

# **EUREF TWG meeting – Padova March 13-14, 2006**

## **1 . Opening**

## **2. Minutes and Action Items**

Action items will be finalized at the end of this meeting.

## **3. GRF2006 and FIG symposium in Munich (Altamimi)**

Zuheir Altamimi contacted Hermann Drewes status of GRF2006 symposium. Hermann Drewes will organize a common one day session between GRF2006 and FIG; Hermann Drewes will send out the program and contact the speakers soon (these will not only be speakers from EUREF). Zuheir Altamimi requested that we (EUREF) will not pay an additional fee to register for FIG. Zuheir Altamimi will propose to Hermann Drewes that EUREF can make two presentations one general and one about the EPN (a general EPN presentation : applications, RF activities, ETRS89, ... co-authors: EPN Coordination Group ; CARINE BRUYNINX, Zuheir Altamimi, Heinz Habrich, Günter Stangl, Georg Weber).

Should EUREF not also make a presentation at the larger audience at FIG? Johannes Ihde has already been invited to make a presentation about his IAG IAC project (=EUREF's ECGN).

Hermann Seeger: FIG is very formal; it is maybe too late to propose any presentations, it could be that everything is already fixed.

## **4. General information (Torres)**

Joao Torres: will make steps to link .eu domain to EUREF, will keep us informed on progress

Joao Torres wrote a letter in the name of EUREF to solve Matera problem

INSPIRE meeting in Austria, June 21,22 ; all SDI's are invited to participate (Heinz Habrich will not participate). Heinz Habrich is asked to report about activities (in general). Heinz Habrich will do this for the next TWG meeting.

## **5. EUREF Contribution to AFREF (Torres)**

Joao Torres prepared a letter to IAG (cc to Zuheir Altamimi and the person in the UN + second similar letter to the UN person himself with cc to IAG) in response to AFREF CfP. EUREF proposes to include North African stations into the EPN in order to demonstrate and example. Action: Joao Torres will send us the letter by email for final approval to TWG and send the letters.

The CfP is detailed and allows participating at level of Tracking stations, DC, AC.

AFREF Workshop, July 10-13, 2006. Carine Bruyninx, Heinz Habrich, Georg Weber could go.

South-Africa is already well-involved in EUREF-IP.

EUREF needs to give advise on how Africa should start with the solving problem, based on part EPN experience.

## **6. Central Bureau Report (Bruyninx)**

Create: on-line tool propagate the coordinates using the velocities.

Action item: TWG members should again have a look at EPN CB to provide feedback and ideas for improvement.

## **7. Status of ITRF2005 (Altamimi)**

There is one year delay with update of ITRF. Delay caused by new approach (stacking of time series). During the course of project, IERS realized that IDS, ILRS and IVS were not ready for this approach and several iterations were necessary:

- IVS submitted last version on March 1, 2006 (seems OK);
- ILRS submitted last version in Jan. 2006 (1993-2006, seems OK)
- IGS submitted in Aug. 2005 (1996.1-2006);
- DORIS: 3 different solutions were submitted, 2 of them OK at this stage

Definition of origin (SLR) and scale (SLR+VLBI) for ITRF2005 is still under discussion: stick to origin/scale of ITRF2000 or redefine them. WG: SLR problem because in mean only 20 stations are observed simultaneously in the time series (caused by instability of SLR network). If you need from this a set of core stations, you are left with only 10 stations! Despite this fact, SLR is the only technique able to give the origin and the results seem to be good and stable (drift in TZ of origin of ITRF2005 with respect to ITRF2000 caused by network geometry). Amplitude of annual signal in scale is larger in case of VLBI than for SLR. This larger amplitude is partly caused by the fact that the VLBI stations do not take into account the thermal expansion of their antennae.

## **8. Status report on Time Series Special Project (Kenyeres)**

What is new in SP?

- new outlier data base (variable size outlier possible now)
- new offset data base
  - i. offset data base is available in SINEX format (but not yet available at EPN CB)
  - ii. 95% agreement with IGS discontinuity table

EPN cumulative solutions submitted to the IERS for the densification of the ITRF2005 (computed by Heinz Habrich) should use for IGS stations the IGS discontinuity table, and for the remaining EPN stations, the discontinuity table from Ambrus Kenyeres.

The table from Ambrus Kenyeres can be used a priori information.

WRMS of EPN combined solution shows the improvement of the height-component (from 12 mm to 4 mm); some of the weekly combinations have to be redone. When eliminating the outliers, the quality of the height component is much better going now from 6 mm to 4 mm.

New noise analysis of EPN time series using CATS software capable of analyzing noise characteristics of time series has been performed. Flicker noise is seen most of the time. Velocity field on EPN CB web-site is computed using CATREF, but Cats is used in order to have reliable velocity stdev (on SP web page). On web page of coordinates, all results (coord., vel. + formal errors are outcome of CATREF).

Zuheir Altamimi: Variance-covariance matrix from weekly solution should be used for the computation of the velocities!

Proposal to devote more time to this topic at the next TWG with a paper distributed in advance to the TWG before the next TWG.

Action: Ambrus Kenyeres: clarify difference between EUREF product (cumulative solution) and research activities within the frame of the TS SP.

## **9. Status of EPN multiyear solution for the ITRF2005 densification (Habrich)**

Step 1: MC for set of reference stations and save NEQ and save coordinates.

Step 2: take NEQ from step 1 and heavily constrain coordinates from step 1, then output SINEX file. (860-1310, including 8 week with Bernese 5.0).

Both solutions have exactly the same a posteriori RMS. But difference between 2 solutions is processing time (32 min step 1, 3h30m step2; reason is unclear at the moment).

RMS of Helmert transformation between each weekly solution (determined from residuals) and the combined solution shows a lot of bad weeks and is an argument for the reprocessing. Parameters of Helmert transformation show clear annual period in TY with an amplitude of 6 cm. Variations are maybe related to geocentre motion computed by IGS. Can maybe explain part of the variation, but not everything.

Next steps: submit preliminary solution to Zuheir Altamimi and wait for feedback.

To be consistent with the other techniques, observations up to end of 2005 will be used.

Alessandro Caporali: What is the physical interpretation of the estimated global Helmert parameters computed from a regional network?

Heinz Habrich: Does presently not really understand how ADDNEQ2 works.

Zuheir Altamimi: Heinz Habrich should do some tests: 1) compute the translations+scale (and rot=0) and then compute only rotations and compare both results.

Other test: compute translation, then apply it to the network and then in a second step compute remaining rotation and scale.

Action for Heinz Habrich: give MC solution to Zuheir Altamimi, clarify how ADDNQ2 works

## **10. Special Project Troposphere Status Report (Weber)**

Today 8 LAC with 5.0, 6 with 4.2

Main difference: Dry Niel for a priori trop modeling and Wet Niell for zenith path delay parameter wrt to 4.2.

Difference between ROB and LPT: decrease in bias and stdv when switching from 4.2 to 5.0. So the switch is to Bernese 5.0 shows improvement.

## **11. EUREF-IP Status Report (Weber)**

Impressive number of Ntrip streams (about 1000) in Europe; some are provided through virtual reference stations. Growing number of Ntrip supporting devices!

## **12. NTRIP symposium (Weber)**

100 institutions, 32 nations, 150 participants

ESA will integrate its stations in EUREF-IP

## **13. Integration of real-time data into the EPN (Bruyninx)**

WG created: Bruyninx, Gurtner, Torres, vdMarel, Weber, Caporali

## **14. Status of the GPS-Meteorology projects TOUGH and E-GVAP (Brockmann, vdMarel)**

TOUGH: EU research project finishes in June 2006 (scientific project)

- 7 MetOffices, ZTD used for validation, not for assimilation, continue now for operational use,
- 6 GPS analysis centers (550 sites processed in total)

E-GVAP: under authority of EUMETNET (is a meteorological project)

- Goal: operational use of Near Real-time ZTD in numerical weather prediction

- Met offices of 11 countries are participating
- GPS liaison group vdMarel, Brockmann, Bruyninx
- GPS data processing is more and more done by the Met-offices instead of the NMA
- Met-offices are responsible to make available the results to other participating countries

#### Role of EUREF

- Backbone network (data provider)
- Hourly data analysis, only if EPN LAC can process dense networks
- Monitoring of coordinates is done is same run as ZTD

EB: Stimulate more EPN LAC to contribute with generation of ZTD. Some of them are already now processing a dense national network in order to monitor the site coordinates. These LAC could also contribute to E-GVAP with the results of their ZTD

WG: it is a good to have a few EUREF LAC involved in this, but not all of them have the means to do it.

Günter Stangl: some EPN LAC process a NRT subnetwork consisting of a majority of NRT stations whose data are not freely available and a part EPN stations. The products of the NRT stations are freely available, but the data themselves are not.

DNMA (Danish Met office) makes real-time comparison of all ZTD estimated. At KNMI there is some work on a combined ZTD for validation purposes.

EUREF should formally contribute with data to EUMETNET

National Met-offices make agreement with national geodetic institute (data exchange, processing).

EUREF could also make an agreement with E-GVAP as data contributor using a resolution at Riga. The resolution is not really necessary, but it is not hurting. We will make a resolution at Riga. EUREF could get from E-GVAP the meteorological data for the EPN stations. We should request this mutual commitment in the resolution.

### **15. Short info on GGOS (Altamimi)**

GGOS retreat in Munich last month.

Zuheir Altamimi shows overview of new GGOS structure proposed for formal approval by the IAG EC, at the EGU meeting in April 2006.

Main goal of GGOS is to promote the products of the service.

### **16. Enhancing EUREF (Ihde)**

Result of brainstorming of BKG.

EUREF will not make any progress related to gravity as long as the gravity people are not involved directly in EUREF. Now, at the European level, there is no group anymore that represents gravity. When ECGN was started, this European gravity group existed, now it does not exist anymore.

WG: EUREF already includes absolute gravity in its work and we should have as much as possible EPN stations with absolute gravity measurements. This is already done in Switzerland. We wait for guidelines from ECGN to publish and make available gravity measurements. We need a web-site with status information on gravity measurements made available within the ECGN.

WG: Quality of GLONASS orbits is not as good as GPS orbits, so GLONASS observations should slightly be de-weighted in the processing.

Regional network like GPS can not determine geocentre. Only 1 technique (global) can determine geocentre: SLR.

## **17. Status report on EUVN-DA (Kenyeres)**

Description of additional data received: Additional information from Italy. New data received from UK, not integrated yet. For all countries: stdv of EUV\_DA and geoid is about half (about 6 cm) after introduction of new geoid version (in fact a new geopotential model).

Future: data validation per country; inclusion of EUVN-DA benchmarks into the UELN adjustment (UELN DC); web page (EVRS layout); draft report (based on the available data).

## **18. Status reports on EUREF height projects and the ECGN (Ihde)**

A new re-adjustment of the UELN is under preparation (new Scandinavian data (Finland, Norway, and Sweden), but Johannes Ihde is waiting for new data from Poland, Netherlands); the new re-adjustment will be linked to new definition of EVRS 2006.

Scandinavian data reduced to epoch 2000.0 by provided land uplift model. But: what about data from Denmark, North of Germany, Baltic States and North Russia, will we reduce them to?

Proposal for new data definition is necessary and in preparation for EUREF symposium.

Discussion on Absolute Gravimeter Meta Data Base with Nordic Geodetic Commission.

IAG ICP1.2: WHS (World Height System) standard/conventions under discussion (meeting at ICP1.2 workshop 10/11 April 2006 Prague + ICP1.2 WG meeting at GGSM2006 Sept. 2006, Istanbul)

## **19. Results of the adjustment of the precise leveling around the Baltic (Mäkinen)**

New national levelings from Finland, Norway, and Sweden have been used to determine update of estimation of post-glacial rebound (PGR). Parts of the effects are due to sea-level rise.

Combined result based on TG, GPS, leveling observations fits very well with what was expected for PGR.

## **20. EUREF contribution to the Tsunami Risk Research Group Europe (Stangl)**

EUREF is prepared to support the TRRGE and Action: Altamimi and Torres will finalize a positive letter.

## **21. Next EUREF symposia (Torres)**

- RIGA 2006 (Kaminskis)  
Height on Wednesday, EPN on Thursday,  
Elizabeth-nams hotel recommended for TWG
- UK 2007 (Torres)
- Brussels 2008 (Bruyninx)

## **22. Review of Action items (Altamimi)**

Next meeting: 6-7 meeting two full days in Frankfurt