# swisstopo

Bundesamt für Landestopografie
Office fédéral de topographie
Ufficio federale di topografia
Uffizi federal da topografia

swisstopo report LPT

**E. Brockmann, D. Ineichen, S. Schaer**

Networks processed by LPT (1)

network (#stations)	availability	comments
EUREF subnetwork (30)	100 % daily	Reference frame Europe
AGNES + subnetwork EUREF (85)	100 % daily	Reference frame Switzerland
AGNES + subnetwork EUREF (80)	98 % hourly	Numerical weather prediction and crd. monitoring

Evolution with time

RMS of unit weight L1 observation [mm]

B4.2-B5.0

B4.0-B4.2

Compiler
error Linux

Number of observations

04/03/06 01:54

04/03/06 01:54

04/03/06 01:54

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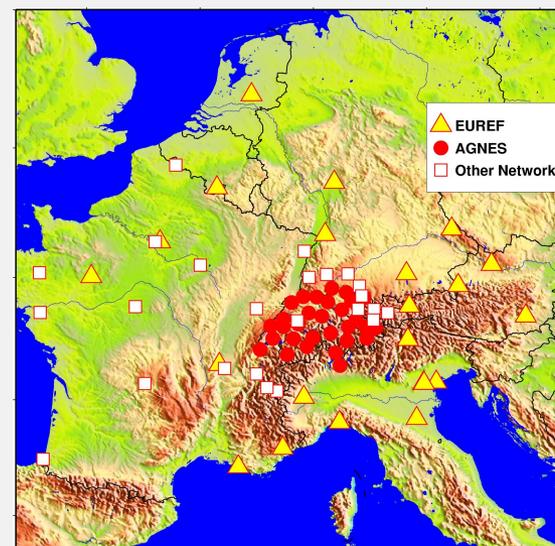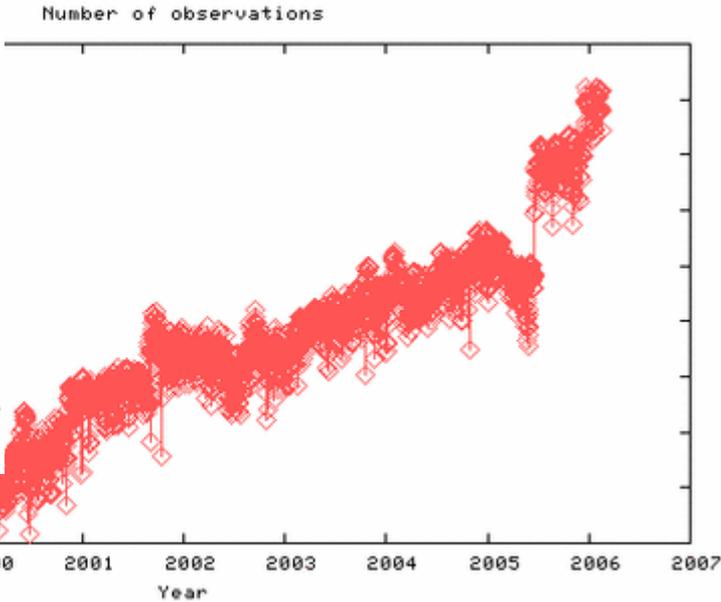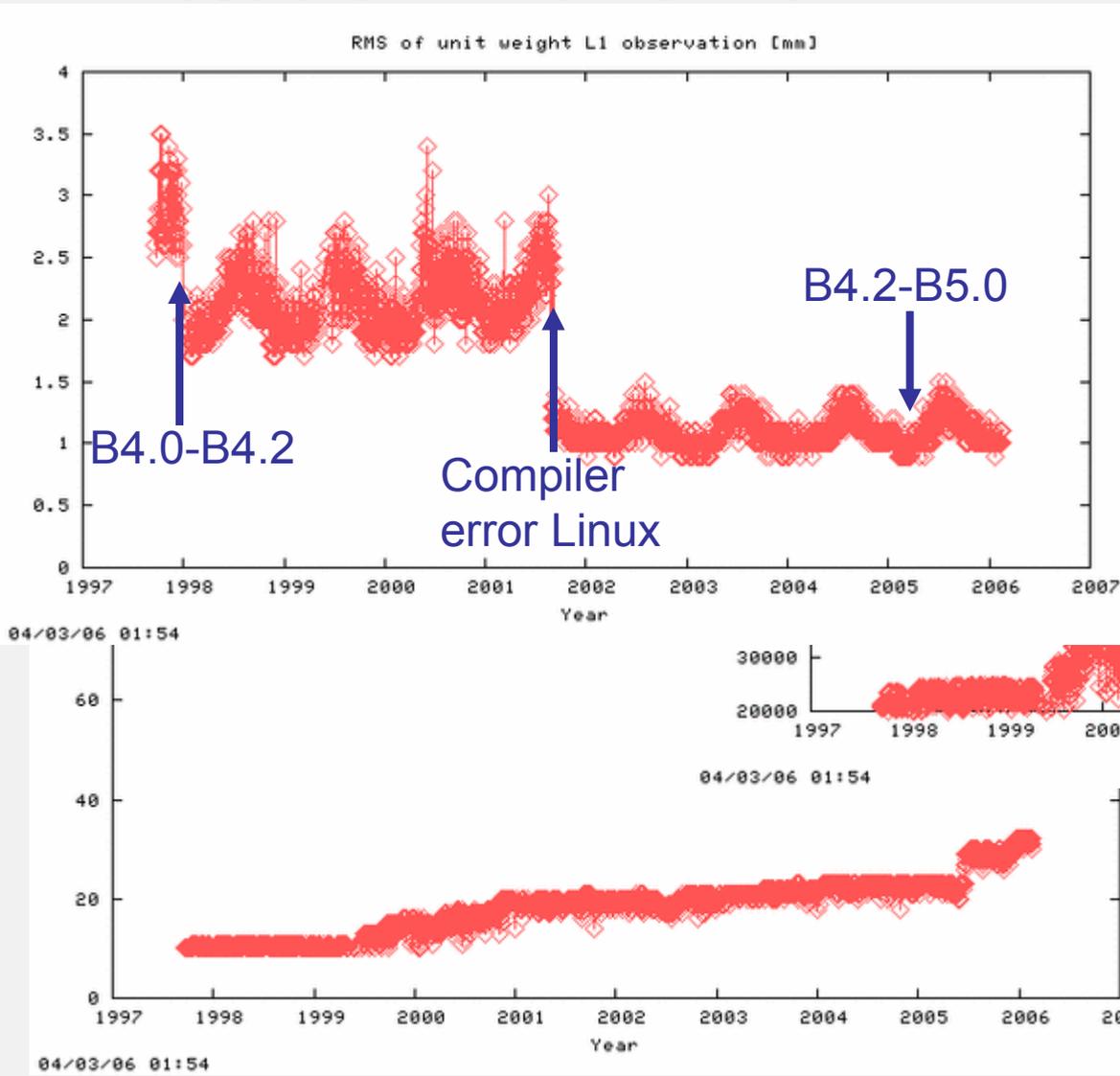
Specific topic: swisstopo <-> CODE

- S. Schaer: employee at swisstopo, but with tasks at swisstopo and CODE

- Common perl programs for data transfer and downloading, vice-versa computer checks

- Specific requests „EUREF type AC" / Federal surveying agency -> direct improvements to Bernese

```
# Define list of data centers to be considered
# ------------------------------------------
if ($ENV{AC_NAME} eq "COD") {

@CENLST=("BKG","CDDIS","GA","GODC_","IGN","JPL","SOPAC","DWH1","CRAR_","CDDISA_","ASI","BKG_E",
"IGN_E","IGN_E2","OLG","ROB","KASI_","BKG_GREF") }
elsif ($ENV{AC_NAME} eq "LPT") {

@CENLST=("BKG","BKG_E","CDDIS","IGN","IGN_E","IGN_E2","SOPAC","CDDISA_","ASI","OLG","ROB","IGN_
RGP","IGN_RGP2","BKG_GREF") }
else {
  die "AC_NAME undefined\n" }
```
get_nrtdata.com

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# Monitoring the dense national network AGNES

- Bernese Monitoring (hourly)
  - Coordinate monitoring
  - ZTD estimation for numerical weather prediction

- Trimble GPSNet Monitoring (real-time)
  - Coordinate monitoring
  - ZTD estimation for numerical weather prediction

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Monitoring (Bernese) – Positioning Service (GPSNET)

| network (# stations)	availability	comments
AGNES + D-A stations (39)	95% real-time/hourly	Positioning service Monitoring + Bernese Monitoring

- 3 monitoring series
  - NRT 1h Bernese monitoring
  - NRT 30-Sek. Bernese kinematic solutions
  - swipos GPSNet coordinate monitoring
- Quick and high quality check of the reference frame
- Bernese-Monitoring and swipos-Monitoring quite similiar results (constraints in swipos too big)

Kinematic coordinate repeatability of LOMO

http://www.swisstopo.ch/de/basics/geo/permnetworks/pnac/timeseries/
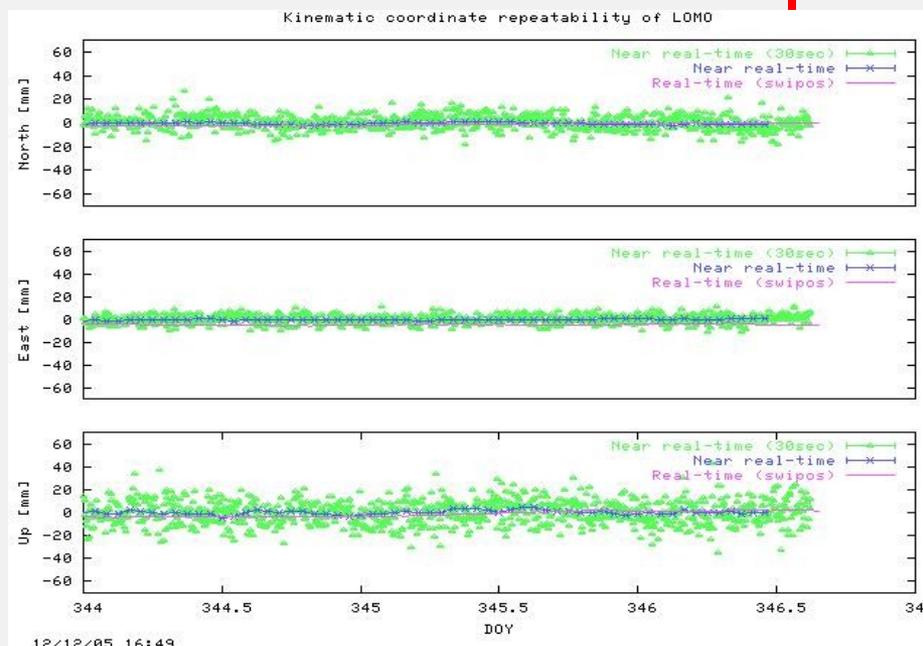
Data Flow of NRT ZTD's

EPN AC's

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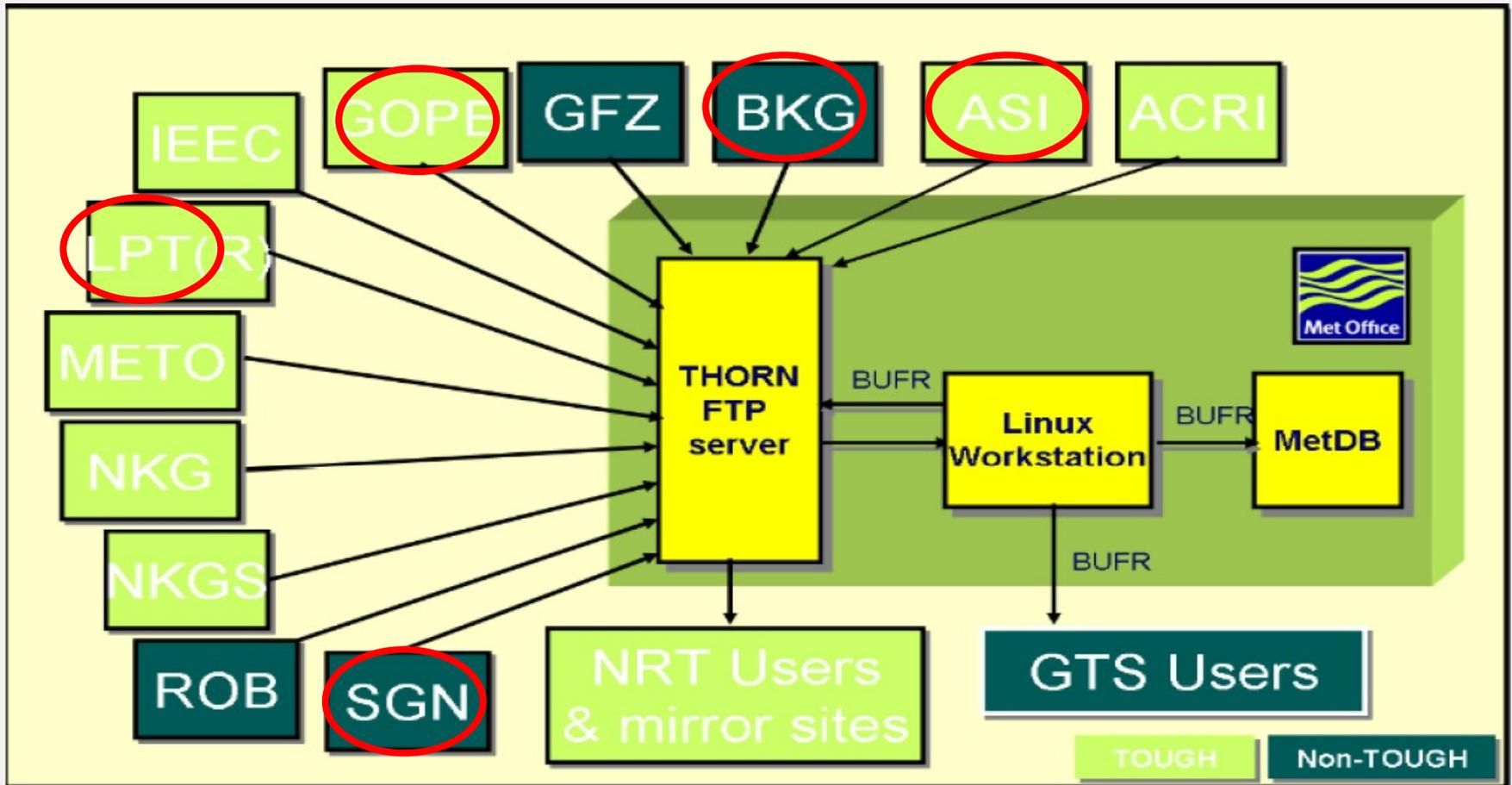
NRT-ZTD submission to MET community

Bernese

GPSNet

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GPS-Meteo Projects

- TOUGH (Targeting Optimal Use of GPS Meteorology)
  - EU Reserch project
  - Jan. 2003 – Jan. 2006 ☑
  - Web page: http://web.dmi.dk/pub/tough/

- E-GVAP
  - EUMETNET project (-> towards operational use)
  - Since April 2005 (3 years)
  - Web page: http://egvap.dmi.dk/ (-> validation)

EUMETNET
The Network of European Meteorological Services

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ZTD estimates

- Example WTZR
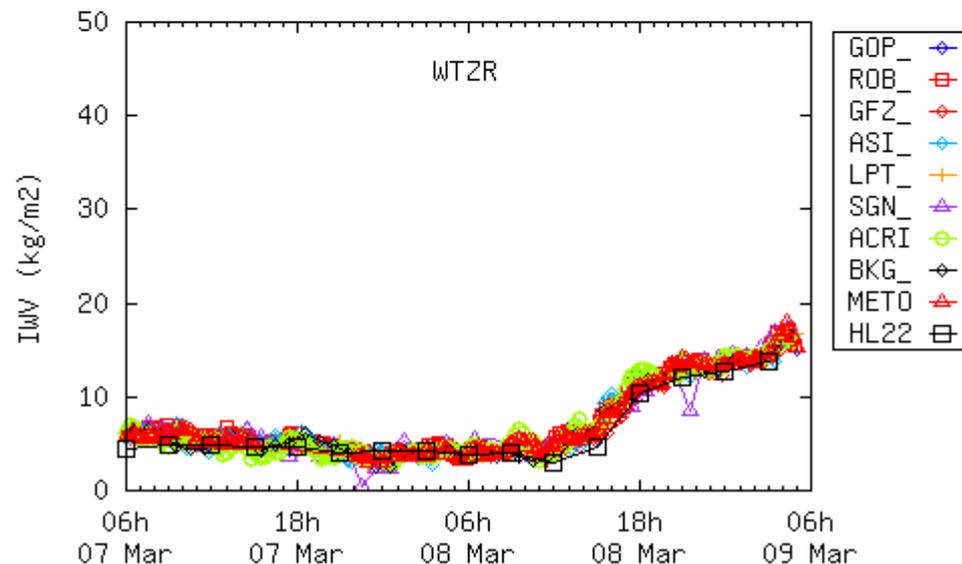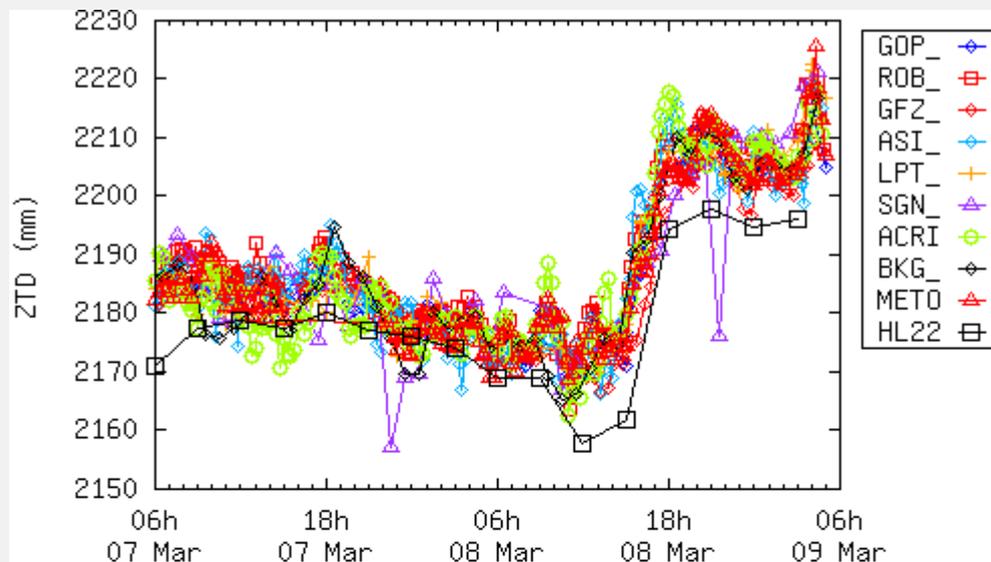
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NRT GPS Network

- ## 550 sites
  - 150 EPN sites
  - 400 national non-EPN sites

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Cooperation options

GPS site owners / location

GPS Processing Centers

Met Offices

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Cooperation options (2)

Ordnance Survey

UK

GPS site owners / location

GPS Processing Centers

UKMetO

Met Offices
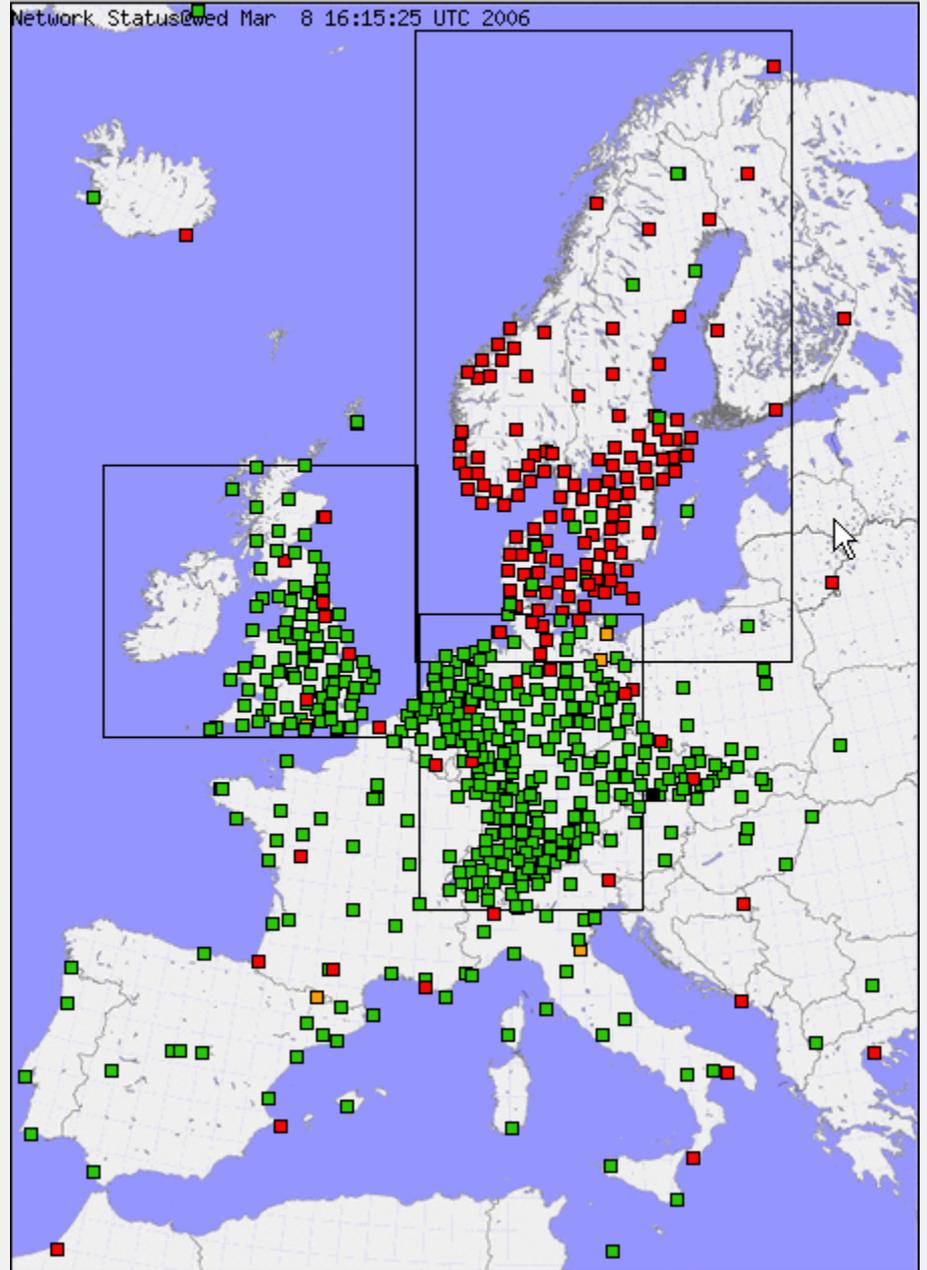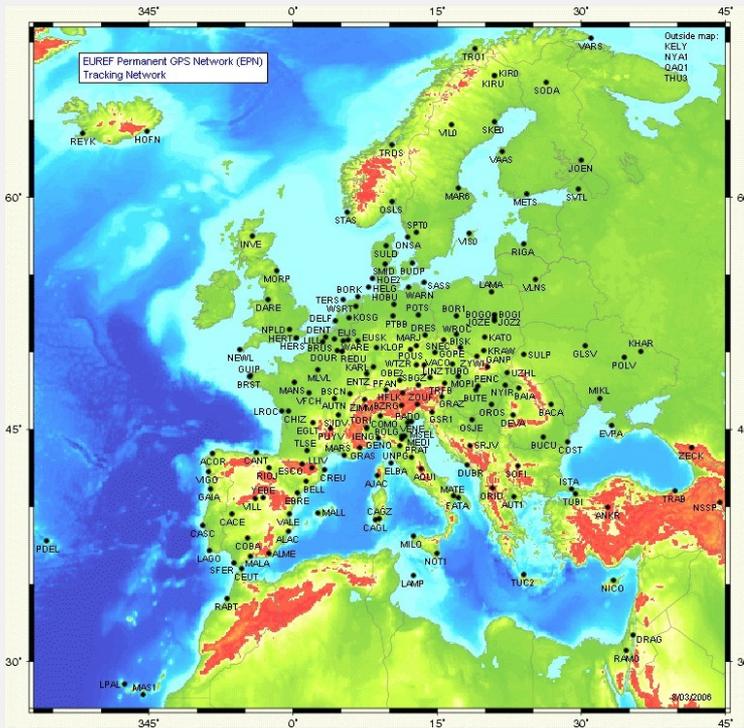
Also NL, S/N/DK/FI
geod. support by universities
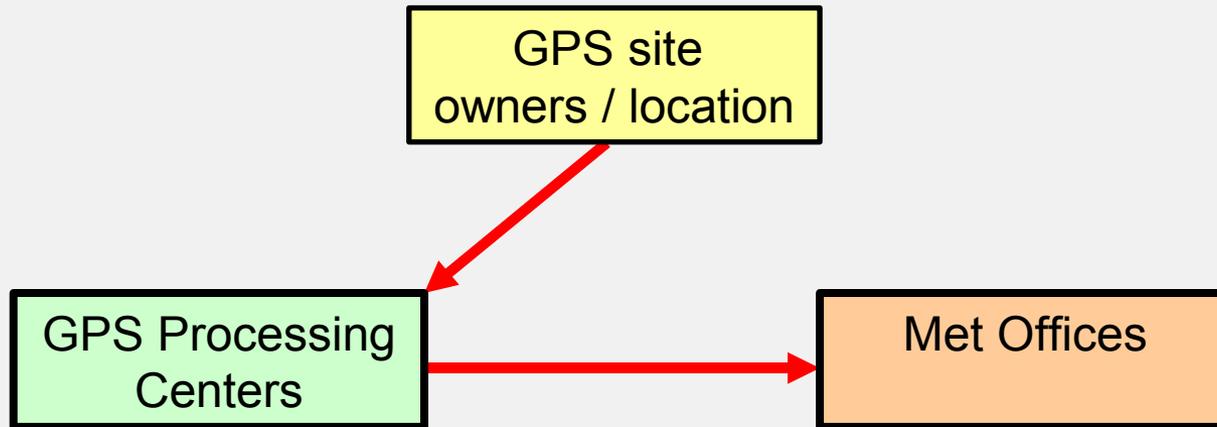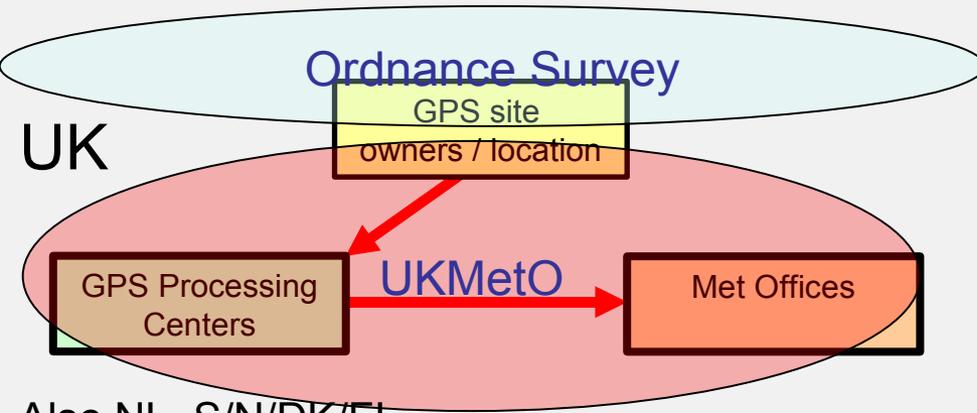
Cooperation based on contracts

D

sapos

GPS site owners / location

GFZ / BKG

GPS Processing Centers

Met Offices

DWD

CH

GPS site owners / location

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GPS Processing Centers

MeteoSwiss

Met Offices

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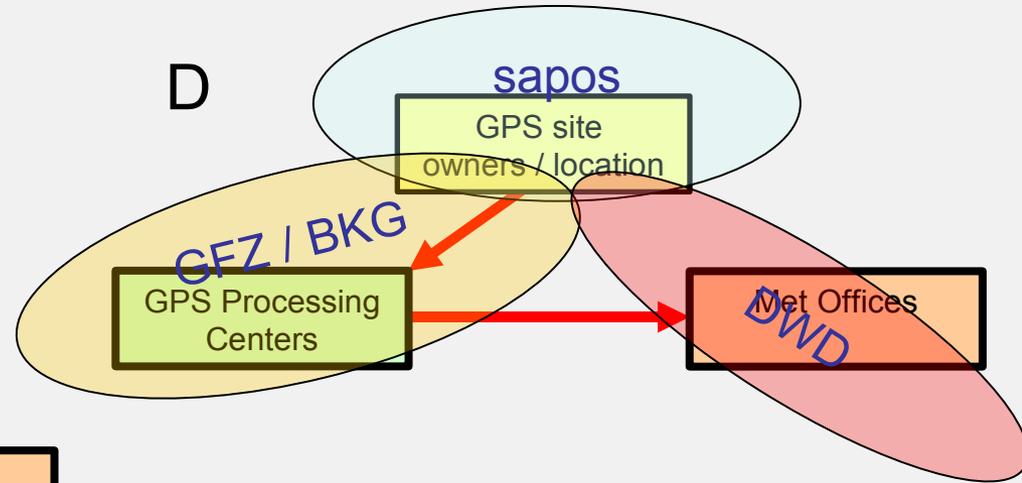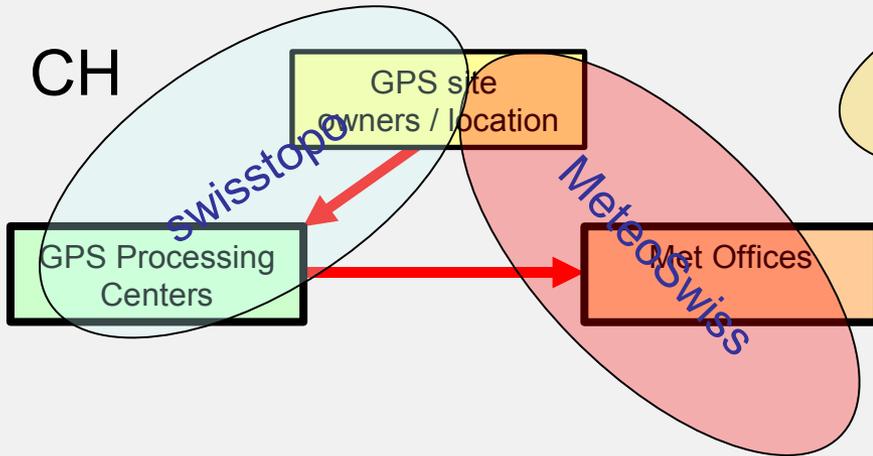
Questions / Role of EUREF

- Backbone network (150) <-> dense networks (400)
  - Data provider (daily, hourly, real-time data)? YES? -> No further actions
  - Data and analysis provider ? which networks? Which observation rates? YES? -> further actions necessary

- NRT processing of dense national networks + EPN network is usefull:
  - EPN-only NRT analysis not useful for MET
  - Synergy of coordinate monitoring and ztd generation !

  - ZTD generation as an additional application of permanent networks – more applications (and potentially contracts with MET institutions) increase usage of permanent networks
  - Interesting for EPN AC's with dense national networks

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