

Observations and modeling of snowpack/atmosphere interactions at Col du Lac Blanc (French Alps)

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Wind and associated snow transport are the dominating factors determining small-scale snow distribution and accumulation in alpine areas and have therefore a major influence on the evolution of avalanche danger. That's why, for 25 years IRSTEA and Météo France have joined together in studying blowing and drifting snow at Col du Lac Blanc (2720 m a.s.l.) in the French Alps. Among the main actions undertaken to better investigate drifting snow, a unique database covering the period 2001-2016 has been formed and is now included as a part of CRYOBS-CLIM and GEWEX-INARCH projects.

Different types of sensors have been tested and compared and physical processes involved in drifting snow studied. For example, since winter 2010-2011, a vertical profile of 3 snow particle counters has been deployed at the experimental site. It provides continuous estimation of transported snow mass to study:

- (i) snowpack/atmosphere interactions during blowing snow events in combination with data from vertical profiles of wind speed, humidity and temperature
- (ii) the redistribution of snow during blowing snow events in combination with data from a terrestrial laser scanner (TLS)
- (iii) the evolution of snow surface roughness using low-cost time-lapse terrestrial laserscan

Data collected at the experimental site are finally used to develop and evaluate numerical model such as the fully coupled snowpack/atmosphere model Meso-NH/Crocus that simulates the main processes governing snow accumulation in alpine terrain.