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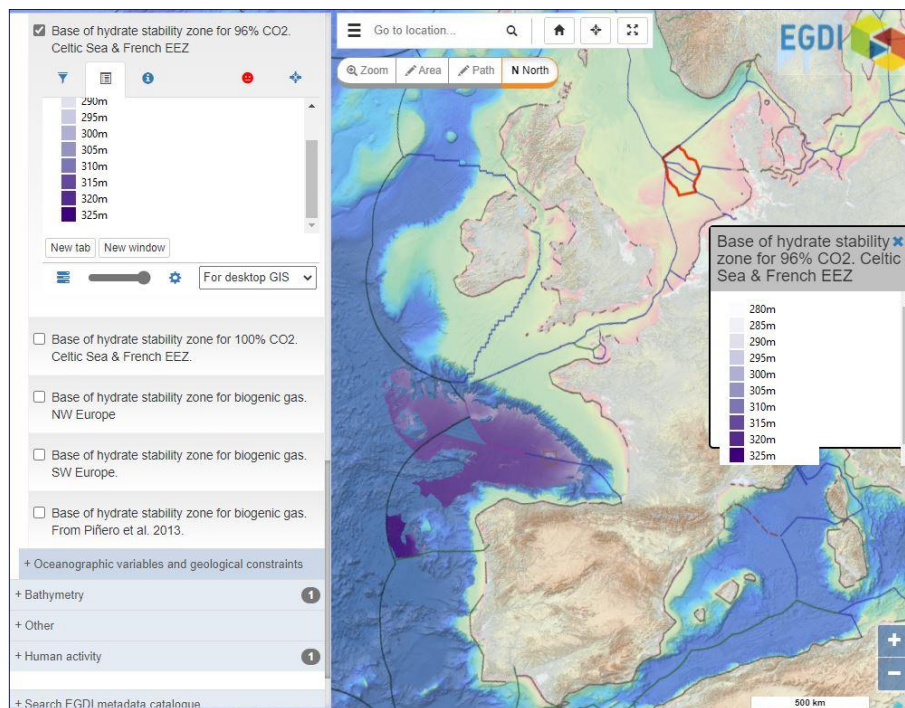
Potential safe geological storage of CO₂ as mixed gas hydrates along the European continental margins

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A pan-European GIS focused on gas hydrates has been developed in the GARAH project (<https://geoera.eu/projects/garah4/>) to assess for the first time the gas hydrate related risk along the European continental margins. Several factors and variables have been taken into account to assess the abundance of sediment-hosted gas hydrates and to estimate the safe storage volume of CO₂ as mixed gas hydrates in deep-sea sediments. The baseline scenario is that gas hydrate occurrence is only possible in seafloor areas where pressure (bathymetry) and seafloor temperature conditions are inside the theoretical gas hydrate stability zone (GHSZ) and that the injected CO₂(l) is expected to percolate downwards or upwards to the neutral buoyancy level (NBZ) depending on the CO₂ quality and on the seafloor depth. In the Bay of Biscay, the safe CO₂ deep offshore storage capacity is estimated in both cases (pure CO₂ or 96%ml CO₂). The French EEZ storage volume estimate of 3,422 km³ is of the same order of magnitude as the total Spanish EEZ storage volume estimate of 3,700 km³. There is, however, a big difference resulting from the seafloor depth: in the French zone, almost all the stored volume is occupied by gas hydrates, whereas in the Spanish zone, about the half (1,728 km³) is occupied by CO₂ in hydrate phase and the other half (1,972 km³) by liquid CO₂. This GIS-database has been conceived as a first step or base-line for future gas hydrate related research.



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