



The Romanian VLF/LF monitoring system as a part of the INFREP international network

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The paper presents the Romanian VLF / LF monitoring system consisting in a radio receiver -made by Elettronika S.R.L. (Italy) and provided by the Bari University- and the infrastructure that is necessary to record and transmit the collected data.

This system is a part of the international initiative INFREP. Through this initiative, originated in Italy, VLF / LF receivers are deployed in different locations in Europe. Each one is monitoring up to ten different transmissions of radio stations across the continent. Information on electromagnetic fields' intensities created by transmitters at each receiving site and gathered from this network are indicating the quality of the propagation along the paths between the receivers and transmitters. Studying the ionosphere's influences on the electromagnetic waves' propagation along a certain path is a method to put into evidence possible modifications of its lower structure and composition as earthquakes' precursors.

The VLF / LF receiver installed in Romania was put into operation in February 2009 and has proved its utility in the case of Abruzzo earthquake that occurred on 6th of April 2009 (M=6.3) (Biagi et al, 2009). Since then, the receiver was relocated from Bucharest to the Black-Sea shore (Dobruja Seismologic Observatory). Changing the receiving site produced unsatisfactory monitoring data, characterized by large fluctuations of the received signals' intensities. Trying to understand this behavior has led to the conclusion that the electric component of the electromagnetic field was possibly influenced by the local atmospheric conditions (as aerosols' concentration could be).

Starting from this observation we have run some tests which have indicated that a loop-type antenna is more appropriate than a vertical antenna, especially for highly electric-field polluted environments. Very good results were obtained with this new configuration, even in the site located at the Black-Sea shore.

Future improvements of the receiver's analog front-end are still possible in order to get better monitoring data by rejecting the off-band noise induced by the aerial high-voltage lines that are surrounding the site, so that for us to accomplish the best achievable surveillance in VLF / LF bands, related to seismo-electromagnetic phenomena.