

THE INFLUENCES OF THERMOSPHERIC WINDS AND OF RESIDUAL SOLAR CYCLE VARIABILITY ON F-REGION TREND ANALYSIS

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Published estimates of the trend in hmF2 using data from ionosondes over the last 30-40 years range from +0.8 km y⁻¹ to -0.6 km y⁻¹ and are subject to the influence of several factors. Here we consider in detail the analysis of two southern hemisphere geomagnetically mid-latitude stations, Argentine Islands and Port Stanley, and a high latitude northern station, Sodankyla. For datasets of 30-40 years length ringing due to long memory processes can produce +/- 0.2 km y⁻¹ variability; the phase of the 11-year solar cycle, and its harmonics, captured by the datasets can cause variability of +/- 0.5 km y⁻¹. We study the ringing characteristics of globally distributed stations which have datasets spanning 30 years or more. We find that they fall into 3 groups depending on the length and specific years of the datasets. The neglect of local time variations in thermospheric wind conditions could result in differences of +0.2 km y⁻¹ for analysis which only considers local midday data. We study the 3 stations in detail for thermospheric wind changes, and will extend the study to a larger set of ionosonde stations which provide global coverage.