Earthquake Swarms in the Western Part of the Bohemian Massif

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The western part of the Bohemian Massif is characterized by re-occurrence of intraplate earthquake swarms. The epicentral region, covering an area of about 3 000 km^2, includes the territory of West Bohemia and the adjacent territories of SE Saxony and NE Bavaria. The seismicity of the West Bohemia earthquake swarm region has been monitored by the local seismological network WEBNET since 1991. WEBNET provides high quality data which enable precise location of seismic events and detailed analyses of the individual seismic phases contained in the seismograms.

Based on the WEBNET data, remarkable features typical for the West Bohemia earthquake swarm region were found. Micro-earthquake activity, mostly of swarm-like character, persisted in the region. Foci of the micro-earthquakes predominantly cluster in a few focal zones.

Seismicity in the main focal zone (Nový Kostel region) is closely related to the system of principal tectonic faults intersecting in the focal region. Foci of the individual swarms are confined to very narrow volumes at depths from 5 to 15 km. Seismograms of local earthquakes that occurred in the main focal zone display pronounced reflections of P- and S-waves which could correspond to a presence of fluid or molten medium at a distance of several hundred meters from earthquake hypocentres. During the last highest activity in January 14-28, 1997, about 1600 events with maximal magnitude M_L=3 were recorded. Advanced source mechanism studies show that during the swarm activity several different focal mechanisms occurred. Two of them corresponding to the major events were predominant. In many cases moment

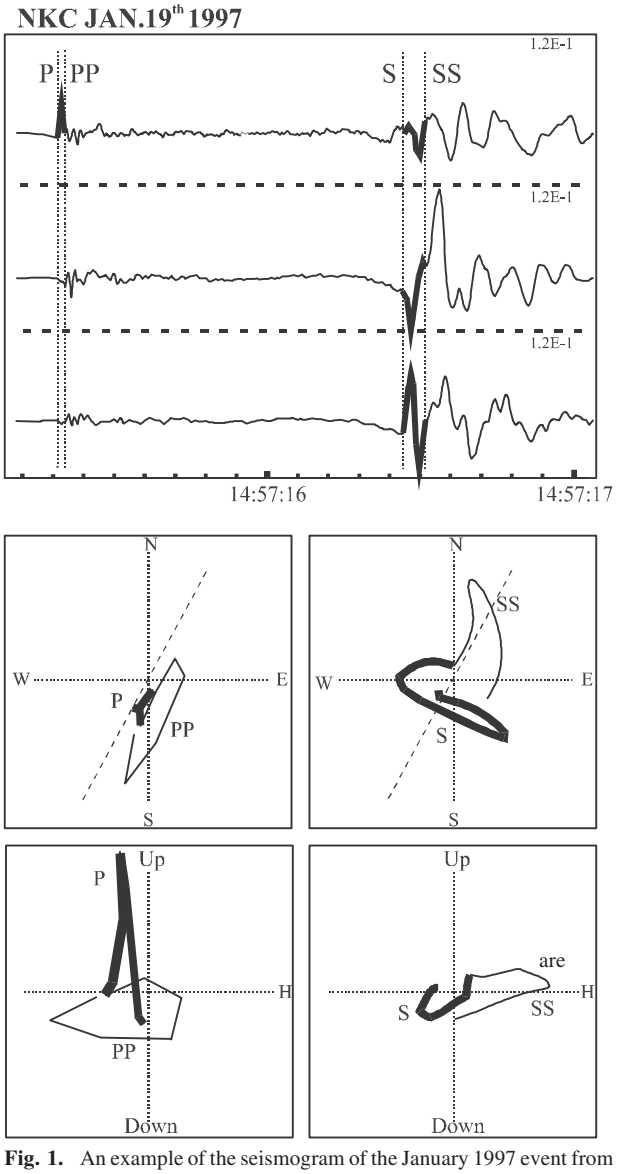

Fig. 1. An example of the seismogram of the January 1997 event from NKC station with the particle motion diagrams of P- and S-waves. Seismogram displays distinctive reflections of P- and S- waves. Direct P- and S- waves indicated by a bold line.

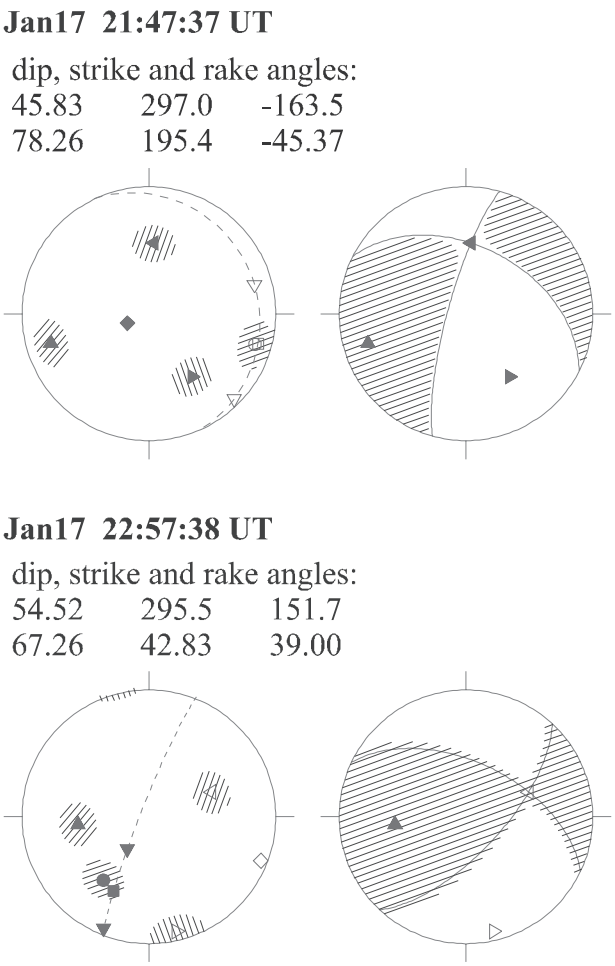

Fig. 2. Two main focal mechanisms corresponding to the major events during the January 1997 microearthquakes swarm occurred.

tensors exhibit, besides a double couple component, also a compensated linear vector dipole and even a volumetric part. Since the events with available source mechanism cover the whole period of the swarm activity it was possible to formulate an idea about processes that are in progress in the course of earthquake swarms in West Bohemia. Based on the focal mechanism data, the state of the tectonic stress in the region was analysed, too.

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