



Interdependence of Model Systematic Biases in the Tropical Atlantic and the Tropical Pacific

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The tropical climatology represented in simulations with General Circulation Models (GCMs) is affected by significant systematic biases despite the huge investments in model development over the past 20 years. In this study, coupled seasonal hindcasts performed with EC-Earth and ECMWF System 4 are analyzed to understand the development of systematic biases in the tropical Atlantic and Pacific oceans. These models use similar atmosphere and ocean components (IFS and NEMO, respectively). We focus on hindcasts initialized in February and May. We discuss possible mechanisms for the evolution and origin of rapidly developing systematic biases over the tropical Atlantic during boreal spring. In addition, we look for evidence of the interrelation of systematic biases in the Atlantic and Pacific, and investigate if the errors in one ocean basin affect those in the other. We perform an upper-atmosphere wave analysis by Fourier filtering for certain ranges of temporal frequencies and zonal wavenumbers. Our results indicate common systematic biases in EC-Earth and System 4 purely attributable to the atmosphere component. Biases develop in the Atlantic basin independently of external influences, while a possible effect of such biases on the eastern Pacific is found.