

HAVE WE SOLVED THE DOLOMITE PROBLEM AND NOT NOTICED?

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Although dolomite is very common in ancient carbonates, modern carbonates only rarely contain more than minor dolomite. This conundrum is known as the Dolomite Problem and numerous workers have tried to solve it by finding that special water or chemical condition that allows dolomite to form. Efforts to synthesize dolomite under sedimentary conditions have met with failure after failure (but see recent work with bacteria) thus complicating the identification of these special conditions using chemical data. However, there is a flaw at the heart of this apparent paradox: the assumption that unmodified seawater cannot form dolomite since it hasn't in the modern. There is a growing consensus that the modern is not a good analog for ancient dolomites because of the very short time involved (5000 years) and that dolomite forms easily in seawater provided a hydrologic pump is available to move large pore volumes over long periods of geologic time. At elevated temperatures, the time needed shortens significantly. It is my contention that the dolomite problem has been quietly solved for years and that most workers today are looking at each occurrence to identify how and when seawater or modified seawater was pumped through the sediment/rock rather than trying to find some special set of conditions that can explain all dolomite. Hydrologic models divide into near-surface processes (reflux, convection, or seawater flow beneath a meteoric lens) and deep processes (convection again, compaction, tectonically-driven flow). Hydrocarbon reservoirs are commonly the former while lead-zinc mineralization is associated with the latter.