L Cocchi, F Graziano, F Caratori Tontini, **C Carmisciano**, **(2007)**,*Determining the optimal Bouguer density for a gravity data-set,* - *Eos Trans. AGU, 88*(23), Jt. Assem. Suppl., Abstract GP53A-07

Two methods are commonly adopted to evaluate the optimal Bouguer density for a given data-set, starting from different data characteristics or geological regime, giving in many cases different results. We propose some simple extension of these methods in order to make their results compatible. To this aim, we have used free-air gravity satellite data from Geosat and ERS-1 missions in order to compile a Bouguer gravity map of the Mediterranean Sea. The complete Bouguer correction has been applied by using the method of Parker (1972), that acts in the Fourier domain and allows for an exact evaluation of the gravity contribution from an highly sampled topographic model of the land. The density used for the Bouguer reduction has been obtained thus from the gravity data-set itself, by using two different optimization methods that have given the same optimal result of 2400 kg/m^3. We have studied the radial power spectrum of the data, choosing the optimal Bouguer density as the one that minimizes its slope, i.e. the fractal dimension of the resulting gravity map in the band of wavelength from 45 km to 105 km. The second approach consists of studying the correlation between topography and Bouguer anomaly by spatial crossplots for a significant sub-set of the data. In the past these methodologies were applied alternatively since they gave different optimization values, especially the second method that seems to ignore large-wavelength isostatic effects. The main novelty of our work is represented by the combined application of both the approaches having as common goal the reduction of the short-wavelength effects of topography in the gravity map. Actually we have revisited both the methodologies, proposing slight modifications to make their efforts compatible. Their coincident results confirm their validity of application and give reliability to the recovered value of the Bouguer optimal density. As a first result we have obtained a revised Bouguer map for the Mediterranean Sea, that is useful for large-scale geological studies. Moreover, studying the correlation between Bouguer anomaly and bathymetry, we propose the compilation of a new interpretative tool that may be considered a sort of normalized correlation map defining the 2D isostatic setting of the investigated region, without introducing any lithospheric model. In a direct way we have found that the over-all region seems to be in a complete isostatic equilibrium apart from the young basins of Tyrrhenian Sea and Aegean Sea, confirming previous similar results.