



Continuous gravity monitoring for CO₂ geo-sequestration, a case study at the Tomakomai site, Japan

Mituhiko Sugihara^{1*}, Tsuneo Ishido¹, Hiroshi Ikeda², Kazunari Nawa¹ and Yuji Nishi¹

¹*Geological Survey of Japan, National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba, Ibaraki, 305-8567, Japan*

²*Cryogenics Center, University of Tsukuba, Tsukuba, Ibaraki, 305-8577, Japan*

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Our purpose is development of a monitoring method for both lowering costs and increasing the safety in CO₂ sequestration by complementing standard time-lapse seismic survey with high-precision continuous gravity measurement technique.

In March 2015 we started baseline measurements using a superconducting gravimeter at the Tomakomai site, where CO₂ will be injected into two different offshore saline reservoirs, at depths of approximately 1100m and 2400m below the seabed offshore by two deviated injection wells in 2016. An iGrav superconducting gravimeter was installed using two protective enclosures. Prior to the installation we have made a two-month measurement using the transportable system at a CO₂-EOR test site in Texas, USA. The Tomakomai observation base, located approximately 50m from the seashore about midway between the seashore and the CO₂ injection well. This is likely the closest installation of any superconducting gravimeter to the sea. Sometimes the noise on the gravity signal increased significantly. During the period the change in barometric pressure is accompanied by large ocean waves crashing onto the seashore.

In spite of the severe noise the most noteworthy result is the small initial drift rate, which was determined to less than 1 microGal/month in less than two months. The disturbances we encountered did not appear to affect the long period performance of the gravimeter which is the principal signal of interest for this study.

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