



## **Simulation of African Easterly Waves and its Projection in Response to Anthropogenic Greenhouse Forcing in a High Resolution AGCM**

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African Easterly Waves (AEWs) are the primary synoptic-scale disturbances over tropical Africa and Atlantic, which propagate westward from East Africa towards Atlantic during summer. AEWs have a pivotal role in the initiation and organization of the convective rainfall over this region and often act as the precursor for Atlantic tropical cyclones. Present study uses a high resolution AGCM, High Resolution Atmospheric Model (HiRAM) developed at GFDL, to investigate the projected changes in AEW characteristics in response to anthropogenic greenhouse forcing. Ensembles of simulations are conducted at a spatial resolution of  $\sim 25$  km, with observed SST and SSTs from two coarse resolution Earth System Models (ESM2M and ESM2G) developed at GFDL, in the history period (1975-2004). Future projections (till 2050) are also conducted for two Representative Concentration Pathways (RCPs), RCP4.5 and RCP8.5. To test the ability of HIRAM to properly simulate the three dimensional structure and the space-time variability of AEW, the simulations in the history period are compared against two reanalysis products, ERA-Interim and MERRA, and against the parent ESMs. Space-time spectral analysis and complex empirical orthogonal function analysis have been conducted to investigate the dispersion characteristics and modes of variability, respectively. The representation of AEW in HIRAM is comparable to reanalyses and is improved in comparison with the coarse resolution parent ESMs.