

**ATMOSPHERIC SCIENCE WITH THE MARS EXPLORATION ROVERS: THINGS ARE LOOKING UP.** M. J. Wolff<sup>1</sup>, and the Athena Science Team, <sup>1</sup>Space Science Institute (wolff@SpaceScience.org),

Although at first glance, the Mars Exploration Rover (MER) payload may be perceived as primarily suited to geological investigation, it is in fact quite well-suited to carry out a robust and dynamic program of atmospheric monitoring and characterization. More to the point, it has already begun to do so from both the Gusev and Meridiani locations. Current atmospheric observations include:

(1) periodic thermal infrared spectra of the Martian sky by the Miniature Thermal Emission Spectrometer (Mini-TES). The actual sequences consist of both standard 200-second integrations and long "stares" of up to (almost) an hour. These data are highly diagnostic of vertical thermal structure (from 10 meters to 3-5 kilometers), aerosol optical depth along with particle size, and under the right conditions, the water column.

(2) direct solar imaging using the Panchromatic Camera (Pancam) and 440/880 nm + neutral density (ND5) filters, providing accurate measurement visible optical depths.

(3) near-sun and "sky-arc" sequences using the full suite of geological filters, intended to capture the forward-diffraction peak and the phase function characteristics of the aerosol particles.

(4) carbon dioxide (15 micrometer band) profiling of the Mini-TES surface observations, providing an average near-surface (1 m) air temperature.

The above activities have been (and will continue to be) used to characterize diurnal and secular temporal trends and to examine the spatial variability of such trends. In addition, serendipity has provided the unique opportunities of watching the decay of a moderate dust storm from two widely-separated sites as well as of multiple simultaneous orbiter-rover observing "campaigns." The latter includes thus far the Mars Express over-flights of Spirit on sols 13A and 29A and the nearly-nadir Mars Global Surveyor over-flight of Opportunity on sol 22B.

During our presentation, we will summarize the atmospheric results obtained and analyzed through the end of February (2004), highlighting the unique contributions/capabilities of each instrument and the synergy which comes from combining the two, e.g., visible-to-infrared optical ratio.