How to compute orthometric altitudes

E.E. Klingelé *

Abstract

In geodynamics the geoid play a very important role for the determination of the deep structure of the Earth crust and mantle as well as for monitoring recent crustal movements. In order to be well suited for inversion algorithm the geoidal undulations data at great wavelengths have to be interpolated in a regular grid.

In countries with very rugged topography (Andes, Himalaya and Alps countries), the orthometric altitudes are better adapted than other scientific altitudes for a smooth interpolation of the geoid between computation points. The computation of this kind of altitude is, however, complicated because of the unknown mean gravity value along the vertical.

We propose a method for computing the mean gravity value along the vertical, joining measurement points and the geoid allowing the computation of the orthometric altitude in a very simple way. This method is based on the prolongation of gravity anomalies between general surfaces.

We present the theoretical development of the method and a test profile in the Swiss Alps showing accuracy better than 0.5 mGal in the determination of the mean value of g.

*   Independant Consultant
     Lerchenberg 4
     CH-8046 Zurich
     Switzerland