
Time-lagged Correlations of Pre-Monsoon Precipitation in the Indochina Peninsula Confirmed in a Large Ensemble Simulation Dataset

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Abstract

Statistically significant time-lagged relationship up to twelve months ahead of pre-monsoon precipitation in Indochina Peninsula (ICP) with large-scale feature over the Pacific and Indian Oceans, which was recently found in observational monthly-mean datasets by the authors, is investigated with a large-ensemble (100 members) simulation database called "Database for Policy Decision-Making for Future Climate Change" (d4PDF). Two different strategies were taken to perform Empirical Orthogonal Function (EOF) analysis on the large-ensemble dataset, namely statistics of the analysis results for each ensemble member separately, and analysis on the 6000-year data. Significant time-lagged correlations of several climate indices related to sea surface temperature (SST) with the pre-monsoon precipitation in ICP as obtained in the observation are confirmed in the d4PDF for both strategies of EOF analyses on each ensemble member and 6000-year data. The climate simulation in the d4PDF can capture the lag-to-lag variations of the time-lagged correlation patterns very well. The time-lagged regressions of SST and zonal wind at 850 hPa upon the first principal component (PC1) time-series of the EOF analysis of the pre-monsoon precipitation over ICP are investigated in low latitudes over the Pacific and Indian Oceans. The observed time-lagged regression features are also confirmed in the d4PDF dataset; the statistically significant regression areas expand larger and significant time lags become longer than the observation, especially in the case of 6000-year data. Cluster analysis on the regression maps shows that the obtained groups with larger numbers of ensemble members are closer to the observation than the other groups.

Keywords: Time, lagged correlation, pre, monsoon precipitation, Indochina Peninsula, d4PDF, EOF analysis

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