

## **Abstract/Paper Title**

Fortnightly Ocean Tides, Earth Rotation, and Mantle Anelasticity

## **Abstract Text**

The fortnightly M<sub>f</sub> ocean tide is the largest of the long-period tides (periods between 1 week and 18.6 years), but M<sub>f</sub> is still very small, generally 2 cm or less. All long-period tides are thought to be near equilibrium with the astronomical tidal potential, with an almost pure zonal structure. However, several lines of evidence point to M<sub>f</sub> having a significant dynamic response to forcing. We use a combination of numerical modeling, satellite altimetry, and observations of polar motion to determine the M<sub>f</sub> ocean tide and to place constraints on certain global properties, such as angular momentum. Polar motion provides the only constraints on M<sub>f</sub> tidal currents. With a model of the M<sub>f</sub> ocean tide in hand, we use it to remove the effects of the ocean from estimates of fortnightly variations in length-of-day. The latter is dominated by the earth's body tide, but a small residual allows us to place new constraints on the anelasticity of the earth's mantle. The result gives the first experimental confirmation of theoretical predictions made by Wahr and Bergen in 1986.