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# A 3D modelling tool to support interdisciplinary interpretation of GravMag fields and Gradiometry

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It is well known that 3D gravity and magnetic modelling appreciably improves the results of most of the depth imaging projects. Typical areas where gravity and magnetic modelling has been successfully used are sub-salt and sub-basalt. Modern geophysical interpretation requires an interdisciplinary approach and software capable of handling multiple inhomogeneous data like seismic, FTG gravity, magnetic and magnetotelluric. We introduce the IGMAS+ ("Interactive Geophysical Modelling Application System") geo-modelling software for realistic 3D FTG and magnetic modelling. The software is also capable for grid computing and allows extreme fast distributed calculations on normal hardware such as a network of PCs even of very large 3D underground models.

The analytical solution of the volume integral for the gravity and magnetic effect of a homogeneous body is based on the reduction of the volume integral to an integral over the bounding polyhedrons). An approach is described to integrate constraining data into the interactive modeling process by means of modern visualization and combination of independent data. We demonstrate stress calculation and modeling of variable density/susceptibility structures. This visual combination of 2- and 3-D models (e.g. from seismic reflection or refraction surveys) enables a quantitative comparison and adjustment by the interpreter, and results in a model comprising as much independently derived information as possible. As an example we show results from the Central Andes. Both gravity and geoid of the Southern Central Andes and their eastern foreland between 20 deg. to 30 deg. S was investigated with regard to the isostatic state, the crustal density structure of the orogeny and the rigidity of the Andean Lithosphere. Estimates of stress and GPE (gravitational potential energy) at the western South American margin have been derived from an existing 3D density model. Here, sensitivity studies of gravity and gravity gradients indicate that short wavelength lithospheric structures are more pronounced in the gravity gradient tensor than in the gravity field.