Report on the Borowa Gora (BG) IGETS Station

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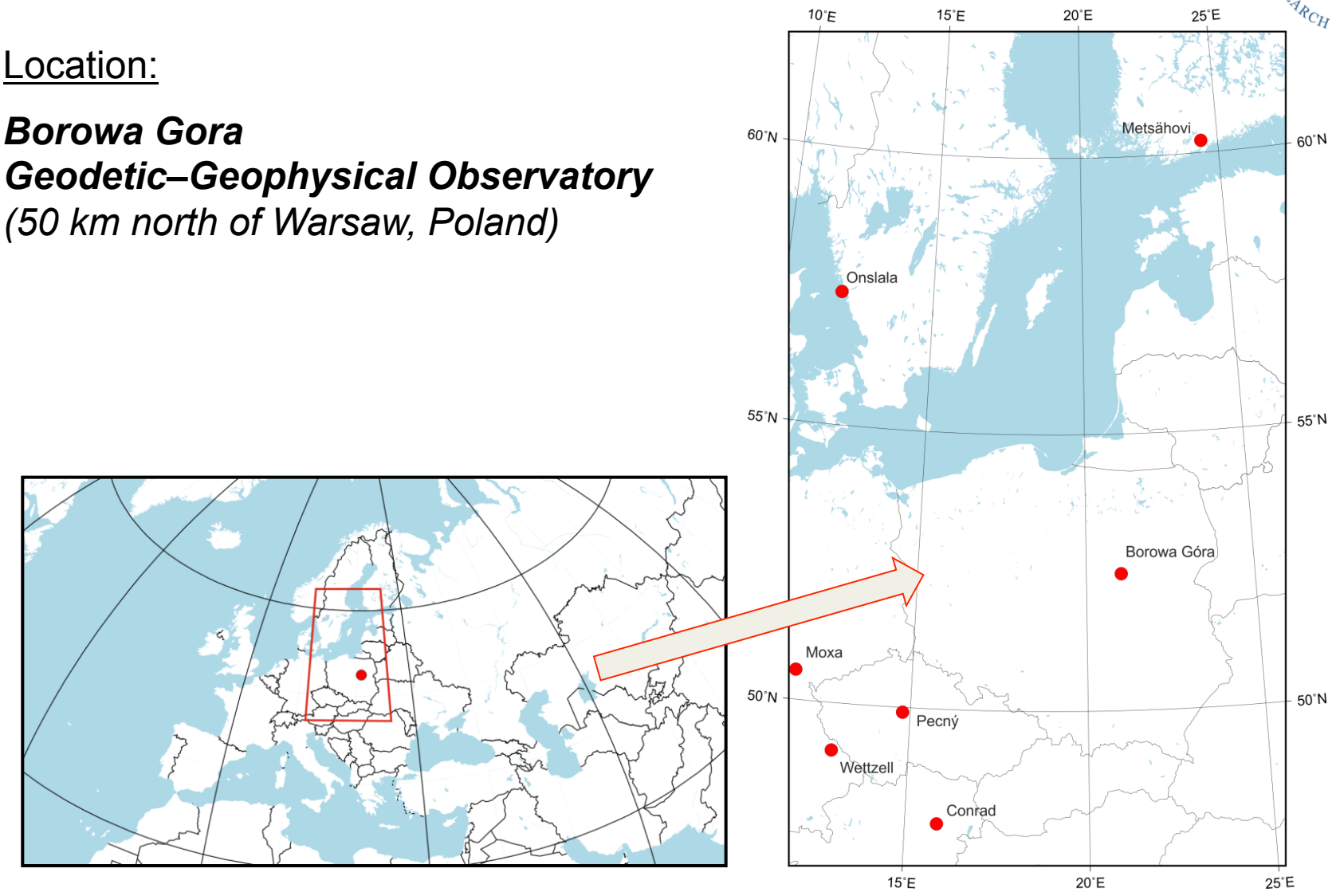
BG location

Location:

Borowa Gora
Geodetic–Geophysical Observatory
(50 km north of Warsaw, Poland)



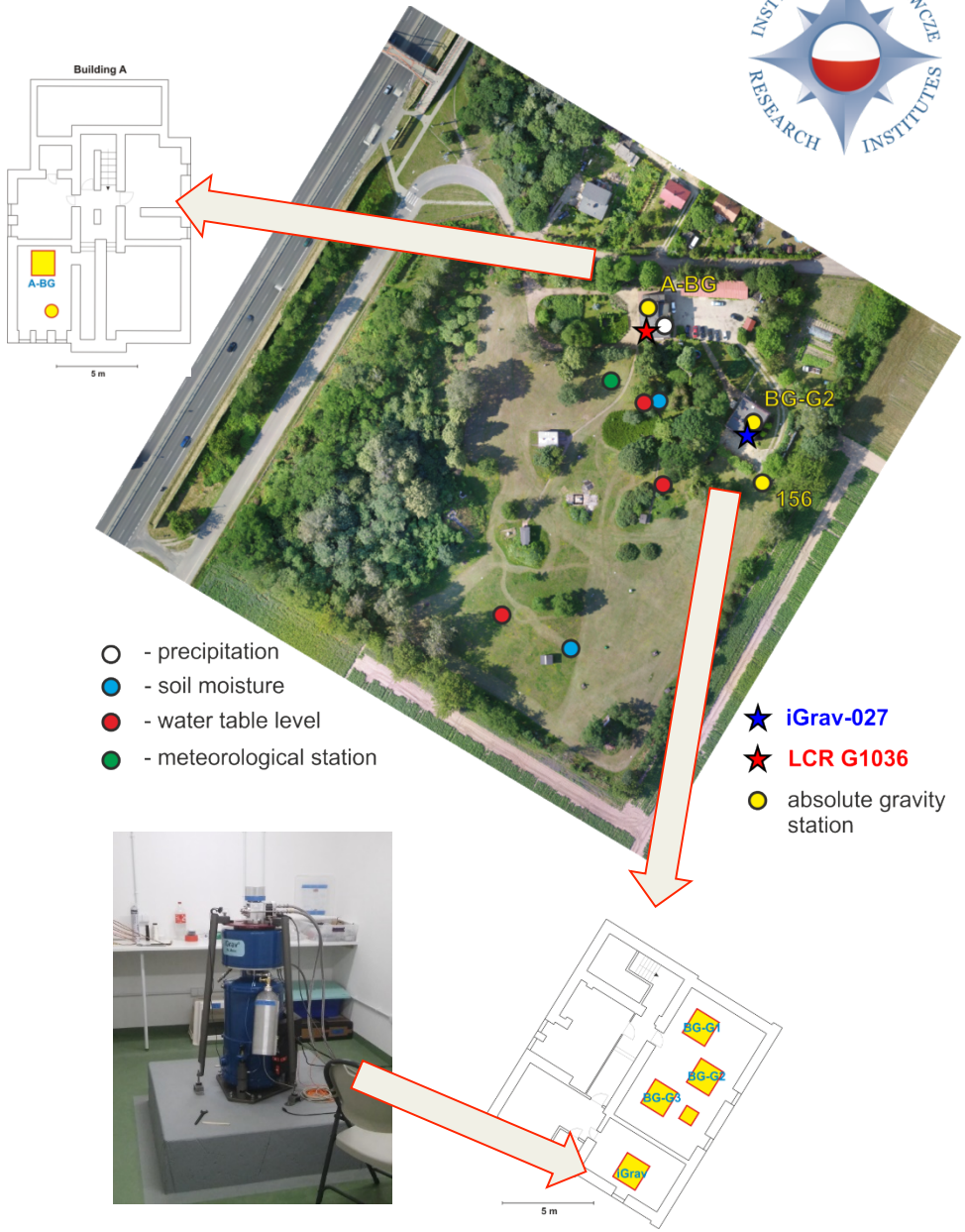
BG infrastructure

Gravimeters:

- **iGrav-027** – *continuous operation*
  2016.05 – ongoing (2.1 years);
- **LCR G1036** – *continuous operation*
  2012.02 – 2018.02 (6.0 years);
  finished for now because of service required
- **A10-020** absolute gravimeter – *quasi monthly absolute measurements on 3 stations (Agrav)*
  2008.10 – ongoing (9.6 years);
- **LCR G1012 and LCR G1084** – *periodical earth tide records.*

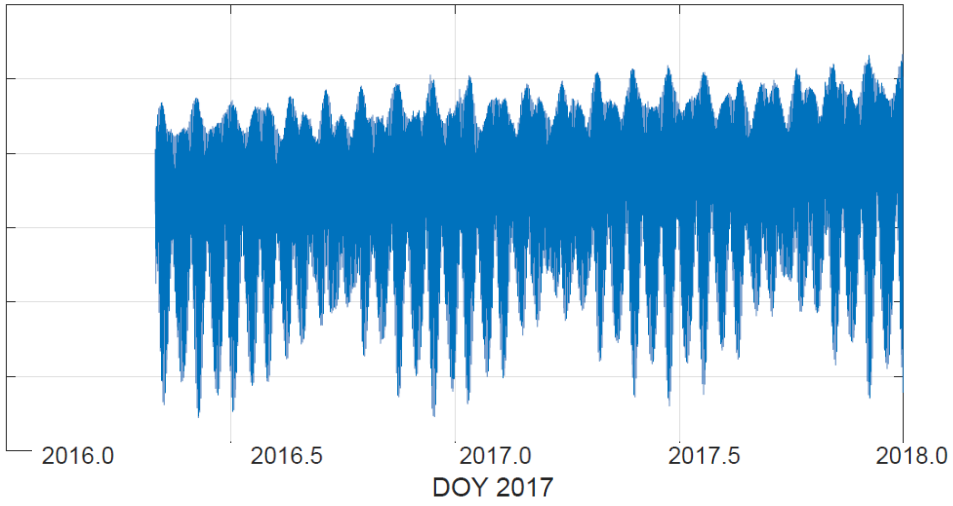
Meteorological/Hydrological instruments:

- standard **meteo station**: *temperature, air humidity, air pressure;*
- *measurements of **water table level**, **soil moisture**, **precipitation.***

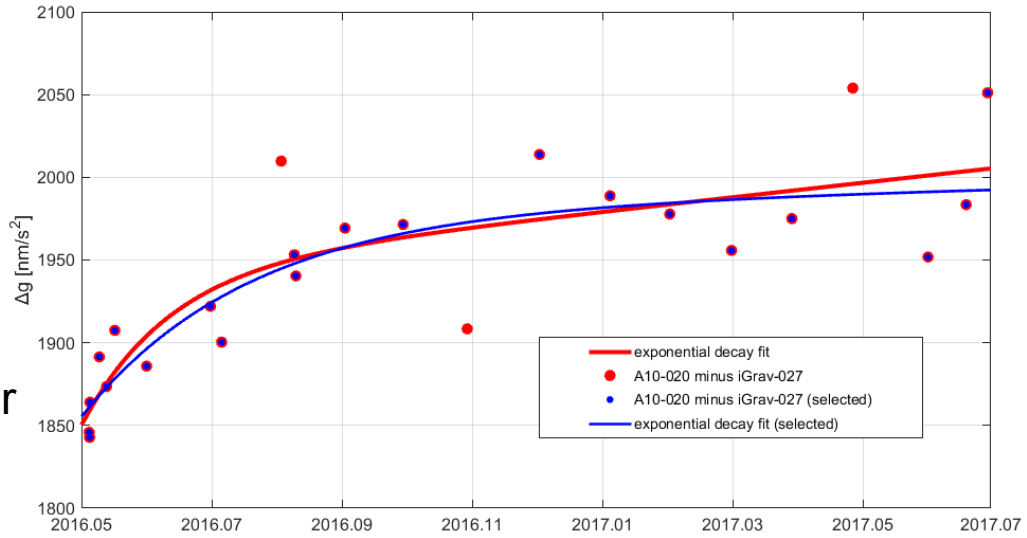


iGrav-027 recordings

- On the right: complete record from 1st May 2016 to 31st December 2017;

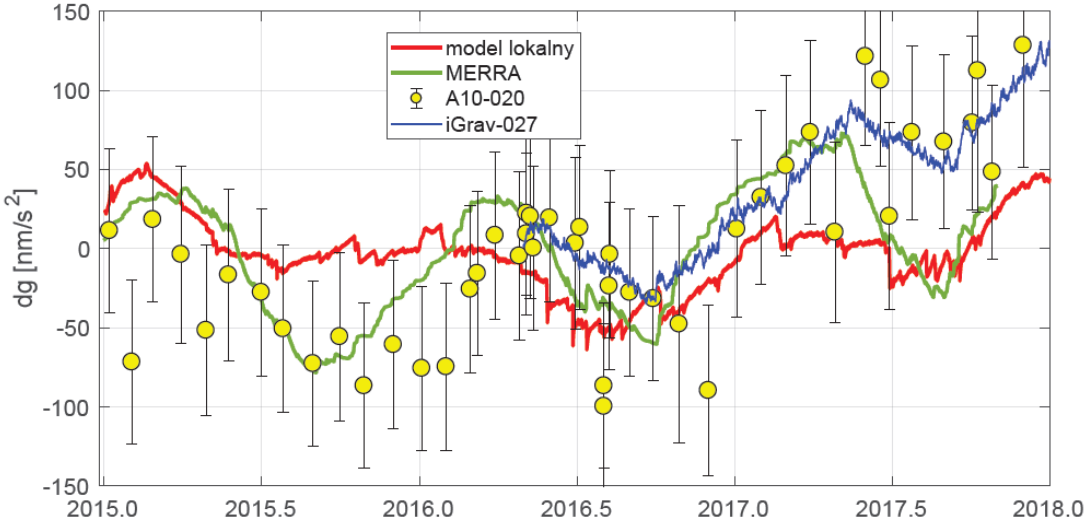


- 10 scale factor determination experiments was done;
- Drift function is evaluated every 6 months;
- Linear trend with respect to A10-020 **16 nm/s²/year** is used for current data processing.

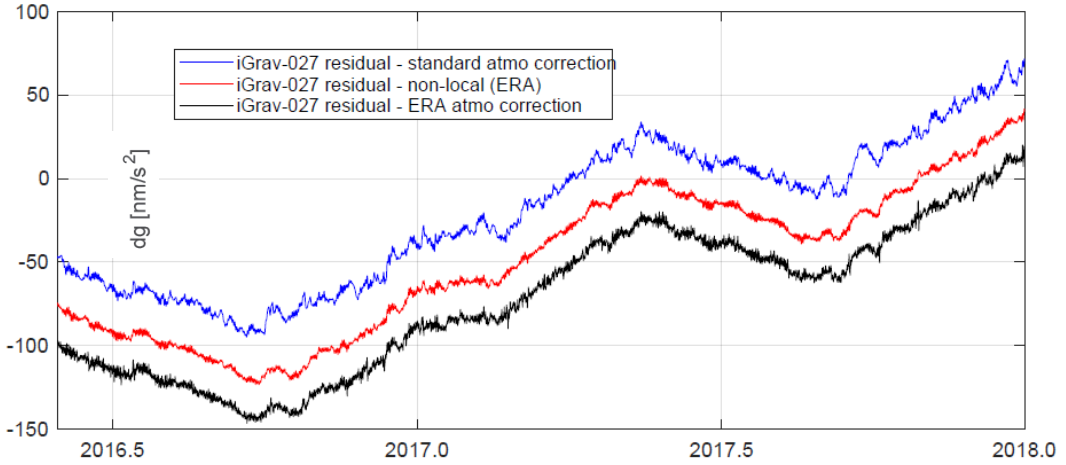


iGrav-027 recordings

- Monthly A10-020 absolute gravity determinations:
  experimental T.U. 5-7 μgal;
- A10-020 standard deviation:
  65 nm/s² ;
- A10-020 – iGrav-027 standard deviation:
  38 nm/s² *(improvement);*



- iGrav-027 residuals corrected with different atmospheric correction models



Other activities

- 2016.08 – 2017.10 – **local AG comparison** campaigns of the A10-020 and FG5-230 supplemented by the ***iGrav-027;***
- 2016.12 – **installation of two seismometers** (REFTEK 151B/120) on the same pillars with the LCR G-1036 and iGrav-027 in cooperation with Institute of Geophysics, University of Warsaw (100 Hz registration);
- 2017.08 – seismometer at the LCR G-1036 taken down, seismometer at the **iGrav-027** remains up to now.

Other activities

- 2017.10 – first coldhead replacement after 13 000 hours of operation

  https://youtu.be/narbiMPmgG8;
- 2018.01- 2018.05 – transfer function determination for the **LCR** gravimeters and **iGrav-027:**
  - special device build for LCR gravimeters screw turns;
  - build in step function for iGrav-027;
- 2018.02 – first one minute data from **iGrav-027** (level 2) sent to IGETS;
- 2018.03 – LCR G-1036 finished tidal record;
- 2018.05 – National Centre of Science grant awarded to use gravimetric and seismic data from SG gravimeters around the globe:

  Title: „*Determination of the seismic structure of the Earth's mantle from measurements of tidal gravimeters",* PI: Monika Wilde-Piorko.

Coldhead activities recorded by REFTEK

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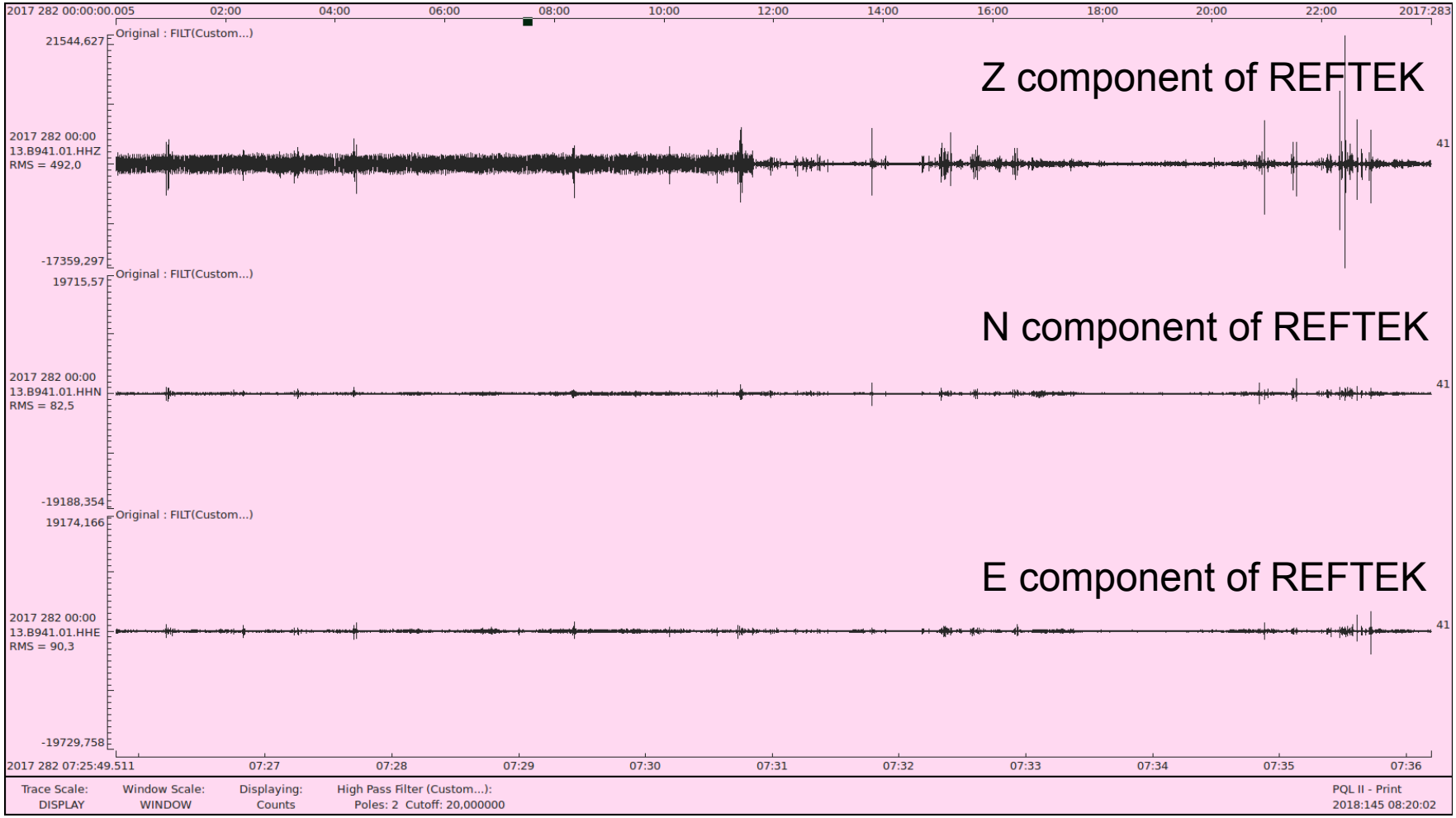

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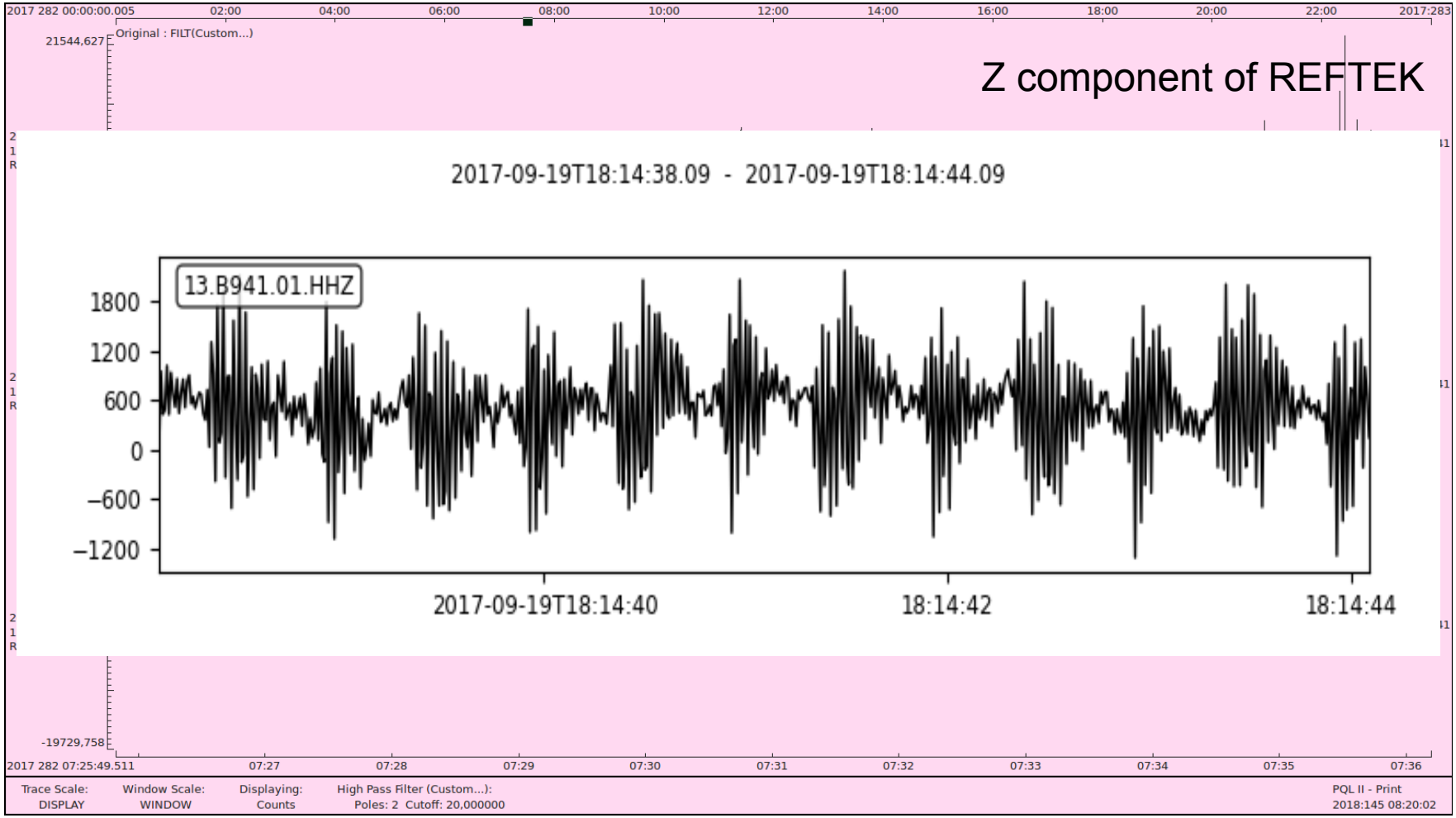
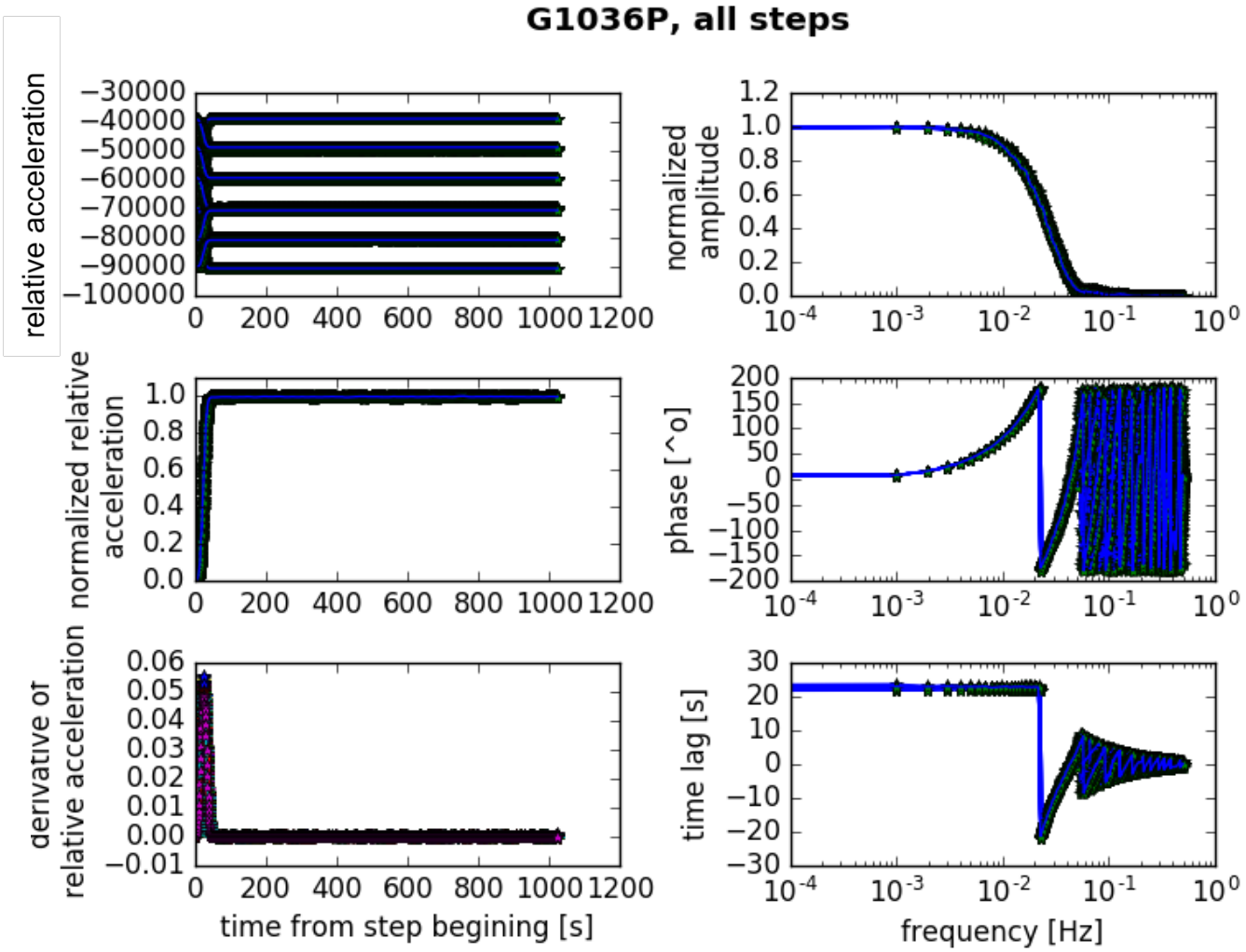


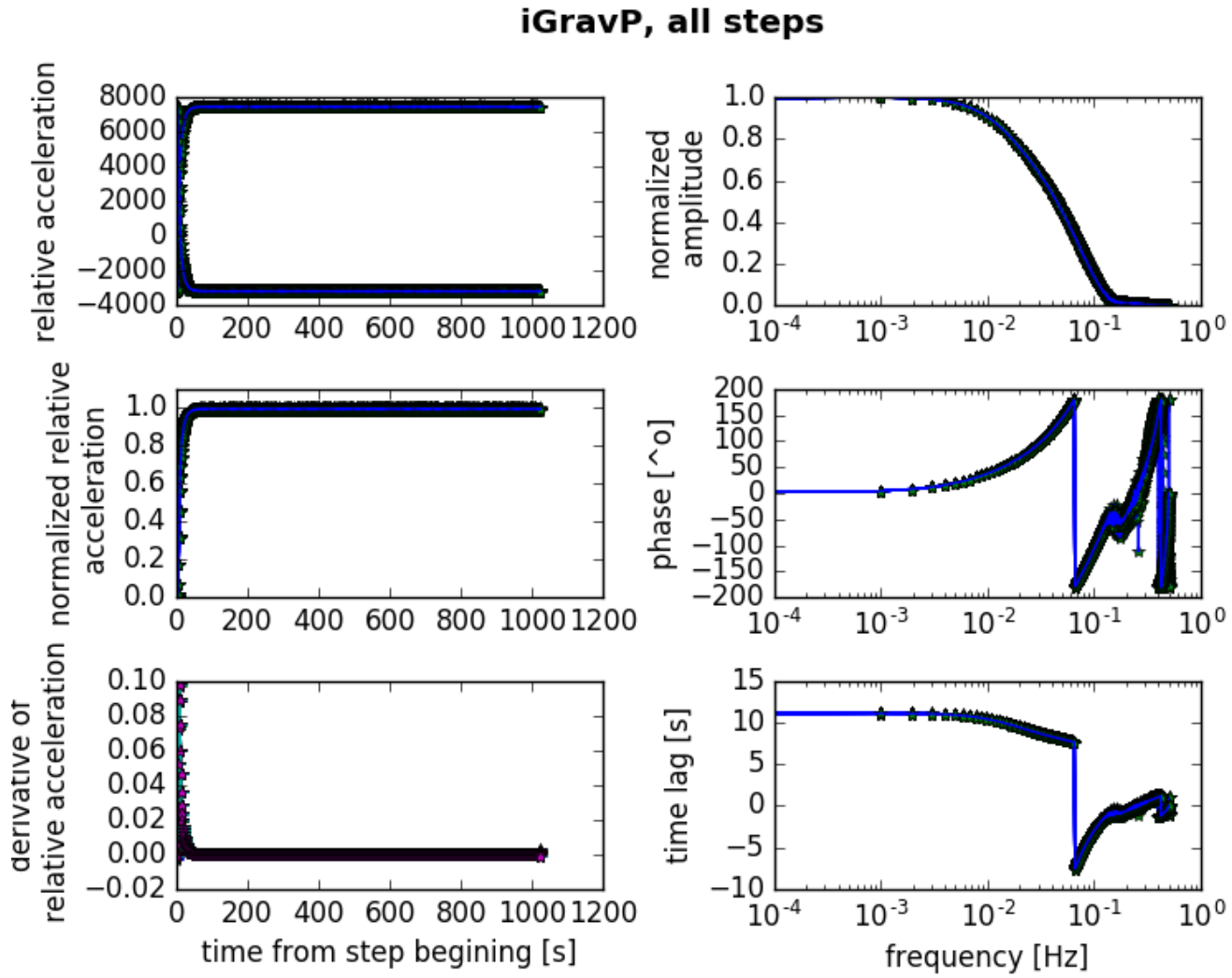
Transfer function of LCR G-1036

First results of transfer function determination of LCR G-1036 (R-T-OTL)



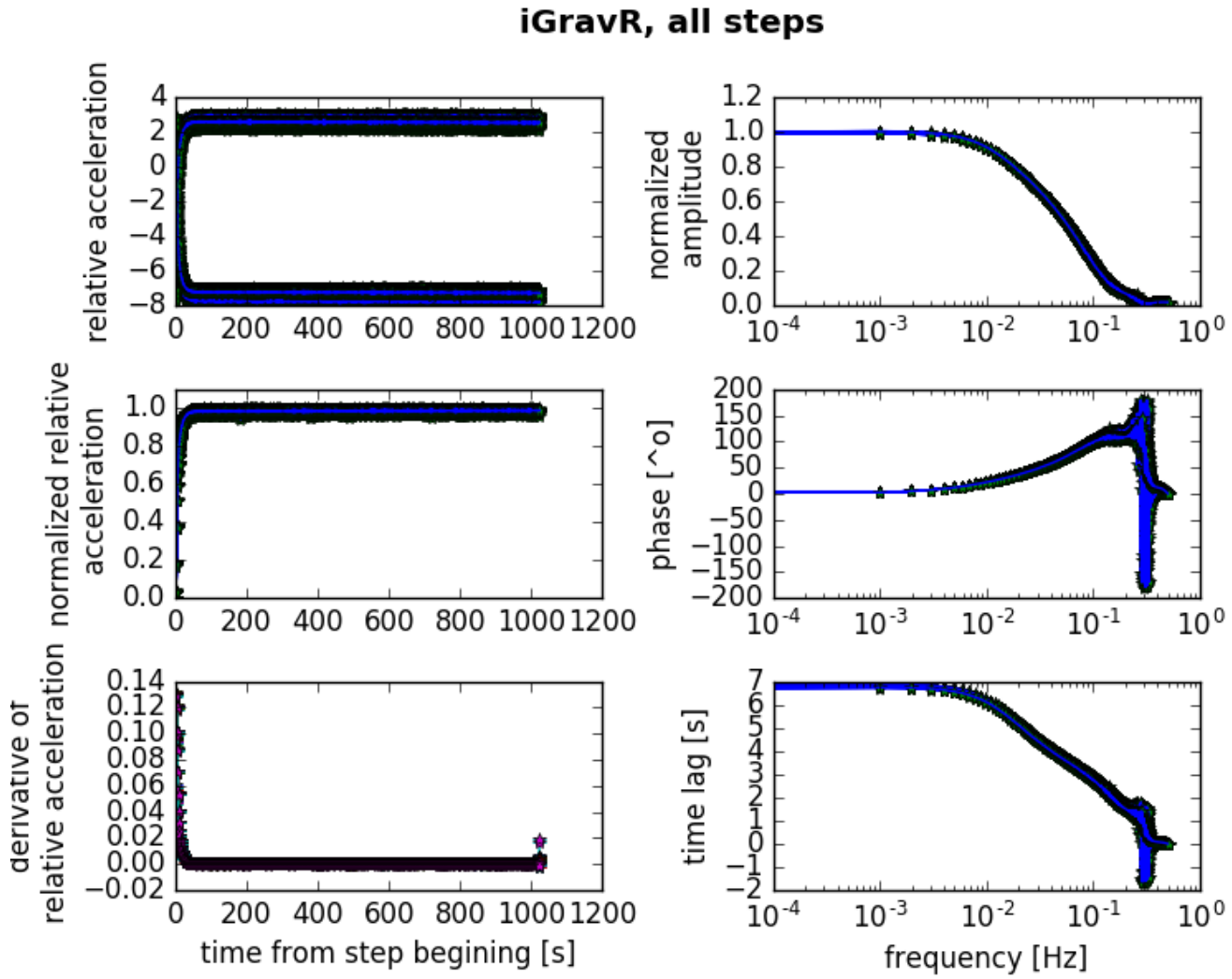
Transfer function of iGrav-027

First results of transfer function determination of iGrav-027 (R-T-OTL-B)



Transfer function of iGrav-027

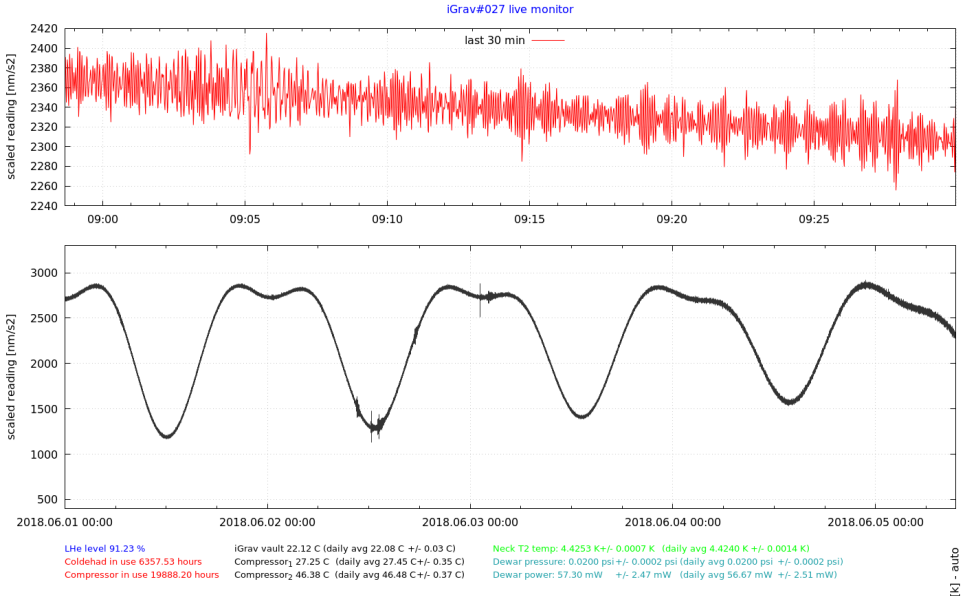
First results of transfer function determination of iGrav-027 (Grav-Ctrl)



Future plans

- Submission data to IGETS with semi-automatic/automatic procedures – 1 min (level 2) corrected data from the iGrav-027 and LCR G-1036;
- Further calibration experiments using AG and RG methods for the iGrav-027 and LCR G-1036;
- Determination of poles/zeros of iGrav-027 and LCR gravimeters transfer functions;
- Creation of the iGrav-027 „live view” website.

Live view (iGrav-027)



2nd Coldhead in use ~6700 hours