2.3.3. ADVANCED DATA PROCESSING AIMED AT PROVIDING MORE INTUITIVE IMAGES FOR HELPING GEOLOGICAL INTERPRETATION

(2) 3.3.1. GENERAL CONSIDERATIONS

Unlike primary data processing aimed at providing consistency to various raw in order to offer coherent images of the investigated potential fields, the advanced data processing is intended to present some more intuitive images to researchers than the raw gravity/geomagnetic maps directly offered to interpreters by the raw observations.

The filtering approaches employed at this stage were as follows:

vertical gradient operator: aimed at emphasizing the shallow location of sources and more accurate outline of their contour; when comparing data offered by the potential fileds, the geomagnetic anomaly should be compared with the vertical gradient of the gravity (and not directly with the Bouguer anomaly) because it is the first derivative of gravity that has the same degree of spatial variability with the geomagnetic anomaly;

horizontal gradient operator: allows for an easier discrimination of cumulated effects belonging to various sources located at similar depths, and a better outline of the horizontal contour of the targets; it better reveals the presence of tectonic discontinuities (e.g. faults), but also inhomogeneities within datasets employed for the construction of the composite maps;

residual anomaly: may play a major role in the discrimination of the sources of different scale for the both geomagnetic and/or gravity anomalies;

reduced-to-the-pole geomagnetic anomaly: helps in the improved localising of the underground sources of the geomagnetic field: the vector-like features of magnetic properties may determine a lateral localisation of the anomaly apex as referred to the real position of the geomagnetic source: the reduce-to-pole approach acts like in the case of vertical magnetisation by bringing the geomagnetic effect above its source;

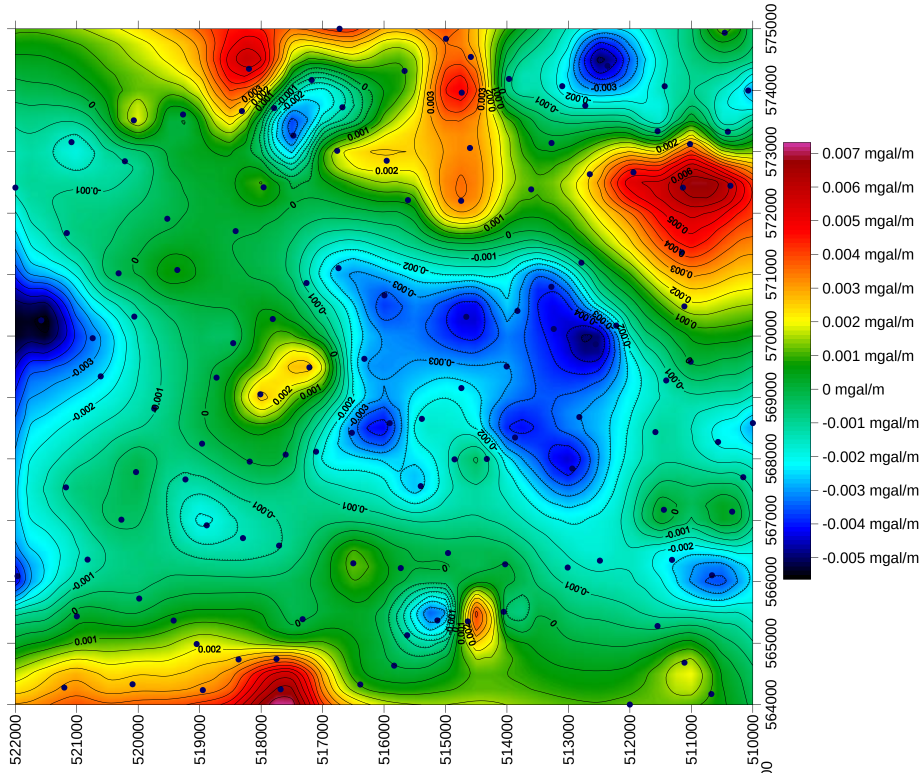
pseudo-gravity operator: computes the equivalent gravity effect of a contrast in magnetic properties based on Poisson relationship: this way it facilitates the interpretation because gravity effects are the result some density contrasts, which have a scalar nature, simpler than the vector nature of geomagnetic properties;

analytical signal operator: represents a mathematical approach that computes a synthetic anomaly, without a direct physical-geological equivalent, but which allows for an easier and more accurate outlining of the track of tectonic lineaments by avoiding distortions introduced by vector features of magnetic properties of the crust;

The above mentioned filters have been applied to currently obtained datasets of gravity and geomagnetic data, offering new images on the observed potential fields at the both regional (e,g, for INSTEC-SUD area), and local scale (e.g. CIOMADUL and PERSANI sub-perimeters).

Some examples are illustrated in the followings.

2.3.3.2. VERTICAL GRADIENT MAPS



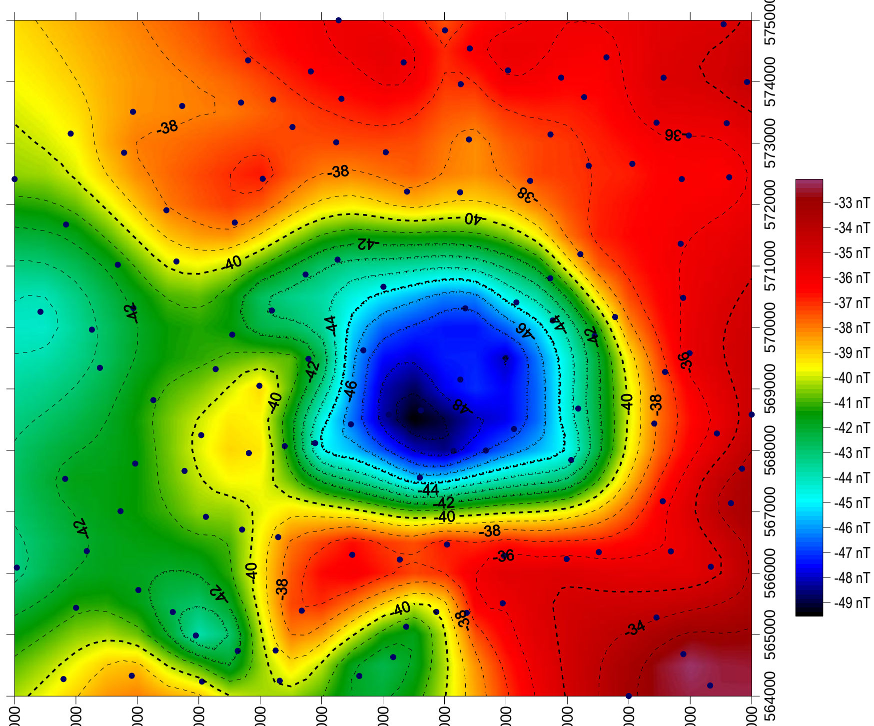


Fig. 47 - CIOMADUL area: Bouguer anomaly (left) and its vertical gradient (right)

(2) 3.3.3. HORIZONTAL GRADIENT MAPS

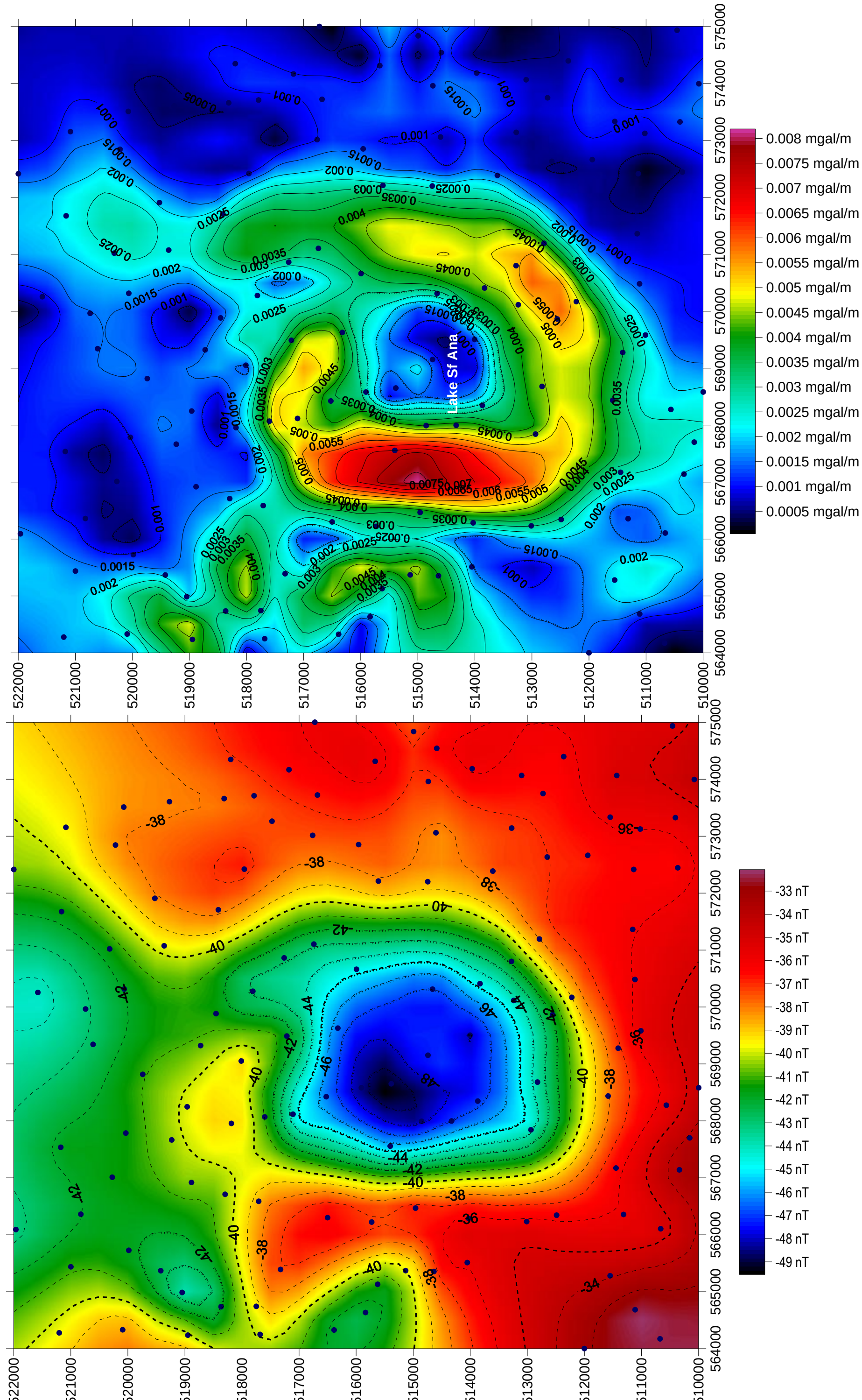


Fig. 48 - CIOMADUL area: Bouguer anomaly (left) and its horizontal gradient (right)

(2) 3.3.4. RESIDUAL ANOMALY MAPS

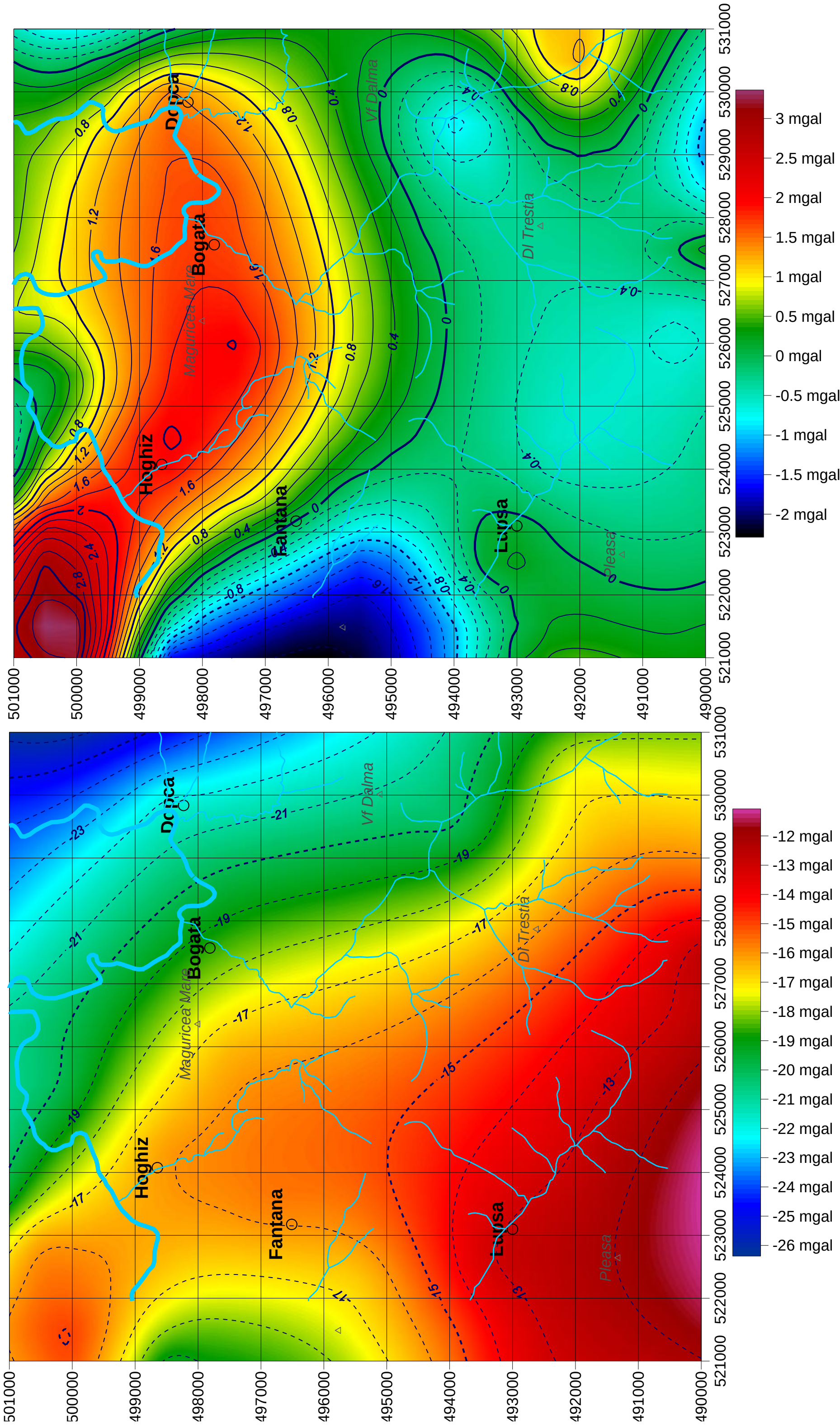


Fig. 49 - PERSANI area: Bouguer anomaly (left) and the residual anomaly as determined by subtratcing a third order polynomial trend (right)

(2) 3.3.5. GEOMAGNETIC ANOMALY REDUCED-TO-THE-POLE

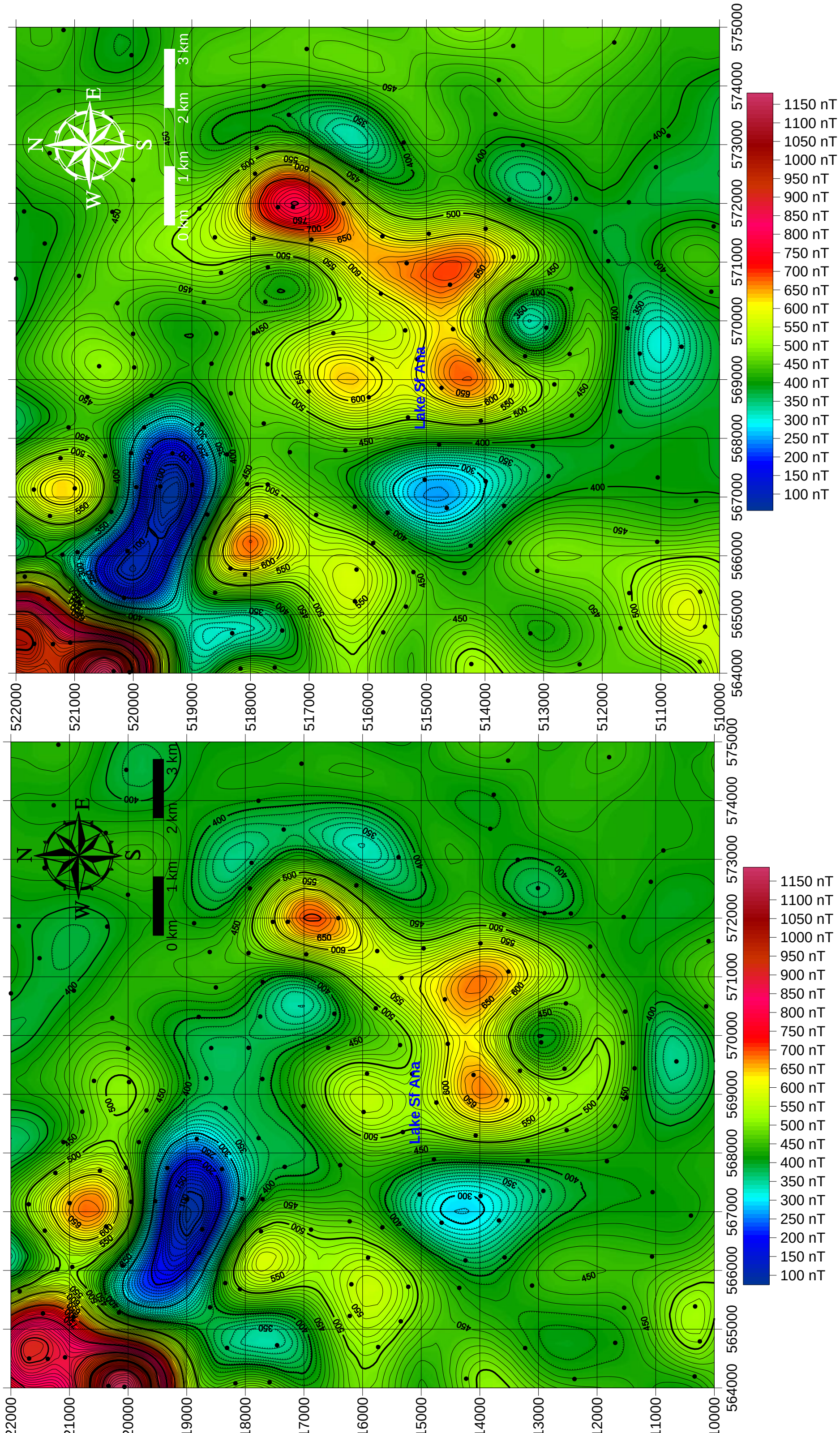


Fig. 50 - CIOMADUL area: Total intensity scalar geomagnetic anomaly (left) and the geomagnetic anomaly rediced-to-the-pole (right)

(2) 3.3.6. PSEUDO-GRAVITY MAPS

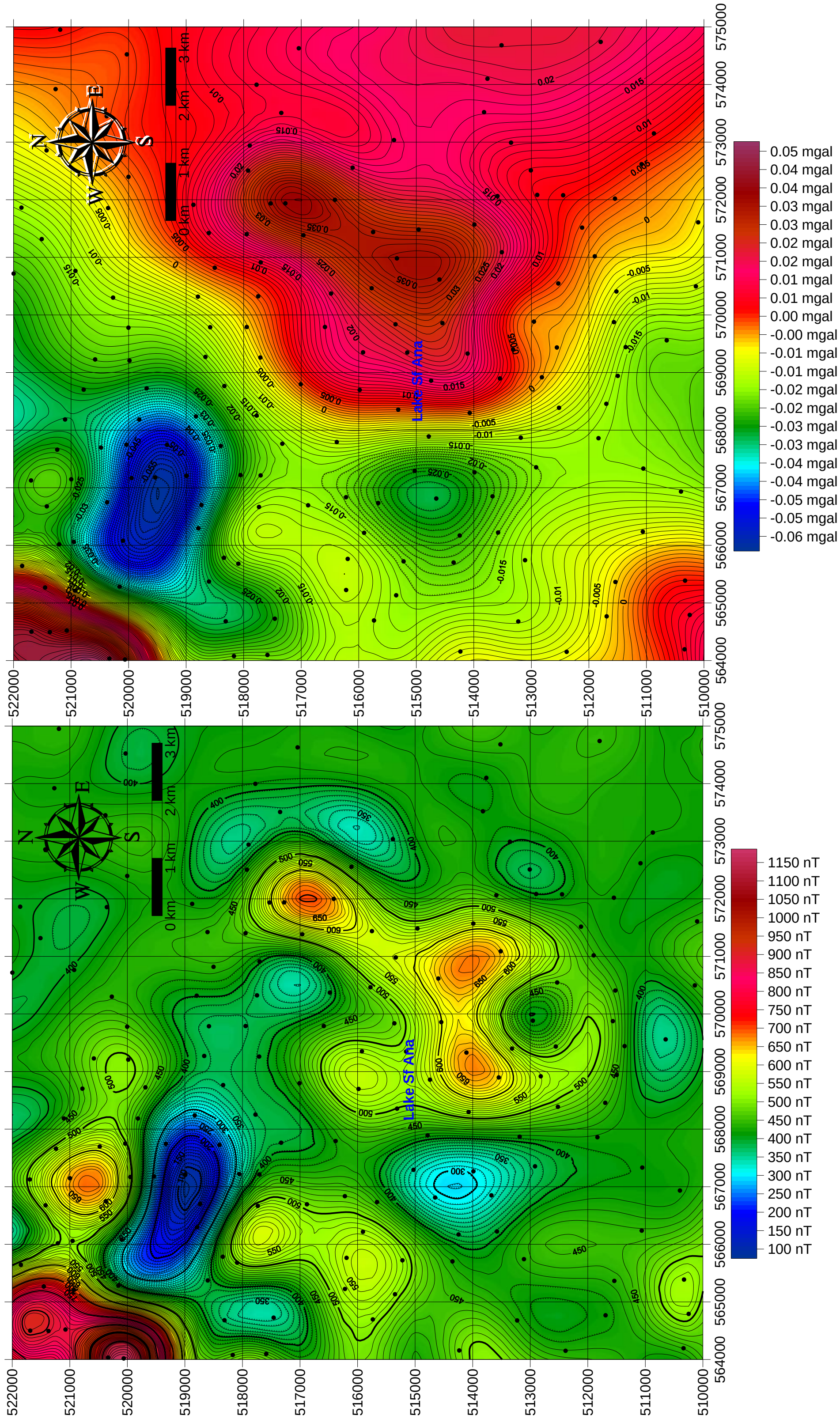


Fig. 51 - CIOMADUL area: Total intensity scalar geomagnetic anomaly (left) and the computed pseudo-gravity anomaly based on the Poisson relation (right)

(2) 3.3.7. ANALYTICAL SIGNAL MAPS

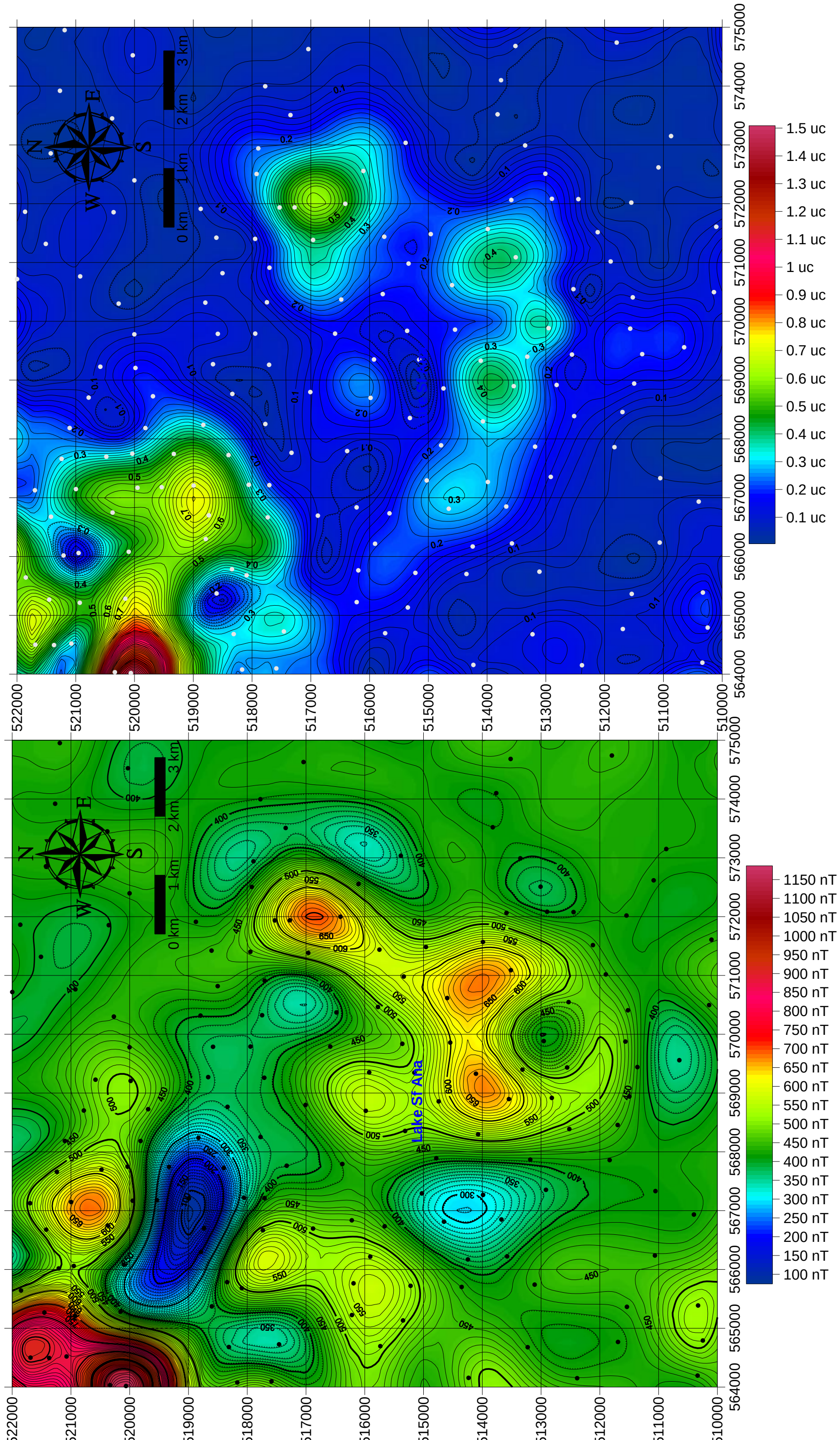


Fig. 52 - CIOMADUL area: Total intensity scalar geomagnetic anomaly (left) and the derived analytical signal (right)