



Improved solutions of Time-variable gravity from SLR & DORIS data

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The time-variations in the gravity field have been shown to show the secular signature of post glacial rebound, and evidence of mass transport in the Earth system on annual and monthly and sub-monthly time scales. While the GRACE data provide a detailed view of the variations in the geopotential over the past ten years, space geodetic tracking data to a suite of other satellites can provide us with a continuous time history over the recent space era. Previously we have developed solutions principally from SLR and DORIS tracking to 11 satellites from 1993 to 2012. We now have developed a new time series that features a number of improvements: (1) the use of additional satellite data, including (for example) the DORIS data from the SPOT satellites; (2) Improved a priori geopotential modeling; (3) Correction of recent anomalies identified in the SLR tracking data, especially for recent data from important stations such as Yarragadee; (4) Full adherence to the IERS2010 standards concerning the ocean pole tide and IERS definition of the pole; (5) The use of an optimal weighting scheme on a weekly basis to more appropriately weight the different satellite data contributions. We discuss the derivation of this solution, the resolution possible with the available satellite data, comparisons with solutions from GRACE data where the two sets of solutions are coincident, and what the solution might reveal about time-variations in the Earth gravity field over the past twenty years.