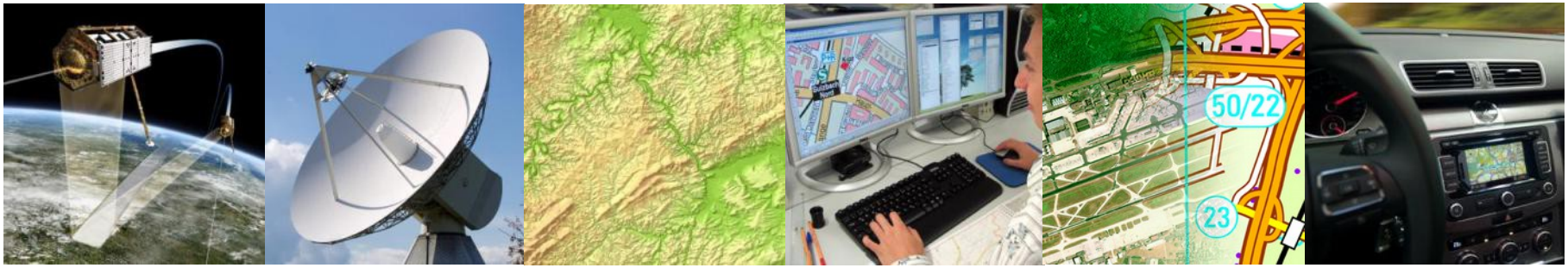
EUREF Symposium 2015, Leipzig
June 3 – 5, 2015

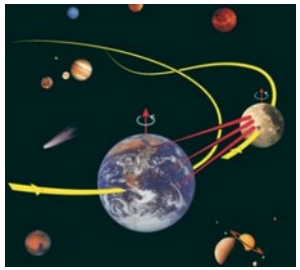
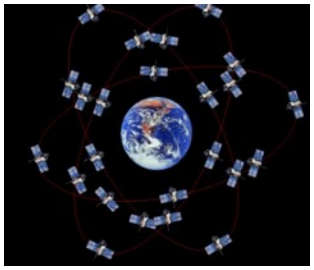
TWG Meeting, June 1, 2015

Federal Agency for
Cartography and Geodesy

The Geodesy Department of BKG



Structure of Department of Geodesy

General Issues Combination of Spatial Systems	***Satellite Navigation***	***Integrated Spatial Reference***	***Metrology of Gravimetry***	***Geodetic Observatory Wettzell***
• Central Office of the International Service for Earth Rotation and Reference Systems • International VLBI Service • International Laser Ranging Service	• German reference network GREF • European reference network/inter- national GNSS service • GNSS satellite orbits • Real-time positioning	• German/European height reference system • Geoid and gravity field modelling • Geodetic information systems	• German gravity reference system • Absolute gravimetry • Superconducting gravimetry	• VLBI observations • SLR observations • Local measuring data and professional services
				

Locations

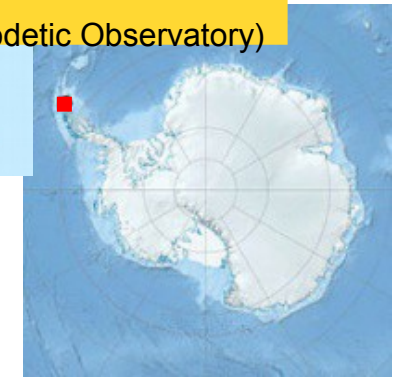
Leipzig
(Branch Office)

Frankfurt am Main
(Central Office)

Wettzell
(Geodetic Observatory)

Concepcion, Chile
(Geodetic Observatory)

O´Higgins, Antarktis
(Geodetic Observatory)



Geodetic Observatories

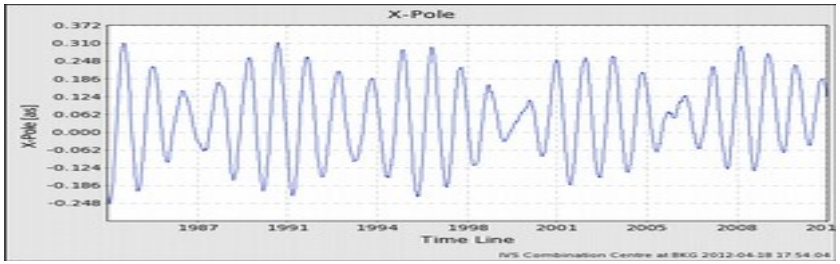
For this purpose, BKG operates the following geodetic observatories:

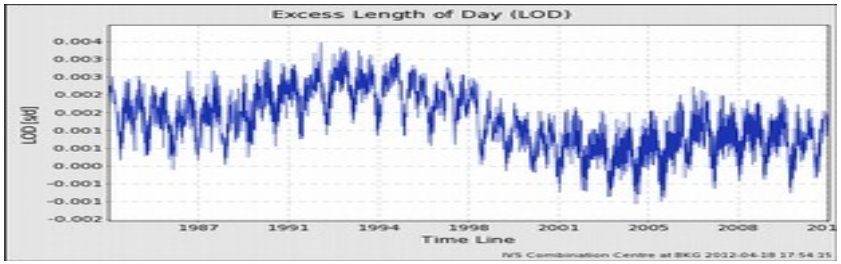
- in BY (Wettzell)
- in Chile (TIGO)
- in Antarctica (O‘Higgins)

TWIN Radiotelescope Wettzell
Orientation by Quasars

First telescopes worldwide according to VLBI2010 specifications

- Performance of the first tests as from the beginning of 2013
- Completion/entry into service of the first TWIN telescope by the end of April 2013
- The second TWIN telescope will be operational by the end of 2013

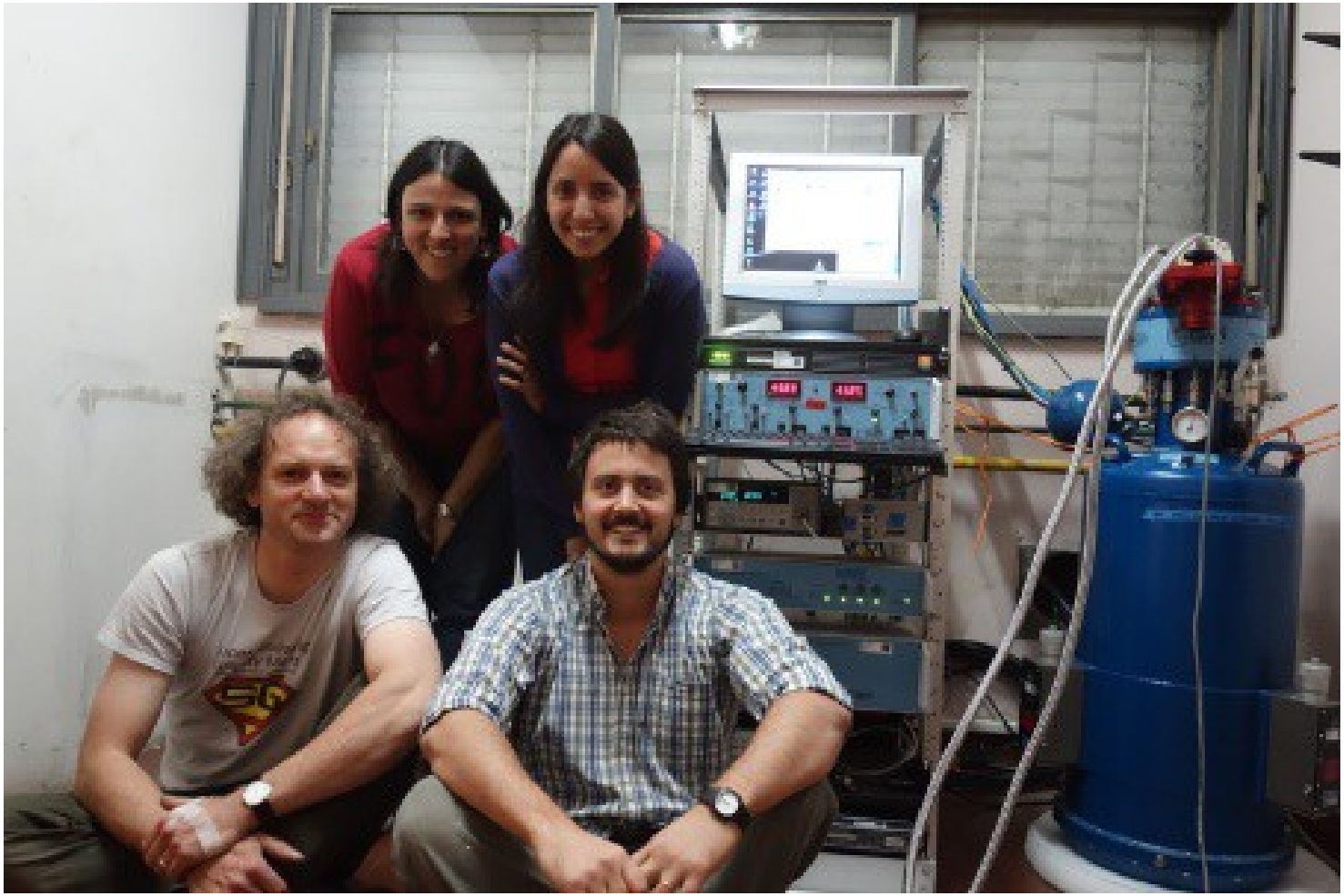





TIGO-5
2014.09.29


La Serena
San Juan
Córdoba
Santa Fe
Salto
Tacuarembó
Paysandú
Villa María
Mendoza
Rosario
Urugua
Valparaíso
Santiago
San Luis
Río Cuarto
San Antonio
Melipilla
Rancagua
35 Std.
2.924 km
Buenos Aires
La Plata
Curicó
Talca
Argentina
Linares
Chillán
Santa Rosa
Concepción
Los Angeles
Angol
Mar del Plata
Temuco
Bahía Blanca

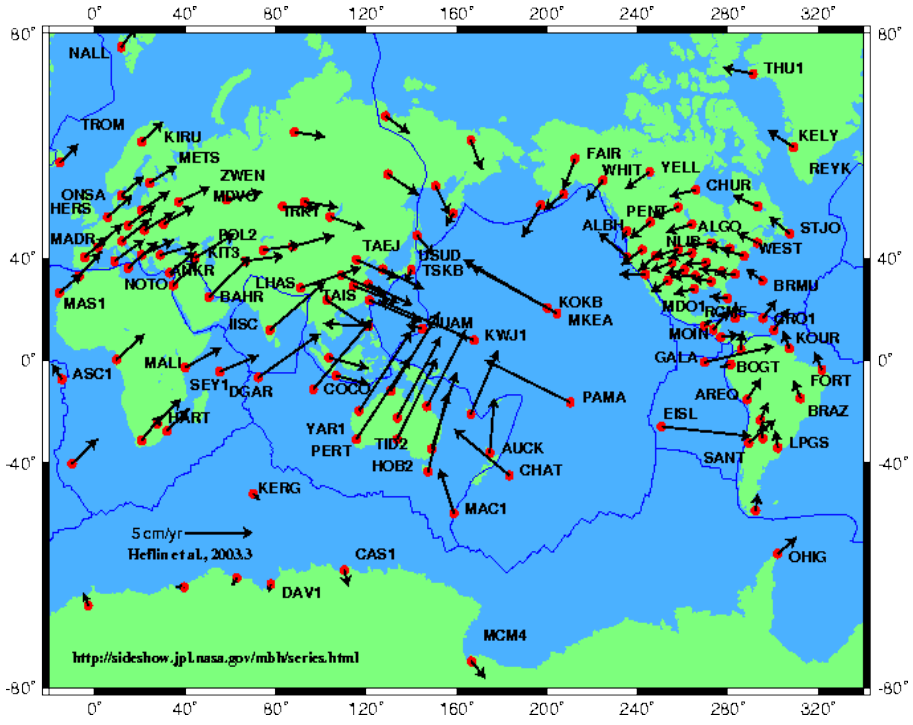

TIEx
TIEx



Contributions to the Global, European and National Reference Systems

Internationale Assoziation of Geodesy (IAG)

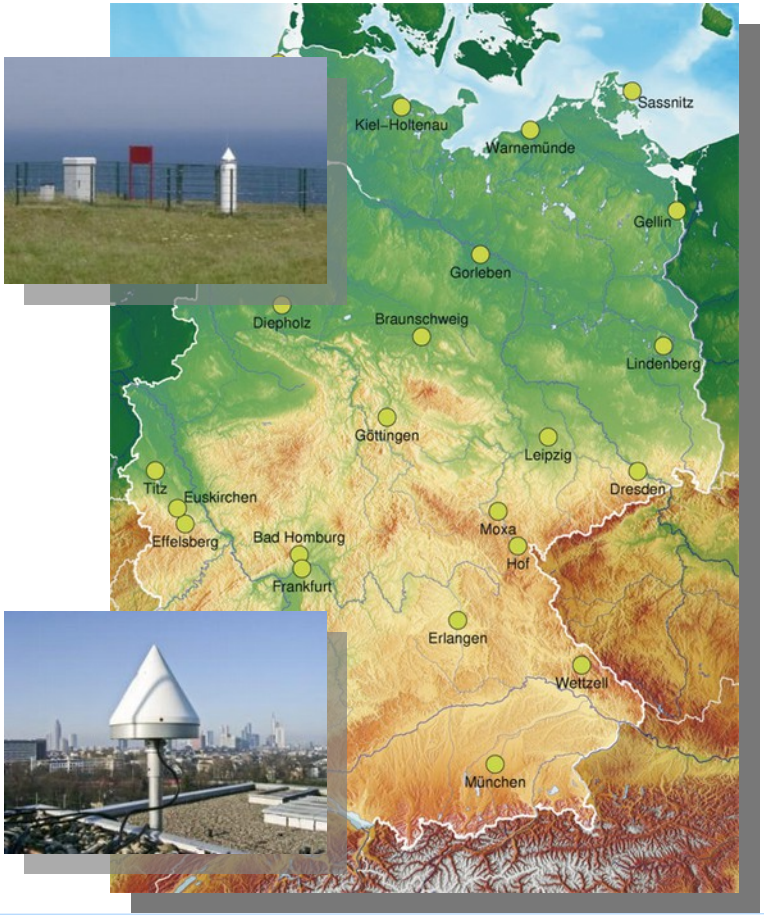
Reference coordinates and geodynamics, satellite orbits, earth rotation parameters



International Earth Rotation Service (IERS) determines Terrestrial Reference System (ITRF) from

- observation of quasars
- satellite laser rangings
- observations of the satellite navigation systems
- BKG is a data and analysis centre and maintains the IERS office

Georeferencing
Provision of the Spatial Reference



The Integrated German Geodetic Reference Network GREF

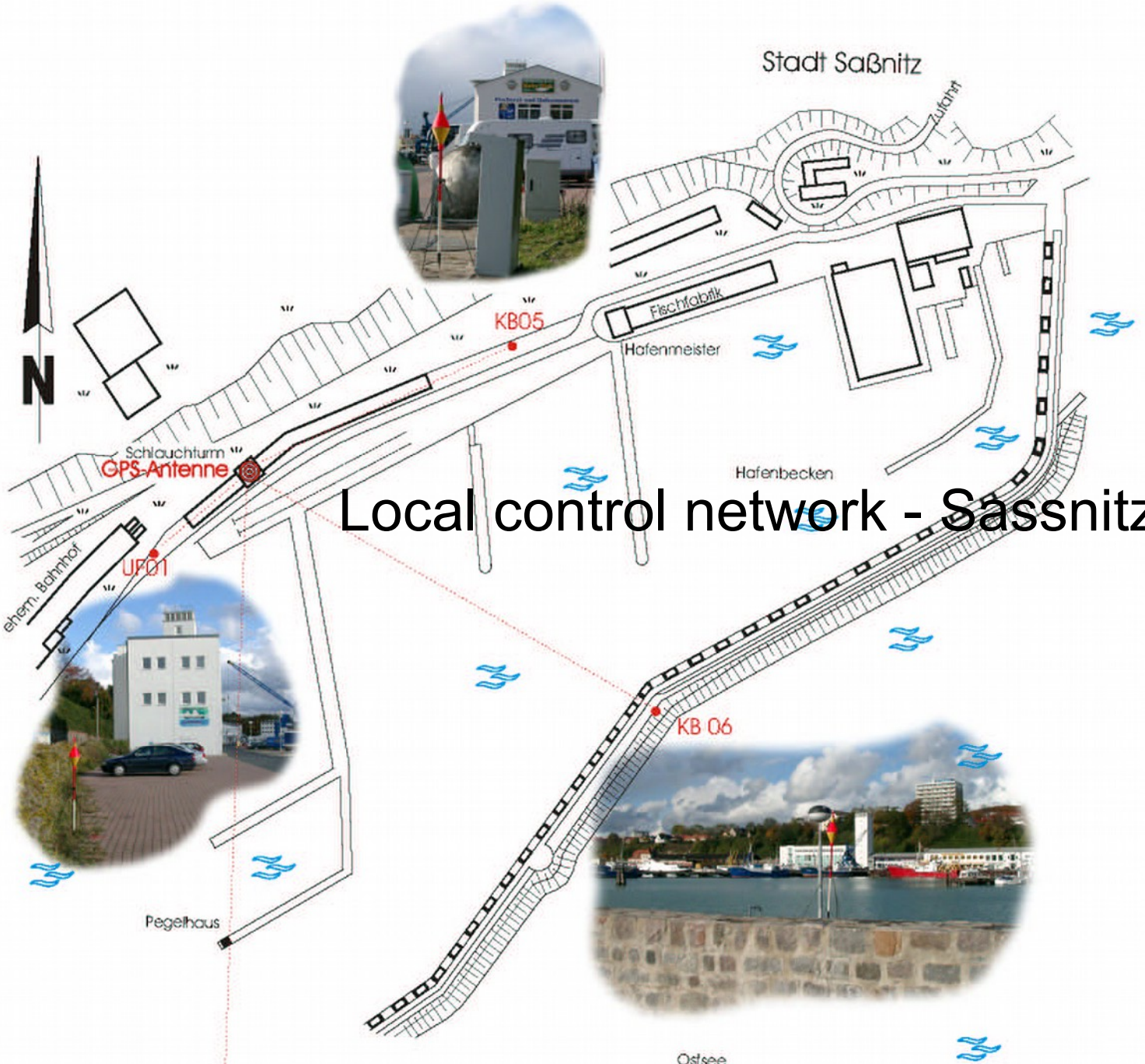
Objectives and tasks:

- Realization and maintenance of a uniform three-dimensional spatial reference in D
- Integration of this system into the European and the International Terrestrial Reference Systems
- Support of realtime satellite positioning services
- Monitoring of temporal changes at the stations
- Determination of the height reference surface

GNSS - Sassnitz

Radar tide gauge Sassnitz

Local control network - Sassnitz

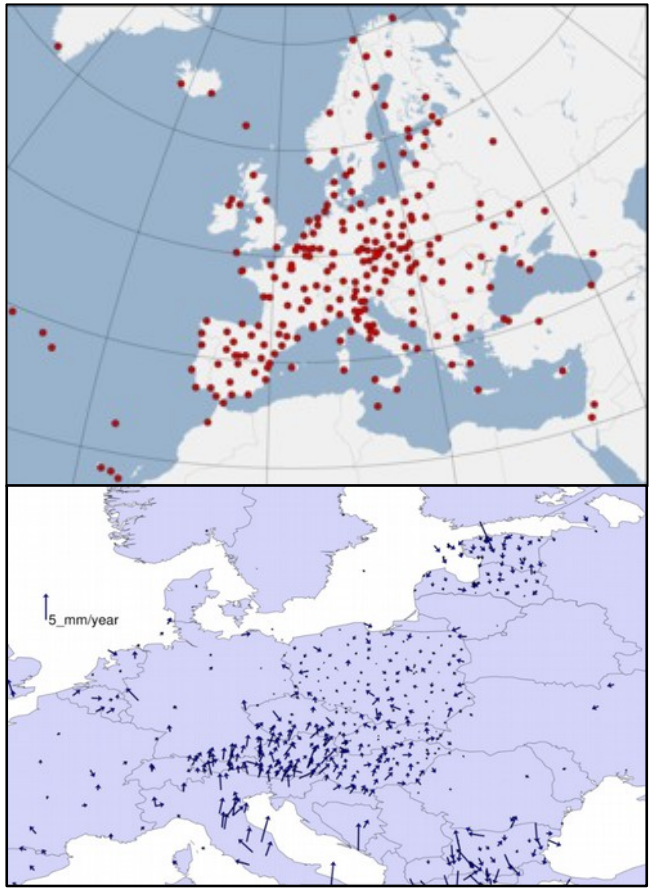


Georeferencing
Provision of European Reference Networks

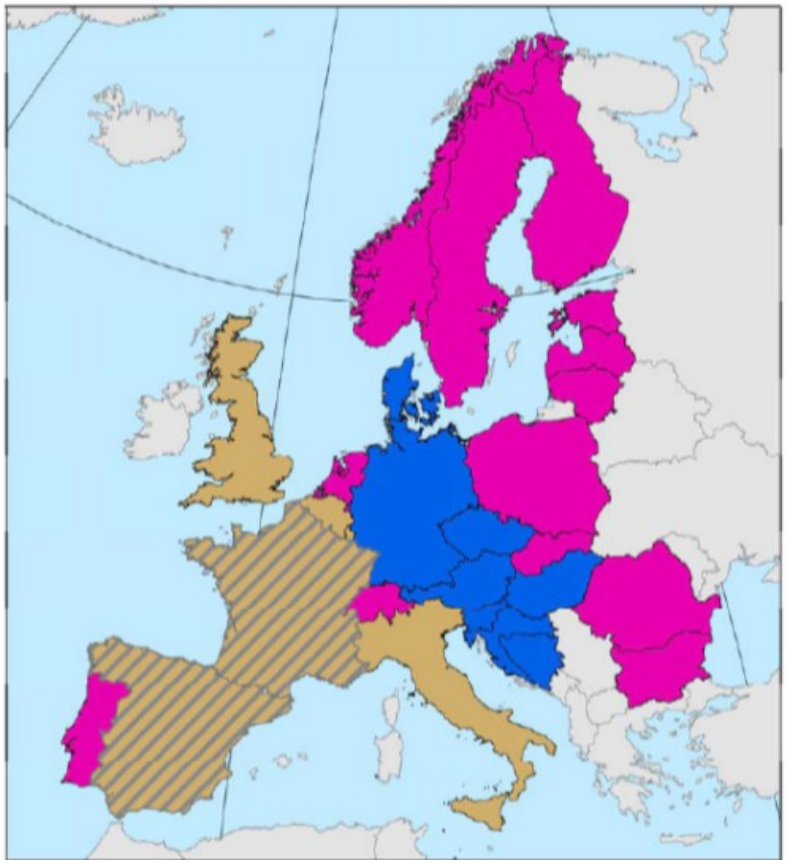
European Integration:

EUREF ⇔ IAG / IERS

- Regional densification in Europe
- *GNSS Permanent Network (EPN)* with 250 stations
- 130 EPN stations form part of the ITRF2008
- Approximately 150 stations provide RT and GLONASS data ⇨ Galileo
- Class A stations (200 of 250)
  Position: 1 cm accuracy “continuous” coordinates
- Monitoring and consideration of the station movements



Georeferencing
European Height Reference System



UELN = United European Levelling Network

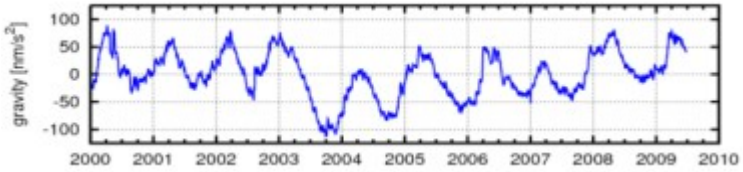
Data and Computing Centre at BKG:

Levelling data (of 26 countries) in one database

Realization of the International Gravity Standard for Germany

- Absolute gravity measurements under the direction of the International Comittee for Measures and Weights
- Transfer of the results to the reference stations Wettzell and Bad Homburg
- Provision of basic data for the computation of gravity anomalies and geoid models

Gravimetric reference and comparison station Wettzell

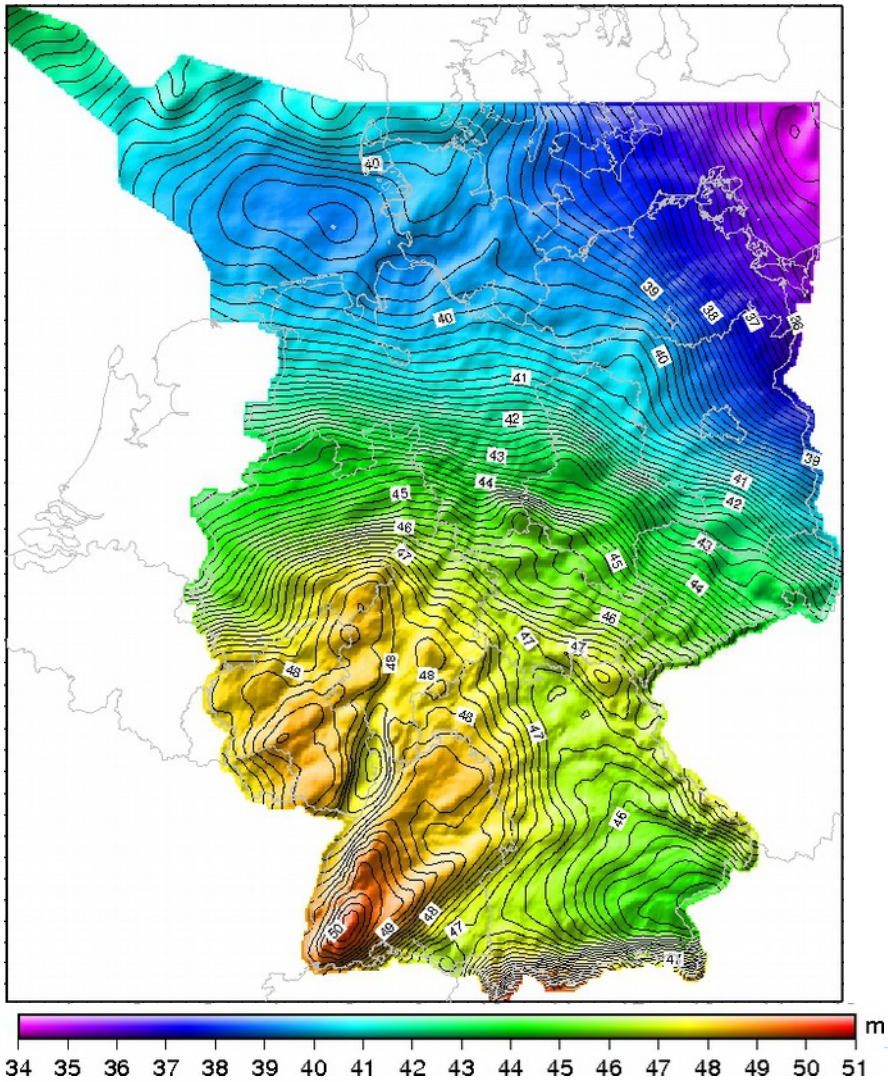


Combined Absolute Gravity Reference Function

Superconducting gravimeter in a separate room

Comparison experiment with five absolute gravimeters

German Combined Quasigeoid 2011 (GCG2011)



- Available in January 2012
- New better date base
- Extendet to the „ausschließlichen Wirtschaftszone Deutschlands“
- Combination of two solutions
  - Institut für Erdmessung (IfE), Leibniz Universität Hannover
  - Bundesamt für Kartographie und Geodäsie (BKG)
- Accuracy
  - flatlands 1 … 2 cm
  - Rockies 3 … 4 cm
  - Sea area 4 …10 cm

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