The variability of ENSO and predictability of seasonal flooding: evidence from the Pacific Islands and Bangladesh

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Abstract This study is an overview of the science of the El Niño-Southern Oscillation (ENSO) climate cycle and its correlation with local climate data (i.e. sea level, floods) on seasonal time scales in different ENSO-sensitive geographic regions. The objective is to visit some "hotspots" of climate hazards (i.e. US-Affiliated Pacific Islands (USAPI) and Bangladesh) and emphasize the role of an ENSO-based operational framework for forecasting, warning and response opportunities. Findings reveal that the sea level variability in the USAPI region (henceforth, USAPI) and flooding in Bangladesh are sensitive to ENSO. In the USAPI, the variability of sea level and consequential flooding is correlated to tropical Pacific sea surface temperatures (SSTs) with lead times of approximately several seasons or so. Similarly, the seasonal flooding in Bangladesh is also correlated to Pacific SSTs with lead times of several months or so. The ENSO-based seasonal forecasts in the USAPI and Bangladesh have been found to be a skilful application for research and outreach. Currently, the operational climate forecasting and warning response scheme in the USAPI region is fully instrumental. The success of the forecast method in the USAPI can be applied as a model to other similar climate sensitive regions. Currently ENSO-based seasonal forecasts are just beginning in Bangladesh; however, like the USAPI region, Bangladesh can benefit by developing potential prediction schemes utilizing ENSO and local climate data.

Key words ENSO; sea level; flooding; Pacific Islands; Bangladesh