

Is IAR necessary for SRS? - Not always

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We analyze magnetograms for the time intervals with clear spectral resonant structures (SRS) at frequencies 0.1- 6 Hz. For this study we use the data of induction magnetometers from Moshiri (Japan) and Karimshino (Russia). The common view is that the SRS originate from excitation of the Ionospheric Alfvén Resonator (IAR) by lightning discharges. However, rather frequently the typical picture in time domain includes only two pulses: the main pulse caused by a lightning discharge, and a single echo pulse following with delay from several tenths of seconds to several seconds. The secondary pulse can be explained by partial reflection of an initial wave from the steep gradient of Alfvén velocity in the ionospheric F-layer. Thus, although a spectrum with the comb-shape structure is seen at IAR frequencies it can be sometimes successfully interpreted without resonance excitation.