Geophysical Research Abstracts
Vol. 15, EGU2013-8393, 2013
EGU General Assembly 2013

First Results of the aerogravity measurements during the geoscientific flight mission GEOHALO over Italy and the adjacent Mediterranean

Ingo Heyde (1), Franz Barthelmes (2), and Mirko Scheinert (3)

(1) BGR Federal Institute for Geosciences and Natural Resources, B1.4: Marine Resource Exploration, Hannover, Germany (ingo.heyde@bgr.de), (2) GFZ Potsdam, Section 1.2: Global Geomonitoring and Gravity Field, (3) TU Dresden, Institute for Planetary Geodesy

In June 2012 the first scientific flight mission was realized with the new German research aircraft HALO (High Altitude and Long Range Research Aircraft). For this geoscientific flight mission GEOHALO was equipped with geophysical-geodetic instrumentation to acquire data over the tectonically active region of Italy and the adjacent Medtiterranean. The Federal Institute for Geosciences and Resources (BGR) as a member of the "HALO geoscience group" operated the recently modernized KSS32-M aerogravity system. The instrumentation of the group partners consists of an additional gravimeter, vector and scalar magnetometers, a laser altimeter and GNSS equipment with zenith, sideward and nadir antennas.

During four flights with duration of up to 10 hours, data along a total track length of 16150 kilometers were obtained. The mission flights started and ended at the special airfield Oberpfaffenhofen, near the compound of the German Aerospace Center (DLR). Eight parallel profiles running from north-west to south-east were flown in an altitude of about 3500 m. The length of each profile was about 1000 km with a line spacing of 40 km. The flight velocity on the survey lines amounted to approximately 450 km/h. Four crossing lines of about 300 km length and a profile at an altitude of about 10500 m along the same track as a line in the lower altitude completed the survey. The first results of the BGR aerogravity will be presented.

To determine the free-air gravity anomalies from the measured gravimeter data a number of corrections have to be applied. For their calculation mainly high-precision position and velocity data are mandatory. The kinematic GPS data were combined with INS data. In addition to own GPS base station data from Oberpfaffenhofen, data of Italian GNSS stations were considered to improve the determination of the flight trajectory by differential GPS. The corrected gravity data are compared with the corresponding data from global gravity models. The free-air gravity anomaly will be used finally to investigate the lithospheric structure of the surveyed area.

The experiences of the GEOHALO mission as a whole are of great importance for future geoscientific flight campaigns with HALO as planned for example in Antarctica.