[EE] Evening Poster | P (Space and Planetary Sciences) | P-EM Solar-Terrestrial Sciences, Space Electromagnetism & Space Environment

[P-EM11]Effects of recurrent storms: from the heliosphere to the atmosphere

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Thu. May 24, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)

Time intervals of declining solar activity are dominated by so-called recurrent storms. They are produced mainly by high speed streams (HSS) of the solar wind coming from coronal holes. A HSS is preceded by a co-rotating interaction region (CIR), where the fast stream interacts with slow solar wind. Recurrent magnetic storms are weak but they cause intense chorus activity, which leads to the acceleration of the magnetospheric electrons up to relativistic energies. These effects are comprehensively investigated now by the Van Allen and ERG space missions. Strong variations of interplanetary electric field in HSSs and precipitation of magnetospheric particles at middle and high latitudes disturb the ionosphere, thermosphere and atmosphere for several days or even weeks. This results in significant energy deposition, which is even greater than strong but short transient storms produced by CMEs. The role of recurrent storms in disturbances of the ionosphere, thermosphere and atmosphere has been under intense investigation during the last several years. Presentation of recent experimental results from space missions, such as modern Van Allen Probes, ERG, COSMIC, Swarm etc., ground-based networks as well as prediction of models on these subjects are encouraged.

[PEM11-P03]**Dynamics of cosmic rays and ionospheric parameters during periods of increased solar activity and magnetic storms**

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Keywords:ionosphere, cosmic rays, magnetic storms, data analysis

In the work, variations of cosmic rays and ionospheric parameters during periods of strong and moderate magnetic storms of 2010-2015 were studied according to the data of ground stations. The data of the neutron monitors of Apatity, Cape Schmidth (Russia) and Kingston (Australia) stations and data of ionospheric stations Paratunka (Russia, Kamchatka), Wakkanai (Japan) and Norfolk (Australia) were analyzed (we used the resources www.nmdb.eu, http://spidr.ionosonde.net/spidr and http://wdc.nict.go.jp). The study is based on new methods of data analysis, described in [1, 2]. The application of these methods made it possible to describe an adequate model of the time course of cosmic rays and in their dynamics to identify abnormal intensities (pre-increases) arising 8-20 hours before the onset of strong magnetic storms. Such anomalies in cosmic rays were first discovered and described in [3, 4]. Their timely detection is of interest in space weather problems [3, 4]. A comparison with the dynamics of the ionosphere parameters showed that during the pre-increase periods in cosmic rays, an appreciable increase in the electron concentration of the ionosphere was observed and positive ionospheric storms lasted from 10 hours to one and a half days. Ionospheric disturbances were observed at different stations with a possible time delay of up to several hours. During the periods of the main phases of magnetic storms, the intensity of cosmic rays was significantly reduced (Forbush-lowering effect), and intense and prolonged (from 12 hours to several days) negative storms appeared in the

ionosphere.

Analysis of the events of 2010-2015 showed a high correlation of the allocated effects in cosmic rays with anomalous processes in the ionosphere at the analyzed stations. The results of a number of works [for example, 5] testify to repeated observations of this anomalous effect in the ionosphere, but questions related to its nature and mechanisms remain open for the time being. The results obtained, according to the authors, indicate the solar nature of the identified anomalous changes in the parameters of the ionosphere. This confirms the hypothesis proposed in [5] that such anomalies in the ionosphere have an external source and are associated with a certain channel of energy penetration from interplanetary space and the magnetosphere.

The research is supported by a grant from the Russian Science Foundation (project No. 14-11-00194-P). The authors are grateful to the organizations recording the data which were applied in the paper.

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