

## Sodium Airglow Observations from India

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Sodium (Na) airglow has been used as a tracer to understand mesospheric and lower thermospheric dynamics. The parameters of atmospheric gravity waves, propagating from lower altitude to thermosphere through Na airglow layer, can be deduced using Na airglow intensity variation. In order to derive the gravity wave modes, campaigns were conducted during 2006-2009 over Mt. Abu (24.6° N, 72.7° E) and Gadanki (13.5° N, 79.2° E), India using a narrow-band and narrow field-of-view Na airglow photometer. Spectral analyses were carried out using Lomb-Scargle technique that can handle unevenly-spaced Na airglow intensity variation. The power spectra and the mesospheric temperature profiles obtained from SABER instrument onboard TIMED satellite indicate that the periodicities are different depending upon mesopause altitude. Further, in order to obtain the relation between Na airglow intensity and neutral Na atoms, the photometer was operated in a campaign mode in conjunction with Na lidar from Gadanki. Comparison of two night profiles reveals that the average Na airglow intensity level on one night is less compared to that on the next night despite average Na concentration being larger by at least a factor of three. Further, on a given night, it was observed that Na airglow intensity variations match fairly well with Na atom variations at an altitude which is around one scale above the peak altitude of Na atom concentration. Theoretical volume emission rate calculations based on other measured parameters like mesospheric ozone concentration, temperature and pressure, obtained from SABER nearly over Gadanki, reveal that the collisions with the ambient molecules in mesosphere play an important role in deciding Na airglow intensity. The highlights of these results will be discussed.