Eurasian Snow Cover Variability Links with Stratosphere-Troposphere Coupling and its Potential Use in Subseasonal to Seasonal Predictions

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Observed fall Eurasian snow cover extent (SCE) has been linked with tropospheric precursors to sudden stratospheric warming and subsequent tropospheric Arctic Oscillation (AO) events. Given that the AO is the dominant mode of Northern Hemisphere variability observations of SCE can be applied to predicting large AO events weeks and even months in advance and therefore winter weather across large regions of the Northern Hemisphere. However, the relationship has weakened over the past decade in the observations and is weak to absent in most modelling studies complicating our understanding of snow climate coupling.

NASA's seasonal hydrologic forecasting system for improved food insecurity early warning in Africa

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Hydrologic extremes such as droughts and floods can lead to water and food insecurity, especially in vulnerable regions of Africa. Thus, forecasting such hydrological extremes becomes an important tool for early warning of food insecurity. With this in mind, a multi-model, remote sensing-based hydrological forecasting system, referred to as NHyFAS (NASA's Hydrological Forecasting and Analysis System), was developed to support food insecurity early warning efforts of the U.S. Agency for International Development's (USAID) Famine Early Warning System Network (FEWS NET). NHyFAS has been generating near real-time operational hydrological forecasts and analysis for continental Africa and the Middle East, using NASA's Goddard Earth Observing System Model (GEOS) Seasonal to Sub-seasonal (S2S) forecasts, along with North American Multi-Model Ensemble (NMME) seasonal climate precipitation forecasts, for FEWS NET scientists and end users. The evaluation focuses on the overall skill and performance of this system in early warning of past drought and flood events that have led to major food insecurity in the region.

A status update on current and planned activities in coupled S2S work with the WRF-Hydro model and it's National Water Model implementation

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This talk will provide a brief project summary on a selection of different research and forecasting projects at the S2S timescale that use the WRF-Hydro modeling system and its configuration as the NOAA National Water Model (NWM). NWM is a hydrologic modelling framework that simulates observed and forecast streamflow over the entire continental United States. The WRF-Hydro land-hydrology modeling system is designed for application at relatively large spatial scales and is used for long range (~30-day), ensemble hydrologic forecasting within NWM.

The Remote Effects of Tibetan Plateau Spring Land Temperature on Global Summer Precipitation --- The GEWEX/GASS/LS4P First Phase Activity

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The GEWEX/GASS Initiative "Impact of initialized land temperature and snowpack on sub-seasonal to seasonal prediction" (LS4P) introduces spring land surface temperature/subsurface temperature (LST/SUBT) anomalies over the high mountain areas as a factor to improve the S2S precipitation prediction through remote effects of land/atmosphere interactions. More than forty groups worldwide have participated in this effort. The LS4P project intends to identify the impact of the initialization of large scale LST/SUBT and aerosols in snow, in climate models on the S2S prediction over different regions and the relative role and uncertainties in these land processes compared to those of SST in S2S prediction. The effect of East Asian Tibetan Plateau has been selected as the focus in the first phase experiment.

Based on the preliminary results from the experiments, it has been shown that the effect of the spring LST/SUBT in the Tibetan Plateau is not limited within the East Asia but may have a much large scale impact on summer precipitation and its S2S prediction. Meanwhile, preliminary results have also revealed that it is a great challenge to preserve the imposed LST/SUBT anomalies in initialization in producing the observed land surface temperature anomalies. The achievement in the LS4P in the first phase research should open a new gateway for more studies with various approaches to understand the roles of different forcing and internal dynamics in S2S predictability along with relevant mechanisms.