Geophysical Research Abstracts
Vol. 16, EGU2014-13971, 2014
EGU General Assembly 2014

Time-variable Gravity Solutions from 1993 to 2013 from SLR and DORIS data

Frank G. Lemoine (1), Douglas S. Chinn (2), Nikita P. Zelensky (2), Jennifer W. Beall (2), and Stavros Melachroinos (2)

(1) NASA GSFC, Planetary Geodynamcs Lab., Greenbelt, MD, U.S.A. (frank.g.lemoine@nasa.gov), (2) SGT Inc., Greenbelt, MD, U.S.A., (3) Emergent Space Technologies Inc., Greenbelt, MD, U.S.A.

The GRACE mission has been highly successful in determining the time-variable gravity field of the Earth, producing monthly or even more frequent solutions (cf. 10-day) solutions using both spherical harmonics and mascons. However the GRACE time series only commences in 2002-2003 and a gap of several years may occur in the series before a GRACE follow-on satellite is launched. Satellites tracked by SLR and DORIS have also been used to study time variations in the Earth's gravitational field. In this paper we discuss the development of a new time series of low degree spherical harmonic fields based on the available SLR, DORIS data. We have developed solutions to 5x5 in spherical harmonics based on data from up to 18 satellites tracked with SLR and DORIS data. (i.e. Lageos1, Lageos2, Starlette, Stella, Ajisai, Lares, Blits, Larets, Westpac, TOPEX/Poseidon, Envisat, Cryosat-2, Jason-2, SPOT-2, SPOT-3, SPOT-4 and Etalon1 and Etalon2). The new solutions are consistent with the IERS2010 standards with respect to the mean pole and the definition of C21 and S21. We have applied a preliminary version of this time series to the computation of a time series of orbits for TOPEX/Poseidon, Jason-1, and Jason-2 and to the reprocessing of DORIS data for the NASA GSFC submission to ITRF2013 (series gscwd23). We discuss the derivation of these solutions and their evaluation, including their comparison with other solutions, such as those derived from GRACE data.