BOLLETTINO DI GEOFISICA TEORICA ED APPLICATA VOL. 40, N. 3-4, pp.293-293; SEP.-DEC. 1999

Results from simulations studies of the GRACE mission

S. BETTADPUR, J.R. KIM and B.D. TAPLEY

Center for Space Research, University of Texas at Austin, USA

(Received October 4, 1998; accepted August 5, 1999)

Abstract. The GRACE satellite-to-satellite tracking mission will provide measurements of the mean and time variable components of the Earth's gravity field to un-precedented accuracy. These estimates will provide contraints on the global mass distribution and its time variability, which is important for a wide range of disciplines in the Earth System Sciences. The GRACE mission will provide high precision measurements of the range change between two low Earth orbiters using dual-one-way, dual frequency microwave tracking. The two orbiters will be placed in near polar, near 500 km altitude orbits, separated from each other by approximately 250 km, over a mission lifespan of 3-5 years. The satellites will also carry GPS receivers and accelerometer to aid the recovery of the gravity field from observational data. We have performed simulation studies of expected accuracy of gravity field recovery from GRACE in the presence of some of the prominent error sources. Starting with a brief description of the simulation and analysis procedures, we characterized the effects of principal measurement errors on the estimated gravity field, along with the influence of the orbit parameters. We also obtained results on the influence of short period gravity field variability on the longer term estimates of the mean gravity field.

Corresponding author: S. V. Bettadpur; Center for Space Research, University of Texas, 3925 W. Braker Lane St. 200; 78759 Austin, Texas, USA; phone: +1 512 4717587; fax: +1 512 4713570; e-mail: srinivas@csr.utexas.edu