GROUND-BASED OBSERVATIONS FROM A HIGH ALTITUDE SITE BY THE JPL MKIV INTERFEROMETER

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Abstract:

Since October 1998, the JPL MkIV interferometer has made routine observations from Mt. Barcroft (37.584°N; 118.235°W; 3801 m) in the White Mountains of California. This site is sunny, dry, and far from sources of pollution. These characteristics make it ideal for atmospheric monitoring by FTIR solar absorption spectrometers, and more than compensate for its inaccessibility and the need to remotely control the instrument. In this work, we compare the quality of the column abundances retrieved from this site, with those obtained earlier using the same instrument from lower altitude, e.g. Table Mountain (2258 m) or Pasadena (360 m). We show that the data acquired from Mt. Barcroft are of higher quality and exhibit better consistency (i.e. precision). This is mainly thanks to the reduction in the absorption from gases that interfere with the stratospheric measurements. For example, the Mt. Barcroft H_2O column is typically 3 times less than Table Mountain and 9 times less than Pasadena. In addition, temperature-sensitive interfering absorptions by H_2O, CO_2, and CH_4 are reduced by the colder temperatures. Also, the lower atmospheric pressure (650 hPa) results in narrower absorption features for the interferences, further limiting their effect. Finally, Mt. Barcroft is above most of the boundary-layer tropospheric pollution (e.g. CO, NO_x, C_2H_2), and far from Los Angeles and San Francisco: this further reduces the spectral interferences and variations thereof.

First topic: 3. Trends of species of relevance to stratospheric chemistry.
Second topic: 7. Prospects: new instrumental techniques, data assimilation, and stations.