



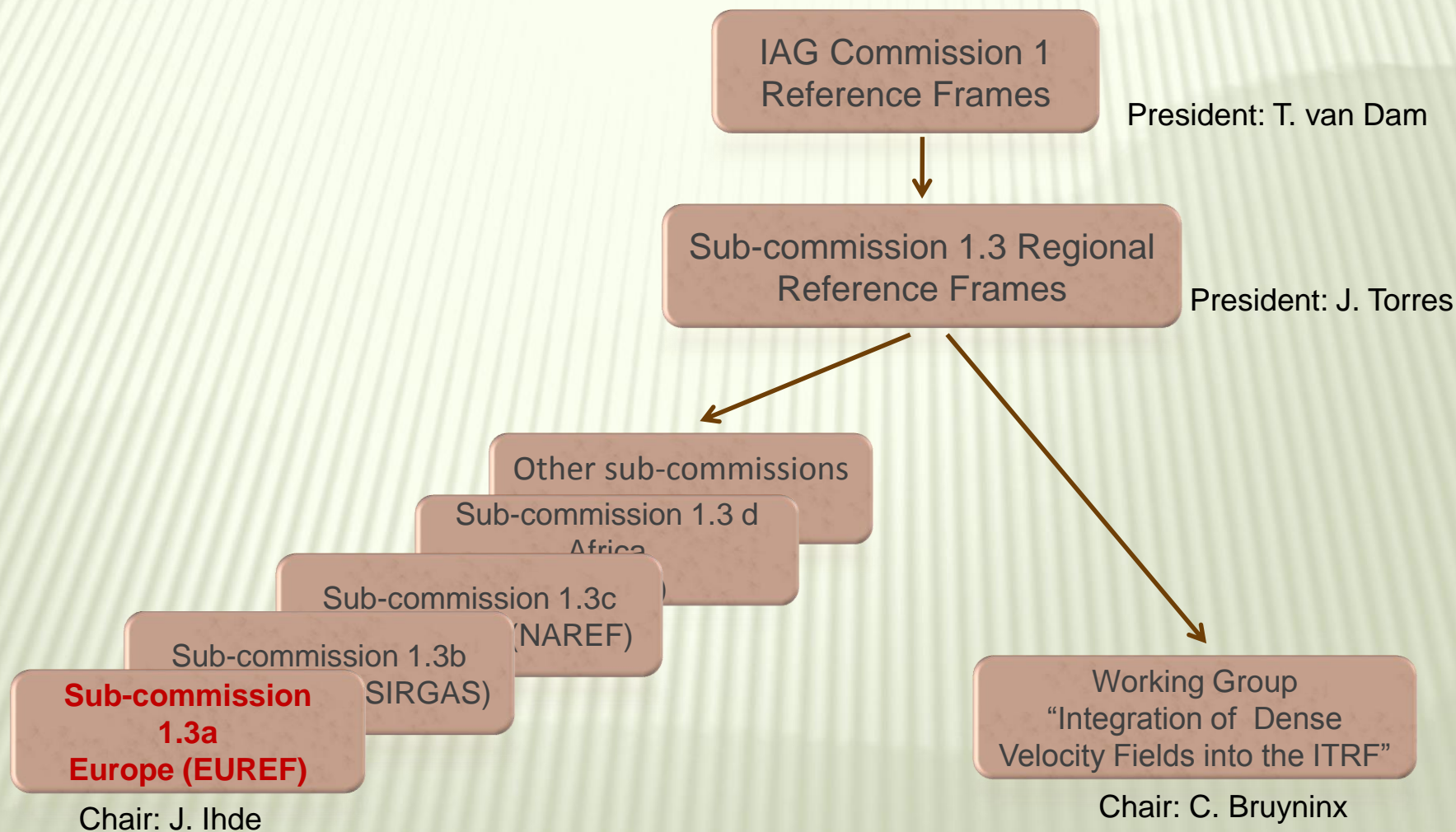
ACTIVITIES OF THE EUREF TECHNICAL WORKING GROUP

EUREF 2013 Symposium
Budapest, Hungary
May 29-31, 2013

C. Bruyninx for EUREF TWG

For more info . . .
<http://www.euref.eu/html/twg.html>

INTERNATIONAL ASSOCIATION OF GEODESY (IAG)



EUREF TECHNICAL WORKING GROUP (TWG)

- ✖ Technical Working Group = EUREF steering committee
- ✖ The EUREF TWG was created at the EUREF symposium in Berne, 1992
- ✖ Meets two to three times a year to manage current activities
- ✖ Minutes of the meetings : <http://www.euref.eu/>
- ✖ Members elected by the plenary (4 year term, renewable once), ex-officio members, members in charge of special tasks

CURRENT MEMBER LIST

- ✕ Zuheir Altamimi, France
- ✕ Elmar Brockmann, Switzerland
- ✕ Carine Bruyninx, Belgium (TWG chair)
- ✕ Alessandro Caporali, Italy, (EUREF secretary)
- ✕ Rolf Dach, Switzerland
- ✕ Jan Dousa, Czech Republic
- ✕ Rui Fernandes, Portugal
- ✕ Heinz Habrich, Germany
- ✕ Johannes Ihde, Germany (EUREF chair)
- ✕ Ambrus Kenyeres, Hungary
- ✕ Martin Lidberg, Sweden
- ✕ Rosa Pacione, Italy
- ✕ Markku Poutanen, Finland
- ✕ Wolfgang Söhne, Germany
- ✕ Günter Stangl, Austria
- ✕ João Torres, Portugal

Honorary members:

- ✕ Claude Boucher, France
- ✕ Erich Gubler, Switzerland
- ✕ Herman Seeger, Germany
- ✕ Helmut Hornik, Germany
- ✕ Werner Gurtner[†], Switzerland
- ✕ Herman Seeger, Germany
- ✕ Knud Poder, Denmark

EURF GOALS

Define, realise, maintain, provide access and promote the adoption of

- ✖ ETRS89

European Terrestrial Reference System

- ✖ EVRS

European Vertical Reference System

RECENT ACTIVITIES

× EPN

+ New set of official EPN coordinates

ETRS89 – NEW SET OF EPN COORDINATES

- ✖ EUREF Permanent Network (EPN), <http://www.epncb.oma.be/>
- ✖ GNSS reference stations with freely available observations and known ETRS89 coordinates

*Bruyninx « The EUREF Permanent Network: Status and Strategy »
Session 1*



ETRS89 – NEW SET OF EPN COORDINATES

- ✗ New set of official EPN coordinates (C1725)
 - + In ETRF2000 / **IGb08** (ITRF2008)
 - ✗ Includes EPN data up to January 2013
 - ✗ Partly based on an historical reprocessing of EPN (1996.0-2007.0)
 - ✗ Fully compatible with present-day antenna modelling
 - epn_08.atx (igs08.atx+ indiv. calibrations), in use since April 2011
 - ✗ Class A (212) & Class B (31)
 - + Update « Guidelines for EUREF Densifications »
 - ✗ Class A stations remain backbone for all densifications
 - ✗ Reflect current usage of IGb08
 - + ITRF2013 → *Altamimi « Preparation for the ITRF2013 », session 3*

RECENT ACTIVITIES

× EPN

- + New set of official EPN coordinates
- + Real-time products

REAL-TIME EPN PRODUCTS

Real-time analysis project:

- + 48% of EPN : real-time data streams
- + ETRF2000 orbit/clock correction streams
 - + EUREF01 : GPS-only
 - + EUREF02 : GPS+GLONASS
 - + EUREF03, future: GPS+GLONASS+Galileo
- + Official EUREF product since Nov. 13, 2012
- + Provide direct access to ETRS89 in the field
- + Success depends on implementation of PPP in receivers

RECENT ACTIVITIES

× EPN

- + New set of official EPN coordinates
- + Real-time products
- + **Multi-GNSS**

MULTI-GNSS

EUREF symposium 2011, Chisinau:



Resolution no. 2

The IAG Reference Frame Sub-commission for Europe (EUREF)

considering the ongoing evolution of GNSS and the availability of new GNSS signals such as GPS L5 for example

encourages EPN station managers to configure their stations to, where possible, submit observations of all the new signals in addition to current submissions.

- + 70% of EPN stations: GPS+GLONASS
- New EUREF WG “Multi-GNSS” (E. Brockmann) to facilitate multi-GNSS tracking, monitoring & analysis (created on Nov. 13, 2012)
- Related presentations in Session 1, e.g. IGS-MGEX project, RINEX V3.02, RTCM MSM, GLONASS calibrations

RECENT ACTIVITIES

× EPN

- + New set of official EPN coordinates
- + Real-time products
- + Multi-GNSS
- + **Densification**

DENSIFICATION

Goal: Consistent set of ETRS89 positions/velocities for a very dense network → deformations

- Integration of weekly position solutions (SINEX) from third party networks in EPN
- National Mapping Agencies are invited to participate!

EPN Reference Frame Coordinator

- Kenyeres “EPN Densification based on the Integration of National Active GNSS Networks”, Session 3

EUREF symposium 2010, Gävle:



Resolution no. 4

The IAG Reference Frame Sub-commission for Europe (EUREF)

Noting that the European contribution to the IAG WG on Regional Dense Velocity Fields is coordinated by EUREF

Considering that there are permanent tracking stations, not included in the EPN, but are of scientific importance

Encourages analysis of the data following the guidelines for EUREF densifications and transmission of weekly SINEX solutions to EUREF

RECENT ACTIVITIES

× EPN

- + New set of official EPN coordinates
- + Real-time products
- + Multi-GNSS
- + Densification
- + **New Analysis Center Coordinator**

EPN ANALYSIS CENTRE COORDINATOR

- ✖ March 2013: BKG announced H. Habrich would retire from his position as ACC
- ✖ April 4, 2013: Call for new ACC (4 years) distributed by EUREF mail
- ✖ Proposal from MUT/WUT consortium accepted by EUREF TWG on May 28, 2013
 - + K. Szafranek (MUT): EPN ACC from June 1st, 2013 → May 31, 2015
 - + A. Araskiewicz (MUT): EPN ACC from June 1st, 2015 → May 31, 2017

RECENT ACTIVITIES

× EPN

- + New set of official EPN coordinates
- + Real-time products
- + Multi-GNSS
- + Densification
- + New Analysis Center Coordinator

RECENT ACTIVITIES

× EPN

- + New set of official EPN coordinates
- + Real-time products
- + Multi-GNSS
- + Densification
- + New Analysis Center Coordinator

× Monitoring of national ETRS89 coordinates

MONITORING OF NATIONAL ETRS89 COORDINATES

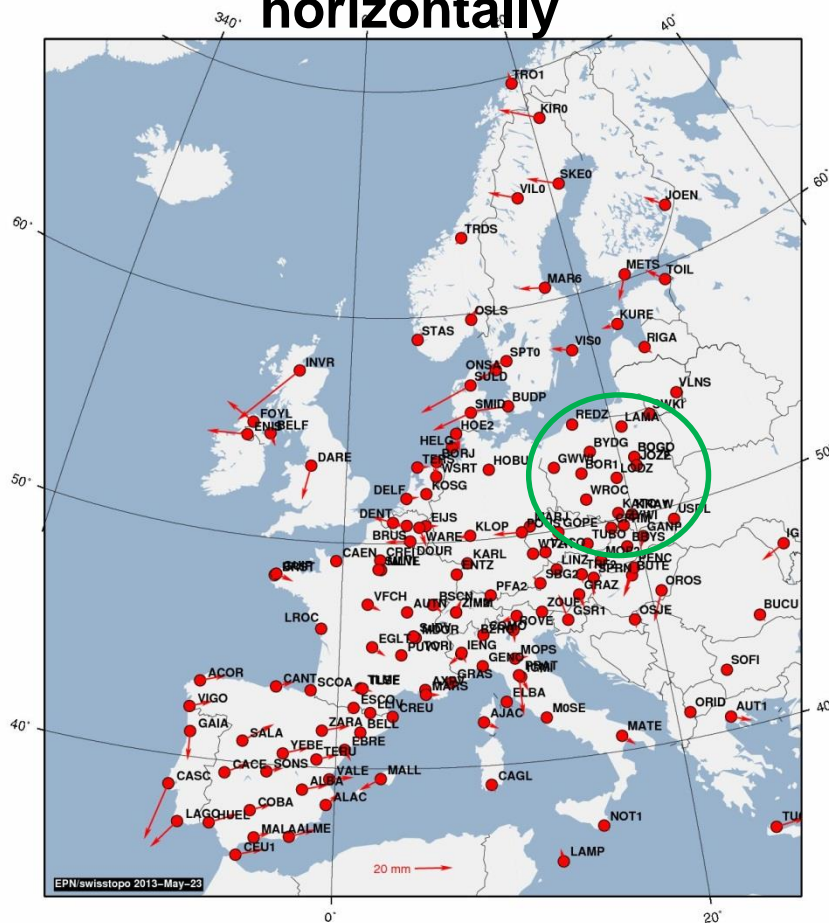
- ✖ Monitoring of official ETRS89 coordinates for EPN stations
- ✖ Updates:
 - + Czech Republic (23.5.12): 5 new stations
 - + Sweden (21.9.12): coordinate update (due to igs08.atx)
 - + France (3.4.13): Update
 - + Poland (15.4.13): 18 new official coordinates -> see presentation this symposium Ryczywolski et al.
- ✖ Comparison with latest EPN cumulative solution (C1715), densification of IGB08:
 - + All national ETRF coordinates are consistent with latest cumulative EPN solution in European reference frame on the level of 1-3 cm!

COMPARISON WITH EPN REFERENCE SOLUTION

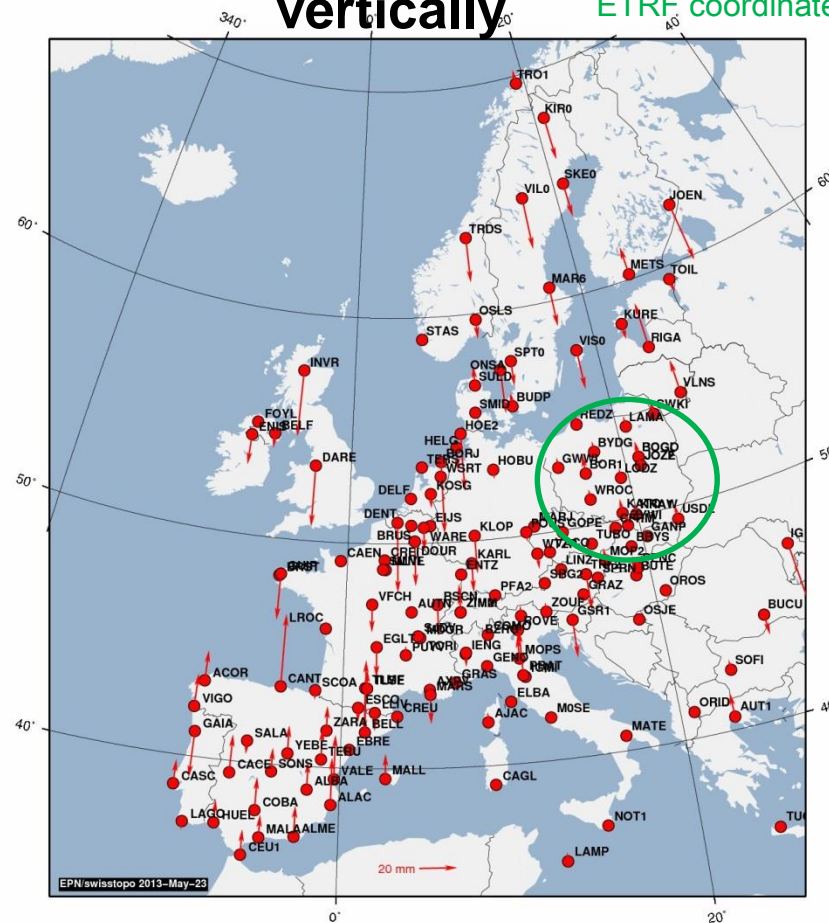
151 stations (only class A, C1725)
28 countries

New Polish official
 ETRF coordinates

horizontally



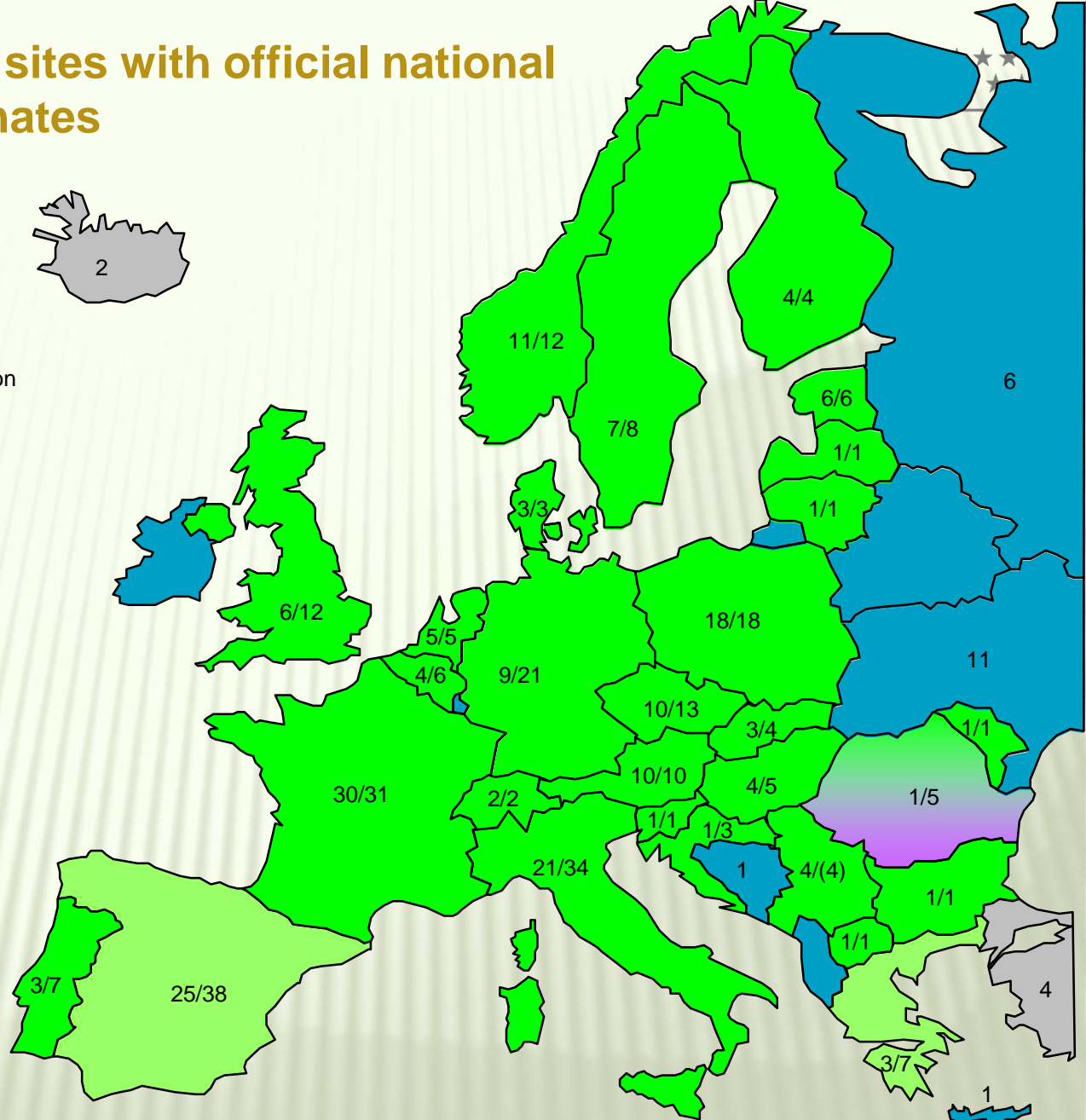
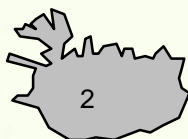
vertically





Number of EPN sites with official national ETRS89 coordinates

- No information (EPN sites)
- Ok: (CRD delivered / EPN sites)
- No EPN sites used: (CRD delivered / EPN sites)
- Coordinates delivered, but no publication on EPN (CRD delivered / EPN sites)
- Out of geographical scope of ETRS89 (EPN sites)



Greenland:5
Israel: 2
Jordan: 1
Morocco: 2
Armenia: 1
Faroe:1

Official ETRF coordinates:
28 countries
192 sites (+ **7** prop. EPN sites)

EPN: **40** countries
297 active sites

Status National: 22.5.2013

EPN: 22.5.2013

RECENT ACTIVITIES

- ✖ EPN
 - + New set of official EPN coordinates
 - + Real-time products
 - + Multi-GNSS
 - + Densification
 - + New Analysis Center Coordinator
- ✖ Monitoring of official ETRS89 coordinates
- ✖ Working Group on Deformation Modelling

WG ON DEFORMATION MODELLING

- ✖ Created on Nov. 13, 2013, chaired by M. Lidberg
- ✖ Goal to create a crustal deformation model for Europe to
 - + Improve knowledge of surface deformations in Eurasia and adjacent areas,
 - + Manage (life time) and use of the national realizations of the ETRS89. Study behavior of geodetic reference frames in the presence of crustal deformations
- ✖ Input from EPN densification project (Kenyeres)

See *Holger S. et al “First steps and tests in the development of a EUREF velocity model” (session 3)*

RECENT ACTIVITIES

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 - + Real-time products
 - + Multi-GNSS
 - + Densification
 - + New Analysis Center Coordinator
- ✖ Monitoring of official ETRS89 coordinates
- ✖ Working Group on Deformation Modelling
- ✖ UELN updates → *Liebsch, Session 5*

RECENT ACTIVITIES

- ✖ EPN
 - + New set of coordinates (repro + IGS08 +igs08.atx)
 - + Real-time products
 - + Multi-GNSS
 - + Densification
 - + New Analysis Center Coordinator
- ✖ Monitoring of official ETRS89 coordinates
- ✖ Working Group on Deformation Modelling
- ✖ UELN Updates
- ✖ EUREF Retreat

EUREF RETREAT NOV. 12-13 2012, BERNE

× GOALS:

- + Review EUREF key themes and organizational structures
- + Derive plan to achieve EUREF objectives for the next 4-8 years

× EUREF products and services

× EPN and possible ways to improve weaknesses

× Link with other geodisciplines: Troposphere, Ionosphere, InSAR, Gravimetry

× EUREF promotion and outreach → Questionnaire!

× EUREF organizational aspects

RECENT ACTIVITIES

- ✕ EPN
 - + New set of coordinates (repro + IGS08 +igs08.atx)
 - + Real-time products
 - + Multi-GNSS
 - + Densification
 - + New Analysis Center Coordinator
- ✕ Validation of new EUREF campaigns
- ✕ Monitoring of official ETRS89 coordinates
- ✕ Working Group on Deformation Modelling
- ✕ UELN Updates
- ✕ EUREF Retreat
- ✕ EPN LAC Workshop

EPN LAC WORKSHOP, BRUSSELS

Program

May 14, 2013

14:00-16:00 : Introduction to Bernese 5.2 - presentation and demonstration by Rolf Dach

May 15, 2013

10:00-10:20 : Opening Session (Chair: C. Bruyninx)

10:20-12:30 : Reports from EPN Coordination Group and EUREF TWG (Chair: E. Brockmann)

12:30-13:30 : Lunch

13:30-14:00 : New processing strategies & EPN-REPRO2 (Chair: C. Völksen)

14:00-14:15 : Coffee break

14:15-15:00 : EPN LAC Reports (Chair: A. Kenyeres)

15:00-15:30 : Coffee break

15:30-16:30 : EPN LAC Reports (Chair: A. Kenyeres)

May 16, 2013

09:00-10:30 : EPN LAC Reports (Chair: W. Söhne)

10:30-11:00 : Coffee break

11:00-12:00 : Closing Session (Chair: C. Bruyninx)

PARTNERS



EuroGeographics

- MoU signed August 2007
- Mutual projects, e.g. INSPIRE



EUMETNET

- MOU signed June 2007
- Mutual exchange of data



International GNSS Service

- Cross-fertilization
- Common standards
- EUREF involved in IGS Governing Board, WG: real-time, antenna calibration, and Infrastructure Committee



CERGOP, Central European GPS Geodynamic Network Consortium

facilitate the densification of the European GNSS network for reference frame definition and geokinematical applications

MoU signed May 2011



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Welcome to EUREF !

Our work is focused on:

- Definition, realization and maintenance of the European Geodetic Reference Systems;
- Promotion and assistance of the adoption and use of European Terrestrial Reference System (ETRS89) and European Vertical Reference System (EVRS) in our partner countries;
- Development and maintenance of the EUREF GNSS Permanent Network (EPN) which is the ground based GNSS infrastructure for scientific and practical applications in positioning and navigation (GGOS, IGS-RT);
- Development of strategies and technologies for the realization of geodetic reference systems.

EUREF provides all its products on the "best effort" basis and free of charge to the public.

Updated 2011.02.04

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 - ✕ <http://www.euref.eu/>
- ✕ EUREF Permanent Network
 - ✕ <http://epncb.oma.be/>
- ✕ ETRS89
 - ✕ <http://etrs89.ensg.ign.fr/>
- ✕ EVRS
 - ✕ <http://www.bkg.bund.de/geodIS/EVRS/>
- ✕ CRS (Information system for European Coordinate Reference Systems)
 - + <http://www.crs-geo.eu/>