

Observations of IAR spectral resonance structures at a large triangle of geophysical observatories

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The results of investigation of spectral resonance structures (SRS) caused by influence of the ionospheric Alfvén resonator (IAR) in electromagnetic 0.1-4 Hz emissions are presented. The data were collected at two distant mid-latitude geophysical observatories (GOs) at Borok (L=2.8) and Mondy (L=2.1), and at an auroral Sodankylä (L=5.2) GO. During period from 1996 to 1998 more than thirty events were detected at mid-latitude GOs. All events occurred at Borok were always seen at Sodankylä, whereas only a few SRS events were observed at Borok and Mondy at nearly the same local time. The SRS dynamical spectrograms consist of well separated spectral lines allowed determining the SRS frequency differences between lines Δf and their time variations. Observed frequencies are increasing from the evening to the midnight and decreasing to early morning as well as their time variations behave. The SRS number distributions versus local time, which are obtained at the mid-latitude stations Borok and Mondy, are similar to each other and the distribution maxima take place approximately at the same local time.

A correlation between diurnal behaviour of IAR frequencies and the ratio of f_oF_2 ionospheric frequencies to total electron content in the ionosphere was observed. For confirmation of the IAR origin for SRS spectra we use both a phenomenological formula for resonator harmonics obtained by generalizing of results of some IAR models and IAR numerical simulations on the basis of height profiles for ionospheric plasma parameters obtained from the EISCAT radar measurements.

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