

OBSERVATIONS OF ULF WAVES FROM THE SOLAR ATMOSPHERE TO THE EARTH'S SURFACE: NEW FACTS

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There are many factors that transmit solar impact to near-Earth space. One of them is the ultra low frequency (ULF) electromagnetic waves with periods ranging from one hundred to one thousand seconds. Three- and five-minute oscillations are often observed in the solar atmosphere with the help of telescopes, and similar fluctuations are measured in the solar wind by on-board magnetometers. Neighbour frequencies are characteristic of the various magnetospheric cavities. Is there a relationship between these fluctuations? We present a set of facts allowing us to suggest a positive answer to this question. If this relationship can be proven, it will be possible to consider the probability of resonance influence of the Sun on the geomagnetic field due to the excitation of magnetospheric cavities by ULF waves coming from the Sun. We point out two possible mechanisms of transmission of ULF wave energy from the solar wind to the magnetosphere: (1) due to the solar wind pressure oscillations at frequencies below 2–3 mHz, and (2) due to the penetration of waves through the magnetopause against the background of excitation of Mills-Phillips type instability for frequencies above 3 mHz. The possible influence of ULF fluctuations on the other processes in the magnetosphere is discussed, in particular, the acceleration of the electrons of the outer radiation belt; the results of the corresponding analysis are given. This work was partially supported by RFBR grants 13-05-00529 and 13-05-00066.