

Efficiency of Superconducting Gravimeter observations and future prospects

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The Superconducting Gravimeter (SG) is an integrating sensor measuring gravity variations associated with mass redistributions in its near and far surroundings. It integrates gravity changes of the different sources and cannot separate them. Therefore all gravity effects must be modelled with high accuracy to separate one special effect. Starting from the performance parameters of the SG's and the general fields of applications the quality is discussed for the reduction models of atmosphere and hydrosphere induced gravity variations. Main emphasis for the atmosphere induced gravity variations is the modelling with 3D atmospheric pressure data. Besides the assessment of the Earth Tide Parameter determination analysing results of other geophysical effects are presented from the GGP (Global Geodynamics Project) network of SG stations like Free Oscillation of the Earth, Slichter Triplet, Polar Motion.

Of fundamental interest is the combination of SG with CHAMP and GRACE satellite derived temporal gravity variations. The newest comparison of these variations is shown using GFZ and CSR GRACE-solutions for selected SG stations by considering the gravity variations induced by hydrological effects derived from global hydrology models. The problems are discussed rising by combination of point (SG) and spatial (satellite derived) gravity measurements. Furthermore combinations of SG measurements with other techniques are shown like GPS and tide gauge measurements. An outlook with proposals for future SG applications is given e.g. for validation of GRACE and GOCE derived gravity variations and for possible geo-hazard applications.