



Dust acoustic mode in Earth's ionosphere

S.I. Kopnin, S.I. Popel

Institute for Dynamics of Geospheres, Moscow, Russia (serg_kopnin@mail.ru)

The purpose of the investigation is to describe possible manifestations of the dust acoustic mode, which is typical only for dusty plasmas, in the ionosphere. The emphasis is given to the interpretation of the radio-frequency noises, which occur during the observation of such meteor fluxes as Perseides, Orionides, Leonides, and Gemenides, and to the dust acoustic localized structures which can be used for the diagnostics of noctilucent clouds and polar mesosphere summer echoes. The importance of the dust acoustic mode during the meteor fluxes is confirmed by the observation of the radio-frequency noises of 0.1 to 60 Hz, which correspond to the frequencies of the dust acoustic wave. It is shown that the main process resulting in such noises is the modulational interaction of the electromagnetic and dust acoustic waves. The possibility of the diagnostics of noctilucent clouds and polar mesosphere summer echoes with the aid of the localized dust acoustic structures is related to the fact that the characteristics of self-organized structures on the dust acoustic time scale depend strongly on the sign of the dust particle charge, and the structures can have different properties.

This work was carried out within the Program of Fundamental Investigations of the Division of Earth Sciences of the Russian Academy of Sciences "Nanoparticles in Nature: Conditions of Existence and Technological and Ecological Consequences." S.I.K. is grateful to the "Dynasty" Foundation for financial support.