Recent lower stratospheric ozone trends in satellite data and specified dynamics model simulations

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A recent analysis of satellite-based ozone measurements reported that near-global lower stratospheric ozone has continued to decline since the late 1990s. In contrast to this lower stratospheric ozone decline seen in satellite measurements, lower stratospheric ozone was found to be increasing in specified dynamics (SD) simulations from the Whole Atmosphere Community Climate Model (WACCM-SD) where the model is nudged using reanalysis wind/temperature fields. In this presentation, we show that WACCM-SD fails to reproduce the underlying tropical upwelling changes present in the reanalysis fields used to drive the model, thus causing the apparent discrepancy between modeled and observed ozone trends. We present new methods of specified dynamics nudging aimed at ameliorating the dynamical inconsistency and more accurately modeling recent ozone variability. Finally, we compare these model results to the updated (through 2018) Stratospheric Water and OzOne Satellite Homogenized (SWOOSH) data record.