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How do the large-scale models represent the West African Monsoon mean state and variability (the AMMA-MIP experiment)?

F. GUICHARD (1), F. HOURDIN (2), I. MUSAT (2),

A DELL'AQUILA (1) and P.M. RUTI (3)

(1) CNRM-GAME (CNRS & Météo-France), Toulouse, France

(2) Laboratoire de Météorologie Dynamique, CNRS, IPSL, Paris, France

(3) ENEA, Roma, Italy

West Africa is characterized by well defined strong meridian surface gradients coupled to specific atmospheric circulations, such as the African Easterly jet (AEJ) which is present during the monsoon season. The location of the AEJ itself is strongly constrained by meridian surface temperature and moisture gradients. Synoptic variability in turn is dominated by African easterly waves (AEW) which are dynamically linked to the AEJ.

The structure and variability of these basic large-scale features involve complex interactions with soil, surface, turbulent and convective processes occurring on different scales. Finally, the WAM exhibits specific seasonal variations, with an abrupt monsoon onset to be compared to a more progressive latitudinal retreat.

While current numerical weather prediction (NWP) analyses seem able to reasonably capture these large-scale atmospheric features, the extent to which large-scale models are able to properly reproduce these observations remains unclear, and likely sensitive to changes in the physical parametrizations. The objective of the AMMA-MIP intercomparison is therefore to get a more precise view concerning the ability of the large-scale models involved in the AMMA project to simulate these fundamental features of the WAM. Particularly, we focus on the mean WAM state along a meridional transect, and on its seasonal cycle, and on the WAM intra-seasonal variability.