

Warm Dolomites and Leached Limestones

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Devonian carbonates have been altered to dolostones in much of the WCSB. It is popular currently to attribute this dolomitization to burial or hydrothermal processes; based largely on geochemical considerations that ignores much sedimentary and stratigraphic evidence to the contrary. Much geochemical evidence for burial dolomitization has been gleaned from analysis of burial cements, not the original replacement dolomite which has been largely overprinted by burial processes. Widespread Devonian matrix dolostones are characterized by shallow-water deposition of limestone. They exhibit multiple subaerial exposure and dissolution events linked to the end of depositional cycles. Vadose and phreatic cavities are common. The relationship among matrix dolostones, solution cavities and their internal sediment also suggests a near-surface origin. One interstitial fluid cannot both leach and dolomitize limestone: these interrelated processes are best explained by alternations of sea- and fresh-water. Currently mixing zone dolomitization is in disrepute mostly because the process, as originally proposed, has not been duplicated in the laboratory. This does not preclude pervasive matrix dolomitization in a near-surface environment, it may simply mean that the process is not understood. Currently there is a discrepancy between the mineralogical evidence for burial dolomitization and the stratigraphic-sedimentologic evidence, the latter of which suggests pervasive dolomitization of the Devonian of Western Canada in a near-surface environment.