



Geocenter motion estimates from the IGS Analysis Center solutions

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While GNSS are nowadays successful in a wide range of geodetic and geophysical applications, the direct observation of the geocenter motion with GNSS remains problematic. In theory, the weekly terrestrial frames provided by the Analysis Centers (AC) of the International GNSS Service (IGS) should have the "instantaneous" center of mass of the Earth as their origin. The net translations between the weekly AC frames and a secular frame such as ITRF2008 should thus approximate the non-linear motion of the center of mass. However, the comparison of the AC translation time series with each other, with SLR geocenter estimates, or with load-model-derived geocenter motion reveals weaknesses and systematic errors in the direct observation of the geocenter motion with GNSS.

On the other hand, the IGS weekly solutions precisely sense the deformations of the Earth's surface. If assumed to be loading-induced, the non-linear part of these deformations can be used to retrieve low-degree variations of the surface load, and hence surface-loading-induced geocenter motion. The viability of this indirect approach for observing the geocenter motion with GNSS has been demonstrated in several studies. We apply it here to the reprocessed solutions from 10 IGS Analysis Centers for intra-comparison and comparison with results from the direct method.