

Geochemical characterization of the Coda Terminal CO₂ storage site, Iceland

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The Carbfix technology has been demonstrated to be a safe and cost-effective approach to reduce carbon dioxide (CO₂) emissions into the atmosphere. It uses the capability of basalt to neutralize the CO₂-charged water resulting in precipitation of CO₂ as carbonate minerals within the storage reservoir. This carbon mineralization technology is currently the only one in the world applied at a commercial scale. One of the largest projects that has currently been developed by Carbfix – the Coda Terminal – received 115 M EUR from the EU Innovation Fund. The first phase of the Coda Terminal project assumes an annual injection of about 700 ktCO₂ in 2027, whereas its final capacity is estimated to be 3000 ktCO₂/yr in 2032. The simplified value chain of CO₂ includes: 1) capturing at the industrial sites in Europe, 2) transport to the European hub, 3) shipping to the Terminal in Iceland, 4) offloading and conditioning, 5) injection through a network of wells into the basaltic bedrock and 6) subsurface mineral storage.

In this communication, we will present the current knowledge of the subsurface storage reservoir gained during drilling and post drilling operations. Up to date one injection, two monitoring, and four water supply wells have been drilled. The water discharged from the injection well is saline in contrast to the deep monitoring wells where the water is of fresh to brackish characteristics depending on the depth of the feed zones. The background water pH varies from 8 to 11 at relatively low temperature with CO₂ concentration in a range seen in groundwater in Iceland. The spatial variability of the water compositions adds to the complexity of the system and therefore it may affect the injection strategy and the scale-up of the operation. It also highlights the need for further geochemical characterization of the subsurface aquifer.