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North Polar Water-ice Clouds  
Tamppari, L. K., M. D. Smith, D. S. Bass

Mars Global Surveyor (MGS) Thermal Emission Spectrometer (TES) limb sounding and nadir pointed data in the north polar region of Mars have been analyzed during northern spring and summer to find water-ice clouds. There has been uncertainty about the amount of water cycling in and out of the polar region, as evidenced by visible brightness changes in the residual polar cap from year to year which were originally thought to be interannual variations (James and Martin, 1995; Kieffer, 1990). Bass et al. (2000) re-examined Viking data and found that 14-35  $\mu\text{m}$  of water-ice appeared to be deposited on the cap later in the summer season. This deposition could be due to adsorption directly onto the cap surface or due to snowfall. In addition, Viking IRTM albedo and MAWD water vapor data were examined throughout this season (Bass and Paige, 2000), and water vapor was observed to increase in the cap area as the residual cap brightened. The possibility that some of the water is seasonally sequestered in water-ice clouds and may allow later precipitation had not been previously considered.

Water-ice clouds, in the north polar region, have previously been tentatively identified in the Viking data (Tamppari and Bass, 2000), and some water-ice clouds identifications have been made in the north polar region during the MGS era (M. Smith, pers. comm., 2001). The detection of water-ice clouds over a cold surface is difficult (Tamppari et al., 2000) and during northern spring, the CO<sub>2</sub> cap is retreating. Therefore, it is advantageous to examine TES limb-pointed observations over the seasonal polar cap regions and to combine those data with nadir-pointed data over the non-frost covered areas. We are examining these two data sets together to identify and track water-ice clouds and current results will be presented.