

# Height System Modernization and Geoid Modelling Studies In Turkey

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## SUMMARY

The establishment of vertical reference system in Turkey, that is, Turkish National Vertical Control Network (TNVCN) started with the adjustment of the observations at Antalya tide-gauge station between 1936 and 1971. In March 2012, Turkey National Geodesy commission held an official meeting at Zonguldak Bülent Ecevit University. In the final declaration of the meeting, the problems with the levelling-based vertical control approach which is currently used in the country and the realization of the vertical datum in Turkey were discussed. The definition of geoid model which is more resistant to geodynamic activity, local crustal uplift or subsidence as well as the deterioration of the benchmarks are specified as the main topics of the realization of the new vertical datum. The problems in levelling-based vertical control approach have led the country to find an alternative approach to vertical control. In this aspect, geoid based vertical datum approach is under consideration as an alternative way. Thus, the Realization of Turkish National Control Network Project has been initiated by the General Command of Mapping. The aim of the project is to obtain a 1-2 cm-accuracy geoid model that will be the new vertical datum of Turkey by using terrestrial and airborne gravity data which were obtained during the realization Project. The maximum accuracy of the regional geoid models achieved in Turkey is 8.7 cm. According to the Large-Scale Map and Map Information Production Regulation of Turkey, though, the accuracy should be at least 5 cm, which means that the result of the accuracy of the latest geoid model in Turkey is not satisfactory. Until reaching the aimed accuracy (1-2 cm accuracy regional geoid model), the local GPS/levelling surface models will be used as a geodetic infrastructure in Turkey. There is an increasing trend of geoid models in the world, and many countries determine them as their vertical datum. An example of this is the GRAV-D (Re-definition of the American Vertical Datum) project of the United States. From this aspect, having a local geoid model which can meet the accuracy demands in Turkey is very important. This study aims to specify the historical perspective of Turkish vertical control approaches, their current situation and current developments.