

Structural and lithological mapping of Surjan Anticline in South of Laki Range Using GIS and Remote Sensing

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Abstract

In this project, Surjan anticline was selected for Structural and lithological mapping of sedimentary rocks using GIS and Landsat7 remote sensing satellite data. Band rationing technique was used for the study such as false color composite band ratio used for identifying lithological features of the study area. Laki Formation (limestone, Marl and Calcareous Shale rocks) is indicated by reddish yellow to pale yellow color; the Tiyan Formation (shale, Nodular Limestone and Limestone) is indicated by reddish brown to pale green color; the Nari Formation (Limestone, sandstones and shale) is indicated by light brownish green to dark green color; Khirtar Formation (shale, limestone and marl) is indicated by reddish brown to light green color, (Manchar Formation Sandstone and pebbly Conglomerate) is indicated by light blue and reddish brown, while the alluvial sediments and recent deposits) are indicated by light purple, pale green and reddish brown color. Generally, the rocks rich in iron show a bright green color and show a high dark proportion of secondary iron minerals in their weathered surfaces; the rocks rich in silica and their weathering products which are kaolin rich besides silica exhibited a light blue and a light reddish color. Laki, Tiyan, Khirtar, Nari and Manchar formations constitutes the bulk composition of the area. Imageries produced from Spectral Indices comprise for 30-bit DN values. In order to segregate desired lithological components from surrounding material a threshold value was given for each of the resultant imagery. Landsat 7 band 5/7, 5/4, 3/1 were applied to discriminate the rocks such as Limestone, Sandstone and Shale in the study area.

Remote sensing techniques was also proved very useful in mapping Surjan Anticline and fault in the area. Spectral Indices on LANDSAT dataset proves to be a valuable image processing technique for discriminating different structures and rock types. The study was aimed to establish remote sensing techniques for structures and rock type discrimination.