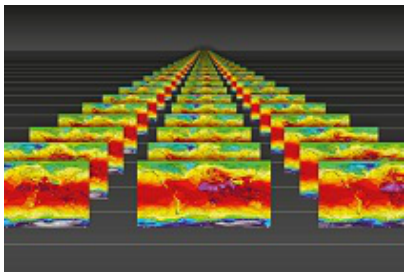

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Drought Monitoring and Prediction Using Sub-Seasonal Predictions

Friday, 5 April 2019 09:45 (15 minutes)

Accurate real-time monitoring and prediction of drought on a sub-seasonal timescale enhance our capability of drought risk assessment and management. This study investigated the feasibility of the sub-seasonal drought prediction using dynamical model outputs. To this aim, we adopted the Keetch-Byram Drought Index (KBDI) to estimate soil moisture deficits and used real-time and historical satellite-based measurement of precipitation, GSMaP, provided by JAXA, and historical and real-time climate analysis, JRA-55, and sub-seasonal ensemble prediction data provided by the WWRP/WCRP Sub-seasonal to Seasonal Prediction Project (S2S). We first verified the sub-seasonal predictive skills for precipitation using reforecast data. We found that the skills are generally higher over the ocean than land; the skills are moderately high but in numerous terrestrial regions. Then we assessed the predictive performance of KBDI and found much higher predictive capability (Kendall rank correlation coefficient) for KBDI than that for precipitation due to slow variability and the predictability originated from a memory of soil moisture. We identified potential regions where the dynamical model outputs can enhance the predictive skill of KBDI. In boreal summer, for instance, these regions include Southeast Asia, western United States, northern South America, Australia and Central Africa. Some of these regions are susceptible to droughts and wildfires, thus results suggest that the new products developed in this study are potentially useful for decision making of wildfires and agriculture. We further investigated Indonesian drought. Remarkable events are dry and wet conditions in 2006 (Eastern-Pacific El Nino and positive Indian Ocean Dipole (IOD) case) and 2010 (negative IOD case) and these events were well captured by the ECMWF model, suggesting that El Nino and IOD provide the subseasonal predictability in the Indonesian archipelago.

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