Federal Agency for
Cartography and Geodesy

Status report 2010

of the BKG Gravity Group

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Federal Agency for Cartography and Geodesy (BKG), Frankfurt a. M., Germany

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- Our Activities with the FG5 within the Nordic Countries since 1993
- Report about other campaigns and topics (data base for absolute gravity data)
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Transportable Integrated Geodetic Observatory TIGO in Concepcion/Chile

TIGO Gravity building

TIGO Gravimeter Equipment

SC38

Back from service/upgrade in late 2009

FG5-227 with Remote control option, 1 observation / week (24 sets/150 drops)

After the Earthquake on February 27, 2010 in Concepcion

SG38

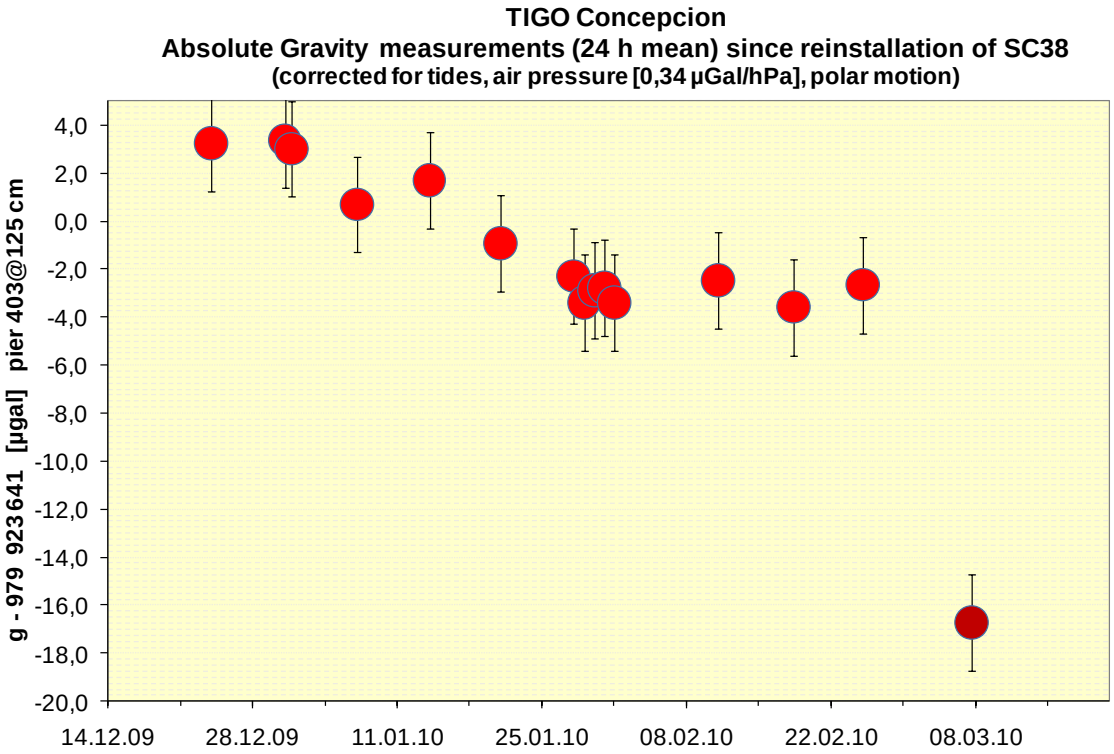
No data until now available, but it is on power and seems to be o.K. (reported)

FG5-227,

dropping chamber was fallen down, first data on March 8 available, measurements were started on March 6

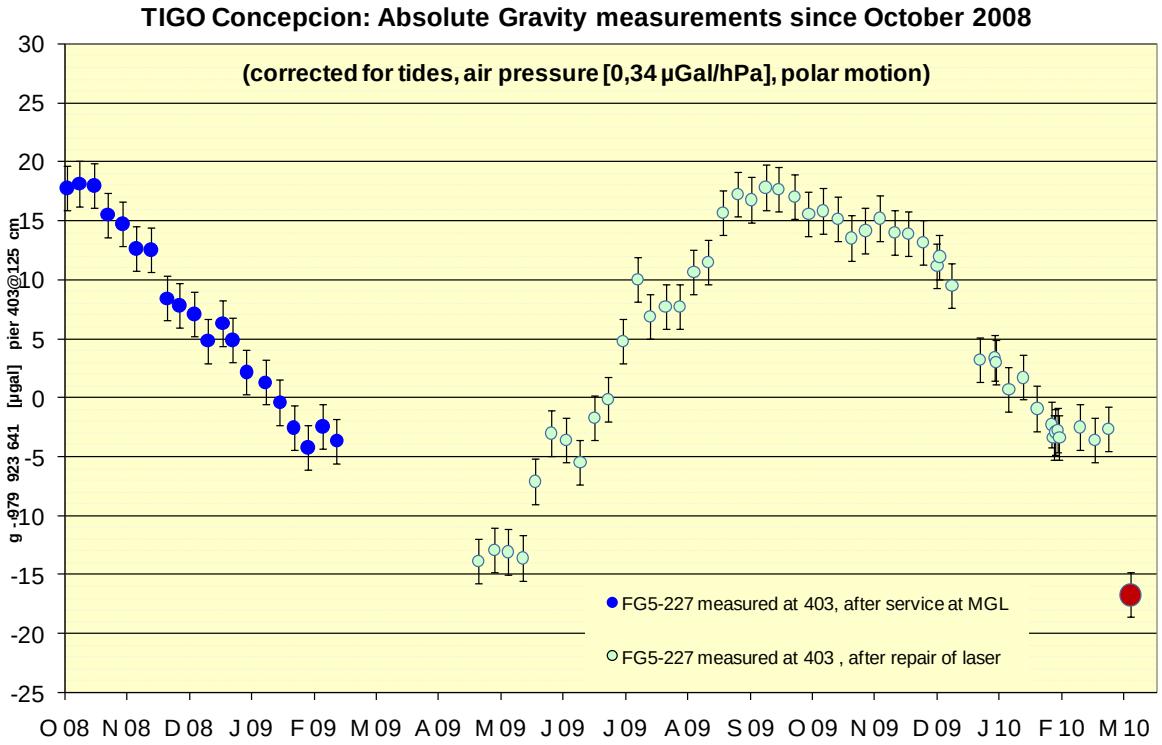
Both Instruments need to be checked carefully

Gravity at Concepcion pier 403 (FG5-227)



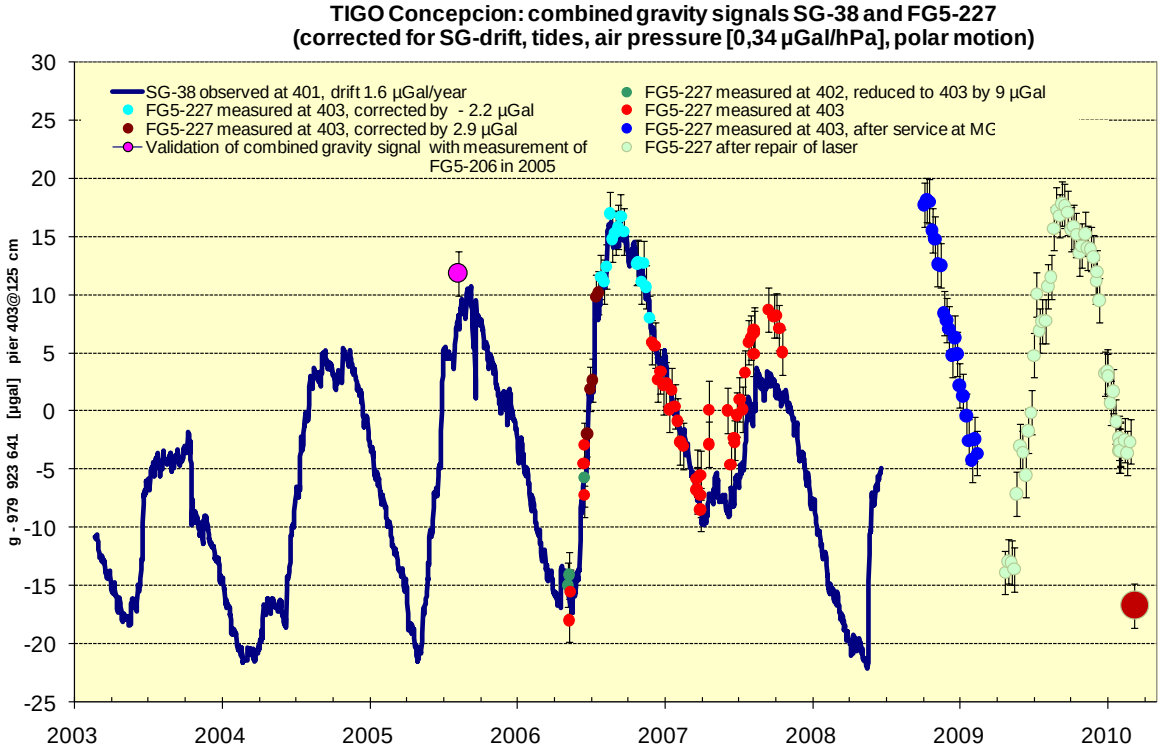
Gravity change of -14 µGal ?

Gravity at Concepcion pier 403 (FG5-227)



Gravity change of -14 µGal ? Seems to be realistic, but the result is preliminary until the FG5-227 was checked carefully!

Gravity at Concepcion (SC38 + FG5-227)



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Our Activities with our AG within the Nordic Countries since 1993

station	date	FG5-#
Höfn (IS)	26.07.1997	101
Egilsstadir (IS)	29.07.1997	101
Akureyri (IS)	02.08.1997	101
Holmavik (IS)	05.08.1997	101
Reykjavik (IS)	08.08.1997	101
Haymyrar (IS)	13.08.1997	101
Herdubreidarlindir (IS)	18.08.1997	101

station	date	FG5-#
Furoeregrund (S)	26.06.1998	101
Furoeregrund (S)	09.07.2003	301
Kiruna (S)	06.07.2003	301
Martsbo (S)	25.09.1995	101
Martsbo (S)	12.07.2003	301
Onsala (S)	08.08.1993	101
Onsala (S)	29.09.1995	101
Onsala (S)	13.06.1998	101
Onsala (S)	15.07.2003	301

station	date	FG5-#
Bornholm/Tejn (DK)	02.08.2006	101
Gedser (DK)	06.08.2006	101

station	date	FG5-#
Hönefoss AB + AC (N)	22.06.2003	301
Stavanger (N)	17.06.2003	301
Tromsoe (N)	30.06.1998	101
Tromsoe (N)	03.07.2003	301
Trondheim (N)	24.06.1998	101
Trondheim (N)	28.06.2003	301
Trysil (N)	13.08.1993	101
Trysil (N)	03.10.1995	101
Trysil (N)	18.06.1998	101
Trysil (N)	24.06.2003	301
Vagstranda (N)	26.06.2003	301

station	date	FG5-#
Metsähovi (FI)	17.06.2000	101
Metsähovi (FI)	11.07.2004	101 + 301

station	date	FG5-#
Ny-Alesund	18.08.2001	101
Ny-Alesund	05.07.1998	101

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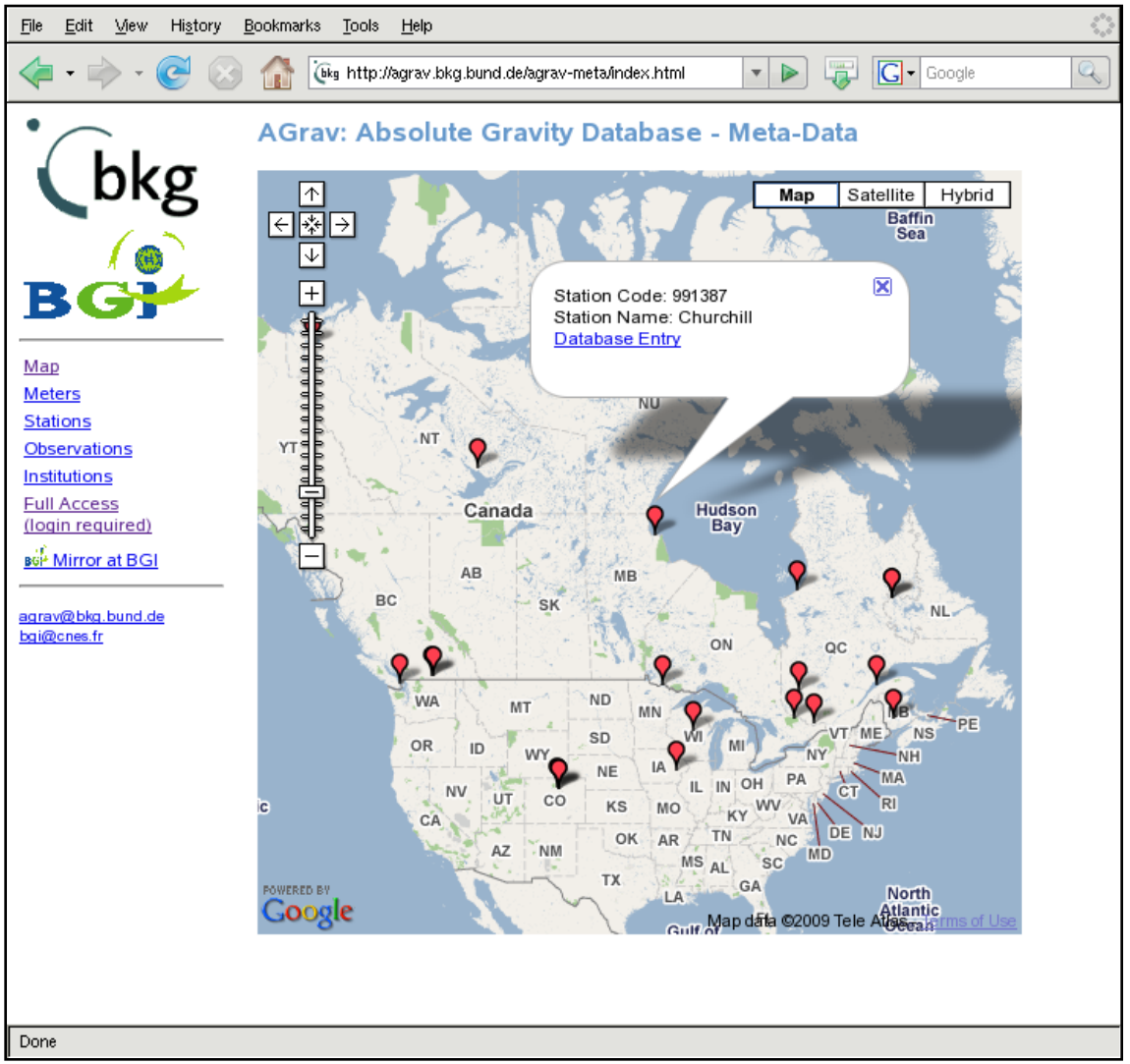
Absolute Gravity Database AGrav

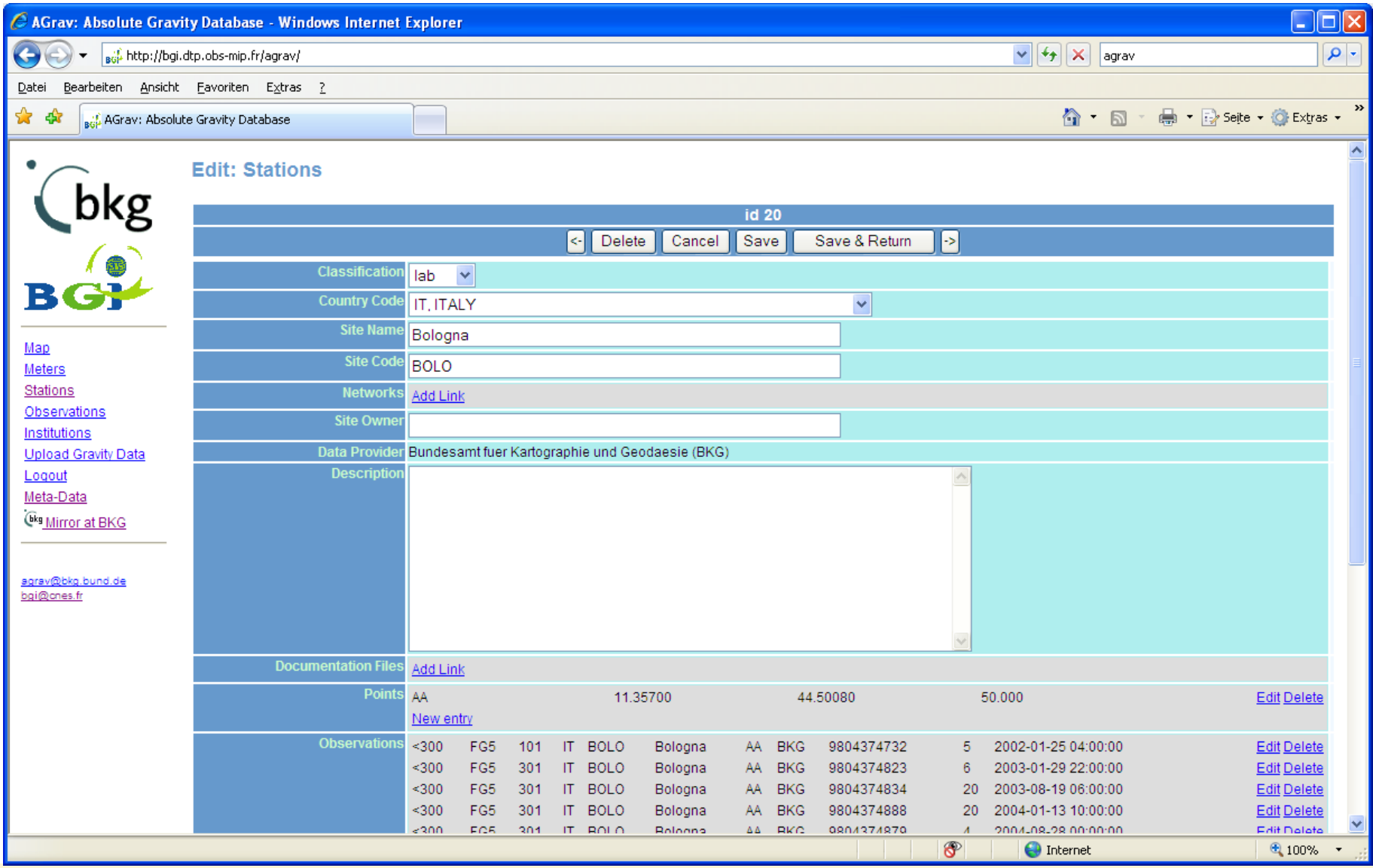
http://agrav.bkg.bund.de

http://bgi.dtp.obs-mip.fr

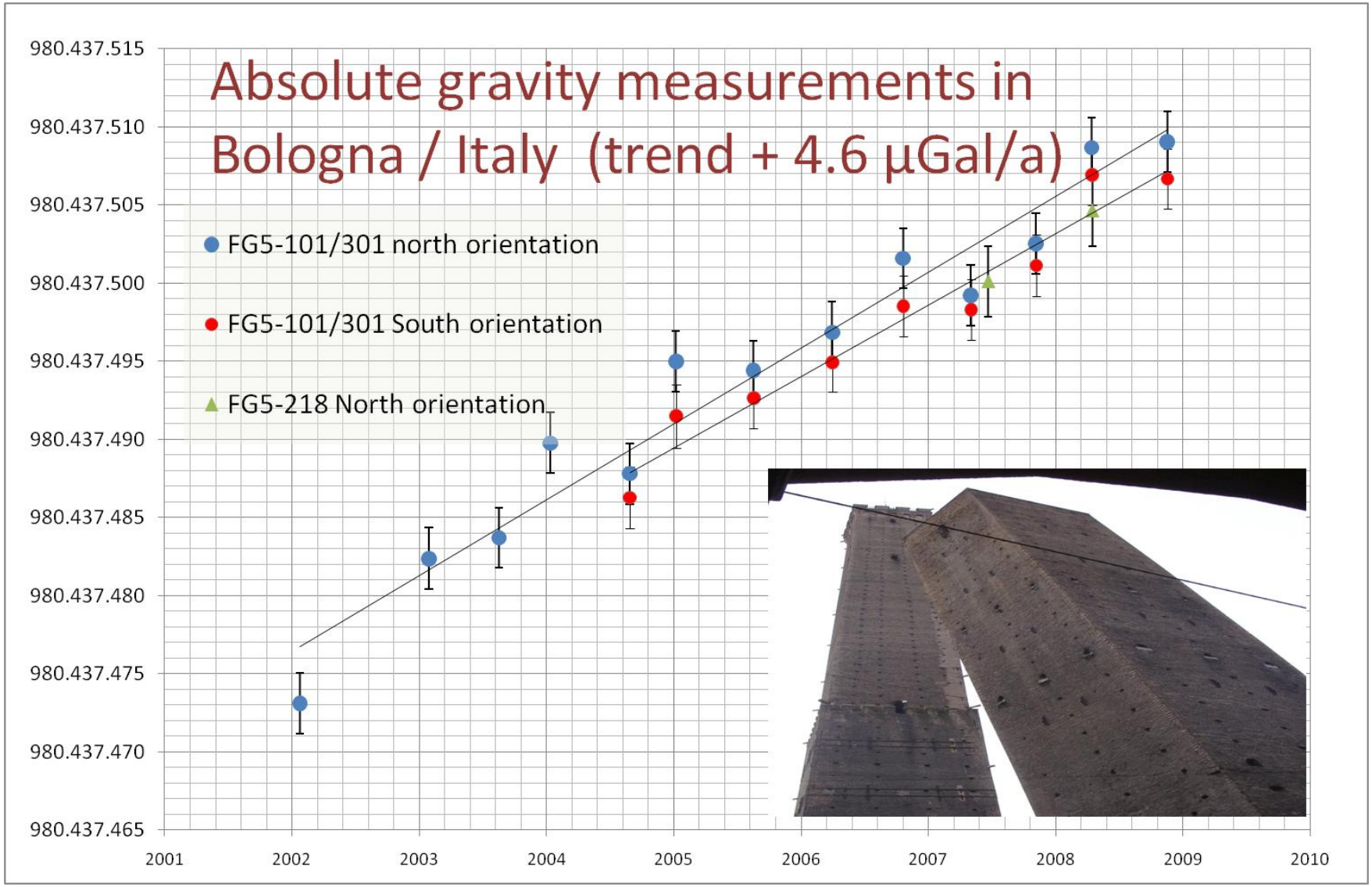
- Mirrored servers at BKG (Germany) and BGI (France)
- Map based web-interface to access meta-data and/or processing results
- Two “views” to data:
  - meta-data: free access
  - complete data: restricted to contributing groups
- Relational database
- Implementation: classical LAMP system



Absolute Gravity Database Agrav
Exemple for gravity data



Absolute Gravity Database Agrav



Absolute Gravity Database AGrav

- AG database is operational at BGI and BKG
  - Graphical and tabular overview about the stored data
  - Improved cooperation within the gravity community and for interdisciplinary activities
  - Secure repository for AG data
- AG data owner are asked to contribute to the database
- Cooperation between WGAG and the CCM-Working Group on Gravimetry and IAG-SG 2.1 Comparison of Absolute Gravimeters in the calibration of AG and the standardisation of data processing
- The authors propose the realisation of a global absolute gravity reference system in the “few µGal-level”
- If the time series will be not submitted, please give at least one gravity value for the station for e.g. the first epoch

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GREF Stations in Germany

Most of the GREF stations are AG – sites also

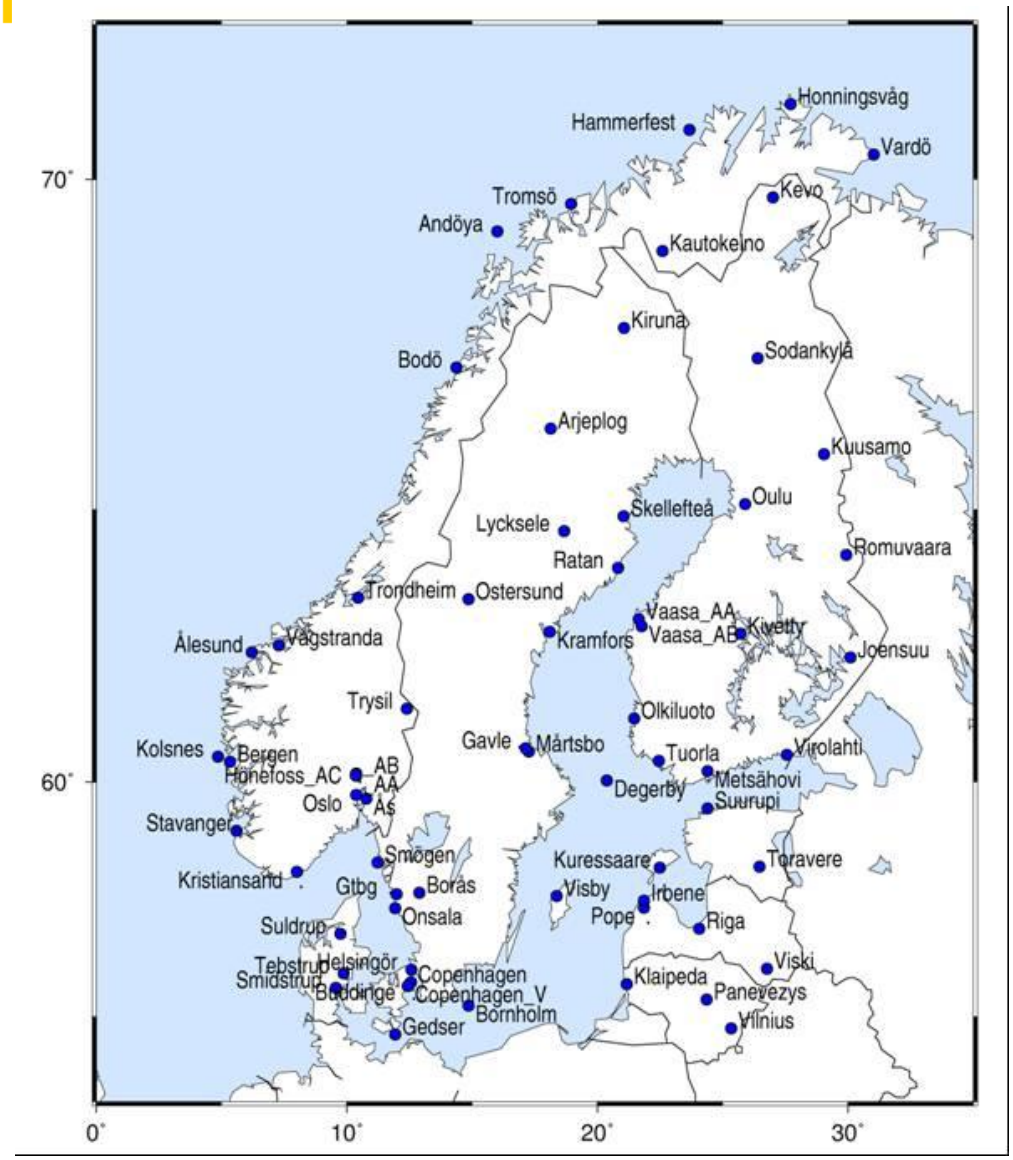
station	date	FG5-#
Sassnitz	17.05.2003	301
	30.07.2006	101
	12.05.2009	101
Warnemünde	15.07.2005	101
	14.06.2008	101
	2010 (?)	101
Kiel-Holtenau	01.06.2005	101
	12.08.2009	301

Occupation of German Baltic Sea coastal stations with FG5 absolute gravimeters

Federal Agency for Cartography and Geodesy

AG stations measured with FG5 by BKG

AG stations included within the Abs_Grav_Plan



We recommend to include the German Baltic Sea Coastal Stations measured with FG5

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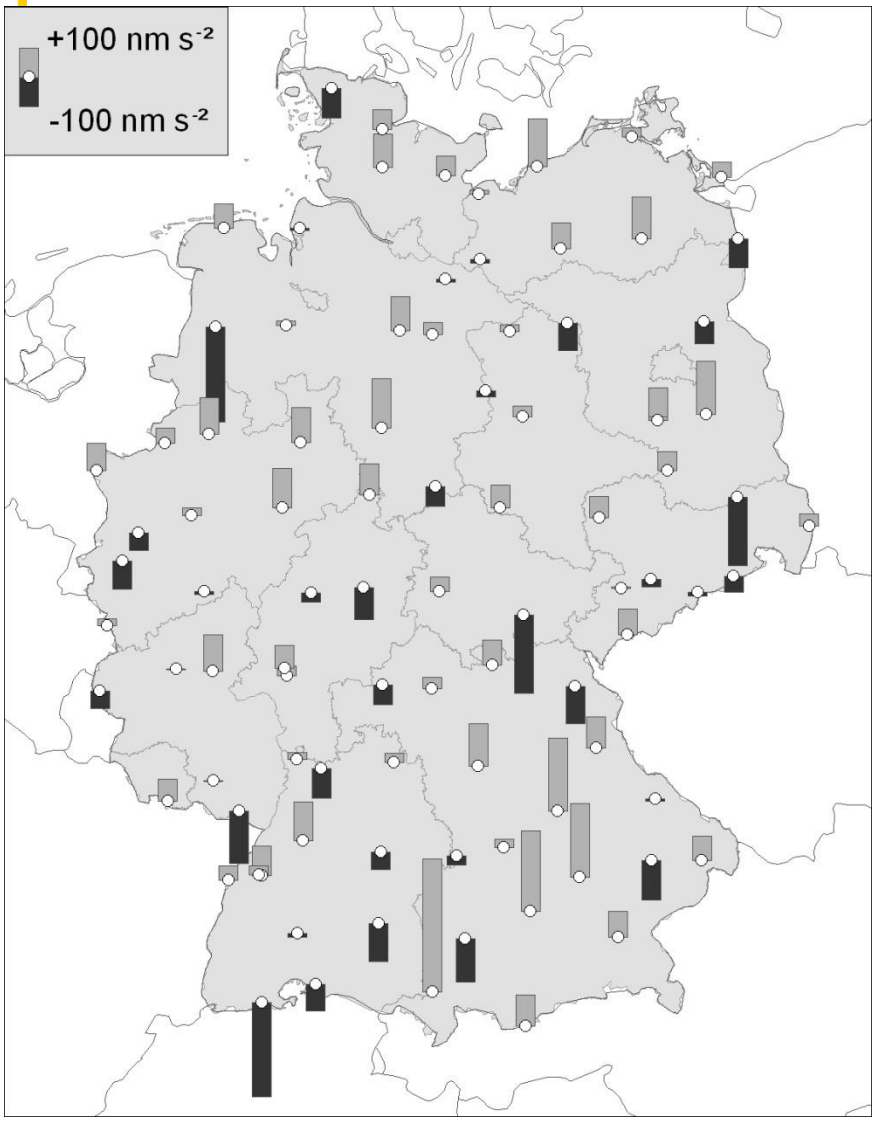


Validation of the First Order German Gravity Network (DHSN96):

- discover systematic offsets in existing gravity networks
- improve the databasis for geoid determination
- gravity measurements at GPS reference sites

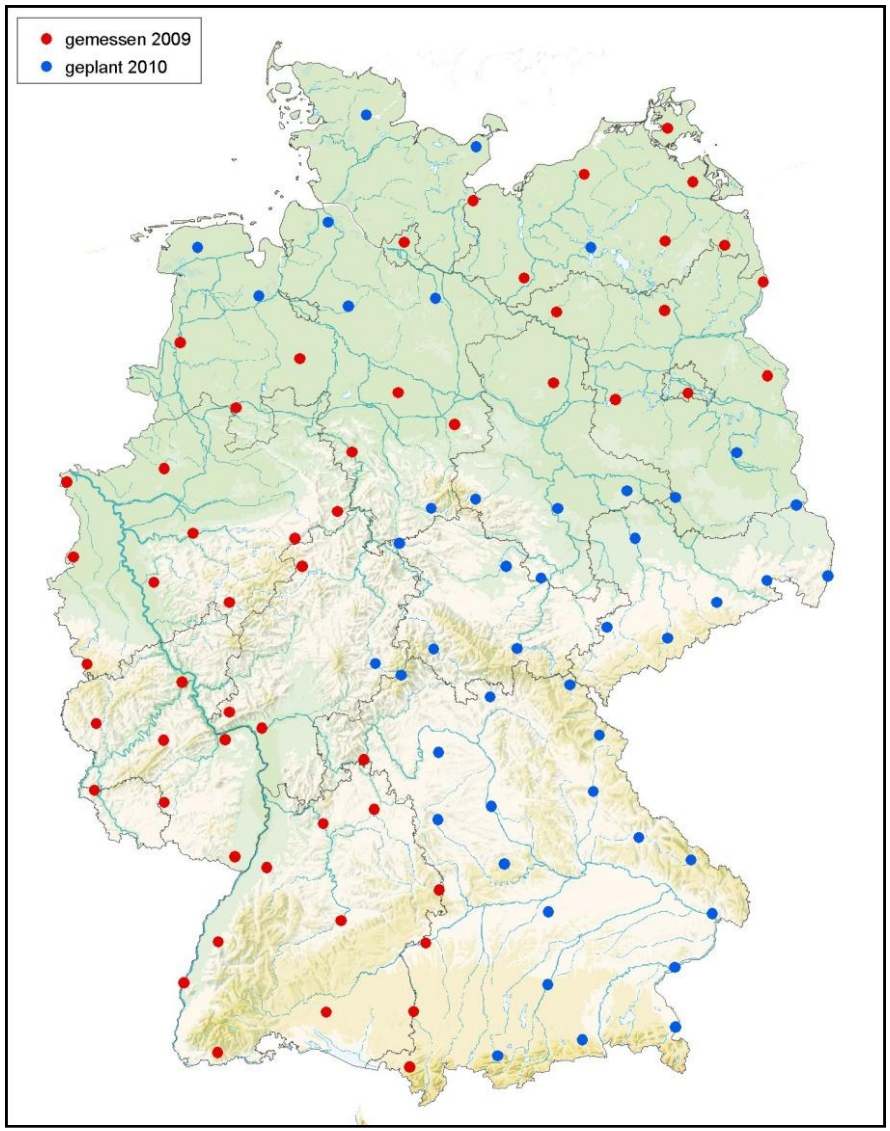
Sample measurements (1) with A10 absolute gravimeter on 94 field sites in the period 2006 to 2008.

Measurements (2) with A10 absolute gravimeter on about 100 new field sites in the period 2009 to 2010.

(1) BMBF/DFG-Special Research Programme „Geotechnologien“ (No. 03F0422A)

(2) Reobservation of the German height reference network (DHHN201x)

GREF Station in Germany



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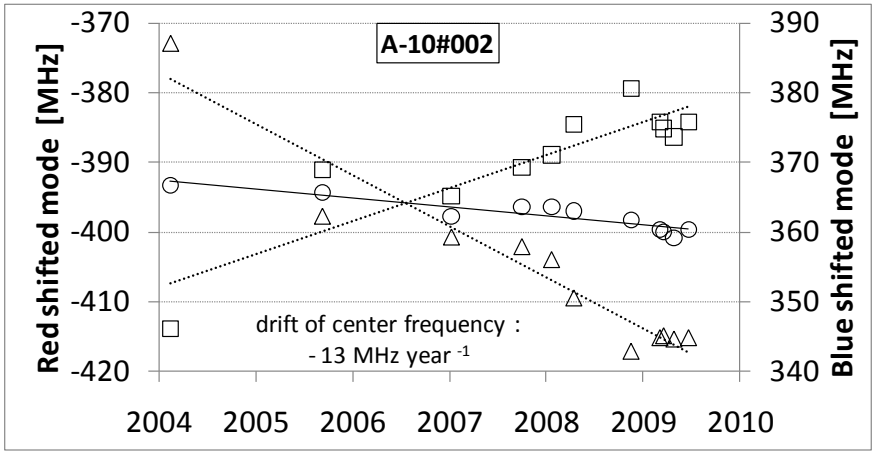
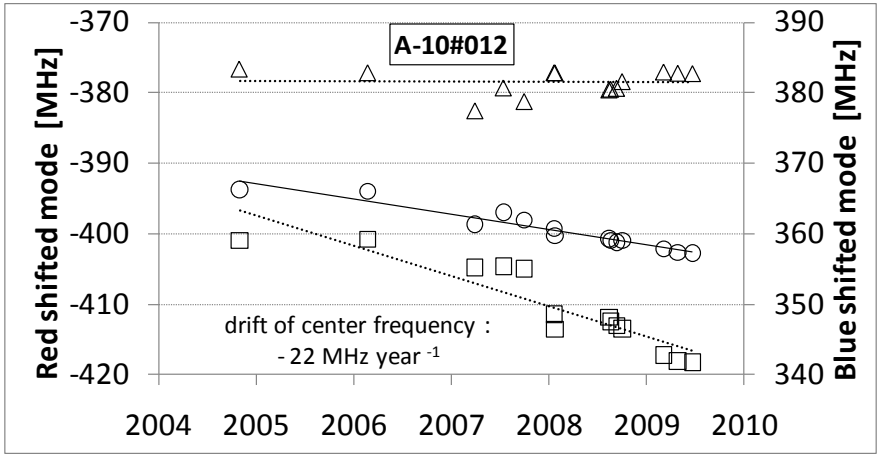
A10 laser calibration history





For A10#012 laser we found a drift of center frequency, resulting in level change of - 4,4 µGal /year !

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Validation of the instrument at the regional comparison site Bad Homburg

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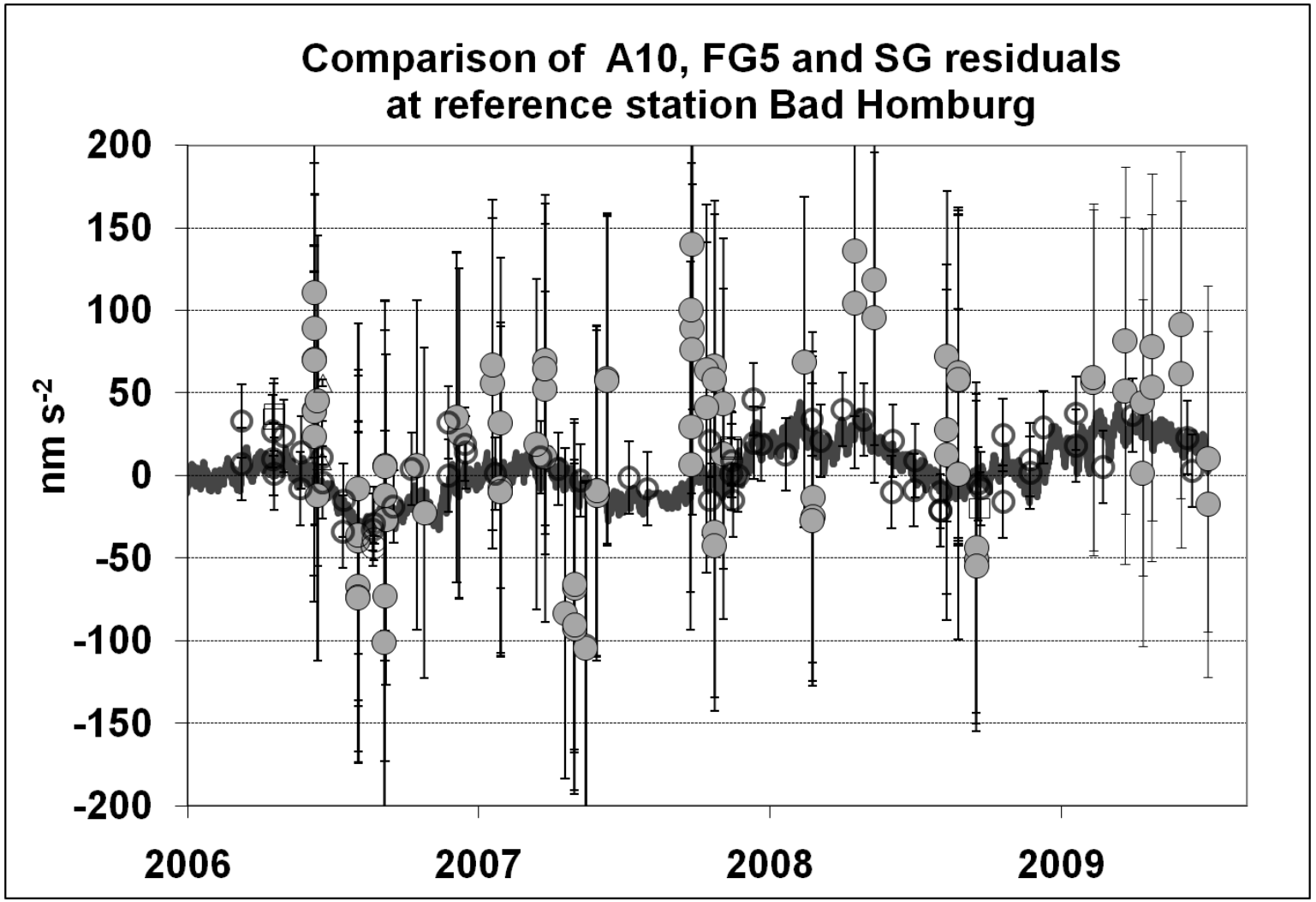
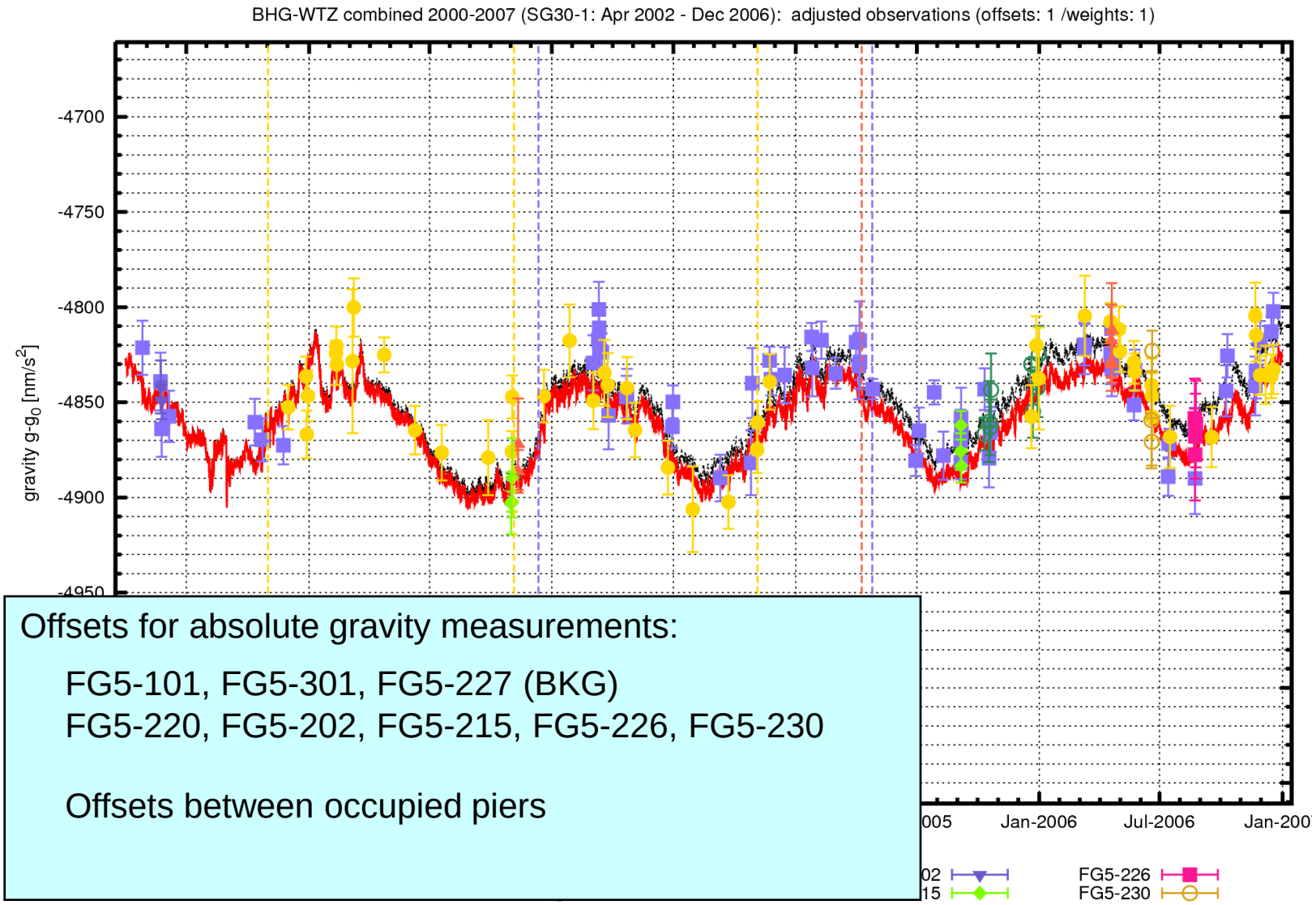


Validation of A10 using the combined (FG5 and SG) time serie in Bad Homburg

Results for station Bad Homburg

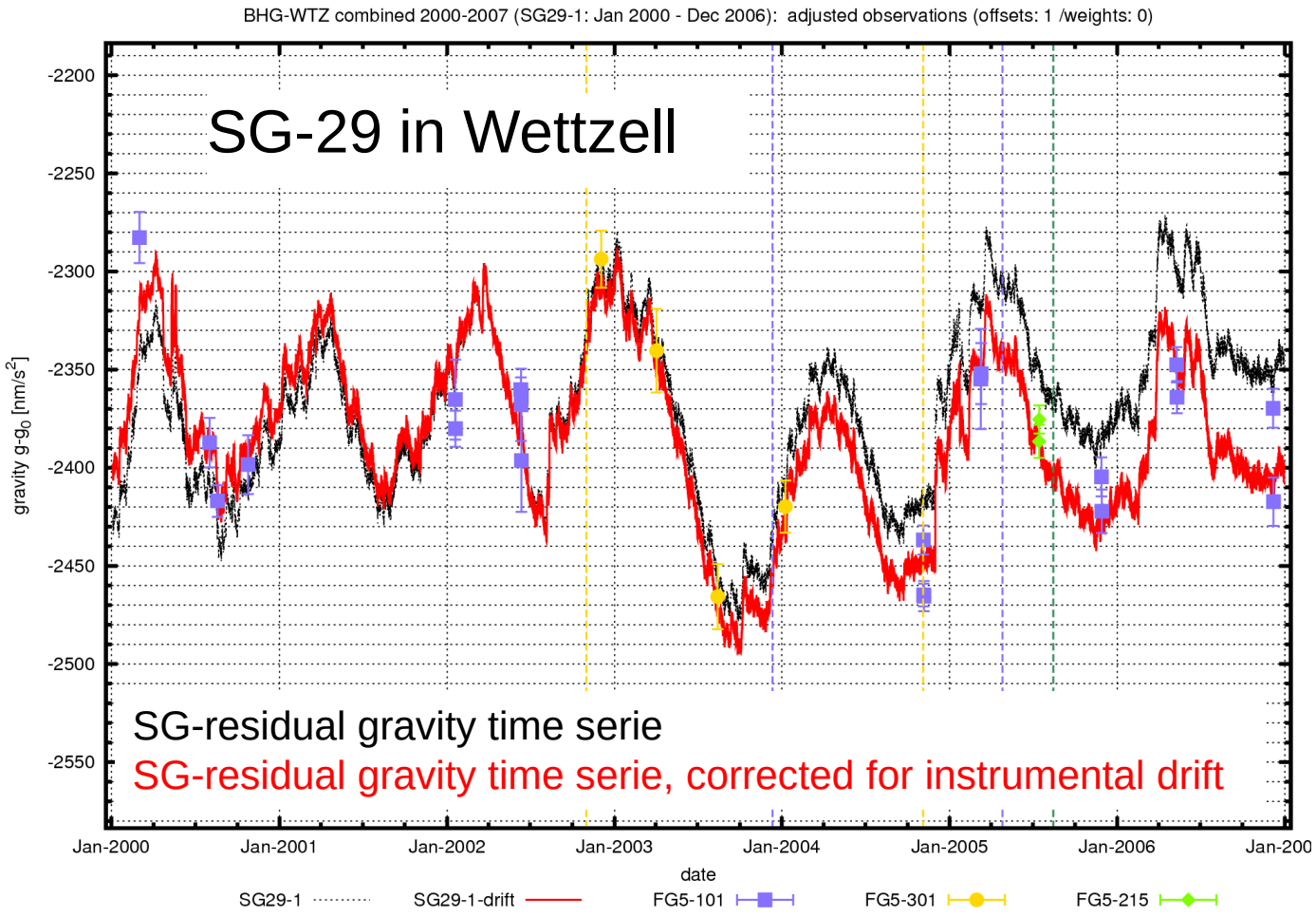


Offsets for absolute gravity measurements:

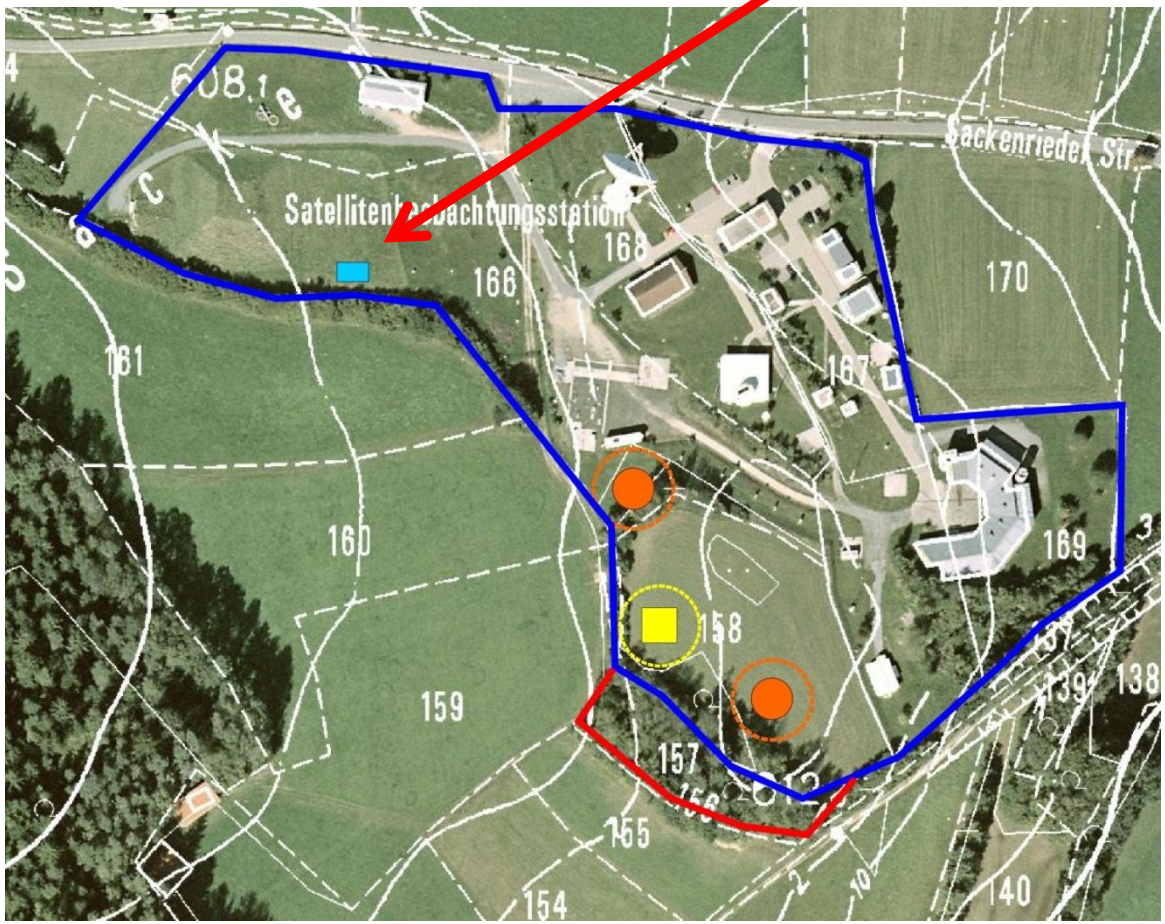
FG5-101, FG5-301, FG5-227 (BKG)
FG5-220, FG5-202, FG5-215, FG5-226, FG5-230

Offsets between occupied piers

Combined gravity time serie for Wettzell



New gravity building (blue) in Wettzell



Statusreport BKG gravity group

New gravity building in Wettzell, offers 4 pillars for AG and 2 for SG, air condition systems were installed in late February 2010

Thank you for your attention !