



Preliminary carbon and oxygen isotope results from CO₂ injection at the Ketzin site

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Stable carbon isotopes may serve as useful tracers for injected CO₂ in the subsurface. This is especially true if the already present dissolved inorganic carbon (DIC) has a different isotopic composition (¹³CDIC) than the injected CO₂. After dissolution of the latter, mixture of both pools can thus enable mass balance calculations to quantify ionic trapping of the injected CO₂. In addition, since both water and CO₂ contain oxygen, it is possible that the oxygen isotope composition of the water changes, if large amounts of CO₂ are in contact with the water. Isotopic equilibration between both phases would provide an additional useful isotope tracer. Preliminary isotope measurements before and after injection of CO₂ at the Ketzin site revealed good correlation between increasing DIC contents and its isotopic composition. The latter was as negative as -35 permille compared to values ranging between -4.2 and -5.6 permille before injection. On the other hand, the stable isotopic composition of the water (¹⁸OH₂O) remained relatively homogeneous with little variations, thus indicating that equilibration between CO₂ and water –if any– did not yet occur several weeks after injection. Preliminary data will have to be confirmed with samples from more frequent and robust sampling and preservation strategies. Particularly other geochemical data including ion- and organic matter contents, as well as pH measurements need to be combined with isotope data to understand subsurface processes and to quantify ionic trapping.

Keywords: monitoring of CO₂ dissolution, stable isotopes