## Characteristics and variability of total column ozone concentration over Petaling Jaya, Malaysia using the Brewer Spectrophotometer

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Total Column Ozone Concentration (TCO) observations started at Petaling Jaya Meteorological Station, Malaysia (3.10N, 101. 0E) since 1993 using the Brewer MKII Spectrophotometer. Reliable data are available since 1997 and in this study 13 years of daily data from 1997 to 2009 are investigated for their characteristics and temporal variability. The daily UVB portion of the ultraviolet radiation spectrum data measured from the same instrument is also to examine the link between TCO and UVB. The annual cycle of the TCO shows a bimodal distribution with peaks in April and September with values of around 264 DU. The minimum TCO (248 DU) is recorded in December, the period when the incoming solar radiation is at its minimum. The frequency distribution of the daily TCO grouped in two periods of six months, October to March and April to September is found to be normally distributed with its axis of symmetry located at 253 DU and 264 DU and standard deviations of 5.4 DU and 8.7 DU respectively. Comparison with EP-TOMS satellite observed TCO data for the period 1997 to 2005 shows that the satellite overestimates the TCO by between 1 to 3%, the largest difference being recorded between July and October. Overall TOMS data explains about 72% of the total variance in observed TCO. The monthly mean ultraviolet radiation (UVB) shows a complex relationship with the TCO. The UVB too has a bimodal peak in the annual cycle but the peaks occur one month before and one month after the TCO peaks and a distinct minimum is observed in June. Between January to March and October to December, both quantities follow the same trend indicating UVB is aiding in the production of atmospheric ozone, whereas between April to September when the atmospheric ozone reaches saturation, it acts as a filter to the UVB. Linear trend analysis on the annual mean TCO shows a decreasing trend in the TCO concentrations of about 8 DU in the last decade. Spectral analysis performed on the daily TCO data for all the 13 years shows strong intraseasonal fluctuations, and the oscillation with the highest variance has a cycle of between 45 and 90 days with peak period centered around 60 days. Three years; 1998, 2006 and 2008 shows strong oscillation in this mode, whereas in 2001 and 2007 no significant intra-seasonal variations is being observed. The monthly mean TCO also shows a strong signal in the quasi-biennial oscillation (QBO) mode which is in phase with the equatorial lower stratospheric zonal wind QBO at this longitude.