Geophysical Research Abstracts
Vol. 12, EGU2010-3213, 2010
EGU General Assembly 2010

Effect of blowing snow on surface mass balance of East Antarctica

Massimo Frezzotti (1), Claudio Scarchilli (1,2), and Stefano Urbini (3)

(1) ENEA, Laboratory for climate observations, Roma, Italy (massimo.frezzotti@enea.it, +390630486678), (2) Dipartimento di Geoscienze, Trieste, Italy (claudio.scarchilli@enea.it), (3) INGV, Laboratorio di Geofisica Ambientale (stefano.urbini@ingv.it, fax:+390651860397)

In the convergence slope/coastal areas of Antarctica, a large fraction of snow is continuously eroded and exported by wind to the atmosphere and into the ocean. The extreme environmental conditions and remote location of Antarctica have long inhibited the systematic study of its climate and snow accumulation processes. Measurement of blowing snow in Antarctica is very difficult and limited, and data are only available for a few sites. Atmospheric models estimate that the horizontal divergence of snow by wind transport is of minor significance for integrated ice sheet surface mass balance because the model simulations assume that katabatic winds tend to remove mass from the interior regions of the continent and displace it to coastal/convergence areas. Moreover, the blowing snow process and direct export into the ocean are not explicitly included in numerical weather forecasting and general circulation models.
Blowing snow transport and erosion from instruments, snow radar and satellite images were acquired in East Antarctica. Extensive presence of ablation surface (blue ice and wind crust) upwind and downwind of the measurement site suggest that the combine processes of blowing snow sublimation and snow transport remove up to 50% of the precipitation in the coastal and slope convergence area. These phenomena represent a major negative effect on the snow accumulation, and they are not sufficiently taken into account in studies of surface mass balance. The observed wind-driven ablation explains the inconsistency between atmospheric model precipitation and measured snow accumulation value.