



## **Tectonic Control on the Meander Pattern of Alaknanda River in Srinagar Valley (Garhwal Himalaya), India**

Sapna Semwal

D.B.S. (PG) College, Dehra Dun, Geography, India (sapnasemwal91@gmail.com)

The geomorphologic evidences of tectonic activities in the Lesser Garhwal Himalaya along the North Almora Thrust (NAT) in the Quaternary period have been documented. The northern flank of Almora Nappe marked by NW-SE to WNWESE trending tectonic plane in Central Kumaun is called the North Almora Thrust (NAT). The continuous tectonic movements have resulted in the development of numerous N-S trending transverse faults along the NAT. One significant section at Srinagar along the thrust plane has been chosen for the study. The Alaknanda River is a significant parental river of Ganga and forms an 11.5 km long and 2.5 km wide valley, locally known as the Srinagar Valley in Garhwal Himalaya.

The main purpose of the present study is to investigate the tectonic control on meandering patterns and geometric properties of the meanders in the study area. The entire study has been carried out by Remote Sensing and GIS techniques on Arc GIS 9.3 software. The approach of the study is that the Alaknanda River in Srinagar valley is divided into 8 meander segments of three reaches from Supana to Kiratinagar. Each segment consists of a river meander. The meandering course is a direct consequence of the tectonic features and it has been found that all the meander bends are tectonically controlled by the transverse faults/lineaments. The earlier stages faults/lineaments are displaced by latter phases of deformation. However, the river turned its course at the displaced points and formed a meander bend. The tectonic control clearly reflects on the abrupt change in flow direction, distinct drainage pattern and shape and size of meanders. The prominent geomorphic evidences are 6 levels of fluvial terraces, meandering nature of river, offset drainage pattern, knick points, rapids, pools, straight and wide river channel, paleo channel, deep gorges, landslides etc.

Planimetric geometry properties of each meander bend have been assessed and analyzed. Sinuosity index of the Alaknanda River is 1.34 in the study area which indicates that the river is sinuous to meandering. The average entrenchment ratio of the channel is 3.27 which shows slightly entrenchment channel. The average wave length of the river is 1.4 km. There is strong correlation between amplitude and sinuosity index ( $R=0.94$ ) and width and length ratio ( $R=0.96$ ). Finally, it may be concluded that eight meander segments are controlled by tectonic features and have played a major role in increasing the sinuosity ratio in selected channel reach of the Alaknanda river course of the study area.