

Hydrological importance of an unusual hazard in a mountainous basin: Flood and landslide

Umesh K. Haritashya, Pratap Singh, Naresh Kumar and Yatveer Singh

ABSTRACT

The Bhagirathi River, a proglacial melt water stream of the Gangotri Glacier, is the principal source of the Ganges river system. The upper part of the basin lies in the high altitude region of the Garhwal Himalayas and is extensively covered by glaciers. We provide hydro-meteorological insight into a severe storm that produced unusual high rains in June 2000 in the uppermost part of the Bhagirathi River. This storm was concentrated upstream of Gangotri town and triggered landslides/rockslides at several locations between the glacier snout and Gangotri town. One of the major rockslides blocked the Bhagirathi River at Bhujbas, about 3 km downstream of the Gangotri Glacier snout, creating an artificial lake at this location. High stream flow in the river, generated by rapid runoff response from mountain slopes along with melt runoff from the glacier, quickly increased the level of water stored in the artificial lake. Daily rainfall in this region rarely exceeds 10 mm, while total rainfall during this 6-day storm was 131.5 mm. This unusual rain event occurred during the tourist season in June, consequently trapping a large number of tourists and vendors in this area. Sudden release of stored water generated floods that created havoc downstream of the artificially created lake. This paper presents the hydrological and meteorological information related to such an unusual and devastating event observed in the high altitude region of the Himalayas.