New insights into the lithosphere beneath the Romanian seismic network from Rayleigh wave dispersion and receiver function analysis

Tataru D., Grecu B. and Raileanu V.

National Institute for Earth Physics, P.O. Box MG-2,Bucuresti-Magurele, Romania, dragos@infp.ro

We present new models of shear wave velocity structure of the crust and upper mantle beneath Romanian broad band stations. The data set consist in more than 300 teleseismic earthquake with epicentral distance between 30° and 95°, magnitude greater than 6 and a signal-to-noise ratio greater than 3 for the P-wave pulse. Most epicenters are situated along the northern Pacific Rim and arrive with backazimuths (BAZs) between 0° and 135° at the Romanian seismic network. We combine the receiver functions with fundamental-mode of the Rayleigh wave group velocities to further constrain the shear-wave velocity structure. To extract the group velocities we applied the Multiple Filter Technique analysis to the vertical components of the earthquakes recordings. This technique allowed us to identify the Rayleigh wave fundamental mode and to compute the dispersion curves of the group velocities at periods between 10 and 150 s allowing us to resolve shear wave velocities to a depth of 100 km. The time-domain iterative deconvolution procedure of Ligorrıa and Ammon was employed to deconvolve the vertical component of the teleseismic P waveforms from the corresponding horizontal components and obtain radial and transverse receiver functions at each broadband station. The data are inverted using a joint, linearized inversion scheme which accounts for the relative influence of each set of observations, and allows a trade-off between fitting the observations, constructing a smooth model, and matching a priori constraints. All models fit well their individual data sets. This highlights the point that the inversions are not unique. The upper mantle velocities for the receiver function inversion are too large, while the surface-wave inversion lacks any detail about the Moho. These particularities are corrected in the joint model proving the reliability of the results. The results show a thin crust for stations located inside the Pannonian basin (28-30 km) and a thicker crust for those in the East European Platform (36-40 km). The stations within the Southern and Central Carpathian Orogen are characterized by crustal depths of ~35 km. For stations located in the Northern part of the Eastern Carpathians we found a crustal depth of 32 km. For stations located in the Apuseni Mountains the Moho discontinuity is replace by a transition zone extended between 36 and 40 km depth. For a station located in the Carpathians bent area we identify a double Moho (32 respectively 44 km depth) possible due to the Vrancea subduction process. For the crust of Moesian Platform we get higher values (~35 km) compare to those obtained from seismic refraction profile (VRANCEA’2001). The North Dobrogea crust reaches a thickness of about 44-46 km. For most of the stations the crust-mantle transition zone has a significant gradient, with velocity values varying from 3.8 to 4.7 km/s. Our results are compatible with those obtained from previous studies.

An olistolith with continuous latest Bajocian to late Cenomanian pelagic deposition within the Bornova Flysch Zone in western Turkey: Radiolarian Assemblages

Tekin U.K.[1], Göncüoğlu M.C.[2] and Uzuncimen S.[1]

[1]*Hacettepe University, Geological Engineering Department, 06800, Beytepe-Ankara, Turkey, uktekin@hacettepe.edu.tr*
[2]*Middle East Technical University, Geological Engineering Department, 06531, Ankara, Turkey, mcgoncu@metu.edu.tr*

Bornova Flysch Zone (BFZ) comprises several olistoliths or tectonic slivers, representing the lithosphere of the Izmir-Ankara Ocean and accretionary melange complexes formed during its closure. Radiolarian assemblages in one of the olistoliths in BFZ, to the NE

Manisa city, between Akhisar and Sindirgi towns, is studied along Sogutlu stratigraphic section in detail. Sogutlu section is 73,5 m thick and composed of green to red, mainly thin to medium-bedded chert and mudstone alternation. Ten samples out of eighteen yielded relatively diverse radiolarian assemblages.

Basalmost part of the section contains characteristic latest Bajocian – early Callovian radiolarian taxa (*Acanthocircus suboblangus suboblangus* (Yao), *Higumastra* sp., *Tritrabs ewingi* s. l. (Pessagno), *Acaeniotyle diaphorogona* s. l. Foreman, *Hsuum* sp., *Crubus* sp., *Ristola altissima major* Baumgartner & De Wever, *Mirifusus fragilis* s. l. Baumgartner, *Spongocapsula* sp., *Parvicingula* sp., *Podobursa helvetica* (Rüst), *Podobursa* sp., *Sethocapsa* sp. A sensu Baumgartner, *Stichocapsa* spp. and *Eucyrtidiellum unumaense* s. l. (Yao)). Succesively, radiolarian assemblages indicating Late Jurassic, early Early Cretaceous and late Early Cretacous and early Late Cretacous time intervals have been obtained from the section. Youngest radiolarian assemblage yielded from the section includes diverse radiolarian taxa (*Dactyliosphaera silviae* Squinabol, *Pseudoaulophacus* sp., *Godia* sp., *Rhopalosyringium* sp., *Dictyomitra* spp., *Dictyomitra crassispina* (Squinabol), *Pseudodictyomitra pentacolensis* Pessagno, *Pseudodictyomitra pseudomacrocephala* (Squinabol), *Xitus* spp., *Novixitus mclaughlini* Pessagno and *Stichomitra communis* Squinabol) and these taxa clearly reveals the late Cenomanian age.

Previous studies reveal that the Izmir-Ankara oceanic basin was initially opened during late Ladinian – early Carnian. The new radiolarian data obtained from this olistolith reveals that relatively condensed, continuous pelagic sedimentation took place in this basin during the latest Bajocian to late Cenomanian time span.

Secular variation of the Earth's magnetic field in the Balkan region during the last 5 millennia

Tema E.[1] and Kondopoulou D.[2]

[1]*Dipartimento di Scienze della Terra, Università degli Studi di Torino, via Valperga 35, 10125, Torino, Italy, evdokia.tema@unito.it*

[2]*Department of Geophysics, School of Geology, Aristotle University of Thessaloniki, 54124, Thessaloniki, Greece, despi@geo.auth.gr*

Archaeomagnetic data available for a certain region have been traditionally used to construct reference secular variation curves for single countries. Nevertheless, even though the Earth's magnetic field varies from a geographic region to another, there is no reason to limit its study into national borders. We present here the first archaeomagnetic secular variation curve for the South Balkan region, based on all data that are included in a 700 km circle centered at Thessaloniki. This dataset consists of 226 directional and 416 intensity data, mainly originating from Greece, Bulgaria and former Yugoslavia. Some data from Southern Italy that fall within this circle are also included. The data cover almost continuously the last 5 millennia with a small gap around 2000 BC. The directional data are well consistent to each other while the intensity data show considerable dispersion. All data have been reduced at the latitude of Thessaloniki (40.60^o N, 23.00^o E) and plotted versus time. The moving window technique with windows of 100 years shifted by 50 years has been used to calculate a continuous secular variation curve for both direction and intensity. The obtained curves clearly show some characteristic features of the geomagnetic field variation during the last 5 millennia. Low inclination values are well documented around 1200 AD, 300-400 AD and 1800 BC, even though only few data are available for the latter period. Eastward declination is observed around 1200 AD and 800 BC while for the period between 200 BC and 500 AD only small variations in declination are noticed. The intensity curve is highly influenced by the important dispersion of the reference data points. Comparison with the predictions of the SCHA.DIF.3K regional and the CALS7K and ARCH3K global geomagnetic field models shows good agreement with the regional modelling curve while the global models show much smoother variations. The bulk number of reference data used to calculate the proposed Balkan curves makes them better constrained and thus more reliable compared to the curves constructed using limited data of individual countries.