EGU2020-2094
https://doi.org/10.5194/egusphere-egu2020-2094
EGU General Assembly 2020

The carbon-isotope signature of diagenetic carbonates

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Diagenetic carbonates often show large variations in their carbon isotope compositions. Variations are mainly the result of isotope fractionation effects during microbial metabolic processes, and these processes themselves may induce carbonate formation. Inorganic carbon from dissimilatory microbial activity shows negative carbon isotope values ($d^{13}C$), in particular if methane is used as a carbon source. In turn, inorganic carbon produced during methanogenesis shows positive $d^{13}C$ values. The range of isotope values preserved in the carbonate phase ultimately depends on the reservoir sizes, diffusive mixing of different carbon sources, and episodic formation of carbonate (Meister et al., 2019; Meister and Reyes, 2019). The carbon-isotope signature of diagenetic carbonates therefore represents an archive of past biogeochemical activity in the subsurface.

References:

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