PRESSURE AND TEMPERATURE DEPENDENCE OF THE NEAR UV ABSORPTION CROSS SECTION OF HNO_3

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In the atmosphere, HNO_3 is an important reservoir species for the odd nitrogen (NO_x) and odd hydrogen (HO_x) families, both of which contribute to the destruction of stratospheric ozone. In the sunlit atmosphere, NO_2 and OH are liberated by photolysis of HNO_3. Therefore, in order to model the distribution of these species, accurate values for the photodissociation cross section of HNO_3 are necessary, particularly for wavelengths beyond 290 nm, which dominate the available light in the lower stratosphere. Previous investigations[a] show significant discrepancies at wavelengths greater than 310 nm, and have also noted a marked temperature dependence in this region. In an effort to resolve these discrepancies, and determine if clusters of HNO_3 are affecting the previous measurements, we have reexamined the near UV absorbance cross section from 240 to 350 nm at a wide range of pressures and temperatures. Implications of these results for the observed diurnal variation of [OH] in the lower stratosphere will be discussed.

[a] J. B. Burkholder, R. K. Talukdar, A. R. Ravishankara, and S. Solomon, J. Geophys. Res. 98, 22937, (1993); O. Rattigan, E. R. Lutman, R. L. Jones, and R. A. Cox, Ber. Bunsenges. Phys. Chem. 96, 399, (1992); and references therein.