

Paleoenvironmental setting of the early Cambrian Khewra Sandstone, eastern Salt Range, Pakistan

Naveed Akhtar; Irfan U. Jan; Muhammad Hanif; Irshad Ahmad and Muhammad Ishaq

*National Centre of Excellence in Geology, University of Peshawar
naveedmaneri@yahoo.com*

Abstract

The early Cambrian Khewra Sandstone is a well exposed succession in the Khewra Gorge and consists of fine-grained sandstone with intermittent shale intervals. The basal part is comprised of thin bedded fine sandstone with shales and siltstones, passing upward into massive thick bedded and jointed sandstone. The upper part is dominantly reddish brown and yellowish brown sandstone. The Khewra Sandstone has been divided into five lithofacies; 1. Flaggy shale and siltstone lithofacies (Sh), 2. Fine-grained sandstone lithofacies (Sf), 3. Fine-grained trough cross-bedded sandstone lithofacies (St), 4. Massive mudstone lithofacies (Ms) and 5. Friable sandstone lithofacies (Ss). Four facies associations recognized include a. Prodeltafacies association, marked by lithofacies (Sh), b. Delta front facies association, marked by lithofacies (Sf), c. Distributary channel and lacustrine delta-fill facies association, marked by lithofacies (St) and (Ms), d. Aeolian dune facies association, consisting of lithofacies (Ss).

The Khewra Sandstone shows deposition ranging from shallow marine deltaic to fluvial conditions. On the basis of vertical facies association and other sedimentary structures, the delta that deposited the Khewra Sandstone is interpreted to be prograding wave-dominated, which was also influenced by tides. Khewra Sandstone records an upward transition from marginal marine to fluvial conditions and is deposited in regressive shallow sea and continental environment. The Khewra Sandstone succession passes up from offshore mudstones through interbedded, sandstone and mudstone, which are cross stratified, into the shoreface sandstones. Climbing ripples and rarely shown hummocky stratified beds characterizing lower part of shoreface while trough cross and planar bedding characterizing the upper part. Approximately 59 m-thick troughs cross bedded succession is deposited by sandy braided streams. The Punjab Platform is the westward extension of Bikaner Nagaur Basin, and the Cambrian sea extended from Bikaner region towards the Salt Range and deposited the Khewra Sandstone. The published paleocurrent data indicate the supply of sediments took place from the Aravali Ranges, India.