observations and to study the motions of the natural satellites of the planets.

The positions are given as coefficients of elementary functions depending directly on time. The calculations are easy to program on a pocket calculator or on a micro-computer.

This booklet also contains a method of calculation to predict the phenomena of the satellites of Jupiter in 1994 .

Such ephemerides of unique nature, have their place in the libraries of Universities and Observatories.