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Focal Mechanisms of Dobra Voda Source Zone in the Male Karpaty Mts., Slovakia

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Dobra Voda area is one of the most seismically active zones in the territory of Slovakia. In the 20th century, the most prominent earthquakes with the epicenters in Dobra Voda occurred in January 9, 1906, in January 16, 1906, and in March 13, 1930 with magnitudes of 5.7, 5.1 and 5.0, respectively. Since 1985, the seismic activity is monitored by a local seismic network installed in the area. Since 2004, the source zone is also monitored by the Slovak national seismic network. In this study, 18 microearthquakes which occurred in the period of 2002-2008 are analyzed. The microearthquakes were located using the Fasthypo program (Herrmann, 1979). The source area has been divided into three subareas related to local geological conditions: Dobra Voda area, Male Karpaty area, and Povazsky Inovec area. The depth of the hypocenters range from 5 to 13 km. The focal mechanisms of the microearthquakes were calculated by program FOCMEC (Snoke, 2003) using polarities of Pg and Pn phases of seismic waves. The program produced families of acceptable solutions. The optimum focal mechanisms were determined as an average solution for each event. As a result, 12 of the 18 analyzed microearthquakes have a similar strike-slip focal mechanism with a weak normal component. The P-axes of the focal mechanisms are in the azimuth of 20-50° NE, the T-axes of the focal mechanisms are in the azimuth of 140-170° SE. This indicates that tectonic stress in the region probably displays an inverse pattern compared with the regional middle-European tectonic stress (Mueller, 1992).