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Drifting snow measurements over an instrumented mountainous site : improvement of numerical model input parameters

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Blowing snow may occur both in mountain ranges and on flat terrain, creating cornices, slabs, or snowdrifts. As a consequence, the probability of avalanche occurrence can be totally modified, roads and buildings can be obstructed and drivers' visibility can be dramatically reduced. Therefore, the prediction and control of drift patterns are of real importance. Different blowing-snow studies were conducted using either physical or numerical modeling. The numerical model currently used in Cemagref is NEMO (Naaim et al, 1998). Although its predictions correctly reproduce the windward and leeward accumulations around fences in wind tunnels, the computation results were often less conclusive when compared to those of field experiments (Michaux, 2001). Indeed, accurate evaluations of the input parameters needed for the numerical model remain an open question. At the present time for our numerical model the estimation of roughness, blowing snow mass fluxes and wind profiles is mainly obtained from empirical relations determined by Pomeroy and Gray (1990) on flat areas in Canada. As the topography and type of snow could be quite different in the Alps, further experimental research is needed before using such formulae. To obtain the required field data (roughness, friction speed, threshold friction speed, blowing snow mass fluxes profiles), specific optical and acoustic instruments (e.g., SPC and Flowcapt, respectively) and a 10 meter-mast with 6 anemometers were set up on our experimental site Col Du Lac Blanc (2700 m) in the Alps. Data obtained during winters 2005-2006 and 2006-2007 are compared with empirical formulae.