

PEM022-02

Room: 201A

Time: May 23 11:00-11:15

ULF magnetic response to lightning

Viacheslav Pilipenko¹, A. Schekotov¹, Kazuo Shiokawa^{2*}

¹Institute of the Physics of the Earth, ²STEL, Nagoya Univ.

High-sensitive induction magnetometer data from the station Moshiri has been examined in search of a transient response to the regional lightning activity. The information from the lightning detection system was provided by the Franklin, Japan. The lightning events have been selected within the 100 km circle from a point located 300 km southward of the station. For many events the impulse produced by the lightning discharge can be seen, though there were puzzling events, when no magnetic response was detected, even for a rather intense stroke current. Moreover, for some events, besides the main impulse, a secondary impulse delayed about 1 s was observed. These echo-impulses are probably caused by the reflection of a part of wave energy from the upper boundary of the ionospheric Alfvén resonator. The modeling with artificial signals has shown that a multi-band spectral resonant structure (SRS) can be formed owing to the two-pulse sequence. The statistical superposed epoch method indeed revealed that during the periods of the SRS occurrence the specific time structure of disturbed magnetic field - impulsive burst followed by a secondary impulse, dominated. The time delay between impulses varied in accordance with the variations of the ionospheric parameters.

Keywords: lightning, ULF wave, ionospheric Alfvén resonator, induction magnetometer