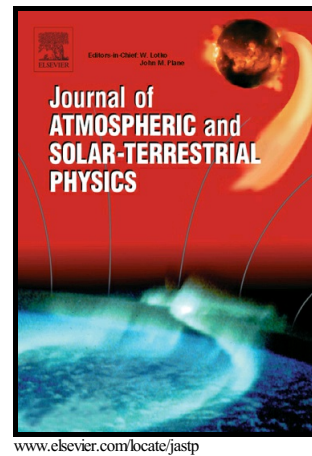


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Mesospheric Temperature Trends derived from Standard Phase-Height Measurements

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Abstract:

New homogeneous time series of daily standard phase-height (SPH) and daily plasma scale-height (PSH) have been derived from a 50-year long-radio-wave measurement of the broadcasting station Allouis (France, 162 kHz). The signal was received at Kühlungsborn (54° N, 12° E, Mecklenburg, Germany) and the present series is a third release. The daily time series of SPH shows in its spectrum dominant modes which are typical for the solar cycle (SC), for El Niño-Southern Oscillation (ENSO) and for quasi-biannual oscillation (QBO), indicating solar and lower atmospheric influences. Surprisingly, the time series of daily PSH shows a band of dominant cycles larger than 16 years.

In order to exclude the influence of the winter anomaly in the determination of column-integrated mesospheric temperature trends the phase-height-temperature procedure is confined to summer months.

The derived thickness temperature of the mesosphere decreased statistically significant over the period 1959-2008 after pre-whitening with summer mean of solar sun spot numbers. The trend value is in the order of about -1.05 K / decade if the stratopause trend is excluded. The linear regression is more pronounced, -1.35 K / decade for the period of 1963-1985 (2 SCs), but weaker, -0.51 K / decade during 1986-08 (last 2 SCs). The linear regression is in very good agreement with a mean column-integrated mesospheric trend derived from OHP-Lidar temperatures on a monthly mean basis for the last two SCs. This clearly shows that the thickness temperature of the

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