

Lithofacies and palaeoenvironments of the Carboniferous-Permian Nilawahan Group, Salt Range Pakistan

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The sedimentological investigation of the Permian Nilawahan Group (i.e. Tobra, Dandot, Warchha and Sardhai formations) has helped in identifying 13 lithofacies; including three in the stratigraphically lowermost Tobra Formation, three in the overlying Dandot Formation and seven in the Warchha Sandstone. These lithofacies have been further grouped into three facies associations: 1. The glacial and glacio-fluvial facies associations of the Tobra Formation. 2. The tidally influenced shallow marine facies associations of the Dandot Formation and the fluvial channel bar and flood plain facies associations of the Warchha Sandstone. The uppermost Sardhai Formation represents recessive- profile, and is sporadically found in the Salt Range and due to the incompetent lithology, the unit is rarely exposed and hard to differentiate into lithofacies/facies associations at the present locations.

The lowermost of the Nilawahan Group succession i.e. the Tobra Formation represents glacial to glacio-fluvial depositional environment, which is overlain by deltaic and tidally influenced Dandot Formation. The arid fluvial condition is represented by the Warchha Formation and nearshore marine environment by the Sardhai Formation. The Sardhai Formation is overlain by the Zaluch Group carbonates. The Carboniferous-Permian succession of Pakistan thus represents the warming as a result of the demise of the Carboniferous-Permian glaciation and the northward drift of the southern Tethyan shore during Early and Middle Permian.