

Gravity monitoring using superconducting gravimeters near the seashore at the Tomakomai CCS demonstration site

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Monitoring the distribution and migration of CO₂ injected into geological formations is needed for management of geological storage of CO₂. Superconducting gravimeters (SG's) potentially enable monitoring of offshore CO₂ storage at ground-based stations because of its high precision. We conducted continuous gravity observations using SG's near the seashore at the Tomakomai CCS (carbon dioxide capture and storage) demonstration site, Japan to study variation in the observed gravity near the seashore. The gravity data after correcting for tides, polar motion, and barometric pressure changes was strongly affected by shallow groundwater level changes but it was corrected by expressing their effects as a summation of linear functions of groundwater level changes. The standard deviation of the gravity residuals was reduced to less than 1 μ Gal after correcting for the groundwater effects. The small variation in the observed gravity residuals suggests that the ground-based gravity monitoring using SG's can be useful in long-term monitoring of offshore CO₂ storage.

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