

# EPN Reprocessing: Report on the current status of the EPN Project



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Internationale Erdmessung  
(BEK)



# The Working Group

(currently 30 members - each LAC is represented!)

Alessandro Caporali (UPA) - Ambrus Kenyeres (SGO) - Andrzej Araszkievicz (MUT) - Bruno Garayt (IGN) - Carine Bruyninx (ROB) - Carmela Ferraro (ASI) - Christof Völksen (BEK) - Cornelia Aichhorn (OLG) - Daniel Ineichen (LPT) - Elmar Brockmann (LPT) - Günter Stangl (OLG) - Heinz Habrich (BKG) - Jan Dousa (GOP) - Jan Hefty (SUT) - Juliette Legrand (ROB) - Karolina Szafranek (MUT) - Lotti Jivall (NKG) - Marcelino Valdes (IGE) - Mariusz Figurski (MUT) - Martin Lidberg (NKG) - Miguel A. Cano (IGE) - Miroslava Igondova (SUT) - Robert Odolinski (NKG) - Rolf Dach AIUB /(Code) - Rosa Pacione (ASI) - Rui Fernandes (DEO) - Stefan Schaer (LPT) - Tomasz Liwosz (WUT) - Vratislav Filler (GOP) - Wolfgang Soehne (BKG) -



# Initiative

Since the launch of the EPN in 1996

- different reference frames,
- different correction models,
- different processing strategies and software versions were applied.

Consequently:

- Estimated coordinates are not consistent in time!
- Time series are not harmonized!

This initiative aims at the improvement of:

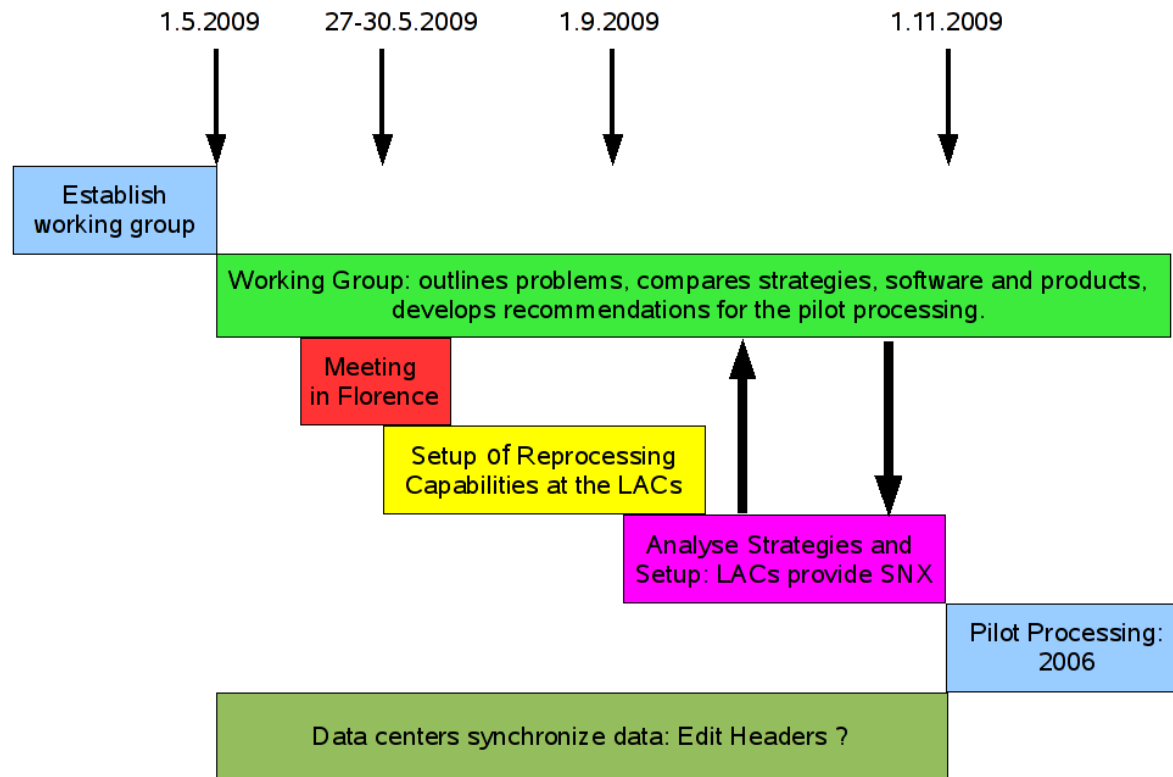
- consistent coordinates in time (time series)
- the reference frame realization and
- its by-products (e.g. troposphere)



# Proposed Contributions

Organisation	LAC	Software	Data Center	Combination Center	
				NEQ	Trop.
ASI	X	MicroCosm/GIPSY	X	-	-
BEK	X	Bernese	-	-	
BKG	-	Bernese	X	X	X
DEO	X	GIPSY/OASIS	-	-	-
GOP	X	Bernese	-	-	-
IGE	X	Bernese	X	-	-
IGN	X	Bernese	X	-	-
MUT	X	Bernese/GAMIT		-	-
NKG	X	Bernese/GAMIT	-	-	-
OLG	X	Bernese	X	-	-
ROB	X	Bernese	X!	-	-
SGO	X	Bernese	-	-	-
LPT	X	Bernese	-	-	-
SUT	X	Bernese	-	-	-
UPA	X	Bernese	-	-	-
WUT	X	Bernese	-	-	-
AIUB/CODE	Software updates; consultation for Bernese				

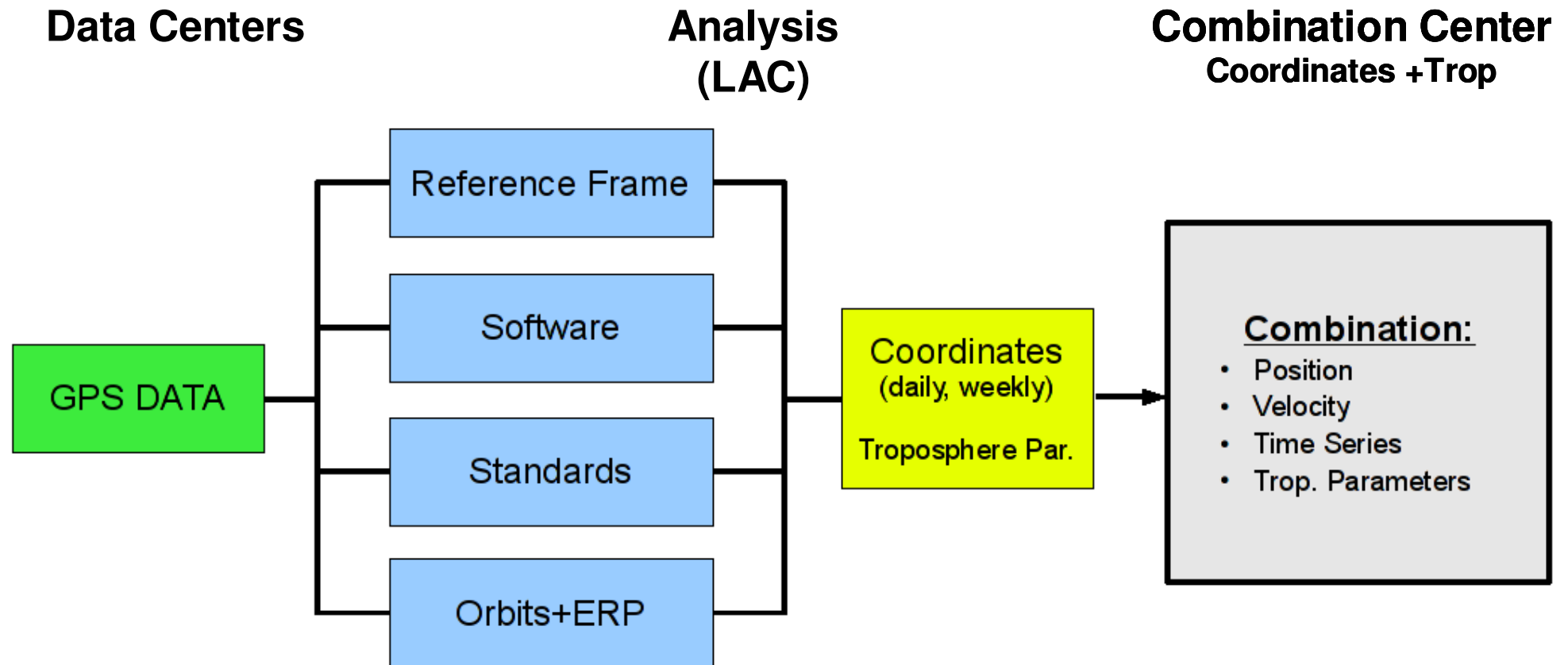
# Original Time Schedule 2009



Status May 2010:

- Pilot Processing underway (50%)!
- Open questions:
  - Analysis strategy
  - Standards to be used
  - Orbits to be used (IGS: repro1)
  - Network configuration (almost finished)
  - Additional sites

# Processing Flow





# Products used for the Reprocessing

**Potsdam-Dresden** reprocessed orbits, clocks, and ERP!

- Available for 1994 - 2007
- Realized in the PDR05 ~ ITRF2005

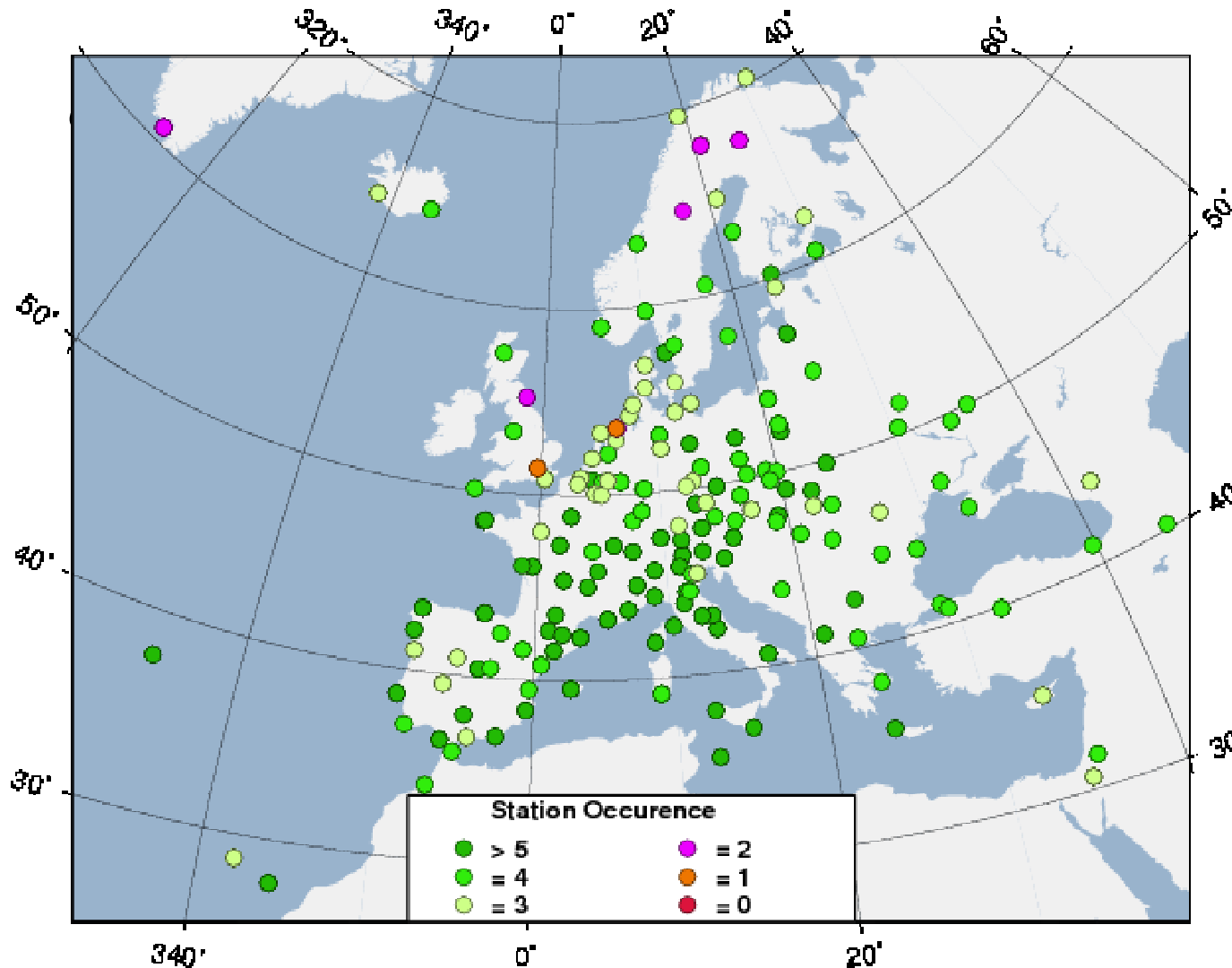
**REPRO1** (IGS) products are available since April 2010

- Reprocessed products of the individual analysis centers (e.g. JPL for GIPSY/OASIS; soon CODE with GPS+GLONASS)
- Combined IGS - products (IG1) realized in ITRF2005 (IGS05)
- Combined weekly solutions for a global system of GPS-sites

Future reprocessing activities of the IGS "REPRO2" (2012?)

- ITRF2008/IGS08
- Improved orbit modeling
- Implementation of IERS conventions
- Higher order correction terms for the ionosphere
- Atmospheric loading

# Site distribution - Pilot Phase



Critical Sites:

(1): BORJ, NPLD  
 (2): BORK, KIRU, MORP  
 QAQ1, SODA,  
 VILO

Commonness	#
1	2
2	6
3	42
4	72
5	45
6	19
7	6
8	2



# Current Status

- Almost 50% of the solutions for the pilot phase are uploaded
- Setup of the computers, software and data products is almost finished. (= > Will speed up the processing of the remaining years)
- Site redistribution and is almost completed
- Combination of the available products is now possible
- Analysis of the results concerning
  - Applied strategies
  - Software packages used (BERNESE, GIPSY, GAMIT)has to be carried out.

Discussions and exchange of information between LACs and Combinations center are absolutely necessary.



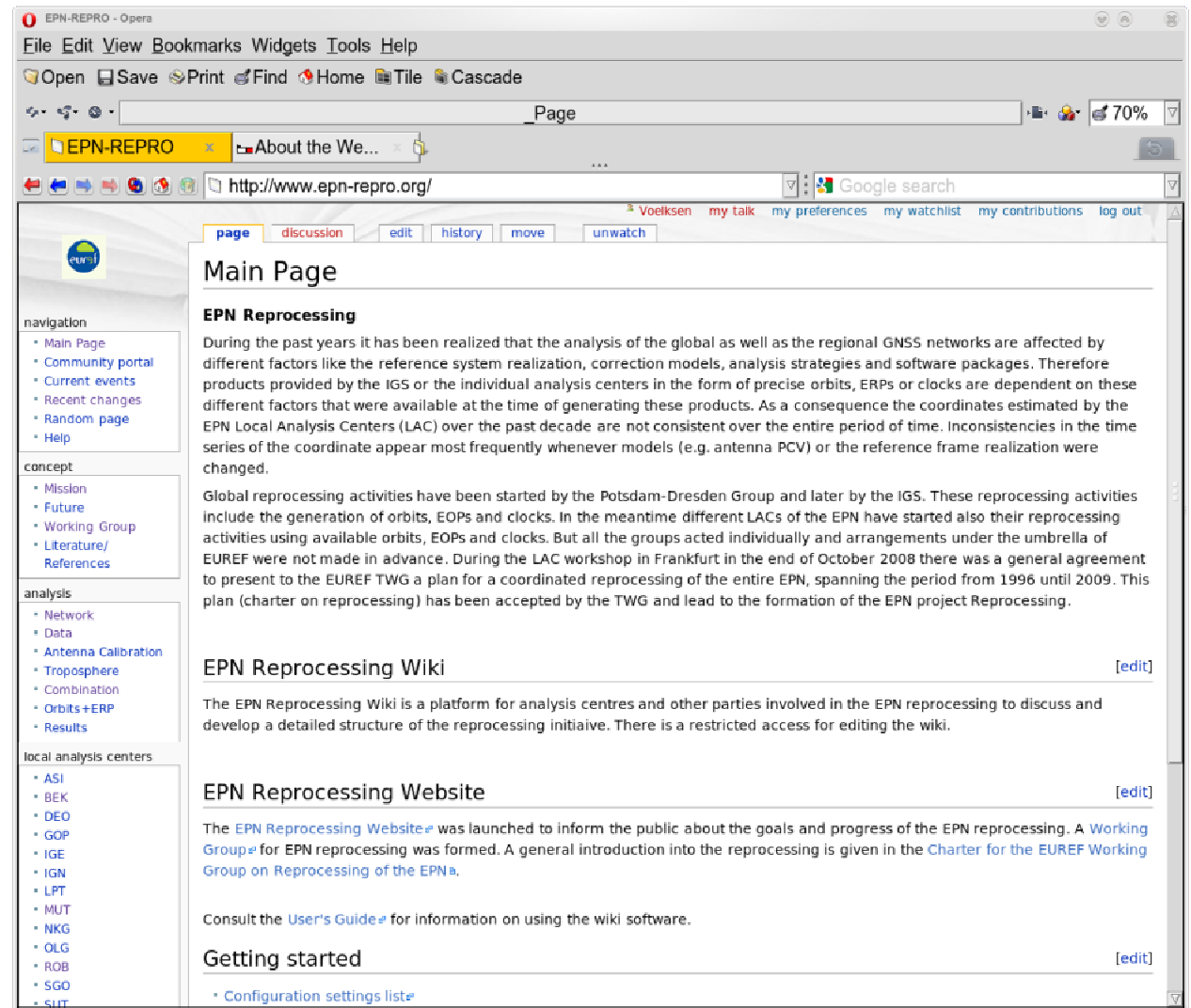
# Realization of a WIKI

A Wiki is:

- Web-based tool
- shares information
- often used as forum
- maintained by many users

Access can be

- open or
- restricted
- open/restricted in parts





# Simple editing of the WIKI

EPN-REPRO - Opera

File Edit View Bookmarks Widgets Tools Help

Open Save Print Find Home Tile Cascade

EPN-REPRO About the We...

http://www.epn-repro.org/

Google search

Voeksen my talk my preferences my watchlist my contributions log out

page discussion edit history move unwatch

## Editing Network

Navigation

- Main Page
- Community portal
- Current events
- Recent changes
- Random page
- Help

concept

- Mission
- Future
- Working Group
- Literature/References

analysis

- Network
- Data
- Antenna Calibration
- Troposphere
- Combination
- Orbits+ERP
- Results

local analysis centers

- ASI
- BEK
- DEO
- GOP
- IGE
- IGN
- LPT
- MUT
- NKG
- OLG
- ROB
- SGO
- SUT

### Network distribution:

It is a goal to arrange a distributed processing of the entire EPN. Therefore at the minimum three LACs shall be appointed to process each site. A redistribution of sites will be necessary, since not all LACs will contribute in the same extent as they do in the weekly analysis of the EPN. Therefore each LAC shall compile a list of sites that it intends to reprocess. That will be the basis for redistribution of the sites to other LACs. There is the option to include additional global sites into the EPN reprocessing for purpose of datum definition. The appointment of such global sites to individual LACs needs to be discussed.

### concept

The following figure shows the occurrence of each site in the different networks analysed by the LACs. Apparently it is necessary to distribute still a number of sites, which are shown in dark red, orange and purple. Obviously a number sites from the northern part of the network need to be assigned to different LACs.

[[Image:distribn23042.png|700px|border|center]]

Based on this figure a table has been generated with those site that need to be associated to additional LACs. Especially for the site NPLD we need three LACs for the processing of the data. For the sites with a single occurrence we need two additional LACs. It would be very helpful if we could find some volunteers that will add these sites to their network.

```
{| class="prettytable sortable" center="1" border="1" align="center"
|- ''Site Occurrence (current)''
|- style="background-color:#efefef"
```

Please note that all contributions to EPN-REPRO may be edited, altered, or removed by other contributors. If you do not want your writing to be edited mercilessly, then do not submit it here.

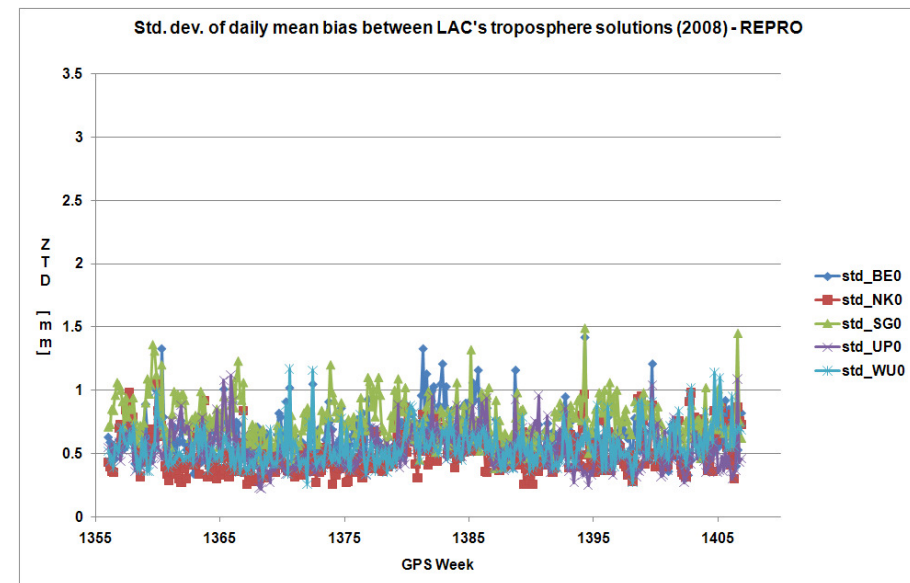
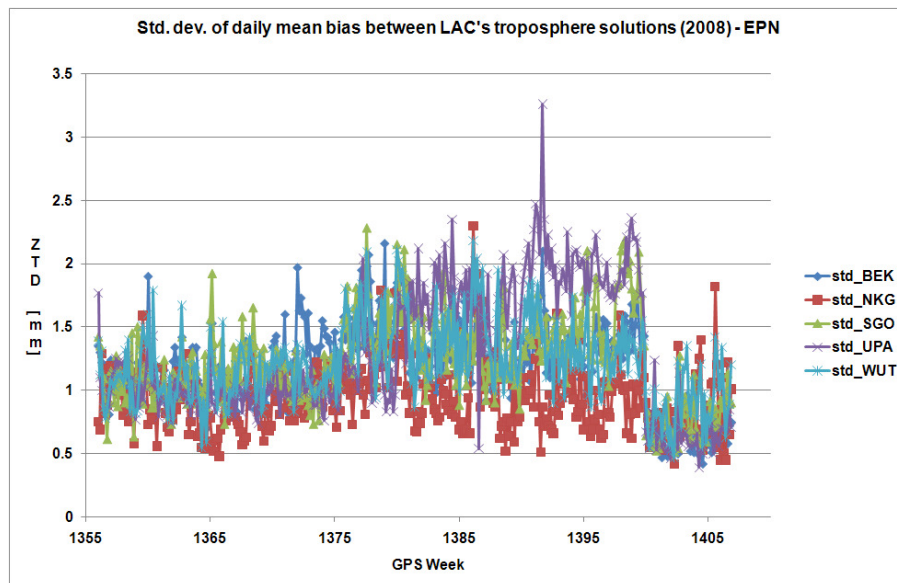
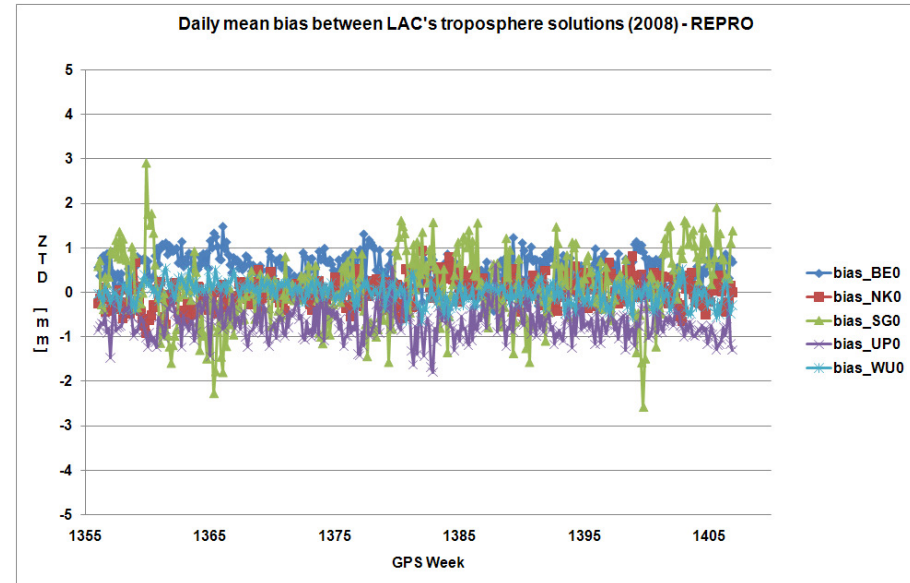
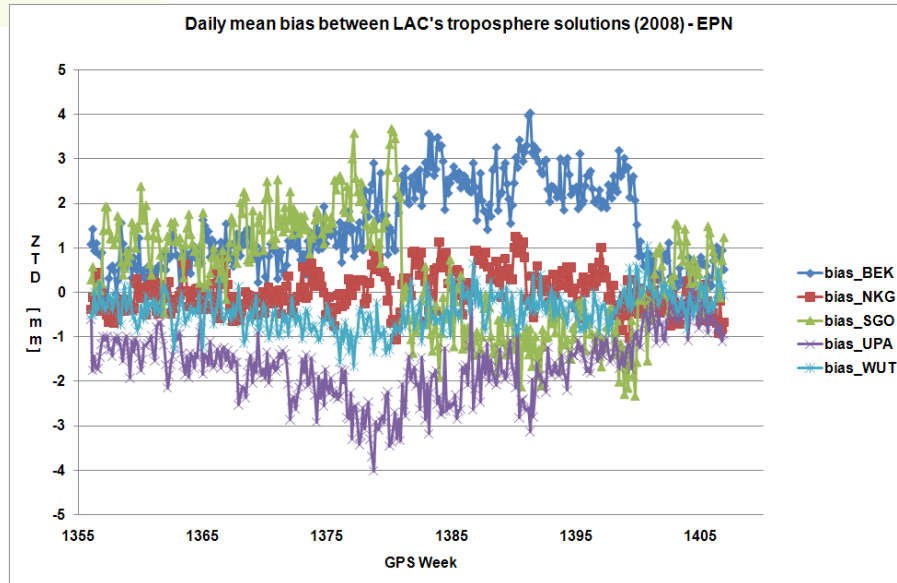
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Summary:

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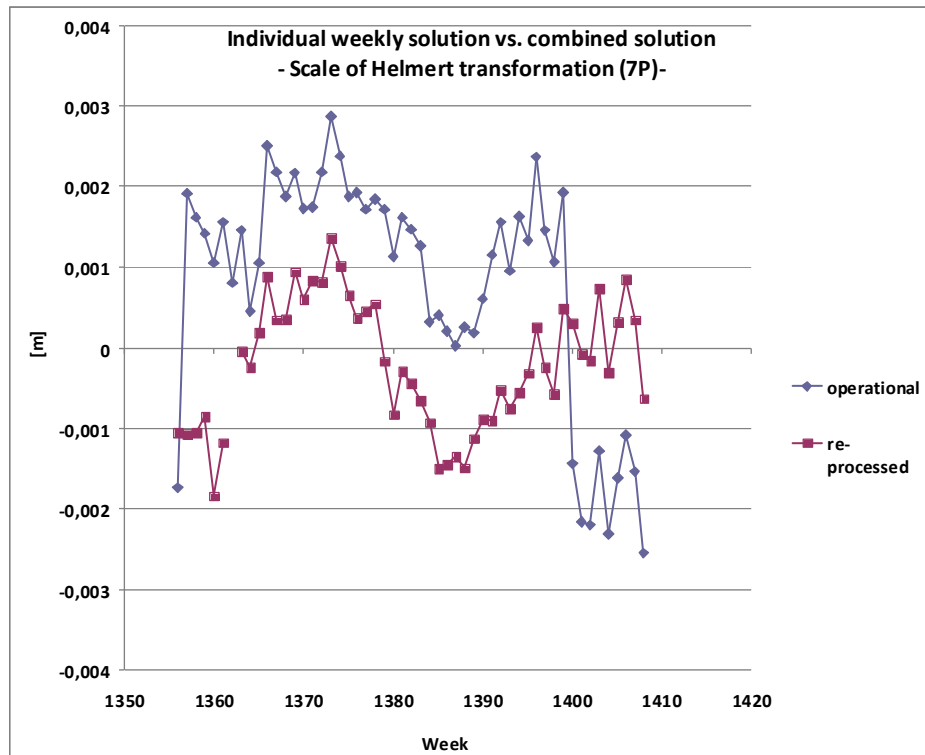
# First Results: Troposphere (weekly solutions) [from Wolfgang Söhne, BKG]



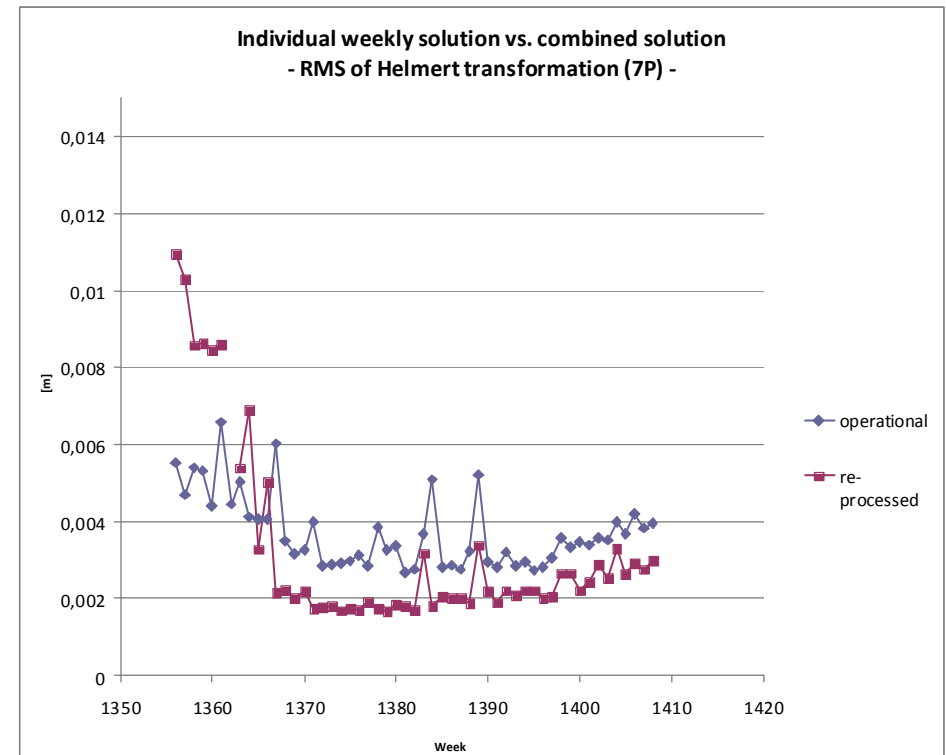
# First Results: Coordinate combination (weekly)

[from Heinz Habrich, BKG]

## Scale old/reprocessed Weekly solutions



## RMS old/reprocessed Weekly solutions



# Action

- Comparison of the individual solutions is necessary according to
  - strategies, analysis software, parameter modeling
- The best available strategy should be selected, which fulfills requirements on
  - Modeling of the troposphere
  - Datum realization
  - Correction models (e.g. absolute PCV)
- Products for the complete reprocessing have to/should be selected
  - Currently "Potsdam-Dresden-Reprocessing" and IGS "Repro1" products are available (+ind. Analysis solutions)
- Time Schedule has to be reviewed



# Outlook

- Pilot processing will be finished within a few weeks
- Analysis of the results and then proceed with the remaining years
- "Reprocessing and LAC Workshop" will take place in Warsaw in November 2010 to answer some of the remaining questions.
- The ITRF2008 will be released soon
- The IGS intends to carry out a repro2 campaign (2012?)
  - Is there a need for reprocessing of the entire EPN in ITRF2008 with the upcoming repro2 products?
- GLONASS is not yet taken into account (REPRO2)
- Available software does not meet future requirement of the IGS
  - Improved analysis packages are required