



Representation of relationship between PDO and global precipitation in CMIP6 models

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Decadal Climate Variability (DCV) modes perturb regional climatic parameters across the globe at multi-year timescales. Precipitation is one such climatic parameter of socio-economic importance.

Our study examines the ability of Coupled Model Intercomparison Project Phase 6 (CMIP6) models in representing the observed teleconnection of DCV modes; Pacific Decadal Oscillation (PDO) and Tropical Atlantic SST Gradient with the global precipitation. We chose the subset of CMIP6 models that participate in both historical and hindcast experiments.

In this study we examine the relationship between the model's ability to simulate the long-term DCV pattern and its ability to simulate the teleconnection between DCV mode and global precipitation.

HadGEM3-GC31-MM and MPI-ESM-1-2-HR, which simulate the observed global SST anomaly pattern in the warm phase of PDO considerably well, also simulate observed global precipitation patterns during the warm phase of PDO quite well in regions like central India, Europe, North- and South-America, Eastern Africa, Eastern Australia etc. However, BCC-CSM2-MR and NorCPM1 fail to effectively simulate observed precipitation patterns in the warm phase of PDO in regions like, North- and South-America, Africa etc.

Hence, we found that models that are able to simulate the PDO pattern of SST are also able to represent the teleconnection between PDO modes and precipitation across the globe. We also examined the regression pattern of wind circulation, and the regression pattern of converging and diverging parts of the wind with PDO index. Models that better represent the observed warm phase of PDO pattern, also well represent the observed circulation pattern in respective phases of PDO. Similar analysis is also performed for TAG.

Keywords: Decadal Climate Variability (DCV), CMIP6, historical experiments, teleconnection, precipitation.