

A NEW PANTHALASSAN IRON-OOLITE DEPOSIT FROM THE EARLY JURASSIC: IMPLICATIONS FOR GLOBAL SHALLOW MARINE IRON DEPOSITION IN THE AFTERMATH OF THE END-TRIASSIC MASS EXTINCTION

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A newly reported occurrence of iron ooids in the Ferguson Hill Member (FHM) of the Early Jurassic Sunrise Formation of western Nevada, USA, was examined to develop a detailed facies model and sequence stratigraphic framework for one of the earliest occurrences of oolitic ironstones in Panthalassa following the Triassic-Jurassic Boundary.

The Ferguson Hill Member of the Sunrise Formation was deposited on a northwest-dipping carbonate ramp, with facies including shallow-subtidal skeletal – peloidal wackestone to packstone, ooid-skeletal packstone to grainstone shoal, and lower ramp carbonate shales and turbidites. Iron ooids appear in ooid-skeletal packstones to grainstones just above a major flooding surface in columns across the study area. SEM imaging of iron ooids revealed the laminations are irregular and mottled at the sub-micron scale. The chemical composition of the iron ooid laminations showed areas rich in silicon and oxygen—interpreted as silica, and areas rich in iron, manganese, silicon, aluminum, and oxygen—interpreted to be chamosite. We interpret the iron oolite as a condensation feature that along with authigenic iron and the lack of bioturbation may indicate a low-oxygen, reducing environment that allowed chamosite and other authigenic iron minerals to accumulate at the sediment water interface.

The FHM iron oolite closely resembles deposits in the Tethys Sea during the Early Jurassic (Minette-type ironstones). The FHM iron oolite also represents deposition in a lower paleolatitude than Early Jurassic oolitic ironstones found in Europe and Northwest Canada. The concurrent deposition of ironstones in the early Jurassic may indicate unique geochemical conditions favorable to their precipitation and highlights their potential as indicators of low-oxygen conditions during biotic recovery following the end-Triassic mass extinction.

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