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Joint 60th Annual Northeastern/59th Annual North-Central Section Meeting - 2025

Paper No. 5-48

Presentation Time: 8:30 AM-5:30 PM

ELUCIDATION OF DIAGENETIC OVERPRINTING DURING DOLOMITIZATION USING X-RAY DIFFRACTION OF CARBONATES FROM THE GREAT BANK OF GUIZHOU (SOUTH CHINA)

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The Great Bank of Guizhou is a 2.5 km-thick isolated carbonate platform of Triassic age located within the Nanpanjiang Basin of south China. Complete stratigraphic sections of these partially dolomitized Early to Middle Triassic carbonates are exposed along a steeply dipping syncline and portions of the platform, slope, and basin facies are preserved. Previous research in the study area used petrography, fluid-inclusion and clumped isotope geothermometry, U-Pb LA-ICPMS age dating, Sr-isotope data, stable isotope compositions, and other data to constrain conditions of diagenesis. Previous interpretations have included multiple mechanisms for dolomitization where early dolomite (e.g., reflux) has been overprinted by late-stage burial dolomites at elevated temperatures (90-200°C) in the presence of brines (4-19 weight % NaCl eq.) during burial at depths of at least 4-6 km.

This study used pXRD of dolomite-bearing samples from across the Bianyang Syncline area of the Great Bank of Guizhou to determine if multiple modes of dolomite formation could be identified using cation ordering and stoichiometry. Dolomite ordering (015/110) ranges from 0.22 to 0.84, with most samples below 0.65. The mole % MgCO_3 ranges between 44.8% and 51.8%, and nearly all data fall into two distinct groups. Group 1 consists of Ca-rich poorly ordered dolomite with (015/110) ordering between 0.22 and 0.48). This population contains facies and dolomite types that are consistent with early dolomitization (e.g., cycle caps and isolated dolomitized slope breccia fragments that are finer grained). Group 2 contains moderately to well-ordered stoichiometric dolomite that follows a linear trend with increasing ordering and mole % MgCO_3 . This group contains dolomites with coarser textures and late-stage saddle dolomite cements, including samples with the highest fluid-inclusion homogenization temperatures. The X-ray diffraction data indicate the presence of two distinct populations with different ordering and stoichiometry and are consistent with multiple dolomitizing episodes/mechanisms (early/late) on the Great Bank of Guizhou.

Session No. 5--Booth# 48

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Friday, 28 March 2025: 8:30 AM-5:30 PM

North Great Hall (Bayfront Convention Center)

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