



Investigation of very low and low frequency (VLF/LF) electromagnetic waves propagation over seismogenic zones using the improved Romanian radio monitoring system

Iren Adelina Moldovan (1), Victorin Emilian Toader (1), Pier Francesco Biagi (2), Robert Colella (2), Christina Oikonomou (3), Angela Constantin (1), Cristian Ghita (1), Alexandra Muntean (1), Mihai Andrei (1), Haris Haralambous (3), Anita Ermini (4), and Adrian Moldovan (5)

(1) National Institute for Earth Physics, Research, Development and Innovation in Earth Sciences Department, Magurele, Romania(irenutza_67@yahoo.com), (2) Department of Physics, University of Bari, Bari, Italy, (3) Frederick Research Center, Filokyprou St.7, Palouriotisa, Nicosia, 1036, Cyprus, (4) Department of Industrial Engineering, University of Tor Vergata, Rome, Italy, (5) Terrasingna Ltd, Bucharest, Romania

A new VLF/LF INFREP radio receiver was installed in Romania, in the summer of 2017 at the seismic station Barlad, Vaslui county. In the same site with the magnetic antennas and radio receiver, were added a Boltek electrometer, a lightning detector and a Conrad meteo station, to monitor the local atmospheric conditions that might affect the signal reception. The same monitoring configuration is also installed at Dobrogea Seismological Observatory (Dob-Ro), from Eforie Nord, Constanta County Romania.

In the present study, is presented the new monitoring system and the data recorded by the two Elettronika receivers are processed and anomalies are correlated with the preparation stage of the last earthquakes with ML larger than 5.0, occurred in Vrancea zone, and felt on the extra-Carpathian area. Barlad receiver was inside the Dobrovolsky preparation area of the analyzed shocks, and the 5th Fresnel zones of three radio paths monitored by the Dob-Ro receiver crossed the epicentral area. During the last 12 months, five largely felt earthquakes occurred in Vrancea seismogenic zone (September and December 2016 and February, May and August 2017), but only the last one occurred after the installation of the Barlad receiver.

The paper is presenting some preliminary results from two new VLF radio receivers designed and installed in Romania.

The Ionospheric TEC (Total Electron Content) variations are also analyzed using observations from the Global Navigation Satellite System (GNSS) aiming to detect potential ionospheric anomalies related to these events and describe their characteristics.

Acknowledgements

This paper was carried out within Nucleu Program, supported by ANCSI, project no. PN 16 35 03 01, PN 16 35 03 01, and the Partnership in Priority Areas Program – PNII, under MEN-UEFISCDI, DARING Project no. 69/2014.