

Report on IAG Sub-commission 1.3

Regional Reference Frames

JULY 2003 – APRIL 2005

President: Zuheir Altamimi (France)

1.3C : Regional Sub-commission for North America (NAREF)

Chair : Michael Craymer (Canada), Richard Snay (USA)

This sub-commission has 3 active working groups. The following summarizes the recent activities of each.

SC1.3c-WG1: North American Reference Frame (NAREF)

The objective of this WG is to densify the ITRF and IGS global networks in the North American region. Work continued on the production of weekly GPS coordinate solutions for over 400 continuously operating ITRF/IGS densification stations in North America. These solutions are a combination of five different regional solutions using three different GPS processing software. The combined solutions are being contributed to the IGS, together with weekly processing reports, with a latency of approximately 4 weeks. Most recent improvements since 2003 have been the incorporation of a weekly regional solution for over 350 US CORS stations using the PAGES processing software. The Plate Boundary Observatory solution from Scripps was also expanded from 50 to 75 points. In the past year, a cumulative solution has been computed based on the weekly combinations to provide velocity estimates for all sites with a data span of at least one year. This solution is being combined with a ten year solution computed by NGS for approximately 200 of the better CORS sites and will be contributed to the densification of the ITRF2004.

SC1.3c-WG2: Stable North American Reference Frame (SNARF)

Significant efforts began under this newly created joint working group with UNAVCO, Inc. The goal is to define a plate-fixed regional reference frame for North America stable at the mm-level to provide a standardized and consistent reference frame in support of geodynamics studies throughout the continent. Three workshops to define the reference frame been held in 2004 and 2005. The frame is being defined via a no net rotation condition for a set of stable frame sites with respect to ITRF2004. The first version of the reference frame will be delivered at the UNAVCO Annual Meeting in June 2005. This version will include coordinates and velocities (with uncertainties) for all frame sites, a model for glacial isostatic adjustment, and rotation rates with respect to ITRF2000. Further versions will follow as the reference frame is improved. More information about the working group is available from the UNAVCO web site (follow the links at <http://www.naref.org/>).

SC1.3c-WG3: Reference Frame Transformations

This sub-commission is concerned with the definition and maintenance of the relationships between international and North American reference frames/datums. This primarily involves maintaining the officially adopted (in Canada and the U.S.) relationship between ITRF and NAD83, the later which is now defined in terms of a fourteen parameter transformation from ITRF. There has been no recent activity since the updating of the transformation between NAD83 and ITRF2000. However, it was agreed in 2002 to update the reference epoch of published NAD83 coordinates from 1997.0 to 2002.0 for continuously operating GPS stations in both Canada and the U.S. to avoid the accumulation of small bias in the NNR-NUVEL1A plate motion model used to define the motion of NAD83 in ITRF. In addition, the transformation between the new SNARF reference frame and ITRF2000 will be made public as part of the SNARF frame.