CO2 storage potential of basaltic rocks in Iceland and the oceanic ridges - DTU Orbit (03/12/2018)

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Iceland is the largest landmass found above sea level at the mid-ocean ridges, about 103,000 km(2) mostly made of basaltic rocks (similar to 90%). Theoretically much of Iceland could be used for injection of CO2, fully dissolved in water. Most of the pore space in the older rocks is filled with secondary minerals, thus the young and porous basaltic formations, found within the active rift zone and covering about one third of Iceland, are the most feasible for carbon storage onshore. Studies on mineral storage of CO2 in basaltic rocks are still at an early stage. Therefore, natural analogues are important for gaining a better understanding of CO2 fixation in basaltic rocks. Volcanic geothermal systems serve as an applicable analogue since the systems receive considerable amounts of CO2 from magma in the roots of the systems. Wiese et al. [1] quantified the amount and spatial distribution of CO2 stored as calcite within the bedrock of three active geothermal systems in Iceland. The results from this study reveal a large storage potential of basaltic rocks and can be used as a guideline for the theoretical potential of CO2 storage in basaltic formations. The largest storage potential lies offshore, with long-term advantages for safe and secure CO2 storage in the mid-ocean ridges. The theoretical mineral CO2 storage capacity of the ocean ridges, using the Icelandic analogue, is orders of magnitude larger than the anticipated release of CO2 caused by burning of all fossil fuel on Earth. (C) 2014 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/3.0/).

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