

ORIGIN, DISTRIBUTION, AND FORMATION OF ATYPICAL MAP-SCALE DOLOMITE BODIES IN THE MONTEREY FORMATION, CENTRAL CALIFORNIA

Maia Davis

Geology, California State University, Long Beach, Long Beach, California
maiac.davis@gmail.com

Abstract

Dolomite within California's Monterey Formation commonly occurs as diagenetic laminations, beds, nodules, veins, and replaces other lithologies. However, in central California, isolated, massive, map-scale dolomites adjacent to faults and along contact or unconformable surfaces exist locally throughout the Monterey. This study will test the hypothesis that these bodies are of hydrothermal origin associated with normal or detachment faulting.

In central California, bitumen is found in fractured dolomite cements and hydrocarbon nuclei occur in dolomite crystals. These occurrences inarguably link dolomite-forming brines to hydrocarbon migration and to forming petroleum reservoirs in associated dolomite breccias. Little is understood of the genesis of these non-stratigraphic dolomites. Identifying their origin, age, and distribution offer more insight into fluid (hydrocarbons and brines) migration through the Monterey, augmenting the understanding of how the Monterey basins evolved.

Geologic maps were scoured to document the distribution of atypical dolomite bodies. Samples of dolomite and adjacent lithologies from each location will be collected for laboratory analysis. With dolomite thin-sections, we seek to analyze rock fabric and delineate any similarities between occurrences. Thin-sections of dolomite-adjacent lithologies will be analyzed to determine if rock fabric and composition contribute to confining the dolomite bodies. Isotope analysis will be conducted to identify isotopic signatures of atypical dolomite exposures. The $\delta^{18}\text{O}$ values (possibly also clumped isotopologues) will indicate dolomite formation temperatures while $\delta^{13}\text{C}$ values will provide insight into compositional variations between locations. Carbon and oxygen isotope signatures of the dolomite will be compared to determine any parallels within occurrences.