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Preliminary Correlation and Isopach Map of Pennsylvanian and Permian Sandstones of the Western United States

John H. Whitmore

Cedarville University, johnwhitmore@cedarville.edu

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Research + Scholarship SYMPOSIUM



Preliminary Correlation and Isopach Map of Pennsylvanian and Permian Sandstones of the Western United States

Using the COSUNA data compiled by the AAPG in the 1980's, Permian and Pennsylvanian sandstones were correlated across western North America. Stratigraphic sections and thickness information were obtained from charts and spreadsheets available from that data set. An isopach map was constructed from the thickness data of sandstones usually found below a Guadalupian Limestone. In particular, this project was concerned with sandstones that could be lithostratigraphically correlated with the Leonardian Coconino Sandstone of the Grand Canyon region of northern Arizona. These sandstones are mostly Lower Permian (Leonardian and Wolfcampian) but some are Upper Pennsylvanian, especially in the northern part of the outcrop area. It was found the sandstones are often located directly below a chemically rich unit (phosphorite, gypsum or anhydrite) or a limestone. Additionally, many of the sandstones have limestones at their lower contacts as well. It was found the lithostratigraphic equivalent of the Coconino could be correlated as a single diachronous unit from southern California to North Dakota, and from Texas to Idaho, an approximate area of 2.4 million km². Examples include the Coconino Sandstone (Arizona), the Glorieta Sandstone (New Mexico, Texas, Oklahoma), the Lyons Sandstone (Colorado), the Wood River Formation (Idaho), the Weber Formation (Utah), the Tensleep Sandstone (Wyoming), the Minnelusa Formation (Montana, South Dakota) and the Broom Creek Formation (North Dakota). For most of the outcrop area the sandstones were less than 200 m thick, but very thick sections (some approaching 3,000 m) were found in parts of Utah and Idaho. These findings are significant because the Coconino Sandstone and many of its equivalents are usually interpreted as a fossilized desert sand dune deposits. However correlation of the lithostratigraphic equivalents of these sandstones, their thicknesses, their continuous lateral extents and the clear marine nature of many of the sandstones makes this interpretation highly unlikely. The Permian and Pennsylvanian sandstones of the western United States are just one of many examples of thin widespread deposits that are common throughout the geological record and are consistent with the types of deposits that we would expect to be formed during Noah's Flood.