

IMPORTANCE OF SPECTROSCOPY FOR SPACE-BASED REMOTE SENSING

PHILIP L. DeCOLA, *Research Division, Office of Earth Science, Code YS, National Aeronautics and Space Administration, Washington, DC 20546-0001.*

Space-based remote sensing provides a powerful tool to study atmospheric trace constituent and aerosol distributions. A wide variety of spectroscopic techniques are used in these atmospheric composition measurements and they span a wavelength range from the microwave to vacuum ultraviolet - probing the full range of rotational, vibrational, and electronic transitions which molecules in the atmosphere can undergo. Retrieval of reliable column densities and mixing ratio profiles for these atmospheric constituents depends on the availability of accurate laboratory spectra obtained under appropriate atmospheric conditions. As instrumentation for remote-sensing improves in order to meet new challenges, such as those presented by the need for global tropospheric monitoring from space, our knowledge of spectral line and band parameters must improve as well. This talk will review the types of space-based observations available for atmospheric chemistry studies with a focus on the stratosphere, although some attention will be given to the troposphere and the mesosphere. Various applications of spectroscopy will be presented in each case, along with identification of significant unmet needs in the area of laboratory measurements. Several examples of the use of space-based data in advancing our understanding of atmospheric chemistry will be shown. The talk will conclude with a description of forthcoming space measurements planned by the United States and other nations.