

Thin skin tectonic study based on gravity along the western limb of Hazara Kashmir Syntaxis, Muzaffarabad and adjoining areas, Sub Himalayas, Azad Kashmir, Pakistan

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The Hazara Kashmir Syntaxis is an antiformal structure formed by the folding of thin skin thrust sheets. These sheets are bounded by the Main Boundary Thrust (MBT), the Panjal Thrust (PT) and the Kashmir Boundary Thrust (KBT). These thrusts are displaced by the left-lateral Jhelum strike-slip fault. Gravity study based on geological and gravity data delineates the thickness of crust and thin skin faults of the area. Computed gravity model demonstrates the thickness of the crust, sedimentary/ metasedimentary wedge and depth of faults. The thickness of the crust varies from southwest to northeast 14 km to 15.5 km, respectively. In the study area, the MBT lies west of Jhelum fault. The Hazara Formation is thrust on the Murree Formation. The Murree Formation is trapped as horse block between the Hazara Formation and the Carbonates. Geophysical study delineated the KBT (Muzaffarabad Fault) near Nisar Camp between the Cambrian Muzaffarabad Formation and Miocene Murree Formation and joins the thick skin Kawai Fault or Indus Kohistan Seismic Zone. Gravity study shows that the KBT is a thin skin structure within the cover sequence of the Indian plate. It is a reverse fault dipping at an angle of 48° NE and penetrates up to a depth of 8.63 km. This fault was reactivated during October, 8th 2005 Kashmir earthquake. A 3 m net slip has been calculated along this fault which extends from Balakot to Bagh. The crystalline crust dips 5° NE from Chattar in the southwest to Ghorri in the northeast in Muzaffarabad area. The model depicts the Jhelum left-lateral strike-slip fault between Precambrian Hazara Formation and Miocene Murree Formation. It dips at an angle of 75° SW and penetrates up to a depth of 14.7 km in sedimentary/metasedimentary wedge and does not displace the crystalline basement in the Muzaffarabad area.