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Seismicity patterns characteristic in the crustal domain of the SE Carpathians arc bend: the case of Ramnicu Sarat (Romania) earthquake sequences

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The Vrancea crustal seismogenic zone lies in front of the SE Carpathians arc bend, in a narrow band delimited to the north and south by two major crustal faults (Peceneaga-Camena and Intramoesian faults). It is adjacent to the Vrancea subcrustal region where significant intermediate-depth seismicity is observed. The eastern part, so-called Ramnicu Sarat zone (RS) is characterized by frequent earthquake sequences, while the northern part (called Vrancioaia zone – VRI) is characterized mostly by seismic swarms. The stress field as emphasized by the fault plane solutions of the main shocks of the sequences occurred in 1983, 1986, 1991, 1997, 2004 and 2007 in RS region is complex and characterizes a transition zone from a compressive regime in the Vrancea subcrustal region to an extensional regime in the whole Moesian Platform. The most distinctive property of RS sequences is the nearly parallel orientation of the rupture direction in the source, as noticed for all studied sequences. The rupture tends to expand in a NE-SW direction, parallel to the Carpathians Arc bend in Vrancea, probably reflecting a strong anisotropy in the crust. The last sequence recorded in this area in November 29, 2007 consisted of 41 events with magnitude between 1.8 and 3.9 located in the 4-43 km depth interval. The source parameters and fault plane solution reflect the common seismicity parameters as determined for the previous sequence data. They are interpreted in terms of the tectonic and geodynamical modeling in the study area.