

6.139 Downmixing of stratospheric air observed from FTIR measurements in central Mexico.

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Abstract:

A new tropical ground-based station part of the Network for the Detection of Atmospheric Composition Change (NDACC) is operating in Mexico since 2012. Altzomoni (19.12° N, 98.66° W) is located at an altitude of 3,985 m a.s.l. within a national park in central Mexico next to the Popocatepetl and Iztaccíhuatl volcanos. The station contributes to NDACC with high resolution solar absorption measurements by means of a Fourier Transform InfraRed (FTIR) spectrometer, from which vertical profiles and total column of several atmospheric species such as O₃, HNO₃, HCl, HF, CO, N₂O and CH₄ are retrieved. The station offers the opportunity not only to contribute to the scarce information available for the annual variability, trends and vertical distribution of important gases at these latitudes, but also to study the exchange processes between the stratosphere and the troposphere.

In this contribution we will show some examples of events in which the vertical downmixing of stratospheric air is detected. Time series in which O₃ and HCl present anti-correlations to tropospheric gases such as CH₄ and N₂O are shown. The potential temperature plot shows that these are periods of strong instability and that the Tropical Tropopause Layer (TTL) is frequently breaking allowing an exchange into lower altitudes. Discussion of the occurrences and frequency of these events and their implications will be included.