

## **Origin of dolomite in loessitic paleosols of the Abo and Tubb units, northeastern New Mexico.**

By

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The research objective is to assess the origin and possible paleoclimatic significance of dolomite within paleosols of the Lower Permian Abo/Tubb unit (subsurface, northeast NM). Specifically, I plan to test the hypothesis that the dolomite formed pedogenically.

Dolomite formation at ambient temperatures and pressures is rare and poorly understood. If this dolomite formed pedogenically, it represents a significant example of low-temperature dolomite precipitation. This study might provide insight on dolomite precipitation under ambient conditions, in addition to providing information on paleoclimatic conditions.

Four slabbed cores from the study region have been logged focusing on the dolomite types, abundance, vertical distribution and paleosol features. Samples chosen for thin section preparation were selected from intervals that contain all dolomite types, concentrations and distributions. Thin sections will be stained (for calcite and ferroan dolomite) and studied using transmitted light and cathodoluminescence to establish mineralogy, crosscutting relationships, fabrics and carbonate compositional attributes. Specific samples will be selected for fluid inclusion analysis, to assess temperature and chemistry of the dolomite-precipitating fluid.

Major (Ca,Mg) and trace (Fe, Mn, Na, Sr) element content will be assessed to determine chemistry and oxygenation of the fluid during dolomite precipitation. X-ray diffraction analysis will be used to reveal detailed phase identification and dolomite ordering. In addition C and O isotopes will be measured through the paleosol profiles; this isotopic analysis could yield information on atmospheric pCO<sub>2</sub>, and provide insight on dolomite formation. Finally, Sr isotopes analysis will be conducted which might provide information on the dolomitizing fluid.