



Idealized SST anomaly regional climate model experiments: A note of caution.

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To date, a number of studies have focused on the influence of sea surface temperature (SST) on global and regional rainfall variability, with the majority of these focusing on certain ocean basins e.g. the Pacific, North Atlantic and Indian Ocean. In contrast, relatively less work has been done on the influence of the central South Atlantic, particularly in relation to rainfall over southern Africa. Previous work by the authors, using reanalysis data and general circulation model (GCM) experiments, has suggested that cold SST anomalies in the central southern Atlantic Ocean are linked to an increase in rainfall extremes across southern Africa.

In this paper we present results from idealized regional climate model (RCM) experiments forced with both positive and negative SST anomalies in the southern Atlantic Ocean. These experiments reveal an unexpected response of rainfall over southern Africa. In particular, it was found that SST anomalies of opposite sign can cause similar rainfall responses in the model experiments, with isolated increases in rainfall over central southern Africa as well as a large region of drying over the Mozambique Channel. The purpose of this paper is to highlight this finding and explore explanations for the behaviour of the climate model. It is suggested that the observed changes in rainfall might result from the redistribution of energy (associated with upper-level changes to Rossby waves) or, of more concern, model error, and therefore the paper concludes that the results of idealized regional climate models forced with SST anomalies should be viewed cautiously.