Dobson total column ozone (TO) data for the South Pole station are corrected to account for seasonal changes in the stratospheric temperature that impact the absorption cross sections used to derive TO. The Bass and Paur (1985) ozone cross-sections were used to derive TO from AD direct sun observations by Dobson. The effective temperature is calculated using the ozone and temperature profile climatology (McPeters and Labow, 2012) that is latitude and month dependent (https://acd-ext.gsfc.nasa.gov/anonftp/toms/ML\_climatology).

The effective temperature is calculated by weighting the climatological temperature profile with climatological ozone profile (see Eq. 9, Redondas et al, 2014). The 12 effective temperatures (see file weighted\_climatology\_temperature) are assigned to the middle of the month (i.e. January 15), while for daily TO data correction, the monthly effective temperatures are interpolated to obtain the effective temperature for the specific day of the year.

The total column ozone corrections are done as the following:

TO\_corr=TO\_obs\*(1-C(T))

where C(T)= −0.0013(T\_eff − 226.7)

Where TO\_corr is corrected total column ozone, TO\_obs is the total column ozone obtained from the operational processing where the fixed atmospheric temperature T\_std, -46.3 C or -226.7 K is used to calculate the absorption cross section sensitivity coefficient (Redondas et al, 2014); T\_eff is the temperature calculated using monthly averaged ozone and temperatures climatology.

References:

Bass A.M., and R.J. Paur, The ultraviolet cross-sections of ozone: I. The measurements in Atmospheric ozone (Ed. C.S. Zerefos and A. Ghazi), Reidel, Dordrecht, Boston, Lancaster, pp. 606-610, 1985

McPeters, R. D., and Labow, G. J. (2012), Climatology 2011: An MLS and sonde derived ozone climatology for satellite retrieval algorithms, J. Geophys. Res., 117, D10303, doi:10.1029/2011JD017006.

Redondas, A., Evans, R., Stuebi, R., Köhler, U., and Weber, M.: Evaluation of the use of five laboratory-determined ozone absorption cross sections in Brewer and Dobson retrieval algorithms, Atmos. Chem. Phys., 14, 1635–1648, https://doi.org/10.5194/acp-14-1635-2014, 2014