Tidal and Planetary scale waves in the equatorial middle atmosphere

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The upper mesospheric airglow emissions, OH(6,2), O2 atmospheric (0,1) band and OI 557.7 nm, have been measured by using a ground-based airglow photometer in the equatorial region, Sao Joao do Cariri (7 S, 37 W), Brazil. Good weather condition made it possible to study nocturnal and day to day variation of the emission rates in 1998 and 1999. It is found that there are distinct 2- and 3.5- day period oscillations in the emission rates, those are most probably due to Rossby-gravity wave and Kelvin wave, respectively. The amplitudes of oscillation of the Kelvin wave are large in June and July, being 40 % for OI5577, 23 % for O2A (0,1) and 26 % for OH(6,2).

Nocturnal and day to day variations of the earth's upper atmosphere airglow emissions are known to be mainly caused by dynamical processes, such as solar tides and internal gravity waves. Recent airglow data, however, suggests appearance of longer period (more than 1 day) oscillations, those are believed to be planetary waves generated in the upper troposphere and stratosphere and propagating to the upper mesosphere. The upper mesospheric airglow emissions, OH(6,2), O2 atmospheric (0,1) band and OI 557.7 nm, have been measured by using a ground-based airglow photometer in the equatorial region, Sao Joao do Cariri (7 S, 37 W), Brazil. Good weather condition made it possible to study nocturnal and day to day variation of the emission rates continuously for more than 12 days per month in 1998 and 1999. It is found that there are distinct 2- and 3.5- day period oscillations in the emission rates, those are most probably due to Rossby-gravity wave and Kelvin wave, respectively. The amplitudes of oscillation of the Kelvin wave are large in June and July, being 40 % for OI5577, 23 % for O2A (0,1) and 26 % for OH(6,2).