

Inter-Commission Project 1.2

Vertical Reference Frames

Mid-Term Report April 2005

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Based on the classical and modern observations, the ICP1.2 on Vertical Reference Frames shall study the consistent modelling of both, geometric and gravimetric parameters, and provide the fundamentals for the installation of a unified global vertical reference frame.

Objectives

- To elaborate a proposal for the definition and realization of a global vertical reference system (World Height System – WHS);
- To derive transformation parameters between regional vertical reference frames;
- To establish an information system describing the various regional vertical reference frames and their relation to a world height frame (WHF).

Program of Activities

- Harmonization of globally used height data sets;
- Study of combination procedures for height data sets from different techniques;
- Study of information on regional vertical systems and their relations to a global vertical reference system for practical applications;
- Unification of regional (continental) height systems.

Activities since 2003

(1) Realization of the European Combined Geodetic Network (ECGN) as case study for further global activities (Project of EUREF - IAG SC1.3a)

ECGN is a terrestrial network for the combination of different techniques: GPS/GLONASS positioning, gravity measurements, levelling, tide gauge observations.

- 1st Call for Participation: Implementation of ECGN Stations in April 2003
- Decision about the criteria to evaluate the proposals of the 1st Call and discussion of the individual proposals in September 2003
- Information of the ECGN organizations/institutions about the status in November 2003 (<http://www.ifag.de/ecgn/index.htm>)

- Preparation of the 2nd Call relating methodical investigations for the combination of spatial observation data with gravity field data.

(2) European Vertical Reference System Workshop April 5-7, 2004

- Preparation of a common European Vertical Reference System (EVRS) and its relation to a WHS till 2007
- Revision of the present EVRS conventions in agreement with the WHS/WHF conventions of ICP1.2
- Realization and maintenance of the EVRS by the ECGN till 2007.

(3) Meeting of ICP1.2, August 31, 2004, Porto

Main items of the discussion were the

- view to ICP1.2 strategy
- principles for conventions, open questions
- Information of local reference frames needed for transformation in a regional and global vertical system
- importance of W_0 in the definition of a global vertical reference system, and adoption of a new number for W_0 , respectively the acceptance of existing conventions,
- importance of tide gauge observations and satellite altimetry for the realization of the global vertical reference system as well as the unification of regional vertical reference frames.

Next actions

A result of the discussion of the members of ICP1.2 about the definition and realization of a global vertical reference system was the composition of two work packages.

The first work package will address

- convention and standards for a Conventional Height System, a World Height System and a World Height Frame
- relationships to the CTRS, CTRF and gravity standards

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- datum realization (handling of information of the satellite altimetry, possible role of the TIGA project, mean earth ellipsoid versus W_0)

This work package will be executed in collaboration of J. IHDE, J. KRYNSKI (chair), J. MÄKINEN and V. VATRT.

The second work package is related to the unification of height systems and the collection and distribution of information about the different national height systems including transformation parameters. Members of the group are M. AMOS, A. KASENDA, BILL KEARSLY,

G. LIEBSCH, D. ROMAN (chair) and MARC VERONNEAU.

All ICPI.2 members are asked to contribute to the work packages. Both groups shall present first results till end of March 2005.

The next ICP 1.2 meeting is planned for spring 2005 during the EGS Conference in Vienna on 24.-29.04.2005. First results of our project shall be presented on the IAG Scientific Symposium in Cairns, Australia on 22.-26 August 2005.