

The impact of tropical SSTs on interannual variability of tropical lower stratospheric ozone

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Interannual variability of Tropical Lower Stratosphere (TLS) ozone and its connections to sea surface temperatures (SSTs) is examined using a combination of data including Aura MLS, reanalysis, and simulations from chemistry climate models with coupled ocean. The models and data show large differences in the magnitude of interannual variability in ozone between Northern and Southern tropics (NT (0-18°N) and ST (0-18°S) respectively) during boreal summer, but small differences in winter. This summer interannual variability is strongly correlated with summer SSTs in the eastern and central Pacific Ocean and the El Niño – Southern Oscillation (ENSO). The interannual variability in NT ozone is shown to be primarily due to meridional advection, connected with the Asian summer monsoon anticyclone. During cold (La Niña) events there is a stronger monsoon anticyclone and more transport of TLS ozone into the NT, with the reverse for cold (El Niño) events.

Key words: Tropical lower stratosphere, ozone variability, El Niño – Southern Oscillation, Asian Summer Monsoon anticyclone