Estimating the Period and Q of the Chandler Wobble from mass variations.

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The free Chandler wobble is the largest component of the observed polar motion. The period of the Chandler wobble and quality factor Q depend on the internal structure and rheology of the Earth. There is quite good agreement in empirical determination and theoretical estimations of the Chandler wobble period but there is still large dispersions of the Q values.

One of the methods to assess the value of the period and Q of the Chandler wobble is to determine those values that minimize the power within the Chandler band of the difference between observed and modeled polar motion excitation. Modeling of the polar motion excitation requires information on geophysical fluids distribution. Only recent investigations using atmospheric, oceanic and hydrological excitation computed for the period spanning from 1962 to 2010 shown the value of Q is about 111.

Here we estimate the period and Q of the Chandler values on the basis of that method using direct observations of the excitation caused by mass variations as determined from approximately 25 years of SLR data from five geodetic satellites and from GRACE time varying gravitational field. Atmosphere, ocean, and hydrology models are also used to model the excitation caused by both mass and motion variations within these global geophysical fluids.