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Plain Language Summary: In this study, we have constructed a merged dataset using 20 available satellite Level 2 total column ozone (TCO) datasets over 40 years from 1978 to 2017. The individual datasets and the merged dataset are corrected against selected Dobson and Brewer spectrophotometer TCO measurements by two methods: simple linear regression (SLR) as a function of time, and multiple linear regression (MLR) as a function of time, solar zenith angle, and effective ozone temperature.

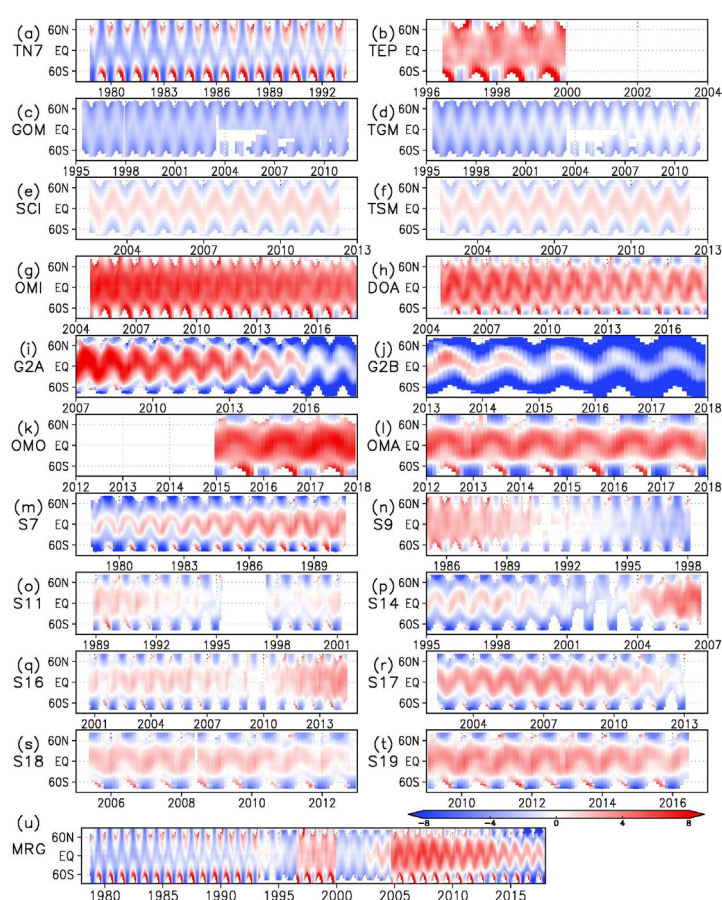


Figure 1. Latitude time cross sections of differences between monthly mean corrected and uncorrected satellite TCOs (DU) in individual datasets.

(a) TOMS/N7, (b) TOMS/EP, (c) GOME, (d) TOGOMI, (e) SCIAMACHY, (f) TOSOMI, (g) OMI-TOMS, (h) OMI-DOAS, (i) GOME-2A, (j) GOME-2B, (k) OMPS-NOAA, (l) OMPS-NASA, (m) SBUV/N7, (n) SBUV/N9, (o) SBUV/N11, (p) SBUV/N14, (q) SBUV/N16, (r) SBUV/N17, (s) SBUV/N18, (t) SBUV/N19, and (u) Merged TCO dataset during 1978-2017 (MRG).

- The behavior of the merged TCO after bias correction by SLR is similar to that after correction by MLR.
- The root mean square of TCO overpass differences in the corrected datasets by SLR and MLR are reduced from 8.6 DU to 8.4 DU.
- The corrected merged TCO datasets that are converted into time-series homogenization with high temporal-resolution are suitable as a data source for trend analyses as well as assimilation for long-term reanalysis.