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Validation of the Atmospheric Chemistry Experiment (ACE) version 2.2 temperature using ground-based and space-borne measurements

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Abstract. An ensemble of space-borne and ground-based instruments has

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been used to evaluate the quality of the version 2.2 temperature retrievals from the Atmospheric Chemistry Experiment Fourier Transform Spectrometer (ACE-FTS). The agreement of ACE-FTS temperatures with other sensors is typically better than 2 K in the stratosphere and upper troposphere and 5 K in the lower mesosphere. There is evidence of a systematic high bias (roughly 3–6 K) in the ACE-FTS temperatures in the mesosphere, and a possible systematic low bias (roughly 2 K) in ACE-FTS temperatures near 23 km. Some ACE-FTS temperature profiles exhibit unphysical oscillations, a problem fixed in preliminary comparisons with temperatures derived using the next version of the ACE-FTS retrieval software. Though these relatively large oscillations in temperature can be on the order of 10 K in the mesosphere, retrieved volume mixing ratio profiles typically vary by less than a percent or so. Statistical comparisons suggest these oscillations occur in about 10% of the retrieved profiles. Analysis from a set of coincident lidar measurements suggests that the random error in ACE-FTS version 2.2 temperatures has a lower limit of about ± 2 K.

■ [Final Revised Paper](#) (PDF, 2445 KB) ■ [Discussion Paper](#) (ACPD)

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