

Abstract Details

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Title: Satellite Gravity Missions and Precise Gravimetry for Investigation of Active Geosphere

Abstract:

The successful launch of CHAMP (CHAllenging Mini-satellite Payload) in 2001 and GRACE (Gravity Recovery And Climate Experiment) in 2002 has opened a new era of satellite gravimetry. Especially, GRACE and its follow-on missions will provide not only data for precise gravity mapping but also time series of global gravity fields coefficients. These data are precise enough to reveal the temporal variations of the gravity fields due to mass redistribution in and on the Earth, and will lead to understanding of various problems in the Earth sciences, i.e., meteorology, hydrology, oceanography, glaciology as well as the solid Earth sciences. On the other hand, precise gravimetry by means of Superconducting Gravimeters (SG) and Absolute Gravimeters (AG) provides a brand-new technique for multidisciplinary purposes. The high sensitivity and long-term stability of SG, especially calibrated by and/or combined with AG measurements, are expected to reveal not only the gravity signals due to tectonic actives but also the changes of fluid envelope of the Earth, i.e., ocean loading, atmospheric pressure, soil moisture/land water, glacier movements, and so on. Although spatial resolution or sensitivity is different between the satellite mission and the precise gravimetry, the fundamental idea or philosophy behind the techniques is the same; detection of mass movement or redistribution as the results of various phenomena on and in the Earth. The satellite technique and surface precise gravimetry are complementary for each other, and both techniques should be combined to realize the idea. In this paper, we briefly review the satellite missions and the precise gravimetry, and discuss how the both techniques should be combined.

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