



Modeling $^{13}\text{C}/^{12}\text{C}$ fractionation of dissolved inorganic carbon species and precipitated calcite along the flow path of natural streams

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$^{13}\text{C}/^{12}\text{C}$ isotope fractionation in natural aquatic systems can be followed very comfortably with the hydrogeochemical computer program PHREEQC-2 (Appelo, 2002). In this study PHREEQC-2 is used for modeling the $^{13}\text{C}/^{12}\text{C}$ fractionation of dissolved inorganic carbon (DIC) species along the flow path of a natural stream in Carinthia (Austria). The stream is characterized by high supersaturation with respect to calcite induced by rapid CO_2 degassing. Applying a 1D transport model a progressively enrichment of ^{13}C in DIC and precipitating calcite can be simulated. The modeled ^{13}C values agree well with the measured data. The obtained rates of CO_2 degassing and calcite precipitation along the flow path of the stream can be directly followed by geochemical modeling.

Reference

Appelo, C.A.J. (2002): Calculating the fractionation of isotopes in hydrochemical (transport) processes with PHREEQC-2. In H.D. Schulz and A. Haderler (eds): Geochemical processes in soil and groundwater. GeoProc, Wiley-VCH, Weinheim, p. 383-398.