Leakage monitoring of onshore CCS using existing wells

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Designing the surface monitoring network of CO_2 leakage is a strategically difficult task in establishing on-land CCS sites. Since we cannot exclude the possibility of the localized leakage event with high CO_2 fluxes to cause fatal accidents, any proposal of surface monitoring network might be qualified as inadequate to the local residents.

However, if there exist active users of underground resources such as oil, gas, ore minerals, thermal waters, and drinking waters in a supposed CCS site, these stakeholders can take an important role not only in the early warning and remediation strategy after site closure, but also in the CO_2 migration monitoring during the injection phase.

In Japan, the typical sedimentary basins with high population density recently have a large number of hot springs for recreational purposes. The spring water continually pumped up from underground of 1000 m to 1500 m in depth can be served as a reliable leakage monitor, when the CO_2 injection layers are identified below these hot spring aquifers.