Geophysical Research Abstracts
Vol. 13, EGU2011-3482, 2011
EGU General Assembly 2011


# Mass and energy balance over 6 decades at a glacier surface: relation to local and synoptic variables

Emmanuel Thibert (1), Nicolas Eckert (1), and Christian Vincent (2)

(1) Cemagref, UR ETGR, St Martin d'Hères, France (emmanuel.thibert@cemagref.fr, 33 04 76 51 38 03), (2) Laboratoire de Glaciologie et Géophysique de l'Environnement, CNRS-UJF, St Martin d'Hères, France

The winter and summer mass balance of Sarennes Glacier (Massif des Grandes Rousses, French Alps) has been measured since 1949 by the glaciological method. The recorded temporal signal is extracted with the well-known Lliboutry's linear model extended to the two seasonal components of the balance (winter, summer), the potential correlation between the two series being therefore explicited. Second, a none-exchangeable structure allowing capturing change points and various types of systematic trends is added. The extracted temporal patterns exhibit different change points in 1976 and 1982. They separate different trends for accumulation and ablation. The relation of these time structured signals with long records of precipitations and temperatures is discussed. The summer balance increase observed over the last 25 years corresponding to a +17 W/m2 forcing from the atmosphere is analyzed through the different components (radiative, sensible and latent heat) of the surface energy balance together with albedo and topographic feedback at the glacier scale.