



## **Investigation of VLF and LF transmitter signals prior to earthquakes in Italy and in Greece recorded in the year 2016**

Mohammed Y. Boudjada (1), Konrad Schwingenschuh (1), Hans Eichelberger (1), Alexander Rozhnoi (2), Bruno Besser (1), Pier F. Biagi (3), Werner Magnes (1), Helmut Lammer (1), and Manfred Stachel (1)

(1) Space Research Institute, Austrian Academy of Sciences, Graz, Austria (mohammed.boudjada@oeaw.ac.at), (2) Institute of the Earth Physics, RAS, Moscow, Russia, (3) Department of Physics, University of Bari, Bari, Italy

We analyze the VLF and LF transmitter signals recorded in the year 2016 by the Graz seismo-electromagnetic facility (15.43 E, 47.06 N), as part of the European VLF receiver network. The regular VLF/LF signals received at Graz are from: Germany (DHO, 23.4 kHz), Great Britain (GBS, 19.58 kHz), Island (NRK, 37.5 kHz), Italy (ICV, 20.27 kHz; ITS, 45.9 kHz), Turkey (TBB, 26.7 kHz) and USA (NPM, 21.4; NAA, 24.0 kHz). A first part of our contribution will emphasize on the signal reception conditions and the geomagnetic and solar effects. The amplitude and the phase of the transmitter signals are considered and separated in day- and night-time observations. A second part will be devoted to the investigation of earthquakes events which principally occurred in the Southern Europe, i.e. in Greece and in Italy. In this context the propagation paths between the transmitter and the receiver are taken into consideration. Particular attention is given to the transmitters localized in the surrounding regions where the earthquakes occurred. It is the case of three stations, two in Italy (ICV and ITS) and one in Turkey (TBB). We show that attenuations and/or absences of the VLF/LF intensity signals may be considered. Our main outcomes are discussed and combined to previous investigations in particular those which referred to the L'Aquila earthquakes of April 2009.