

## Excitation of Earth Rotation Variations "Observed" by Time-Variable Gravity

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Time variable gravity measurements have been made over the past two decades using the space geodetic technique of satellite laser ranging, and more recently by the GRACE satellite mission with improved spatial resolutions. The degree-2 harmonic components of the time-variable gravity contain important information about the Earth's length-of-day and polar motion excitation functions, in a way independent to the traditional "direct" Earth rotation measurements made by, for example, the very-long-baseline interferometry and GPS. In particular, the (degree=2, order=1) components give the mass term of the polar motion excitation; the (2, 0) component, under certain mass conservation conditions, gives the mass term of the length-of-day excitation. Combining these with yet another independent source of angular momentum estimation calculated from global geophysical fluid models (for example the atmospheric angular momentum, in both mass and motion terms), in principle can lead to new insights into the dynamics, particularly the role or the lack thereof of the cores, in the excitation processes of the Earth rotation variations.