

User Workshop, April 2010, Madrid

PPS Reference System Operational production at SMHI

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Outline

- Reception and Data
- Level-1 processing
- PPS Reference platform
- PPS on HRPT
- PPS on Global Metop
- SMHI post-processing - plans

Reception and Data

- HRPT station:

- Kongsberg Spacetec MEOS
- L-band
- Yantai Antenna
- Installed 2004
- No polarisation switch (affects N16 reception)



- All NOAA satellites (NOAA-16 bad quality)
- Metop-A
- FY1

- EUMETCast reception:

- DVB antenna
- Telicast system
- Ipricot



- Global Metop-A (AVHRR & IASI)
- EARS AVHRR & AMSU/MHS
- MODIS lvl1b
- SEVIRI (0 deg service)
- RSS
- Met-7
- ...

Norrköping HRPT

- Antenna inside Radome (recycling the old Radar station) for easy maintenance.
- Currently schedules (in order of priority):
 - NOAA-19
 - NOAA-18
 - NOAA-15
 - Metop-A

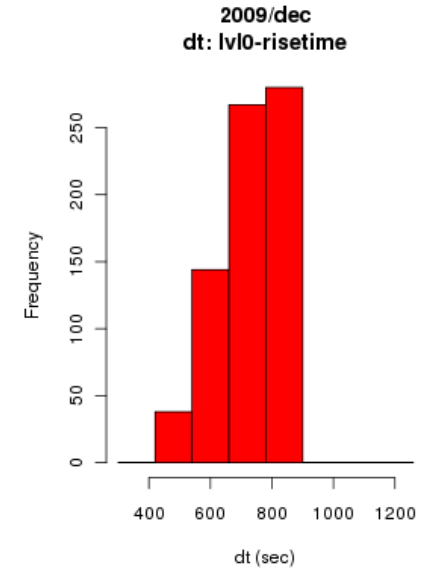
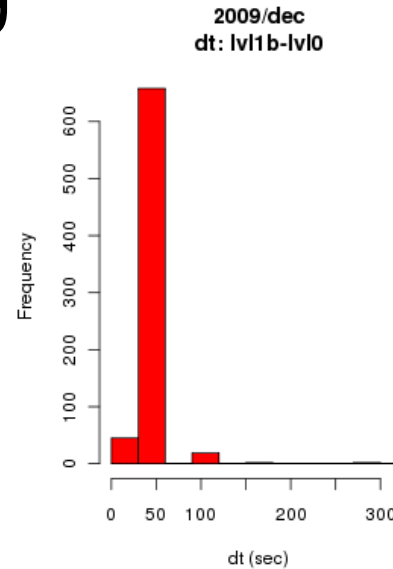


Ole-Jørgen, Spacetec, in Norrköping on the yearly maintenance check



Level 1 processing

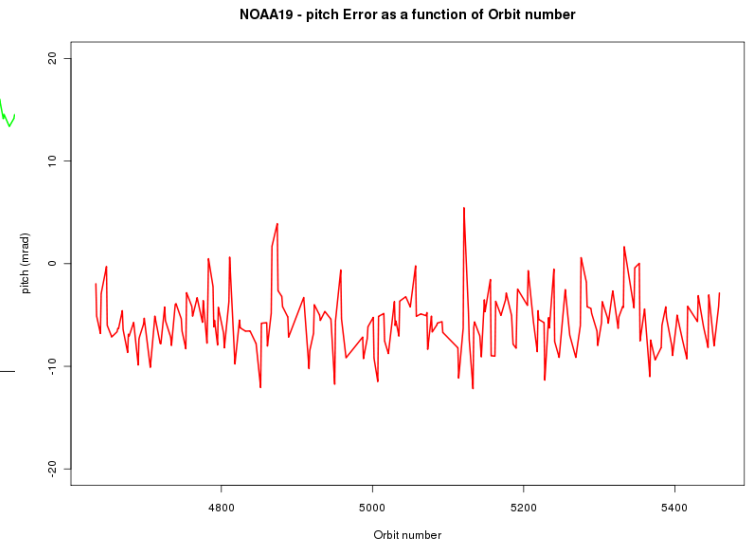
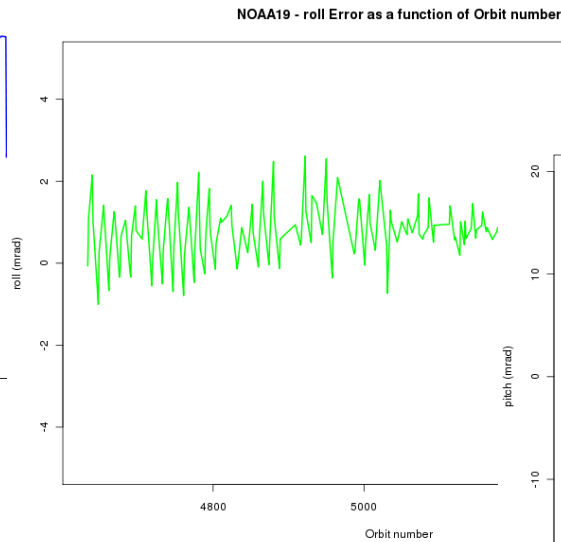
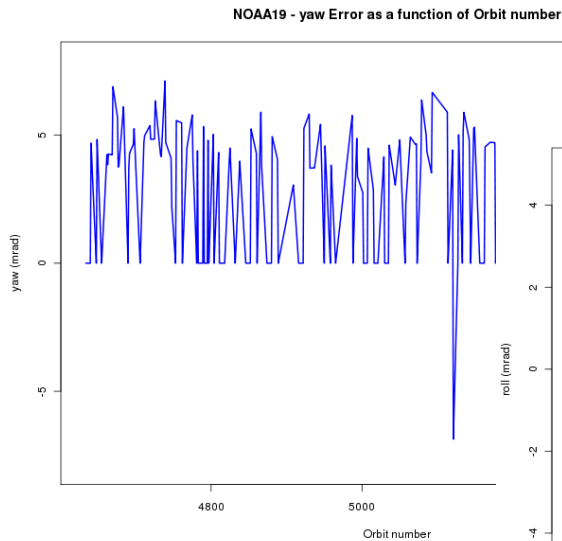
- Processing to level 1 starts when last scanline has been received
- Timeliness is less than 1 minute
- Level-1 processor = AAPP
- Recent increase in N18 & N19 failures yet to be understood



	Order		Norder		Iorder	
	Success	Failure	Success	Failure	Success	Failure
N0A15	177	0	22	1	12	1
N0A16	0	0	0	0	0	0
N0A17	15	0	38	1	12	0
N0A18	0	0	23	10	13	16
N0A19	15	4	26	18	12	20
All	57	4	104	30	79	37

Level 1 processing

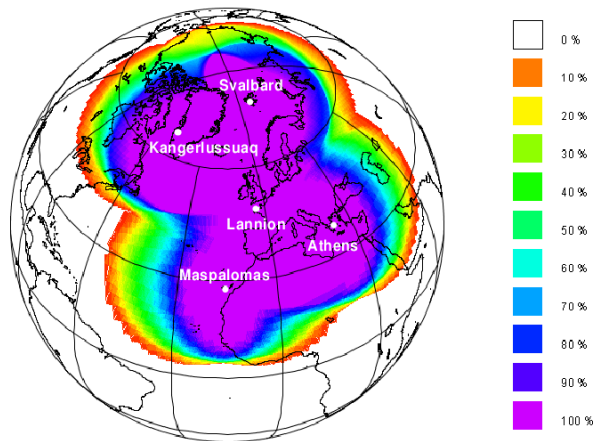
Post-navigation using ANA (Automatic Navigation Adjustment) kindly provided by Météo-France:



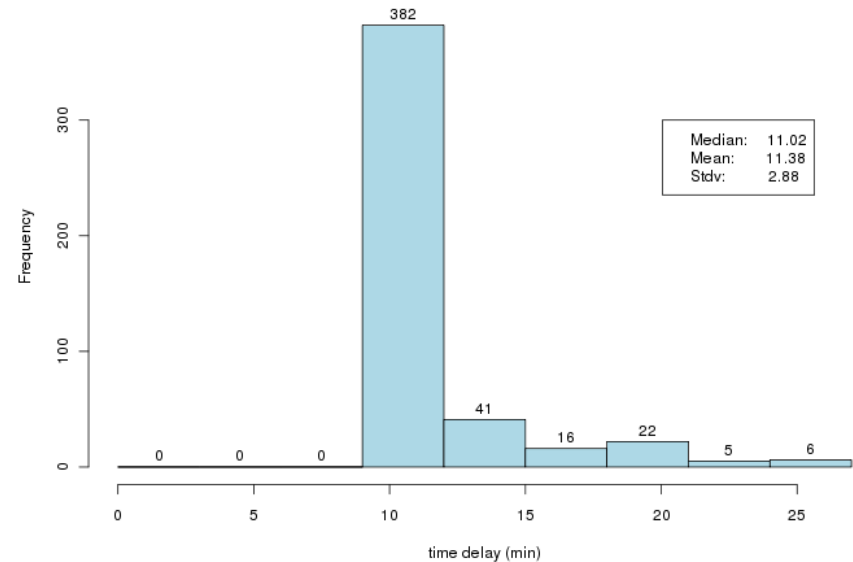
Attitude correction is still an issue!

EARS AVHRR

- Average timeliness ~ 11 minutes.
- No PPS or Image production at the moment.
- RGBs over our AOI before summer.
- PPS production on trial: End 2010



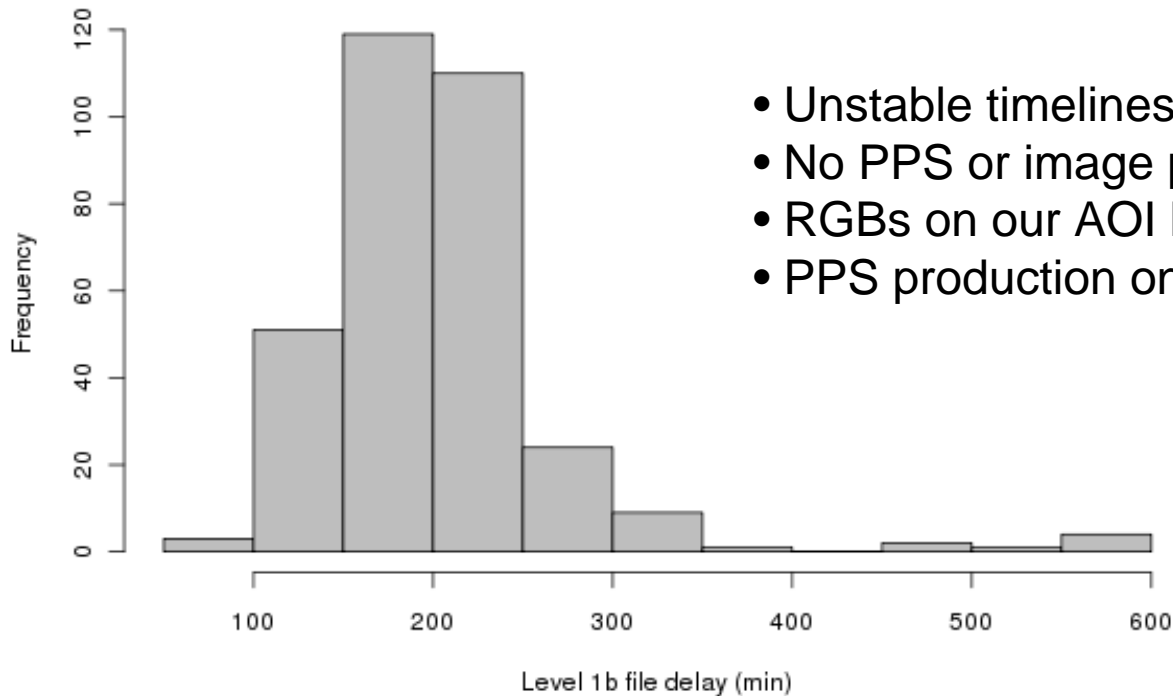
EARS AVHRR timeliness
Difference between Observation time and time of data availability



MODIS level 1b

EUMETCast disseminated data from NOAA: Lvl1b + geolocation files

Modis lvl1b on EUMETCast. Measuring the data file delay in minutes



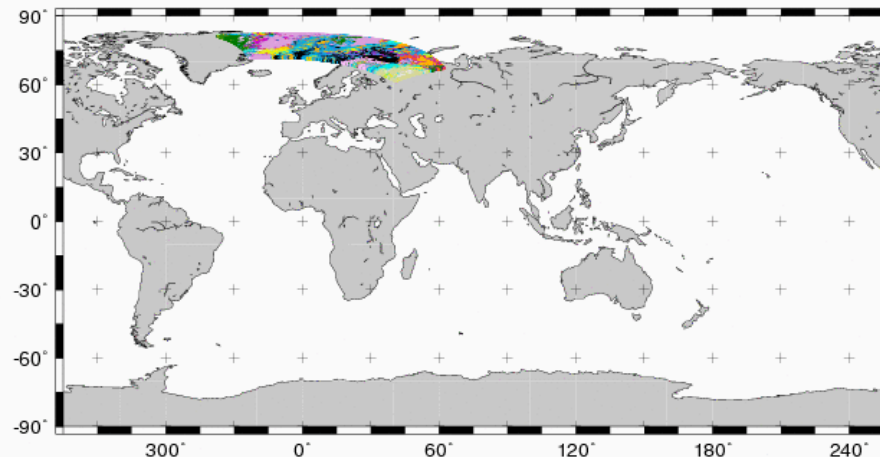
- Unstable timeliness around 3 hours
- No PPS or image production at the moment
- RGBs on our AOI before summer.
- PPS production on trial: End 2010

Global Metop AVHRR level 1b

EUMETCast disseminated data in

PFS format:

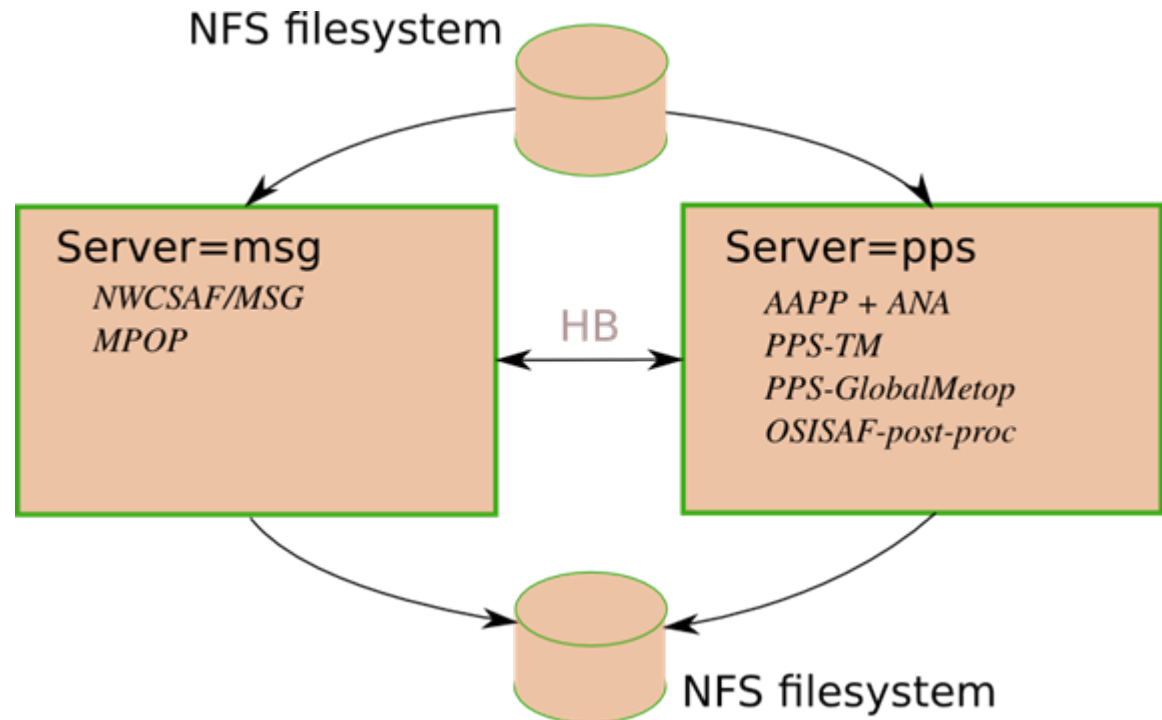
- Timeliness ~ 2 hours
- For demonstration and evaluation mainly
- PPS Cloud Mask, Type and CTTH on all granules
- RGBs on all granules
- RGB's and PPS products mapped to our AOI



PPS Cloud Type - Metop-A Orbit 18194 - 20100422 0958 UTC

PPS Reference platform

- HP ProLiant BL460c G1 (blade) with 2x Intel Xeon quad core 2.4 GHz
- RAM=12 Gb
- RedHat ES 5.1
- gcc/gfortran 4.1.2
- 72 Gb Harddesk



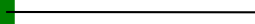
PPS Reference platform

Software:

Now

Next month

- AAPP-6.8
- RTTOV-7.1
- EMOSLIB-3.5.0
- Proj-4.6.0
- Python-2.4.3
- Numeric-23.8
- Scientific Python 2.6.1
- PIL-1.1.6
- HDF5-1.6.7
- HLHDF-0.54
- GMT-4.1.4
- ...
- **PPS-v2009**

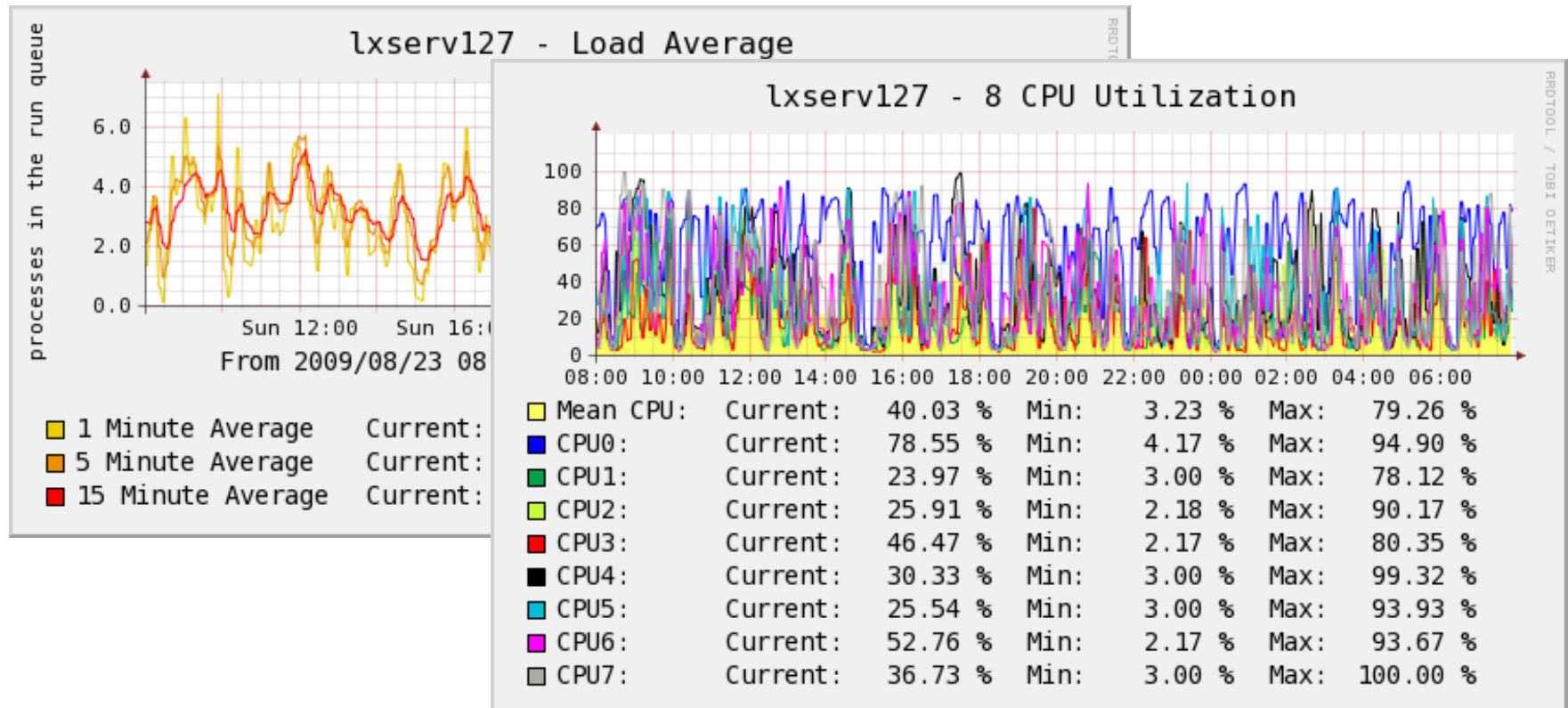


- AAPP-6.12
- RTTOV-9.3
- Grib-API-1.8.0
- Proj-4.6.0
- Python-2.4.3
- Numpy-1.2.1
- ...
- PIL-1.1.6
- HDF5-1.8.3
- HLHDF-0.79
- GMT-4.1.4
- ...
- **PPS-v2010**

PPS Reference platform

Snapshot example:

CPU-usage and processing load on the PPS server

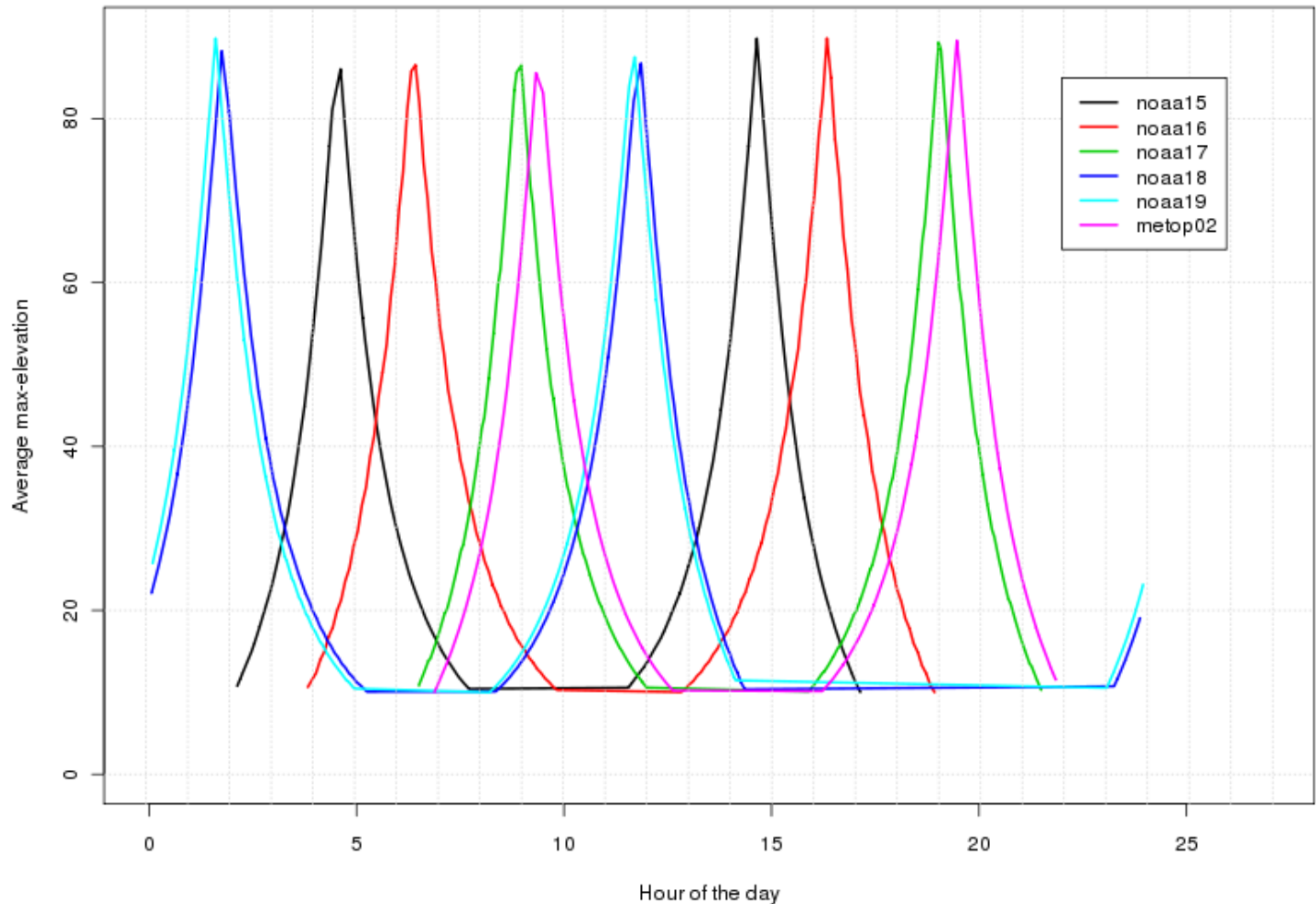


PPS on HRPT

- PPS is run via the Task Manager:
 - The AAPP schedule (ephemeris file) is synchronised twice a day with the MEOS schedule
 - Using up to three modules/clients for each task -> several areas can be processed at the same time
 - Allows for the pre-processing of data before satellite data reception
 - Minimising the time delay from observation to product readiness
 - Utilising the multiple CPU's
- Outstanding issue:
 - The updating and synchronisation may sometimes result in a missed overpass!
 - Something we will look into before 2011 release.

Current satellite constellation is unfortunate concerning coverage in time!

2010-mar: Average max-elevation angles at Nrk versus time of day



PPS on HRPT

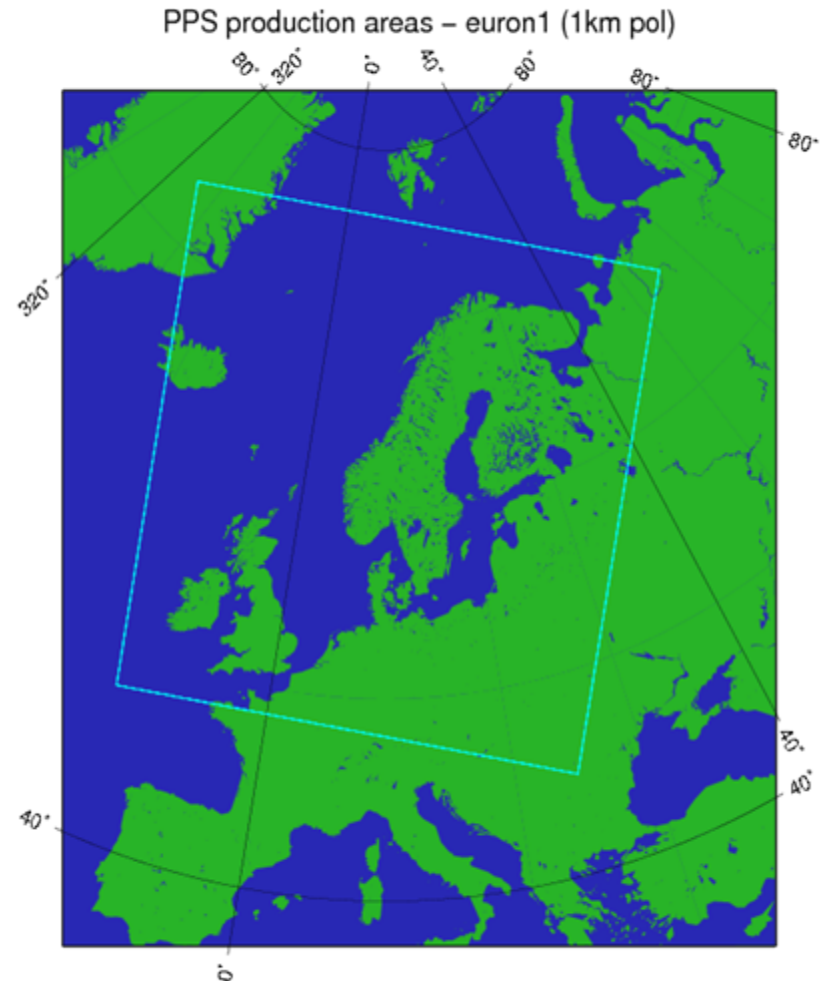
- NOAA-15, NOAA-18, NOAA-19, Metop-A
- Waiting to get NOAA-17 back in (currently bad quality due to scan motor problems)
- Around 19 passes per day (with NOAA-17 this would be 23)
- Currently poor coverage in time due to loss of NOAA-17 and Metop-A HRPT restrictions – Almost no data from late afternoon till around midnight

PPS on HRPT

The current setup at
SMHI:

- *euron1* (3072x3072)

Main production area for SMHI:
1km polar stereographic
covering the main area of
interest

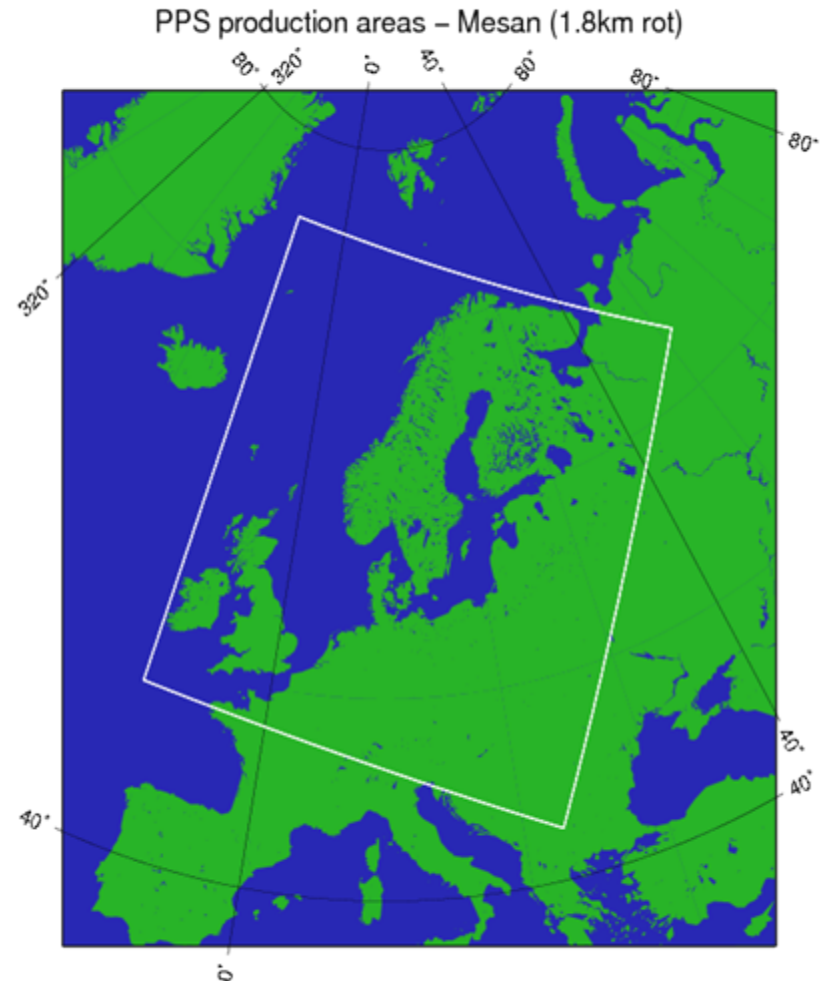


PPS on HRPT

The current setup at
SMHI:

- *euron1* (3072x3072)
- ***mesanX*** (1476x1608)

Input to the SMHI mesoscale
analysis model MESAN: 1.8 km
rotated lon-lat grid

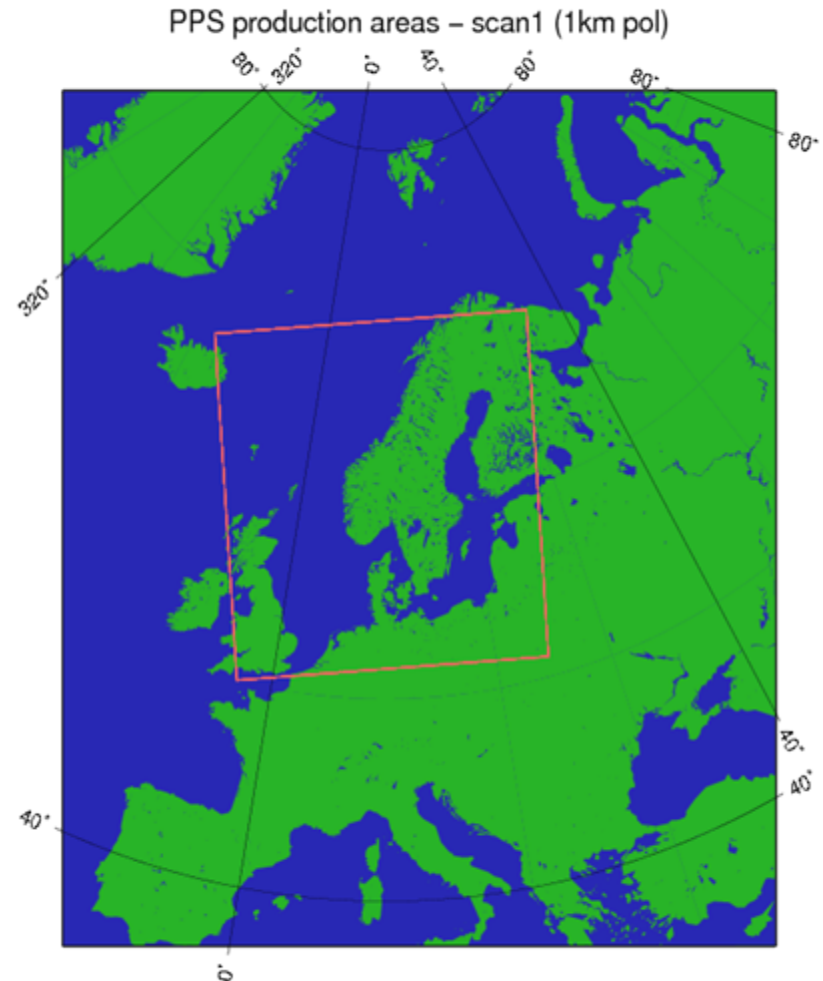


PPS on HRPT

The current setup at
SMHI:

- *euron1* (3072x3072)
- *mesanX* (1476x1608)
- ***scan1* (2048x2088)**

1km polar stereographic area
currently required by our
visualisation system

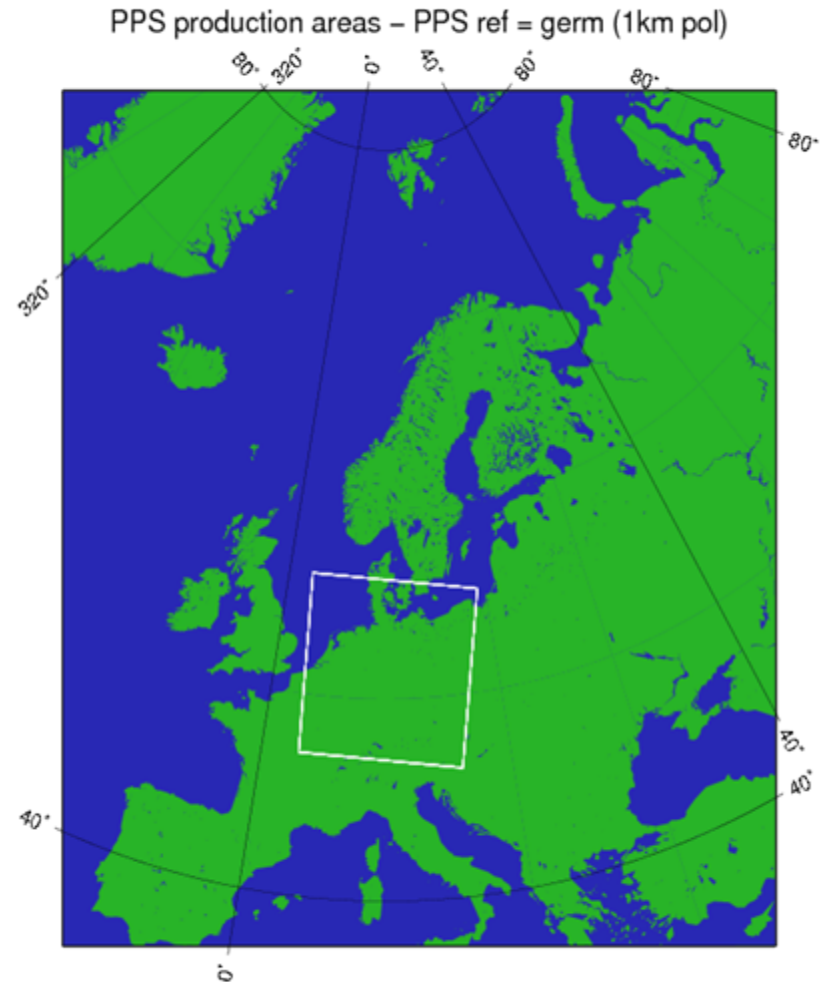


PPS on HRPT

The current setup at
SMHI:

- *euron1* (3072x3072)
- *mesanX* (1476x1608)
- *scan1* (2048x2088)
- ***germ* (1024x1024)**

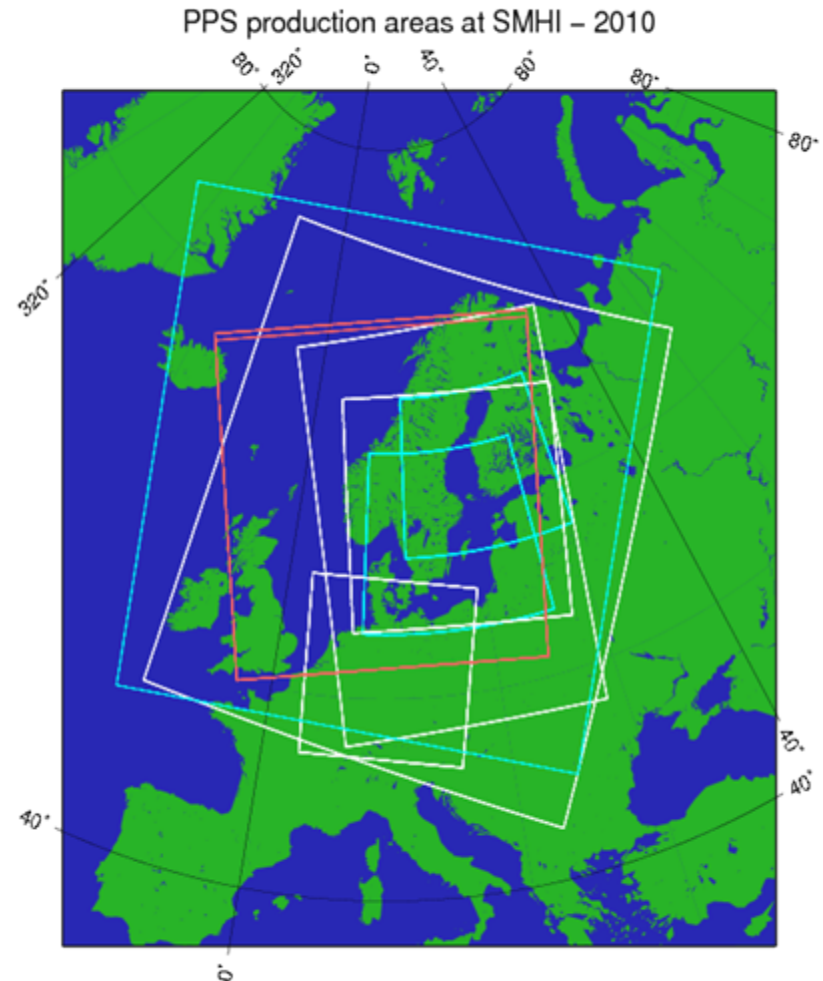
NWCSAF/PPS reference
region: 1km polar stereographic



PPS on HRPT

The current setup at SMHI:

- *euron1* (3072x3072)
- *mesanX* (1476x1608)
- *scan1* (2048x2088)
- *germ* (1024x1024)
- *ssea* (1024x1024)
- *nsea* (1024x1024)
- *baltrad_lambert* (815x1195)
- *baws* (1400x1400)
- *scan2* (1024x1024)

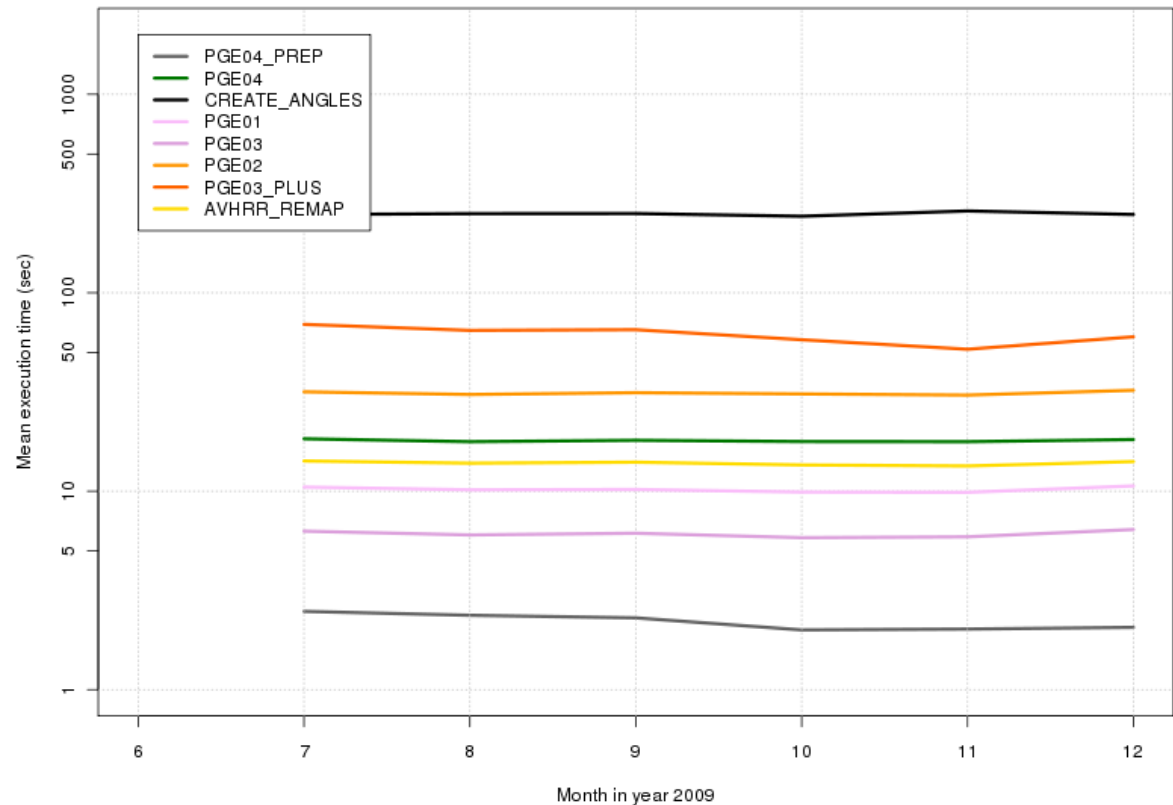


Many overlapping areas: Not an optimal way to run PPS!

PPS on HRPT

NB! The time is per module and area, and thus depends on the size of the area. Numbers here represent an average over all areas.

Mean execution times for individual PPS modules for the second half of 2009



PPS on Global Metop

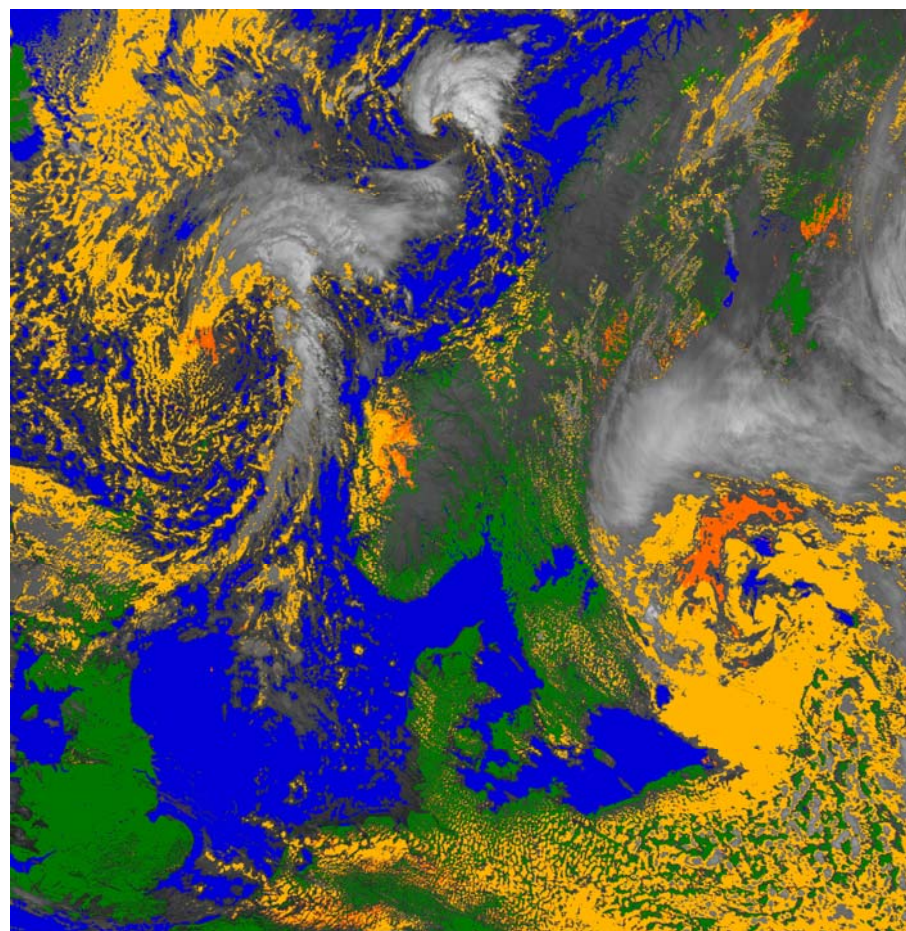
- Primitive scheduling, something we will look at in the near future
- Mostly for demonstration. But very valuable for quality checking and subjective validation

Remaining issues:

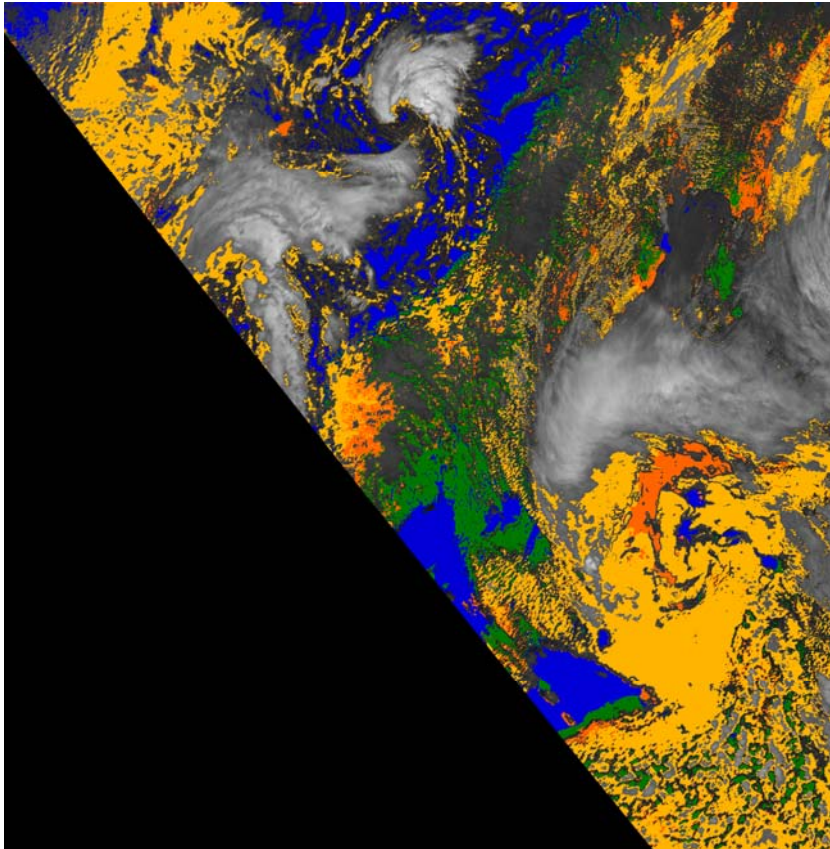
- Occasional hiccups. Seems like PPS processing starts before lvl1b data is ready. Maybe an NFS problem. Something we need to investigate.

PPS on Global Metop

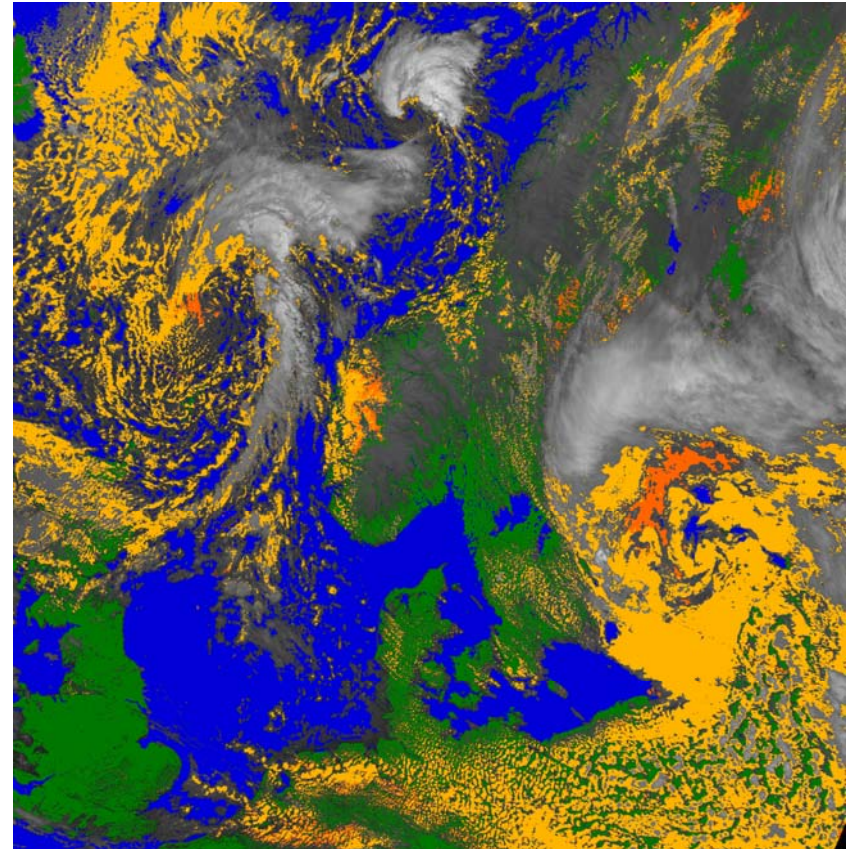
Building up the regional products from the PFS granules (PDU's)



Opportunity to get coincident (conflicting) passes from different satellites:



NOAA-19 at 10:06 UTC



Metop-A at 09:58 UTC

SMHI post-processing – plans

Advertisement

DMI & SMHI collaboration project.

To be presented at the EUMETSAT Conference in Cordoba:

Meteorological Post Processing for Geostationary and Polar Imagery

Martin Raspaud, Adam Dybbroe, Anna Geidne, Kristian Rune Larsen, Esben Stigård Nielsen and Lars Ørum Rasmussen