

Diurnal variations in discharge and suspended sediment concentration including runoff delaying characteristics of the Gangotri Glacier in Garhwal Himalayas.

Pratap Singh, Umesh K. Haritashya, K. S. Ramasastri and Naresh Kumar

ABSTRACT

Diurnal variations in discharge and suspended sediment concentration (SSC), including runoff delaying characteristics, have been studied for the Gangotri Glacier, the largest glacier in the Garhwal Himalayas (glacierized area 286 km²; drainage area 556 km²). Hourly discharge and SSC data were collected near the snout of the glacier (~4000 m) at an interval of about 15 days for an entire ablation period (May–October 2001). Diurnal variability in SSC was found to be much higher than the discharge. Hysteresis trends between discharge and SSC were established. Results indicate that, for the study glacier, clockwise hysteresis dominated for the entire melt season, indicating that most of the time the SSC led the discharge. During the peak melt period, anticlockwise hysteresis was also observed for a few hours. Assessment of runoff-delaying characteristics was made by estimating the time lag between the occurrence of melting and its appearance as runoff along with estimation of time to peak. A comparison of runoff-delaying parameters with discharge ratio clearly indicated that changes in time lag and time to peak are inversely correlated with variations in discharge. Attempts have also been made to establish the relationship between discharge and SSC using short-interval data