



Four years of mass balance on Chhota Shigri glacier (Himachal Pradesh, India), a new benchmark glacier in the Western Himalaya

P. Wagnon (1), A. Linda (2), Y. Arnaud (1), R. Kumar (3), P. Sharma (2), C. Vincent (4), J. G. Pottakkal (2), E. Berthier (5), A. Ramanathan (2) and P. Chevallier (1)

(1) IRD-Great Ice, France, (2) School of Environmental Sciences, JNU, India, (3) Remote Sensing Division, BIT Extension Centre Jaipur, India, (4) LGGE-CNRS, France, (5) LEGOS-CNRS, France

Little is known about the Himalayan glaciers although they are of particular interest in terms of future water supply, regional climate change and sea level rise. In 2002, a long-term monitoring program was started on Chhota Shigri glacier (32.2°N, 77.5°E; 15.7 km², 6263 to 4050 m a.s.l., 9 km long) located in Lahaul and Spiti valley, Himachal Pradesh, India. This glacier lies in the monsoon-arid transition zone (western Himalaya) which is alternatively influenced by Asian monsoon in summer and the mid-latitude westerlies in winter. Here, we present the results of 4 years of mass balance and surface velocities. Overall specific mass balances are mostly negative during the study period and vary from a minimum value of 1.4 m water equivalent (w.e.) in 2002-2003 and 2005-2006 (Equilibrium line altitude (ELA) at ~5180 m a.s.l.) to a maximum value of +0.1 m w.e. in 2004-2005 (ELA at 4855 m a.s.l.). Chhota Shigri glacier seems rather similar to mid-latitude glaciers with an ablation season limited to the summer months and a mean vertical gradient of mass balance in the ablation zone (uncovered part) of 0.7 m w.e. 100 m⁻¹, similar to those reported in the Alps. Mass balance is strongly dependent on debris cover, exposure and shading effect of surrounding steep slopes.