

Mass transfer and the diffusion path during fluid-rock interaction in the Nishisonogi metamorphic rocks, southwest Japan

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Hydrothermal alteration of basic schist next to retrograde dolomite + calcite veins provide evidence for fluid flow and associated fluid-rock interaction in the Nishisonogi metamorphic rocks, southwest Japan. The alteration is characterized by carbonation and sericitization. Mass balance calculations indicate that the predominant chemical changes were gains of CO₂ and K₂O from the vein-fluid along with losses of CaO and total iron from the basic host schist.

Diffusion path during alteration was estimated from phase relations in the basic host schist using ionic activity diagrams. The path indicates that the activities of CO₂ and K⁺ increase, and the activity of Ca⁺⁺ decreases as the alteration proceed. This is consistent with the actual chemical changes in the basic host schist.