

Opportunity and benefits of monitoring of the electromagnetic environment of a planet

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For monitoring and mapping of the electromagnetic (e.m.) environment of a planet, e.g. the Earth, it is necessary an advanced recording and data processing technology onboard of space vehicles and an accurate theory of the propagation of ultra-wide-band (UWB) signals in inhomogeneous and magnetised media in free space and in guided modes. In this presentation the actual application of this new remote sensing method is given by the investigation of the e.m. environment of the Earth by satellites, as Demeter, ISS-Obstanovka and the Compass-Volcano series. The recorded and interpreted new type of VLF signals, the SpWs (Spiky Whistlers) opened a way for monitoring of lightening activity and the classification of the signals originated from CC and CG sources. The combination of these satellite data with the continuous measurements of ground based automatic whistler detector system (AWDA) gives a unique possibility for continuous monitoring and mapping simultaneous the lightning (source) activity and the state of the upper atmosphere including the changings of the lower boundary of the ionised region. These measurements produce new open questions about the e.m. activity of our planet, too. Finally, in this presentation the possibility of this new technique will be demonstrated in the case of other planets, first of all in the case of the very Earth-like Venus without a strong magnetic field. The differences of the signal propagation and the detectability of the e.m. signals in the Venusian environment including the aspects of an experiment planning will be presented.