

Determination of the Zero-Height Geopotential Value of the Sri Lankan Vertical Datum for Unification with the International Height Reference System (IHR)

by

H.M.I.Prasanna

Department of Surveying and Geodesy, Faculty of Geomatics, Sabaragamuwa University of Sri Lanka, P.O. Box 02, Belihuloya 70140, Sri Lanka.

Email: indika@geo.sab.ac.lk

Tel: +94714418438

Abstract

An assessment of the integrity and inconsistency of existing datum, such as local vertical datum (LVD) is essential for surveying and mapping exercises. Likewise, the estimation of the zero-height geopotential (ZHG) value of the existing LVD is an important task when connect an isolated vertical datum to the conventional global vertical datum (GVD), particularly while examining their unification into the GVD. However, there is paucity of information on the ZHG values in Sri Lanka. To identify the datum inconsistency, this research first compares newly observed and processed GNSS data with the geodetic coordinates of the Sri Lankan horizontal datum, which were initially observed using the GPS method. Second, the zero-height geopotential value of the Sri Lankan LVD was determined using the corrected geodetic coordinates and the global geopotential model (GGM) technique with least-square (LS) adjustment and then linked it to the International Height Reference System (IHR). The consistencies of the results showed a significant improvement of the datum. For the first time, based on the outcomes of this study, the accurate estimation of the ZHG value of the Sri Lankan LVD and the precise datum offsets between LVD and the IHR are obtained, which will be useful practical applications.

Keywords: Geopotential; vertical datum; unification; zero-height; IHR