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Crustal models in Romania based on seismic data

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More tectonic units cover the Romanian territory from platform to orogen and depression structures. This structural variability is reflected both in thickness and physical properties of the crust. Seismic investigations mainly refraction and reflection surveys started in the 1970s have provided several crustal regional and local models. Seismic investigations from the last decade have been focused mainly on the Vrancea seismogenic region and its adjacent areas. They have brought significant details on the complex structure of region. We present a suite of crustal models within the main tectonic units: Moesian Platform (MP), Romanian sectors of the East European (EEP) and Scythian platforms (SP), Eastern (EC) and Southern Carpathian (SC) orogen and its foredeep, Apuseni Mountains (AM) and Transylvania (TD) and Pannonian (PD) depressions. The crustal models comprise two layers: sedimentary cover and crystalline crust. For each of the two basic layers the thickness and the P-wave seismic velocity (Vp) at the top and bottom of layer are displayed. The models are mainly derived from seismic refraction and reflection lines, seismic velocities measured in deep wells and receiver function analyses. MP covers the southern part of country from the river Danube (DR) to the Carpathians. Crustal thickness of MP is variable from 30 km in south near DR to 46 km in the Focsani Depression (FD) sector that is located on a MP basement. Sedimentary cover has a wide thickness palette: from less than 1 km in Dobrogea to about 18 km under FD, while the Vp increases from 1.8-2.0 km/s at surface to 5.8-5.9 km/s at base of the Paleozoic pile in the same depression. In the crystalline crust Vp increases from 5.9-6.2 km/s at the top of basement to 6.9-7.1 km/s at Moho. EEP located in the NE part of Romania has been less seismically investigated. Some seismic studies point a crust of about 40 km and a sedimentary cover from less than 1 km in NE to 3-4 km thickness under the EC foredeep and at contact with SP. Vp in sediments increases from around 2 km/s at surface to 4 km/s at

its base. Crustal thickness of the SP reaches up to 45 km under the North Dobrogea Orogen (NDO) and the foredeep of EC. Sediments are lack on some areas of NDO or can reach up to 10 km thickness in the EC foredeep. Vp in sediments starts from 1.8-2.0 km/s and increases up to 5.5-5.8 km/s. Vp in crust is from 5.9-6.0 km/s at the top of basement to 7.1 km/s at Moho. TD has a relatively thinner crust in comparison with the platforms: 30 to 37 km and a sedimentary cover with less than 1 km thickness in the northern sector and up to 8 km in the Tarnava Depression. Vp increases from 1.8-2.0 km/s to 5.2-5.4 km/s in sediments and from 6.0 to 7.0 km/s in the crystalline crust. In PD a thin crust is observed with thicknesses from 25 to 30 km. Sediments reach a few hundred meters thickness on the blocks with uplifted basement and 4-5 km in the deep grabens. The range of Vp is close to the TD, both for sediments and crust. Carpathians are mainly some structures of sediment and basement nappes over an autochthonous basement. The EC and SC have a crust of over 40 km but under 50 km thickness. Nappe thickness could reach up to 8-10 km. Seismic lines Vrancea 99 and Vrancea 2001 point 4-6 km thickness and Vp from 3.3 to 5.1 km/s for the Carpathian nappes crossed by them. In the crystalline crust Vp is from 5.9-6.0 km/s on the top of basement to 7.0 km/s at Moho. AM has a thinner crust in respect with EC and SC, that is under 40 km thickness.