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Ionospheric Alfvén resonator response to remote earthquakes

Alexander S. Potapov (1), Boris V. Dovbnya (2), Battuulai Tsegmed (1,3)

(1) Institute of Solar-Terrestrial Physics SB RAS, Russia (potapov@iszf.irk.ru, +7 3952511673), (2) Borok Geophysical Observatory of Institute of Physics of the Earth RAS, Russia (dovbnya@inbox.ru, +7 4854724763), (3) Research Center for Astronomy and Geophysics MAS, Mongolia

The ionospheric Alfvén resonances (IARs) are an interesting wave phenomenon well described in the literature. The IAR formation region is located between two bends of the plasma density profile: in the lower part of the ionospheric F region and at altitudes of about 1000–3000 km. In this region, Alfvén waves are entrapped and form standing waves. The quality factor of the resonator can attain a value of 5–10. We studied local IAR features using data of the Borok Geophysical Observatory (58°N, 38° E) and found that the ionospheric Alfvén resonances observed as geomagnetic pulsations at frequencies of a few hertz respond to remote seismic events. There are different kinds of the seismic wave effect on the IARs mode: sometimes the oscillations arise after an earthquake moment, in other cases they sharply decay, and sometimes they abruptly change their intensity. Among possible mechanisms of the earthquake action on the ionosphere acoustic and electromagnetic waves emerged by a seismic shock are discussed. The work was supported by the RFBR grants 09-05-00048 and 10-05-00661.