Geophysical Research Abstracts, Vol. 8, 08143, 2006
SRef-ID: 1607-7962/gra/EGU06-A-08143

3D- Gravity Modelling: Intrusion vs. Inversion at Southern Rim of Northwest German Basin

Filiz Bilgili, Hans-Jürgen Götze, Sabine Schmidt and Andrea Lippmann

Inst. for Geosciences, Geophysics, University zu Kiel, Otto-Hahn-Platz 1, 24118
(bilgili@geophysik.uni-kiel.de / Fax: +49(0)4318803906 / Phone: +49(0)4318804432)

In this study, we tested the existing "intrusion model" against the new "inversion model" of the Northwest German Basin. Key area for testing the models are located on the southwestern (Bramsche Anomaly). The high Bouguer gravity and positive magnetic field anomalies are interpreted as a mafic intrusion (pluton) at depths of 6-10. The high thermal maturity, the CO_2risk and the lack of usual reservoir properties are regarded as the consequences of an intrusion. This earlier interpretation has been subsequently discussed on the basis of more recent findings: it was demonstrated that the level of maturity within the boreholes is better explained by an increased amount of burial with subsequent tectonic inversion rather than by an intrusion. If, as suspected, this intrusion never existed in this form, the regional structural and thermal development of the southern rim of the northwest German Basin would need to be judged differently. We modelled the density structure of the Bouguer anomaly to a depth of 15 km using 3D forward modelling. We used the interactive modelling tool IGMAS, which includes a wide range of 3D GIS functions and can integrate other geophysical models, information and data from both geophysics and geology. To achieve our goal, we have remodelled the existing structural models using the data set from the "Geotectonic Atlas" and density values from boreholes. Using the information about the geological layering and density values, the intrusion model fits better than the inversion, so we updated and adjusted the inversion model with the modern information and data. The final 3D density structure shows a very good fit between measured and modelled anomalies. This study demonstrates the use of the atlas data set for evaluating models of basin rim evolution and for 3D modelling of geological processes and structures.