

EGU2020-11308

<https://doi.org/10.5194/egusphere-egu2020-11308>

EGU General Assembly 2020

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A recent slowdown in the decline of CFC-11 concentrations in the upper troposphere

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Since 2004, the Atmospheric Chemistry Experiment – Fourier Transform Spectrometer (ACE-FTS) instrument has been measuring concentrations of chlorofluorocarbons (CFCs) in the stratosphere and upper troposphere and is currently the only satellite instrument that measures vertically resolved profiles of CFC-11. Since CFCs are major ozone depleting substances, monitoring their atmospheric abundances is critical for understanding ozone layer recovery. Recent studies based solely on surface-level measurements have shown strong evidence for new CFC-11 production, leading to an increase in CFC-11 emissions over the past decade. In this study, the TOMCAT/SLIMCAT 3-D chemical transport model is used in order to bridge the altitude/geolocation gap between ACE-FTS measurements in the UTLS and surface level measurements. Trends in two different time periods over the ACE-FTS mission, 2004-2012 and 2013-2018, are examined to determine if the recent change in surface level CFC-11 trends is influencing UTLS concentrations. The ACE-FTS measurements show that, below ~10 km, the rate of decrease of global CFC-11 concentrations was slower during 2013-2018 (-1.2 pptv/year) than during 2004-2012 (-2.0 pptv/year). Similar trends are observed in the model data for the same spatial/temporal regions.