Study of isostatic compensation rate at Hellas

Kanetaka Heshiki[1], Kei Kurita[2]

[1] Dep. Earth & Planet. Sci. Tokyo Univ., [2] ERI,Univ. of Tokyo

http://www.eri.u-tokyo.ac.jp/heshiki

Internal structure of terrestrial planet generally consists of metallic core and silicate mantle, crust, which means material of planet have differentiated. To know the internal structure in detail is important for considering the evolution of planet. But now, as little seismic data are obtained, we must rely on topography and gravity data for estimating interior.

Bouguer anomaly might be interpreted as subsurface mass anomaly. On this concept, we can estimate moho structure, if we give hypothesis of crust, mantle density and crustal thickness at some region. Hellas basin, known as large diameter (over 3000 km) and small gravity anomaly, should be isostaticaly supported, so crustal thickness is estimated at Hellas with the airy model (e.g. Turcotte and Shcherbakov, 2002; Zuber et al., 2000; Sjogren and Wimberley, 1981).

The data set used in this study is IEG100A (topography data) and JGD85F60 (gravity data), each of them has 1 by 1 degree resolution. We assume densities of crust and mantle as 2900 kg/m^3, 3500 kg/m^3.

First, we calculate bouguer anomaly from JGD85F60. On the other hand, we calculate gravity anomaly by airy model. Changing crustal thickness, we seek the best fitting between observed bouguer anomaly and calculated one. With uncompensated condition, we perform same calculation. In conclusion, we find that each model can be accepted and crustal thickness should vary from 50 to 130 km.