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Absolute gravity measurements of vertical crustal movements in the UK

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Beginning in 1995/6, we started to make absolute gravity(AG) measurements at 3 sites in the UK using the Micro-g Solutions, Inc., absolute gravimeter FG5-103. These sites are at Newlyn in the south-west of England, Aberdeen in north-east Scotland and Lerwick in the Shetland Islands. The sites were chosen to be on bedrock, in order to reduce the effects of any possible local hydrological variations. The objective is to obtain long time series of absolute gravity values, which can be used for determining the vertical crustal movements at these sites, accurate to a few tenths of a millimeter per year. The measurements will be used to correct the mean sea level trends determined from the nearby tide gauges for crustal movements, in order to find the climate related changes in mean sea levels. Newlyn and Lerwick are core tide gauges in the Global Sea Level Observing System (GLOSS). The AG measurements show that both Newlyn and Lerwick are subsiding and this is consistent with GIA models, which show that the maximum subsidence rates in the British Isles following de-glaciation are in the extreme south-west of England and in the Shetland Islands. Compared to previous models of the ice distribution at the last glacial maximum, the recently published ICE-5G model has major modifications in ice thickness in Scotland and particularly in the North Sea around the Shetland Islands. The AG measurements will be important for testing the validity of the various models.