



Multidisciplinary network monitoring precursors in a seismic area

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AeroSolSys is a multidisciplinary network consisting of 10 stations near to faults in an active seismic area (Vrancea, sitting at curvature of Carpathian Mountains) characterized by intermediate depth earthquakes. The targets are the phenomena between the lithosphere and near surface low atmosphere, the correlation with seismicity and climate change effects. The analysis of environmental processes is based on real-time information about ions, radon and CO₂ concentrations, solar radiation, profile of temperature in boreholes, meteorological data (atmospheric pressure, air temperature, humidity, wind speed and direction), telluric currents, infrasound, electromagnetic activity, ULF radio wave propagation, seismo-acoustic emission, magnetic field and seismicity. The network is a part of NIEP infrastructure (National Institute for Earth Physics from Romania). There are seismic equipment in all stations. The radon concentration is continuously monitored in 5 stations, the ULF radio waves in 4 locations and telluric field in other 2. We use a radiometer for solar direct and reflected monitoring (long and short waves), 4 meteorological stations and acoustic monitoring in 5 locations (22 KHz rate). The analysis algorithms include power spectrum, Power Spectral Density, Probability Density Function Estimation, spectrograms (Gabor, STFT, and wavelet), standard deviation, mean and filters. We correlate our measurements with meteorological information and solar activity from NOAA. We found variations of radon concentration and temperature in borehole with 1 – 2 days before an increase of seismic activity. Acoustic effects of rock deformation and microfracturing were recorded, too. The anomalies of telluric field, air ionization, radon, electromagnetic field and CO₂ should be correlated with local environment factors. Only in a multidisciplinary network can validate all seismic precursors. The main goal of network is to help the authorities with information about risk situation and effects of climate change.

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