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Title: snow atmosphere coupling and its assoicate predictability
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Abstract:
 Potential climate predictability associated with snow atmosphere coupling during the boreal ablation season (March-June) is investigated with the Community Climate System Model (CCSM) with prescribed realistic snow information obtained from the MODIS satellite observations and Global Land Data Assimilation System (GLDAS). A series of experiments with different configurations to prescribe the Snow Cover Fraction (SCF) and Snow Water Equivalent (SWE) are designed to separate the immediate snow albedo effect and the delayed snow hydrological effect. Also, a baseline experiment is forced with the climatological snow cycle to remove any inter-annual snow variability, decoupling snow-atmosphere interactions. The forecast skill increment compared with baseline experiment, the potential predictability due to the snow albedo effect, the hydrological effect or both, are quantified during the 10 years from 2000 to 2009. The albedo effect contributes to the forecast skill before and during snowmelt. After snowmelt, the hydrological effect still contributes substantially to the climate predictability by soil moisture-evaporation-precipitation feedback, which is often ignored at previous predictability studies. The contribution to forecast skill due to the snow boundary information is directly proportional to the snow-atmosphere coupling strength, which varies depend on the snow anomalies, melting stages and geographic features.
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