

The development of the Israeli official geoid undulation model

Gershon Steinberg, Gilad Even - Tzur, Hagi Ronen, Hezi Hezi Sarid and Sagi Dalot (Israel)

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SUMMARY

In the XXIII FIG Congress held in Munich, Germany, October 8-13, 2006 the first two authors proposed the idea of using permanent GNSS networks and the Official Geoid Undulations Model (OGUM) as a substitute for Orthometric Control. About half a year later, this idea was adopted by the Survey of Israel (SOI). As of May 2007, surveyors in Israel can define official orthometric heights in real-time using a single GNSS receiver equipped with the Israeli official geoid undulation model (ILUM). Instead of occupying at least 4 benchmarks, they can use just one benchmark for checking and verification purposes only. The ILUM is actually the countrywide orthometric height reference system of Israel. The Israeli OGUM was based on GPS-Leveling. It is flexible to local improvements through changes in its versions, which are well maintained. Over the last years, the SOI continued to sporadically measure GNSS-leveling lines to improve its OGUM. Research introducing a Geoid model that is based on terrestrial gravity measurements in Israel and its surroundings, incorporating shipborne gravity measurements and altimetry data over the Mediterranean Sea, using the EIGEN-6C4 as the reference earth gravity model was recently made. Relying on the conclusions and results of this study, the SOI is working to further improve the consolidation of a hybrid geoid model. Following a short description of the OGUM's concepts and its advantages, the paper elaborates on how the proposed idea was established in Israel 13 years ago. Comparison between precise leveling in different areas of Israel and deduced orthometric height-differences from the Israeli OGUM (ILUM2.0) - as well as the new hybrid model - are presented. The results of this comparison approve the accommodation of using OGUM and a permanent GNSS network as a substitute for the classic orthometric control for most of the engineering works. The Global Geoid model EIGEN-6C4 is also analyzed, demonstrating its potential to contribute to the establishment of an OGUM in other parts of the world.

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