Frequently used monsoon circulation indices of the Asian summer monsoon

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Abstract

Asian monsoon is one of the major components of the earth climate system. The arrival of the Indian summer monsoon over the Kerala coast is found to be reasonably punctual either towards the end of May or beginning of June. A delay in the onset of the monsoon by a few weeks would affect agricultural activity while an early onset might not be utilized to its full advantage without accurate prediction in advance. The traditional methods of defining onset guarantee a marked increase in rainfall over this Kerala coast. So far there exists no widely accepted definitions of these monsoon transitions. The monsoon onset occurs due to large-scale interactions between surface heating and atmospheric dynamical, thermal and hydrological process. Given the relatively small scale of Kerala that is less than 200 km in breath, sensitivity of the declaration of onset based solely on the district's rainfall to spatial area in the monsoon transitions is also likely to be large. The IMD, which is run by the Ministry of Earth Sciences, has been using the qualitative method over a long period using rainfall to declare the onset date. IMD declared the observed onset date of the southwest monsoon 2008 over the Kerala on 31 May, which is a day before the normal date. In the normal course it takes about one and half months time to cover the whole of India.

In India the NCMRWF, a Center of Excellence in modeling, has generated vast experience in global and regional modeling. Currently NCMRWF is running the global spectral model T254/L64 operationally. This spectral model is being used to for this study to monitor the onset phase of the monsoon 2008 with the following various circulation indices. (1) In 1996 Ramesh et al. gave the following characteristics for the evolution of the onset over the Arabian Sea covering the area of 0° - 19.5° N and 55.5 °E - 75 °E: (a) the net tropospheric moisture build-up, (b) the mean tropospheric temperature increase, (c) sharp rise of the kinetic energy at 850 hPa. (2) In 2002 Fasullo gave the hydrological definition (HOWI). (3) In 1992 Webster and Yang (4) In 1999 Goswami et al (5) 1999 Wang and Fan (6) 2000 Lau et al (7) In 2002 Syroka and Toumi