



Absolute-gravity stations in Western Dronning Maud Land, Antarctica

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Absolute-gravity stations are an important part of the geodetic infrastructure of the Antarctic. They provide accurate starting values for gravity surveys performed e.g. for the determination of the geoid, for geological studies and for geophysical investigations. The time variation in gravity determined from repeated absolute-gravity measurements provides insights into the Glacial Isostatic Adjustment (GIA) and into solid Earth deformation due to variation in contemporary ice load. Given sufficient joint coverage with International Terrestrial Reference Frame (ITRF) sites, gravity rates in high latitudes could in principle provide an independent check of the geocentricity of the z-dot (velocities in the direction of the rotation axis of the Earth) of the ITRF.

We review the absolute gravity stations in Western and Central Dronning Maud Land. The oldest station is at the Finnish base Aboa, with 5 measurements by the Finnish Geodetic Institute (FGI) starting with the FINNARP 1993 expedition. Measurements at Maitri (India) and Novolazarevskaya (Russia) were first performed in 2004 by the National Geophysical Research Institute (NGRI) of India, and by the FGI, respectively. In the season 2010/11 a new station was constructed at Troll (Norway). In the season 2011/12 the aforementioned four sites were occupied by the FG5-221 absolute gravimeter of the FGI. At Sanae IV (South Africa) there are previous occupations by the FG5-221, in 2003/4 and 2005/6.

All these bases have continuous GNSS stations. Numerous supporting measurements have been made at the sites: microgravity networks, levelling and GNSS ties to excentres etc., for controlling the stability of the stations. At some sites, nearby glacier elevations were surveyed to monitor the attraction of the variable close-field snow and ice masses. We give a description of the sites and the measurements performed at them. The work has benefited from the co-operation in the COST Action ES0701 “Improved Constraints on Models of GIA”.