

## **LOFAR as a new tool for monitoring and diagnostics near Earth's Environment**

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### **ABSTRACT**

Polish astronomers and space scientists joined the International LOFAR Telescope ILT LOFAR in 2015. The Low Frequency ARray - LOFAR, exploring yet poorly studied range of low (<300 MHz) frequencies. It constitutes a European array of thousands of antennas - a challenge for data transfer and processing techniques. The three new LOFAR stations were installed during 2015 in Poland. The LOFAR facilities in Poland are distributed among three sites: Borówiec near Poznan, Bałdy near Olsztyn and Łazy near Krakow. All they are connected via PIONIER dedicated links to Poznan. Each site One LOFAR station consist of 96 high-band and 96 low-band antennas. They are most time work as a part of European network, however, when during weekend they can operate as a national network. The active Sun exercises a fundamental influence on the Earth's eco-space thereby affecting the quality of life on Earth and the performance of technological systems. The Sun releases sporadic bursts of energy the most violent of which are identified as coronal mass ejections (CME), clouds of highly ionized plasma ejected into interplanetary space. Solar storms are known to have a damaging effect on critical space-borne and ground-based technology systems and on the Earth's ecosystem, with immediate negative consequences for society. GPS and GALILEO can be harmfully affected, electrical power distribution systems can break down due to large geo-magnetically induced currents.. The investigations with the help of the LOFAR installation, besides monitoring the universe, will also be oriented towards developing techniques to perform detailed diagnostics and monitoring of near Earth's environment and for proof-of-concept GNSS services and space weather applications, which is well in line with ongoing efforts to coordinate and develop European space research activities.

**Key words:** LOFAR, Space weather, Ionosphere