EUREF Symposium 2015,
Leipzig, June 3-5, 2015

Activities of the EPN Analysis Combination Centre

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ROUTINE PRODUCTS:

Final products: daily and weekly solution

based on 16 individual EPN AC solutions

Rapid products: daily solution

based on 10 individual EPN AC solutions

Ultra-rapid products: hourly solution

based on 3 individual EPN AC solutions

SPECIAL PRODUCTS:

Daily combined solution from repro2

FINAL PRODUCTS:

Daily and weekly solution combined from 16 individual solutions provided by EPN ACs. Combination is done in ADDNEQ2 at normal equation level (NEQ).

ASI BEK BKG COE IGE IGN LPT MUT NKG OLG RGA ROB SGO SUT UPA WUT

15# BERNESE, 1# GIPSY OASIS

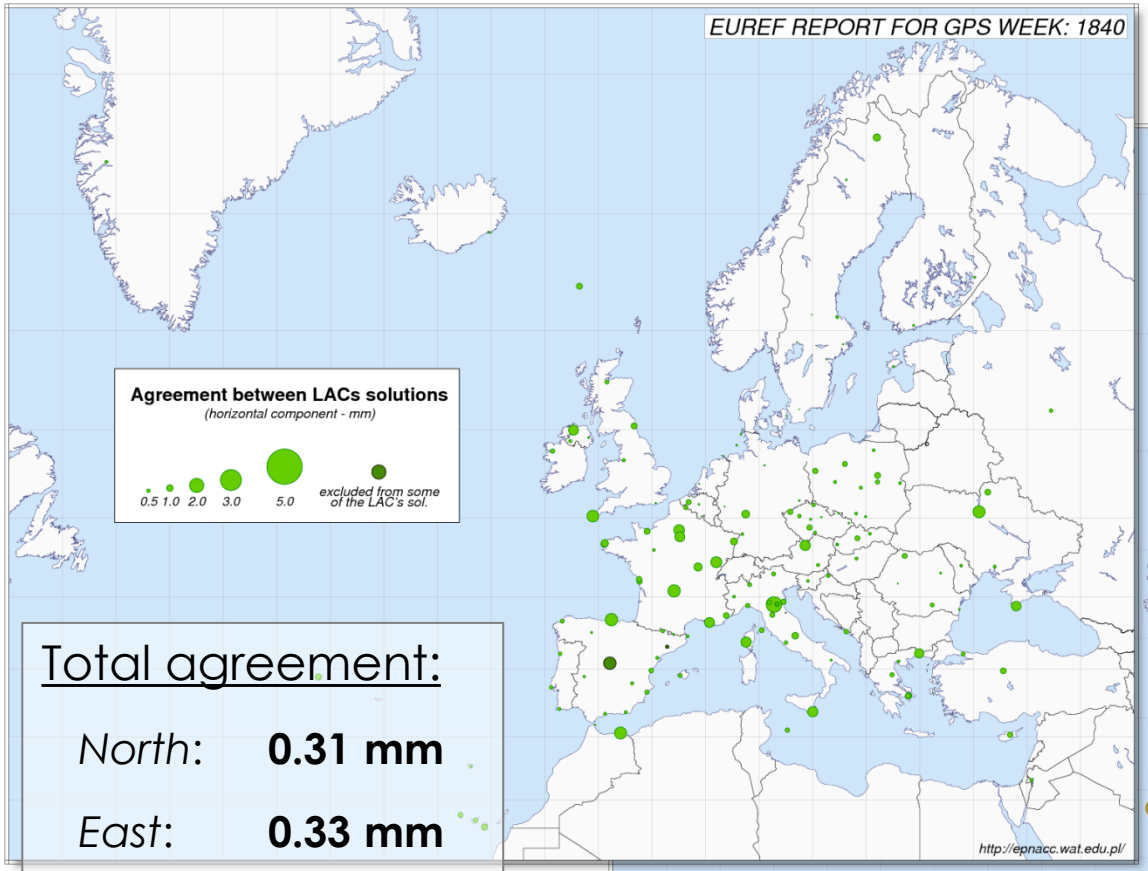
ASI BEK BKG COE IGE IGN LPT MUT NKG OLG RGA ROB SGO SUT UPA WUT

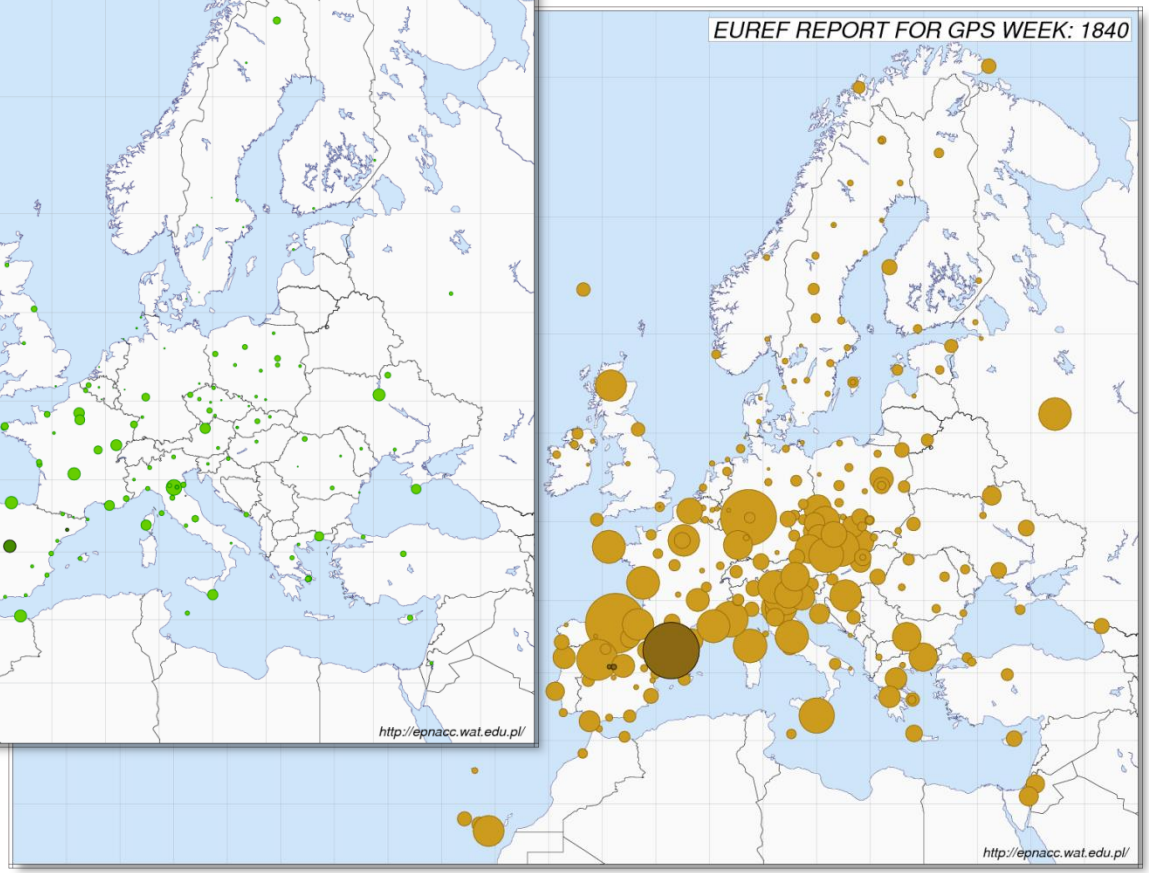
15# REGIONAL, 1# GLOBAL

ASI BEK BKG COE IGE IGN LPT MUT NKG OLG RGA ROB SGO SUT UPA WUT

14# GPS + GLONASS, 2# GPS only

FINAL PRODUCTS:

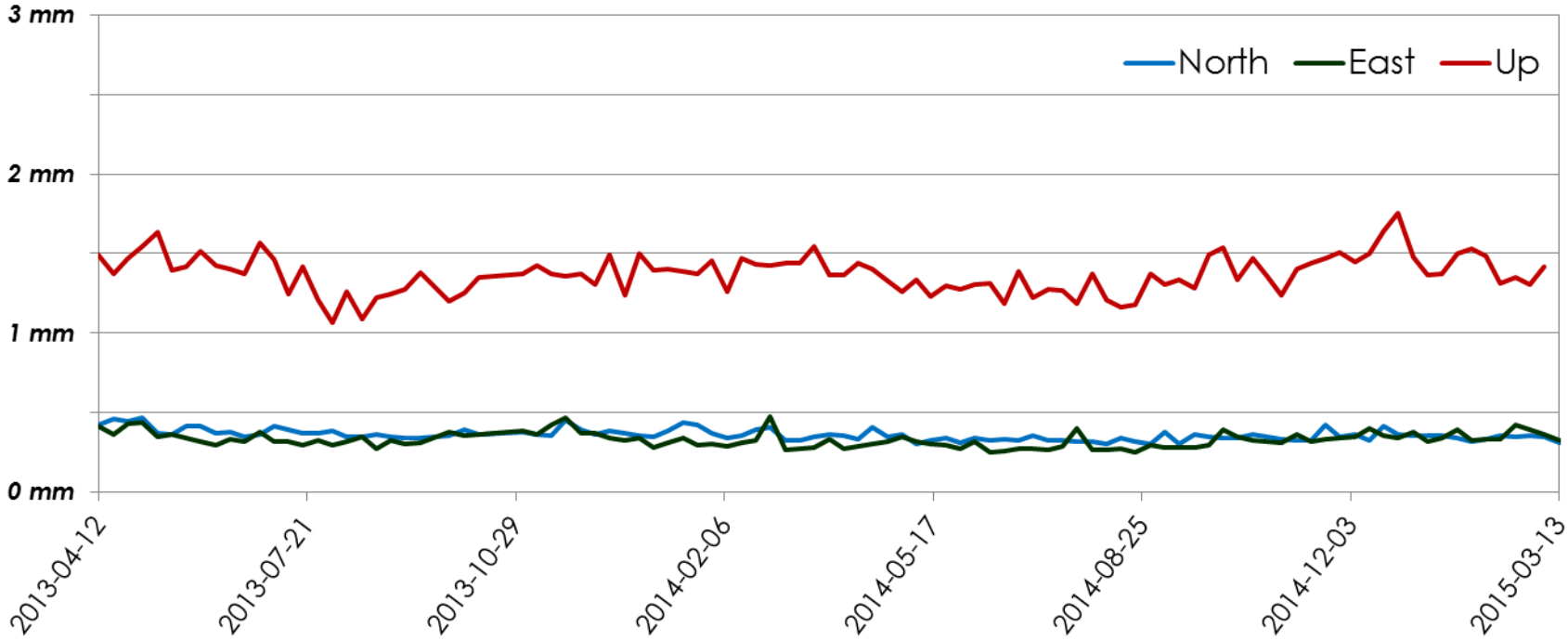




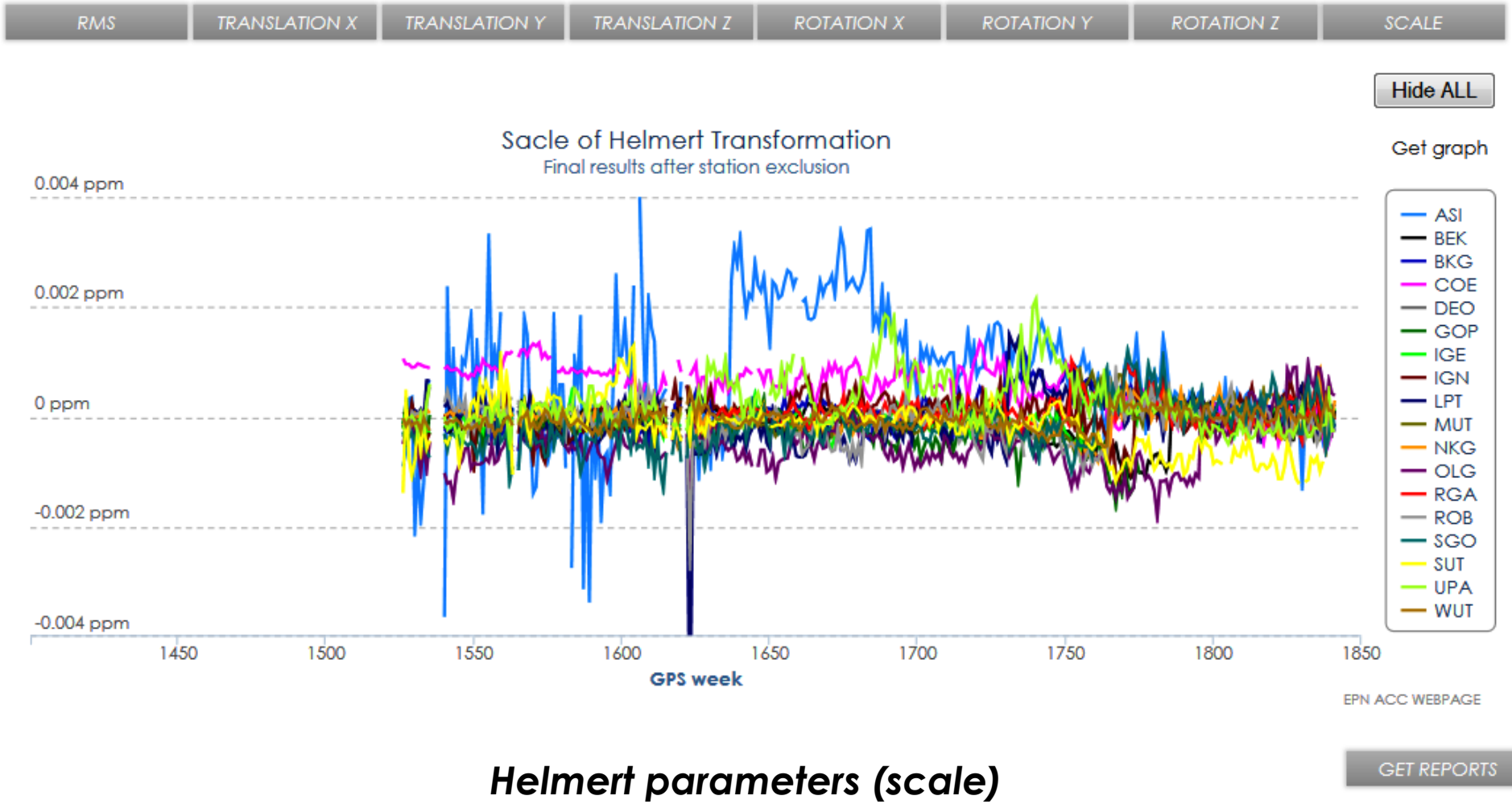
Total agreement:

North:	**0.31 mm**
East:	**0.33 mm**
Up:	**1.42 mm**

FINAL PRODUCTS:



History of total agreement between LAC solutions (GPS weeks: 1740 -1840)



Helmert parameters (scale)
between each weekly AC solution and combined solution

RAPID PRODUCTS:

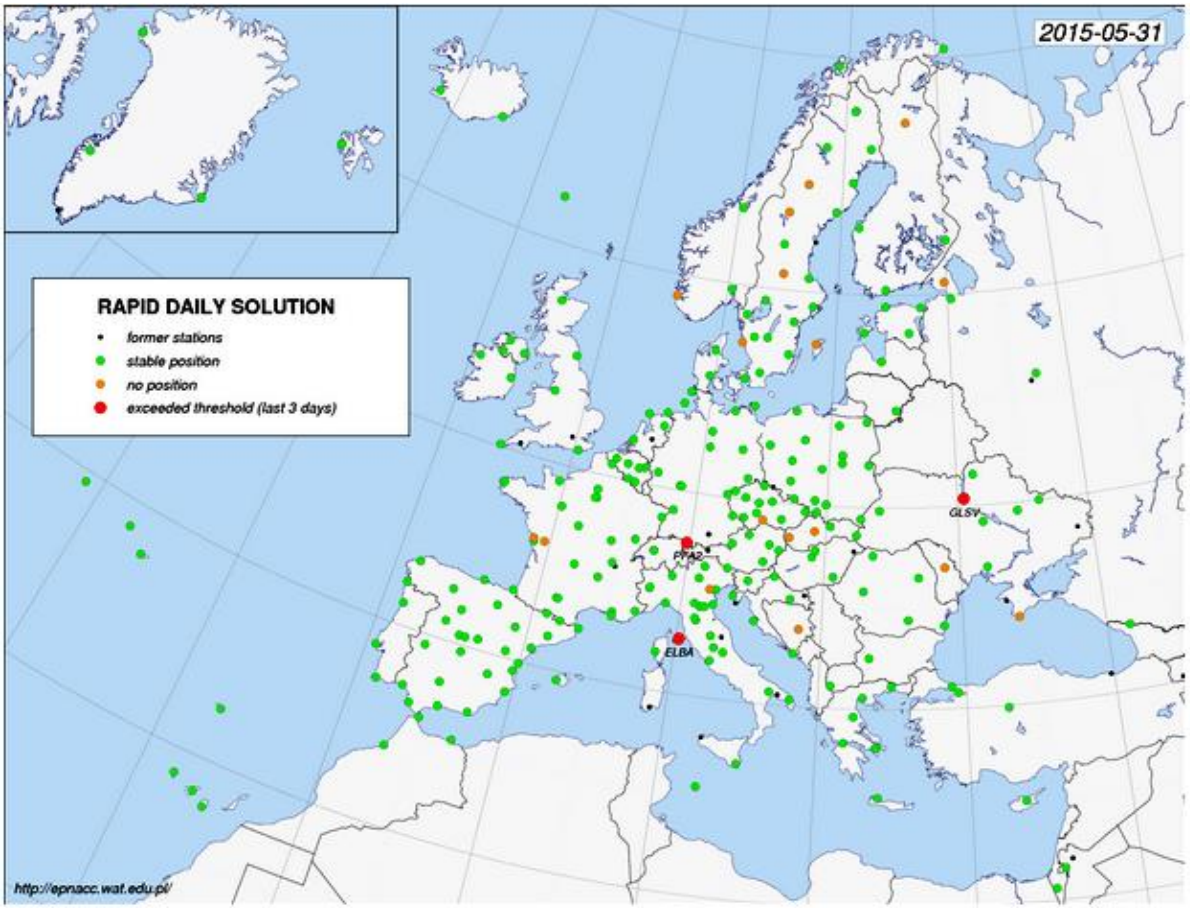
Daily solution combined from 10 individual solutions provided by EPN ACs.

ASI BEK BKG COE IGE IGN LPT MUT NKG OLG RGA ROB SGO SUT UPA WUT

9# BERNESE, 1# GIPSY OASIS

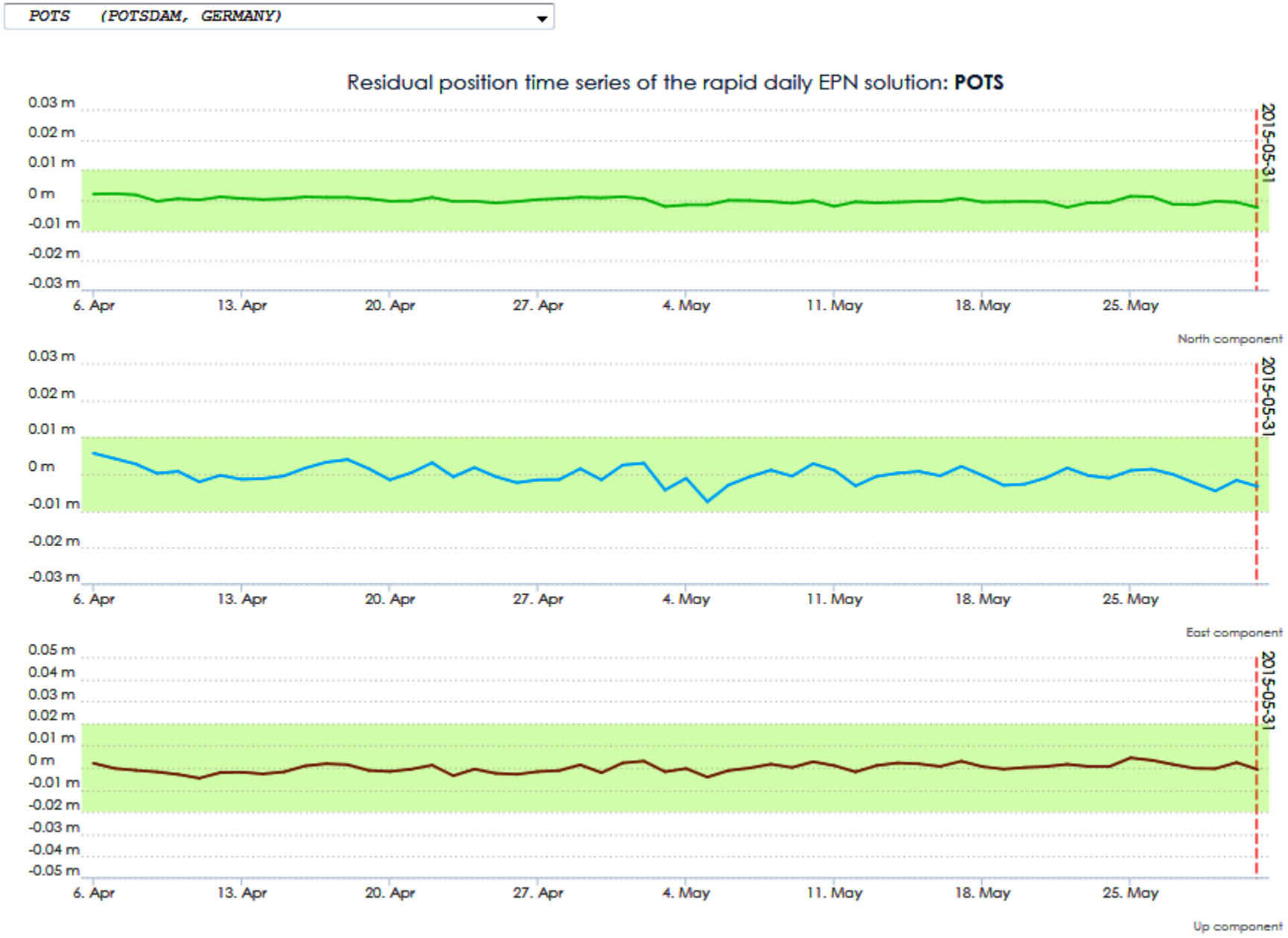
- Rapid monitoring of EPN station positions.
- 1 day latency.
- Currently ~95% stations monitored (but many processed by 1 LAC only).
- Metadata in LACs SINEX files checked against log files.
- Problematic stations excluded.
- Notification emails sent to LACs.
- Software used for combination: Bernese GNSS software ver. 5.2.
- Products and reports available at the BKG EPN data center.

RAPID PRODUCTS:



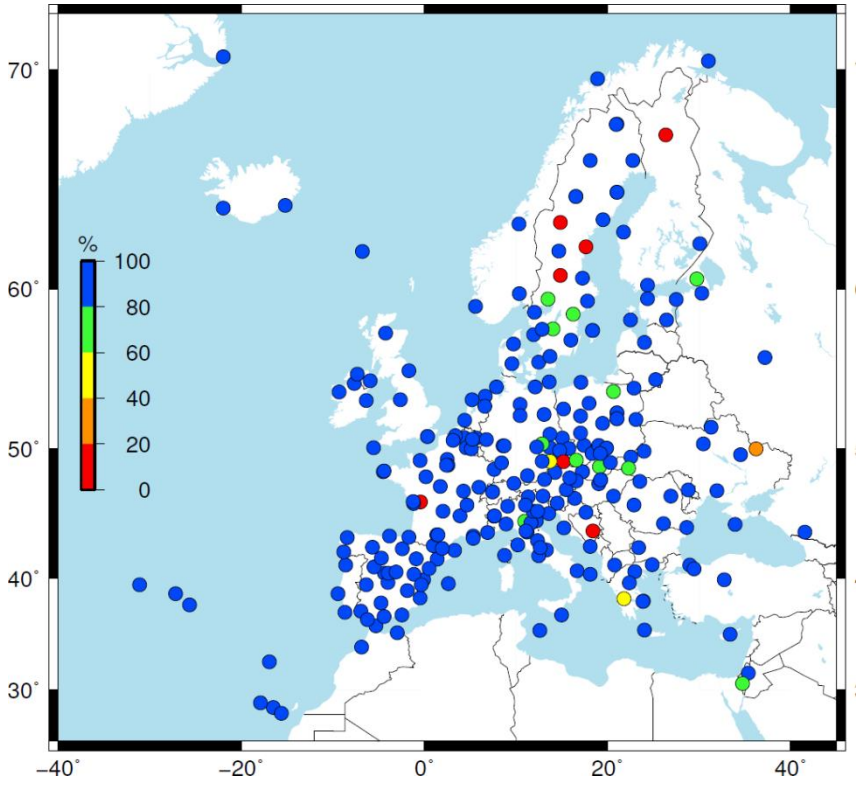

```
STATUS FOR EPOCH: 2015-05-31 (DOY: 151)
=======================================

List of the stations for which residual
exceeded specified threshold (0.01/0.01/0.02)
---------------------------------------------
NAME     North[m]   East[m]    Up[m]

ELBA     -0.0032     0.0106     0.0056
PFA2     -0.0027     0.0128     0.0154


List of the stations without estimated crd.:
--------------------------------------------
BBYS CHIZ IGEO KTVL KUNZ LEK6 LROC MOP2
ONSA OST6 PADO QAQ1 SODA SRJV STAS SVTL
VIL0 VIS6
```

Current status of the EPN stations

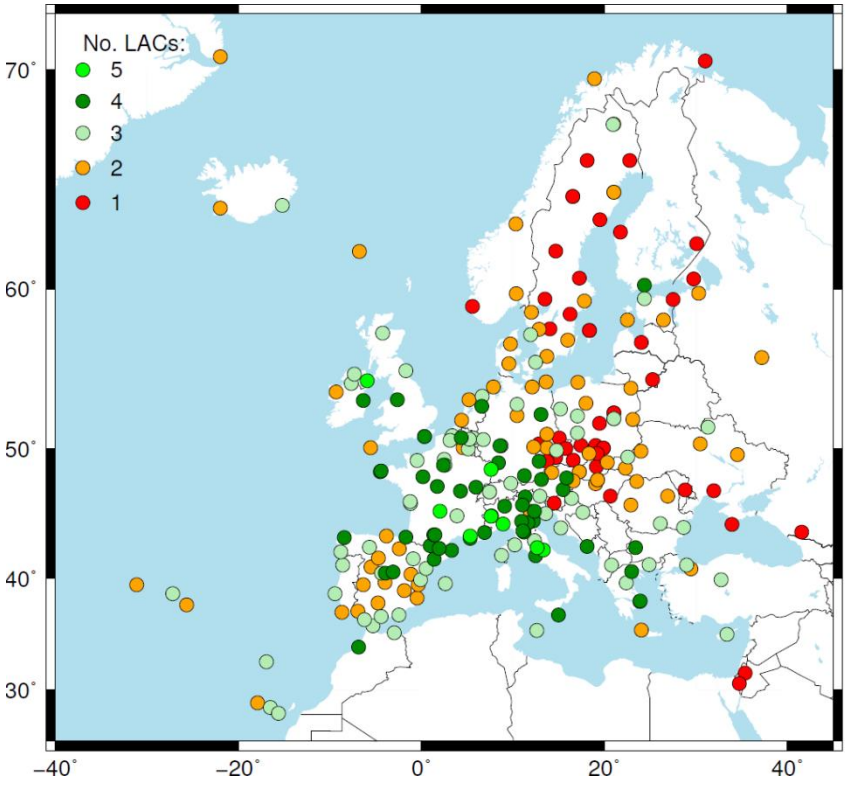


Residual positions time series from last 56 days (8 weeks)

RAPID PRODUCTS:

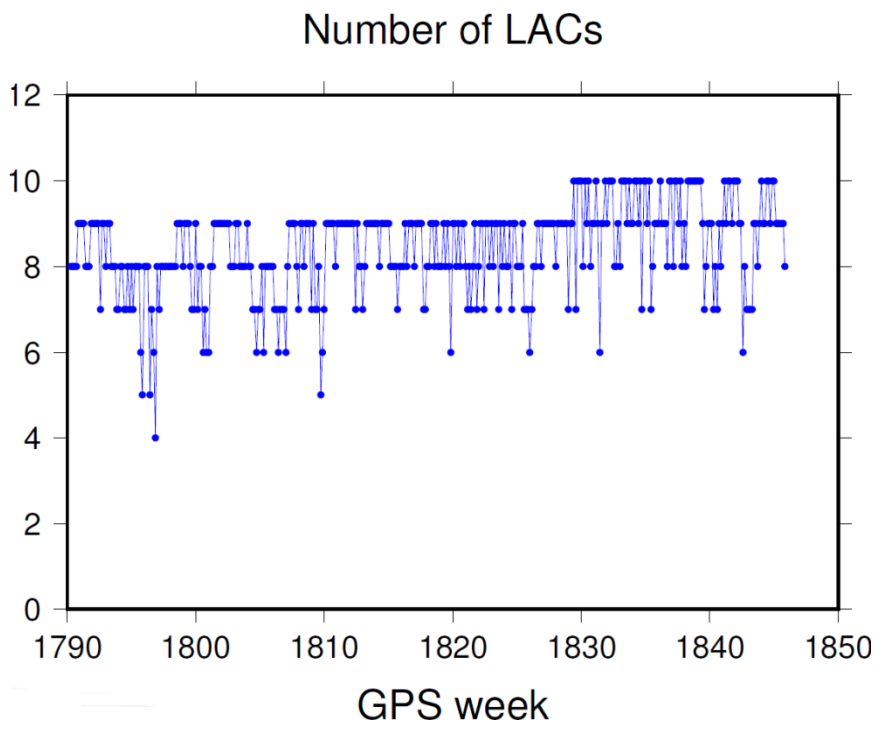


Completeness of observations in rapid solutions (GPS weeks 1840-1845)

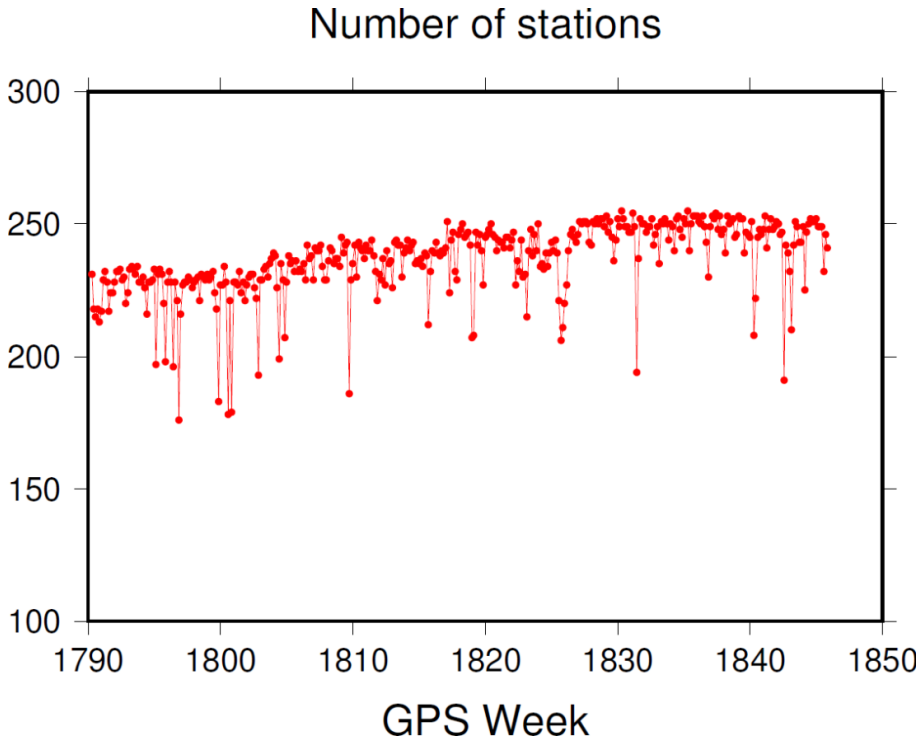


Number of LACs processing each EPN station (day1845 0)

RAPID PRODUCTS:



Number of solutions (ACs) included in rapid combination



Number of stations included in rapid combination

ULTRA-RAPID PRODUCTS:

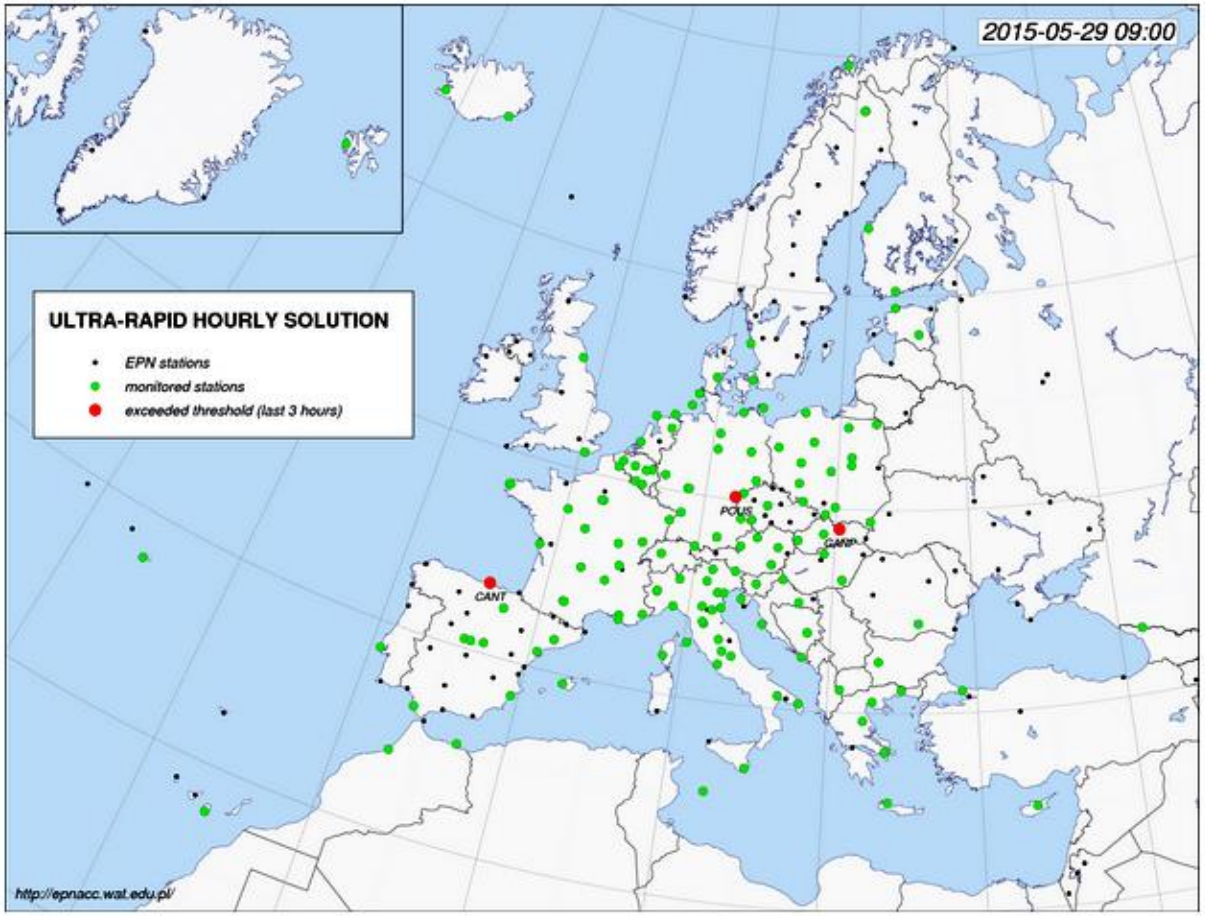
Hourly solution combined from 3 individual solutions provided by LACs.

ASI BEK BKG COE IGE IGN LPT MUT NKG OLG RGA ROB SGO SUT UPA WUT

2# BERNESE, 1# GIPSY OASIS

- Near real time monitoring of EPN station positions (1 hour latency).
- Metadata in LACs SINEX files checked against log files (problematic stations excluded).
- Products from combinations available at the BKG EPN data center.

ULTRA-RAPID PRODUCTS:




```
STATUS FOR EPOCH: 2015-05-29 (DOY: 149) 09:00
==============================================

List of the stations for which residual
exceeded specified threshold (0.01/0.01/0.02)
----------------------------------------------
NAME    North[m]  East[m]   Up[m]

GANP     0.0079    0.0106   -0.0039


List of the monitored stations:
----------------------------------------
AJAC AQUI AUT1 AUTN AXPV BADH BISK BOGO
BOR1 BORJ BRST BRUX BSCN BUCU BUDP BYDG
BZRG CANT CASC COMO DELF DENT DOUR DRES
DUTH DYNG EGLT EIJS ENTZ EUSK GANP GENO
GOPE GRAS GRAZ GSR1 GUIP GWWL HELG HERS
HERT HOBU HOFN IENG ISTA JOZ2 JOZE KARL
KIR0 KIRU KLOP KRAW LAMP LARM LIL2 LINZ
LODZ M0SE MALL MAN2 MARJ MARS MAS1 MATE
MEDI MELI METS MLVL MORP NICO NOA1 NOT1
NYA1 OBE4 ORID OROS PADO PDEL PEN2 PENC
PFA2 POTS POUS PTBB PUYV RABT REDU REDZ
REYK SASS SBG2 SFER SMID SMNE SOFI SRJV
SUR4 SWKI TERS TLMF TLSE TOR2 TORI TRF2
TRO1 TUC2 UNTR USAL USDL VAAS VACO VEN1
```

Current status of the EPN stations

Residual positions time series from last 72 hours

ROUTINE PRODUCTS:

Final products: daily and weekly solution

based on 16 individual LAC solutions

Rapid products: daily solution

based on 10 individual LAC solutions

Ultra-rapid products: hourly solution

based on 3 individual LAC solutions

SPECIAL PRODUCTS:

Daily combined solution from repro2

REPROCESSING 2:

Voelksen et al.:
„ EPN Repro 2: Activities on the EPN Working Group on Reprocessing"

Daily solution combined from 5 individual solutions provided by ACs.

ASI BEK BKG COE IGE IGN LPT MUT NKG OLG RGA ROB SGO SUT UPA WUT GOP

3# BSW, 1# GIPSY-OASIS, 1# GAMIT

ASI BEK BKG COE IGE IGN LPT MUT NKG OLG RGA ROB SGO SUT UPA WUT GOP

3# FULL EPN, 2# PART EPN

ASI BEK BKG COE IGE IGN LPT MUT NKG OLG RGA ROB SGO SUT UPA WUT GOP

4# NET, 1# PPP

ASI BEK BKG COE IGE IGN LPT MUT NKG OLG RGA ROB SGO SUT UPA WUT GOP

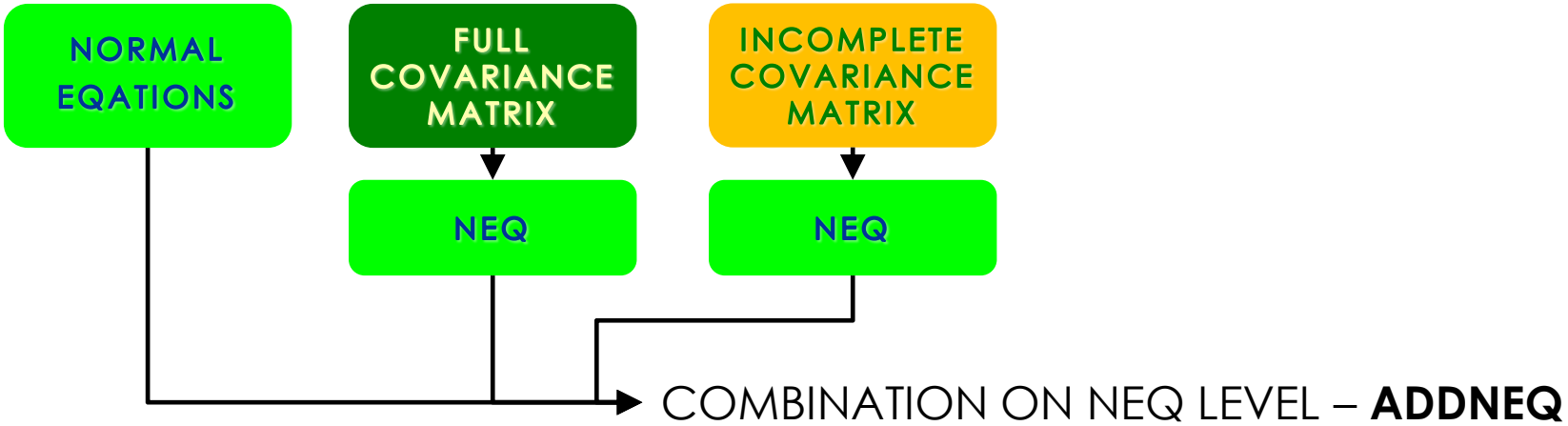
3# FULL NEQ, 1# FULL COV, 1# INCOMPLETE COV

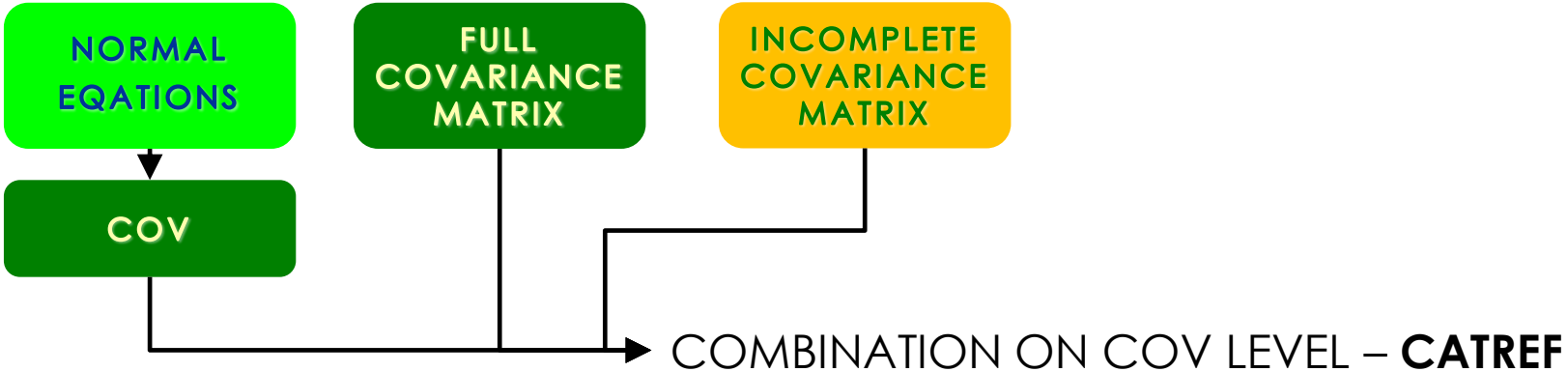
REPROCESSING 2:

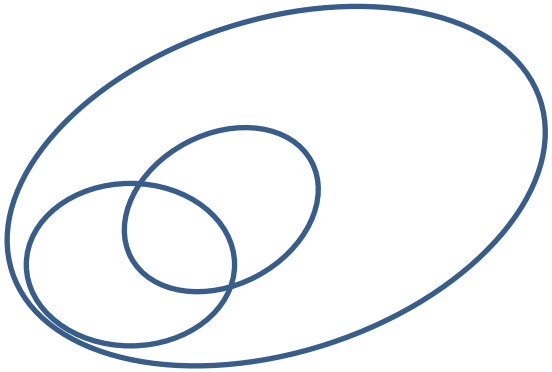
Main concerns regarding combined solution:

1. Various processing **tools**.
2. Different **extent** of processed networks.
3. Different **format of solution** (normal equations, covariance matrix or incomplete covariance matrix).

REPROCESSING 2:







3 BSW solutions:

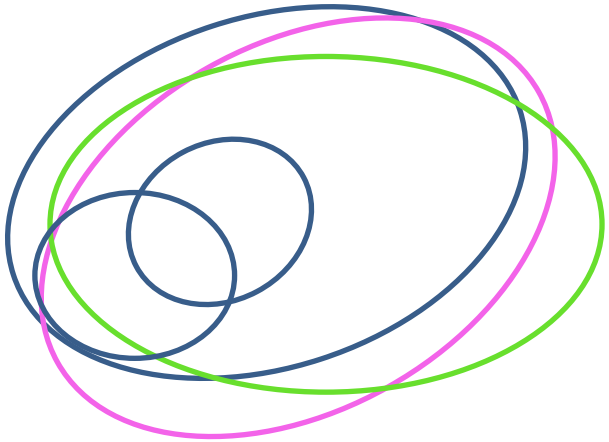
-GOP (full EPN)
-LPT (EPN subnetowork)
-IGE (EPN subnetwork)

THE SAME SOFTWARE, DIFFERENT NETWORKS

3 solutions (full EPN):

-GOP (BSW)
-ASI (GIPSY-OASIS)
-MUT (GAMIT)

DIFFERENT SOFTWARE, THE SAME NETWORKS



5 solutions:

-GOP (full EPN, BSW)
-ASI (full EPN, GIPSY-OASIS)
-MUT (full EPN, GAMIT)
-LPT (subnetwork, BSW)
-IGE (subnetork, BSW)

ALL SOLUTIONS

Test period: ***GPS week 1677***

SUMMARY AND OUTLOOK

- Routine EPN ACC products: final weekly, final daily, rapid daily and ultra rapid (hourly).
- Routine solutions available at ***http://www.epnacc.wat.edu.pl***.
- Several tests of repro2 combination on the level of NEQ (BSW) and COV (CATREF) were carried out.
- Main goal for the near future: full agreement of repro2 combination products estimated on the level of NEQ and COV.