ABSTRACT

The Second Phase of the Global Land Atmosphere Coupling Experiment (GLACE-2): Impact of Land Initialization on Subseasonal Forecasts

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The recently-completed second phase of the Global Land-Atmosphere Coupling Experiment (GLACE-2) focused on quantifying, for boreal summer, the subseasonal (out to two months) forecast skill for precipitation and air temperature that can be derived from the realistic initialization of land surface states, notably soil moisture. An overview of the multi-institutional numerical experiment is described, along with a determination and characterization of multi-model "consensus" skill. The models show modest but significant land-derived skill in predicting air temperatures out to two months, especially where the rain gauge network is dense. Given that precipitation is the chief driver of soil moisture, and thereby assuming that rain gauge density is a reasonable proxy for the adequacy of the observational network contributing to soil moisture initialization, this result indeed highlights the potential contribution of enhanced observations to prediction. Land-derived precipitation forecast skill is much weaker than that for air temperature. The skill for predicting air temperature, and to some extent precipitation, increases with the magnitude of the initial soil moisture anomaly. GLACE-2 results are examined further to provide insight into the asymmetric impacts of wet and dry soil moisture initialization on skill.