## Impact of the autumn snow cover on high latitude climate variability

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The influence of the snow cover on atmospheric teleconnections in winter has received renewed attention in recent years, partially for its potential impact on seasonal predictability. Many observational and model studies have indicated that anomalies in the autumn Eurasian snow cover in particular, influence circulation patterns over the North Pacific and North Atlantic, and may condition the phase of the North Atlantic Oscillation (NAO) in the following winter. We have performed a suite of coupled AOGCM simulations with the ECMWF ensemble forecast system to investigate the impact of accurate snow initialisation on seasonal forecasts, and to attribute circulation anomalies to changes in snow amount. Pairs of two-month ensemble forecasts were launched from several start dates from October through December over the years 2004-2009, with either realistic initialization of snow variables or else with randomized initial snow variables. Realistic snow initialization is based on ERA INTERIM re-analyses, which assimilate snow cover satellite observations as well as synoptic in-situ snow depth measurements. The impact of realistic snow initialization upon the forecast skill is estimated for various lead times. Regions of strong coupling between the snow amount and the surface temperature or atmospheric circulation patterns, are examined, with a focus on the high latitudes.