

Hydrogeochemical monitoring as a baseline for CO₂ leakage detection

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This study is objected to devise an early detection and warning system of CO₂ leakage from geological storage by hydrogeochemical monitoring at the zone above the storage formation. This study was carried with geothermal groundwaters and carbonated springs as an analogue to the zone above the storage. Ranges of natural variation were set for groundwater components and stable isotope signatures based on seasonal samplings. Relatively stable components in the above zone were identified statistically with the relative standard deviation less than 10%. Then, assuming introduction of CO₂ by leakage, components with ionic variation greater than 10% were identified as “sensitive”. In geothermal groundwater conditions, pH, EC, HCO₃, d18O, d2H and d13C could be used as indexing parameters for CO₂ leakage. In carbonate-rich conditions, pH, d18O and d2H can be used. Geochemical monitoring with baseline data can provide better safety measures for CCS projects.

