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Water mixing reactive transport aproach

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A method for solving reactive transport in porous media is proposed. The approach relies in the fact of not transporting species or components, but the containing waters by using mass mixing ratios (λ). This allows decoupling chemistry calculation from solute transport modelling. Any existing transport numerical formulation can be used to calculate λ. In order to avoid numerical dispersion due advection, an Eulerian-Lagrangian modelling is proposed which consists on the construction of a streamline oriented grid where the residence time between successive cells is constant. We call this as isochronal mesh. Four examples have been tested. The first two examples consist in the comparison with existing analytical solutions. Moreover two reactive transport problems has been performed using both proposed method and existing DSA to compare precision and computational cost. The results confirm that the proposed method gives satisfactory results when no sharply concentration gradient occurs. Regarding CPU, the method provides a remarkable reduction of the computational cost especially in large node model. In short, a new reactive transport methodology has been proposed, although refinements for complex cases are needed like in problems with adsorption.