

AN ANALYSIS OF TIDAL VARIATIONS IN THE LENGTH OF DAY

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ABSTRACT. Observations of the length of day (LOD), corrected for the effects of variations in the angular momentum due to changes in wind velocity and atmospheric pressure, ocean tide heights and currents, and solid Earth zonal tides, were analyzed. The apparent effect of atmospheric angular momentum (AAM) on the astronomically determined LOD is found to be much less at the highest frequencies than at lower frequencies. For periods shorter than ten days there appears to be essentially no correlation between AAM and LOD. The International Earth Rotation Service (IERS) Standards (1992) model for the effects of zonal tides on the Earth's rotation, which includes ocean tidal effects, adequately accounts for the observations of the variations in the length of day with periods between five and 180 days at the present level of accuracy. A currently unexplained semi-annual variation in the length of day remains, but this may be due to the unmodeled effects of stratospheric winds. The power spectrum of the remaining variations with periods less than twenty days is essentially that of a white-noise process. The amplitudes of the remaining unexplained variations in length of day are less than thirty microseconds. This paper has been accepted by *Geophysical Journal International* for publication.

Reference

McCarthy, D. D., 1992, *IERS Standards*, IERS Technical Note 13, Observatoire de Paris, Paris.