



Impact of snow cover on inter-annual variability of the NH winter circulation in an ensemble GCM simulation forced by satellite observations

Y. Orsolini (1), N. Kvamstø (2), A. Sorteberg (2)

(1) Norwegian Institute for Air Research (NILU), Norway, (2) Geophysical Institute, University of Bergen, Norway (orsolini@nilu.no)

The impact of land boundary conditions on predictability from the seasonal to decadal time-scale is now the focus of renewed attention, as land variables could provide a memory on scales longer than synoptic time scale., and hence, be involved in forcing atmospheric teleconnections. In order to investigate the impact of the terrestrial cryosphere, we have performed a suite of GCM simulations spanning two decades (1979-2000). The aim is to attribute circulation anomalies to changes in snow cover extent, with a focus on the northern hemisphere high latitudes. Observed snow cover derived from satellite data has been retrieved from the NISDC, and nudged weekly into the GCM. Control simulations with prognostic or climatological snow variables have been also performed. Our simulations are ensemble simulation with five members, and are carried out at a T63 resolution. We have examined the connection of snow cover variability over Eurasia with several features of the northern hemisphere winter circulation, in particular the Aleutian and Icelandic lows. We find that nudging of realistic snow cover considerably improves the hindcast and the representation of the Aleutian-Icelandic Seesaw in the model. We discuss gains in potential predictability in winter, resulting from the snow nudging, and potential for seasonal to decadal predictions.