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Short-term and long-term variation in midlatitude and tropical ozone using the Merged Ozone Dataset

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Although the UNEP/WMO Ozone Assessments traditionally represent ozone trends in the bands 35°- 60° S/N for midlatitudes and 20°S - 20°N for the tropics, we propose that a more physical definition would be 20°-50° for midlatitudes in both hemispheres and 10°S-10°N for the tropics. Defined in this way, the midlatitude and tropical bands are all strongly internally correlated across their width and the two midlatitude bands are anti-correlated with the tropics.

Using these definitions applied to the NASA SBUV Version 8.6 Merged Ozone Dataset (Frith et al. 2014, McPeters et al. 2013, Bhartia et al. 2013, DeLand et al. 2012) we study how well these bands are able to be represented by a single band average. In both hemispheres, the correlation with the midlatitude band average is best in spring and weakest in autumn. The gradient in variation from the average is strongly linear across the width of the band in almost all years of the record, confirming the physical coherence of the selected regions.

Finally we apply these results to assist in the interpretation of ozone trends over the 1979-2015 period in the three bands as defined.

References

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