

Monsoon Variability and Stratosphere-Troposphere Exchange (STE) of Ozone over Costa-Rica (10° N,83.4° W)

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High vertical resolution radiosondes and ozonesondes are launched every week from stations in Southern Hemisphere ADitional OZonesondes (SHADOZ) network. We have analyzed the data of ozone mixing ratio, winds and temperature, of a tropical station Costa Rica (10° N, 83.4° W) for the year 2016 to study transport of ozone between stratosphere and troposphere (STE/TSE). Costa Rica has basically two seasons: dry (December – April) and wet (May – November) seasons. The intra seasonal variability ranges between two or more weeks per phase. STE/TSE events are found to be more frequent and deeper in monsoon. FFT analysis shows the presence of Kelvin wave, MJO and short period GW. Wavelet analysis shows the presence of Kelvin wave and MJO in the UTLS region and their participation in transport of ozone. LID technique shows the presence of GW ($\rho > 0.7$) in UTLS region and RGW (ρ within ± 0.3) in the lower and mid troposphere. Higher values of turbulent kinetic energy and eddy diffusivity in the UTLS region may also be responsible for STE/TSE events.

Key words: Stratosphere Troposphere Exchange, ozone mixing ratio, middle atmospheric dynamics, LID and Turbulence