



Distinguished ENSO response and moisture supply of dominant intraseasonal modes in the East Asian summer monsoon

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On the basis of various self-organizing map (SOM) analysis, a kind of artificial neural network, the dominant modes of the East Asian summer monsoon (EASM) are identified as the Meiyu-Baiu, Changma, post-Changma, and the dry-spell modes. The SOM approach supposes that sudden phase change during summer monsoon period results from the presence of non-linear coupled features of intraseasonal phases. Thus, the origin and nature of the moisture supply in the dominant intraseasonal modes of the EASM rainfall can be identified in terms of each mode. To discuss the uniqueness of EASM major modes, the horizontal and vertical moisture supply are examined using moisture budget equation consisting of convergence, advection and transient eddy terms. Strong moisture convergence region can be found over the southern part of Meiyu-Baiu rainband. The Changma mode has zonal-oriented moisture source which confined to low-level from surface to 925-hPa over the Korean peninsula. Furthermore, convective instability deeply developed in the Changma mode. It means advection of moist, warm air by low-level wind from the south and cold, dry air from the north are fundamental for generating convective instability and sustaining convective activity. On the contrary to Changma mode, post-Changma mode has meridional-oriented moisture source with its deep vertical profile. Moisture divergence regions cover the northern China, Korea, and Japan for dry-spell mode. Besides the moisture convergence and advection, the transient eddies play a role in supplying moisture over the boundary region of mean flow. Detailed analyses for the relationship between external components such as El Niño Southern Oscillation which can be affected slowly on the inter-annual time scale have been discussed.