



Power lines harmonic radiation in circumterrestrial space

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Currently, one of the main areas in the near-Earth space research is the space weather exploration and forecasting. This study mainly relates to solar activity influence on the ionosphere and the Earth's atmosphere (i.e. the energy transfer in the direction of the Sun-magnetosphere-ionosphere-atmosphere-surface of the Earth) and does not reflect a significant impact of the powerful natural and anthropogenic processes, which occur on the Earth's surface and influence on the atmosphere-ionosphere-magnetosphere chain. The powerful sources and consumers of electrical energy (radio transmitters, power plants, power lines and industrial objects) cause different ionospheric phenomena, for example, changes of the electromagnetic (EM) field and plasma in the ionosphere, and affect on the state of the Earth atmosphere.

Anthropogenic EM effects in the ionosphere are already observed by the scientific satellites. Consequences of anthropogenic impacts on the ionosphere are not currently known. Therefore, it is very important and urgent task to conduct the statistically significant research of the ionospheric parameters variations due to the influence of the powerful man-made factors, primarily owing to substantial increase of the EM energy production. Naturally, the satellite monitoring of the ionosphere and magnetosphere in the frequency range from tens of hertz to tens of MHz with wide ground support offers the best opportunity to observe the EM energy release, both in the global and local scales.

The available experimental data, as well as theoretical estimations, allow with a high degree of certainty to say that the permanent satellite monitoring of the ionospheric and magnetospheric anthropogenic EM perturbations can be used for: a) objective assessment and prediction of the space weather conditions; b) evaluation of the daily or seasonal changes in the level of energy consumption; c) construction of a map for estimation of near space EM pollution.

The examples of power line harmonic radiation (PLHR), which were detected by "Sich-1M", "Chibis-M" and "Demeter" satellites, have been presented and discussed.

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