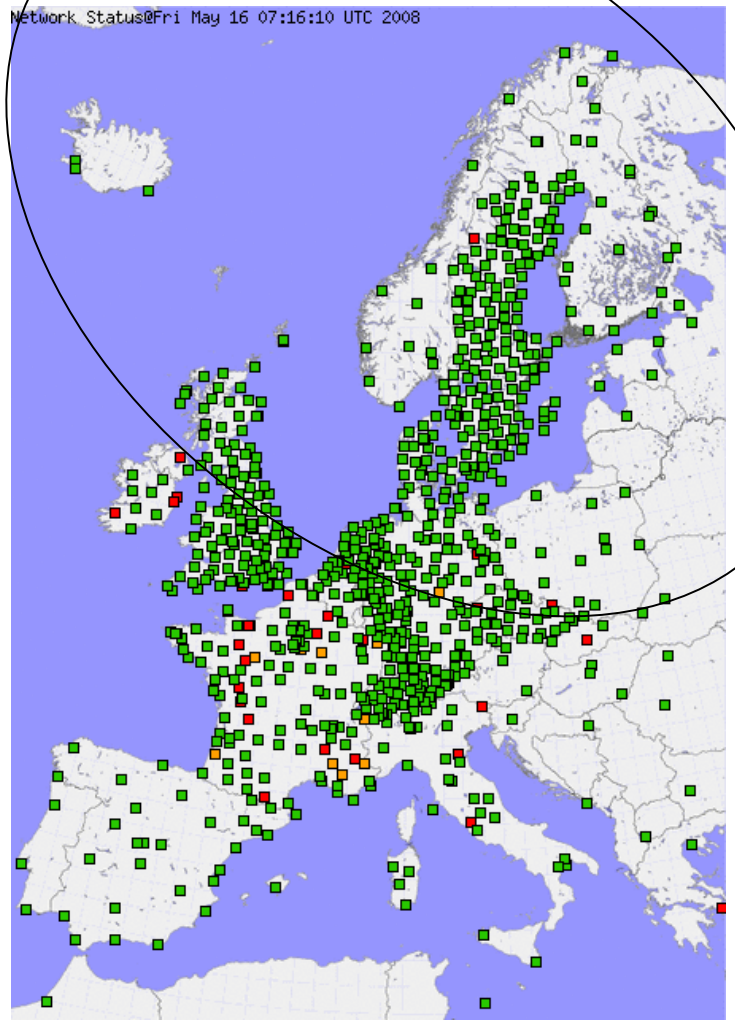
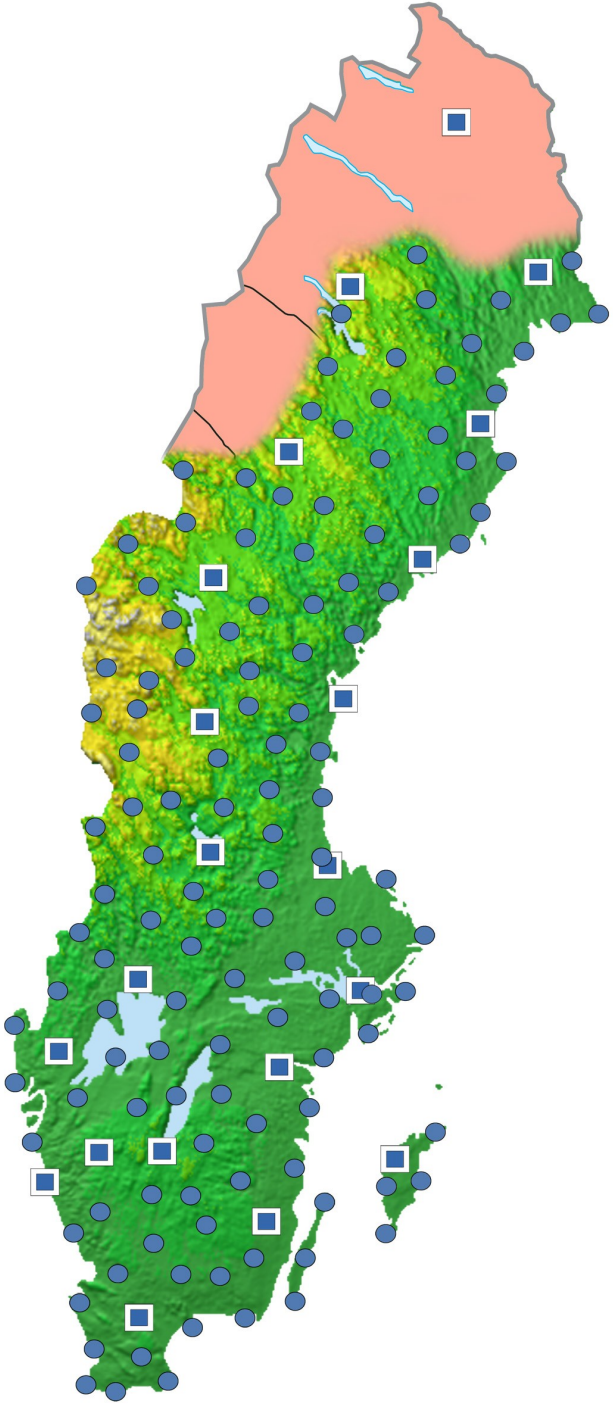
NGAA – EGVAP

- GNSS data processing hosted at the SMHI operational center since 2007
- Data from Denmark (30), Finland (23), Iceland (2), Norway (25), Sweden (155) and surrounding countries (35).
- The map ( ) is missing Thule & Scoresbysund (Greenland) Ny Aalesund (Svalbard), and 3 stations in the Moscow region.
- Data from the previous hour is processed and results (integrated tropospheric content) for all stations delivered to EGVAP no later than 40 minutes after full hour.
- In total NGAA is processing > 260 stations.





SW EPOS

National network of 155 (2008-09-01) permanent reference stations:

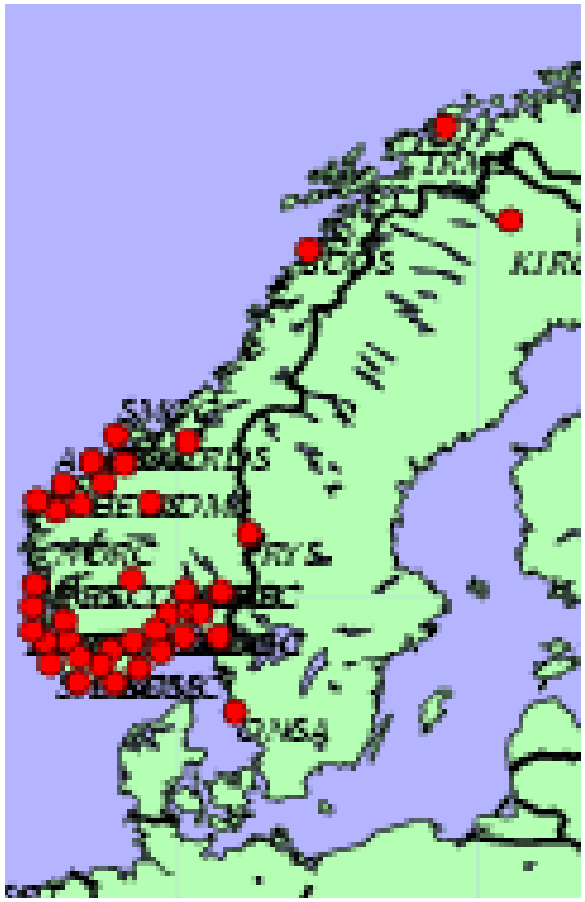
- Established 1992-93
- **Operated by the National Land Survey**
- At least 2 receivers per station (21 stations)
- **Identical antennas and configuration**
- **Real time connections to all stations**
- Reference system (SWEREF)
- GLONASS-receiver at all stations?
- RTK and DGPS data in RTCM-format
- L1/L2-data in RINEX-format for post processing

GPSnetDenmark Status 2008-09-01

Permanent network of 26 stations in Denmark:

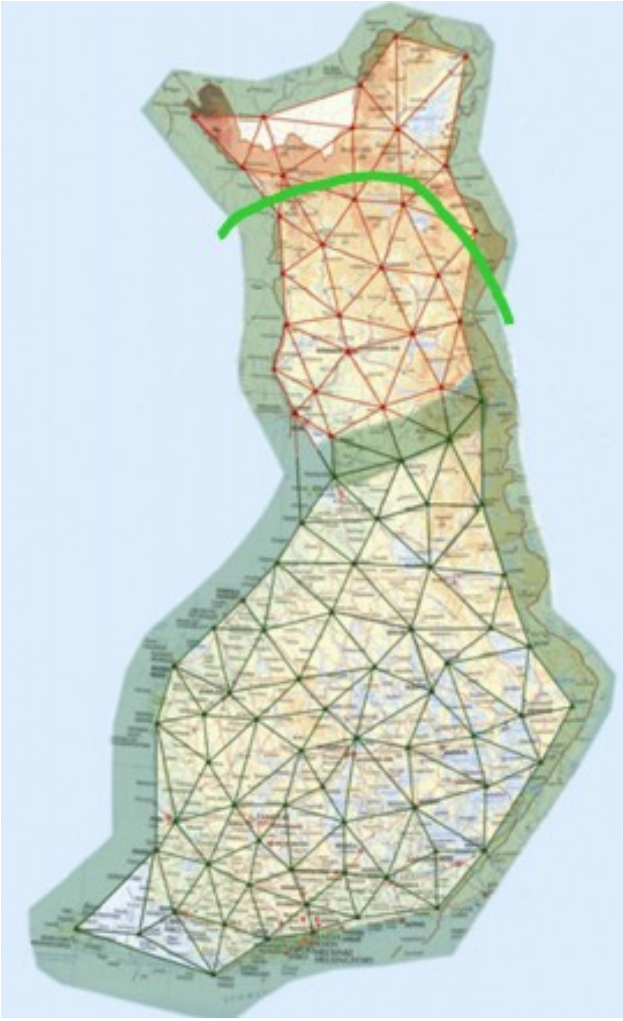
- Commercial network delivering data free of charge to NGAA
- Trimble receivers
- Identical installations
- Real time connections to all stations
- Common reference system
- L1/L2-data in RINEX-format
- 3 additional stations from KMS/IGS
- Several additional stations on the way from KMS including Faroe Islands

SATREF (Norway) status 2008-09-01



- Data from 19 (out of 50) stations fetched by NGAA
- Very good quality and timeliness since 2008-01-01.
- Data from GNSS stations on 10 oilrigs in the North Sea is now being processed
- Possibility to get data from all 50 stations soon as well as more oilrig stations!

FGI+ GPSnet.fi network Finland



Permanent network of 13 (FGI) and 84 (GPSnet.fi) stations in Finland:

GPSnet.fi:

- Commercial network delivering data free of charge to NGAA
- So far only 13 stations released in real time
- Trimble receivers
- Identical installations at all stations
- Real time connections to all stations
- Common reference system
- RTK and DGPS data in RTCM-format
- L1/L2-data in RINEX-format for post processing

Already processed

Soon to be processed

New stations!!!

Part 1 – Satellite Orbit & Clocks:

get_orbits: Ultra rapid orbits & clocks from IGS or GFZ

get_global_data

network_1h: Orbit improvement and clock estim.

(~5 minutes CPU, Linux PC)

Part 2 a - PPP Analysis:

get_SWEPOS (Sweden)

qm4ppp: Editing and quality check

point_1h: Estimation of trop. parameter using PPP

(~ 25 minutes CPU for 150 stations on a standard, Linux PC)

Part 2 b - PPP Analysis:

get_satref (Norway), get_finnnet (Finland), get_IGS (Europe)

qm4ppp: Editing and quality check

point_1h: Estimation of trop. parameter using PPP

(~ 20 minutes CPU for 120 stations on a standard, Linux PC)

Part 2 c - PPP Analysis:

get_dannet (Denmark)

qm4ppp: Editing and quality check

point_1h: Estimation of trop. parameter using PPP

(~ 10 minutes CPU for 26 stations on a standard, Linux PC)

Part 3 – Combined ZTD and Quality

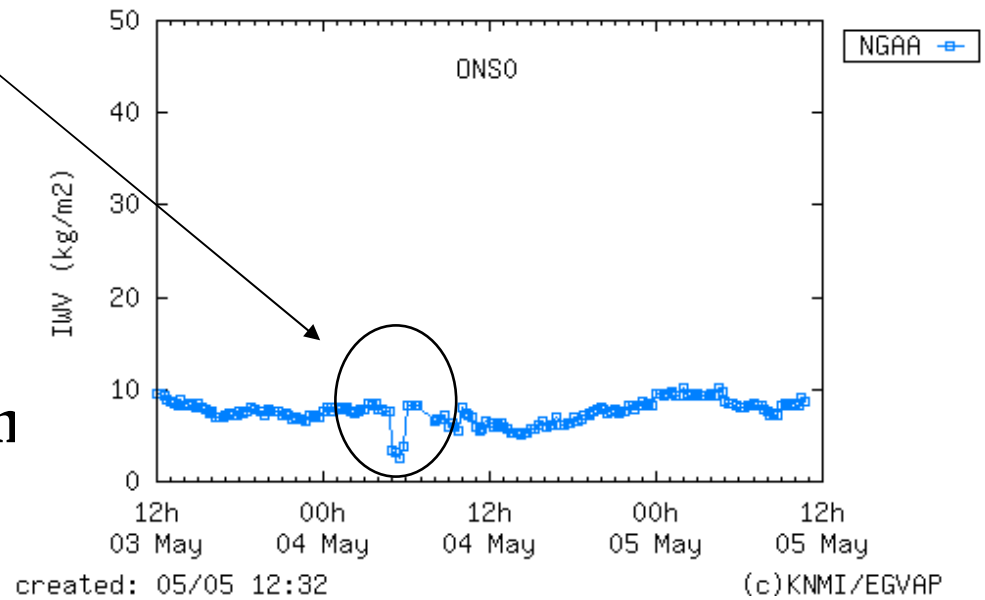
costprod_file: Merging the solutions and delivery of “cost-file”

ftp SMHI and UKMO (COST-server)

(~2 minutes CPU, Linux PC)

NGAA Performance 2008-09-01

- Station performance > 90 %
- Data transfer > 95 %
- Processing > 98 %
- Occasional (5-10 times per week) bad hourly values delivered to EGVAP (see figure).
- The reason for these bad values are related to the orbit and clock analysis which may fail due to data collection problems.
- **However, the uncertainty given in the COST-files indicates if values are not to be trusted!**
- A software upgrade in September 2008 will (almost) eliminate the drop-out.



NGAA Activities and plans 2008

- Include the entire GPSnet.fi network in Finland (84 stations) in the end of 2008?
- Include another 10 stations common to all EGVAP analysis centers (for evaluation of products => better quality) 2008-09-24!
- Larger increase of Norwegian stations including oil rigs and islands in North Sea to be completed 2008!
- Additional stations in Iceland ready to be included 2008-10-01?
- 8 UKMO stations available to be included before 2008-09-01!
- 15 new stations being build in Northern Sweden. To be included 2008-2009.
- Baltic countries contacted through geodetic and meteorology institutes! 26 stations in Latvia to be included around 2009-01-01!
- Total number of stations 2009-01-01 > 350 ???
- **Larger Software upgrade September 24-30, 2008.**

Results and feedback

- Public internet access to results and IPWV animation linked to mapping agency web-pages
- Possibility to use Met. Inst. Infrastructure when establishing new stations (remote areas)
- Near Real Time information from Numerical Weather Predictions (NWP) about tropospheric propagation path delay for users requiring cm-level accuracy in real time (project run with UKMO).