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27-day modulation of the electromagnetic impedance tensor at mid-latitude

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Analysis of four years of parallel registration of geomagnetic and telluric variations in the Szechenyi Istvan Geophysical Observatory, presented evidence of significant 27-day modulation of the surface electromagnetic impedance. The impedance tensor's variation spectra has been calculated by using four day time intervals covering four years. Based on the plane wave assumption some stable behavior of the transfer function is expected. On the contrary certain periods has been identified in its long term variation spectra. The modulation was recognized both in the amplitude and phase of the tensor elements. The orientation independence of the phenomena has also been demonstrated by computing certain rotational invariantses spectra. Dominant spectral peaks have been shown at periods of 27 days, 6 month and 1 year related to the Carrington-rotation and the Earth orbiting respectively. The modulation amplitude distribution over the ULF frequency range has also been analyzed and recovered statistical relation between surface impedance and magnetospheric processes.
The long term fluctuation of the magnetotelluric impedance results 30-40% fluctuation of the apparent resistivity function in the depth of the upper mantle. The presentation provides the results of our investigation on source effect of magnetotelluric deep sounding at mid latitude, specially on the site of the Nagycenk Geophysical Observatory.