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## Key factors in simulating the equatorial Atlantic zonal SST gradient in a CGCM

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Modeling the mean climate state reasonably is the first step toward simulating as well as predicting climate variations. In the equatorial Atlantic, state-of-the-art CGCMs are not sufficient in this regard as the zonal SST gradient is incorrectly simulated in most CGCMs with model SST cooler in the west than in the east. Since the cold tongue is the integral part of the zonal mode or Atlantic Niño, this dominant climate mode in the equatorial Atlantic cannot be simulated or predicted by these CGCMs. To examine the causes of the model bias, we analyze three versions of the same CGCM differing only in the cumulus convection scheme. One version of the CGCM successfully simulates the mean zonal SST gradient of the equatorial Atlantic, in contrast to the failure of the CMIP3 models. The present analysis shows that key factors to be successful are high skills in simulating the meridional location of the Intertropical Convergence Zone, the precipitation over northern South America, and the southerly winds along the west coast of Africa associated with the West African monsoon in boreal spring. Model biases in the Pacific contribute to the weaker precipitation over northern South America. Uncoupled experiments with the atmospheric component further confirm the importance of remote influences on the development of the equatorial Atlantic bias. Preliminary results from ensemble seasonal prediction experiments using the above CGCM will be also presented.