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# Influence of ENSO on Extreme Precipitation

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Several studies have established the influence El Nino southern oscillation (ENSO) phenomina on precipitation around different parts of the world. ENSO may also contribute to the long term climate trends. In order to understand anthropogenic contribution to the long term trends in climate, it is important to remove natural variabilities like ENSO from the climate data. The ENSO signal is removed from the HadISST data using a dynamical filter. A recent study using dynamical ENSO filter found that multidecadal variations in the Pacific, Indian, and Atlantic Oceans all have significant ENSO components. Also the long term warming trends in these oceans have the ENSO components.

In order to understand the influence of ENSO on precipitation, two climate model experiments are designed using Community Atmospheric Model (CAM5). In the control experiment (CTRL) the model is run from 1979 to 2005 in a transcient mode forced with unfiltered HadISST. In the second experiment (NOENSO) the model is forced with the ENSO filtered HadISST data and all other model configurations are kept same as in CTRL. The analysis of the model simulations shows that ENSO has a global influence and contributes significantly to the long term climatic trends.

Extreme climate indices based on the precipitation is computed from the model simulated precipitation. The number of days with more than 10 mm precipitation (R10), number of days with more than 1 mm precipitation (RR1), consecutive dry days (CDD), and consecutive wet days (CWD) are the precipitation based climate indices derived from the model simulated precipitation data. A significant decrease in R10 is found over the western tropical Pacific in the NOENSO case as compared to CTRL. A strong decreasing trend in R10 over the Gulf of Mexico region has substantially weakened in the NOENSO case when compared to CTRL. Decreasing trends in the R10 over western India and Bangladesh in the CTRL experiment disappeared in NOENSO case. The R10 index shows a more widespread positive trend over estern central Pacific in the NOENSO as compared to CTRL. A significant positive trend in R10 is found over northern tropical Atlantic in the NOENSO experiment.The CDD is found to have strong and widespread positive trend in the tropical west Pacific in the NOENSO case whereas in the CTRL it is weaker and less spatially distributed. A strong positive trend in CDD found in the northern tropical Atlantic in the CTRL simulation substantially weakened in the NOENSO case. The CDD is showing a positive trend in the east of southern Africa, western India and Bay of Bengal in the NOENSO case while it is weaker or non-significant in the CTRL.