

ABSTRACT

To define the Northeast Monsoon's arrival in the Philippines, the synoptic circulation patterns prior to and during its onset were analyzed. The onset is characterized by the 850-hPa meridional wind averaged over the study domain (0-60°N and 90-160°E) showing a period when its northerly component is at its strongest. The analysis of synoptic conditions during the strongest northerlies signifies a progressing Northeast Monsoon prevailing over the country. Empirical Orthogonal Function (EOF) analysis was done on the SLP data from the ERA5 reanalysis to determine the dominant spatial modes driving the monsoon onset. Results show the first two EOFs explaining a respective total variance of 19.26% and 16.91%. When the Principal Component (PC) time series were put into a correlation test with the intensity indices of Siberian High and the Aleutian Low, results revealed a strong positive correlation ($r= 0.95$) between PC1 and the Aleutian Low index and a strong positive correlation ($r=0.92$) between PC2 and the Siberian High, which indicates that the two prominent circulations patterns driving the monsoon wind arrival in the country during the study period are the changes in the Aleutian Low and Siberian High. A deepening center of the Aleutian Low and increasing Siberian High pressure is observed prior to the arrival of the Northeast Monsoon in the Philippines. A detailed examination of the observed surface pressure and wind direction from PAGASA synoptic stations showed a trend that establishes criteria for secondary and local signals; **a)** A pentad containing at least 3 consecutive days of an increasing mean SLP in all the 5 stations, supported by a northerly to easterly (0°-90°) range of wind direction in at least 3 out of 5 stations; or **b)** A pentad recording at least 3 consecutive days of an increasing pressure difference between Basco and Baler, supported by a northerly to easterly (0°-90°) range of wind direction in at least 3 out of 5 stations. This study demonstrated an objective definition for the onset of the Northeast Monsoon in the Philippines. A robust

characterization of its commencement is of considerable significance to the country's economy and people's well-being.

Keywords: Northeast Monsoon; onset; circulation patterns; the Philippines