DEVELOPMENTS IN ACCURATELY CALIBRATED FTS OBSERVATIONS OF THE ATMOSPHERE IMPROVE RADIATIVE TRANSFER MODELS AND REMOTE SENSING

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Fourier transform spectrometers offer the spectral resolution and sensitivity needed to improve the vertical resolution of temperature and water vapor sounding of the atmosphere from nadir-viewing satellite instruments. In pursuing the goal of improved soundings, it has become evident that FTS also offers significant advantages for absolute accuracy. Emphasis on realizing a highly accurate calibration has made it possible to apply atmospheric observations themselves to advance the quality of the radiative transfer calculations needed for atmospheric remote sensing and climate models. In addition, we are demonstrating that the radiometric accuracy of FTS offers the opportunity to improve climate monitoring and the consistency among IR measurements from different instruments and different spacecraft platforms. Examples are presented of FTS techniques and results from the University of Wisconsin ground-based Atmospheric Emitted Radiance Interferometer (AERI) and the Scanning High-resolution Interferometer Sounder (S-HIS) aircraft instrument. We also summarize the status of new satellite instruments for operational polar orbiters (Cross-track Infrared Sounder, CrIS) and for a geosynchronous demonstration of future operational capability on GOES-R (Geosynchronous Imaging FTS, GIFTS).