

Can the “Dolomite Problem” be Solved?

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Abstract

Whether or not the “dolomite problem” can be solved is as much as a philosophical, a scientific, and a technical question, and depends on how the problem is defined. The “dolomite problem” is here defined as consisting of four aspects: (a) dolomites can form in many different diagenetic and hydrothermal settings; (b) data often permit more than one genetic interpretation; (c) dolomite is rare in Holocene sediments, yet abundant in older rocks; and (d) well-ordered, stoichiometric dolomite has never been successfully grown inorganically in laboratory experiments at near-surface conditions. These aspects lead to practical problems plaguing the petroleum industry, most notably in determining the geometry and porosity-permeability patterns in dolostone reservoirs, which are notoriously difficult to interpret and predict.

From a philosophical point of view, the “dolomite problem” cannot be solved because there is no globally accepted definition, and one has to deal with some unprovable assumptions, just as in religion. From a practical point of view, the “dolomite problem” can be solved to a degree that would enhance exploration success, and allow for more efficient development of dolostone reservoirs. Attaining these goals requires a comprehensive understanding and application of the involved disciplines, most notably crystallography, geochemistry, and hydrogeology. Many ambiguities in previous studies arose from a superficial understanding and lack of rigor in the application of these disciplines.