

# Towards a More Consistent Geoid Model for North America

Kevin Ahlgren, Yan-Ming Wang, Xiaopeng Li and Monica Youngman (USA)

**Key words:** Reference frames; Reference systems; Geoid; Gravity

## SUMMARY

In support of a new geophysical vertical datum in 2022, the National Oceanic and Atmospheric Administration's (NOAA) National Geodetic Survey (NGS) is continually improving our existing data holdings through new modeling techniques but also by acquiring new data. This data acquisition can be in the form of NGS conducting geodetic surveys and collecting new data; however, it can also be in the form of data sharing between international partners. One of the foundations of the North American-Pacific Geophysical Vertical Datum 2022 (NAPGD2022) is a static geoid model (GEOID2022). This geoid model will be produced through a collaborative effort between colleagues across North America including the Canadian Geodetic Survey (CGS), Mexico's Instituto Nacional de Estadística y Geografía (INEGI), and the NGS. Towards this effort, a number of common datasets are required in order to produce such a model including terrestrial gravity data, shiptrack gravity data, altimetric gravity data, digital elevation models, etc. Additionally, various data sharing and collaborations between the NGS and the National Geospatial-Intelligence Agency (NGA) have recently been initiated in support of both the NGA's Earth Gravitational Model 2020 (EGM2020) and the NAPGD2022 model. NGS has received extensive surface gravity data from NGA, and NGS has provided NGA with processed GRAV-D airborne gravity data.

The goal of these international collaborations and data sharing is a more consistent geoid model across North America. Improvements in the NGS experimental geoid models (xGEOID) are already evident as a result of these collaborations. The xGEOID17 model relied on a considerably new surface gravity dataset from the NGA's database and shows considerable improvement in a number of areas from previous xGEOID models. The upcoming version of the experimental models, xGEOID18, will incorporate another iteration of common data in the form of surface gravity data from CGS, INEGI, and NGS, shiptrack data from NGA and NOAA's NCEI (National

---

Towards a More Consistent Geoid Model for North America (9619)  
Kevin Ahlgren, Yan-Ming Wang, Xiaopeng Li and Monica Youngman (USA)

FIG Congress 2018

Embracing our smart world where the continents connect: enhancing the geospatial maturity of societies  
Istanbul, Turkey, May 6–11, 2018

Centers of Environmental Information), and other agreed upon parameters. This paper will highlight the collaborative efforts that have been initiated with the goal of producing a more consistent and accurate geoid model for North America.

---

Towards a More Consistent Geoid Model for North America (9619)  
Kevin Ahlgren, Yan-Ming Wang, Xiaopeng Li and Monica Youngman (USA)

FIG Congress 2018  
Embracing our smart world where the continents connect: enhancing the geospatial maturity of societies  
Istanbul, Turkey, May 6–11, 2018