Belgium National Report

- Royal Observatory of Belgium :

- National Geographical Institute :

Contribution to the EUREF Permanent Network

Manage the EUREF Permanent Network Central Bureau

next to core EPN:

- Collects and validates metadata of the EPN densification network
- Since 2017 use tool "M^{3}G" (Metadata Management and Dissemination System for Multiple GNSS Networks)

- 21 new EPN stations in the EPN network

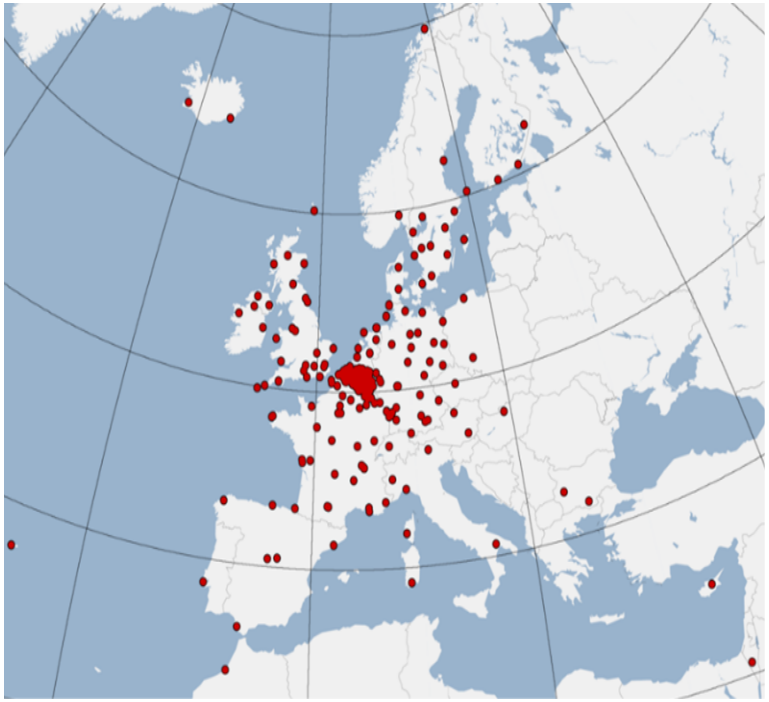
Data analysis

- daily rapid position
- final position
- tropospheric zenith path delay estimates

- Since GPS week 2044 (March 2019), ROB final solutions include Galileo

Contribution to the EUREF Permanent Network

EPN core products



GNSS network, contribution to EPN densification

Contribution to the EUREF Permanent Network

ROB is responsible for the Reference Frame Coordination of the EPN

- to provide the regional densification of the IGS reference frame in Europe in order to maintain of the ETRS89
- EPN multi-year position and velocity solution is computed
- CATREF
- updated each 15 weeks

Troposphere

Tropospheric Products and E-GVAP Analysis Centre

- participating to the E-GVAP program and provided European meteorological institutes with tropospheric Zenith Path Delay (ZPD) estimates

Troposphere

Long-term Stability of GNSS-based Tropospheric Zenith Path Delays

- Tropospheric time series homogenisation
  - Within the IAG Working Group:
    - ROB
    - RMI (Royal Meteorological Institute, Belgium)
    - MUT (Military University of Technology, Warsaw, Poland)

- ROB continued to collaborate with the RMI and ASI to evaluate the atmospheric water vapour content in the regional (European-wide) climate model ALARO

- ROB continued to collaborate with RMI to study the seasonal variabilities and trends in the atmospheric water vapour at about 100 worldwide IGS station locations based on GNSS

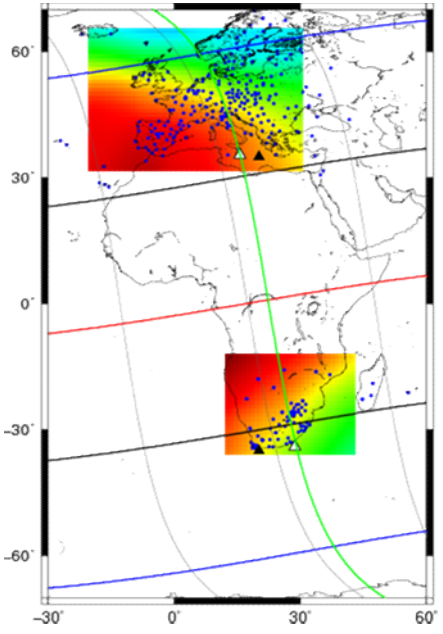
Ionosphere

Ionospheric Products and Space Weather impacts

- maintain the near real-time products dedicated to Space Weather generated by the ROB-IONO software

Inter-hemispheric comparison (Europe – South Africa) of the ionosphere-plasmasphere system

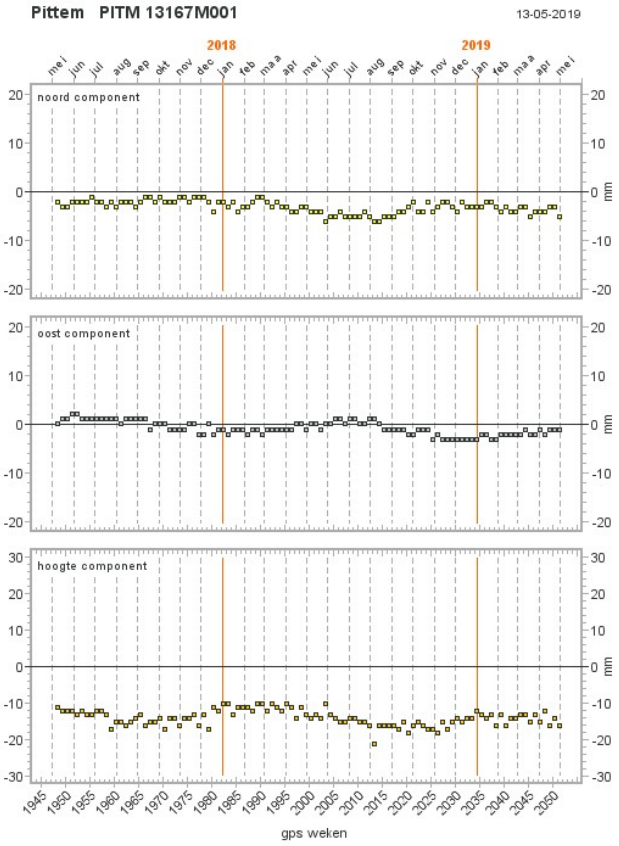
- GNSS data (GPS+GLONASS) of the dense EUREF Permanent GNSS Network
- together with the South African TRIGNET network
- IGS stations
- for the period 1998-2017



AGN (Active Geodetic Network)

RTK networks: since 2003:

- Operated by regional governmental agencies and NGI
- In the process of changing their hardware (Galileo)
- NGI is responsible for initial coordinates and monitoring of stations
- All information and results on our website (http://www.ngi.be)



AGN (Active Geodetic Network)

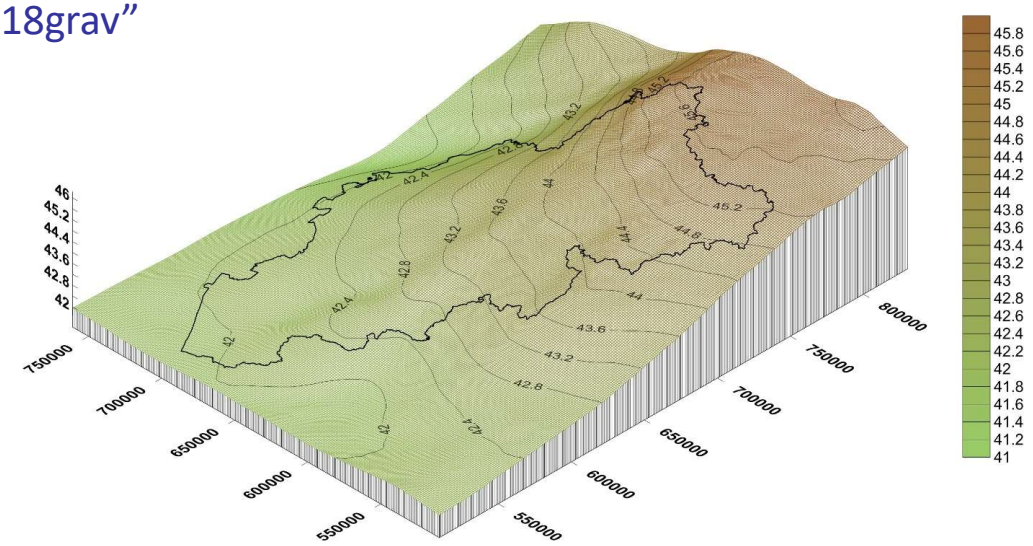
EPN Densification project

- Since the beginning of 2015, we are taking part in the EPN Densification project
- 1656 (2 October 2011) up to week 2052 (11 May 2019)

New height-conversion model hBG18

On the 1ste august 2018 new height-conversion model hBG18

- hBG18 made at “Delft University of Technology”
- Based on new quasi-geoid model “NLGEO2018grav”
- 3707 new GNSS-levelling points



New 3D network

Started new 3D-network (± 2500 points) and 10% is done

- GNSS friendly
- Good accessibility
- Stainless steel nails in existing solid concrete surfaces
- Coordinates will be determined with static GNSS and spirit levelling

Ground motion Analyses using Radar Interferometry technique

We have started a project with the :
"Geological Survey of Belgium"

- a cartography of the ground movements in Belgium highlighted by radar interferometry.
- characterizing the areas that undergo ground motion
- Help us to decide new leveling"

Belgium National Report

Thank you