

Orographic and Tectono - Geomorphic controls of recent disasters in Himalaya: An appraisal from East to West Himalaya

Chandra S. Dubey¹, Nitu Singh¹, Dericks P. Shukla¹, Ravindra P. Singh¹

¹ Department of Geology, Centre for Advanced Studies, University of Delhi, Delhi, 110007, India, csdubey@gmail.com, dericks.82@gmail.com

The massive change in the climatic conditions have increased the frequency of extreme events and have played a significant role in enhancing the tectonics of the Himalaya. High precipitation along the Himalaya has played a significant role in evolution of its landscapes enhancing hill slopes and fluvial erosion processes leading to huge amount of mass removal. Most of the landslides of the world occur in South Asia out of which, Himalayas are the most plausible, due to their topography and extreme precipitation conditions. High precipitation often leads to flooding, cloud burst, landslides, bank erosion etc. In this work, TRMM (Tropical Rainfall Measuring Mission) data for 16 years (1998-2013) was utilized to visualize the present variation of precipitation pattern along whole Himalaya. Not just precipitation but extreme events such as cloud burst, flash floods, landslides collected from various sources such as research papers, articles, and news reports were plotted for whole of Himalaya. It is observed (Figure 1) that the extreme events in Himalayas are mainly restricted to the south of the Higher Himalayas or near the foothills of the Siwaliks where coincidentally high precipitation is also detected. Since, both the Higher Himalayas and Siwaliks are bound by MCT and MBT in north and south respectively, it could be envisaged that these thrusts have been acting as orographic barriers because most of the extreme events and the high precipitation is confined in these thrust areas. These orographic barrier in Himalayas play a significant role in controlling the expectancy and extant of rainfall. It is seen that in the south of hanging wall of MCT, the precipitation is high as compared to its foot wall in the north. Since the presence of high mountains does not allow the monsoon winds of Indian Summer Monsoon (ISM) to cross over and it generates large amplitude stationary waves which are responsible for the dry climate in Tibetan areas. While the winter monsoon (Northwest disturbance) causes high precipitation (mostly snowfall) on the vicinity of Higher Himalaya. Most of the precipitation during Monsoon occur below the MCT while during Post Monsoon precipitation is seen on either side of the MCT. These thrusts mainly MCT, MBT present whole along the Himalayas have a huge impact on the precipitation pattern along them.