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GSA Connects 2021 in Portland, Oregon

Paper No. 188-7

Presentation Time: 2:30 PM-6:30 PM

MECHANISMS FOR REGIONAL DOLOMITIZATION OF THE TRIASSIC YANGTZE PLATFORM IN THE NANPANJIANG BASIN OF SOUTH CHINA

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This project focuses on the mechanisms of regional dolomitization within the Lower to Middle Triassic Yangtze Platform of the Nanpanjiang Basin.

Burial history was calculated by using regional stratal thicknesses indicating a burial depth of 4970 m and 2200 m for the base and top of the platform respectively. Using a thermal gradient of 30°C/km, burial temperatures would have reached 96 to 179°C. Conodont alteration index (CAI) from a nearby platform with similar burial history was used as a proxy for thermal history. CAI values range from 4 (190 to 300°C) at the base of the platform to 1 (50 to 90°C) at the top of the platform. Fluid inclusion homogenization temperature (Th) data from dolomite in the interior and slope of the platform ranged from 51 to 158°C (average 109°C), with a robust fluid inclusion assemblage with Th average 120°C. Freezing point depression (Tm) values ranged between 0 and -10°C (ave. -6.0°C). Tm values indicate a fresh water to saline brine composition (ave. 9.2%, max 14% salinity, NaCl eq.).

Facies indicate a heavily dolomitized interior, largely undolomitized margin of *Tubiphytes* boundstone, and partially dolomitized slope. Precursor carbonate facies that were later fully or partially dolomitized include pelagic lime mudstone, packstone-grainstone carbonate turbidites and debris-flow breccia on the slope, and fenestral packstone with vadose cements in the platform interior. Anhydral dolomite replaces micrite, carbonate grains, and vadose or sparry carbonate cements, with crystal size of 0.01-0.3 mm. Coarser anhedral to subhedral dolomite (0.1-0.5 mm) pervasively replaces grainstone with a coarse euhedral dolomite cement (0.3-0.8 mm) lining larger cavities and locally replacing bladed marine cement. There are multiple generations of fractures, vug porosity, euhedral dolomite cement with zoned crystals, and subsequent twinned calcite fill of fractures and vugs. Rarely, the coarse dolomite cement in fractures and vugs includes saddle dolomite. Stylolites crosscut twinned calcite fracture fill and all dolomite phases. The relatively late diagenetic stage of most dolomite, presence of saddle dolomite, Th ranging up to 158°C, Th assemblage values averaging 120°C, and spatial distribution of dolomite indicates burial dolomitization is likely the main mechanism of dolomitization.

Session No. 188--Booth# 52

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Geological Society of America *Abstracts with Programs*. Vol 53, No. 6
doi: 10.1130/abs/2021AM-366804

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