

THE BOUGUER GRAVITY FIELD OF THE MEDITERRANEAN SEA : CRUSTAL DEFORMATION AND ISOSTACY

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A new Bouguer Gravity map of the Mediterranean sea and adjacent countries originally prepared as an overlay sheet for the International Bathymetric Chart of the Mediterranean sea has been reprocessed and evaluated. In general, the gravity anomalies and their broad distribution reflect the topographic features; for example, the deep Ionian Basin and the Sardino-Balearic Abyssal Plain are floored by broad positive gravity features in the order of 180 to 200 mgals. The Herodotus Abyssal Plain in the eastern Mediterranean has a gravity maximum of 160 to 170 mgals extending from the Egyptian Coast to the Eratosthenus seamount. Most surrounding continental areas including western Turkey, western Greece, the Calabrian Apennine Arc, parts of North Africa and the western Mediterranean countries are all marked by negative Bouguer gravity features from zero to -180 mgals. We combined deep seismic soundings with associated gravity anomalies and, by computing 2-D density models, we were able to show that most of the deep basins of the Mediterranean sea are floored by old oceanic crust covered by sediments of variable thicknesses exceeding 10 km in parts. The surrounding continental margins of the North Mediterranean basins are all floored by continental crust that varies in thickness between 25 and 40 km depending on the state of deformation that geological processes have imposed on them by compression. Isostacy is mainly distributed along still active compressional fronts which expose strong seismic activity and systematic deepening of the Benyoff Zones from the onshore to the offshore areas. A series of crustal models and the development of the various basins will be presented and discussed.