Vigyan Samachar: MoES News
30/01/2020

Scientists studied Intra-annual Variations of Regional Total Column Ozone, Aerosol Optical Depth and Water Vapour

Scientists recently measured Total Ozone Column (TCO), Precipitation Water Content (PWC) and Optical Aerosol Thickness (AOT) above sea level using Microtops II ozonometer in the village of Atigre, located on the southeastern slope of Indian western Ghats. The data were analyzed on board NASA's Terra satellites along with the products retritrieved from the Ozone Monitoring Instrument (OMI) and the Moderate Resolution Imaging Spectroradiometer (MODIS), as well as the ERA-interim model of reanalysis.

The study noticed the strong seasonal variability in the observations made on the above. During the winter season, TCO was minimum and it peaked during the summer season. As shown in the figure, PWC and AOT were minimum during the post-monsoon season and maximum during the summer season.

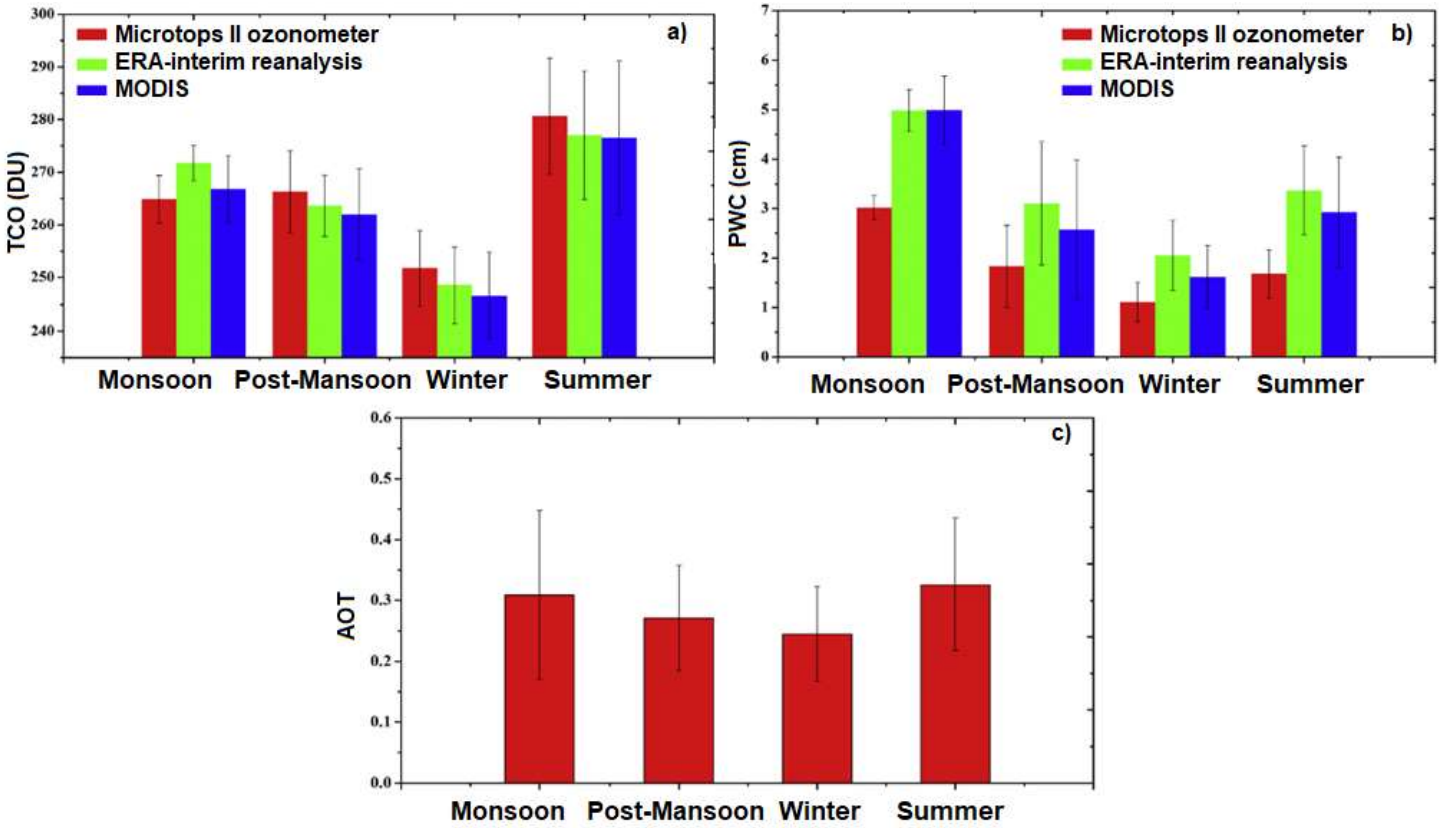

Figure: Season wise variations in TCO(a), PWC (b) and AOT (c) over Atigre village

Ref: https://www.sciencedirect.com/science/article/pii/S0169809519306477?via%3Dihub

Ozone, aerosols, and water vapor play an important role in influencing the weather and climate globally as well as regionally. Atmospheric ozone is a minor component of the Earth's atmosphere amouting to just 0.0012 per cent. There are two forms of ozone: good ozone (stratospheric ozone) that absorbs ultraviolet radiation from sun, and bad ozone (tropospheric ozone) that is hazardous to the biosphere. The TCO reflects both good and bad ozone concentrations in the atmospheric column.

Seasonal variation in ozone happens due to the intensity of solar radiation and presence of gases like NOx (In atmospheric chemistry, NOx is a generic term for the nitrogen oxides that are most relevant for air pollution, namely nitric oxide (NO) and nitrogen dioxide) and Hydrocarbon concentration. The TOC and PWC gradually increase with increasing temperature from winter to summer season, which shows the positive relationship between temperature and water vapor in the atmosphere. The lowest of AOT in the post-monsoon season is due to rain washout effect and it maximises during the summer season due to dry weather conditions. Liquid water throughout the vertical column of a cm^{-2} cross-sectioned atmosphere is known as the precipitation water content (PWC). It absorbs infrared (IR) radiation and perturbs the incoming solar radiation and outgoing terrestrial long-wave radiation budgets.

The research teem included Dada P. Nade and Swapnil S. Potdar of Shivaji Universit, Rani P. Pawar of Sanjay Ghodawat Universit, Alok Taori of Regional Remote Sensing Centre- Central, NRSC/ISRO, Gourihar Kulkarni of Pacific Northwest National Laboratory, USA, and Devendraa Siingh & **Sunil D. Pawar of Indian Institute of Tropical Meteorology (IITM), Pune.**

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