Integration of the Canadian Gravity Standardization Network with the Canadian Spatial Reference System: Challenges and Opportunities

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VERTICAL DEFORMATION RATES IN CANADA
An analysis of the GPS-determined time rate of change for sites of the Canadian Base Network (CBN)

The primary role of the Geodetic Survey Station (GSS) is to maintain, continuously improve, and facilitate efficient access to the Canadian Spatial Reference System (CSRS). This includes the responsibility to maintain the Canadian Gravity Standardization Network (CGSN) that provides gravity control for Canada. The current primary task is to establish and maintain the CSRS, utilizing primarily absolute gravimetry (AG) observations to maintain the CGSN.

Additionally, as an observation and processing network, the GSS is involved in the definition of the reference frame and ensure consistency with other network solutions. The GSS is also responsible for maintaining the Canadian gravity control network, which includes a network of gravity stations and the associated data quality control and management system.

CBN SOLUTIONS

- B-series GPS Software Version 4.x
- Double-differenced observations
- 30 second data sampling
- Niell mapping function (dry)
- No ocean loading model
- QIF ambiguity resolution
- 10° elevation cut off
- 108 WAAS satellites
- 140°W to 120°W
- 50°N to 60°N
- 70°N to 0° latitude

CBN COMBINATIONS

- All (scaled) CBN solutions combined (to allow solutions to translate during combination)
- CBN solution (to allow solutions to align)
- Geocentre parameters added to each site
- 3 translations, 3 rotations & 3 scalings
- No ocean loading model
- QIF ambiguity resolution
- 10° elevation cut off
- 108 WAAS satellites
- 140°W to 120°W
- 50°N to 60°N
- 70°N to 0° latitude

CBN 2005 (EPOCH GPS)

MODERNIZATION OF THE CGSN
Moving towards co-location of gravity datum control sites with CSRS positioning reference stations

Within Canada, the most significant improvement for Canadian gravity data is the development of a national datum defined by control stations. It is estimated that this new gravity datum will benefit the Canadian scientific community and the general public by providing more accurate and reliable gravity data. The development of this new gravity datum will be based on the integration of absolute gravimetry and geodetic data, as well as the use of modern navigation technologies.

ACKNOWLEDGMENTS

We are indebted to the dedicated field personnel of NRCan for their contributions to the development and implementation of the CGSN. We also thank Phil Salib for his guidance with respect to the GSD SINEX procedures. We would like to acknowledge Earl Lapelle, Nicholas Piraszewski, and Martin Bourassa for their contributions to the CGSN and their efforts in ensuring the success of this project.

REFERENCES