Simultaneous Airglow, Lidar and Total Electron Content Measurements Over Gadanki (13.5° N, 79.2° E) – First Results

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We report first simultaneous airglow, lidar and total electron content measurements over Gadanki $(13.5^{\circ} \text{ N}, 79.2^{\circ} \text{ E})$ to study the mesosphere – thermosphere – ionosphere system behavior on October 22-23 and 23-24, 2009. Large variations were noted from one night to other. Wave amplitudes at OH emission altitudes were found much stronger on October 23-24 than October 22-23, 2009. We note gravity waves with clear upward propagation on both the nights. The deduced OH rotational temperatures compared well with SABER derived temperatures and variability agrees well with lidar measured temperature values at 75-80 km altitudes. The 630.0 nm thermospheric emission intensity exhibited plasma depletions on October 22-23 while no depletion was noted on October 23-24, 2009 which compared well with total electron content measurements. We discuss the mesospheric wave characteristics in connection to the observed depletion structures in data.