The effect of geocenter motion on Jason-2 orbits and the mean sea level

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Abstract

Geocenter motion, as induced by tidal forcing and density variations, has been shown to cause observable effects on orbit stability and mean sea level rise. In this work, we investigate the impact of geocenter motion on Jason-2 orbits and the mean sea level (MSL) by computing a series of orbits using different models for the geocenter motion. We find that the geocenter model corrections are a significant source of orbit error, with a correction of order 0.1 mm/yr in the mean sea level estimates. Furthermore, we show that the geocenter motion corrections are strongly correlated with the Jason-2 satellite velocity, with a correction of order 0.7-0.8 mm/yr. This result is consistent with previous studies, and suggests that the geocenter motion is an important factor to consider when modeling satellite geodetic measurements.

Conclusions/Future work

In conclusion, we have investigated the impact of geocenter motion on Jason-2 orbits. This was accomplished by computing a series of orbits using different models for the geocenter motion. From these results, we have shown that the geocenter motion corrections are a significant source of orbit error, with a correction of order 0.1 mm/yr in the mean sea level estimates. Furthermore, we have shown that the geocenter motion corrections are strongly correlated with the Jason-2 satellite velocity, with a correction of order 0.7-0.8 mm/yr. This result is consistent with previous studies, and suggests that the geocenter motion is an important factor to consider when modeling satellite geodetic measurements.