

Intraseasonal oscillations in the tropical boundary layer and its implications to monsoon variability

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Analysis of zonal wind data from lower atmospheric wind profiler (LAWP) showed the presence of ISO and its amplification within the boundary layer. It was found that 10-25 day periods present during pre-monsoon got shifted to 30-60 day periods that dominates during SW monsoon. The weak signals of ISOs in the lower levels got amplified across the ABL and this amplification was quite prominent in the case of 30-60 day oscillations. It was also observed that NCEP reanalysis zonal wind showed good agreement with the measured zonal wind observations. To see the changes if any, in the periodicity of wind during a drought year, the time series of zonal wind at 850 hPa in 2001 and 2002 were subjected to wavelet transform and FFT analysis. The year 2001 was a normal monsoon year whereas, 2002 a drought year. During 2002, the monsoon onset was delayed and rainfall during the SW monsoon season over India as a whole was deficient by $\sim 19\%$ of the long period normal. Analysis of 2001 wind data showed the time evolution of the oscillation from 10-25 day during premonsoon to 30-60 day during SW monsoon, whereas in 2002, the time evolution of 10-25 day periodicity was not clear and 30-60 day oscillations were present even during premonsoon period and the evolution of the periodicities from June to September showed an irregular pattern of oscillations ranging from 20-50 days. Thus this study suggests that the periodogram of zonal wind during normal monsoon year shows a systematic evolution of periodicities whereas a different pattern is seen during a drought year, pointing towards the potential of using the nature of time evolution of ISOs for predicting the monsoon variability. This is verified for the SW monsoon during 2005.