

**TEMPERATURES OF MARTIAN ATMOSPHERE IN THE ALTITUDE REGION 60-100 KM RETRIEVED FROM THE MGS/TES BOLOMETER INFRARED LIMB RADIANCES.** A. A. Kutepov<sup>1</sup>, A. G. Feofilov<sup>1</sup>, L. Rezac<sup>2</sup>, and M. D. Smith<sup>3</sup>, <sup>1</sup>Dep. Of Physics, The Catholic University of America/NASA Goddard Space Flight Center, Mail Code 674, Greenbelt, MD, 20771, Alexander.A.Kutepov@nasa.gov, <sup>2</sup>Hampton University, Hampton, VA, Ladislav.Rezac@hamptonu.edu, <sup>3</sup>NASA Goddard Space Flight Center, Greenbelt, MD, Michael.D.Smith@nasa.gov

We present retrievals of kinetic temperatures in the altitude region 60-100 km using the TES broadband thermal (5.5-100  $\mu\text{m}$ ) bolometer radiances measured in the limb geometry. At these altitudes, the emission of the ro-vibrational bands of several  $\text{CO}_2$  isotopes provides the main contribution to the signal, among them fundamental and hot 15  $\mu\text{m}$  bands and 10  $\mu\text{m}$  bands. Above about 85 km, during both day and night, the breakdown of the local thermodynamic equilibrium (non-LTE) has significant impact on the 15  $\mu\text{m}$  radiances. During the daytime, the 10  $\mu\text{m}$  emission pumped by the absorption of the solar near-infrared radiation already deviates from LTE above 40 km. In our work we employed the ALI-ARMS (for Accelerated Lambda Iterations for Atmospheric

Radiation and Molecular Spectra) non-LTE model and the forward fit algorithm developed and applied for retrieving mesospheric and lower thermospheric temperatures and trace gas densities from the Earth's limb radiances. We used integrated spectral TES limb radiances to validate the limb TES bolometer signal and applied temperatures retrieved from the spectral TES data below 60 km in our radiative calculations for adequate estimating the upwelling atmospheric radiation. The latter allowed us to link smoothly the temperatures below 60 km with those retrieved from TES bolometer data for higher atmospheric layers. In this report we present our results for dust free atmospheric situations. The extension of retrieval technique on the dust storm conditions is discussed.