

Preseismic ULF effect and possible interpretation

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Abstract

We present the results of ULF magnetic field observation at Karimshino station (Kamchatka, Russia). Using a case study we discovered an effect of suppression of ULF intensity about 2-6 days before rather strong and isolated seismic shocks (magnitude $M = 4.6-6.6$). It is revealed for nighttime and the horizontal component of ULF field (G) in the frequency range 0.01-0.1 Hz. Then we prove the reliability of the effect by computed correlation between G (or $1/G$) and especially calculated seismic indexes K_s for the rather long period of observation from June 2000 to November 2001. Our recent data confirm the validity of the effect. We show here a similar result during a period of frequent strong seismic activity in April-May 2002. It is highly probable that the effect observed is connected with the increase in plasma density perturbations inside the ionosphere, which are induced by preseismic water and gas release at the ground surface and following energy transportation into the ionosphere by atmospheric gravity waves. Two models are discussed and computed: the first is a decrease of penetration coefficient of Alfvén waves from the magnetosphere due to a turbulent increase in effective Pedersen conductivity in the ionosphere, and the second is a change in wave number (k) distribution of source ionospheric turbulence. One of the mechanisms or both could be responsible for the observed 2-3 times suppression of ULF magnetic field noise at the ground.

Keywords

Ultra-Low Frequency emission; seismicity; Alfvén waves

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References

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
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