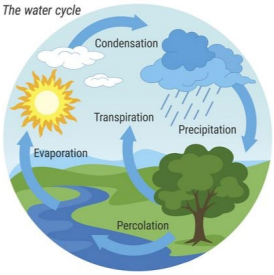
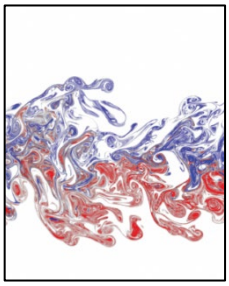
Boase Seminar Series in Hydrology and Water Resources Engineering

Department of Civil, Environmental and Architectural Engineering





Multi-stage Drought Prediction to Support Food Insecurity Early Warning

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Abstract:

Food insecurity is on the rise globally. In 2020, according to the United States Agency of International Development (USAID)-funded Famine Early Warning Systems Network (FEWS NET), up to 113 million people in 46 countries, most of whom are in sub-Saharan Africa (SSA), were estimated to require emergency food assistance, a 140% increase over 2015. While conflict, economic crises and COVID-19 are important drivers, climate-driven drought is one of the key shocks contributing to food insecurity. For example, recent droughts in 2015, 2016, 2017, and 2019-2020 in SSA helped push millions of people into food insecurity with the impacted populations ranging from 13 to 26 million due to each of these events. Prediction of climate-driven drought, therefore, is needed to mitigate food insecurity impacts. Here we describe several ongoing activities and advancements that are providing multi-stage drought predictions, issued at different stages of a crop growing season. Multi-stage drought prediction is conducted by (i) leveraging long-term seasonal climate forecasts (6 months or longer in future) to sub-seasonal (3-4 weeks in future) to short-term weather forecasts (2 weeks in future) and (ii) combining observations of climate and/or simulated hydrologic conditions in the recent past with climate forecasts. Application of climate forecasts at multiple scales (seasonal to weather) allows for early drought prediction for the season as a whole and for routine tracking of the evolution of the season at weather to subseasonal scales (e.g., focus on consecutive dry days, dry and wet spells) during the critical points in the season. Integration of near real-time observations with forecasts greatly enhances detection capabilities by leveraging the skill that is derived from the past observations or initial hydrologic conditions, and for providing precise and finer scale drought prediction as the season progresses, to better support decisions to mitigate the impacts of food insecurity.

Speaker Bio: Shraddhanand (Shrad) Shukla is an Associate Researcher, at Climate Hazards Center (CHC) of the Department of Geography at UCSB. He is a large-scale hydrologist with expertise in drought monitoring and seasonal scale climate and drought forecasting. He received his Ph.D in Civil and Environmental Engineering from the University of Washington, Seattle and, before starting with CHC as a Researcher, he was UCAR's Postdocs Applying Climate Expertise (PACE) Fellow. His research focuses on improving drought monitoring and early warning capabilities using advanced earth observations, models, remote sensing data sets and through capacity building. Shrad is currently a speciality chief editor of Frontier's Climate Services, an editor for EGU's Hydrology and Earth System Sciences (HESS) and an Associate Editor of AMS's Journal of Hydrometeorology. He is also currently a member of the NASA and USAID's SERVIR's Applied Sciences Team (AST) and AST lead for "Weather and Climate" thematic area.