

# **Tidal associated temperature disturbances observed at the middle atmosphere (30- to 65 km) by a Rayleigh Lidar at 23° S**

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A lidar has been operated in São José dos Campos, Brazil (23.2°S, 45.8°W) since 1972, mainly dedicated to the study of mesospheric sodium at the 589 nm resonant line. The molecular Rayleigh scattering can also be used since we limit the height to ~75 km where the sodium scattering begins. Nevertheless, the weak signal obtained only permits the determination of density and temperature profiles by accumulating a large number of shots giving only nocturnal average profiles. Temporal variations in density and temperature on the scale of hours can, however, be obtained by performing a superposed epoch analysis for a determined time interval and covering a period of several days. In this way we obtained hourly mean profiles grouped by months, seasons and overall, with data acquired from 1993 to 2004. The difference between the hourly temperatures and the nocturnal means show for some months, with enough data coverage, downward propagating structures that apparently have tidal origin. The seasonal averages show a recurrent feature with high temperatures before and low temperatures after midnight above 50 km. Some similarity is found with the GSWM model, but the observed temperatures amplitudes are twice of that for the model.