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Recent SST trends and Natural Disasters in Brazil

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We analyzed recent variations in the sea surface temperature (SST) anomalies of Pacific Oceans to understand their roles in extreme discharge of Amazon River Basin. In general, higher than monthly average discharge appears when La Nina condition forms and lower than monthly average discharge appears when El Nino condition forms. We also investigated the relationship between SST anomalies and recent floods in Brazil during the period of 1980-2010. Severe floods (e.g. 2003 and 2010 Rio de Janeiro-Sao Paulo Flood) in austral summer occurred when El Nino Modoki appears in the Pacific Ocean. In addition, warm waters in tropical South Atlantic Ocean between American and African Coasts also helped the moisture convergence to the affected region. These warm temperatures sometimes together with La Nina or La Nina Modoki give rise to extreme flood events. For example, the extreme flood and sediment disaster that occurred in the beginning of 2011 is a typical case as it happened during an intense La Nina event together with extreme warm water in tropical South Atlantic Ocean. The occurrence of extreme SST in Atlantic Ocean may be a cause of the continuation of disasters in that region. That also explains the non-linearity in the tropical Pacific influences on the local rainfall extremes.

Keywords: SST, El Nino, La Nina, Modoki, Warm water, Atlantic Ocean