

BASIN-SCALE ASSESSMENT FOR CO₂ STORAGE PROSPECTIVITY IN THE PROVINCE OF QUÉBEC, CANADA

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The suitability of the sedimentary basins for CO₂ storage is assessed according to geological and practical criteria. The southern part of the Province of Québec is divided into four basins which all meet the size and depth criteria.

The Magdalen basin, located mainly offshore in the Gulf of St. Lawrence, is made up of Upper Devonian to Lower Permian rocks including evaporites and salt domes, and coal measures. Coarse clastics and carbonate rocks are potential reservoirs, whereas evaporites and shales are candidate seals. The accessibility and infrastructure of the offshore potential CO₂ storage sites do not exist.

The Gaspé Belt basin, mainly located in the Gaspé Peninsula, is made up of Upper Ordovician to Lower Devonian rocks and the intensity of deformation and metamorphism varies from moderate to high. The oil and gas exploration is better developed in the northern part of the basin where data from wells and seismic lines are available. Sandstones and carbonate with reefs are potential reservoirs, whereas fine-grained clastics are candidate seals. The northeastern Gaspé Belt basin is geologically prospective but there are no large CO₂ emitters nearby.

The Humber-Dunnage folded belt basin is made up of highly folded and faulted Cambrian to Upper Ordovician rocks. This basin is practically unexplored for oil and gas and the CO₂ storage prospectivity is evaluated as very low.

The St. Lawrence platform basin is made up of Cambrian to Lower Silurian and is divided into two sub-basins: the Anticosti sub-basin and the St. Lawrence Lowlands sub-basin. The Anticosti sub-basin is only affected by syn-sedimentary normal faults and the intensity of deformation is low. This sub-basin is geologically prospective for CO₂ storage, but infrastructure on the island is poor and large CO₂ emitters are far away. Deformation intensity in St. Lawrence Lowlands sub-basin varies from very low to intermediate. Candidate reservoirs include sandstone, dolostone and limestone rock units. Overlying thick units of shale and fine-grained clastics are candidate seals. Oil and gas exploration is developing and there is large potential for unconventional shale gas. The St. Lawrence Lowlands sub-basin represents by far the most prospective basin for CO₂ storage.