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3D gravity modeling of sedimentary basins with variable density contrast

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The decrease of density contrast in sedimentary basins may be approximated by a simple mathematical function for example quadratic density function which was used here. A sedimentary basin may be viewed as a number of prisms placed in juxtaposition. Equations in closed form for the gravity anomalies of 3D prismatic models are derived. Juxtaposed 3-D rectangular/square blocks with their geometrical epicenters on top coincide with grid nodes of a mesh to approximate a sedimentary basin. Efficient methods and a MATLAB program have been developed for anomaly calculation by solving the equations. The depths to the basement are adjusted iteratively by comparing the calculated anomalies with the observed anomalies. First, validity of this modeling was examined on the synthetic model. Then, interpretation of Pannonian basin, Eastern Austria, with a quadratic function is presented which has already been interpreted with exponential density function.