

## **SST bias development in the Tropical Atlantic in PREFACE coordinated experiments**

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Coupled climate models used for long-term future climate projections as well as seasonal forecasts models share a systematic warm SST bias in the Tropical Atlantic. One of the objective of the EU-FP7 PREFACE project is to better understand physical mechanisms responsible for the development of such systematic biases in the Tropical Atlantic. It has already been shown that these biases develop relatively fast and the idea is to analyze the drift of initialized coupled simulations to help pointing out the initial source of the bias. Several climate models have thus been run in seasonal forecast mode with the aim of analyzing the mechanisms at play during the drifting period. Five coupled models have participated to the coordinated analysis: CNRM-CM-LR (CNRM), CNRM-CM-HR (Cerfacs), EC-Earth v3.1 (WU, BSC), ECMWF-S4 (UREAD), NorESM (UiB). Seasonal hindcasts simulations have been performed for May and February start dates over the period 2000-2009.

The spread of the multi-model ensemble and speed of the drift set up depend on the region studied. Over the Equatorial Atlantic open ocean region, the models that simulate realistically the wind stress drift less severely than those having strong wind stress biases, and surface heat fluxes hardly explain a warm drift. On the contrary, in the southeast open ocean, surface heat fluxes are shown to play the leading role. Along the African coast, in the Benguela and Angola regions, the drift evolution is more dependent on the model.

As a second step, 4 of the models involved have performed a sensitivity experiment in which the equatorial surface wind stress has been replaced by the ERA-Interim wind stress over the Atlantic from 5S to 5N. This sensitivity experiment allows to disentangle the role of the wind stress biases driving the set up of the SST bias locally and remotely over the southeastern Atlantic.