



The Darmstadt VLF radiophysical station VADAR for the detection of possible earthquake precursors

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Since 2010, based on the knowledge of the Graz and Bari members of the International Network for Frontier Research on Earthquake Precursors INFREP and of the Institute of Physics of the Earth Moscow, a new VLF radiophysical receiver, called VADAR (Vlf Antenna DARMstadt), is under construction at Technische Universität Darmstadt.

VADAR uses the UltraMSK software that runs under the Linux operating system. The signal coming from a SIRIO BOOMERANG 27-A antenna is preamplified up to the line level suitable for connection to a four-channel sound card with 192 kHz sampling rate. This allows to receive phases and amplitudes of signals of transmitters having two times higher frequencies than signals treated by usual UltraMSK facilities. At a later stage, the addition of an additional dipole antenna is foreseen. The timing signals are taken from a GPS receiver with precision of one pulse per second and an absolute timing precision of a few ten ns. Observations are performed every 20 seconds. It is foreseen to store the data on a ftp-server available to all INFREP members.

The VADAR data will be applied to record short-time electron density variations in the lower ionosphere and atmosphere. There will be made a comparison of modifications of signals propagating at the same time above seismo-active and non-seismic regions. Dependencies of VADAR data on meteorological conditions will be investigated. Numerical programmes for the data analysis, also including first error estimates, are under development. VADAR is used as an advanced laboratory facility within the master and bachelor course of studies. First Darmstadt VLF data are presented.