Revised stratigraphy of uppermost Indus (Khyber-Hazara-Kashmir) Basin, Pakistan

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Abstract

The uppermost Indus (Khyber-Hazara-Kashmir) basin is the lateral extension of Upper Indus (Kohat-Potwar) Basin in the Paleo-downward slopes. In the Kohat-Potwar basin the alternating terrestrial and marine conditions were dominant while in the Khyber-Hazara-Kashmir basin the marine conditions were common showing occurrence on relatively deep sea. For example in the case of terrestrial Datta Formation which is terrestrial in upper Indus and marine in uppermost Indus. The comprehensive and revised stratigraphic setup of Khyber-Hazara-Kashmir (uppermost Indus) basin represents Precambrian Hazara Formation, Tanawal Quartzite; Cambrian Abbottabad and Hazira formations; Triassic Chalk Jabbi; Jurassic Datta and Samana suk formations; Cretaceous Chichali and Kawagarh formations in southern part while in northern part the Panjal Formation including volcanics; Infra Tertiary boundary represented as Indus Formation (bauxite and laterite); Latest Cretaceous to Late Paleocene Hangu (Patala is a synonym) and Sakesar (coeval and also synonym of Margala Hill Limestone and Lockhart) formations; Early Eocene Kuldana Group represents Chorgali (marine shale) and Kuldana (alternating red and green shale and limestone; transitional marine and continental) formations; Miocene-Pliocene Murree formation; Pleistocene-Holocene Soan group represents Lei Formation (mainly conglomerate-coarse clastic facies; previous lower Soan) and Holocene Soan Formation (clay, sandstone and subordinate conglomerate-relatively fine clastic facies; previous upper Soan). The Patala Formation is the lateral facies of Hangu Formation within the same basin, same stratigraphic horizon, same lithologies and same depositional environments. So Hangu Formation name is considered as first name and Patala will be junior synonym. Further its age is Latest Cretaceous to Early Paleocene because it is well correlated with the Vitakri coal of Kingri area of Sulaiman basin. In this way the Hangu Group consists of Latest Cretaceous to Early Paleocene Hangu Formation and middle to Late Paleocene Sakaser Limestone. Further there are problems in correlating Murree, Kamlial, Chinji, Nagri, Dhok Pathan especially in Hazara-Azad Kashmir and northern Kohat-Potwar. Murree Formation is the senior synonym of Kamlial. The revised sequence in the Khyber-Hazara-Kashmir represents Murree Formation and in the Kohat-Potwar the Chinji, Nagri and Dhok Pathan will be considered under Potwar Group. The Pleistocene Lei Conglomerate (very coarse clastic) and then Holocene Soan Formation (previously upper Soan; mixed fine and coarse clastic) both are grouped as Soan Group. In Khyber area, the formation names are intensively rich based on local names, it needs further times in studies to revise and correlate with Hazara-Kashmir area of uppermost Indus basin and Kohat-Potwar region of upper Indus basin.