

Homogenization of GNSS time series

COST Action GNSS4SWEC sub-WG3 activity

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Royal Meteorological Institute of Belgium (RMI)



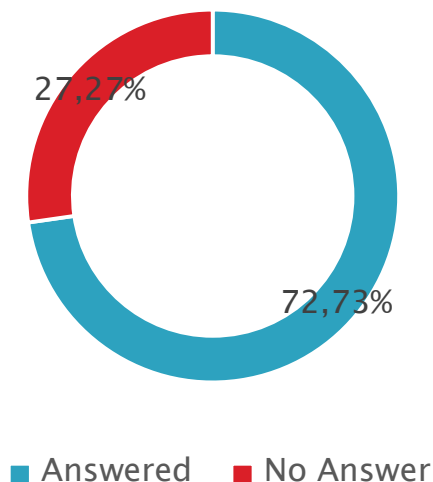
Sub-WG3 Homogenization : General Goals

- ▶ Identify the different tools and methodologies for homogenization currently in use/available
→ EoI & INQUIRY
- ▶ Set up one or two common long-term datasets on which the methodologies of the different participants can be applied (e.g. IGS repro 1, EPN repro 2)
- ▶ Compare the epochs of inhomogeneities found by the different methodologies and create a common public dataset of identified inhomogeneities in those time series (instrumental change, break points, auxiliary data jumps, ...)
- ▶ At the end, come up with a homogenized version of the agreed common long-term datasets, which can be re-used for climate variability studies within the community

Inquiry overview

- ▶ The survey was sent to 22 people and we received **16 responses** (73%, i.e. almost everyone):

Answers Rate



Respondent List:

- Sybille Vey (GFZ)
- Robert Heinkelmann (GFZ)
- Kyriakos Balidakis (TU Berlin)
- Tamas Szentimrey and Peter Szabo (Hungarian Met Office)
- Michal Elias (GOP, Czech Rep.)
- Tong Ning (Lantmäteriet, Sweden)
- Selma Zengin Kazanci (KTU, Turkey)
- Emine Tanir Kayikci (KTU, Turkey)
- Peep Miidla (Tartu University, Estonia)
- Elmar Brockmann (Swisstopo)
- Grzegorz Nykiel (MUT, Poland)
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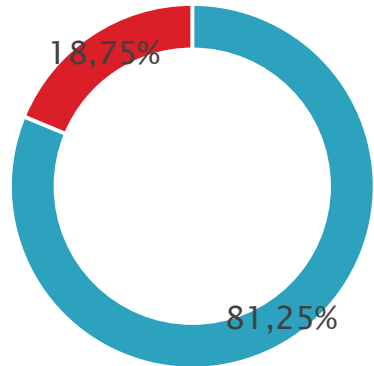
Inquiry : outline

- ▶ **Past Experience and Data Screening**
- ▶ **Datasets**
- ▶ **Method Types and Frequency Averaging**
- ▶ **Expectations from GNSS4SWEC homogenization sub-WG**
- ▶ **Purpose of the Homogenization**

Past Experience and Data Screening

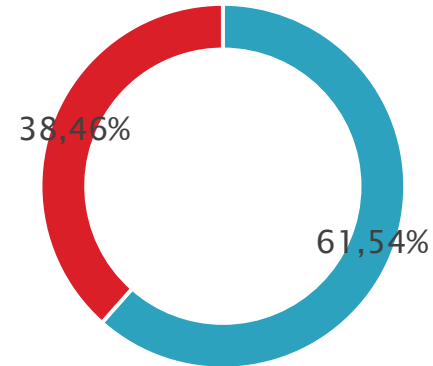
- ▶ Out of the 16 responses,
 - 13 groups already have **past experience** with **homogenization tools**!
 - 8 **apply** some kind of **data screening** before homogenization!

Past Experience
in Homogenization



■ Yes ■ No

Application of
Data Screening



■ Yes ■ No

→ Sub-WG3 Homogenisation Splinter

Thursday, 1st October 2015



Sub-WG3 Homogenization : General Goals

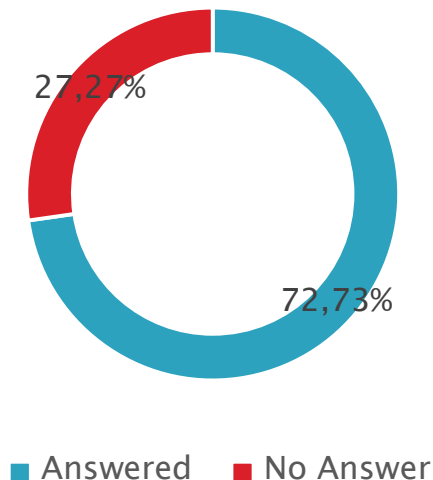
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AGREEMENT? FEEDBACK? INPUT?

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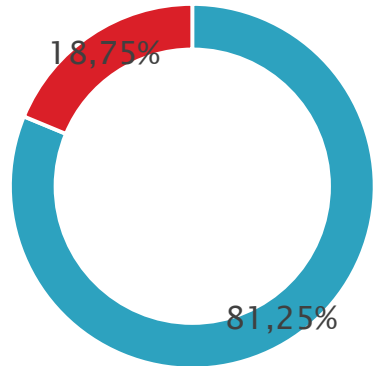
Inquiry : Share and Collaboration

- ▶ **Past Experience and Data Screening**
- ▶ **Datasets**
- ▶ **Method Types and Frequency Averaging**
- ▶ **Expectations from GNSS4SWEC homogenization sub-WG**
- ▶ **Purpose of the Homogenization**

Past Experience and Data Screening

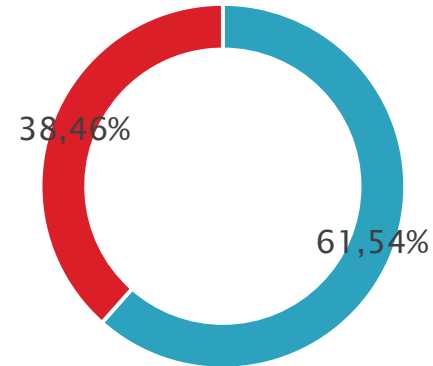
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Past Experience
in Homogenization



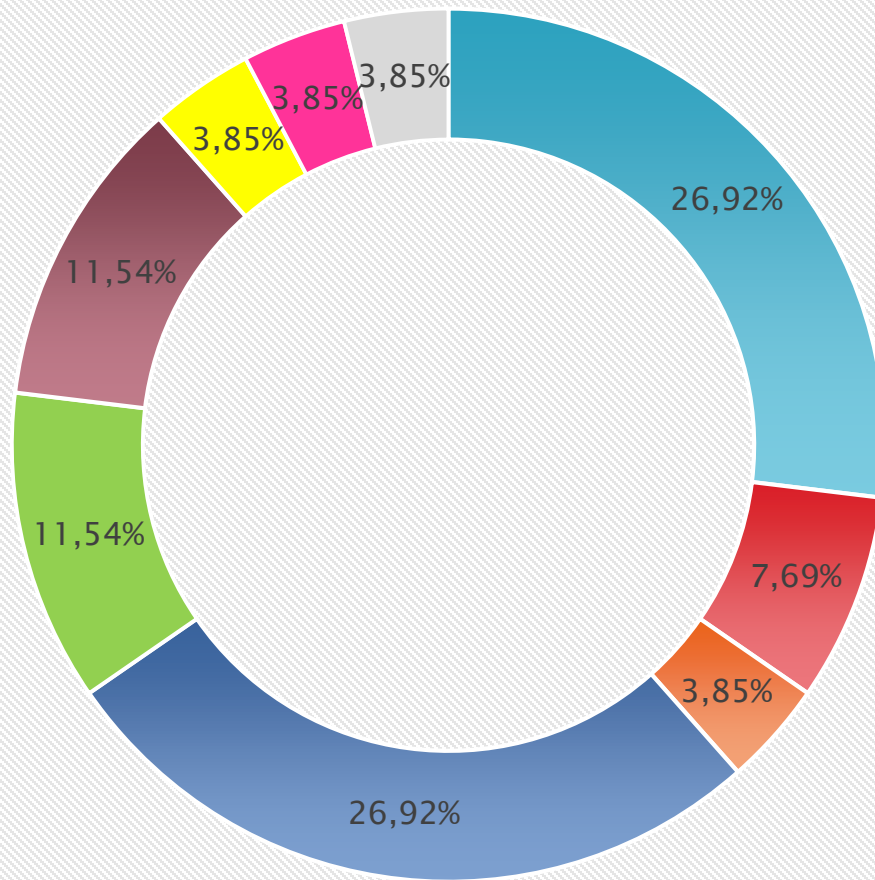
■ Yes ■ No

Application of
Data Screening



■ Yes ■ No

Variable(s) Homogenized



ZTD (7)

ZWD (2)

ZHD (1)

IWV (7)

P (3)

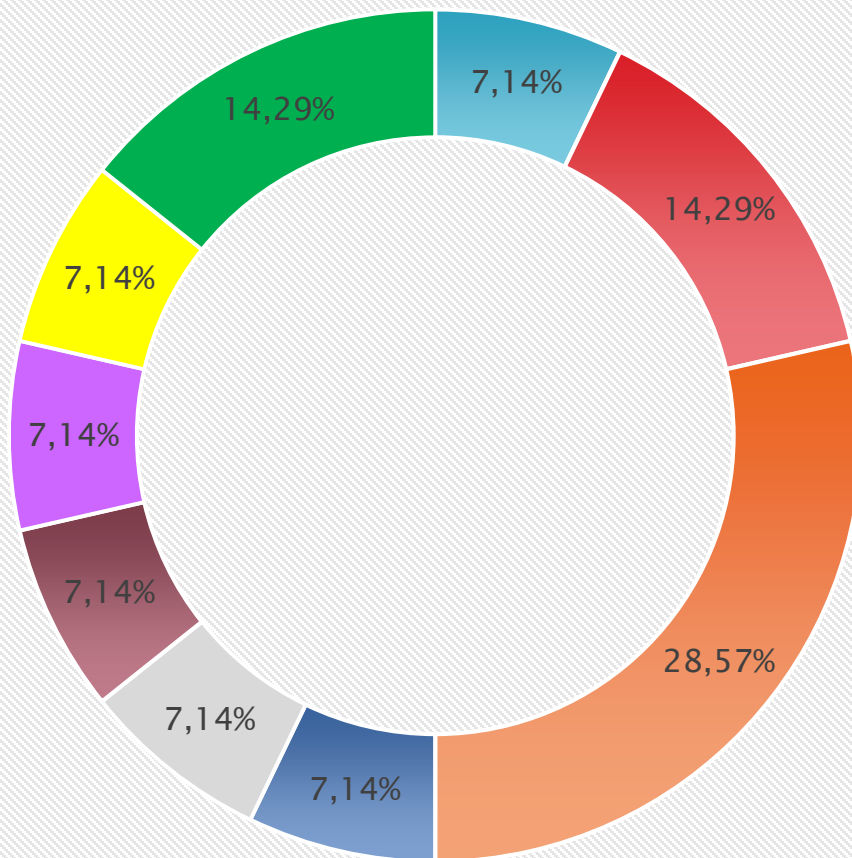
T (3)

e (1)

VLBI and DORIS Coordinates and
Baselines (1)

Stock Exchange Parameters (1)

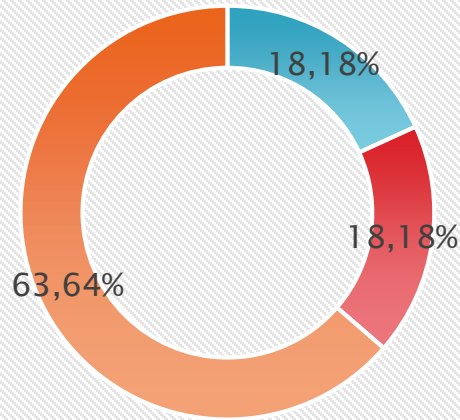
Datasets



- IGS TU-DD TU Munich repro (1)
- TIGA GFZ repro (2)
- IGS repro 1 (4)
- COD repro 1 (1)
- EPN repro 1 (1)
- European sub-set (1)
- Swisstopo repro regional (1)
- NWM output (1)
- Meteo data in station log files from IVS (2)

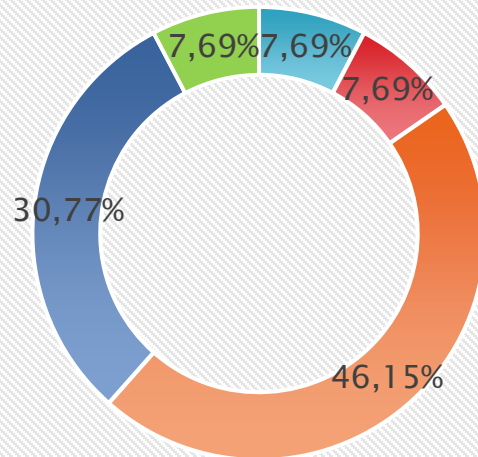
Method Types and Sampling Frequency

Method



- Standalone (2)
- Neighbour-based (2)
- Reference dataset (ERAinterim/ERA40, Others) (7)

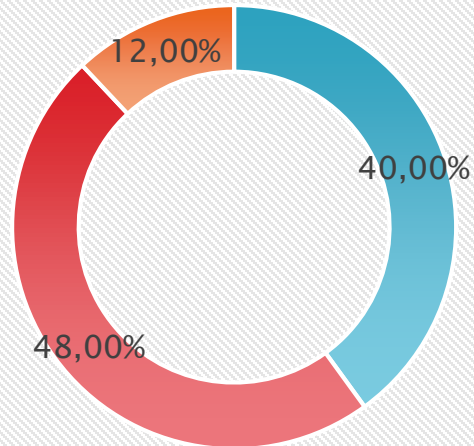
Frequency



- Hourly (1)
- 3-hourly (1)
- Daily (6)
- Monthly (4)
- Annual (1)

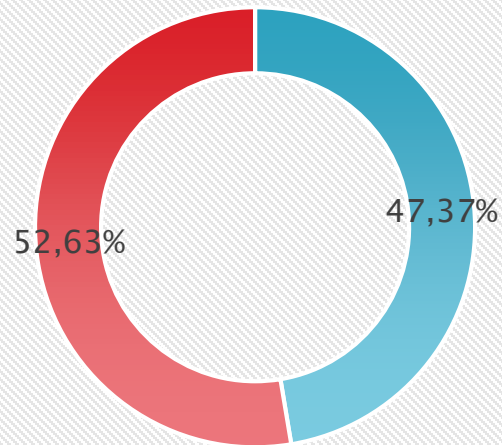
Expectations from GNSS4SWEC homogenization sub-WG

Variable



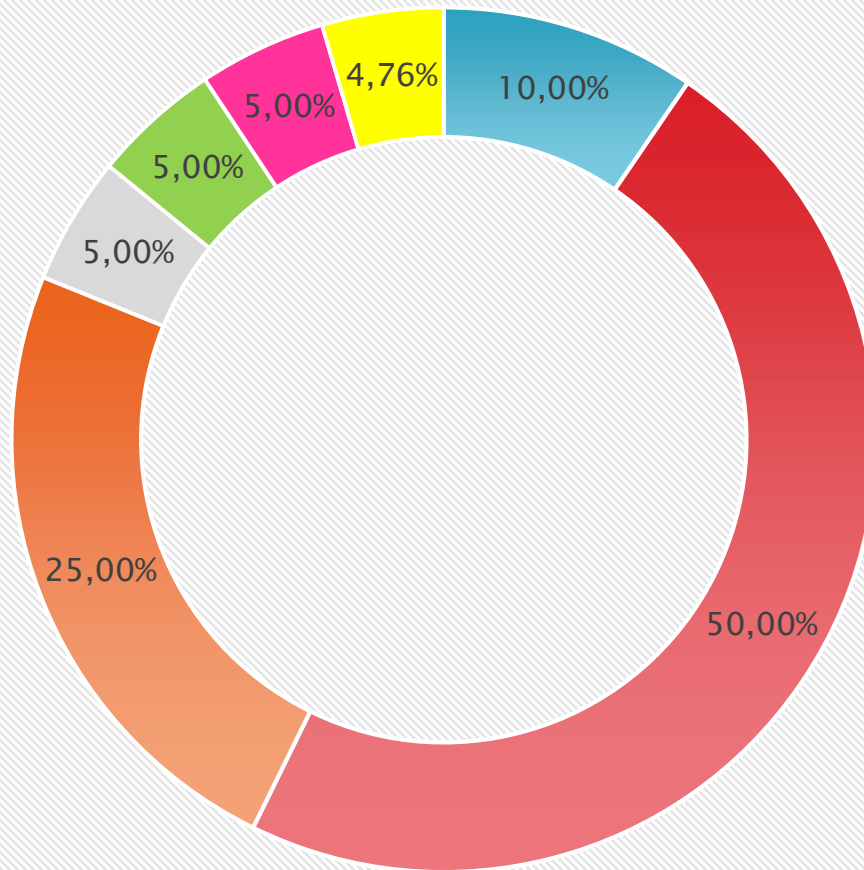
- ZTD (10)
- IWV (12)
- Meteo. Var. (3)

Regional/Global



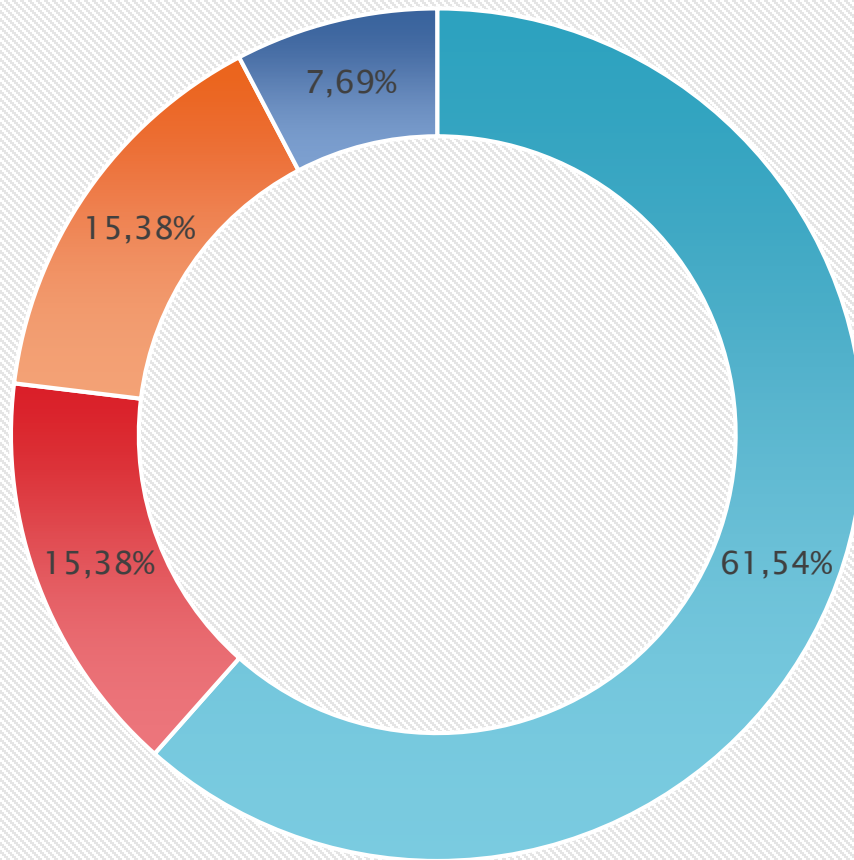
- Regional (9)
- Global (10)

Expectations from GNSS4SWEC homogenization sub-WG



- TIGA GFZ repro (2)
- IGS repro 1 and 2 (10)
- EPN repro 1 (5)
- European sub-set (1)
- NWM output (1)
- Meteo data in station log files from IVS (1)
- VLBI and co-located GNSS datasets (1)

Purpose of the Homogenization



- Climate signal trends and variability (8)
- Improvement of VLBI analysis (2)
- Testing and development of time series homogenization tools (2)
- Improvement of KTU station data series (1)

Inquiry overview

- ▶ **Nice collaborative spirit** in the responses:
 - willingness to apply tools on common dataset: **9/13**
 - willingness to share identified break points of this common dataset: **11/13**
 - willingness to make homogenized dataset available within group: **10/14**
 - willingness to work on the homogenization of a common, open access, dataset: **13/14**
 - willingness to teach how to use your homogenization tool: **8/12**
 - willingness to learn and apply existing homogenization tool: **12/14**

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Common long-term datasets

- ▶ Set up one or two **common long-term datasets** on which the methodologies of the different participants can be applied (e.g. IGS repro 1, EPN repro 2)
 - Which datasets? Which sites? Length of time series?
 - Metadata? Documentation?
 - Where to store? Who will upload?
 - Access rules?

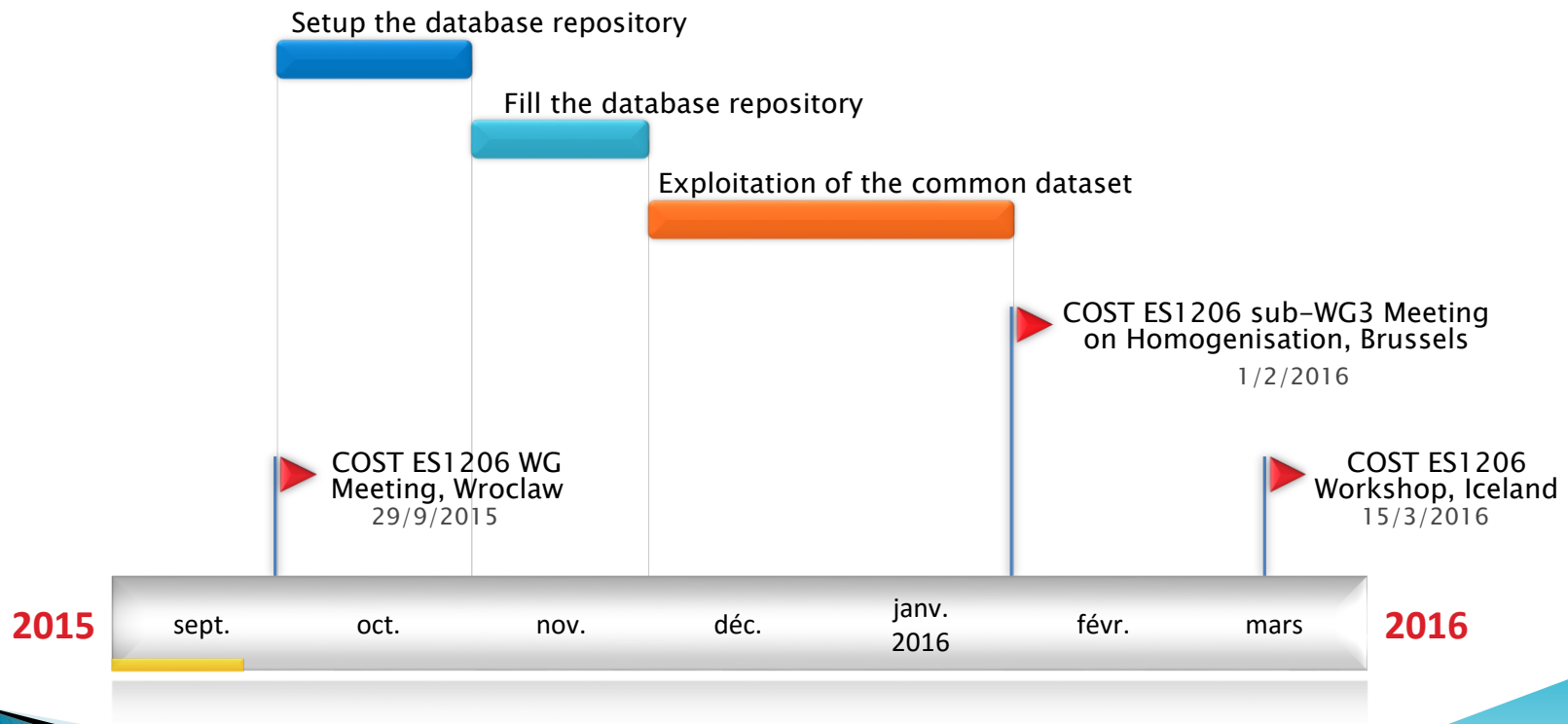
Common long-term datasets

- People with experience: who will work on the databases???
- People without experience: how can we involve them (STSMs)?

Group	Common Database	ZTD or IWV	Ready to host STSM?
Pottiaux and Van Malderen	IGS repro 1 (EPN repro 2)	IWV	Y

Common long-term datasets: time line proposal

- ▶ Set up data base repository (+ metadata): begin November ?
- ▶ Fill the data base repository (+ metadata): End November ?
- ▶ Different groups work on the common datasets (break point identification etc.): December–January
- ▶ Sub-working group meeting @ Brussels: begin February
- ▶ Presentation of progress to GNSS4SWEC community @ Iceland workshop: March



Sub-WG3 Homogenisation Workshop @ Brussels Website (information, registration, material...)


Eric

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 **COST ES1206 Sub-Working Group Meeting on Data Homogenisation**

17-18 November 2015
Royal Observatory of Belgium (ROB)
Europe/Brussels timezone

Register

Home

Registration
↳ Registration Form
Participant List

Venue

Travel Information

Accommodation

Contact

Support

✉ Eric.Pottiaux@oma.be
☎ +32 (0)2 373 03 41

This workshop takes place on the Space Pole where the Royal Observatory of Belgium (ROB), the Royal Meteorological Institute (RMI) and the Belgian Institute for Space Aeronomy (BISA) are located. This workshop is supported by the Solar-Terrestrial Centre of Excellence (STCE).

It is organised in the framework of the COST ES1206 Action "Advanced Global Navigation Satellite Systems tropospheric products for monitoring severe weather events and climate" (GNSS4SWEC) and dedicated to the homogenisation of GNSS-based (long-term) time series in order to use them for studying climate signals (trends, variability, cycles...).

The meeting dates are not yet fixed. If you are interested to participate, please contact us and fill the Doodle pool at <http://doodle.com/poll/arpipyu2g4xe7q3z> to fix the date.

🕒 Starts 17 Nov 2015 08:00
Ends 18 Nov 2015 18:00
Europe/Brussels

📍 Royal Observatory of Belgium (ROB)
Meridian Room
Avenue Circulaire, 3
1180 Uccle (Brussels)
Belgium

👤 Dr. Pottiaux, Eric

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