Geophysical Research Abstracts, Vol. 7, 03813, 2005
SRef-ID: 1607-7962/gra/EGU05-A-03813

Constraints on mantle anelasticity from Earth rotation and other geodetic observations

J. Wahr (1), D. Benjamin (1), S. Desai (2), R. Ray (3), G. Egbert (4)

(1) University of Colorado, (2) Jet Propulsion Laboratory, (3) Goddard Space Flight Center, (4) Oregon State University (wahr@lemond.colorado.edu)

The physical processes responsible for mantle anelasticity are not well understood. The dissipation of seismic energy seems to be caused by different mechanisms than those controlling viscous mantle flow. Geodetic observations offer perhaps the only means of probing mantle anelasticity at periods between one hour (the longest seismic period) and thousands of years (the time scale of post glacial rebound). We find we are able to explain a number of geodetic observations (Mf and Mm tidal variations in the length-of-day, the Chandler Wobble period and damping, and the M2 and 18.6-year gravity tides) with a single frequency-dependent mantle Q model. We find the observations are consistent with a single absorption band stretching from seismic frequencies out to periods of at least 18.6 years. The frequency-dependence of Q within that band is consistent with a power law with an exponent of between 0.2 and 0.3.