

ANALYSIS OF MEAN WINDS AND ATMOSPHERIC TIDES AT MIDDLE AND LOWER LATITUDES IN SOUTH HEMISPHERE

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Mean winds and atmospheric tides have not been much analyzed in the South Hemisphere (SH), and there are few measurement sites and consequently few studies of the behavior of these phenomena. Fortunately, there are three SKiYMET meteor radars operating in Brazil and they are located strategically to cover lower and middle latitudes. These radars are in the equatorial region, at São João do Cariri (7° S, 36° W), low latitude, at Cachoeira Paulista (23° S, 45° W), and mid-latitude at Santa Maria (30° S, 54° W). In the present work we analysis the monthly behavior of the mean wind and the atmospheric tides during the year of 2005 for these radars. We observe an annual variation in the meridional prevailing wind for all latitudes, and the mean wind is southward during the winter months and northward during summer. The zonal prevailing wind increases with decreasing latitude, in some cases with a change of direction. The meridional diurnal tide amplitude has a semi-annual variation with maximum values at the equinoxes, and at all locations the autumn maxima are stronger than the spring. The zonal diurnal tide amplitude changes with the latitude. At equatorial latitudes this component shows a semi-annual variation only above 95 km, but at middle latitudes a strong peak is observed around 93 km, centralized between March and April, and a slight increase in amplitudes is observed around October. The semidiurnal tide shows more variability with latitude. The observed mean winds are compared with the Horizontal neutral Wind Model (HWM-93) and the atmospheric tides are compared with the Global Scale Wave Model (GSWM-00). This analysis adds to our knowledge of winds in the SH, and should lead to improvements in atmospheric wave models.

Atmospheric tidal, mean winds, meteor region

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