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A comparative study of intraseasonal variability of total column ozone measured over the tropical maritime and coastal stations using Microtop II Ozonometer

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Ozone is one of the key species in the atmosphere and it plays a vital role in the air quality, atmospheric chemistry, and climate change over a region. Total amount of ozone (TCO) above the surface of earth varies with location on time scales that range from daily to season. For the present study daily measurements of TCO during the Indian summer monsoon period (June-September, 2015) were taken using Microtop II Ozonometer (Sun Photometer) over Maritime island station Androth (A beautiful and biggest island of Lakshadweep in the Arabian Sea) and the coastal station Cochin (A major port city in India on the south-west coast of Arabian Sea) separated between a distance of 300 km. Both stations are major tourist attractions in the southern part of India. Hence the study of intra-seasonal variability (ISV) of atmospheric ozone at different locations over the globe is very much essential for the adaptation and mitigations of regional climate change. In the present study the dominant and significant modes of Intra- Seasonal Oscillations (ISOs) present in the Intra Seasonal Variability (ISV) of TCO over these locations, an advanced statistical method; Discrete Mayer's Wavelet (DMW) was used to decompose the original signals to different modes. There were two major ISOs were found in the TCO such as Madden Julian Oscillations (MJO, 30-60 days) and quasi-bi weekly (12-16 days) oscillations over Cochin during the Indian summer monsoon period and there were no clear signals of these ISOs in the TCO noted over the Maritime stations (Androth). From the results, it is concluded that the intra-seasonal variability of TCO over Cochin depends strongly on summer monsoon circulation. Earlier studies also brought out similar modes ISOs in the ISV of Indian Summer Monsoon Rainfall (ISMR). Total column ozone measurements shows maximum concentration during the monsoon period (June-September) and minimum during the pre-monsoon period (March-May) over Cochin and converse is true for Androth Island.