インドにおける秋分期の4日及び15日周期波動の性質の観測

OBSERVED CHARACTERISTICS OF 4 DAY AND 15 DAY WAVE MODES DURING AUTUMN EQUINOX OVER INDIA

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インドの10ステーションにおける毎日のラジオゾンデ観測データに基づき、クロススペクトル解析から、対流圏及び下部成層圏内の大規模波動の伝搬方向と位相速度の研究を行った。4日と15日周期の顕著な波動が検出された。15日周期波について、対流圏上部で西向きに位相速度10～15m/sで伝搬し、高度10km以下において伝搬方向の東向き反転が見出された他、1日当り5度の割合で赤道方向に移動している様子が明らかとなった。

In the present investigation radiosonde wind data collected daily (12GMT) at ten stations during autumn equinox over India have been used. The spectral technique using Maximum Entropy Method (MEM) revealed two prominent wave modes viz: 4 day and 15 day. Cross spectral method using Fast Fourier Technique (FFT) applied at latitude belts viz: 26-28N, 20-22N and 17-18N showed that the direction of the observed wave changes in certain height regions, preferably between 10-l5 km the direction is westward with a phase speed of 1O-15 m/s and below 1O km the direction of propagation changes to eastward having same magnitude of speed. The coherence between the series is found to be above 0.8 in most of the cases. By analysing the meridional component over a specific longitudinal belt (Jodhpur (26.2N, 73.2E), Nagpur (21.9N, 79.5E) and Madras (13.4N, 80.2E)) the equatorward shift of 15 day wave was found at the rate of 5 degrees/day. Time Series analysis showed the episodic enhancement of meridional wind component over zonal winds indicating transfer of energy and momentum to the equatorial region which may further simulate the wave modes in the region depending upon the forcing. The vertical phase profile showed distinct differences in phase progression between station close to the equator (Madras) and station farther from the equator (Delhi) indicating that the wave modes, although of the same period may be attributed to different origins.