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Trace metal scavenging from CO_2.H_2S injection into basaltic rocks at the CarbFix pilot and CarbFix2 sites, Iceland

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Basaltic rock dissolution release trace and toxic elements to the aqueous phase; this process has been extensively studied in Icelandic geothermal systems. There is little information regarding their fate as a result of subsurface carbon mineralization. Samples collected from the CarbFix pilot and CarbFix2 monitoring wells at the Hellisheidi geothermal field (Iceland) were measured over time as dissolved CO_2 and H_2S were injected into the subsurface basalts. Results suggest that the release of any trace elements were likely scavenged into several secondary phases, including carbonate and sulfide minerals.

Although these fluids are not meant for human consumption, the aqueous trace element concentrations were generally below the WHO, EU, and Iceland drinking water standards, with a few exceptions. There were peaks in Fe during both injection experiments at the CarbFix pilot site in 2012 that exceeded proposed drinking water values, which were not sustained once the gas injections finished. In addition, As concentrations were significantly elevated at the start of the CarbFix2 gas injection in 2014, but concentrations have since greatly reduced over time to levels at or below drinking water standards although injection continued.