

Using SG arrays for hydrology in comparison with GRACE satellite data, with extension to seismic and volcanic hazards.

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We first review some history of the Global Geodynamics Project (GGP), particularly in the progress of ground-satellite gravity comparisons. The GGP Satellite Project has involved the measurement of ground-based superconducting gravimeters (SGs) in Europe for several years and we make quantitative comparisons with the latest satellite GRACE data and hydrological models. The primary goal is to recover information about seasonal hydrology cycles, and we find a good correlation at the microgal level between the data and modelling. One interesting feature of the data is low soil moisture resulting from the European heat wave in 2002. An issue with the ground-based stations is the possibility of mass variations in the soil above a station, and particularly for underground stations these have to be modelled precisely. Based on this work with a regional array, we estimate the effectiveness of future SG arrays to measure co-seismic deformation and silent-slip events. Finally we consider gravity surveys in volcanic areas, and predict the accuracy in modelling subsurface density variations over time periods from months to years.