



Earthquake swarms in West Bohemia-Vogtland and South-West Iceland: are they of similar nature?

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Earthquake swarms occurred worldwide in diverse geological units. They are mostly related to volcanic and post-volcanic areas, geothermal fields and ocean ridges. However, their origin is still unclear. West Bohemia-Vogtland represents one of the most active intraplate earthquake-swarm areas in Europe, South-West Iceland, which lies directly on the boundary between the North America and Eurasia Plates, is characterized by recurrence of intense intraplate earthquake swarms. Both these areas exhibit very high activity of crustal fluids.

We investigated five intraplate earthquake swarms and one non-swarm sequence from West Bohemia and four interplate swarms from two different tectonic areas in South-West Iceland: the Hengill volcanic complex - Ölfus transition zone, and the Reykjanes Peninsula. We analysed these activities from the perspective of the magnitude-frequency distribution and distribution of the interevent times, their temporal development and the seismic moment release, and the space and time distribution of the foci. The aim was to determine the swarm characteristics that are dependent or vice-versa independent on the tectonic environment, and also the characteristics which should help us to distinguish more precisely earthquake swarms from mainshock-aftershock sequences.

Generally, the investigated South-West Icelandic activities are much larger in terms of magnitudes of the strongest events, total seismic moment released, and in size of the activated focal areas when compared to the West Bohemia ones, the focal depths in South-West Iceland are significantly shallower than those in West Bohemia.

Further we found that the ratio of small to large events and the event rates are similar for all the activities in both areas, while the rate of the seismic moment release is significantly higher for the Southwest Icelandic swarms. Seismic moment released progressively is characterized for the West Bohemia swarms, whereas seismic moment released in one dominant short-term phase is typical of South-West Icelandic earthquake swarms. All the West Bohemian swarms took place in a bounded focal zone Nový Kostel that is fairly complex, consisting of several fault segments. The South-West Icelandic swarms are distributed at much larger area along the Mid Atlantic Ridge up to its branching in the Hengill triple junction, the individual swarms clearly reflect a tectonic structure of respective focal areas. We have concluded that most of the West Bohemia earthquake swarms were series of subswarms with one or more embedded mainshock-aftershock sequences, while the South-West Iceland swarms, particularly those on the Reykjanes Peninsula, represent a transition between earthquake swarm and mainshock-aftershock sequence.