Contribution of gravity data interpretation to the seismotectonic model compilation – an example from Bulgarian EC8 implementation

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Capability of gravity anomalous field data for revealing of deep structures in the earth's crust is well known and often applied to delineate various geological structures such as faults, flexures, thrusts, borders of dislocated blocks and vast intrusions, horsts and grabens, and others, which create significant rock density contrast in horizontal planes. Calculation of Directional derivatives of the Bouguer gravity anomalous field of Bulgaria was used to constrain the geological information for compilation of seismotectonic model which has been implemented in the recently released seismic zoning of the country according to EC8 standards.

For the present research a grid of 1.5x1.5 km from the Bouguer gravity database was prepared. The density of this grid is less than the density of observation points but sufficient for the regional scale of investigation and helps the filtration of existing noise. Using these data and the Fourier techniques, the total horizontal gradient and vertical gravity gradient have been calculated and analyzed.

The gravity anomalies of transition type are well distinguished after a data transformation to the magnitude (modulus) of the Total Horizontal Gradient (THG). The horizontal derivatives along two orthogonal axes have been calculated and geometrically summed. When applied to two dimensional surveys, the THG tends to place narrow ridges over abrupt changes in density and locating maxima can be done by simple inspection or automated procedure.

The calculated Vertical Gravity Gradient (VGG) reflects in other pattern the mentioned above transition anomalies. The vertical derivative of gravity field is similar in its space distribution to the vertical component Z of magnetic anomalies caused by the same structures in case of their vertical magnetization, according to Poisson's theorem. Thus, the vertical gradient of a transition anomaly is a dipolar anomaly with its negative part to the horizontal direction of density decreasing of a vertical or inclined dislocation.

Delineated gravity anomalies wit their amplitude, width, length and coordinates have been compared with the spatial distribution of seismicity, epicentre density function and map of the active faults of the Bulgarian territory. In most of the cases, outlined gravity transitions are characterised with increased seismicity and accompanied by faults drawn according to geological evidences.

Natural aggregate resources in Serbia – an overview

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Aggregate rock industry in Serbia had a turbulent history in the past 20 years, as it had to survive severe political and economical changes in the country and the whole SEE area. The economic crisis resulted in dramatic decrease of aggregate rock production during the beginning of the last decade of the 20 century, to the level of approximately 20-30 % compared to the year of 1990 (all data are from the USGS Minerals Yearbooks, based on Serbian Statistical Reports). Production level remained low but relatively stable until 2004. Since 2005, production of aggregate rocks is steadily increasing, with sand and gravel, and