



Relation of earthquakes and earthquake swarms in West Bohemia, Czech Republic and Reykjanes peninsula, Iceland

Martin Labuta (1), Josef Horálek (2), Hana Čermáková (2), Jana Doubravová (2), Martin Hensch (3), and Kristín Vogfjörð (3)

(1) Faculty of Science, Charles University in Prague, Czech Republic (labuta.martin@gmail.com), (2) Institute of Geophysics, Academy of Science, Prague, Czech Republic, (3) Icelandic Meteorological Office, Iceland

Most earthquakes occur as accompanying activity of large tectonic earthquakes at the edges of lithospheric plates. Another type of seismic activity are earthquake swarms, which are characterized by series of earthquakes with several dominant shocks of similar strength. The origin of earthquake swarms is mostly combination of tectonic stress and movement of hydrothermal fluids along the fault plane. Mainly, swarms are observed within volcanic areas but even in areas without recent volcanic activity, like in West Bohemia.

This region lies above an intra-continental rift zone – the Eger Rift and it has been seismologically active in past years, including swarms in 2008, 2011, 2013 and 2014 monitored by the local seismic network WEBNET with dominant shocks of magnitudes below ML 4.5. All these events are located in depths between 7 and 11 km and they create 8 km long focal zone with N-S orientation. However, the latter swarm changed its character from a continuous occurrence with a dominant shock to a main shock and aftershock activity.

Contrary, the region of Reykjanes peninsula in Iceland is located above the Mid-Atlantic Ridge, which results in shallower depths between 2 to 9 km. Additionally, the seismic energy in this area is released as a typical swarm-like activity and migrates along the rift in certain clusters, i.e. around Grindavík, Fagradalsfjall or Kleifarvatn.

Therefore, we analyzed data from local seismic network REYKJANET from the last third of 2013 when a large swarm occurred there with a dominant main shock of magnitude ML 4.7 in the most South-Western part of peninsula. We compared b-values and space-time distribution of events among these clusters. Furthermore, focal mechanism was done to analyze relations between certain areas in Iceland. We also compare them with similar clusters in West Bohemia, a representation of different tectonic structure.

Main purpose of this study is to clarify the processes of earthquake swarms and to study possible relations in different tectonic settings. This could support further research concerning the better understanding of spatial distribution of releasing accumulated stress.