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Long-term mass and energy balance monitoring of Himalayan glaciers (GLACIOCLIM project) : some results for Chhota Shigri Glacier (India), Mera and Changri Nup glaciers (Nepal)

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Two white Himalayan glaciers, Chhota Shigri Glacier (16 km2, 32°N, India, arid-monsoon transition climate) and Mera Glacier (10 km2, 27°N, Nepal, Indian monsoon climate) have been monitored for mass, energy and hydrological balances since 2002 and 2007 respectively. Both glaciers belong now to the GLACIOCLIM observatory aiming at monitoring over a long term selected glaciers representative of different climates of the world. Additionally, a debris-covered glacier, Changri Nup Glacier (4 km2, 28°N, Nepal) has been monitored for mass and energy balances since 2009. During the period 2002-2011, Chhota Shigri Glacier experienced a negative glacier-wide mass balance (MB) of –0.59 $\pm$ 0.40 m water equivalent per year (w.e. yr-1), measured with the glaciological method. A recent study of the dynamic behaviour of the glacier showed that the glacier has probably experienced a period of near zero or slightly positive mass balance in the 1990s, before shifting to an imbalance in the 21st century. There is no sign of large recession of glaciers in Lahaul and Spiti region (Northern India) over the last 2 decades, the ice wastage being only limited to the last decade. On Mera Glacier, between 2007 and 2011, the cumulative mass balance is very close to zero. Melting is mainly driven by the radiative fluxes, the albedo being a key variable of the surface energy balance. The turbulent fluxes are only important in winter, when melting is insignificant and sublimation high.