Geophysical Research Abstracts
Vol. 14, EGU2012-13115, 2012
EGU General Assembly 2012

Recent trends in the surface mass balance of Karakoram glaciers assessed from high-resolution WRF simulations

S.E. Collier (1), T. Mölg (2), and A.B.G Bush (1)

(1) Earth & Atmospheric Sciences, University of Alberta, Edmonton, Canada (eec@ualberta.ca), (2) Institute of Ecology, Technische Universität Berlin, Berlin, Germany (Thomas.Moelg@uibk.ac.at)

In contrast to the general trend of mass loss and retreat of Himalayan glaciers, some glaciers in the Karakoram region of the northwestern Himalaya have exhibited exceptional behavior in recent decades, including expansion and thickening of the highest-altitude glaciers and high incidences of surging. Understanding the response of glaciers in the northwestern Himalaya to climate change is of great importance for assessing freshwater availability in river systems in this heavily populated region. The anomalous response has been attributed in part to thick debris cover and to observations from low altitude weather stations of cooler summer temperatures and increased winter snowfall.

We asses recent trends in both the regional climate of the Karakoram and the surface mass balance of glaciers in this region using a modified version of the mesoscale atmospheric WRF model that has been adapted to interactively incorporate a surface mass balance model. The atmospheric model is configured with three nested domains of 30-, 10- and 2-km spatial resolution and run from 1990-2011. The mass balance model performs an energy balance calculation of melt and treats both surface and subsurface processes, including albedo evolution and refreeze of meltwater. We also investigate the influence of interactive coupling versus offline forcing of simulations of surface mass balance in alpine regions.