Modernising the Greenlandic Reference System

Kristian Evers, Shfaqat Abbas Khan, Stefan Krebs and Malte Nordmann Winther-Dahl (Denmark)

Key words: Positioning; Reference frames; Reference systems

SUMMARY

The GR96 reference system, established in 1996, is experiencing increasing deformation due to accelerated ice mass loss and associated elastic and vis-coelastic effects. This introduces strain within the frame, necessitating a modernized realization. This presentation details the development of a new GR96 realization leveraging the Greenland GNSS Network (GNET), a con-tinuously operating network providing comprehensive monitoring of defor-mation across Greenland.

A recent GNSS campaign re-observed the fundamental stations of GR96. Data processing was performed using the Bernese software, and a transfor-mation between the current ITRF2020 coordinates of these stations and their original GR96 coordinates was established. This transformation was then applied to the GNET network, effectively assigning GR96 coordinates to the entire network.

This new realization offers significant advantages: it is continuously mon-itorable via GNET, eliminating the need for further costly field campaigns, and exhibits reduced internal strain compared to the original GR96. The presentation will also address practical considerations surrounding the im-plementation of this updated system, including communication strategies for end-users and the management of the transition within the EPSG registry – where the existing GR96 CRS was updated to represent a datum ensemble encompassing both realizations.