National Report of Finland

P. Häkli, M. Poutanen, H. Koivula, J. Mäkinen, H. Virtanen and U. Kallio

Finnish Geodetic Institute

FINNISH GEODETIC INSTITUTE

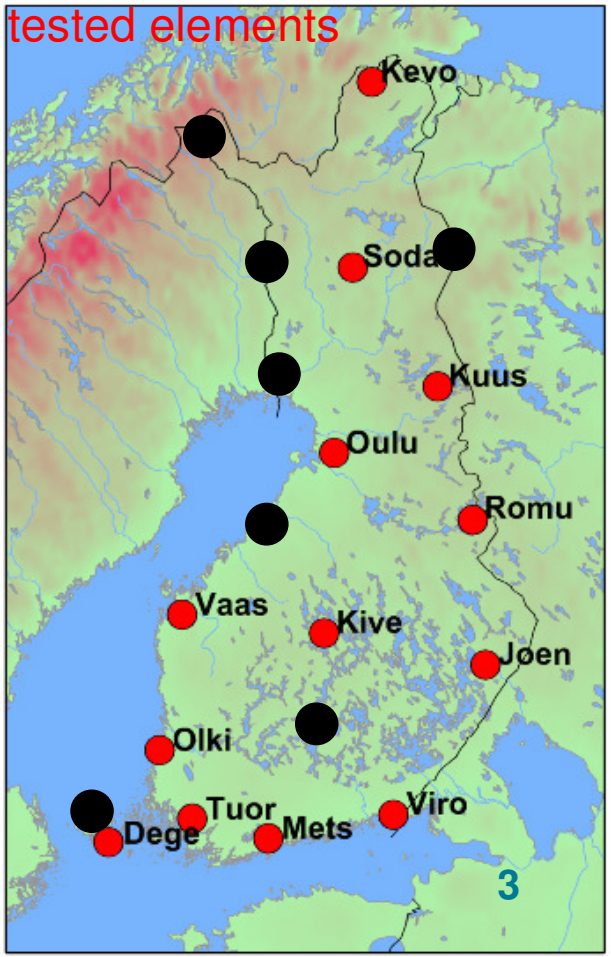
EUREF 2012 Symposium, Saint Mandé, France, June 6-8, 2012.

Renewal of Metsähovi and FinnRef

- Ministry of Agriculture and Forestry allocated a total of 8.1 M€ for renewal of Metsähovi during next five years (2012-2016)
- Finnish Permanent GNSS Network FinnRef (~20 receivers)
  - Schedule 2012-1013; receivers ordered
- SCG; new instrument ordered;
  - Schedule 2012
- SLR (new telescope, laser, renewal of the old one);
  - Schedule 2013-2015
- VLBI (VLBI-2010 compatible new telescope);
  - Schedule 2013-2016
- Infrastructure, local ties &c
- Several minor instruments

Renewal of Finnish Permanent GNSS Network FinnRef

- Currently 13 stations since mid 90's, GPS only (L1+L2)
- 18 new GNSS stations next to the old ones and to new locations
  - Mainly 3 m steel masts
  - Mainly on bedrock (stability controlled with Scintrex CG5 gravimeter)
  - Multi GNSS receivers + choke ring antennas (phase ripple tested elements and individually calibrated)
- Tracking
  - GPS: L1+L2+L5
  - Glonass: L1+L2+L3
  - Galileo: E1+E5a+E5b+AltBOC
  - Compass: B1, B2
  - SBAS: L1+L5
- Status and schedule
  - Receivers and antennas have been purchased
  - Ongoing: selection of station locations
  - Half of the stations operational by the end of 2012
  - Network is fully operational by the end of 2013



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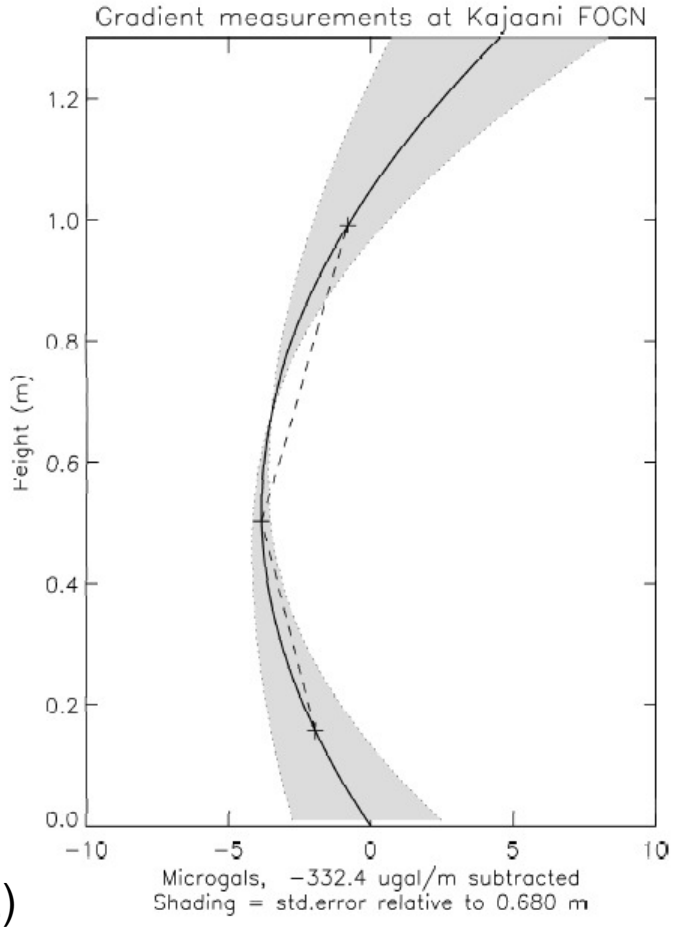
Renewal of the First Order Gravity Net (FOGN)

- A10 measurements 2009-2010
- Supporting measurements completed 2011
  - 3-level gradients with Scintrex CG-5 for A10 computation, for users, and for connecting (picture)
  - relative ties when FOGN and A10 stations are not identical
  - levelling to BM with better than 1 cm accuracy
  - 3-D coordinates from RTK-GPS in combination with tachymeter
- Using the results
  - New values for FOGN in 2012 g=g(z)
  - Epoch: taking 2000.0 consistent with the new height system N2000
  - Recalculate all surveys connected to FOGN since 1962



Gravity above typical church stairs changes very non-linearly

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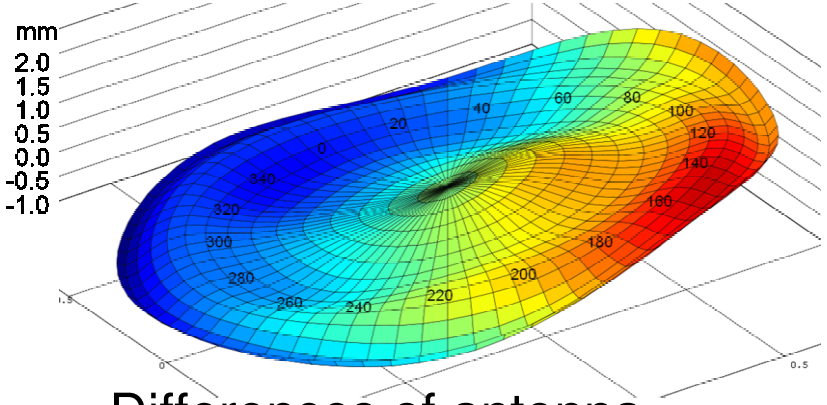
GNSS antenna test



Differences of antenna calibration corrections in L1

- One antenna, two individual calibrations, different results (figure at the top)
  - Validity of the calibration values in the field?
  - Consistency between different antenna types?
- A simple field test to verify the calibration results needed!
  - Permutation method (relative)
    - Full roving method
- Two antenna types gave inconsistent results (figure at the bottom)
  - Near-field effect?
- More details: Kallio et al. (2012): GNSS antenna offset field test in Metsähovi. FIG Working Week 2012.