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Geological settings and crustal models for the seismological stations within the eastern part of Romania

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Romania is a country with a high seismicity concentrated within a small area of the SE Carpathian Arc Bend where 2-3 intermediate depth events/century with Mw>7 occur. A moderate crustal seismicity with events Mw<6 is as well observed within more provinces of the country. To monitor the seismic activity across the whole territory a network with 27 seismological stations and 51 digital accelerometers is in operation. Because of the large heterogeneity of the Romanian lithosphere as a result of the complex tectonics with rapid transition from platform to orogen structures, the path of seismic waves from source to surface is strongly distorted and important deviations in the respect with the plan-parallel homogeneous model for event localization are observed. For an accurate localization of events a good knowledge of the crustal parameters which characterise each site of seismological stations is necessary. The main goal of this study is to investigate the geological setting and to build 1D crustal models for about 30 sites from the eastern part of the country where the most of seismic stations are placed. Geological setting includes the basic structure and lithology of sedimentary cover for each site. Based on crustal refraction and reflection seismic data 1D models of the crustal structure were built. A crustal model comprises a multilayered structure with 1-3 sedimentary layers (usually Neogene and Pre-Neogene piles), the upper and lower crustal layers and the top of the upper mantle. For each layer of model a Vp value (usually), Vs and density values (where they were available) and a thickness are assigned. Such kind of crustal models could account for the plus/minus systematic deviations of travel times from the basic localization model. The eastern part of Romania comprises both platform and orogen units. In the north-eastern part there is the East European Platform that is bordered to the south and west by the Scythian Platform. In the west part, the Eastern Carpathian Orogen with its nappes and foredeep override

the Scythian and Moesian platforms. To the south-east the North Dobrogea Orogen and the Moesian Platform are present. Over the whole region the sedimentary layer thickness is variable from 0 m within some areas of the North Dobrogea Orogen to about 18 km within the Focsani depression. Vp increases from about 2 km/s at the surface of sedimentary cover to about 5.5 km/s at its base. Within the cristaline crust Vp starts from about 5.8 km/s at the top of basement and reaches 7.0-7.1 km/s at the base of crust (Moho) while at the top of upper mantle Vp˜7.8-8.1 km/s. Locally some shear wave crustal models derived from refraction seismics or receiver functions are available. Some crustal density values are available as well from the gravity modeling along of some seismic lines.