Seasonal predictability and Forecast skill in drought events over the Amazon using CESM model

Carlos Enciso

Instituto Geofisico del Peru, Calle Badajoz # 169 – Ate Vitarte, Lima 3, Peru

Past several droughts over the Amazon have led to massive number of impacts in water availability for human consumption, agriculture, ecosystem processes and hydropower production. Increases of these extreme events have been particularly intense in the Southwestern Amazon since 1979; however, the understanding of the mechanism and predictability is still limited.

In this study, we aim to assessed the predictability and skill forecast for droughts over the Amazon basin, based on a 25-year ensemble hindcasts dataset (1980-2004) from The Community Earth System Model (CESM, version 1.2.2), which have been seldom analyzed up to now. Contrasting with ORE-HYBAM grid ($1°x1°$) as an observed database. Focus on meteorological droughts, the 3 months standardized precipitation index (SPI3) was used as a drought index, evaluated from both model hindcasts and observations. Otherwise, the anomaly correlation (AC) mean of the SPI3-drought, was used as measure of predictability skill in all years and also in El Niño-Southern Oscillation (ENSO) events.

Predictability is higher than forecast skill. Drought predictability and forecast skill are well correlated in general, with higher values on the southeastern of the Amazon. The analysis of predictability and prediction skill in ENSO events are slightly higher in the ENSO than in all years. The outcomes of this study serves as an indicator for forecast skill in areas which there is not in-situ instruments and remote sensing techniques are considered unreliable.