
Geocenter motions and Earth figure changes as seen by ITRF2014

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Abstract

The up-to-date solution of the International Terrestrial Reference Frame, entitled ITRF2014, presents particularly large vertical velocities across Greenland, South East Alaska and the Antarctic Peninsula, compared with the previous solution ITRF2008. We investigate here the geophysical origin of this frame evolution and its implication in terms of geocenter motions and Earth figure changes. Using GNSS station velocities we calculate degree-1 and degree-2 Spherical Harmonics Coefficients (SHC) of the solid Earth figure changes at different dates. We show that these SHC are close to those predicted by Glacial Isostatic Adjustment models except for zonal SHC. Our results indicate that the center of figure of the Earth is currently moving towards North Pole with respect to the center of mass and that the solid Earth oblateness is increasingly diminishing. These changes in solid Earth figure are probably due to recent ice melting in Greenland and Antarctica and have tended to increase regularly during the ITRF2014-GNSS timespan. Finally, we investigate Earth's J2-rate and we confront our results to independent observations.

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