

# Total ozone variability of long-term scale near equatorial region

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**Abstract:** Total ozone column data measured by the Dobson Spectrophotometer instrument was analyzed for Lagos, Nigeria, a northern tropical zone (Geog. Lat.:  $6.6^{\circ}\text{N}$ , Geog. Long.  $3.3^{\circ}\text{E}$ ). It was found that total ozone thickness has been increasing at an average rate of about 0.56 percent per year over 12 years (1993-2004) of the data set. The overall monthly average total column ozone is nearly 255 Dobson Units (DU) over Lagos. Also, monthly mean column ozone ranges from  $\sim 230$  DU (in February 1996) to a value as large as  $\sim 290$  DU (in October 1994). On average, standard deviation from the mean of the monthly mean total column ozone is largest in February, with a value of about 15 DU; while the minimum is nearly 6 DU, and is found in August. There is a strong positive seasonal trend in total column ozone over equatorial zone with maximum seasonal amplitude observed in equinox, and the lowest seasonal peak occurred in winter. In addition, the estimated changes in stratospheric tropical column ozone are  $7.2 \pm 6.4$ ,  $6.5 \pm 5.7$ , and  $5.3 \pm 6.2$  percent per decade in summer, winter, and equinox respectively. These values are not statistically significant. Furthermore, trend determinations over the entire data record show negative trends in February and March and positive trends in other months of the year. Spectral analysis results indicate that ozone varied at the time scales consistent with the equatorial quasi-biennial oscillation of the stratospheric circulation. Our results are in good accord with some results obtained for the Southern Hemisphere (SH) and Northern Hemisphere (NH) midlatitudes stations that use different observational techniques.

**Keywords:** Stratosphere ( Total ozone variability, Northern tropics, Quasi-biennial oscillation)