15.3 THE SUMMERTIIME INTRASEASONAL VARIAIBILITY IN THE AMIP SIMULATIONS

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1. Introduction

During the boreal summer, the intraseasonal oscillation exhibits the tendency to propagate northward from the Indian Ocean into the land area in South Asia, and to propagate northwestward in the Philippine Sea toward Taiwan and Southern China (figure 1). Since the phenomenon is closely related to the weather and climate in Asia, it is essential for an atmospheric general circulation model (GCM) to reproduce reasonably well the characteristics of the intraseasonal oscillation. This study investigates the ability of seven GCMs, namely, DNM, JMA, SUNYA, NCAR, PNNL, ECHAM, NTU, in simulating this phenomenon.

2. Results

Most of the GCM underestimate the intraseasonal variability in the regions, e.g., the Bay of Bengal and the western North Pacific, where the active intraseasonal fluctuation is observed. Spectral analysis of the outgoing longwave radiation in the above two regions reveals that none of the above models exhibits a spectral peak around 30-60 days as in the observation. None of the models is able to reproduce realistic northward propagation (figure 2). Some of them do not even exhibit any preferred propagation route. The PNNL and ECHAM are the two models that have limited capability in simulating the northward propagation of the intraseasonal oscillation.

The SVD analysis was applied to the simulated data to retrieve the most recurrent coupled feature of the OLR and 850-hPa streamfunction. The ECHAM model is the only model that produces the first and second singular vectors resembling those documented in the observation. The pattern however exhibits limited northward propagation in the southern Bay of Bengal, which is much less significant than the observed. The deficiency of the model in simulating realistic surface heat flux in the Indian Ocean and the South Asia may result in the limited capability in simulating the northward propagation.

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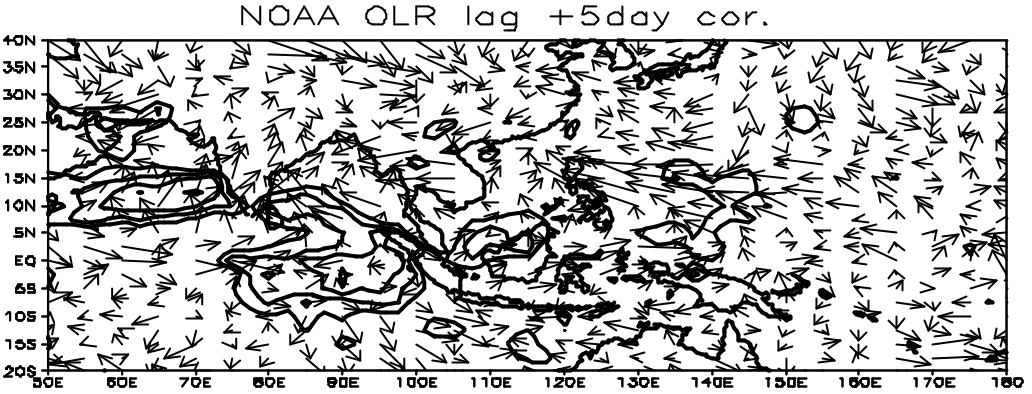

Fig.1 5 day lag correlation coefficient distribution of NOAA OLR 20-80 day oscillation. Contour indicate that the area of correlation coefficients above 0.8. Arrows derived from 5 day lag correlations tendencies of summer ISO propagation .

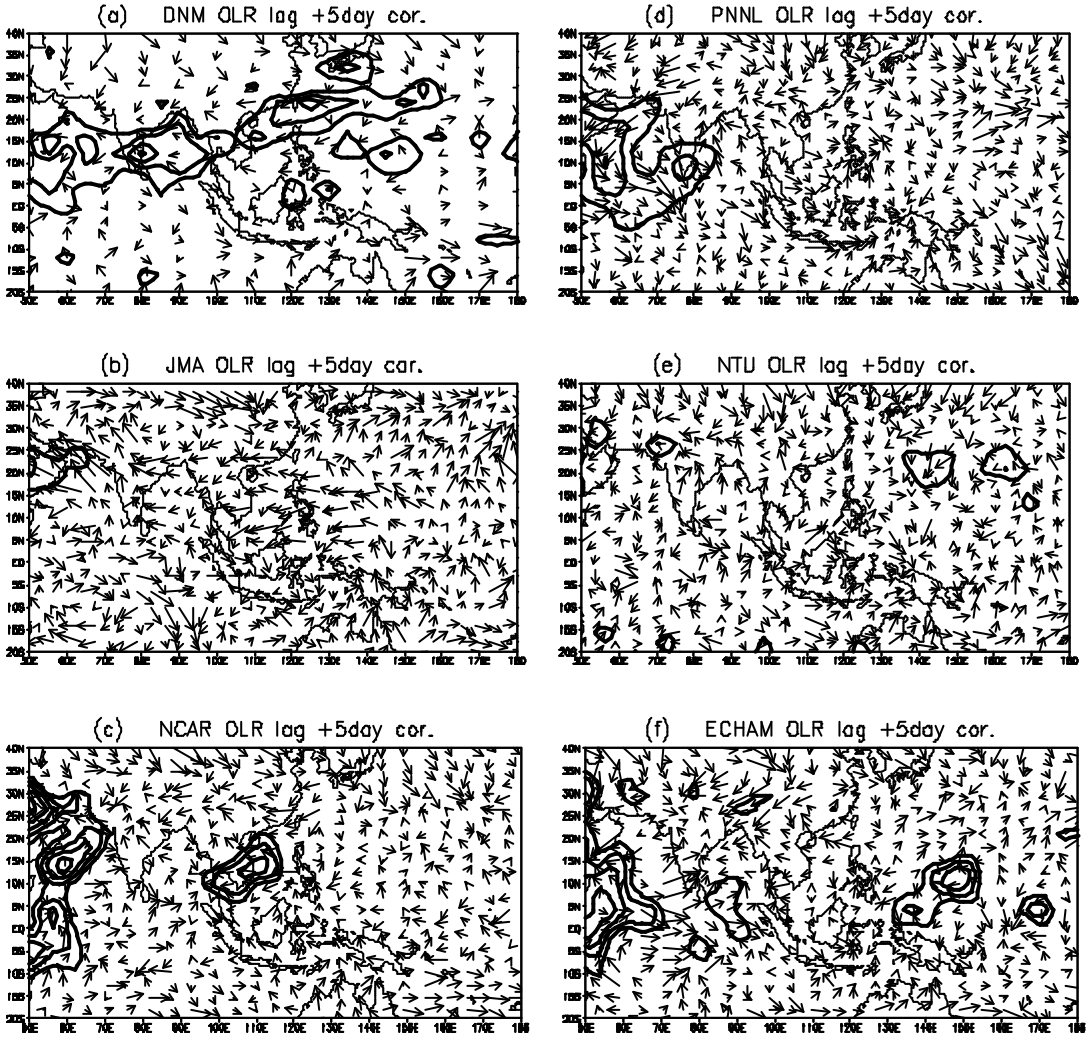

Fig.2 As in Fig.1. But is (a) DNM (b) JMA (c) NCAR (d) PNNL (e)NTU (f) ECHAM models output data.