

Time & location:

Tuesday, February, 27, 2018, 13:00-18:00

Wednesday, February, 28, 2018, 08:30-12:25

Dipartimento di Geoscienze, Università di Padova, via Gradenigo 6, 35131 Padova

Room 'Sala del Consiglio' (second floor)

MINUTES OF MEETING

Last update: March, 02, 2018

1. Opening (Kenyeres)

The GB chair AK welcomes the members and guest of the meeting and thanks the University of Padova for the invitation.

2. Welcome (local organizers)

Prof. Fabrizio Nestola, Vice Director of the Department of Geoscienze, welcomes the participants on behalf of the Director, Prof. Cristina Stefani. Prof. Nestola remarks that this is the sixth time that the Department is chosen to host the TWG/GB meeting, starting 2001. He expresses the hope that this opportunity will repeat again. Joking on his expertise in diamonds he points out, in closing, that the selection of Amsterdam for the Symposium is very attractive also to himself.

3. Approval of minutes of 75th GB meeting in Brussels (Söhne, all)

The secretary distributed the final version on February, 08. No written comments received. ML mentions one correction concerning the IUGG membership under appointment. After correction WS will send the final minutes to M. Vasconcelos for uploading them to the EUREF web page.

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

WS reviews the action items from last meeting which are mostly done, in progress or on agenda of today's meeting.

5. EPN**a. Guidelines for EUREF Densifications (Bruyninx)**

The guidelines were distributed well in time before the meeting, discussed via email and an updated version has been distributed once more. CB explains the motivation or necessity for an update of these guidelines. Simply replacing ITRF2008/IGb08 by ITRF2014/IGS14 is not sufficient. Also historical frames should be considered. Discussion follows about quality differences between IGS combined products and individual IGS AC's products. The differences are expected not to be too large. Consistent products are of special importance for PPP. Next, discussion about velocity estimation. The requirement of minimum length of three years is ok, but what happens with consecutive campaigns? Some members are in favour to remove those kind of campaigns from the guidelines. CB replies that they were not in the first version of the update but have been added on request. GB agrees that some wording to be added explaining the differences between consecutive campaigns and permanent observations with respect to velocity estimation. Discussion about minimum constraints (MCs) on velocities. AC points out that in certain repeated campaigns MCs may not ensure that the network maintains its alignment to the ETRF, and that for this reason further research is necessary. Since there is no agreement on this topic, a final solution is postponed to after the meeting. Discussion about introduction of PPP into the guidelines. GB decides that PPP should not be excluded at all but not included yet into the version to be published soon. Beside a minor discussion about usefulness of RTK with respect to reference frames this topic is finished with a discussion about a potential PPP

working group. The guidelines are accepted¹, but before publication a final interaction amongst the GB will be performed. Open points concerning MC and PPP will be discussed after the GB meeting.

Action Item 1 to AC, ZA, JL, RD, ML: discuss the open points concerning the Guidelines for EUREF Densifications as discussed during the GB meeting and provide a result to the GB.

Action Item 2 to RP, JD, ML, CB/JL: start investigations on PPP with respect to its usage for reference frame realisation in EUREF. Report on the next or over next GB meeting.

b. RT data from Catalunya (Bruyninx, Pacione, Söhne)

WS explains the situation with the request of the “Institut Cartogràfic i Geològic de Catalunya” (ICGC) to sign a letter of acceptance concerning the use of real-time data streams. All three EPN regional broadcasters at ASI, BKG and ROB are faced with this issue. Their first response was that under current conditions they were not able to control or even prevent specific usage of EUREF real-time data. The GB understands the difficult situation the ICGC has to deal with. However, the GB states that it is not possible for EUREF to sign such a letter nor is willing to add restrictions or prohibitions in the Terms of Usage. WS should prepare and write an answer to the latest response of ICGC. It should be evaluated whether it is possible to get at least one RT stream from Catalunya. CV proposes, in the answer, to point to the open data policy of EUREF.

6. 2016 Slovenian GNSS Campaign (Berk, Medved)

SB presents the main results and measures of the 2016 Slovenian campaign. The report and the results (files, maps) were distributed one week before the meeting. Some minor remarks from GS to some old stations and one station double name which should be renamed if possible. ZA continues with some need for clarification: the full time span of 80 days for all observations are too long for neglecting plate motion (station velocities). Discussion about minimum constraints (MCs) approach. Orbits and ERPs are fixed so that no additional MC is needed. Discussion about a priori sigmas of 1 mm but there seemed to be a misunderstanding while using Bernese GNSS software (BSW). ZA recommends to use the term reference frame stations instead of fiducial stations. CB asks which parameters were used for the MC? ZA would like to see in addition to the examples in the report a three rotations only solution for completion. Discussion about shortest baselines option which is used for the campaign versus the maximum observation option in BSW. RD and JD clearly prefer using max-obs. RD states that the numbers of ambiguities solved should be significantly higher than the values which are presented in the report. GB confirms its willingness to accept the campaign during the next symposium in Amsterdam.

Action Item 3 to SB and KM: provide an updated report taking the comments and questions of this meeting into account and distribute it to GB well in advance before the next GB meeting resp. the symposium. In addition, prepare a presentation for the symposium.

7. Coordinators

a. EPN Combination Center Report (Liwosz)

TL gives a short review on the results and decision taken from the AC workshop in Brussels last October. The Vienna Mapping Function, VMF1, has been introduced now in all solutions after IGN recently solved the problem with introducing VMF1. MUT changed from Bernese to GAMIT in GPSweek 1980. RD asks for reviewing the weighting of MUT. The rapid product should be improved. Several ACs resumed, started or reacted positively on this initiative. It is agreed that daily solutions are considered as official product, in particular in the product catalogue.

¹ After meeting note: the guidelines have been published by CB via EUREF mail 9322 on 14 March 2008

Also the EPN CB web pages will be adapted accordingly. ZA asks for the lifetime of the weekly solutions. They should continue for the time being, in particular with view on the troposphere combination. Discussion about rejected stations in the weekly solution, e.g. because of equipment change. This scheme should not be used 1-to-1 for the daily product because solutions will be lost that way. A new file with information about excluded stations should be added for the daily procedure instead². Discussion about individual weekly solutions. RP is afraid concerning loss of required information for the troposphere combination. The GB discusses about a potential solution for this. JL asks for removing one year of the repro 2 computation (2013 to 2014) which had shown problems.

Action Item 4 to CB: make available at the EPN CB files with excluded stations on a daily basis.

b. Updated Status of the EPN Multi-Year Solution (Legrand)

JL starts with reporting about the update of the EPN multi-year solution with respect to the last meeting. Annual and semi-annual signals are not estimated. C1965 has not been published due to time delay but GB insists to publish it, together with C1980. JL explains her investigations on compliance of the EPN solution with the IGS multi-year solution. IGS and EPN discontinuity list have been harmonised in January 2018, the agreement between the solutions has been improved. Nevertheless, there are some remaining differences (36 stations with 50 different discontinuities), this list will be revised again for the next solution C1995. She also checked position and velocity differences for the 194 common stations. WS asks for the update rate of 15 weeks, but the GB is not in favour of changing this periodicity. Short discussion about the ability to estimate annual and semi-annual signals together with positions and velocities when analysing a regional network like EPN.

c. Report of the troposphere coordinator (Pacione)

RP informs about the usage of meteo data and products. She investigates EPN and VLBI co-located stations. Ten sites are found but only four stations are delivering meteo data in Rx2. Dates of calibration are of importance. She continues with investigations on horizontal gradients. The horizontal gradients differ much between Gipsy, GAMIT and Bernese but also within Bernese. There are many different parameters in the three softwares. RP proposes a test campaign of one week for investigation on horizontal gradients, GPSweek 1978 is proposed because it is in the middle of last VLBI CONT campaign. RD has some concern with respect to correlation within the – small – networks. For the test campaign, he proposes a dedicated SNX format with gradients in it for better validation. He also proposes to include a Bernese PPP solution.

d. Short note on real-time data streaming (Söhne)

The introduction of long mount-point names is under preparation. The IGS RT WG chair distributed a white paper on it but it seems that no official acceptance was communicated so far. WS informs about a new version (2.0.31) of the Ntrip caster software allowing internal links (function called 'alias') from (new) long mount-point names to the (old) short ones ("alias /ACOR0 /ACOR00ESP0"). This has to be done in the file 'clientsmounts.aut'. The advantage is that permanent users can still use the short mount-points. However, this relation is only working for those mount-points which are pulled, i.e. relayed from another caster. For those streams which are sent by the station provider to the caster BKG introduced a solution of an internal relay from the short to the long mount-point. In both cases there is only one entry possible in the 'source-table'. It is also worth noting that

² After meeting note: the new file has been announced by JL via EUREF mail 9315 on 07 March 2018

the rights for a stream are transferred to the 'alias' stream. All three regional broadcasters should update to the newest caster version. P. Neumaier from BKG will assist introducing the new options, if necessary.

8. EUREF symposium 2018 (Alberts)

BA reports on the progress with the organization of the symposium. The GB meeting will be held in the Kadaster Amsterdam not far away from the central railway station. Discussion about the schedule of the GB meeting with respect to the tutorial. AK is in favor of having a full day meeting on Monday while some other members prioritize a noon-to-noon meeting. Finally GB agrees on having a noon-to-noon meeting on Monday and Tuesday and possibly miss some early tutorial talks. The tutorial is very well elaborated although some presenters are 'tbd'. WS reminds the GB to the necessary or mandatory talks out of the GB for the symposium.

Action Item 5 to all: identify possible talks from the GB and allocate the necessary time slots (15 or 30 min), reply until end of March.

9. EUREF strategy (Poutanen)

As requested by action item, WS sent out the request for topics, ideas, actions worth to be considered as part of a strategic plan beginning of November 2017. Until mid of January 2018 feedback of 12 GB members was received, with a total of 53 bullet points. The secretary sent out the full set of feedback to the GB January, 30. MP starts discussion by explaining a first draft of a strategy paper compiled by him and WS which was sent to the GB members a day before the meeting. The GB asks for confirmation that the excel file of proposals is explicitly not lost because it contains some more concrete items and ideas which are not perfectly suited for and/or adapted in the draft strategy paper.

Discussion at this early stage about representation of EUREF within UN-GGIM: Europe. Discussion about potential status of EUREF as a legal entity. IAG is not and will not accept this for a sub-commission. AC mentions that the implementation of the INSPIRE directive may require that a European entity acts as a technical body. In such case EUREF could be a valid candidate for reference 3D coordinates and grids, and should be prepared to this eventuality. Hence the opportunity that the Strategy Plan considers for EUREF the possibility of acting as a technical advisor to the EU or EC.

General discussion on the content of the distributed draft. For RD it seems to be a mixture of strategy and implementation plan. The GB shares this concern and agrees on separation of the items.

Discussion on kinematic reference frames which are not seen as part of the section 5 GNSS. After the summary, AK states that the approach, the course of actions is wrong. It should be started first with going point by point through the excel sheet. The GB agrees on this procedure.

Discussion on the wording "higher-level products". WS explains it with respect to the EPOS product nomenclature. The GB asks for a better suited wording.

Discussion on ECGN. The terminology seems to be outdated. Integration should be used instead. CV mentions the optical clocks for example. ZA asks for the level of combination with other techniques. The GB confirms that gravimetric reference frames should not be excluded from the start.

Discussion about the EPN and the proposal asking for more information about the usage of our products. CB proposes to continue with the feedback for troposphere. PM states that he is able to present some statistics on the usage of the BEV data centre. RD emphasizes that "the others" are the more important user group rather than the "common" users.

Discussion on the question whether the EPN analysis should "go global" is raised. The GB is aware of that this is not a new discussion within the EPN.

Action Item 6 on TL: The ACC is asked to organize a test campaign, where the global approach can be investigated in detail, to prepare a working paper with pros and cons concerning "EPN going global?" and to ask the ACs whether they are willing to contribute.

CB explains the necessity of reviewing the structure of ACs on the EPN level. JD is adding that some ACs could intensify the work on EPN densification. AC questions why to change a good running activity; only promising approach if we can convince that a new structure will bring better performance and results³.

The GB concludes that no strategy presentation can be prepared for the symposium on the basis of the presented draft. RD proposes that the EUREF chair should announce at the symposium in Amsterdam the general plan to write down a strategy plan followed by an implementation plan, together with the invitation to the audience to submit ideas. AK and CB propose to have some non-physical meetings in smaller groups before the next GB meeting on specific topics, based on the feedback given by the GB members to the secretary. One topic is EPN, another height and gravity, a third EUREF governance. The GB agrees on this.

Action Item 7 on all: prepare and organize non-physical meeting by appropriate means (Webex or skype) on the identified main topics, before the next GB meeting. Present outcome at the next GB meeting.

10. UN-GGIM:Europe (Poutanen)

MP gave a presentation on "UN-GGIM: Europe – Future of GRF-Europe" at the UN GGIM:Europe ExC meeting in Brussels October, 23, 2018. He reviews the outcome of this meeting with regard to a potential GRF-Europe sub group and emphasizes that EUREF is seen there as the suitable entity to represent the regional organization in Europe. This is intensively discussed. ML mentions that at least EPOS could be identified as the organization in Europe with legal background. WS names some arguments why EUREF cannot be the GRF Europe by nature, e.g. that GRF Europe consists of member states, not agencies or organizations and that decisions of GRF Europe have to be transparent, documented and binding, but the GB is not agreeing on this. The GB is wondering about the nine names from Europe as part of the UN:GGIM Subcommittee of Geodesy. ZA provides the countries and the appointed members from Europe. He emphasizes that each country has to find national means to implement infrastructure. The conclusion of the GB is that EUREF is willing to be a member of UN:GGIM Europe with a voting right. The EUREF chair should go for that.

11. External Interfaces

a. IGS (Dach)

RD reports about antenna calibrations. Galileo satellites are fully calibrated and the meta data is available. But the ground antennas are not calibrated for Galileo frequencies. Main reason for this is the robot calibration which is more or less coming out from one single source. The IGS, especially the ACC M. Moore and the chair of Antenna WG A. Villiger are working on this issue. In particular, there is a request to submit all available chamber calibrations to A. Villiger. CB will check with the EPN CB whether there were more individual chamber calibrations available in the EPN community⁴. Another question to EUREF GB is whether EUREF is willing to write also a letter to Geo++ as it is planned by the IGS. The EUREF chair will consider this.

Action Item 8 to CB: try to collect additional chamber calibrations from EPN stations.

b. EPOS (Bruyninx, Dousa, Fernandes, Kenyeres, Legrand, Lidberg, Liwosz, Söhne)

CB presents the new site log submission scheme based on the new software M3G. WS asks if the change has been announced e.g. by EUREF mail, but CB is not in

³ After meeting comment by the GB chair: we forgot the most preferable option we agreed on the AC workshop: the EPN combination should be based on three software-specific solutions (Bernese, GIPSY, GAMIT), where all Bernese ACs are first merged into one solution. This may better facilitate the stability of the routine-repro solutions and less affects the individual ACs. However, this may generate more work for the ACC and also require network extension of the GAMIT/GIPSY solutions. This needs of course extensive discussions and has to be incorporated into the planned tests.

⁴ After meeting note: the request has been communicated by CB via EUREF mail 9309 on 02 March 2018.

favor of this because it is too early. Instead, M3G is applied in a one by one dialogue with the EPN operational centres. JL mentions that EPN is only submitting Class A stations from the multi-year solution to EPOS, not Class B, which introduces loss of information. AK replies that it should not be an issue and he proposes to submit them, too. The GB agrees.

c. EG POSKEN (Bruyninx, Kenyeres)

AK shortly reviews the history of EuroGeographics Knowledge Exchange Network POSKEN. Since the activities were not sufficient in the past, the role and topics will be changes to communications mainly. There will be a communication workshop in Brussels (National Geographic Institute of Belgium) April, 26 to 27, noon-to-noon. The workshop will be co-chaired by H. Kutterer (Director General of BKG, Germany, Member of EuroGeographics Management Board) and M. Cory (EuroGeographics Secretary General and Executive Director). Webinar is possible. CB and ZA got personal invitations and are planning to take part. Since representation of European organisations is appreciated the GB asks CB to give a short presentation on behalf of EUREF.

12. Working Groups

a. WGs on EPN Densification, European Dense Velocities and Deformation Models: Progress on EPN Densification in Central Europe within the CEGRN EUREF Partnership (Zurutuza)

AK shortly reviews the status of the densification WG. It needs more people to actively cooperate to turn it into a more operational WG. He would like to turn down his effort in this WG. CB asks for the impact on EPOS which might be crucial and emphasises that a densification contribution from AK to EPOS is expected for the next years. Discussion about the progress. Up to now the densification is only complete up to GPSweek 1933, i.e. with IGB08. The continuation with the change to IGS14 is difficult.

AC presents some results on experiments he and J. Zurutuza did with the stacking of normal equations. He presents two approaches named A and B. Simply spoken, A is the approach followed by the WG Densification, B following the approach of the WG on Velocities, with the modification that also covariance information is used. A first test to confirm that results of both approaches are identical was successful. AC lists pros and cons of each approach, e.g. fast(+), straightforward(+), different discontinuities(-) for approach B, full control on discontinuities(+), only one STA file(+), lots of work(-) for approach A. AK mentions that the biggest part of the work is the checking of the meta data which cannot be avoided using approach B as well. The cleaning of the time series is also important. The homogenization of discontinuities of common stations in different solutions is crucial.

Discussion on reference frame realization in both approaches. AC points out that approach B can be successful if all the contributors strictly follow the EPN Guidelines on Densification. This can turn to be a positive opportunity to make the Guidelines of widespread use, even outside the EPN AC community. Some GB members doubt that the removal of MC can perfectly done for approach B.

13. Promotion and Outreach

a. Update of EUREF-relevant web pages (Söhne)

Someone called WS's attention to that the English Wiki pages about EUREF were outdated⁵. It is likely that there are more pages with the same deficiency, e.g. on TWG on the EUREF web pages. The GB takes note that it is necessary to assure

⁵ After meeting remark: The information on the key personnel is outdated on this page.

that the internal and external EUREF-relevant web pages are up-to-date.

14. Action Items (Söhne, Kenyeres)

AK und WS will compile the full set of action items together with the draft minutes of the meeting within the next two weeks.

15. AOB

a. ESA Call “GNSS Scientific Service Center” (all)

Short note on an recently launched call for a GSSC – pilot project activity. Deadline is April, 13, funding volume max. 500 k€ over 14 months. No institutions, represented in the GB are intending to send a proposal.

b. BKG issues (Söhne)

WS informs the GB about a move of the geodetic section of BKG inside Frankfurt starting mid of this year lasting approx. 3,5 years, due to fire prevention measures. More critical could be the IT concentration within German Federal government which should take part for major parts of the geodetic section in the first half of 2018 year and which may affect the BKG Analysis Centre and the BKG Data Centre. WS finally informs on the geodetic fair “Intergeo” (www.intergeo.de) which will take place this year in Frankfurt, October 16-18, together with the conference “Geodetic Week” (www.geodaetische-woche.de), co-organized this year by BKG and M. Becker from TU Darmstadt. Presentations in English are welcome.

c. Next GB meeting(s) (all)

Next GB meeting will be prior to the symposium in Amsterdam as a noon-to-noon meeting on Monday-Tuesday.

PARTICIPANTS

Z. Altamimi
 E. Brockmann excused
 C. Bruyninx
 A. Caporali
 R. Dach
 J. Dousa
 R. Fernandes excused
 A. Kenyeres
 J. Legrand
 M. Lidberg
 T. Liwosz
 R. Pacione
 M. Poutanen
 M. Sacher
 W. Söhne
 J. Torres excused
 C. Völksen

A. Araszkiewicz
 B. Alberts (on Tuesday only)
 S. Berk (on Tuesday only)
 P. Mitterschiffthaler
 K. Medved (on Tuesday only)
 G. Stangl



J. Zurutuza (on call)