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EXPLOITING THE POTENTIAL OF REMOTE SENSING FOR IMPROVING THE DELINEATION AND INTERPRETATION OF LINEAMENTS IN NORTH WESTERN KASHMIR

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ABSTRACT

In this study, an attempt has been made to map a high resolution lineament map of northwest Kashmir valley using remote sensing and GIS technology. In order to accomplish the study, Landsat ETM (2001) and the Landsat PAN (2001) images were used. Different edge enhancement techniques were applied on Landsat ETM to better identify the lineaments using 3x3 edge enhancement filter. The enhanced image was merged with the PAN image in order to differentiate between the artificial linear features such as roads, canals etc. and the lineaments. In all, 93 distinct linear features were identified and digitized their latitude, longitude and the direction was analyzed by rose diagram. By the analysis of these lineaments, it was found that 48 lineament are in NW-SE direction, 32 lineaments are in NE-SW direction, 7 lineaments are in N-S direction and 6 in E-W direction. From the existing tectonic map of the India, Main boundary Thrust Fault (MBT) was overlaid over the lineament map and it was found that the Fault (MBT) passes through the study area in the North western direction and the maximum lineaments are either parallel or perpendicular to the fault. The Drainage map of the study area, digitized from the Landsat ETM image, shows Trellis drainage pattern indicating that the drainage is controlled by different structural features. The mapping of these geological structures improves the existing knowledge about the distribution and direction of these structures in the Kashmir Himalayan region.

Key words: Neotectonic, Lineaments, remote sensing and GIS, Himalayas, MBT (Main Boundary Thrust), drainage pattern

INTRODUCTION

The Himalayas present a classic example of collision-type orogenic belt. It is formed as a result of the northward drift of Indian plate after its split from Gondwana, the consumption of intervening oceanic crust of the Neotethys and the collision with the Tibetan plate during the Eocene period, around 50 Ma ago. The collision was followed by the northward convergence of India against Tibet resulting in crustal shortening both on northern margin of India as well on the southern end of the Tibet (Chen and Molnar, 1977). The compression that was responsible for the Indian–Asian collision and consequent formation of Himalayan orogeny, though subdued, has not yet ceased (Nakata, 1989). In the Himalaya, numerous active faults and neotectonic features have been reported (Bilham, 2004; Valdiya, 1992) that have