

## MIXING OF AQUEOUS SOLUTIONS – IMPACT ON DISSOLUTION AND PRECIPITATION OF CALCIUM CARBONATE

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The potential to dissolve calcite in a fluid created by mixing of two aqueous solutions, which are both saturated with respect to calcite ( $SI_{\text{Calcite}} = 0$ ), has been demonstrated by BOEGLI (1964). In contrast, little attention has been paid to the potential for the mixing of two calcite saturated aqueous fluids to provoke calcite precipitation. This possibility is likely in a number of alkaline systems including limestone dissolution at closed system conditions, carbonate sinter formation in terrestrial lakes, carbonate scaling, and throughout the dissolution of mafic silicates. In such systems fluid mixing is a crucial factor for evaluating solution compositions and mechanisms of carbonate precipitation (e.g. RINDER et al., 2013).

Here we present aqueous solution mixing models within the  $\text{CaCO}_3\text{-CO}_2\text{-H}_2\text{O}$  system at alkaline conditions. Our results display a complex behaviour with respect to the potential dissolution and precipitation of calcite. Mixing of aqueous solutions with different chemistry, but both at  $SI_{\text{Calcite}} = 0$ , may yield in solutions super- or undersaturated with respect to calcite. This is even true for groundwater, which originated from limestone dissolution. The redistribution of carbonate species as a function of pH leads to supersaturation with respect to calcite in the mixed solution, as a critical pH for redistribution of  $\text{HCO}_3^-$  into  $\text{CO}_3^{2-}$  is reached.

BOEGLI, A. (1964): *Erdkunde*, 18, 83–92.

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