

Aeronomy Using Ground-Based Optical Instruments

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Polar Sciences Laboratory has been involved in observing terrestrial nightglow. This radiation from the Thermosphere (and Mesosphere) in the visible, UV and IR regions of the spectrum plays an important role for remote sensing several physical properties (winds, temperatures, brightness) and processes in the emitting region. Various ground-based optical instruments such as Fabry-Perot interferometer, Photometer, and Michelson interferometer, have been used to investigate the dynamics of the Earth's upper atmosphere from the measurements of the Doppler profiles (and line shifts) and vibrational-rotational distribution. In addition, an all-sky camera and a SATI (Spectral Airglow Temperature Imager) are being fabricated for measurements of 2-dimensional airglow patterns as well as temperatures in the upper atmosphere at multi-wavelength of OI(557.7nm, 630.0nm), OH Meinel bands, O₂(0,1) band, and Na(589.3nm) simultaneously. In this paper, we present a brief overview of the on-going research activities and the future plan with some preliminary results.