Boundary Layer Characterization using Mini-TES observations from the Mars Exploration Rovers

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The Mars Exploration Rovers (MER), Spirit and Opportunity, landed on Mars in 2004 just weeks apart. Using spectra from the Miniature Thermal Emission Spectrometer (Mini-TES), both rovers were able to sample the lowest 2 km of the vertical temperature profile of the atmosphere. During a single observation for Mini-TES, spectra were taken every two seconds with observations lasting up to 42 minutes. While results up to this point have averaged the spectra together to retrieve information on dust, water vapor and temperature, individual temperature retrievals are possible every two seconds and contain information on short timescale atmospheric fluctuations. These fluctuations are indicative of boundary layer behavior at each site. We have retrieved the vertical temperature profile from individual spectra and have used these profiles to assess boundary layer conditions at each rover location. We will present temperature profiles from individual retrievals and identify and characterize fluctuations within these profiles. We will also show the seasonal variation of these fluctuations over the first 1200 sols (nearly 2 Mars Years) for both Spirit and Opportunity rovers.