WORKSHOP-ul
NEMO - NumErical MOdelling using high performance computing infrastructures

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1) PRESENTATION TITLE:

GRAVITY INSIGHTS ON THE DEEP STRUCTURE OF THE VRANCEA INTERMEDIATE-DEPTH SEISMIC ZONE

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3) ABSTRACT:

Located in the bending zone of East Carpathians, the so-called Vrancea active seismic zone represents one of the most studied geodynamic regions in Europe and not only.
But despite the impressive amount of various Earth sciences research conducted in the area (seismology, regional reflection/refraction seismics, seismic tomography, geodesy and so on), so far a systematic gravity approach has been insufficiently developed, mainly due to the lack of data (both gravity and rock physics).
The paper is mainly aimed at the modelling of the deep structure of the Vrancea intermediate-depth seismic zone, as based on the interpretation of gravity data under constraints provided by other methods (e.g. seismic tomography, reflection/refraction lines, magneto-telluric soundings).
The idea was to synthesize the gravity effect of various geological structures (based on various tectonic and geodynamic scenarios as known from the literature) and to compare them with the gravity anomaly observed in the Vrancea region.
In order to set up the main mass contrasts in the models, it has been essential to built up a highly detailed model of the densities of the main geological formations for the area of East Carpathians with a focus on their bending zone. More than 50.000 core samples have been analyzed and clustered according to their litho-stratigraphy. In-depth evolution of the rock physics was also taken into account.
Then various tectonic scenarios were used to set up the various potential geometry of the main geological formations in the area. Starting from these elements, several models for synthesizing gravity effect were developed and compared with the observations.
The trial & error modelling process was conducted from top to bottom and from simpler to more complex structures in the attempt to go as close as possible to observed gravity.
Synthesizing gravity effect of the 3D geological structures is a largely time-consuming process needing high performance computing facilities. The GM-SYS 3D software package was used to obtained the best fit between the observations and simulated effects.

The models obtained have been constrained mainly by deep well data for their upper part and seismic tomography for the deeper segment.

4) POSITION OF CORRESPONDING AUTHOR:

Student	~~**yes**~~	no
Post-Doctoral	~~yes~~	**no**
Researcher	yes	~~**no**~~