Geophysical Research Abstracts
Vol. 15, EGU2013-7157, 2013
EGU General Assembly 2013

Influence of particles shape on the vertical profile of blowing snow concentration

Vincent Vionnet (1), Alexandre Trouvilliez (2,3), Florence Naaim-Bouvet (2), and Gilbert Guyomarc'h (4)

(1) Meteo France/CNRS, CNRM-GAME URA, 1357 Toulouse, France (vincent.vionnet@cnrm.meteo.fr) , (2) IRSTEA, UR ETNA, 38402 Saint-Martin d'Hères, France , (3) CNRS, LGGE, UMR 5183, 54 rue Molieres, 38400 Saint-Martin d'Hères, France, (4) Météo France/CNRS, CNRM-GAME URA, 1357 CEN, St. Martin d'Hères, France

In alpine regions, blowing snow events strongly influence the temporal and spatial evolution of the snow cover throughout the winter season. In Antarctica, blowing snow is an essential surface mass balance process and plays a non-negligible role in the annual accumulation. The vertical profile of blowing snow concentration determines the quantity of snow transported in turbulent suspension. A power law is often used to represent this vertical profile. It serves as an analytical solution representing an equilibrium between vertical turbulent diffusion and gravitational settling. In this work, we study how the exponent of the power law depends on the type of transported particles.

Vertical profiles of blowing snow concentration have been collected at the experimental site of Col du Lac Blanc (French Alps) in 2011 and 2012 and near the research station of Cap Prud'homme (Antarctica) in 2010 and 2011. We used mechanical gauges (butterfly nets) and optical devices (Snow Particles Counters). Profiles collected during blowing snow events with precipitation have been corrected to account for the contribution of snowfall.

Results show that profiles collected during blowing snow without snowfall differ from the corrected profiles collected during snowfall. At a given wind speed, particles transported during snowfall have a lower settling velocity than particles transported without snowfall. This difference confirms earlier observations (Takahashi, 1985) and can be explained by the change of drag coefficient between dendritic and rounded particles. This difference pertains several hours after the end of the snowfall illustrating the fragmentation of snow grains during blowing snow events.