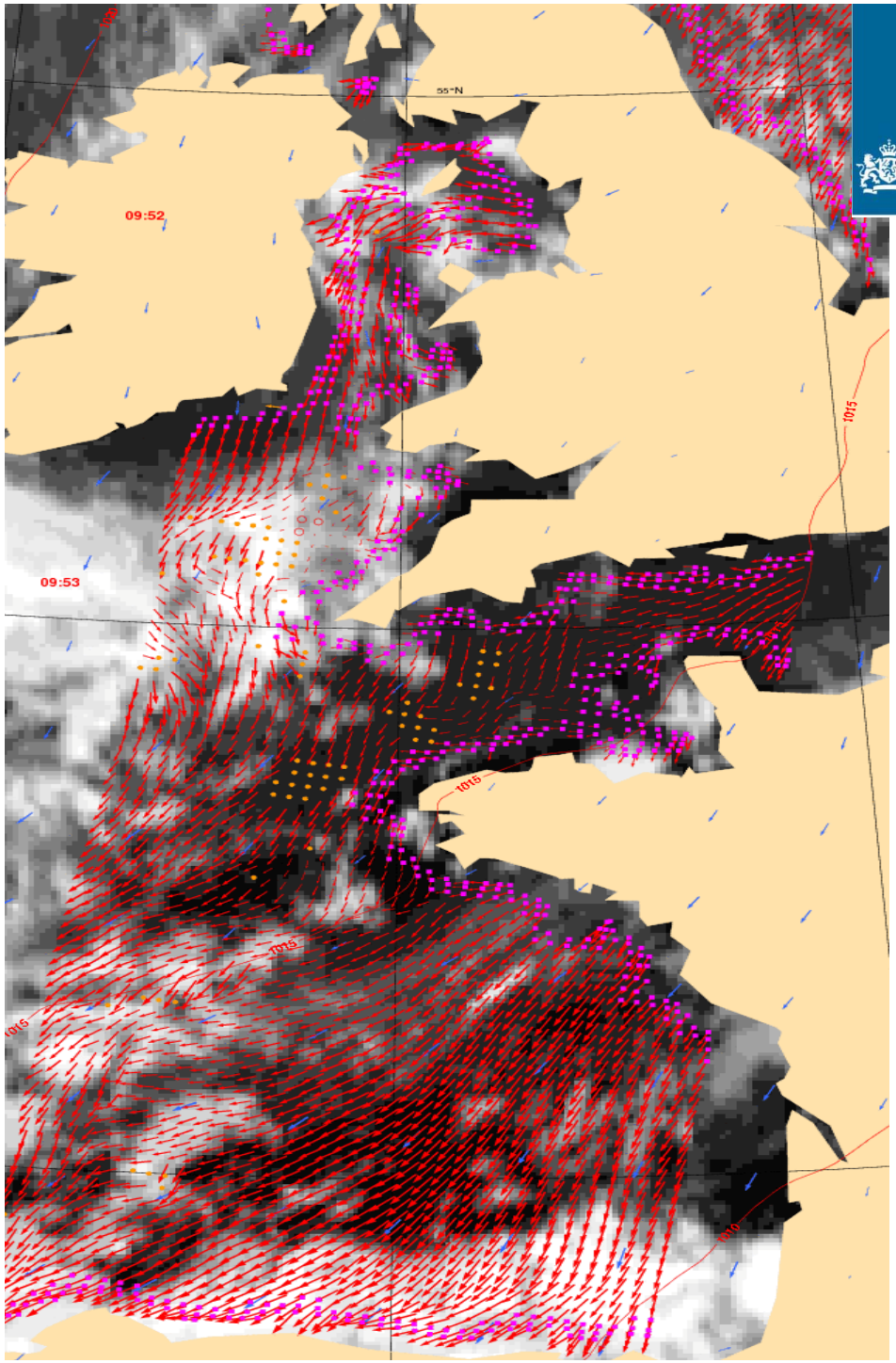


# KNMI Wind Services

## IOVWST Meeting

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Jur Vogelzang
Gerd-Jan van Zadelhoff
Marcos Portabella
Wenming Lin
Maria Belmonte Rivas
Yun Risheng

# User pull

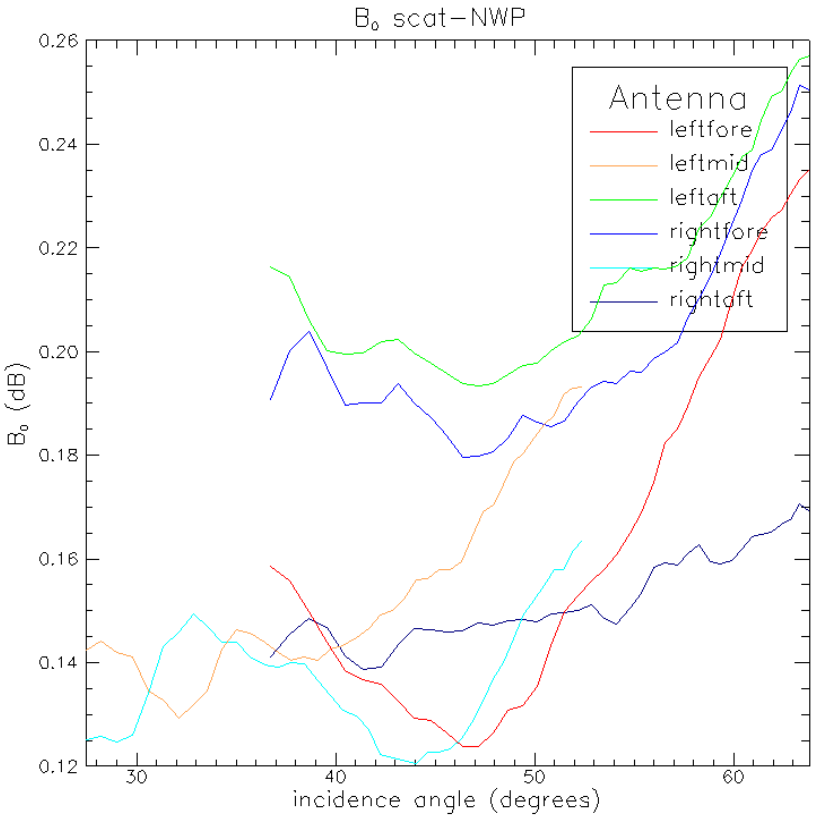
- Higher temporal resolution, i.e., more instruments in space
  - Scatterometer winds are known to improve forecasts when assimilated in NWP models and are popular for nowcasting
  - Currently only one operational mission (ASCAT) and one with development status (OSCAT), many weather phenomena are missed
  - Better coverage is particularly important for nowcasting and r-NWP
- Better spatial resolution
  - Future NWP model grid sizes will be in the order of a few km
  - Nowcasting of cyclones with hurricane force
  - Eddy-scale ocean modeling (L3/L4 wind products, guidance for ocean stress)
  - Coastal phenomena
- Climate data records, stable, complete and well (inter)calibrated
  - Level 2
  - Level 3, 4 (MyOcean, IFREMER)

# Scatterometer missions

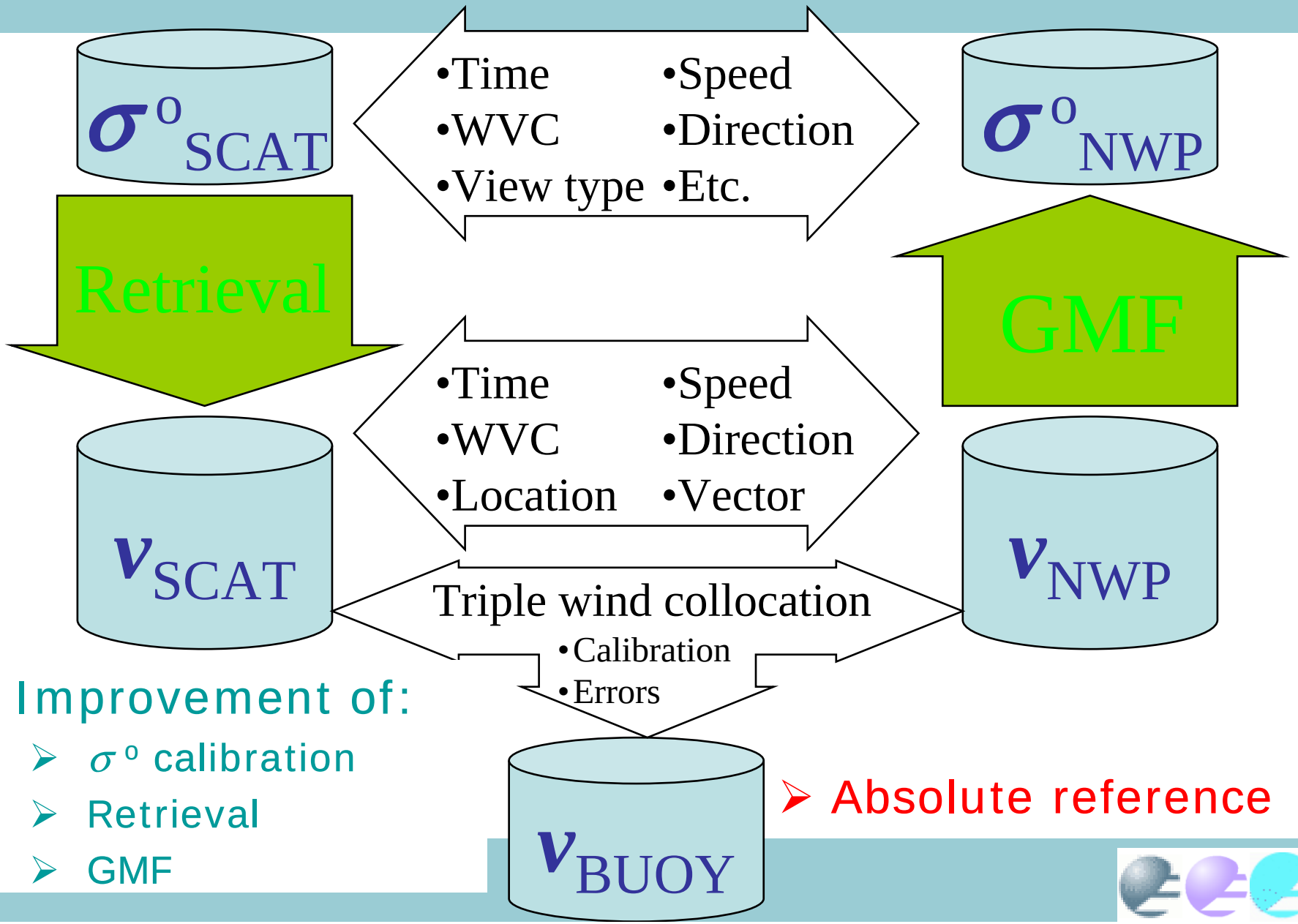
- For the ASCAT missions, the OSI SAF is primarily responsible for the L2 wind products, bur for all these missions, users request:
  - Well calibrated and stable wind products
  - Continuous monitoring of the product quality
  - Data formats that can be handled by existing systems
  - Helpdesk support and service messages
- We want to support missions where necessary with standard services in order to achieve maximum profit for the users
- We also plan wind reprocessing of the ASCAT, SeaWinds, ERS and OSCAT missions

# Ongoing R&D work

- Cal/Val: ocean calibration and development of quality flags
- Backscatter is considered a geophysical property of the ocean, so a particular radar wavelenght/polarisation corresponds to one unique GMF
- Differences between instruments can be assigned to (small) calibration issues and subsequently be corrected
- This method has proven to be successful for ERS vs. ASCAT and for QuikSCAT vs. OSCAT
- Instrument intercalibration (MetOp-A&B / reprocessing)



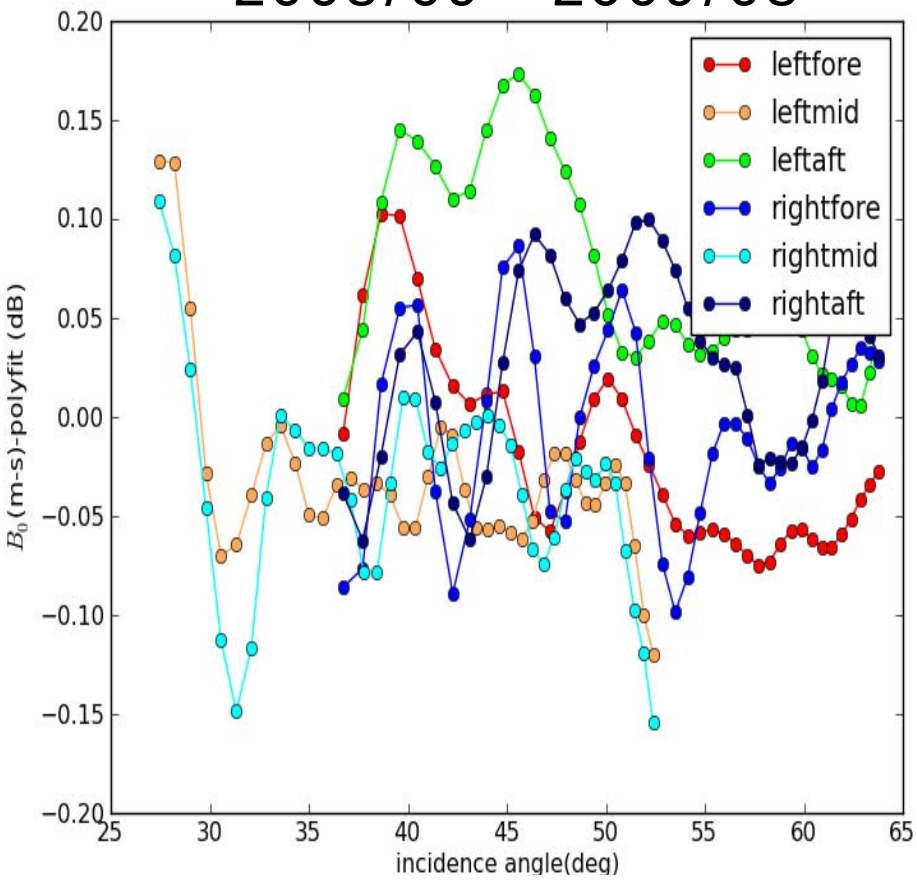
# Ocean Calibration Overview



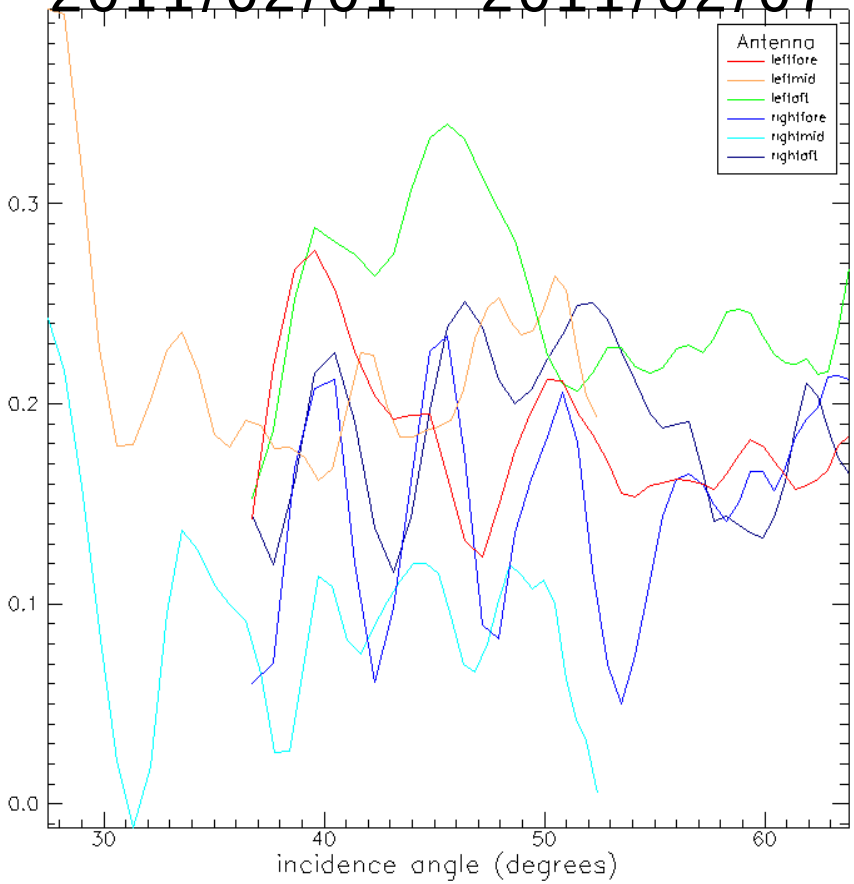

- Improvement of:
  - $\sigma^o$ calibration
  - Retrieval
  - GMF
- Absolute reference

# Reproduceability ASCAT NOC

2008/09 - 2009/08



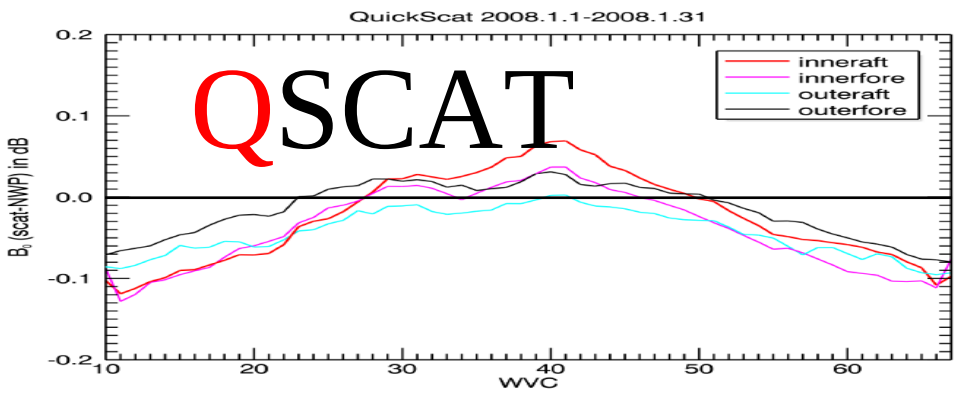

2011/02/01 – 2011/02/07



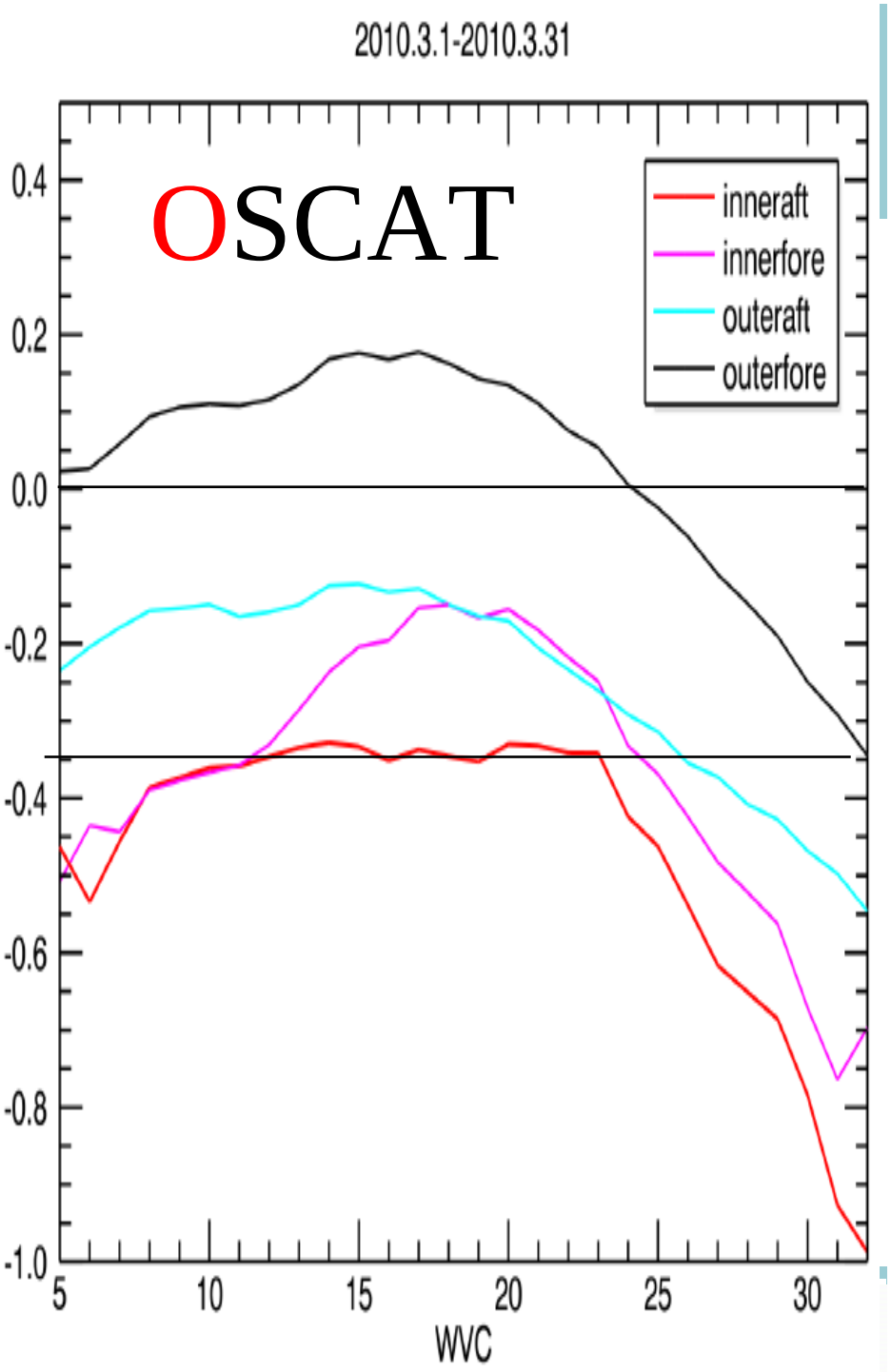

- Patterns identical to within 0.1 dB
- But vertically shifted
- Tested over sea ice

Verspeek et al., 2011

# OScat vs QScat




- Exclude rain
- v2010 biased
- Large fluctuations
- View dependent
- Corrections work



# ASCAT wind calibration

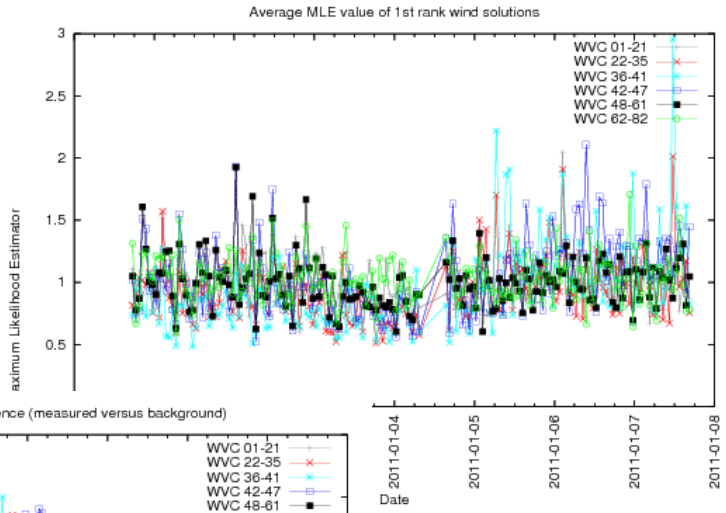
- Triple collocation using all ASCAT-12.5 collocations from Oct 2008 to March 2012
- Error standard deviations in m/s w.r.t. scatterometer scales

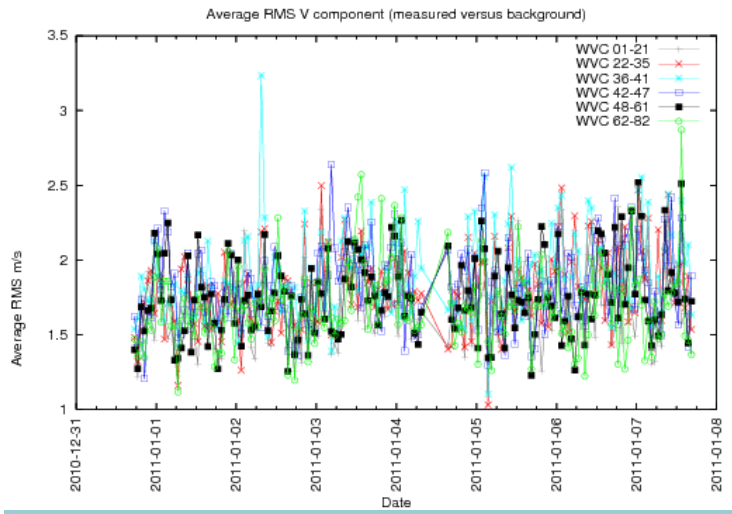
| [m/s] | Buoy | | ASCAT | | ECMWF | |
|---|---|---|---|---|---|---|
| | $\sigma_u$ | $\sigma_v$ | $\sigma_u$ | $\sigma_v$ | $\sigma_u$ | $\sigma_v$ |
| Old | 1.178 | 1.211 | 0.656 | 0.798 | 1.484 | 1.502 |
| New | 1.170 | 1.203 | 0.647 | 0.764 | 1.482 | 1.503 |

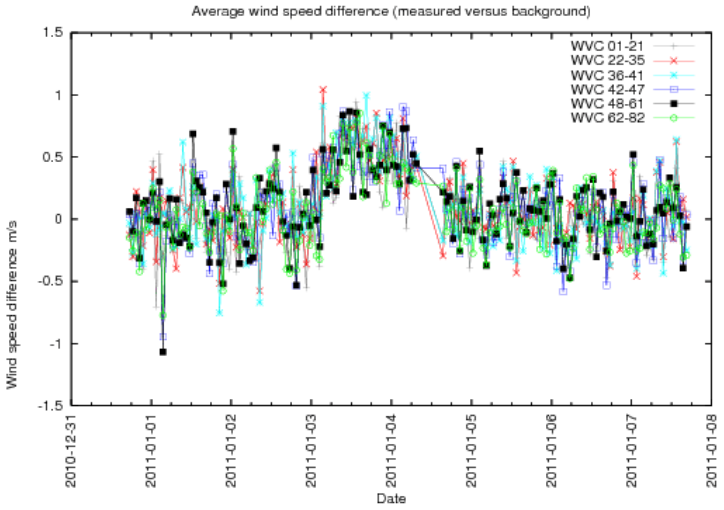
- ➢ Wind calibration improves ASCAT wind quality
- ➢ Work in progress

# Monitoring service

- Monitoring and control: improvement of methods for routine validation
- Buoy verifications
- Quality assurance of the production, see example of ASCAT anomaly

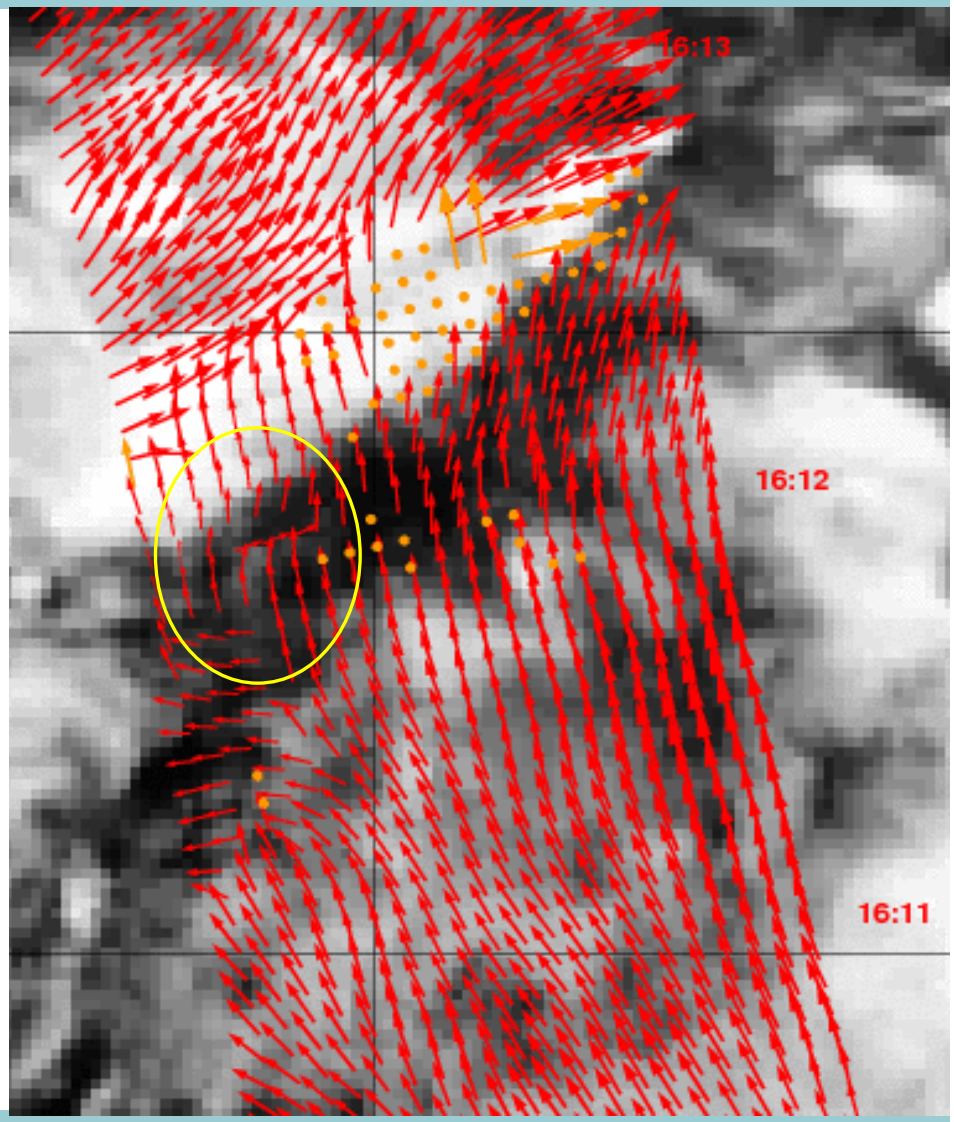


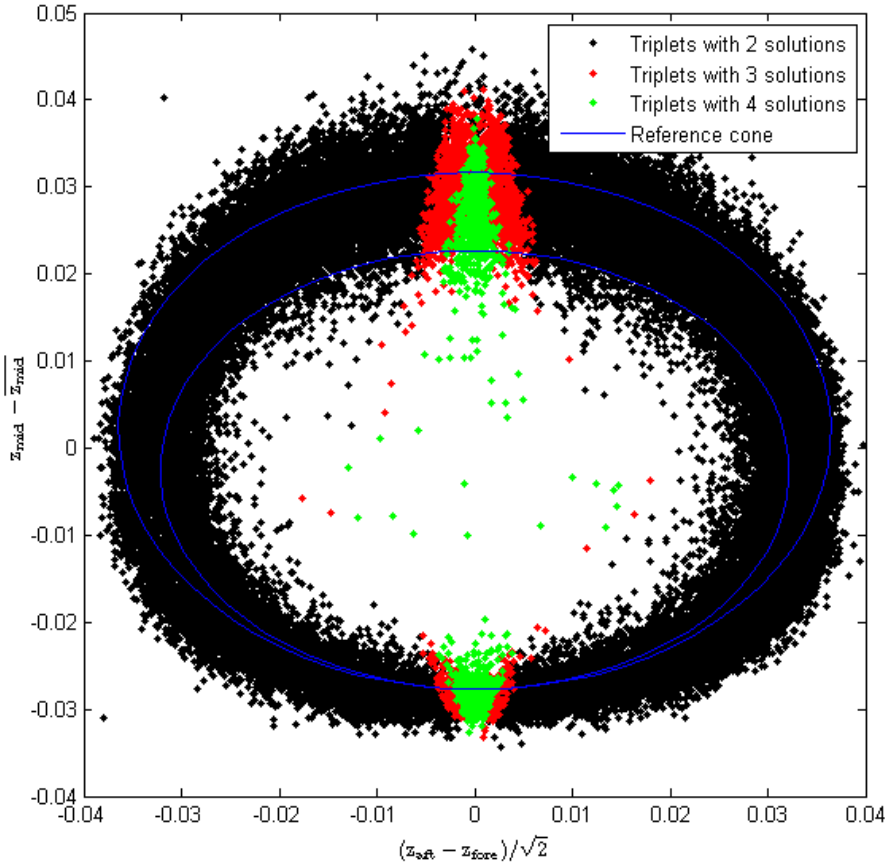
# GMF development

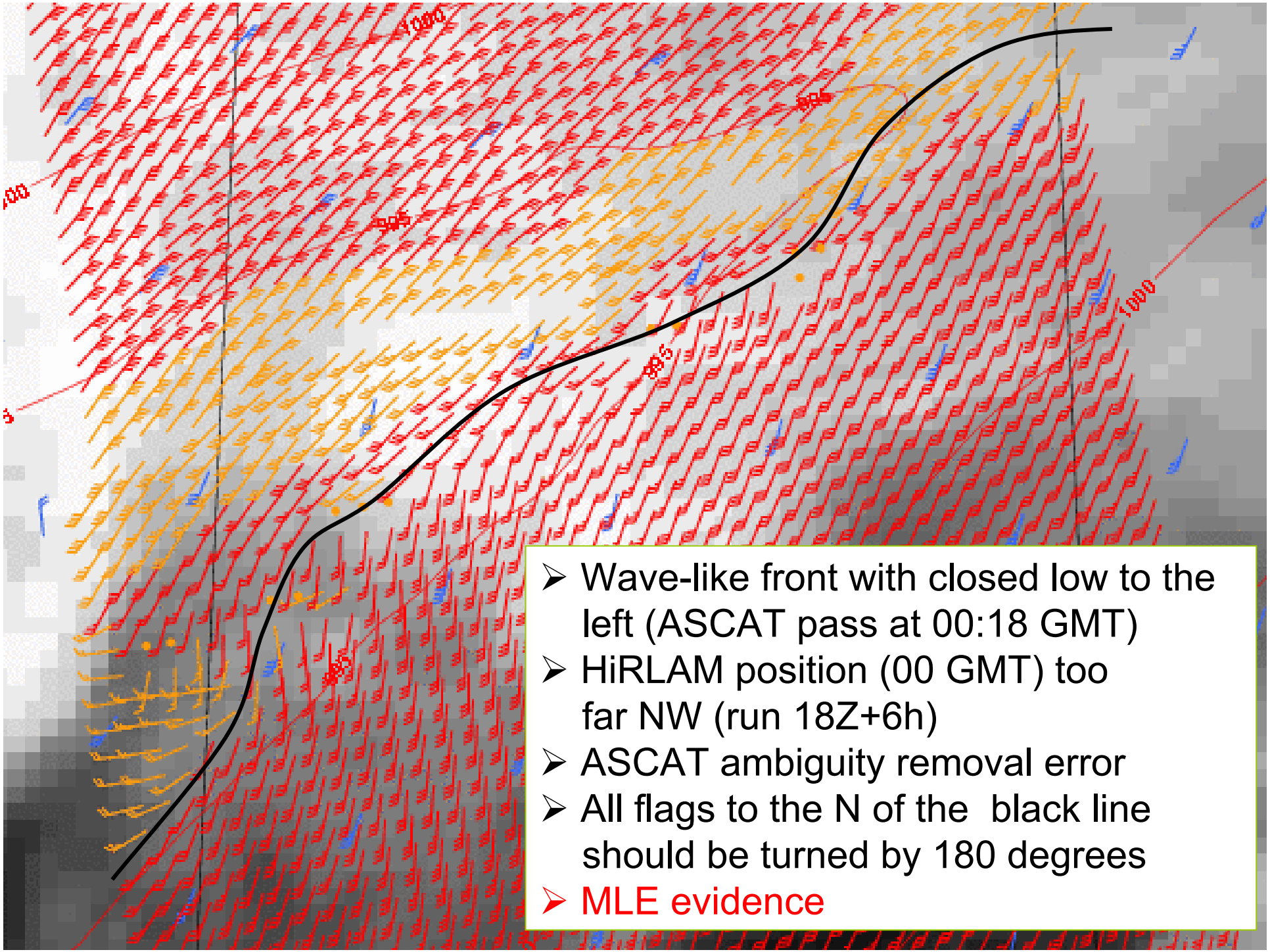
- Improvement of Geophysical Model Functions
- CMOD6 for C-band: better fit around 4 m/s, fix underestimation of wind speed above 15 m/s
- NSCAT3 for Ku-band: fix overestimation of wind speed above 15 m/s
- Cross-polarisation GMF at C-band to support EPS-SG



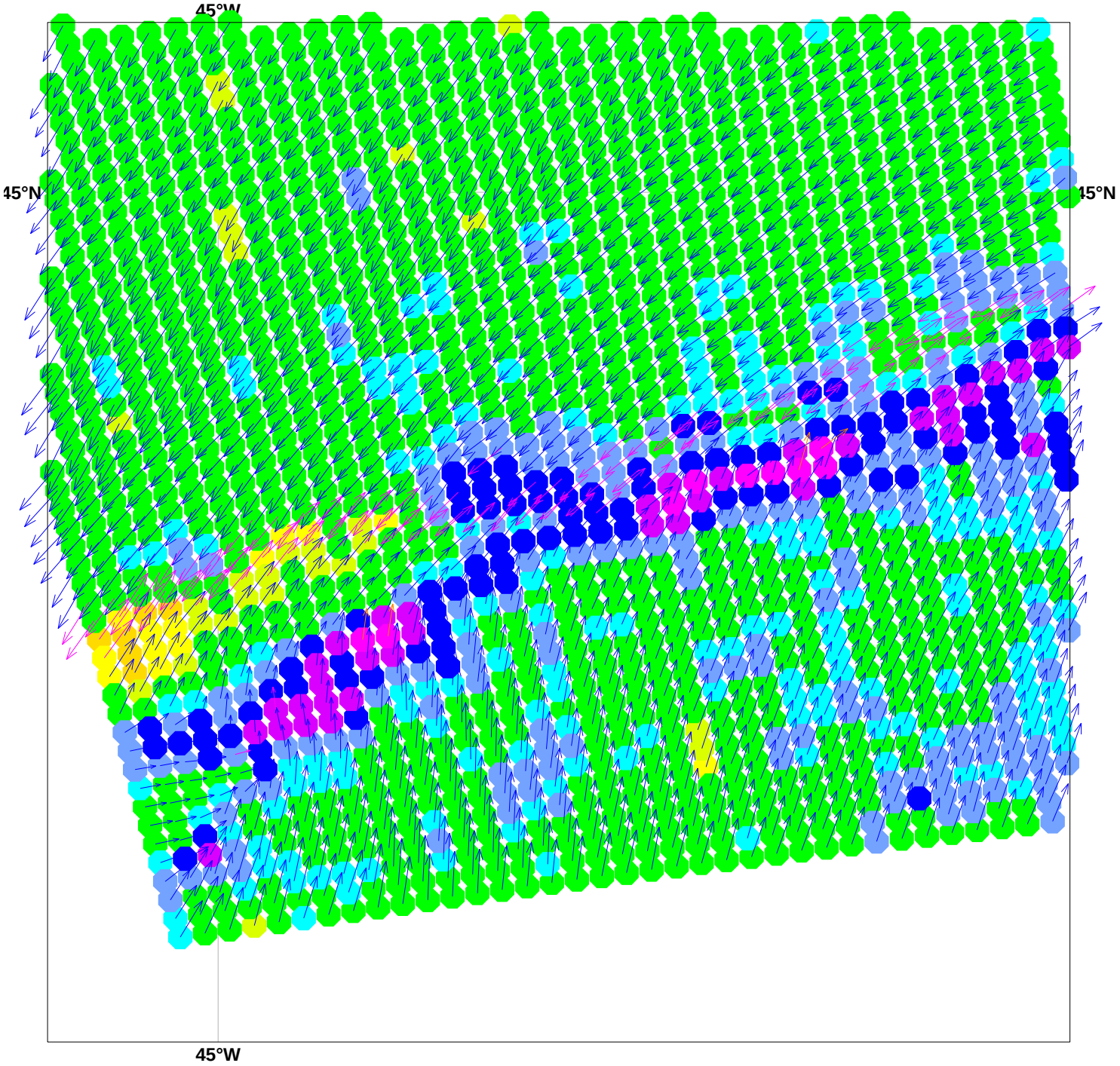
# MLE developments

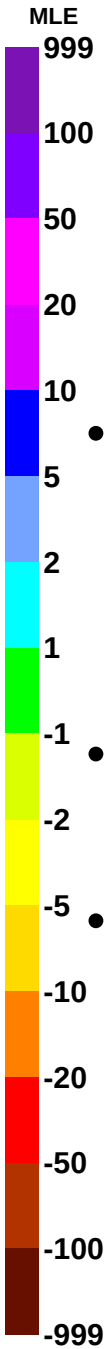
- Cone distance analysis (incl. sign): screening for wind variability and rain, improving Quality Control
- Cooperation with Institut de Ciències del Mar and Unitat de Tecnologia Marina (Spain)
- Location of backscatter data w.r.t. the GMF cone depends on wind variability, …
- Also important for quality assessment in coastal regions (incl. land contamination)
- Important asset in nowcasting and data assimilation





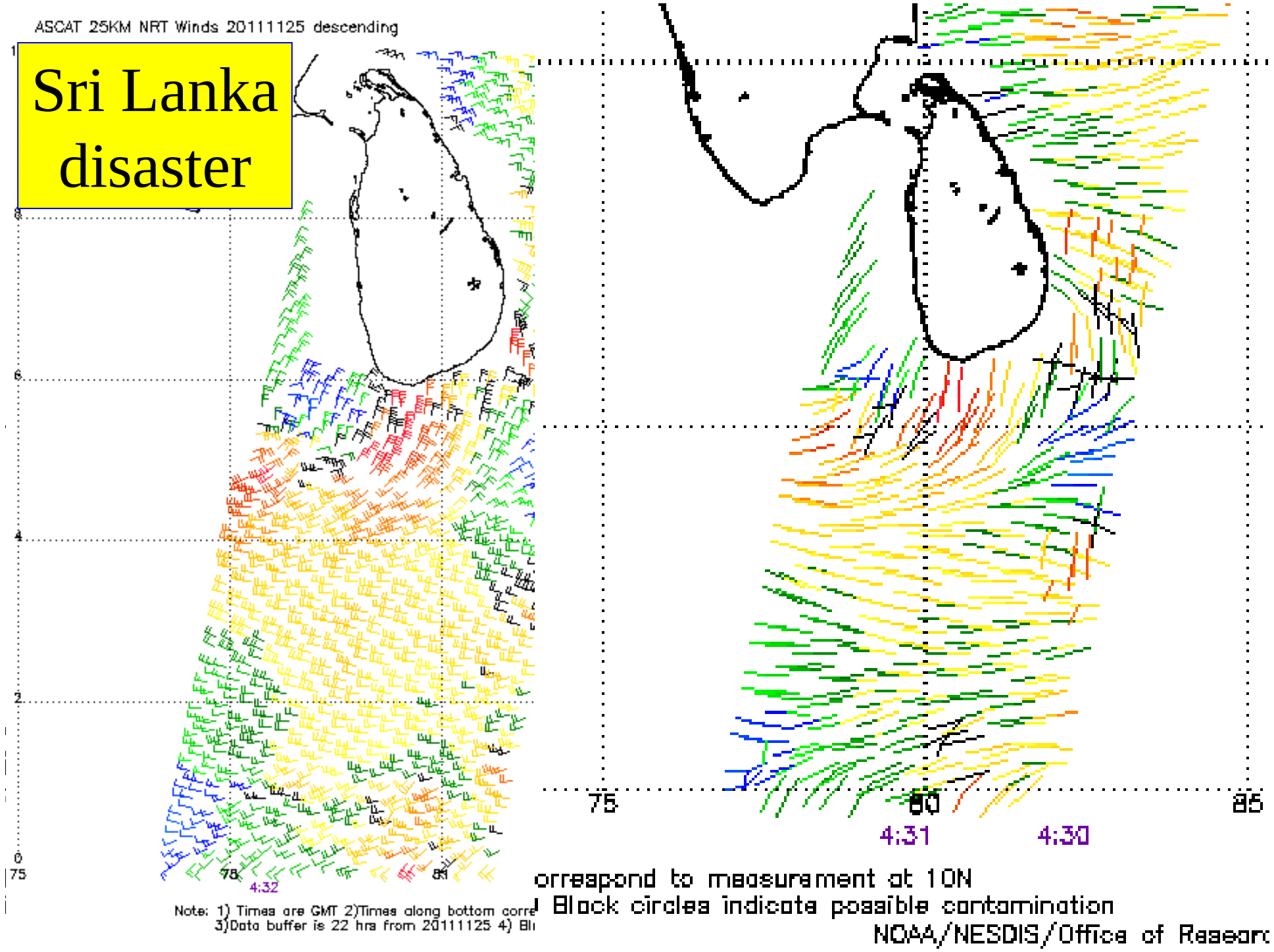

- Wave-like front with closed low to the left (ASCAT pass at 00:18 GMT)
- HiRLAM position (00 GMT) too far NW (run 18Z+6h)
- ASCAT ambiguity removal error
- All flags to the N of the black line should be turned by 180 degrees
- MLE evidence

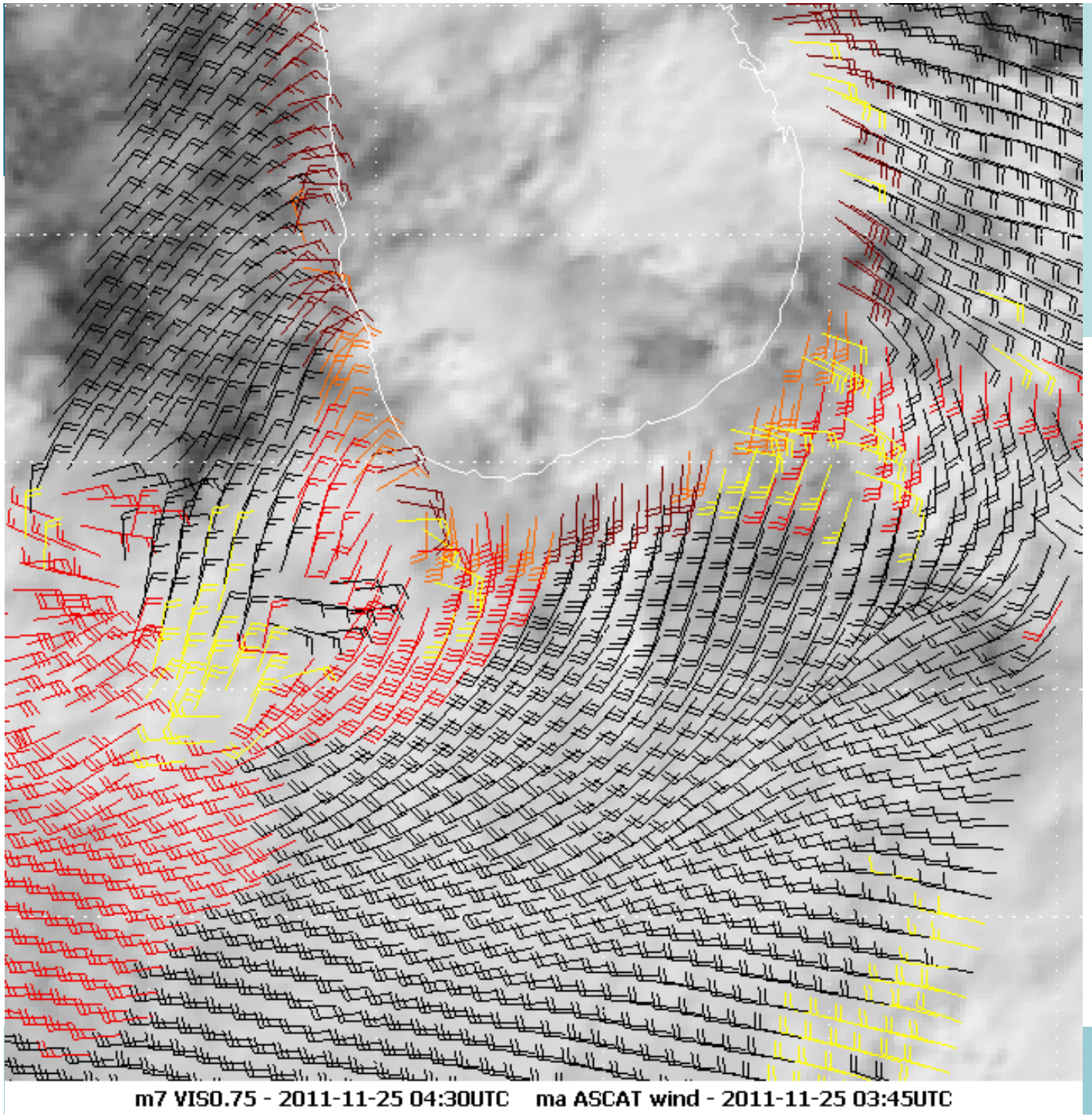



# MLE

- +ve MLE related to wind variation, e.g., front
- -ve MLE to stable flow
- +ve MLE likely aligned with front

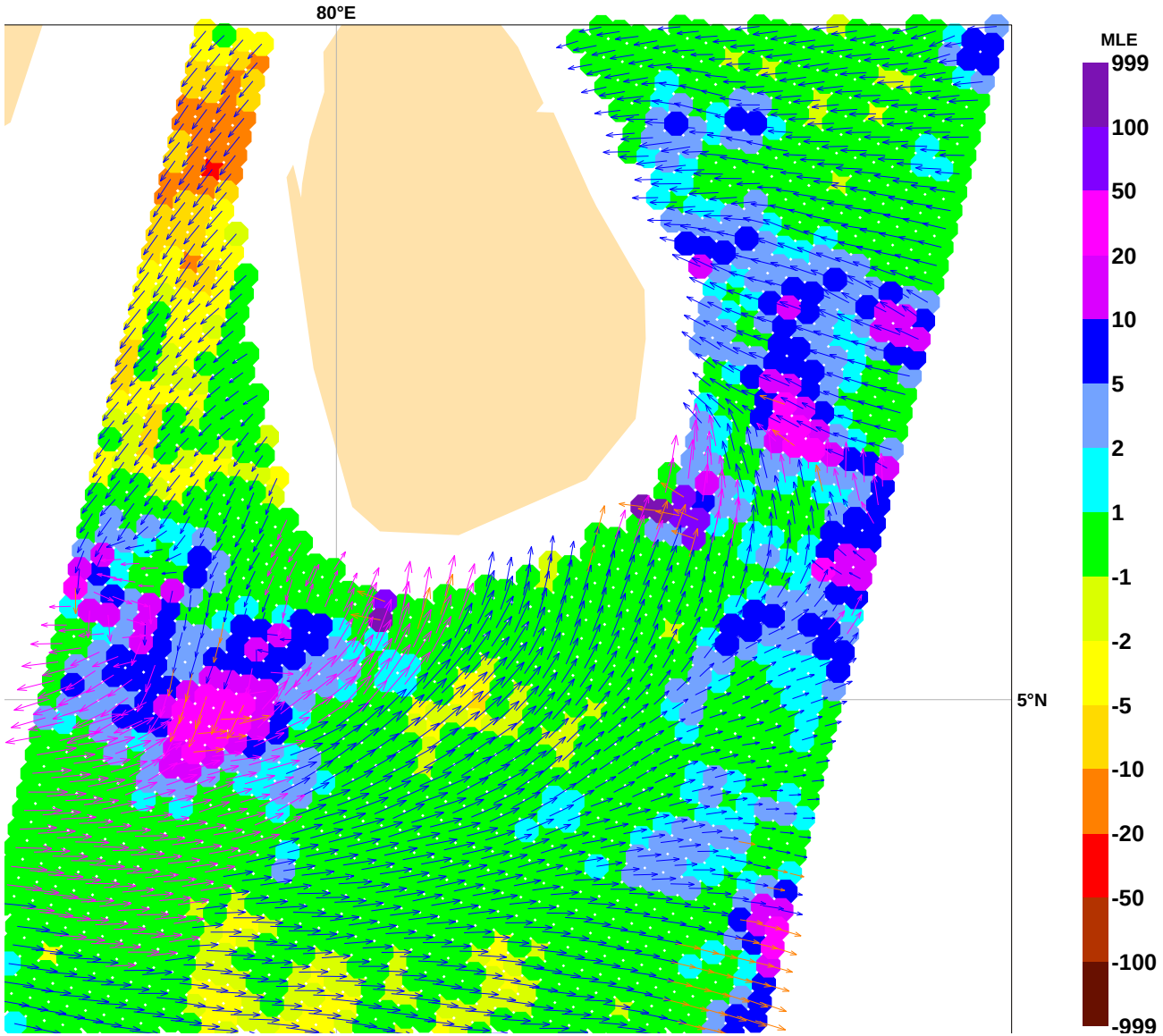

ASCAT 25KM NRT Winds 20111125 descending
Sri Lanka disaster
75
80
85
4:31
4:30
4:32
orresapond to measurament at 10N
Block circles indicate possible contamination
NOAA/NESDIS/Office of Researc
Note: 1) Times are GMT 2)Times along bottom corre
3)Data buffer is 22 hrs from 20111125 4) Bl




# Sri Lanka disaster

- Complex convection
- Spatial inconsistency (red, yellow)
- Spatial consistency (black)
- ASCAT 12.5

# MLE and ASCAT winds

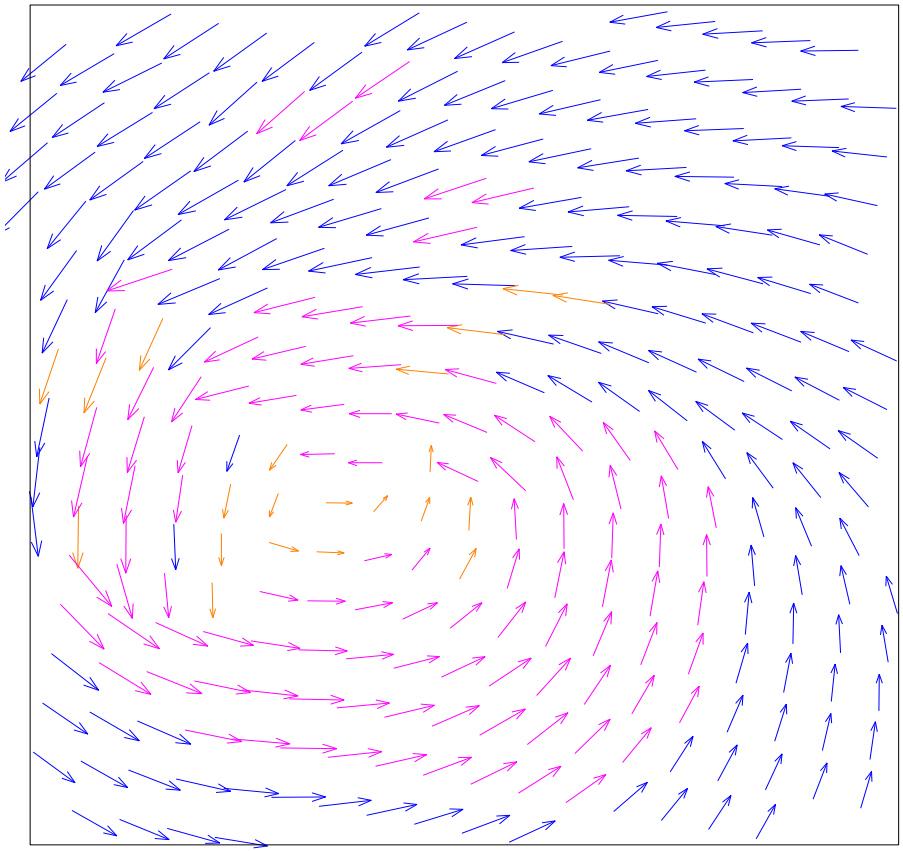


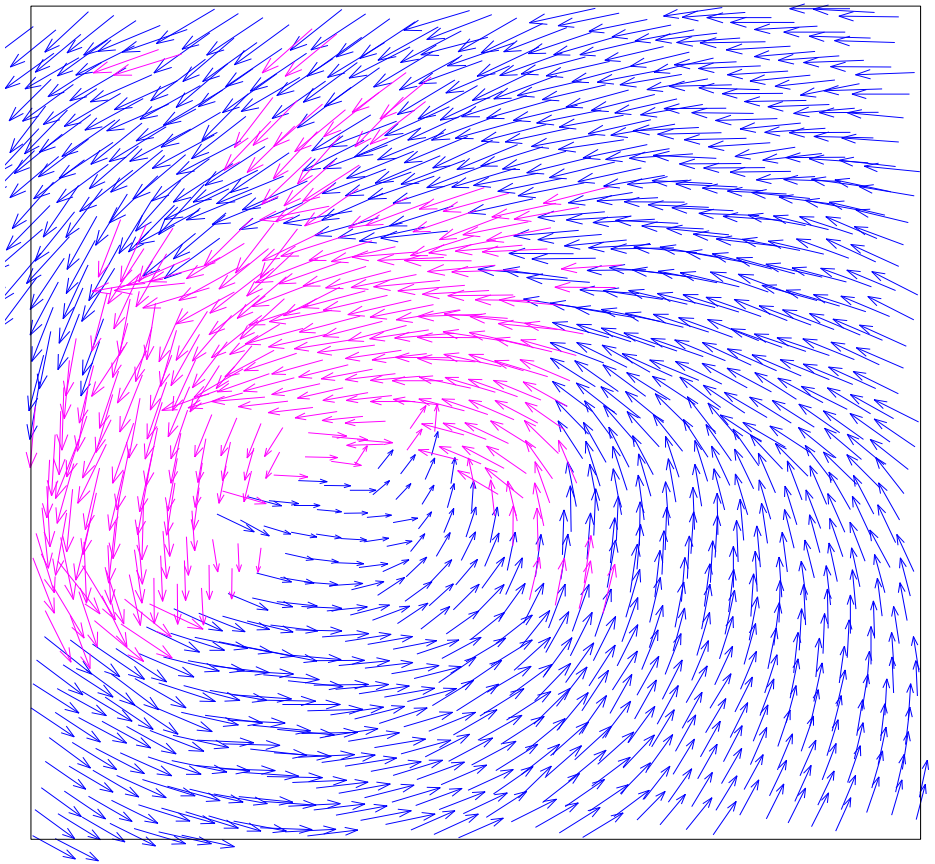

- MLE denotes convection in the low to the SW of Sri Lanka
- N-ly winds to the N of the low appear correct
- E-ly winds to the W of the low should be W-ly

➢ Meteorologists should be trained to use MLE

# The future: 6.25 km grid?

- Left: coastal product at 12.5 km grid size, right: ultra-high resolution product at 6.25 km swath grid size
- Product still looks consistent but data quality not yet assigned





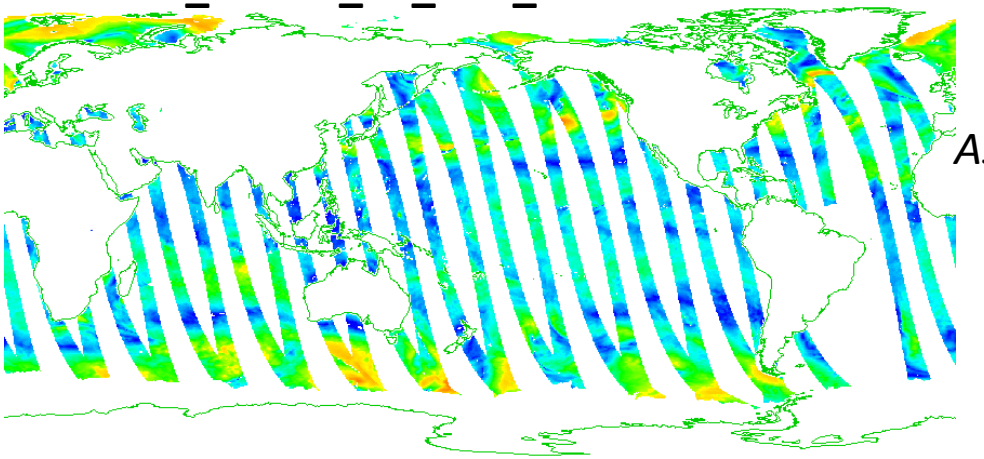
# MyOcean L3 Wind product

- http://www.myocean.eu
- -> access the catalogue and search for global wind:


Poster by Tilly Driesenaar

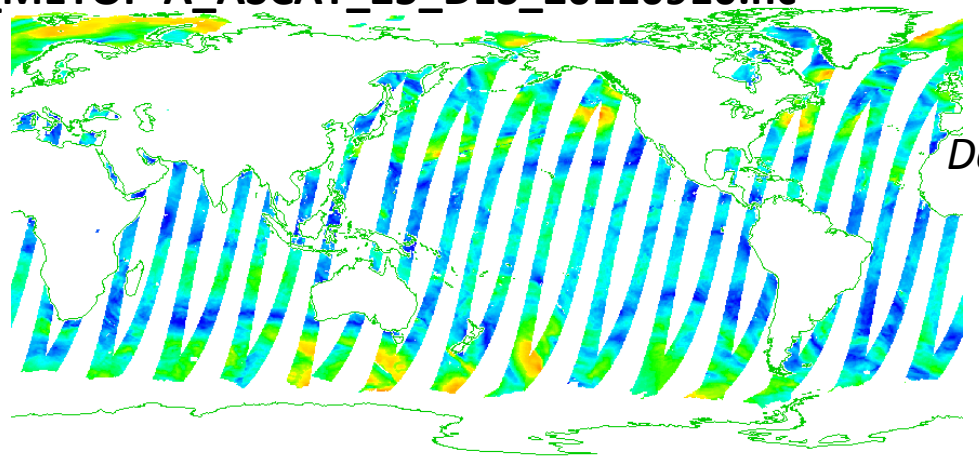
# L3 Wind product example

**GLO-WIND_L3-OBS_METOP-A_ASCAT_25_ASC_20110910.nc**



*Ascending passes*

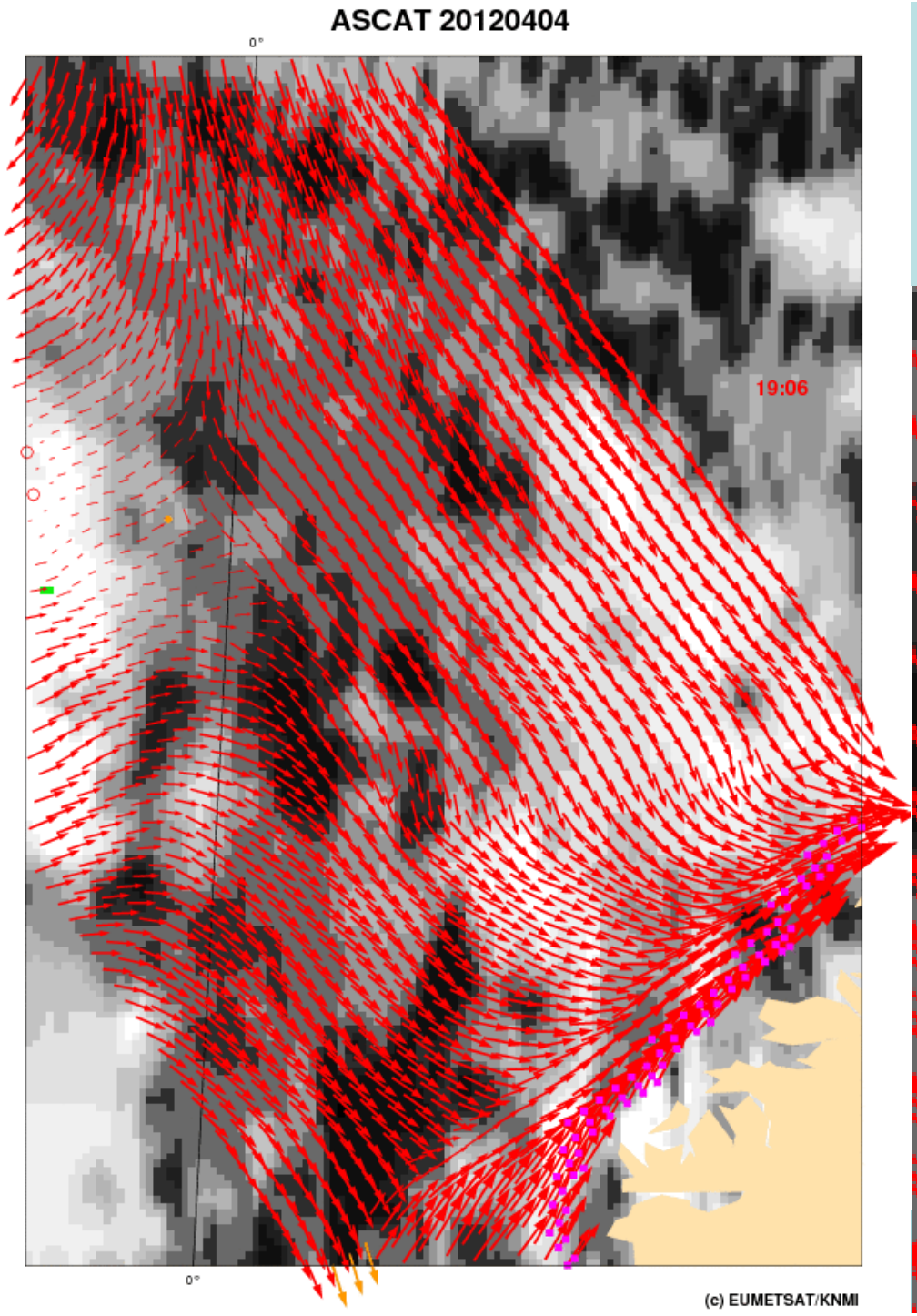
**GLO-WIND_L3-OBS_METOP-A_ASCAT_25_DES_20110910.nc**



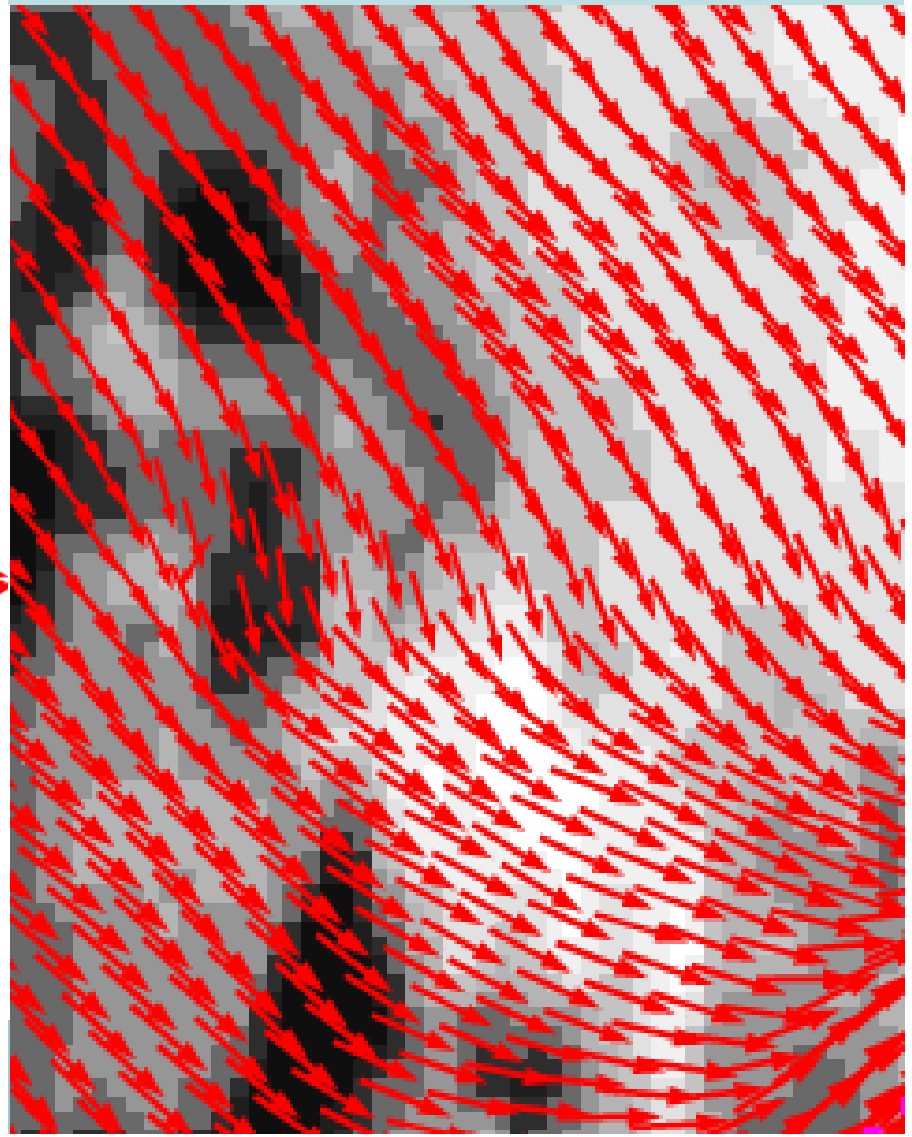
*Descending passes*

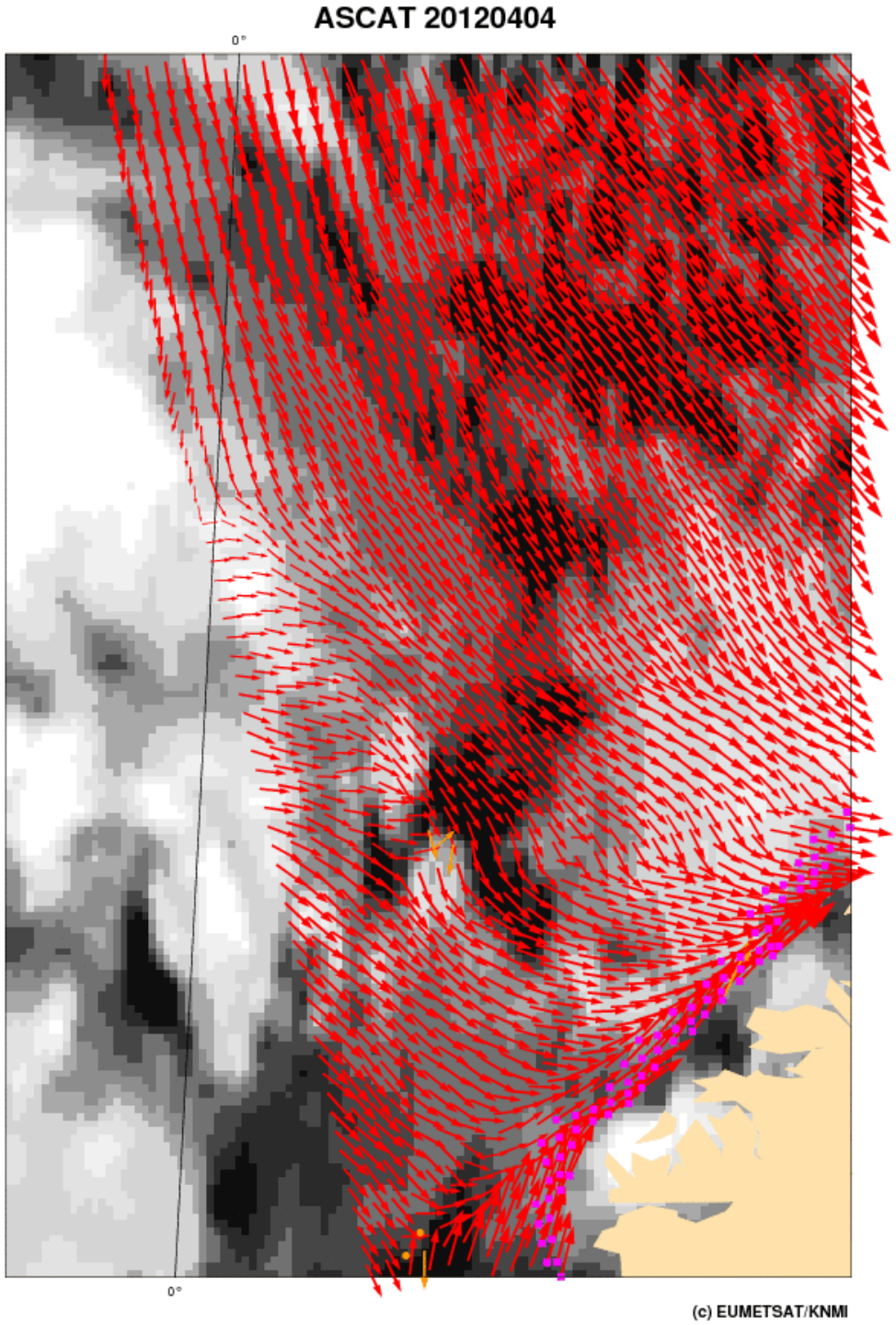
# MetOp-A & B

- MetOp-B succeeds MetOp-A
- Coverage doubled as long as both work well
- Gaps closed at latitudes > 60º, with revisit after 100 minutes everywhere
- Gaps remain in the tropics, with revisit after 50 minutes everywhere

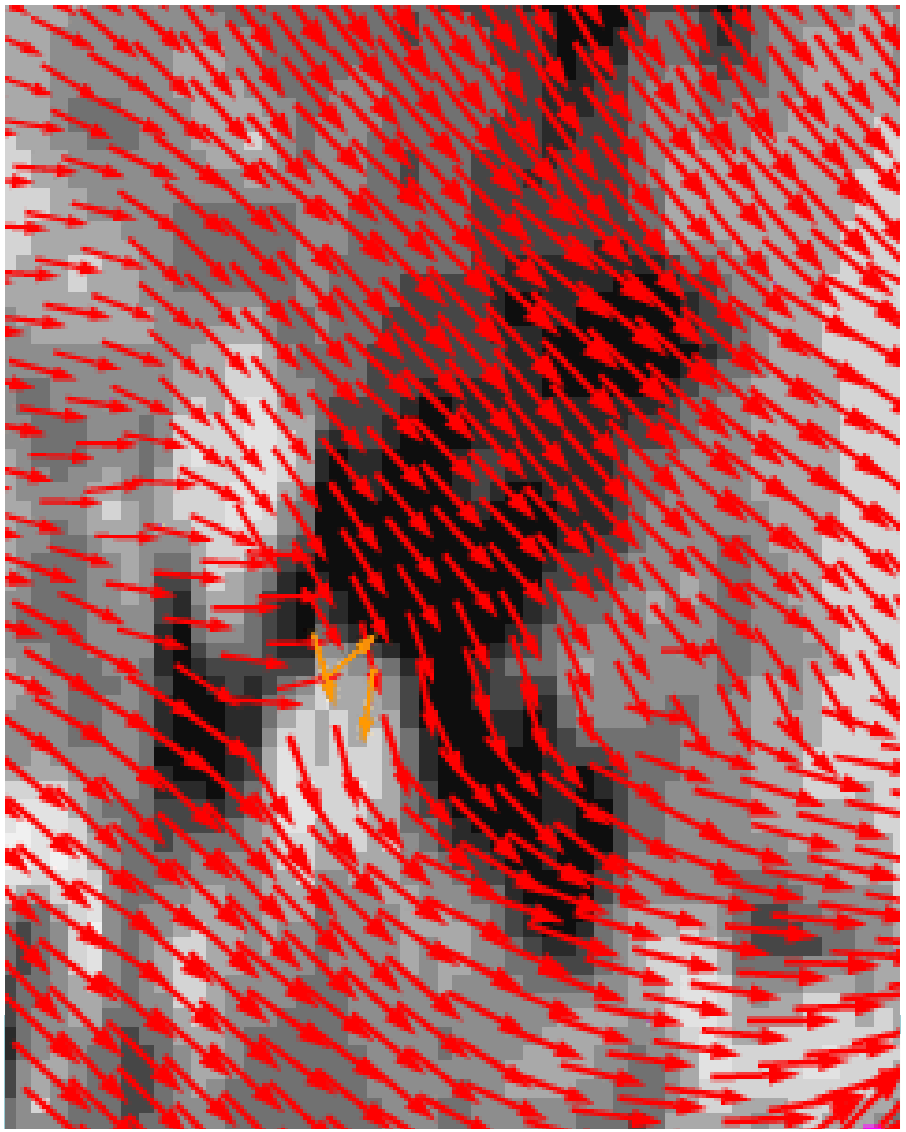



# Left swath






# Wind tendency



*Thank you !*