

**Time & location:**

Part I: Monday, May 13, 2024, 1300-1530 CEST (online)

Part II: Tuesday, June 04, 2024, 0830-1200 CEST, ICGC Barcelona (in person + online)

Excused for Part I: Sacher, Schwabe, Voelksen

Excused for Part II: Caporali, Bruyninx, Torres

Part II online: Dach, Völksen

**MINUTES****1. Opening (Söhne)**

The EUREF GB chair WS welcomes the GB members and guests.

**2. Approval of minutes of 94<sup>th</sup> GB meeting (Kollo)**

Minutes from GB94 will be sent out after GB meeting (Part I) for the final comments.

**3. Review of Action Items from previous GB meetings (Söhne)**

Most of the action items from GB 94 are done, some are in progress:

- regional DCs to rename AC and combined products. Mail sent 09-04-2024, discussion between BKG, BEV, ACC, Tropo C, EPN CB, two lists and simple source code exchanged between EPN RDCs.
- Proceed experimental cumulative solution C2280 and provide it to the GB for testing – JL sent it to Christof and Tomasz last week, Tomasz sent some feedback, presentation will be given at the Symposium.
- Compile points and arguments on the added value of the contribution to the EPN Densification for potential contributors.
- Presentation on IGS activities at the EUREF2024 Symposium will be given by Elmar Brockmann.
- Contact the chair of UN-GGIM:Europe, Jeffrey Verbeugt and invite him to next GB meeting and EUREF2024 Symposium.
- EUREF-EPOS work plan 2024/2025 signed.

**4. EUREF Governance****a. EUREF Symposium 2024 (J. Grau Bellet, E. Bosch Llopart)**

Web-page status: abstract submission extended to 7th of May; registration extended to 21st of May. Program is being updated whenever there is new information available. Sponsor logos will be included. Registration status (as of 13th of May): 48 registered attendees, 18 invitations from ICGC. Abstracts received: Session 1 – 12 presentations, Session 2 – 7 non classical National Reports (NR), 8 classical NR, 4 posters, Session 3 – 9 presentations and 5 posters. Social events: Icebreaker TBD, Some tour before dinner? GB meeting 4th of June (half-day), dinner or lunch TBD. Some still pending: (1) personal data processing contract between EUREF and ICGC, (2) Invoices should be delivered to everybody asking for it, (3) certificates of assistance/presentation via email after the symposium. Announcements via EUREF-Mail. Issues: Session 2 – National and Local Activities needs clarifications. Ask NR presenters with three options: poster, 5 min classical NR, or some more slots for non-classical NR? Program will be published on the webpage 27th of May the latest. Suggestions from GB: Splinter meetings shall be in different days, the order of presentations shall be overlooked by chairs and sent to LOC.

### **UPDATE during Part II**

Total 111 registrations, 85 at the tutorial, 95 at the symposium; 28 countries, 52 abstracts accepted. Tutorial about the Space Weather. When should the webpage of the symposium to be officially closed (is provided by a commercial company)? Not too early, by end of summer. Formal consent paper to be filled by the presenters and sent back.

#### **b. Resolutions for EUREF Symposium 2024 (Lidberg)**

Call for possible resolutions – if good idea, then please step forward. Joachim and Martina were asked, they will think about it. Martin – has idea he will put it to emails.

EUREF2025 – no volunteers so far, possibility to have larger AC meeting, EUREF mail to ask volunteers. EPN AC workshop in 2026, because EUREF2027 shall have elections. Plan B for 2025 is AC workshop, plan A is to have a symposium.

#### **c. Update of EUREF web page (Kollo, H. Ribeiro, Lidberg)**

New webpage, same colours, same sections, easier to update the webpage. Statement about to Ukraine – the situation is not changed, but it is not in the first page of ICG webpage. GB decides to remove the statement. EUREF mail to inform the updated webpage. Protected section for GB members with specific login (sent by Helena to the GB members). What do we want to put there? Any restrictions concerning the structure?

### **5. EUREF collaboration / external interfaces**

#### **a. EUREF-EPOS collaboration: Thematic Core Service “Satellite Data” (M. Manunta)**

EPOS has been designed and built as the only research infrastructure for solid Earth science in Europe to ensure seamless coordination of efforts and priorities among European nations. Thematic communities – 10 different solid Earth domains harmonized across EPOS into Thematic Core Services (TCS). Each TCS is established as consortium of research organizations. EPOS data portal is free for usage (<https://www.epos-eu.org/dataportal>). TCS satellite data governance structure was introduced TCS services – 8 services, Copernicus sentinel 1 data, global coverage. E.g. EPOSAR, deformation time series generation, integration of InSAR and GNSS measurements. GNSS results used as reference so far from the US paper. But should come from the EPOS TCS on GNSS. Discussion: EUREF is everything about reference system. ZA points out that if the products are aligned to ITRF2014 and 2020, then we are ok, otherwise no, because earlier ITRFs are biased. AK: in the new cycle ITRF2020 will be used for the European Ground Motion Service (EGMS).

#### **b. EUREF-UN-GGIM:Europe collaboration: GRF plans (J. Verbeurgt)**

Community of interest on geodetic reference Frames: Europe – provide support and actions that further aims of the Global Geodetic Centre of Excellence (GGCE), act as coordinating body in the field of Geodesy in Europe, focus on growing and sustaining geodesy profession, Assist of EU states on topics related to geospatial information, engage European experts to contribute to UN-GGIM/Sub-committee on Geodesy/UN-GGCE. Work plan (not final): contact register for UN-GGCE, reference frames white paper (aviation), geodetic status of European countries, funding opportunities in Europe. Community interests: overlap in participants EUREF and GRF Europe, GRF Europe focuses on political level, input from EUREF: to avoid duplication and to maximize value of exiting data and information, to have correct reporting to the global level. Discussion of GB: ML points out that EUREF is on the technical side, no connections to political side, connection to UN-GGIM shall

be done. Member from GGIM as permanent guest in GB. Symposia is a value meeting point for everyone in the field of Geodesy.

**c. EUREF-Copernicus/C3S Meeting on May, 14 (Söhne)**

EUREF GB Chair has received letter from Monica Proto about the GNSS RINEX datasets. It was followed by internal discussion with ML, KK, CB and RP, the highlights were: (1) data in the EPN archives are open to everyone without specific license regulations, however for recognition of contributing organizations CC-BY licensing are relevant, (2) recognition of EUREF/EPN is relevant, (3) sharing metadata is sufficient, (4) EPN ZTD is already assimilated in Copernicus Regional Re-Analysis, (5) ZTDs from IGS daily and EPN-repro2 are already used. Similar letter was sent as well to IGS. Digital meeting planned to 14<sup>th</sup> of May. Jonathan Jones submitted an abstract to EUREF2024 symposium on “The GNSS Component of the Copernicus Climate Change Service”.

**6. ITRF2020 updates and consequences for ETRS89 (Altamimi)**

Xavier Collilieux was invited as a guest to GB meeting. Extended data available and results of analysis were presented. No major issues with technique extended data. Stability of SLR/ILRS origin and scale with the extension, is at level of or better 0.1 mm/yr. Expected release date is summer 2024. There will be no change to the frame parameters (origin, scale, orientation) between ITRF2020 and its first update. As well, no change to the ITRF2020 and ETRF2020 relationship.

**7. Coordinators**

**a. Status Report of the Analysis Centre Coordinator (Liwosz)**

Until recently EPN final combination solution (for weeks 2238-2304) were based on 15 solution, 1 missing solution (RGA) was provided and another (IGN) is expected soon. Plans to recombine all solutions when all 17 solutions are available. Methodology for analysis of EPN-Repro3 solutions is ready. First EPN-Repro3 solutions are as well provided, testing in two steps: (1) content of SINEX files checked, and (2) quality of AC solution checked. Problems with missing stations and sometimes large outliers. Issues with file naming – three different naming types were in use, decided to use common names. Reprocessing should as well include troposphere part.

**b. Status Report of the Troposphere Coordinator (Pacione)**

Full report will be presented in the symposium. Rapid combinations are finished; they will be uploaded after IGS conference. EPN-Repro3 – currently checking solutions.

**c. Report of the Reference Frame Coordinator (Legrand)**

In November 2022 switch of EPN daily product to IGS20, C2235 last EPN reference frame product in IGB14. Monitoring solution based on a mix of IGB14 and IGS20 has been processed on a regular basis to monitor EPN stations. “Hybrid solution” C2295 is in preparation, based on daily combined solutions and aligned to IGS20. Test solution C2280 has been sent to TL and CV. C2295 has 507 stations and covers time span 1996-01-01 – 2024-01-06. Containing 21 new stations with published velocities, 101 stations with position changes due to switch to epn\_20.atx/IGS20, 20 stations with additional offsets. This product is not suitable as reference frame to align densification but can provide up-to-date station coordinates while waiting for the EPN-Repro3 solution. Loosing reference station at the borders of the EPN. Question by RD on the number of discontinuities. Discussion on rules for processing velocities. Question by AK on the non-linear velocities of stations.

Discussion on long product file names and adaption of the IGS guidelines for this. RD: we as EUREF are free to adapt, e.g. by using the optional string suggested in the IGS guidelines.

## **8. Height Reference (Sacher)**

Versatile hydrodynamic project of Delft University of Technology (2018-2023), combination of spirit levelling data with model based on hydrodynamic levelling data. Testing of hydrodynamic levelling data to use hydrodynamic connections in the Nordic area of UELN. Has good effect in GB. MP recalls the other parameters, e.g. salinity. Discussion on possibility to extent to, e.g. Mediterranean area. To be discussed in the WG on Unified Height Reference.

New levelling data from France. New set of GNSS/levelling control points for the European height reference surface: (1) homogenization of GNSS heights.

## **9. Working Groups**

### **a. EPN Reprocessing WG (Völksen)**

Short summary and status overview. BKG has started reprocessing. Serbia (AC RGA) not in repro but provides operational solution. Some ACs missed some historical data and need to partly re-reprocess. ANTEX file 95% same as IGS, individual to type mean calibration, global sites what are in Europe. LAC workshop - online meetings with LACs, in next 3-4 weeks, Autumn workshop – online or physical, shall be decided. If yes, should be in September this year.

### **b. WG on EPN Densification (Kenyeres)**

EPND in a hold, waiting for EPN-Repro3, densification repro will be done later. No results before the end of this year. Benchmark test activities prepared, chosen GPS week 2293 with approx. 50 stations, several DACs done. Resolution on EPND activities would be good.

### **c. European Unified Height Reference (Schwabe)**

(1) GNSS levelling: investigation of vertical velocity models, e.g. Piña-Valdés et al. (2022); (2) Activities to improve consistency between GNSS/levelling and quasigeoid; (3) Quasigeoid: refined harmonic correction in residual terrain modelling.

## **10. Divers**

### **a. EUROSDR (Lidberg)**

There will be a joint EUROSDR-EUREF workshop in Tromsø, Norway, in November this year. Organisers asked for EUREF participation / presentation. GB gives ok to ML to proceed.

## **11. AOB**

### **a. Next GB meeting(s) (Kollo)**

Not discussed – but assumed to be online again in two parts in fall this year. Or possibly connected to the LAC workshop in case this workshop is in-person.