

## **Enhancement and analytical processing of Landsat images for surface geological pattern recognition in Central Salt Range, Pakistan**

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### **Abstract**

For successful project development like resource exploration, infrastructure development and environmental management surface geological mapping plays a key role in sense of feasibility or non-feasibility. Surface geological mapping is an important prerequisite for any mining project but its traditional procedure, mainly through field surveying and laboratory analysis, is much expensive and time consuming as well. Digital image processing techniques of remotely sensed data is an economical way of producing surface geological maps both in terms of time and money. This research demonstrates surface geological mapping of central salt range by processing Landsat 8 imagery. For processing of satellite images, Dr Gee's geological map sheet no. 4 of the similar area and topographic sheet prepared by survey of Pakistan 43D/10 were used as secondary data sources. The scale of the Dr. Gee's geological map was 1:50,000 but the interpretation of the satellite imagery generated the surface geological map on the scale 1:25,000. Satellite images are being processed in Erdas Imagine and techniques of image rectification, registration, Sub-setting, resolution merge and unsupervised classification are used. In the resultant surface geological maps, the formation of aluvium, Muree/Kumlial formation and Charat group is more clearly identified. But in the anticline it is difficult to identify small patches with the low resolution imagery where the formation is not much larger in size and difficult to identify. Therefore anticline region is differentiated into two major groups that are Nilawahana group and Salt Range Formation. Before going to field, surface geological maps processed through satellite images will be very much helpful for geologists in terms of cost and time.