



A New Map of UK Vertical Land Movements based on Continuous GPS and Absolute Gravity

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In this study we present a new map of UK vertical land movements from a recent processing that included data for the period from 1997 to 2008 from more than 100 continuous Global Positioning System (CGPS) stations in this region. Not only was the CGPS network dramatically expanded from previous investigations by the authors, it now also includes, for the first time, stations in Northern Ireland, which will be interesting for defining the westerly extent of uplift associated with the glacio-isostatic processes active in the region. In our processing strategy we apply a combination of re-analyzed satellite orbit and Earth rotation products together with updated models for absolute satellite and receiver antenna phase centers and for the computation of atmospheric delays. Our reference frame implementation uses a semi-global network of approximately 50 IGS stations located in North America, Greenland and Eurasia, to align our daily position estimates, using a minimal constraints approach, to ITRF2005. We assess the accuracy of our vertical station velocities along with their associated uncertainties, which were computed from a detailed stochastic model of the position time series, using independent estimates of vertical land movements from two absolute gravity stations and over fifty geological sites. Using the geodetic estimates we produce a series of maps of vertical land movements over the last decade and compare these to the geological map currently used in assessments of future changes in relative sea level for the planning of flood and coastal defenses in the UK.