

Continuous gravity measurement with an iGrav superconducting gravimeter for CO₂ sequestration

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We have started gravity monitoring at the Farnsworth test site in Texas along with US's project of Southwest Regional Partnership. We have been making three kinds of gravimetric baseline measurements: continuous gravity measurements at the gravity hut with an iGrav superconducting gravimeter (SG), co-located absolute gravity measurements at the gravity hut, and relative gravity measurements around the gravity hut with portable gravimeters. The SG is distinguished from other gravimeters by superior precision, better than 1 nm/s² and by the ability to record gravity continuously over periods of months and longer. The SG meter is a type of relative gravimeter, therefore, it is necessary to monitor temporal changes of its scale factor and the zero level of its output signals. We have made the first co-located measurements with the FG5/217 absolute gravimeter for a week (08/01/2013-15/01/2013) to determine the scale factor of the SG meter. We decomposed the continuous gravity data using the program BAYTAP-G into tidal effects and irregularities such as drift, occasional steps and disturbances caused by external mass displacements (CO₂ sequestration, oil and/or gas production, atmospheric, hydrological, and tectonic processes). This research is funded and supported by Ministry of Economy, Trade and Industry (METI).

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