

Depositional environments and tectonic significance of the Wajid Sandstone of southern Saudi Arabia

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Abstract

The Wajid Sandstone, of probable Early Paleozoic age, rests disconformably on crystalline rocks of the southern part of the Arabian shield. Scattered outcrops extend over an area about 450 km north-south and 300 km east-west. The southern part of the formation, near the Yemen border, consists of fluvial sandstones and very minor siltstones and silty shales. The fluvial origin is demonstrated by the presence of fining-upward cycles, channels, trough cross bedding, and absence of all organic traces. The northern part of the outcrop area consists of internally homogeneous, tabular cross-bedded, horizontally bedded sandstones apparently formed in a shallow marine environment. These marine rocks contain trace fossils broadly similar to *Skolithos*. Abundant cross bedding in both facies of the Wajid indicates a northward transport direction, toward what is now the center of the Arabian shield. The southern part of the Arabian shield, which was cratonized about 500 to 600 Ma ago (Pan-African age), was apparently still a depositional area receiving sediments from a southern source in Early Paleozoic time. Other, older, shields also show a tendency to be areas of deposition shortly after their apparent age of stabilization, becoming sources of clastic sediments only after several hundreds of millions of years. The conversion from basin to uplifted source may indicate a prolonged process of shield maturation after initial stabilization.