

Facies and structural analysis of the Janakor Valley, FR Peshawar, NW Pakistan

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Abstract

The sedimentary succession of the Janakor valley, which is located 35 km in south-eastern vicinity of Peshawar city, is investigated for the lithofacies, microfacies, biostratigraphy and structural analysis. Based on litho-biostratigraphy and order of superposition, the rock units exposed in the area ranges in age from Mesozoic to Miocene, namely; Samana Suk, Lumshiwal, Kawagarh, Hangu, Lockhart, Patala and Muree formations.

The microfacies investigations of the Samana Suk Formation revealed Ooidal-Peloidal Grainstone (SKJ-MF-1), Micritized Ooidal Grainstone (SKJ-MF-2), Echinoidal Bioclastic-Peloidal Grainstone (SKJ-MF-3), Ooidal-Peloidal-Packstone (SKJ-MF-4), Bioclastic-Peloidal Packstone (SKJ-MF-5), Sandy-Peloidal-Packstone (SKJ-MF-6), Spicules rich Mudstone (SKJ-MF-7), Bioclastic-Intraclastic Mudstone (SKJ-MF-8) and Dolostone (SKJ-MF-9) microfacies. The microfacies assemblages of the Samana Suk Formation indicate inner ramp shoals to outer ramp settings for its deposition.

Based on the outcrop and petrographic investigations, the Lumshiwal Formation is divided into two sedimentary facies i.e. Sandstone lithofacies A (LMJ-LF-A) and Sandstone lithofacies B (LMJ-LF-B). These lithofacies suggested that this rock unit is deposited in fluvio-deltaic settings.

Three microfacies namely; Planktonic Foraminiferal Packstone (KGJ-MF-1), Intra- Bioclastic Mudstone (KGJ-MF-2) and Planktonic Foraminiferal Mudstone (KGJ-MF-3) are reported for the Kawagarh Formation. The microfacies assemblages of the Kawagarh Formation suggest open marine pelagic environment for its deposition.

The Hangu Formation in the Janakor valley consists of Sandstone lithofacies-A (HJ-LF-A) Laterite (HJ-LF-L), Sandstone lithofacies-B (HJ-LF-B), Sandstone lithofacies-C (HJ-LF-C), Carbonaceous Shale (HJ-LF-CS), Coal (HJ-LF-CL), while two microfacies i.e. Algal Laminated Mud-stone (HJ-MF-1) and dolomitized Lime mud-wackestone (HJ-MF-1) microfacies are also reported. Based on the lithofacies and microfacies the Hangu Formation, fluvio-deltaic to tidal flat marshy settings are interpreted for its deposition.

The Lockhart Formation is consisted of *Miscellanea* wakes-Packstone (LJ-MF-1), *Miscellanea* Algal wakes-packstone (LJ-MF-2), *Milliolid-Algal*-Bioclastic Wake-Packstone (LJ-MF-3), Bioclastic-*Dasycladale*-Wackestone (LJ-MF-4), *Algal-Lockhartia*-wackestone (LJ-MF-5), Planktonic Foraminiferal-*Orbitoclypes* Wackestone (LJ-MF-6), Bioclastic-Wackestone (LJ-MF-7), Bioclastic-Reworked-Larger Benthic Foraminifer-Mudstone (LJ-MF-8), Smaller Benthic-Planktonic Foraminiferal-Mud-stone (LJ-MF-9), Planktonic Foraminiferal-Mudstone microfacies (LJ-MF-10). The microfacies assemblages of the Lockhart Limestone suggest that it is deposited in the inner restricted to outer ramp settings.

Based on the outcrop data and petrographic studies the Patala Formation is composed of Carbonaceous Shale Lithofacies (PJ-LF-Cs), Green Shale Lithofacies (PJ-LF-Gs), Planktonic Foraminiferal Mudstone Microfacies (PJ-MF-1), Larger Benthic-Foraminiferal Mud-Wackestone (PJ-MF-2), and Siliciclastic Mudstone Microfacies (PJ-MF-3) microfacies. All the lithofacies and microfacies of the Patala Formation indicate that this formation is deposited in the middle to outer ramp settings.

The structural investigation of the area suggests that the area of investigation is located in the hanging wall of the Main Boundary Thrust (MBT). All the folds are overturned in the direction of NNE and are trending in EW direction. All the thrust faults are back thrusts and show propagation in NNE direction. The overall EW trends of the structures suggest a NS compression. A relative younger phase of EW shortening is also observed in the study area. This younger phase of deformation may represent the EW shortening associated with the deformation along the Chaman Transform Faults.