Integrated pre-feasibility study for CO₂ geological storage offshore WA and BC

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CO₂ storage in sub-seafloor basalt

Technical/non-technical assessment for safe and permanent storage of 50 MMT CO₂ over reservoir lifetime

CO₂ injected below sediments may be stored through physical, solubility, and mineral trapping mechanisms – CarbFIX and Wallula projects show mineralization occurs quickly (a few years)

(after Goldberg et al., 2008)
Existing physical data in the Cascadia Basin

- Several existing well completions and instrumentation at IODP sites along buried basement ridge
- Multi-year tracer experiments through basalt ocean crust indicate focused northward fluid flow
- Extensive core and measurement data in public archives
- Active cabled network (NEPTUNE) for observation and monitoring

(Neira et al, 2013)
Potential CO₂ sources near Cascadia area

(from M. Scherwath, Ocean Networks Canada, 2016)
CarbonSAFE preliminary results

- Large potential sources of anthropogenic $CO_2$ exist in the region
- Existing regulations appear to restrict $CO_2$ transport across national boundaries (e.g., between US and Canada)
- Compiled hydrological data indicate basalt injectivity is high but likely anisotropic
- Laboratory studies of $CO_2$–basalt–water mixtures indicate large variability in reaction rates
- Real-time injection monitoring is feasible using NEPTUNE