TEMPERATURE DEPENDENCES OF MECHANISMS RESPONSIBLE FOR THE WATER VAPOR CONTINUUM

Q. MA, *NASA/Goddard Institute for Space Studies and Department of Applied Physics and Applied methamatics, Columbia University, 2880 Broadway, New York, NY 10025*; R. H. TIPPING, *Department of Physics and Astronomy, University of Alabama, Tuscaloosa, AL 35487*; C. LEFORESTIER, *Institute Charles Gerhardt CNRS-5253, CC1501, Université Montpellier II, 34095 Montpellier, France*.

The water-vapor continuum plays an important role in the radiation balance in the Earth's atmosphere. While this absorption has been known for a long time, the physical mechanism responsible is still an open problem. We have recently calculated theoretically both the magnitude and temperature dependence for the three mechanism that have been suggested: the far-wings of allowed lines, collision-induced absorption, and water dimers[a,b]. All three mechanisms depend quadratically on the number density of H_2O for the self-continuum, and on the product of the densities for the foreign-continuum. However, these three mechanisms have quite differences on the temperature as we will discuss. This analysis may provide us with a method to assess their relative importance in ambient atmospheric measurements.

[a] Q. Ma, R. H. Tipping, and C. Leforestier, J. Chem. Phys. **128**, 124313 (2008).

[b] C. Leforestier, R. H. Tipping, and Q. Ma, to be submitted for publication.