Far-Infrared Spectroscopy of the Troposphere – FIRST

Absolute Calibration and Atmospheric Observations

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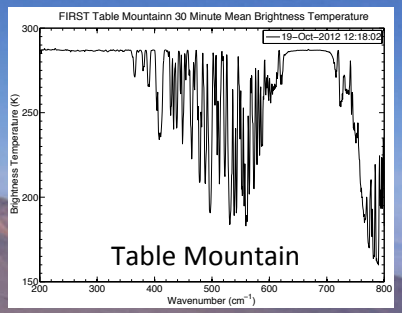
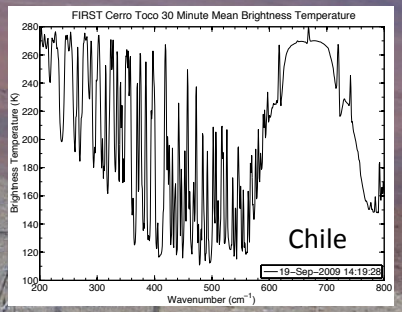
- NASA FIRST instrument, developed under ESTO IIP, measures the difficult far-IR 15-100 μm spectrum– critical to Earth's climate
- Absolutely calibrated datasets, traceable to NIST, available for first time
- Two journal articles in Applied Optics document calibration





Downwelling far-IR spectra are direct measures of Earth's greenhouse effect

FIRST at Cerro Toco, Chile, 17,500 ft AMSL

- First direct, absolute calibration of far-IR FTS over range of geophysical scene temps (180 K – 320 K). ESTO funded
- Data from Chile ('09) and Table Mountain ('12) campaigns recalibrated & published on ARM website, represent far-IR benchmarks
- FIRST data enable fundamental tests of H_2O spectroscopy, validation of natural greenhouse effect, and a pathfinder to CLARREO

FIRST at Table Mtn, 7500 ft AMSL