

Structural geology of Sulaiman ranges around Mughal Kot village, FR D.I. Khan, Pakistan

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The current research complies to describe the structural geology of the eastern part of the Sulaiman Range in the vicinity of the Mughal Kot area, F.R., D.I. Khan, Khyber Pakhtunkhwa Pakistan. The studied area is covered by the Geological Survey of Pakistan toposheets No. 39 ½ and 39 ⅓. Tectonically, the study area is deformed due to counter-clockwise rotation of the India since 55 Ma ago and caused the closure of smaller basins, i.e. the Seistan and Katawaz basins, convergence in Baluchistan region, and collision of various crustal blocks in Iran and Afghanistan that led to the formation of fold and thrust belts including the Sulaiman Range. The western transform border of Indo-Pakistan plate is separated from eastern, and central Afghanistan by major strike-slip faults which are still active and have led to the progressive displacement of the blocks relative to each other. The northern limit of the Sulaiman fold belt lies in the tribal areas of Waziristan Agency, where these rocks plunge into the rocks of the Kohat Plateau and the Waziristan tribal area that is located to the southwest of the Indo-Pakistan Craton near the junction of the western ophiolite belt. The greater width of the Sulaiman range suggests that it is a thin-skinned structure thrust southwards on a weak decollement above a low-angle, northwestwards dipping basement. Bouger and isostatic gravity anomalies suggest that the 250 Km wide fold and thrust belt is underlain by a 15-25 Km thick, extended transitional crust.

The rocks exposed in study area range from late Jurassic to Plio-Pleistocene, influenced by transpressional deformation due to oblique collision of the Indian plate with the Afghan block during Paleocene. The Sulaiman fold and thrust belt has developed due to transpression tectonics caused by the left lateral strike-slip motion along the Chaman Fault Zone, which marks the boundary between the Afghan block and the northwestern margin of the Indian plate. The structural fabric of the area is mostly controlled by N-S trending Chaudwan and Domanda fault system. Being located in the vicinity of the Sulaiman range, the study area is influenced by the Takht-e-Sulaiman ranges strike-slip fault that trends north-south. The promising features of the area are represented by the Drazinda Syncline and Domanda Anticline, which are broad and large-scale folds in en-echelon fashion. The trend of these folds is northeast-southwest which indicates a general northwest-southeast compression.

During the current field investigation two small-scale faults have been mapped which are associated with major structures such as Domanda Anticline. In the central part of Domanda

Anticline, a north-south trending back-thrust is present along which Ghazij Shale is thrust over the younger Eocene sediments in the west. Another small-scale fault is mapped within the southwestern closure of Domanda Anticline along which Habib Rahi Limestone is thrust over the Domanda Shale in the west.