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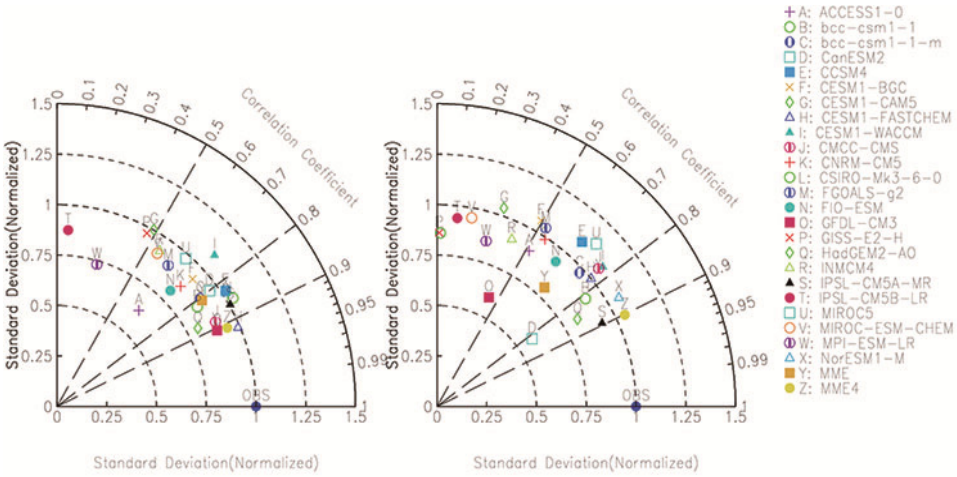
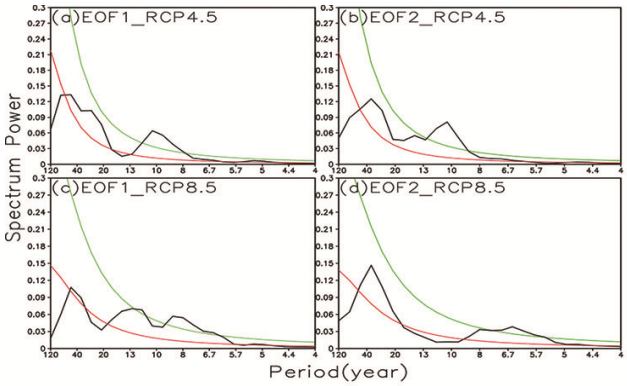


↑ Figure 1. Taylor diagram describing the relationship between the two SSTA dominant modes of 24 models and the observations.



←Figure 2. Power spectrum of two dominant EOF modes of the North Pacific winter mean SSTA in RCP4.5 and RCP8.5 scenarios in MME4.

- Two dominant low-frequency modes in the North Pacific simulated by 24 CMIP5 models are evaluated, 24 CMIP5 models are generally capable of simulating the spatial patterns of PDO and NPGO with a strong inter-model spread (Fig.1). In addition, the performance of the air–sea coupling relationship of each mode is model dependent. Most of the models fail to simulate the air–sea coupling relationship of the second mode. Four models with better simulation capability both of the SSTA variability and the air–sea coupling relationship are selected (MME4).
- MME4 shows some progress in simulating the spatial and temporal characteristics of PDO and NPGO compared with most of the individual models, especially the period features. In future scenarios, spatial patterns of PDO and NPGO are substantially consistent, temporal patterns of PDO and NPGO change substantially. Both modes are weakened and shifted to a higher frequency in the RCP4.5 and RCP8.5 scenarios (Fig.2).