

Hydrothermal Dolomite – A Product of Poor Definition and Imagination

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The latest dolomite bandwagon to drive through the Western Canada Sedimentary Basin is the "Hydrothermal Dolomite model". This model, as presently used, is doomed for two reasons: (1) there are several definitions of hydrothermal, and hardly any author specifies which one s/he is using; (2) almost none of the western Canadian dolomites hitherto called hydrothermal have been demonstrated to be hydrothermal according to any definition, except the worst. As presently applied, the term "hydrothermal dolomite" is confusing and/or meaningless.

We suggest to use White's (1957) definition of "hydrothermal" as "aqueous solutions that are warm or hot relative to its surrounding environment", with no genetic implications regarding the fluid source. Hence, a dolomite should be called hydrothermal only if it can be demonstrated to have formed at a higher than ambient temperature, regardless of fluid source or drive. Furthermore, this definition does not carry a lower or upper temperature limit. Even a dolomite formed at 40 °C could be hydrothermal. By extension, dolomites formed at temperatures lower than ambient are NOT hydrothermal, even if they formed at a rather high temperature. For example, seawater may penetrate a rock sequence through a highly permeable pathway, such that it is heated to 80 °C at a depth where the surrounding rock has a temperature of 100 °C. If dolomite is formed from this seawater, it would not be hydrothermal. If anything, it should be called "hydrofrigid".

White, D.E. (1957): Thermal waters of volcanic origin. Bulletin Geological Society of America, v. 68, p. 1637-1658.