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Sea level reconstructions and non-marine sedimentation at the Triassic-Jurassic boundary: southwestern margin of the Neotethys in the Salt Range, Pakistan

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The environmental changes during the Triassic-Jurassic boundary interval and the associated mass extinction event are still strongly debated. Sea-level reconstruction records during this interval reveal an end-Triassic global regression event. Erosion and karstification at the top of Triassic sediments, and Lower Jurassic fluvial channels with reworked Triassic clasts indicate widespread regression in the European basins. Laterite at the top of the Triassic, and quartzose conglomerates/sandstones at the base of the Jurassic indicate a fluvial/terrestrial onset in Iran and Afghanistan. Abrupt emergence, erosion and facies dislocation, from the Triassic dolomites (Kingriali Formation) to Lower Jurassic fluvial/continental quartzose conglomerates/pebbly sandstones (Datta Formation) occur in the Tethyan Salt Range of Pakistan. Sedimentological analyses indicate marine regression and emergence under tropical-subtropical conditions (Greenhouse conditions) and negates the possibility of glacial influence in this region. Field evidences indicate the presence of an undulatory surface at the base of the Jurassic and a high (Sargodha High) is present south of the Salt Range Thrust, the southern boundary of the basin. Furthermore, geophysical data (mostly seismic sections) in different parts of the basin display normal faults in the basement. These features are interpreted as horst and graben structures at the Triassic-Jurassic boundary in the Kohat-Potwar Plateau. The Lower Jurassic Datta Formation appears to have been deposited in an overall graben fill settings. Similar normal faults and graben fill geometries are observed on seismic sections in Tanzania, Mozambique, Madagascar and other regions of the southeastern margin of the African Plate and are related to the Karoo rift system. To summarize, the basement normal faults and the graben fill features at the Triassic-Jurassic boundary in the Kohat-Potwar Plateau can be correlated to similar features common in the Karoo rift area. Regional sea-level fall associated with this rift produced erosional and reworking features similar to those occur at the Triassic-Jurassic boundary in the European basins, Iran and Afghanistan. The tectonic correlation with the European basins and sedimentological evidences for the globally present Jurassic-Triassic boundary in the Salt Range of Pakistan encourage a detail work in this regard.