

NEARLY DIURNAL NUTATION DERIVED FROM THE OBSERVATIONS OF TIME AND LATITUDE

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The results, given below, of investigations are based on 14 yr of observations carried out with the Danjon astrolabe at the Paris Observatory; such observations allow the measurement of time and latitude.

Previous analysis, based on 6,5 yr showed some periodic terms and, in particular, it had been possible to determine values of the nearly diurnal nutation (results presented at the 6th Symposium on Earth Tides, 1969).

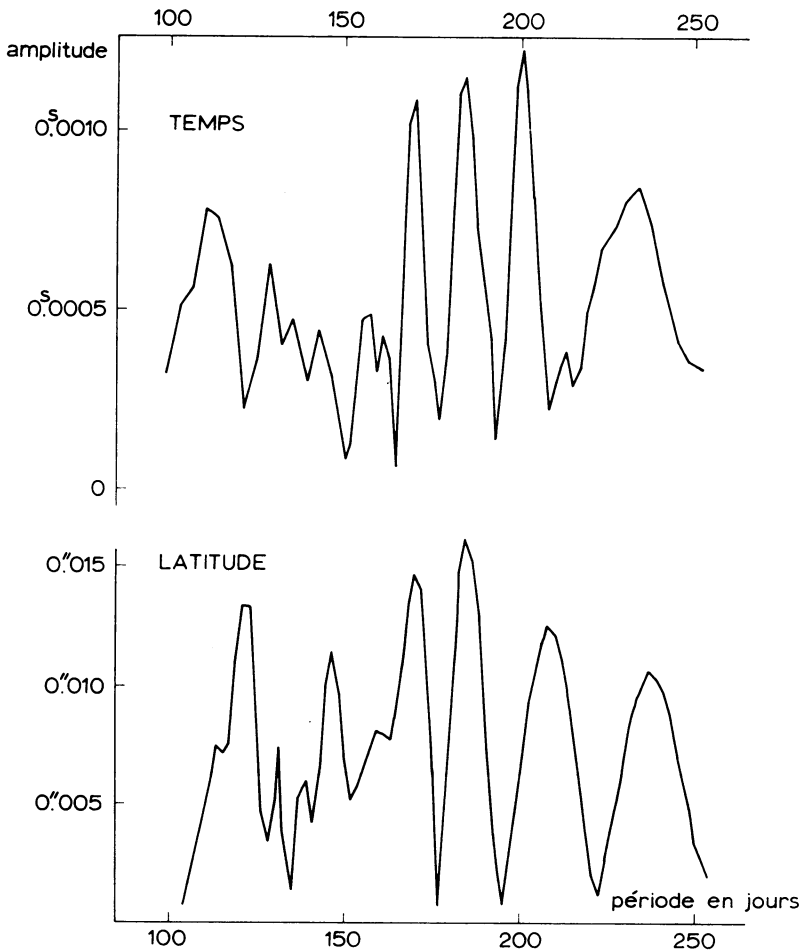


Fig. 1.

The analysis of the observations (1956–1970) is outlined in Figure 1. The semi-annual terms are most certainly due to the movement of the pole in the case of the latitude curve (as is the four months' period term) and due to Earth tides in the case of the time curve. Some other lines are to be seen on both diagrams.

The two lines, close to the semi-annual line, can be interpreted as effects of nearly diurnal nutations; the values of the periods of such nutations are outlined on Figure 2

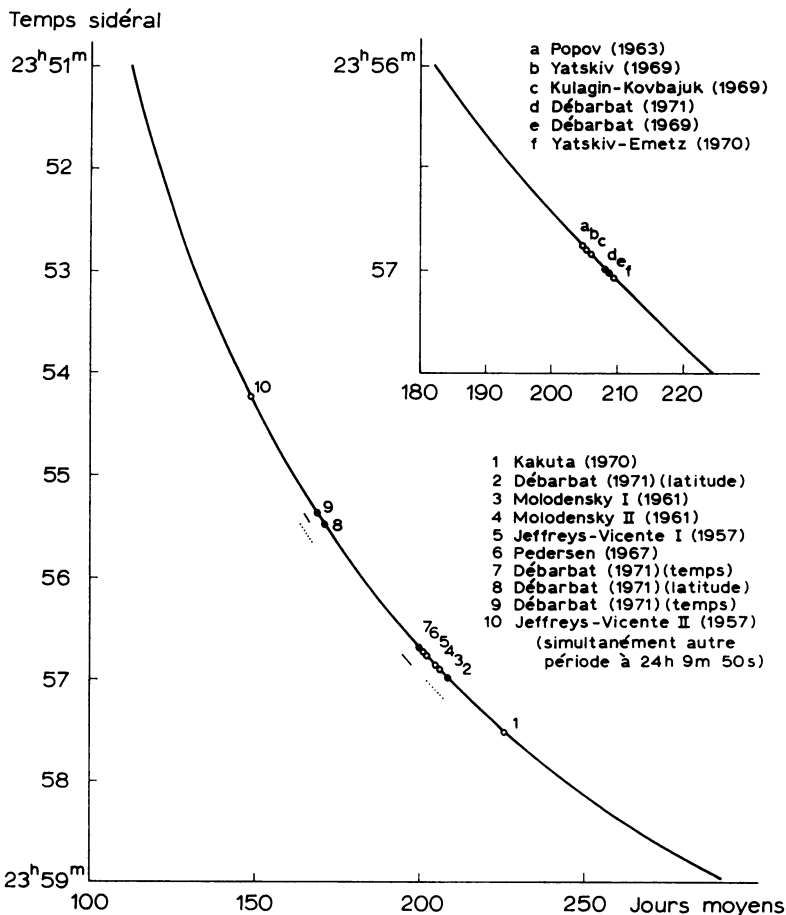


Fig. 2.

(temps sidéral) according to the position of the lines from Figure 1 (jours moyens). The short lines parallel to the curve (time: full line, latitude: dotted line) show the value of the estimated errors.

To compare these experimental results with the theory, on the same diagram, the values obtained by theorists for certain Earth models have been drawn. An enlarged portion of the diagram bears values based on other latitude observations; no major differences are noticed and the results may be considered as satisfactory. The difference

between the values obtained, for the 200 days' line, from time and from latitude, still exists and remains unexplained.

As we can see, the Jeffreys-Vicente I and Pedersen models are in accordance with the line near 200 days for time and the Molodensky I and II models, the line in latitude. But none of the models considered explains the line near 170 days.

Are there any models which indicate, at the same time, two such lines and the Chandler period? Has the 170 days' line an origin other than rotational? If it is found in other observations, theorists will have to find an explanation for it.

DISCUSSION

Ya. S. Yatskiv: Is it your opinion that the time observation is useful now in order to determine the diurnal nutation parameters?

S. Débarbat: The results I have shown to you seem to be able to give an affirmative answer to you.

H. Jeffreys: The extra period calculated by Vicente and me depends very seriously on the structure assumed for the core. The theoretical value may be appreciably different.

S. Débarbat: I agree with you.