

# KNMI Wind Services

## IOVWST Meeting

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# 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 re-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

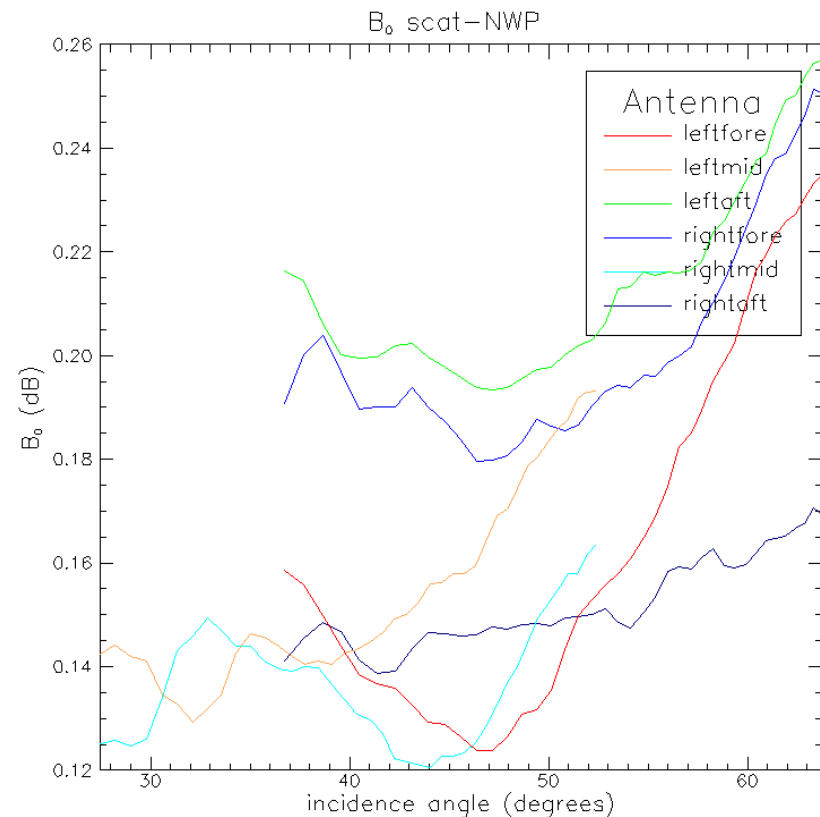
- For the ASCAT missions, the OSI SAF is primarily responsible for the L2 wind products, but for all these missions, users request:
  - Well calibrated and stable wind products
  - Continuous monitoring of the product quality
  - Data formats that can be handled by existing systems
  - Helpdesk support 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



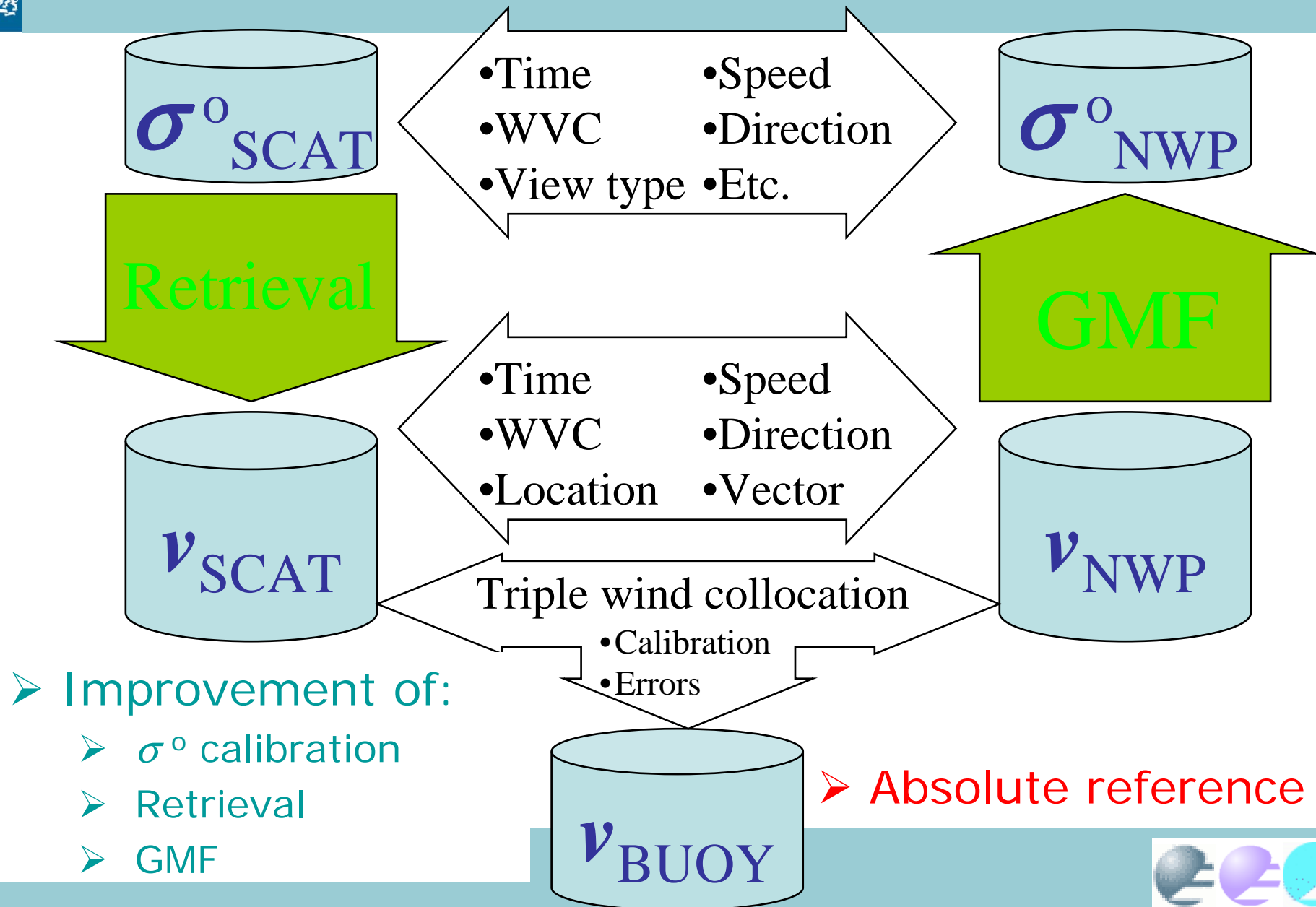


# Ongoing R&D work

- Cal/Val: ocean calibration and development of quality flags
- Backscatter is considered a geophysical property of the ocean, so a particular radar wavelength/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)



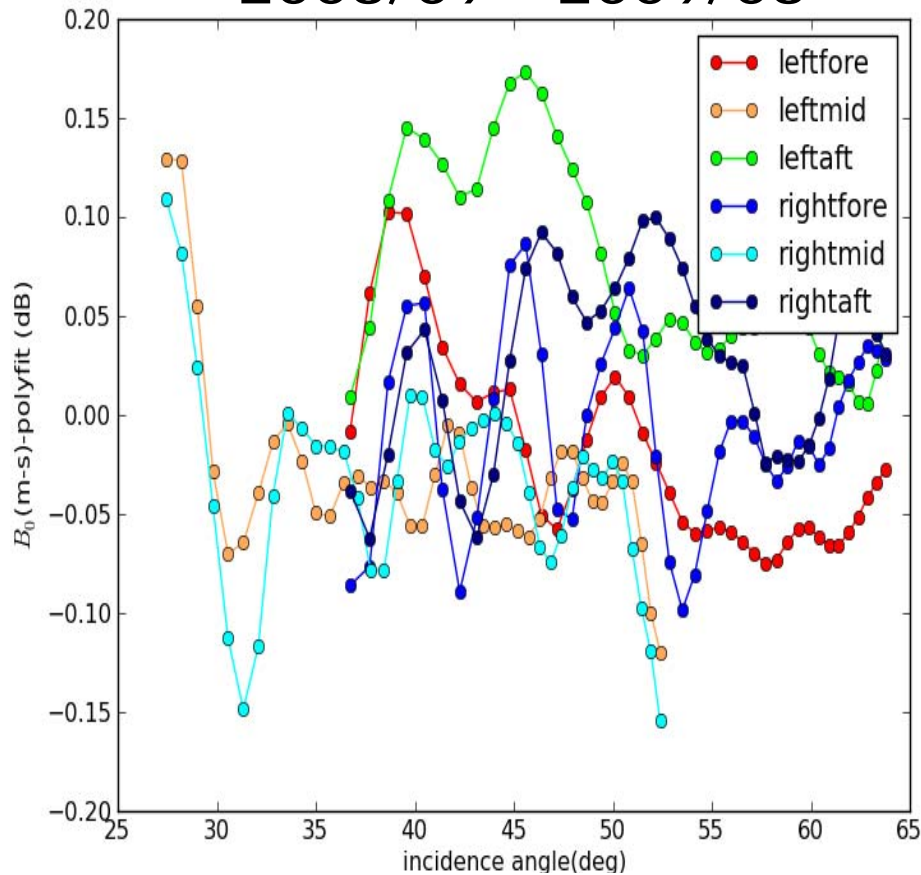
# Ocean Calibration Overview



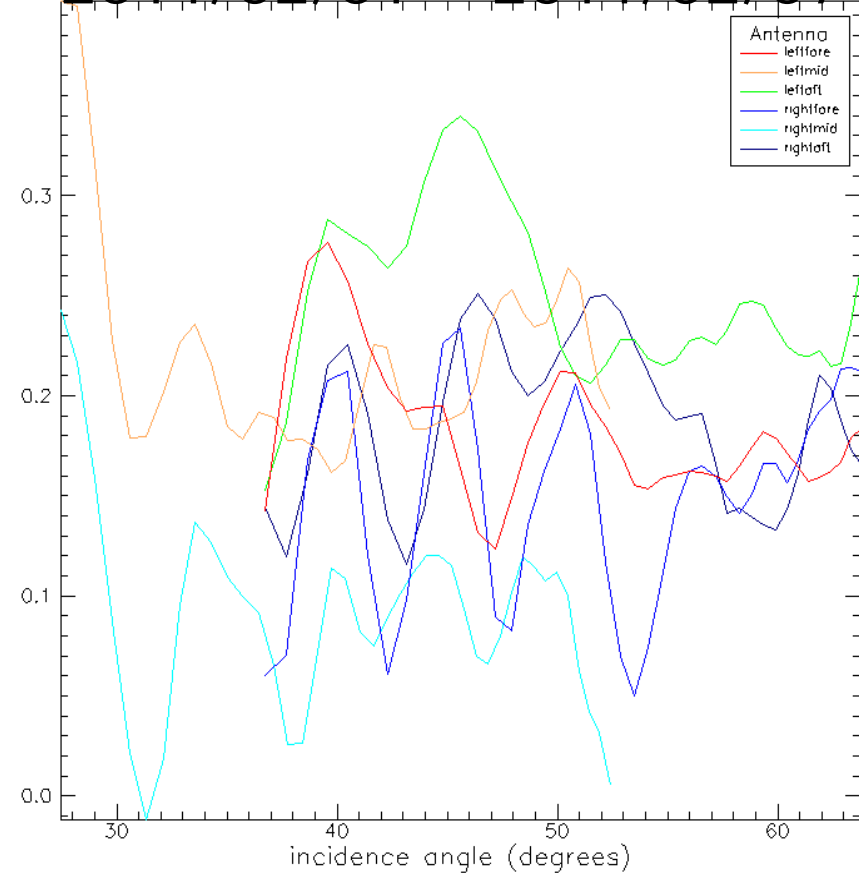
# Reproduceability ASCAT NOC



2008/09 - 2009/08



2011/02/01 - 2011/02/07

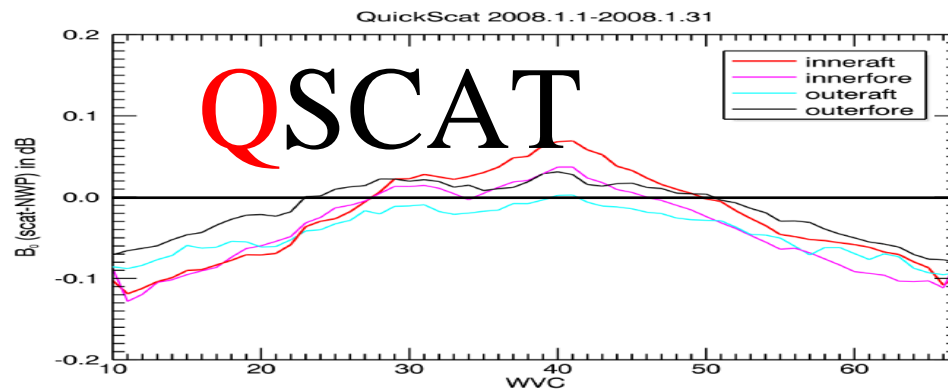


- Patterns identical to within 0.1 dB
- But vertically shifted
- Tested over sea ice

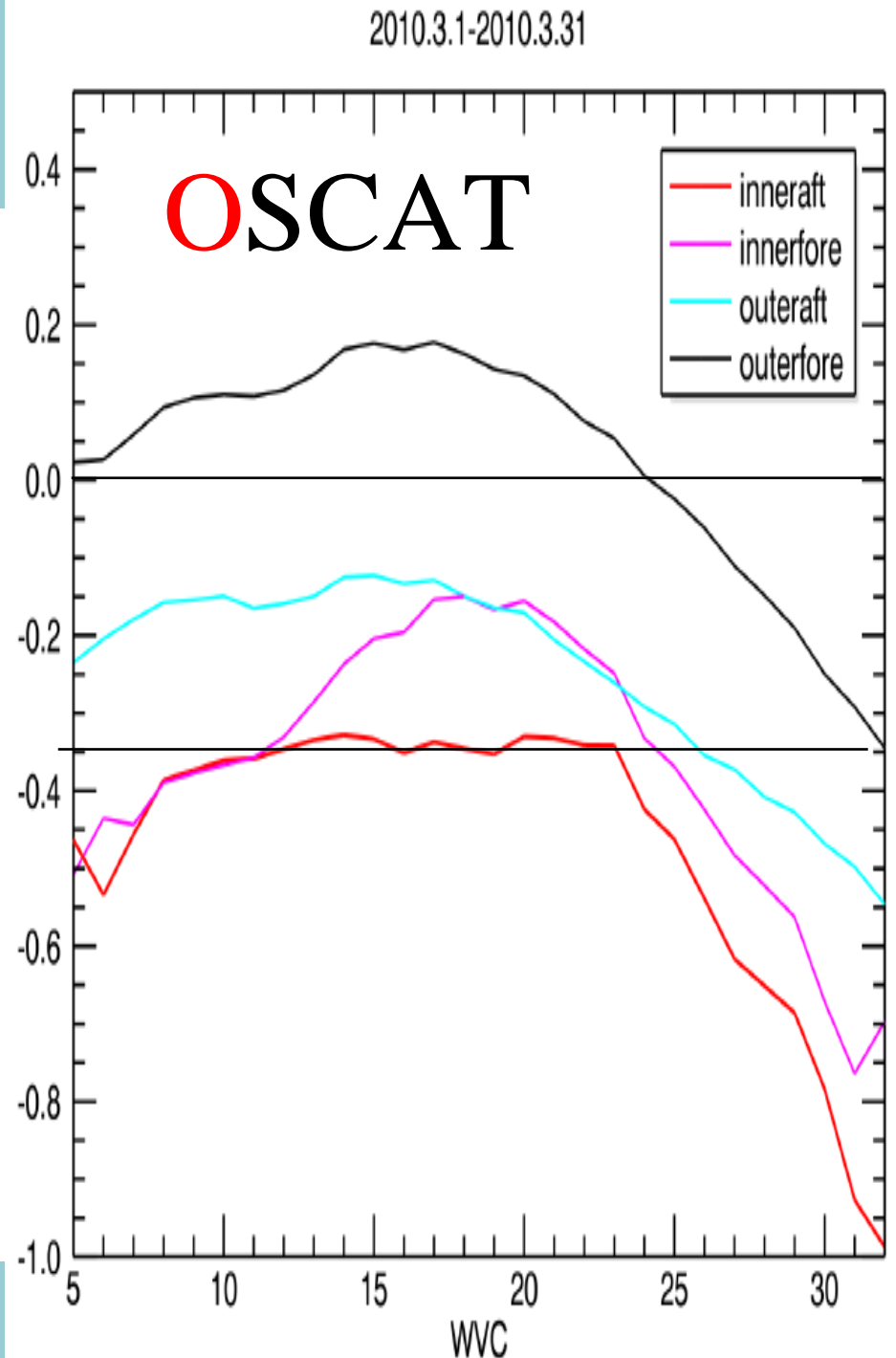
Verspeek et al., 2011



# 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

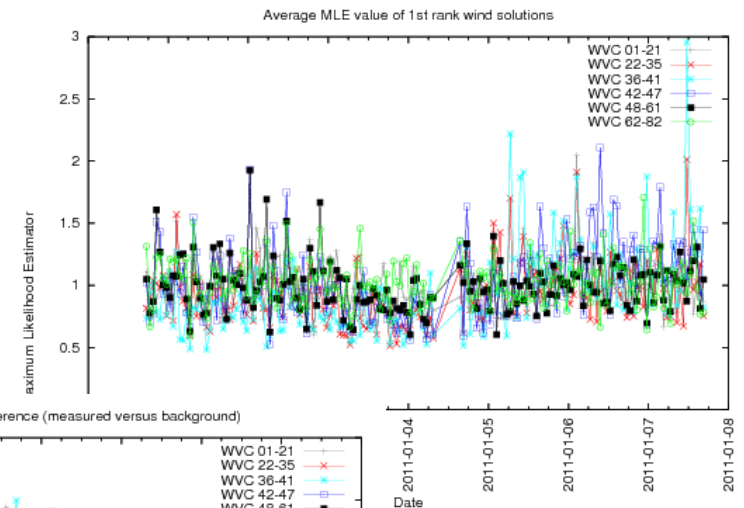
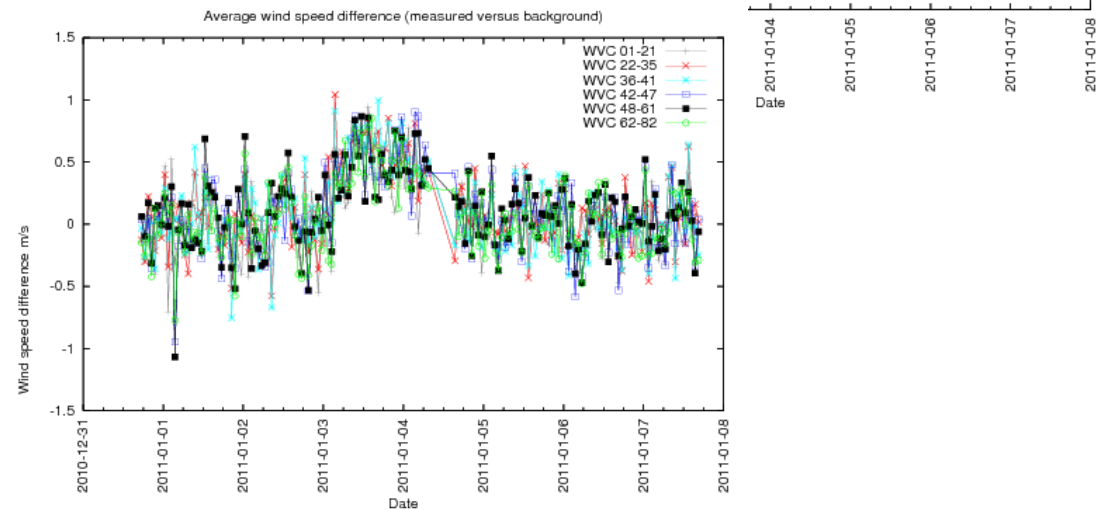
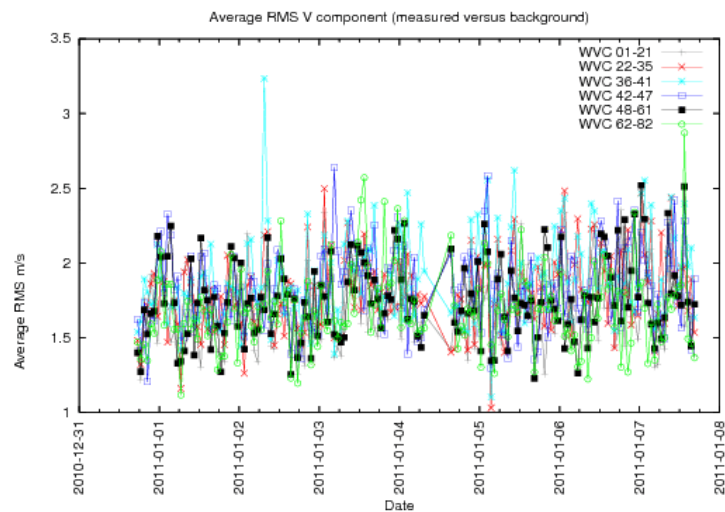






# Monitoring service

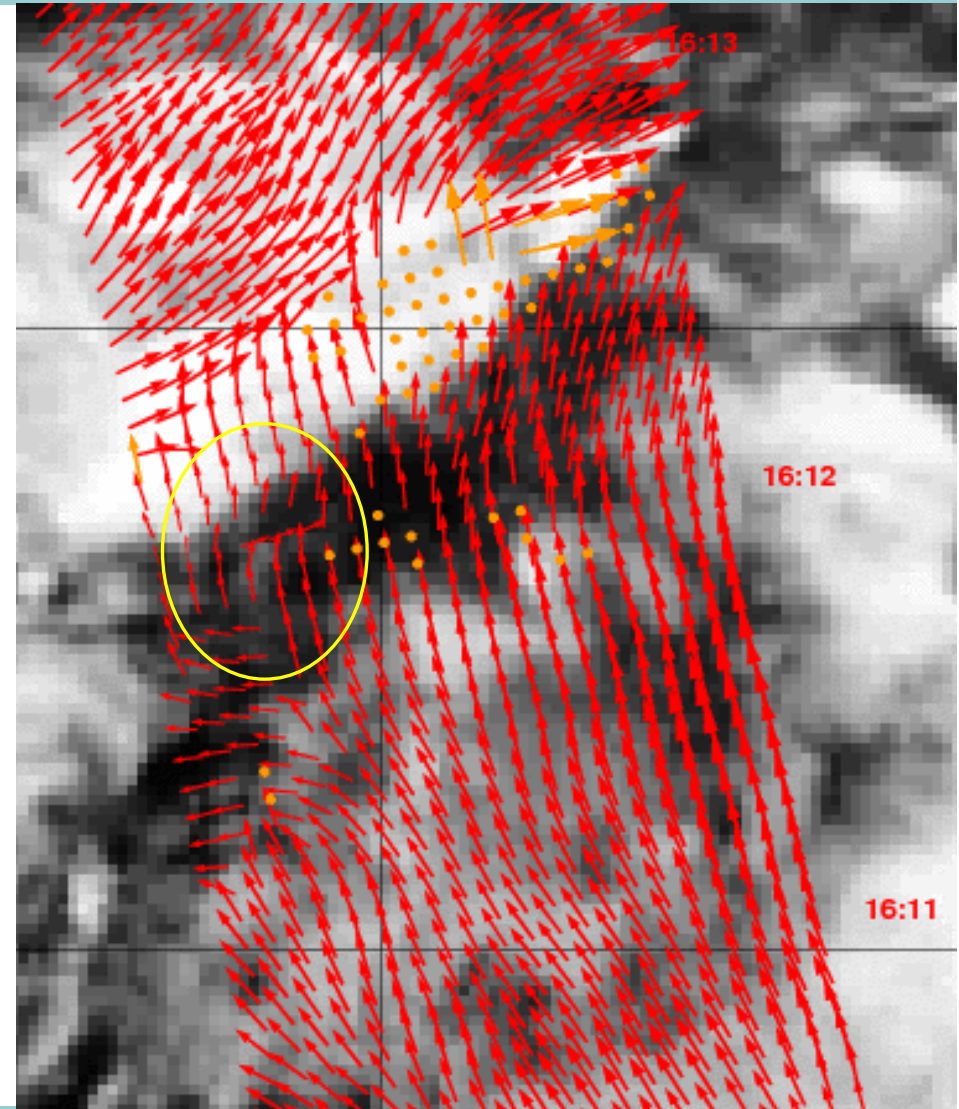
- Monitoring and control: improvement of methods for routine validation
- Buoy verifications
- Quality assurance of the production, see example of ASCAT anomaly





# GMF development

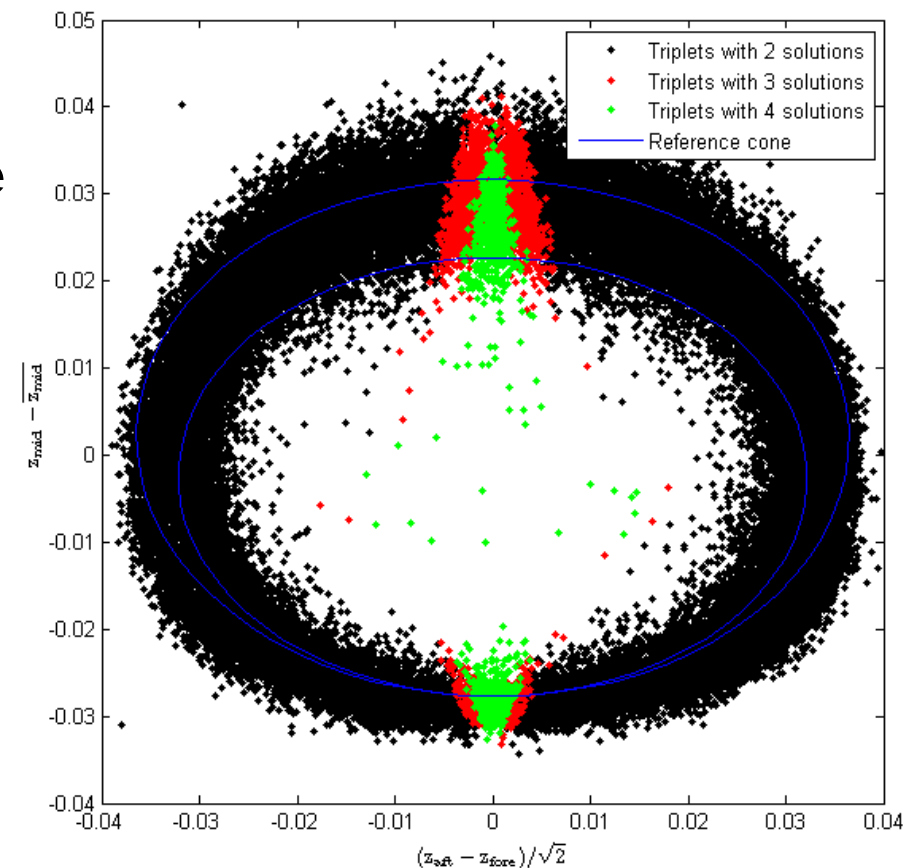
- Improvement of Geophysical Model Functions
- CMOD6 for C-band: better fit around 4 m/s, fix underestimation of wind speed above 15 m/s
- NSCAT3 for Ku-band: fix overestimation of wind speed above 15 m/s
- Cross-polarisation GMF at C-band to support EPS-SG

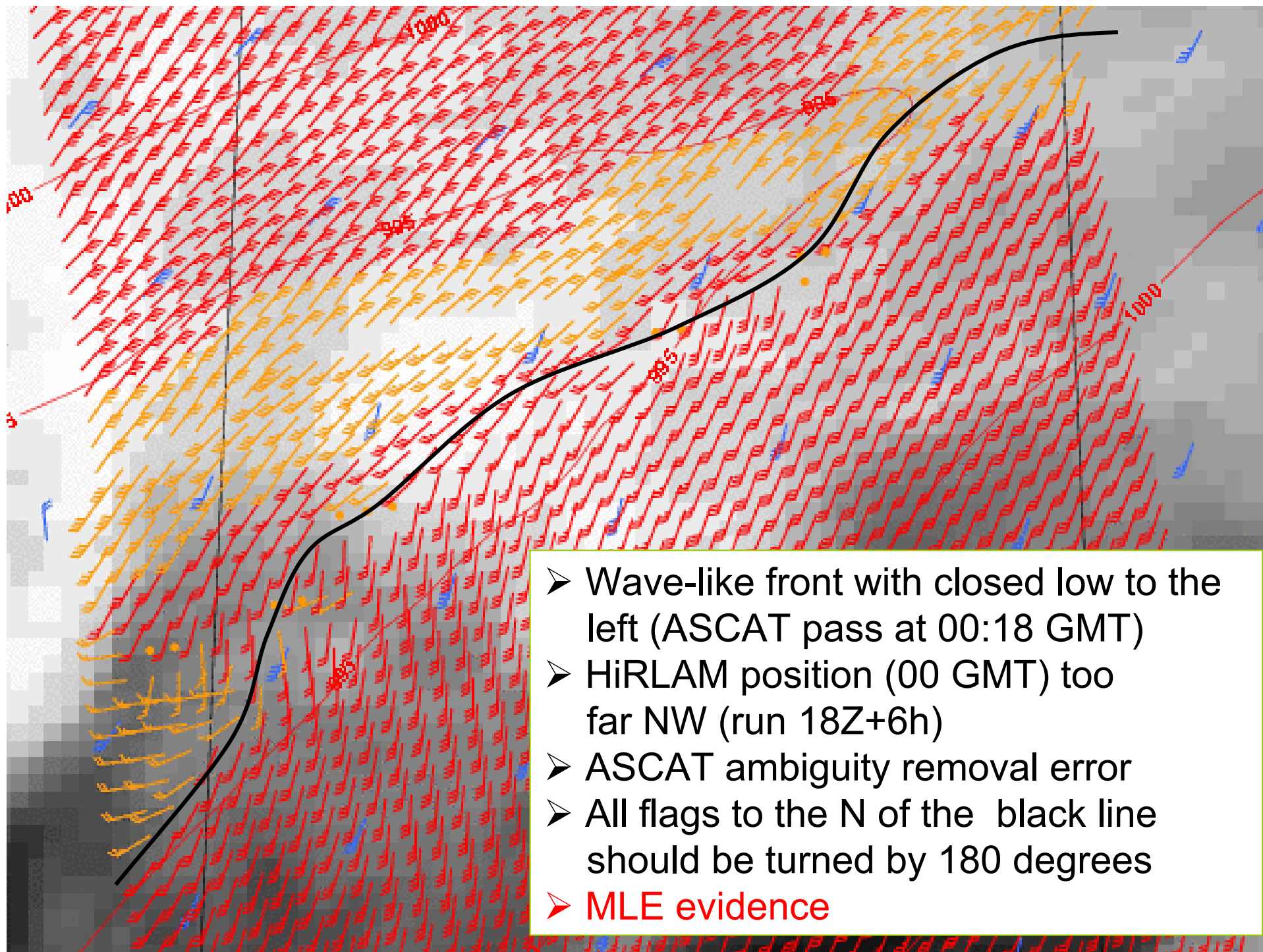




# MLE developments

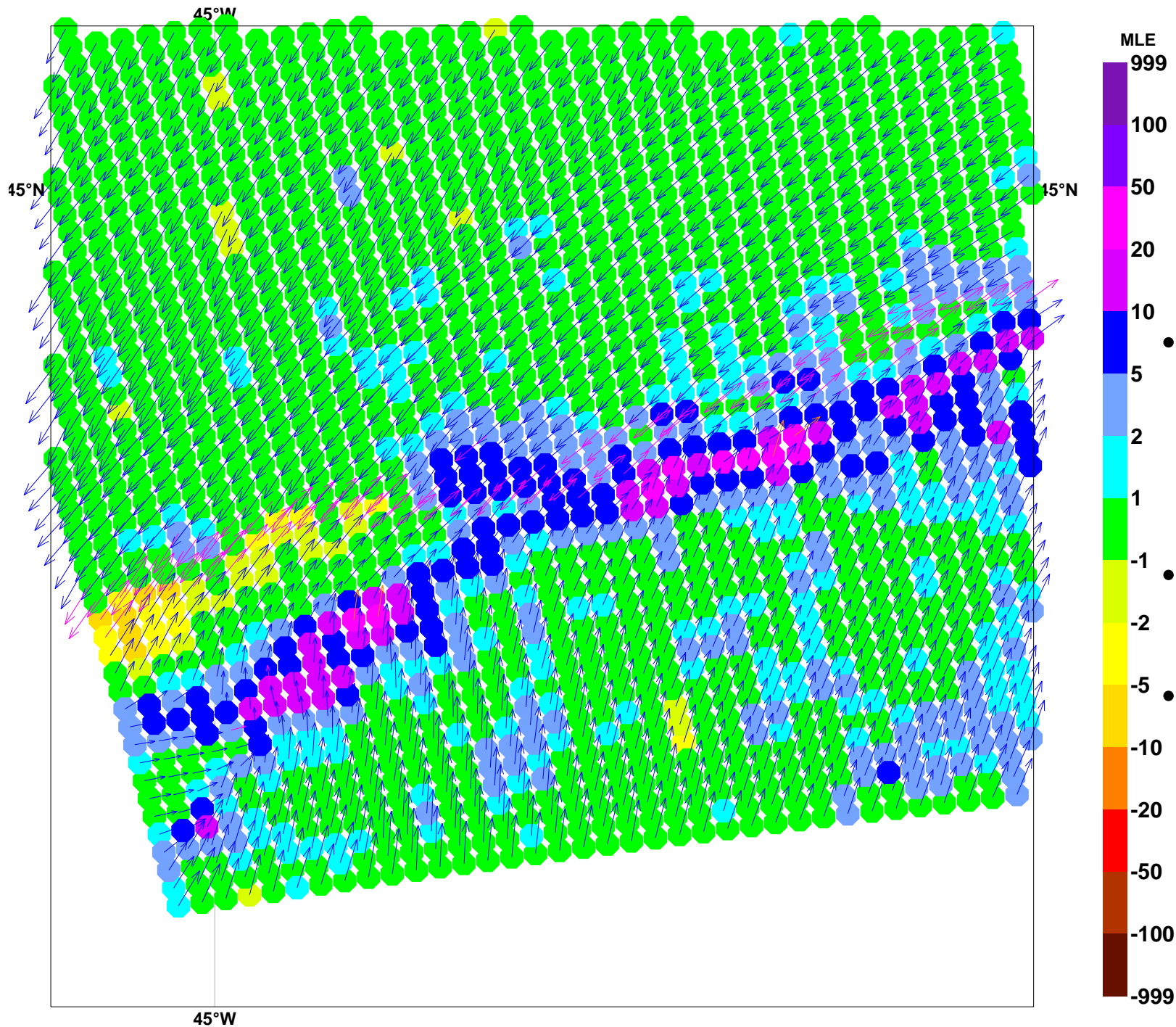
- Cone distance analysis (incl. sign): screening for wind variability and rain, improving Quality Control
- Cooperation with Institut de Ciències del Mar and Unitat de Tecnologia Marina (Spain)
- Location of backscatter data w.r.t. the GMF cone depends on wind variability, ...
- Also important for quality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





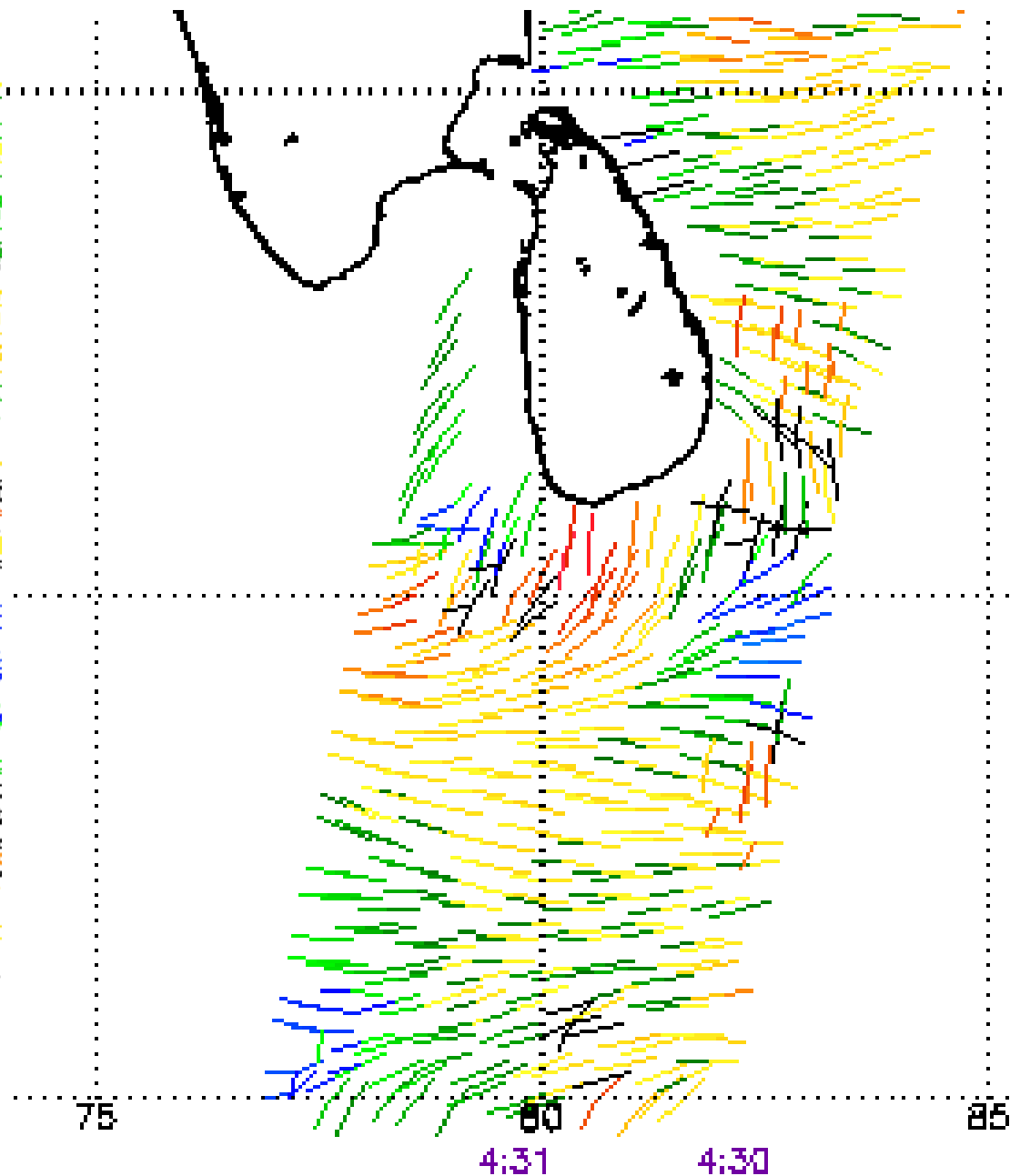
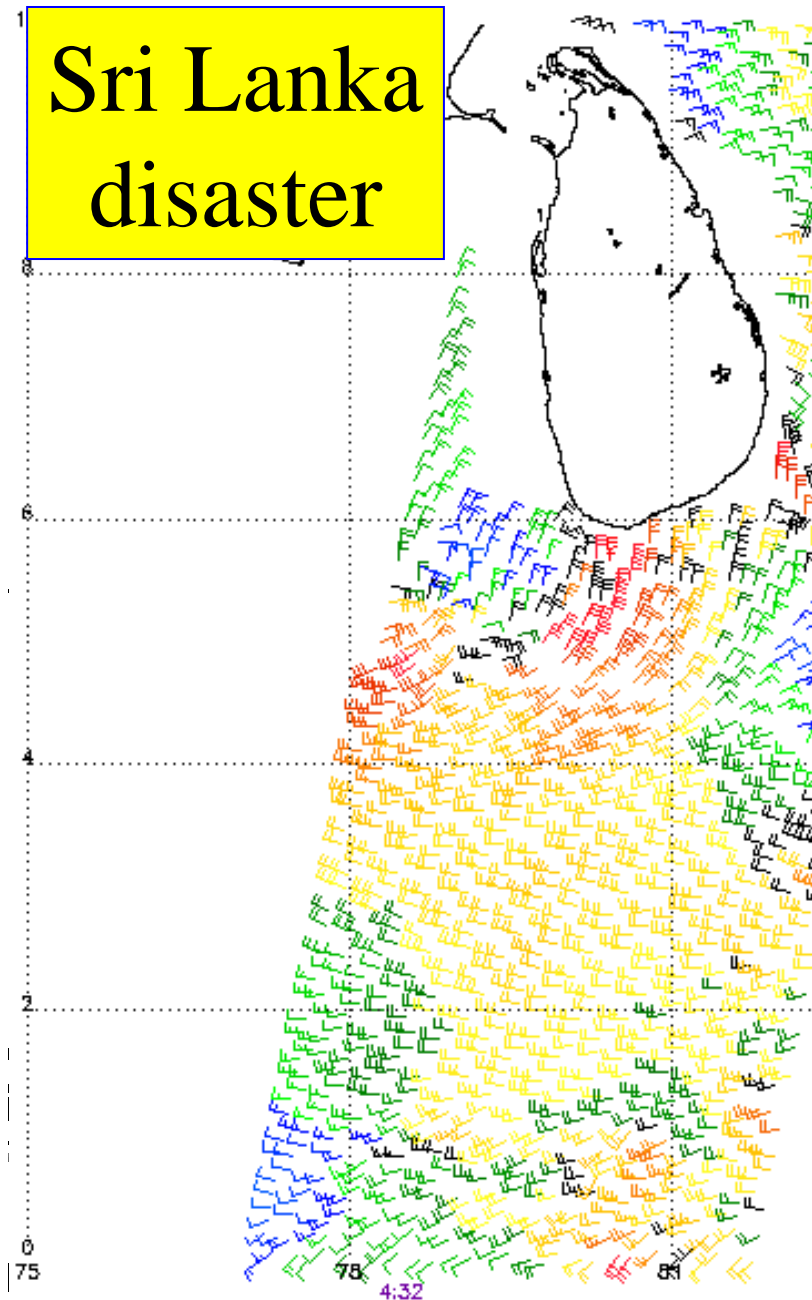
# MLE

- +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



correspond to measurement at 10N

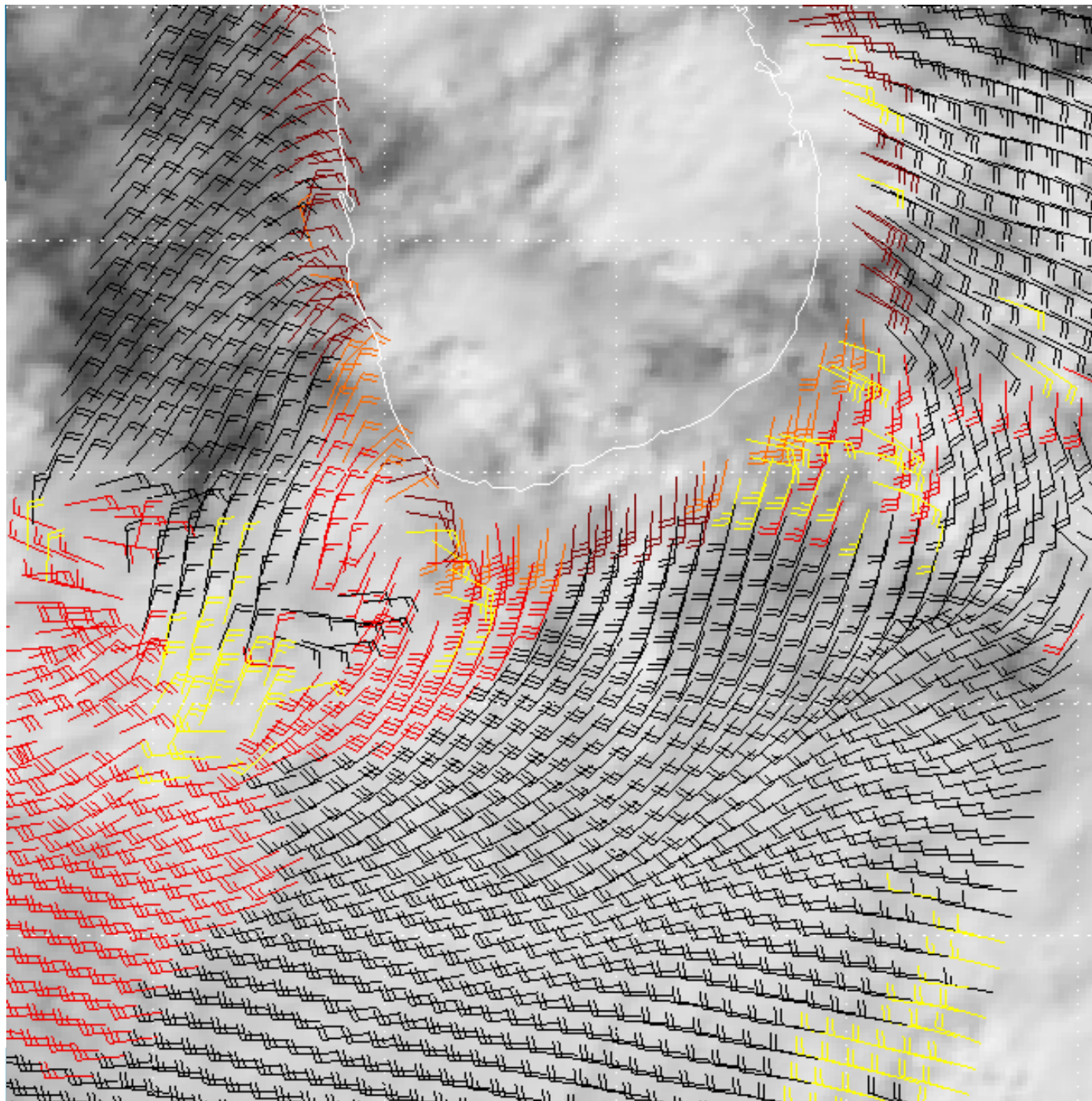
Black circles indicate possible contamination

NOAA/NESDIS/Office of Research

Note: 1) Times are GMT 2) Times along bottom correspond to measurement at 10N  
3) Data buffer is 22 hrs from 20111125 4) Blue

# Sri Lanka disaster

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



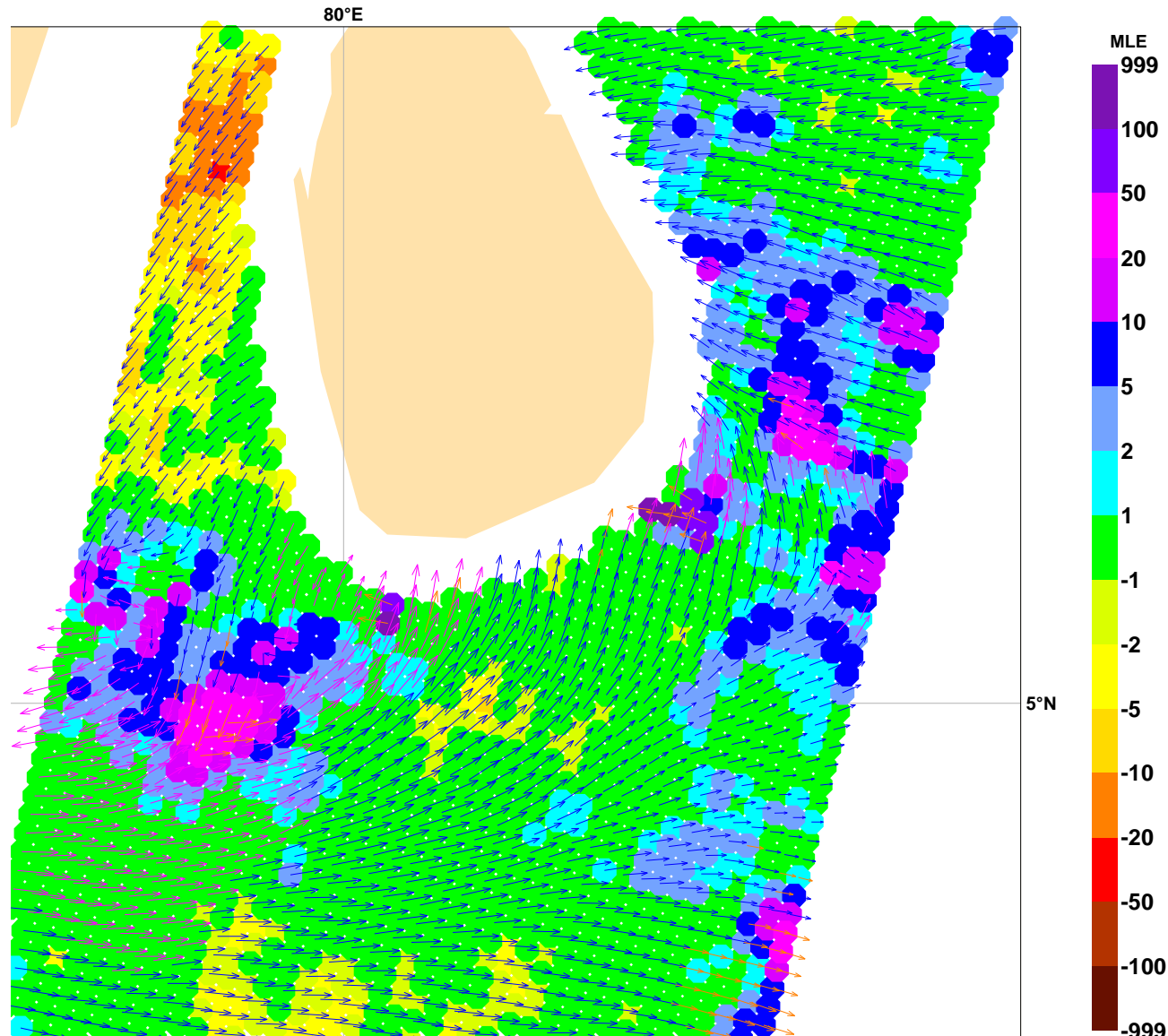
m7 VIS0.75 - 2011-11-25 04:30UTC    ma ASCAT wind - 2011-11-25 03:45UTC







# MLE and ASCAT winds

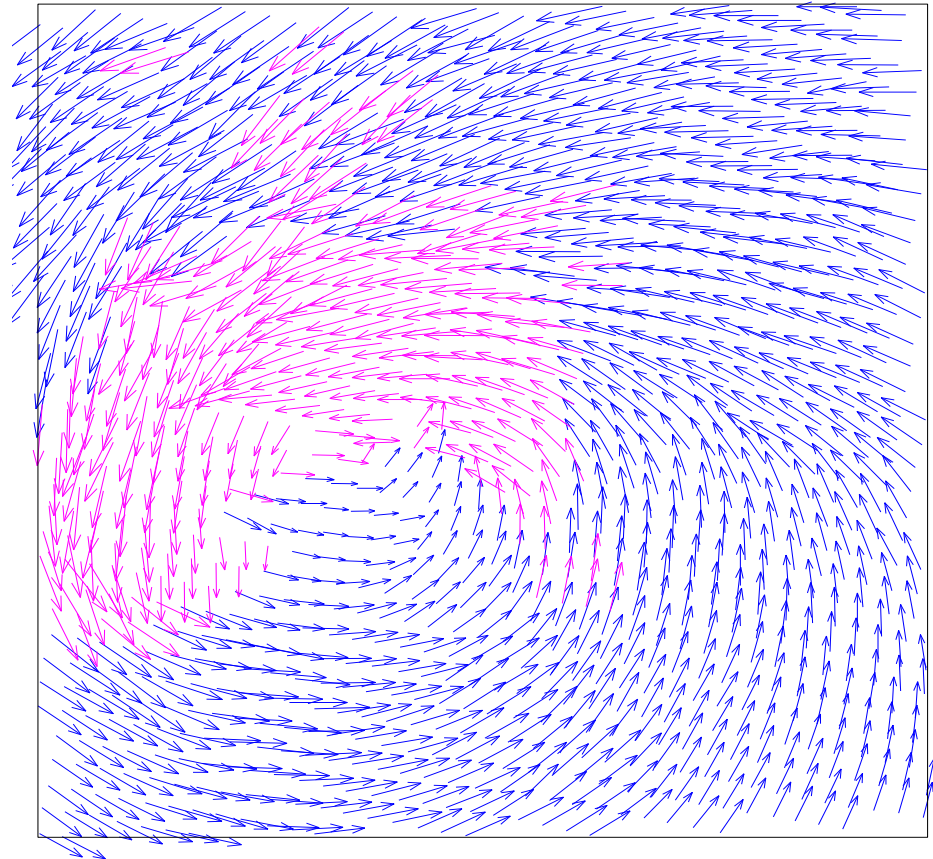
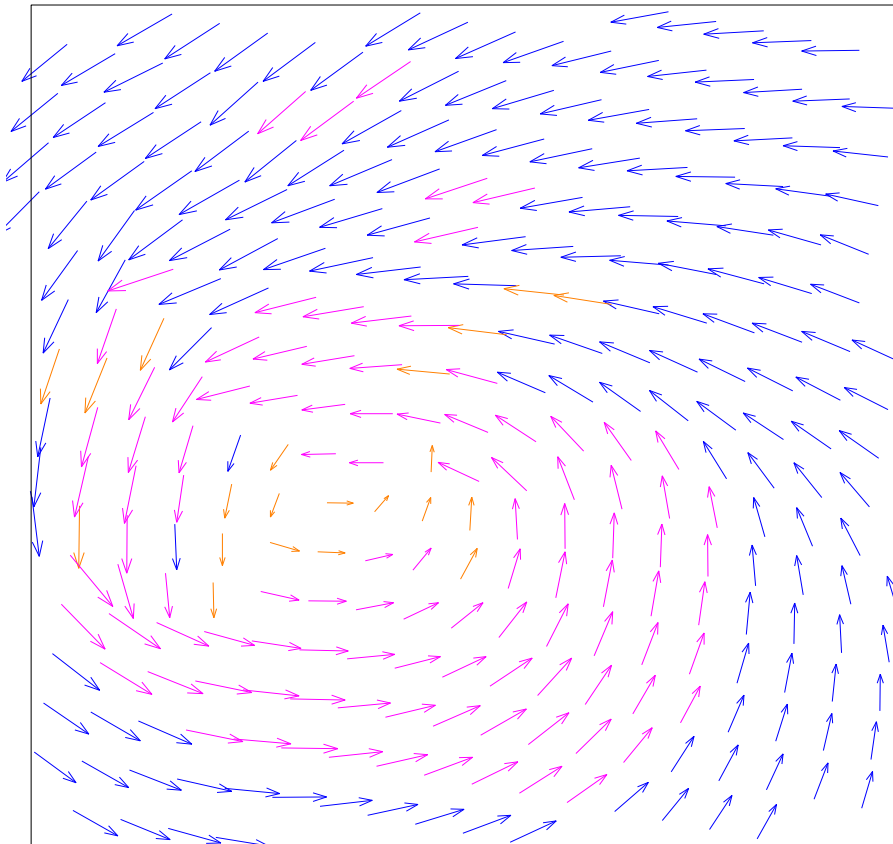


- MLE denotes convection in the low to the SW of Sri Lanka
  - N-ly winds to the N of the low appear correct
  - E-ly winds to the W of the low should be W-ly
- Meteorologists should be trained to use MLE



# 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:

The screenshot displays the MyOcean Interactive Catalogue interface. On the left, a sidebar contains navigation links: SERVICES (Catalogue of services, Register now!, Ask the service desk), PRODUCTS (Access to catalogue, News Flash!, Product improvements, Technical FAQ), NEWS & EVENTS, FOCUS ON, PRODUCT SHOWCASE, EDUCATION (Observation, Modelling, Ocean parameters), and PRESS/EDITION CORNER. The main content area shows the search process: 1. AN AREA (Global Ocean, Arctic Ocean, Baltic Sea, Atlantic-European North West Shelf-Ocean, Atlantic-Iberian Biscay Irish-Ocean, Mediterranean Sea, Black Sea), 2. A PARAMETER (Wind, Biogeochemistry, Currents, Sea ice, Sea level, Temperature, Salinity), and 3. A PRODUCT TYPE (Observation, Analysis and Forecast). A red arrow points from the 'Wind' parameter selection to a detailed product page. The product page shows the title 'WIND-GLO-WIND-L3-NRT-OBSERVATIONS-012-002' and 'GLOBAL OCEAN DAILY GRIDDED SEA SURFACE WINDS FROM SCATTEROMETER'. It includes a description: 'The product contains daily gridded sea surface wind observations from the ASCAT scatterometer on board METOP-A with two resolutions, i.e. 0.25 degrees based on 25 km scatterometer observations, and 0.125 degrees based on 12.5 km scatterometer observations. Data from ascending and descending passes are gridded separately.' Below the description are links for 'INFO' and 'DATA ACCESS'. A globe image is visible in the bottom right corner of the product page.

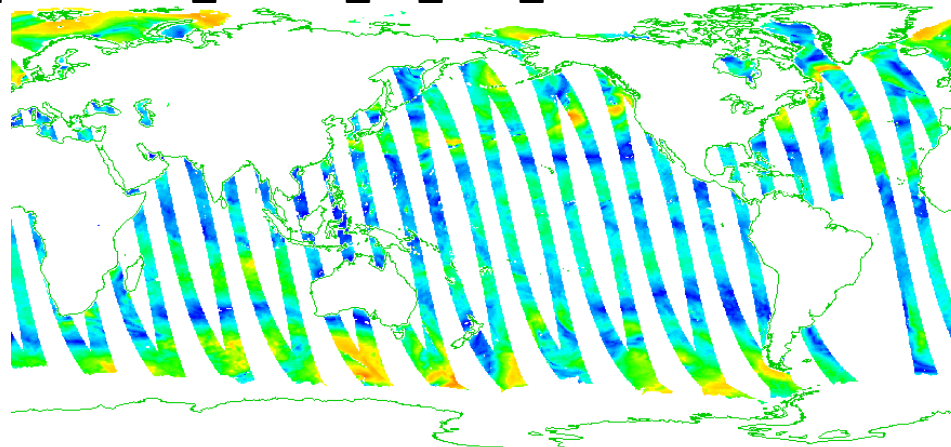
Poster by Tilly Driesenaar





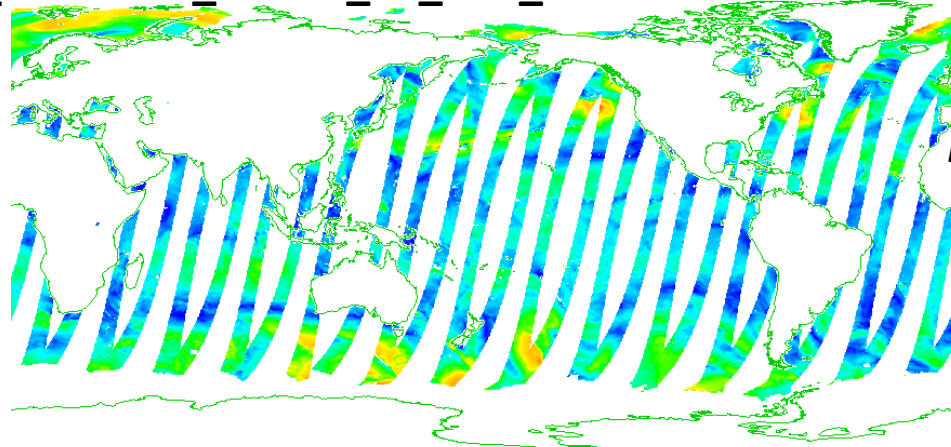
# L3 Wind product example

GLO-WIND\_L3-OBS\_METOP-A\_ASCAT\_25\_ASC\_20110910.nc



*Ascending passes*

GLO-WIND\_L3-OBS\_METOP-A\_ASCAT\_25\_DESC\_20110910.nc



*Descending passes*

Poster by Tilly Driesenaar





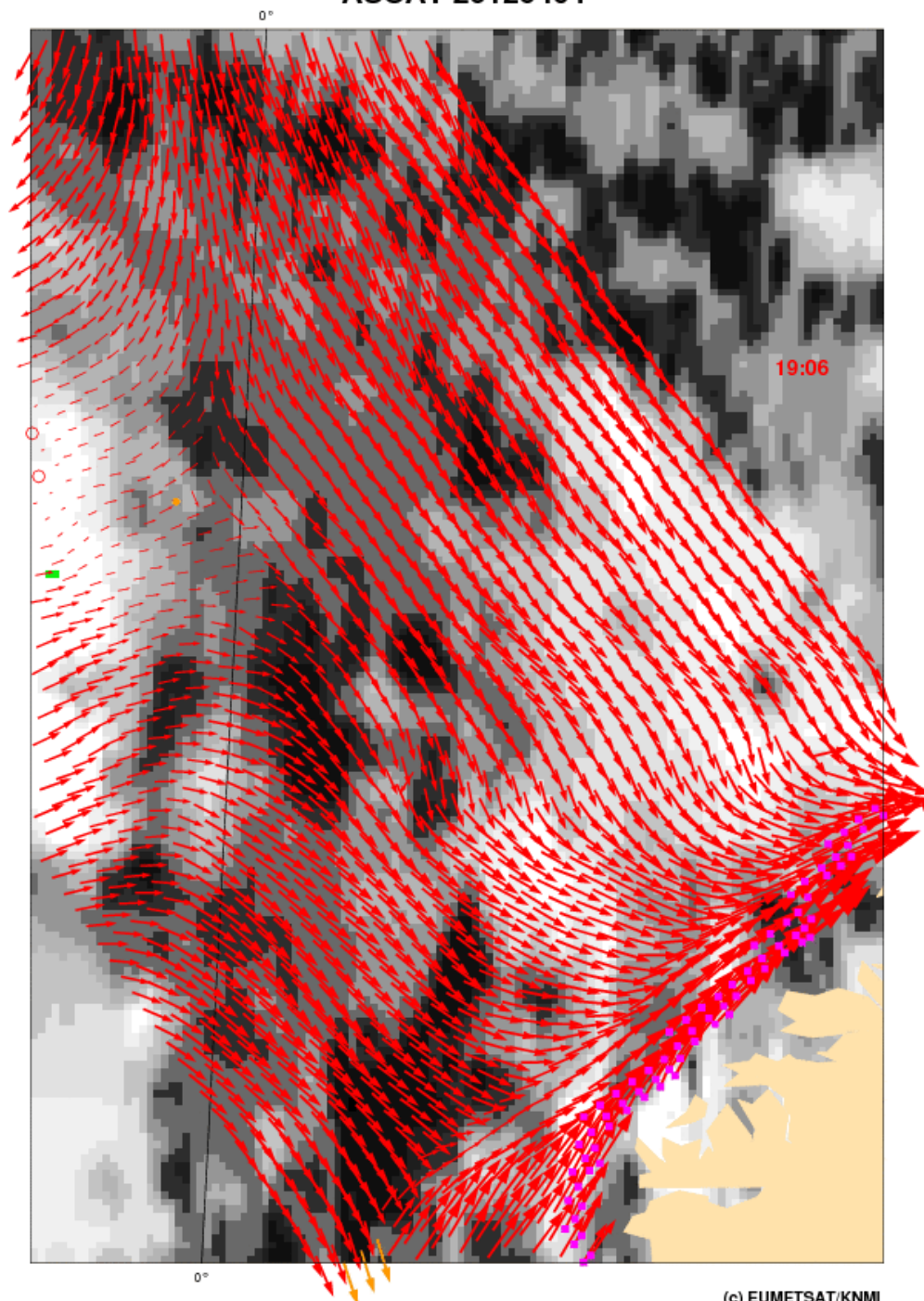
# MetOp-A & B

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



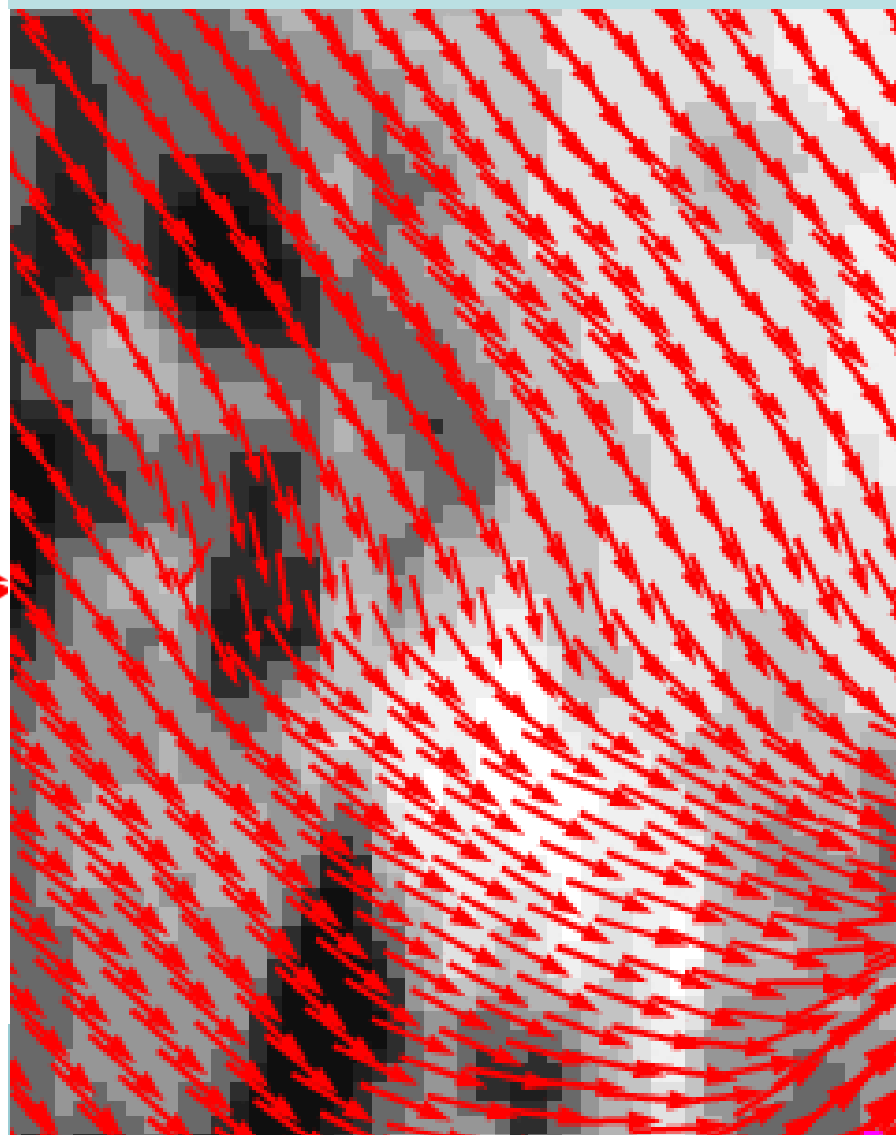


ASCAT 20120404

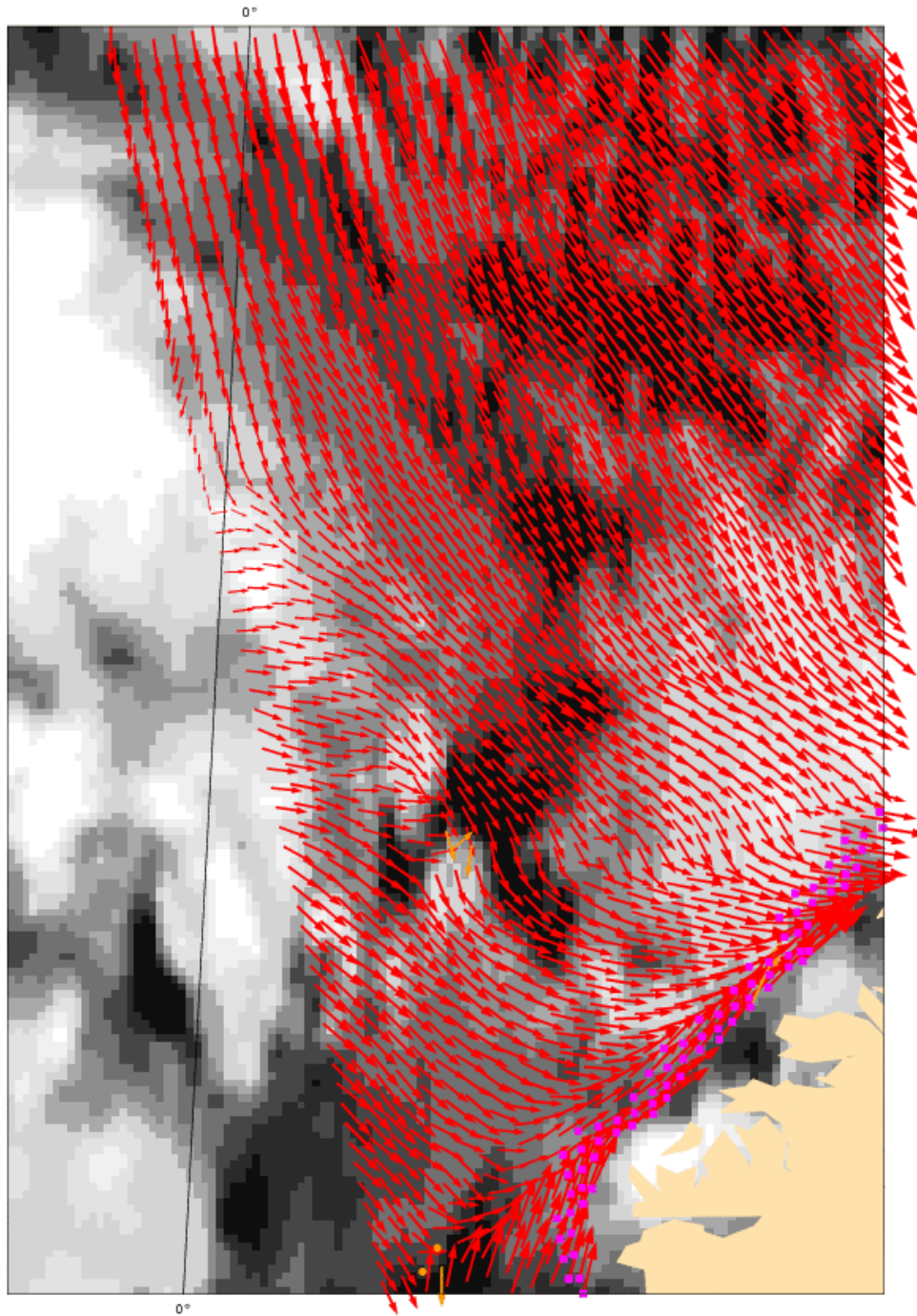


(c) EUMETSAT/KNMI

# Left swath

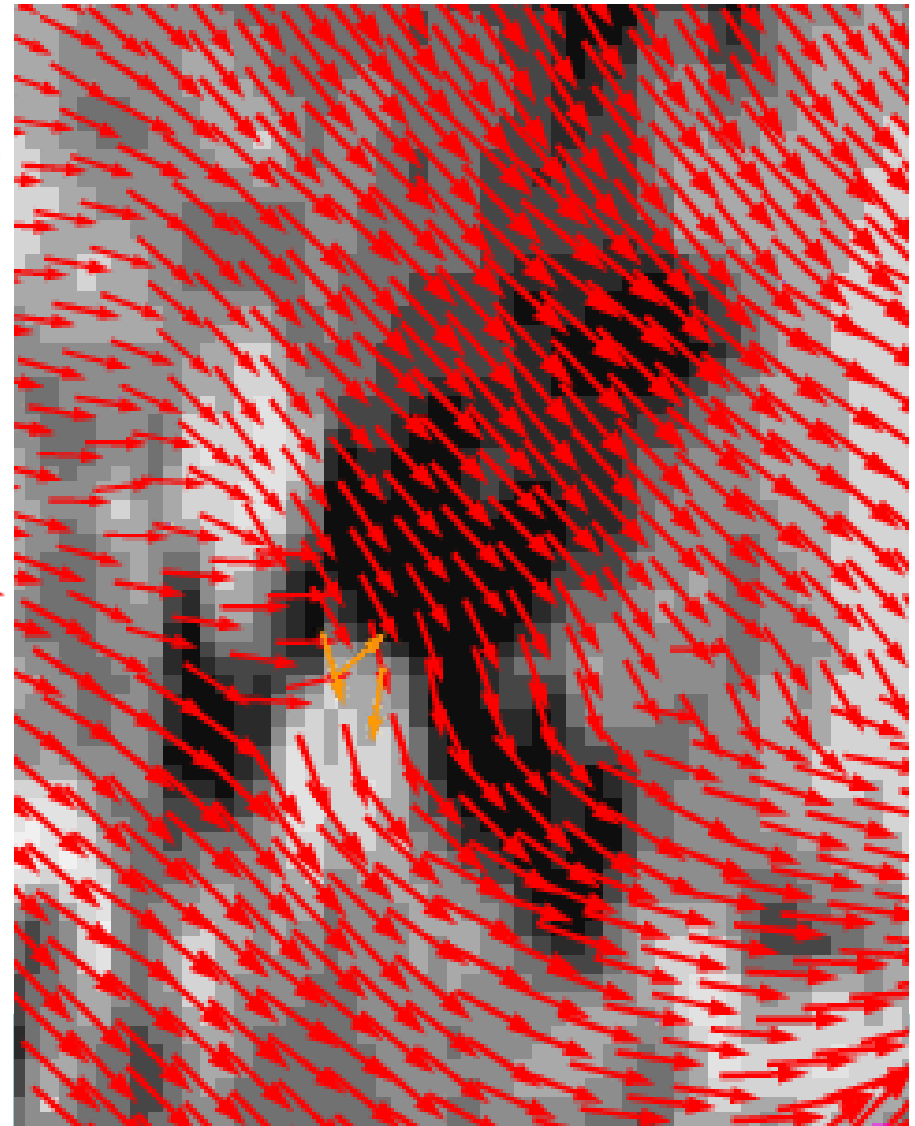


ASCAT 20120404



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# Wind tendency









*Thank you !*

