Geophysical Research Abstracts
Vol. 12, EGU2010-8860, 2010
EGU General Assembly 2010
© Author(s) 2010

Variable forcing of the Chandler wobble

Christian Bizouard
Paris Observatory

The Chandler wobble (the damped free mode of the rotation axis within the Earth) is strongly irregular, exhibiting amplitude variation up to 100 mas, that is 50% of its mean value. A possible explanation is the variability of the fluid layer excitation at Chandler period (around 433 days). The later is analysed in light of the longest available angular momentum time series of the atmosphere, oceans and land mass water. In contrast with most of the related studies, the geophysical effect on polar motion is computed from the integrated solution of the Euler-Liouville equation. Then the variable effect at the Chandler period is filtered by a sliding window method and compared to the one found in observed polar motion. We show that the Chandler variability mostly originates from the combined atmospheric and oceanic forcing, as estimated from NCEP and ECCO-MIT models respectively. Atmospheric and oceanic processes account for the variable amplitude and phase over years ranging from 1948 to 2008 : decrease of the Chandler amplitude from the 1950's (250 mas) to the 1970's (120 mas), slow increase till mid 1990's (up to 200 mas), and decrease in the first decade of the twenty-first century (present amplitude is 100 mas); the phase variations, less striking, within 40° range, are as well explained. The results we obtained are confirmed by shorter sets of atmospheric and oceanic angular momentum time series.