3.1.2. GEOPHYSICAL DATA ACQUISITION

Location of the surveyed areas

During the third stage of the project activitie for new geophysical data acquisition focussed on the two main directions: (i) geomagnetic data, and (ii) gravity data.

Fig. 1 shows location of the main areas where field observations on the gravity and geomagnetic fields have been conducted.

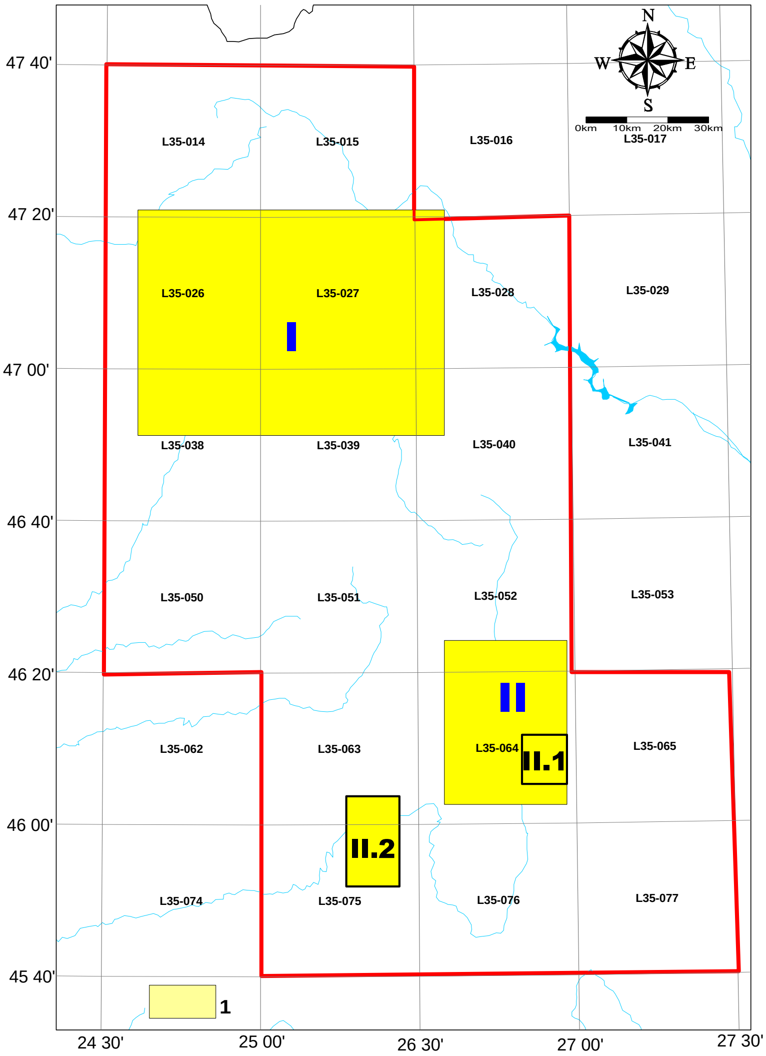

Fig. 1 Location of the areas where new gravity and geomagnetic surveys were conducted
1, searched area; I Călimani region; II, Harghita zone; II.1, Ciomadu volcano; II.2, Persani perimeter

Instruments and methodology

As previously mentioned, two geophysical methods targetting the potential fields of the Earth have been applied:

- ground magnetics
- gravimetry

The instruments and methodology has been the same as employed in the previous stage of the project.

A proton magnetometer Geometrics G856 AX (0.5 nT sensitivity) has been used for current field observations while a Scintrex SM 5 NAVMAG optical pump instrument (0.003 nT sensitivity) has been used for diurnal activity record.

Fig. 2 Total intensity scalar of the geomagnetic field observation within the Persani perimeter

Data points positioning was achieved by the help of a hand GARMIN 76S GPS receiver (± 2.5 m accuracy).

Gravity data were acquired by using the up to date Scintrex CG-5 gravity meter (1 µgal sesitivity).

Both magnetic and gravity works were conducted within an irregular network, mainly following the access ways (see Fig. 3 for an example).

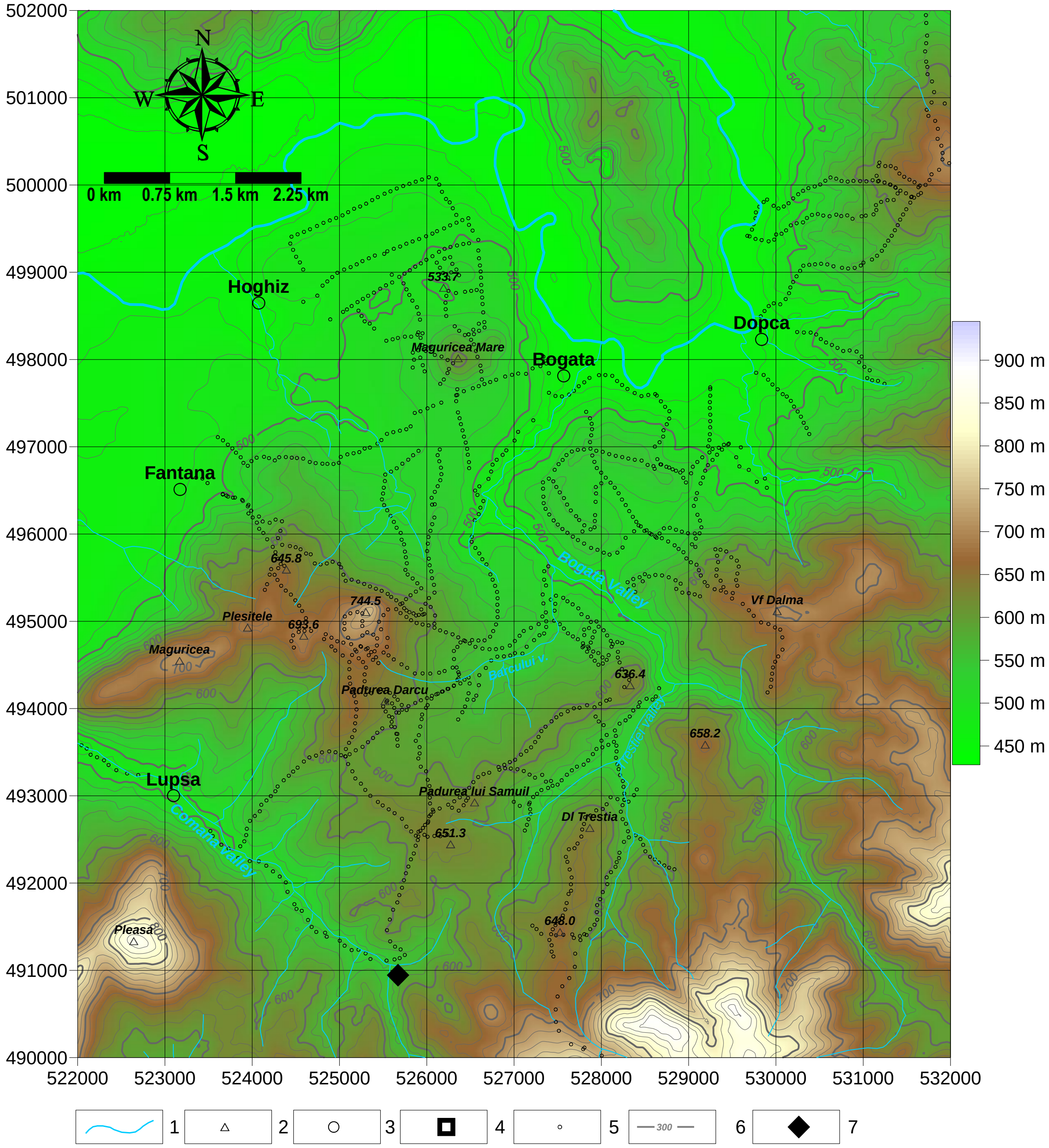

Fig. 3 Topography model and the network of geomagnetic observations within Persani area

Witin areas of rough topography (Călimani and Harghita Mountains), two main approaches were employed: (i) a regional survey for covering the studied region as a whole, in order to outlin the overal pattern of the gravity/geomagnetic field, and (ii) a more detailed investigation in the smaller areas of interest as revealed by reconnaisance.

Călimani area

Fig. 4 shows the topography of the north part of the region explored within the third stage: Călimani Mountains,

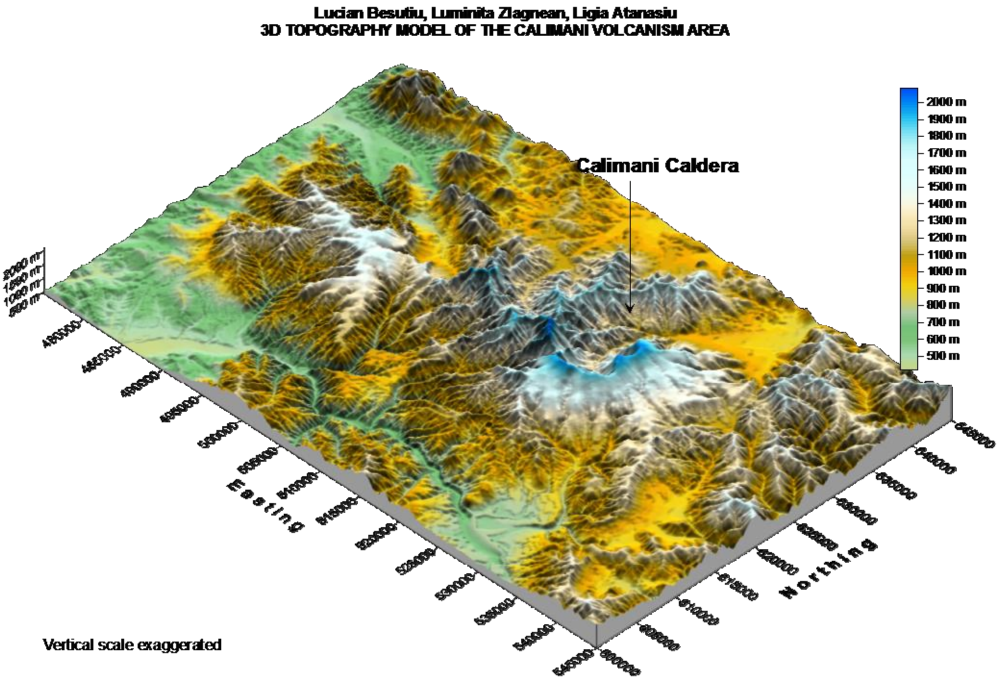

Fig. 4 3D topography model of the Călimani perimeter

The overall aspect of the geomagnetic field in the area is shown in Fig. 5.

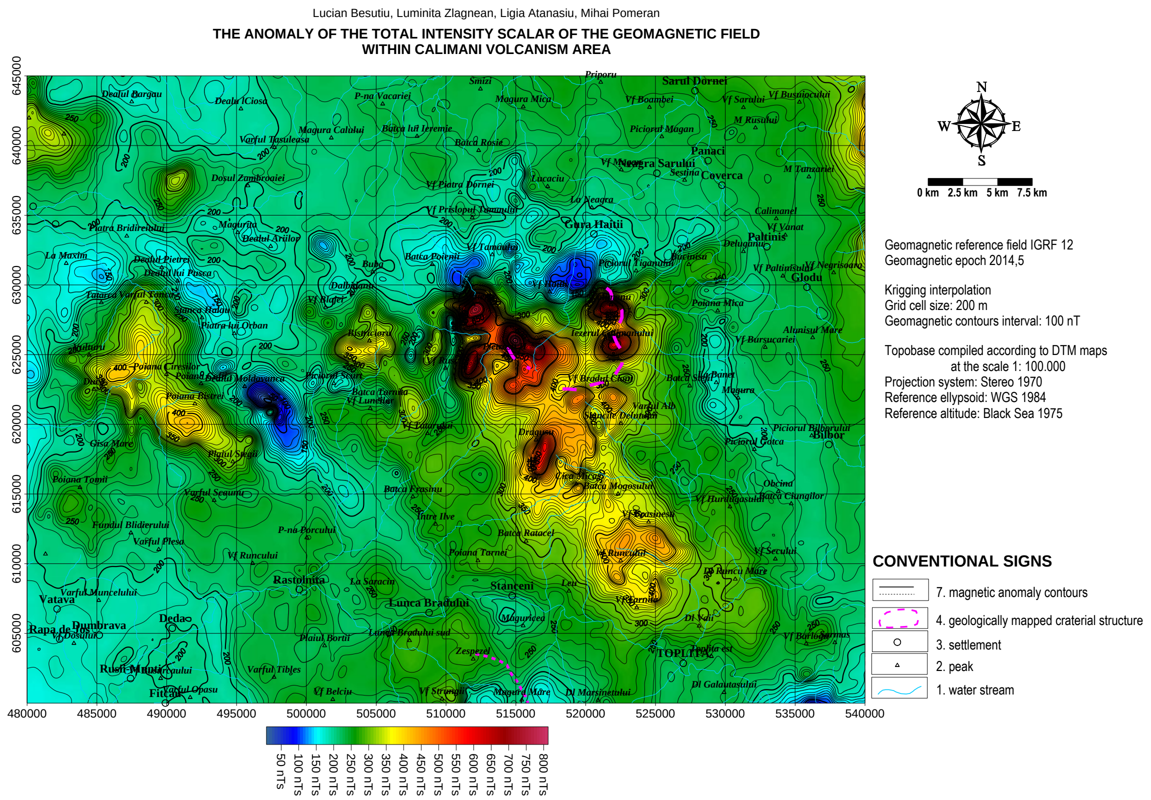

Fig. 5 The total intensity scalar geomagnetic anomaly within Călimani area on a plan located at 2500 m above the sea level

Similarly, a synoptic image of the Bouguer anomaly in the Călimani area has been constructed and is presented in Fig. 6.

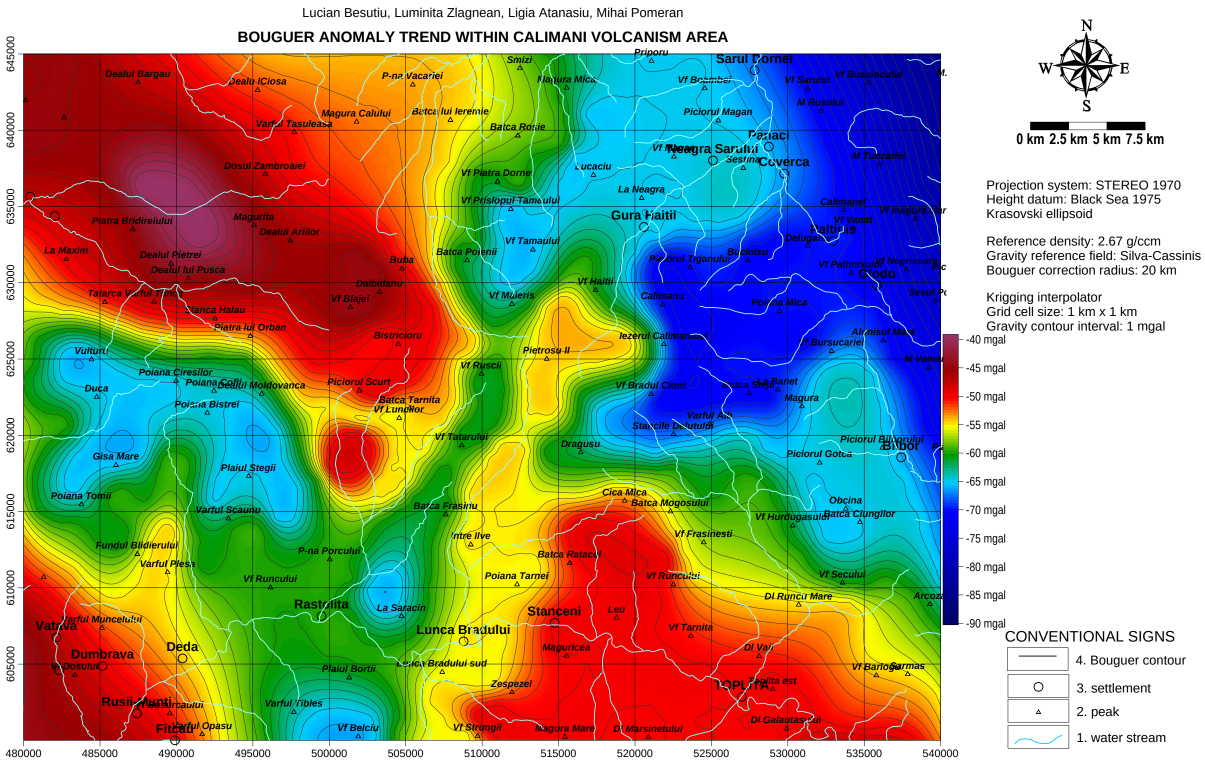

Fig. 6 Synoptic view of the Bouguer anomaly within Călimani area

The most important volcanic structure in the area is the Călimani caldera (for location see Fig. 4). A topography model is shown in Fig. 7. The image is presented from two perspectives.

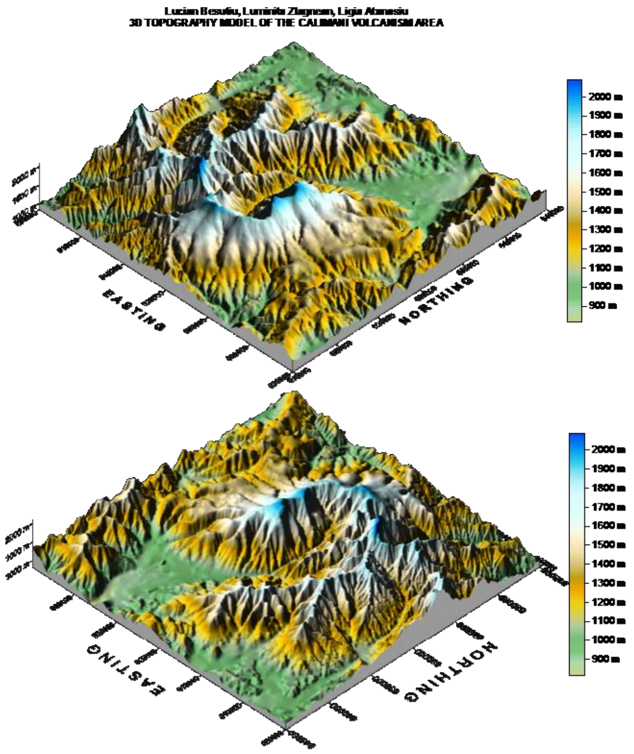

Fig. 7 North-Westward and South-Eastward 3D views on the Călimani caldera topograpy

Some more detailed gravity and geomagnetic surveys have revealed the pattern of the Bouguer and geomagnetic anomaly in the area (Fig. 8 - 9).

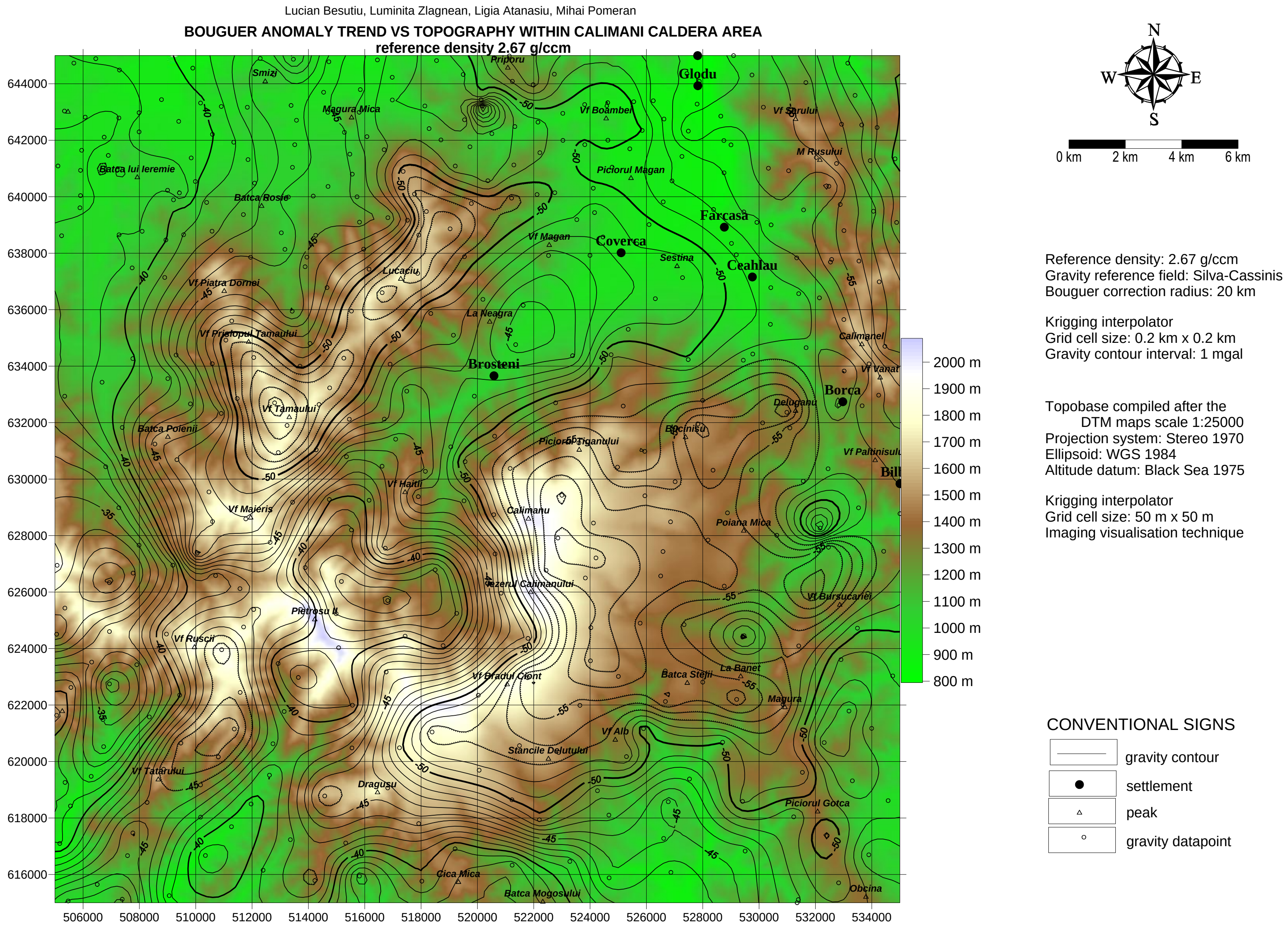

Fig. 8 Bouguer anomaly versus the topography model for Călimani caldera

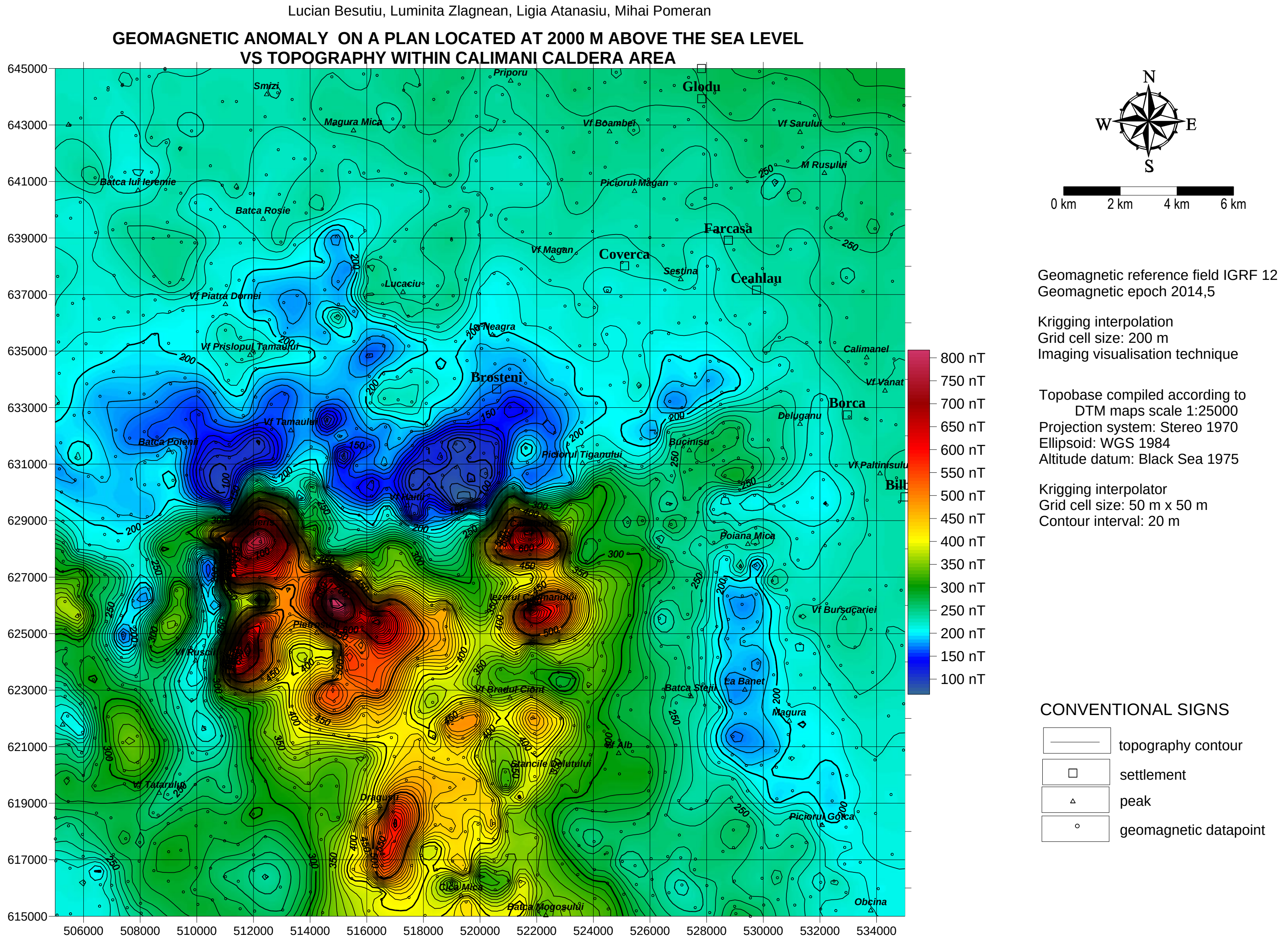

Fig. 9 Total intensity scalar geomagnetic anomaly on a plan located at 2500 m above the sea level for Călimani caldera

Harghita area

The next studied area was the Harghita Mountains. As in the case of the Călimani Mountains, the two above-mentioned survey approaches (regional and more detailed) have been applied. The gravity and geomagnetic investigations focussed on the main volcanic structures as known in the area: Luci-Lazu, Cucu and Pilişca.

The topography of the area is shown on the Fig. 10 along with location of the main volcanic structures.

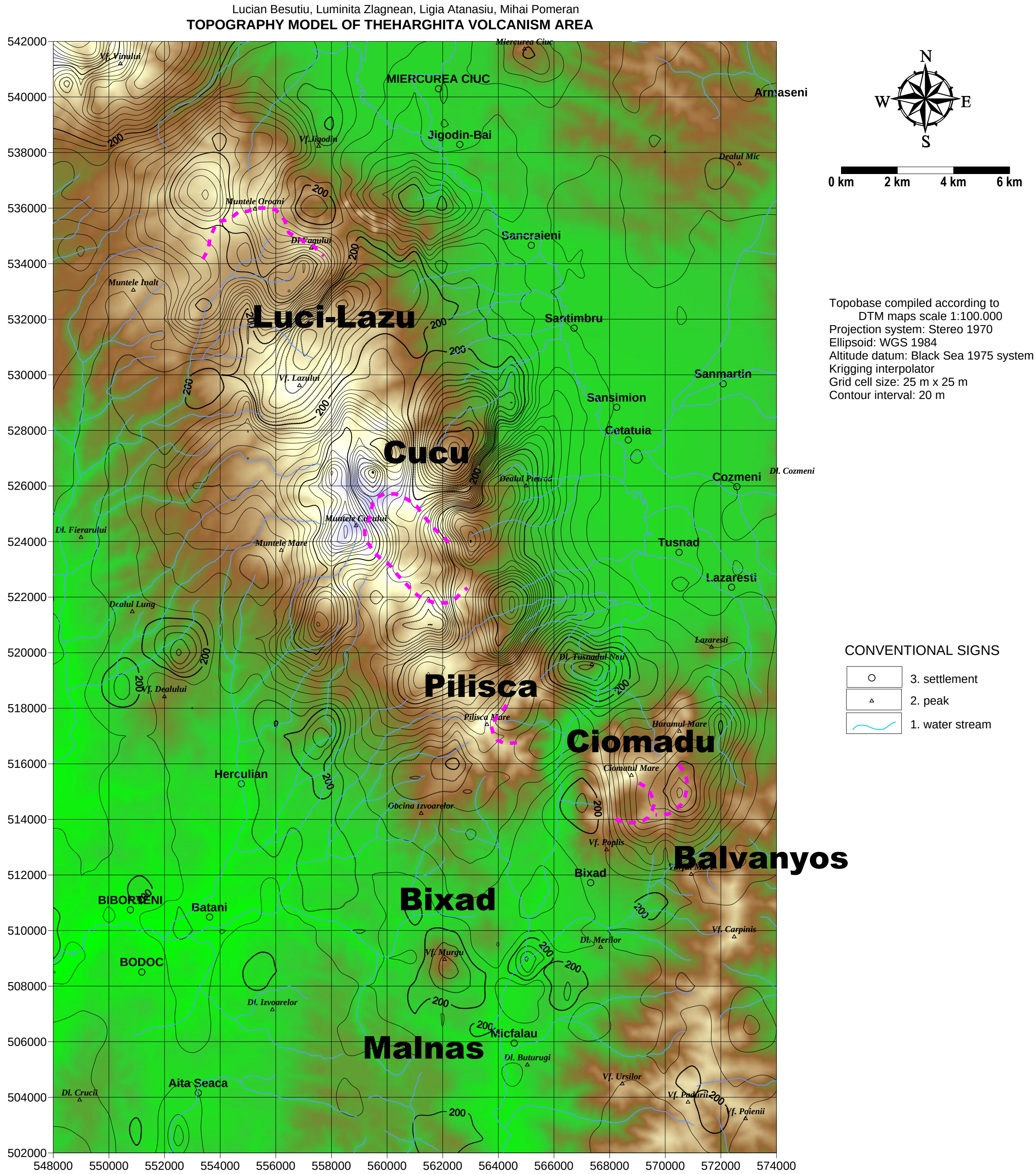

Fig. 10 Topography model of the Harghita volcanism area

Fig. 11 presents a synoptic image on the pattern of the geomagnetic anomaly over the whole area of Harghita Mountains and surrounding region.

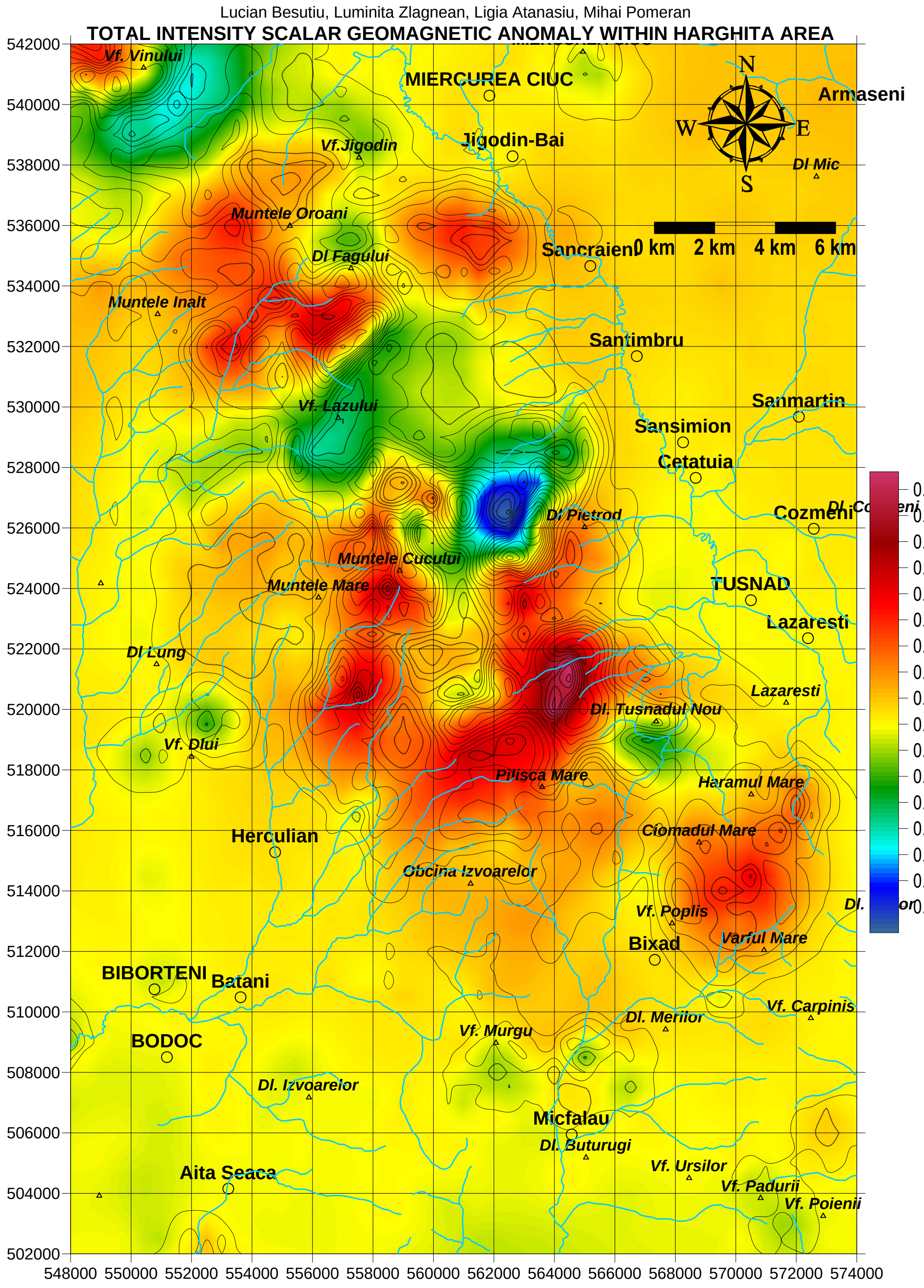

Fig. 10 Synoptic view of the geomagnetic anomaly within Harghita volcanism area

The Bouguer anomaly trend within the Harghita volcanism area is presented in the Fig. 11.

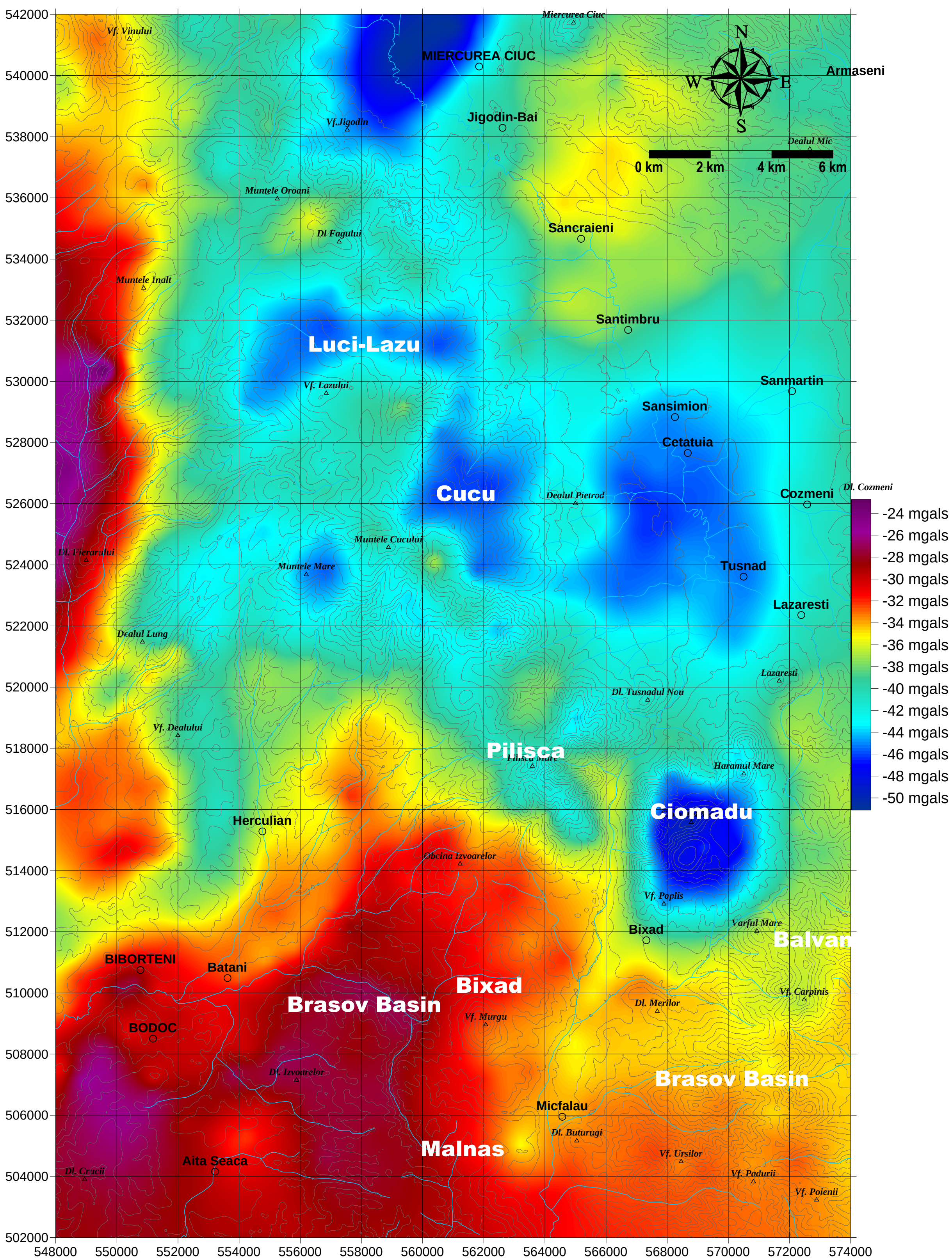

Fig. 11 Bouguer anomaly trend within Harghita volcanism area versus topography
Reference density: 2.67 g/ccm

Some more detailed images on the gravity and geomagnetic field within the area of Cucu volcano are shown in figures 12 and 13.

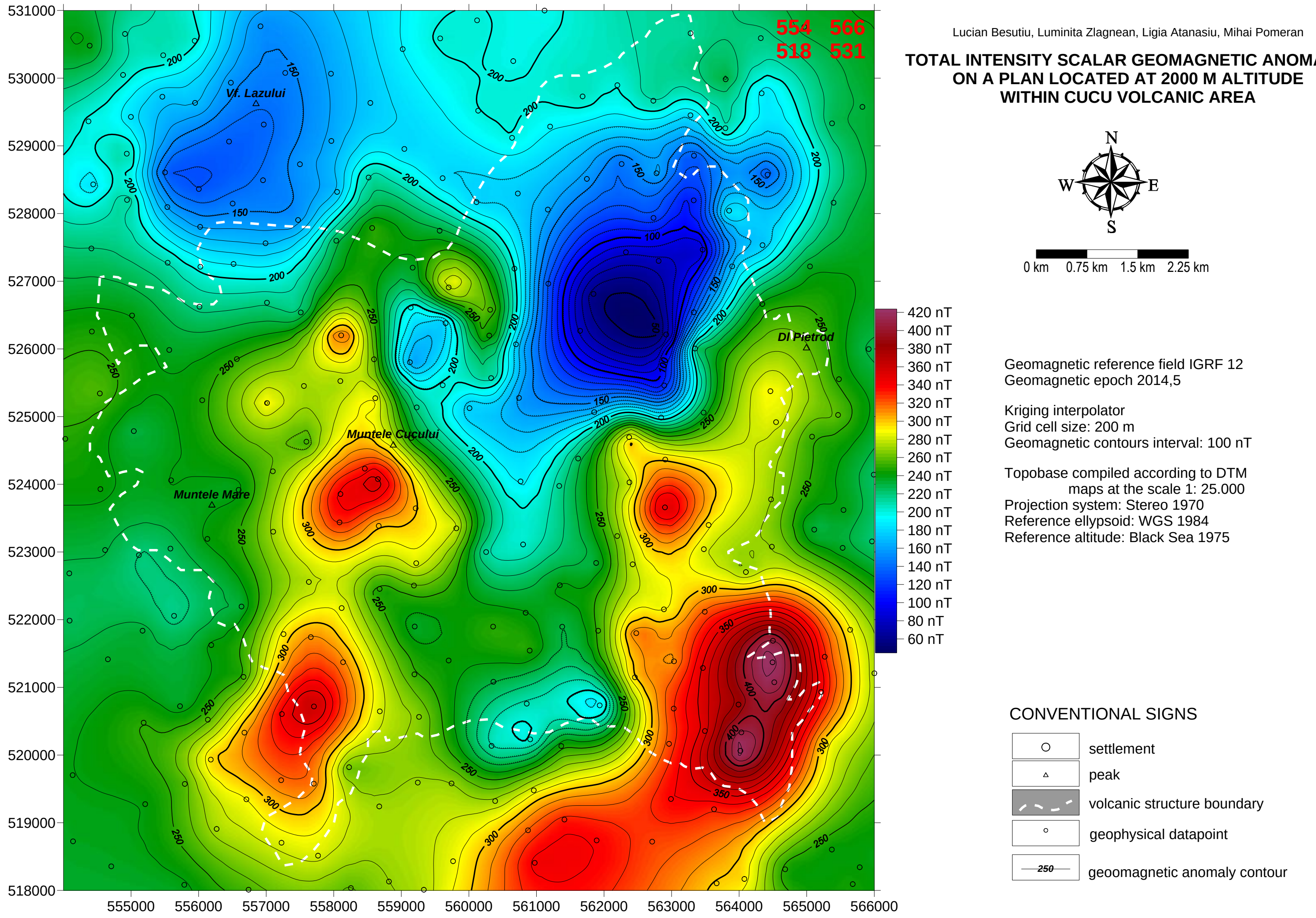

Fig. 12 Total intensity scalar geomagnetic anomaly within Cucu volcano area

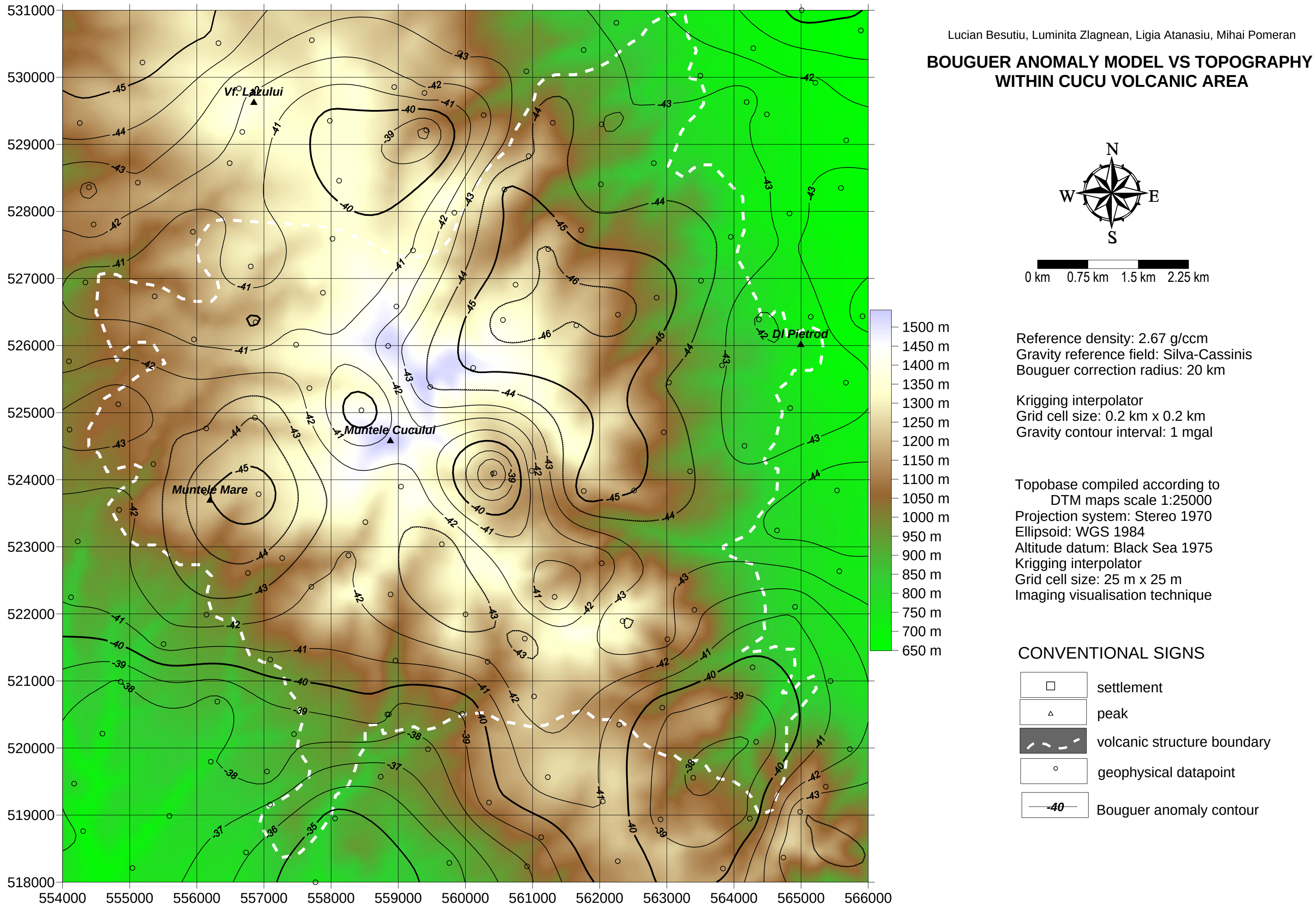

Fig. 13 The Bouguer anomaly versus topography within Cucu volcano area. Reference density 2.67 g/ccm

Persani area

In the southernmost part of the Calimani-Gurghiu-Harghita volcanism area, the Perşani Mountains, geomagnetic observations started in the previous stage of the project has been continued for extending the surveywd area and improving the overall coverage. The new image of the geomagnetic field in the area is shown in Fig.14.

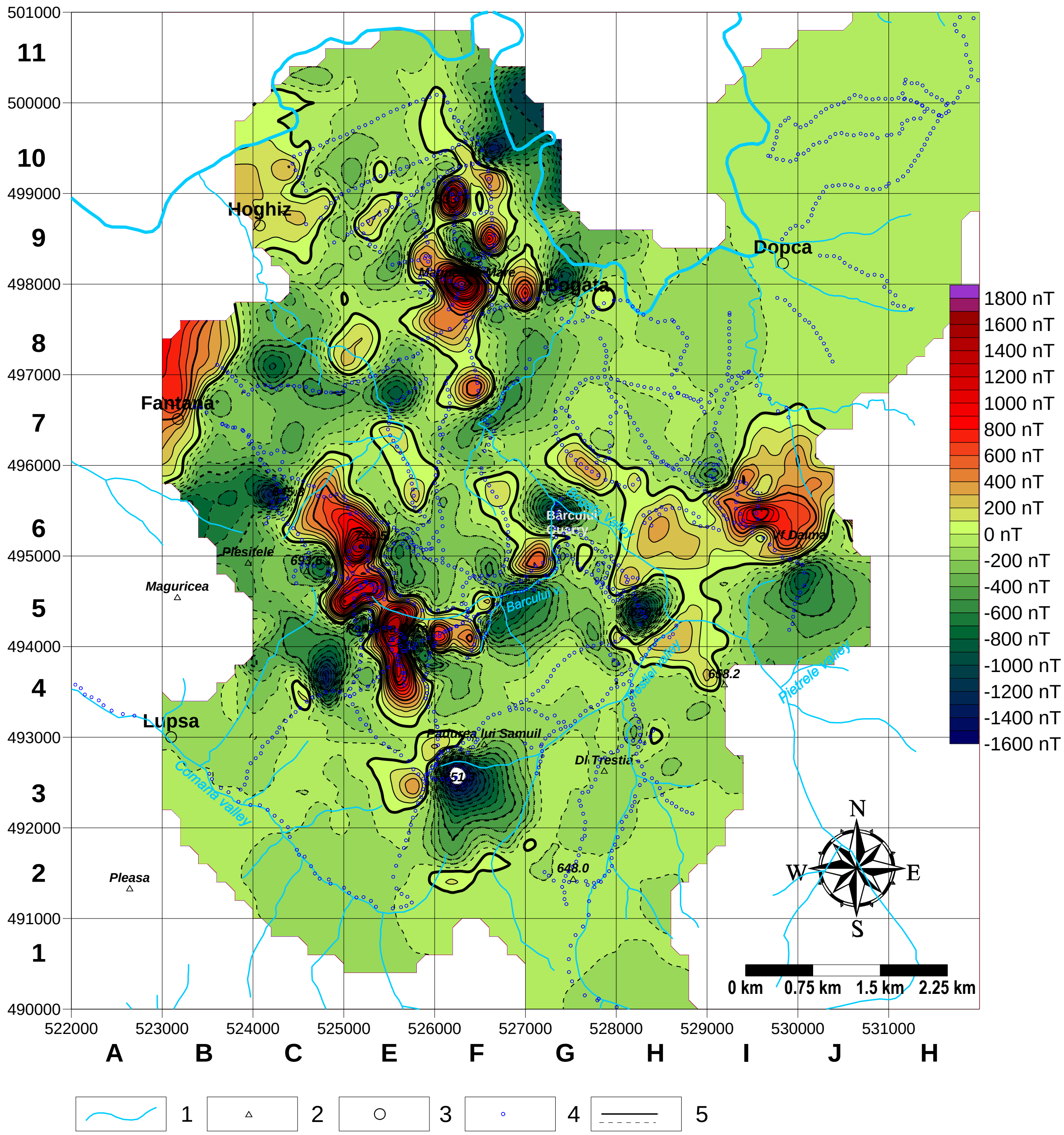

Fig. 14 Total intensity scalar geomagnetic anomaly within the Perşani volcanism area
1, water stream; 2, peak; 3, settlement; 4, data point; 5, isoanomal contour