Geological storage of CO_2 in sub-seafloor basalt offshore Washington State and British Columbia (CarbonSAFE Cascadia project)

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Sub-seafloor basalts are widely distributed on Earth and may enable permanent mineralization of injected CO2 in solid rock form. If feasible and scalable, this sequestration technology promises a means for significant reductions in the atmospheric concentration of greenhouse gases. The CarbonSAFE Cascadia project evaluated both technical and non-technical feasibility of collecting and storing 50 million MT of CO2 in a safe, ocean basalt reservoir offshore from Washington State and British Columbia. Project goals include evaluating this reservoir as an industrial-scale CO2 storage complex, developing potential source/transport scenarios, conducting laboratory and modeling studies to determine the potential capacity of the reservoir, determining long-term monitoring options, and assessing economic, regulatory and project risks. Potential scenarios include a variety of industrial sources and transport options in the USA and in Canada. Experimental and modeling results indicate the potential for effective injection and rapid mineralization in sub-seafloor basalt. Regulatory reforms to facilitate offshore CO2 storage may be needed for development of a future pilot project in the Cascadia Basin and lessons learned at this location may be transferrable elsewhere around the globe.