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Discharge variations in Chhota Darra, the melt water stream from Chhota Shigri Glacier, Himachal Pradesh, India

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Discharge measurements were carried out during the September 2003, 2004 and 2005 by area velocity method in Chhota Darra stream, about 1.5 Km below the snout of Chhota Shigri Glacier, a bench mark glacier chosen by International Commission of Snow and Ice for Mass Balance measurements. The measurements were carried out for a period of 10 to 15 days each year.

The discharge varied from 0.47 to 0.83 m^3/s during September 2003 with an average of 0.63 m^3/s. In the year 2004, the average discharge was 1.73 cm^3/s while in 2005, the average discharge was 0.89 cm^3/s. The lower discharges in 2003 and 2005 are attributed to a good snow fall giving rise to high albedo thus reducing the melting rates in both 2002-03 and 2004-05 hydrological years. Mass Balance measurements for these years support these observations. On the other hand during 2003-04 hydrological year, snow fall was scanty and ice surface opened up to the sun, giving rise to low albedo resulting in higher melting rates and increased discharges. Diurnally, discharge peaked at about 2:00 pm on sunny days and on cloudy days the peak shifts toward 5:00 pm while discharge lows were observed at about 6:00 am in the morning. The solute load estimation is under progress for this ungauged basin.

Long term monitoring with longer spells of measurements are needed to understand this highly climate sensitive stream which is representative of the glacier melt water streams of the Lahaul-Spiti region of Himachal Pradesh, a region that has witnessed high sensitivity to global warming.