



Analysis of the seismicity in the region of Mirovo salt mine after 8 years monitoring

Liliya Dimitrova (1), Dimcho Solakov (1), Stela Simeonova (1), Irena Aleksandrova (1), and Gergana Georgieva (2)

(1) National Institute of Geophysics, Geodesy and Geography - BAS, Sofia, Bulgaria, (2) Sofia University "St. Kliment Ohridski", Sofia, Bulgaria

Mirovo salt deposit is situated in the NE part of Bulgaria and 5 kilometers away from the town of Provadiya. The mine is in operation since 1956. The salt is produced by dilution and extraction of the brine to the surface. A system of chambers-pillars is formed within the salt body as a result of the applied technology. The mine is situated in a seismically quiet part of the state. The region is characterized with complex geological structure and several faults. During the last 3 decades a large number of small and moderate earthquakes ($M < 4.5$) are realized in the close vicinity of the salt deposit. Local seismological network (LSN) is deployed in the region to monitor the local seismicity. It consists of 6 three component digital stations. A real-time data transfer from LSN stations to National Data Center (in Sofia) is implemented using the VPN and MAN networks of the Bulgarian Telecommunication Company. Common processing and interpretation of the data from LSN and the national seismic network is performed. Real-time and interactive data processing are performed by the Seismic Network Data Processor (SNDP) software package.

More than 700 earthquakes are registered by the LSN within 30km region around the mine during the 8 years monitoring. First we processed the data and compile a catalogue of the earthquakes occur within the studied region (30km around the salt mine). Spatial pattern of seismicity is analyzed. A large number of the seismic events occurred within the northern and north-western part of the salt body. Several earthquakes occurred in close vicinity of the mine. Concerning that the earthquakes could be tectonic and/or induced an attempt is made to find criteria to distinguish natural from induced seismicity. To characterize and distinguish the main processes active in the area we also made waveform and spectral analysis of a number of earthquakes.