Geophysical Research Abstracts
Vol. 20, EGU2018-5432-1, 2018
EGU General Assembly 2018

Utilizing Sudden Ionospheric Disturbances to Model Solar X-Ray Fluxes

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Investigations on the Earth's upper atmosphere, and especially on the condition of the ionosphere for long range radio communication, started in the early 20ies century. Most of the ionospheric very low frequency (VLF) radio propagation phenomena are known and presumable almost completely understood. Because the development and especially the distribution of low-cost software defined radio wave receivers (SDRs) are an on-going process, they open many new opportunities for applications in people's daily life. Furthermore, the monitoring of Earth's lower ionosphere by utilizing VLF monitors which are based on SDR technology, it offers new insights into effects of space weather hazards. Therefore, one aim of this presentation is to present the InFlaMo project (www.inflamo.org). It is based on a small network of ground based multichannel SDR-receivers monitoring the state of the ionosphere. Another aim is to show first results of a model, which derives the solar x-ray flux from recorded VLF measurements. The model utilizes cases of sudden ionospheric disturbances (SIDs) from the ongoing solar cycle 24, which are caused due to solar x-ray flares. Because x-ray flares are one of the early warning signs received, the presented model and the ground based SDR-receivers network can be utilized as a space weather now-casting tool in a case of solar flares or massive solar eruptions. The amount of the solar x-ray fluxes can be modelled with the presented ground based method.