Current Status of the Eumetsat Operational and Future AMV Extraction Facilities

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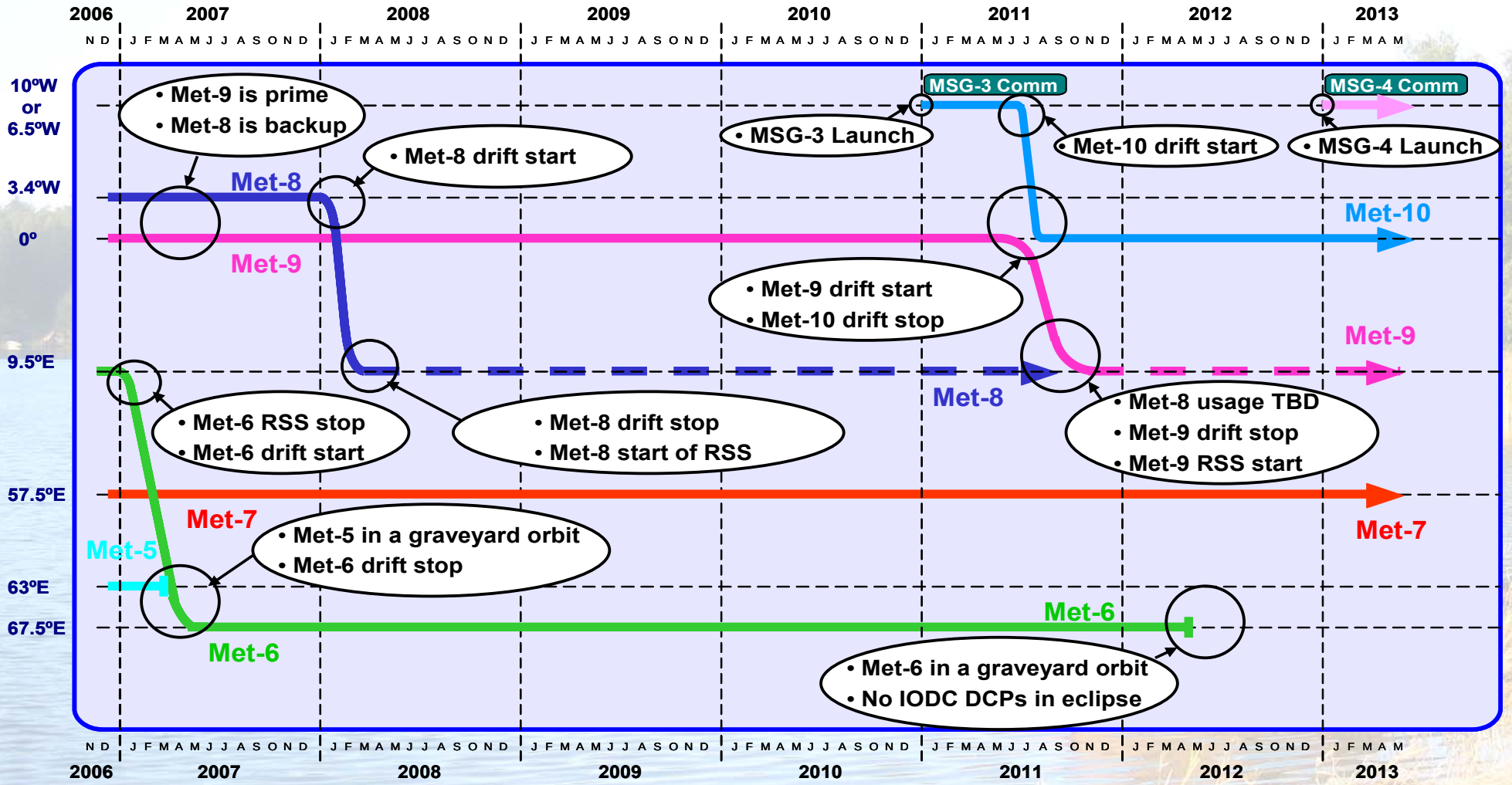
Introduction

- The EUMETSAT Geostationary satellite Status
- MPEF AMV Changes since last meeting
- Upcoming Highlights
  - Change in radiance definition for MSG-satellites
  - Start of rapid scanning with MSG-satellites
- Outlook

The satellite configuration



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Changes since last IWWS

- 13 February 2007 Meteosat-7 takes over IODC
  - **with improved calibration**
- 11 April 2007 Meteosat-9 (MSG-2) becomes prime
- 22 March 2007 Increased processing area
- 4 September 2006 introduction of RFF
  - **no change in operational product, but re-adjusted height disseminated + additional quality info**
  - **+minor modifications to HA, removal of low illumination vis AMVs**
- Improvements in clouds and scenes analysis throughout the period
  - **CRM, Sunglint, thresholds, etc**

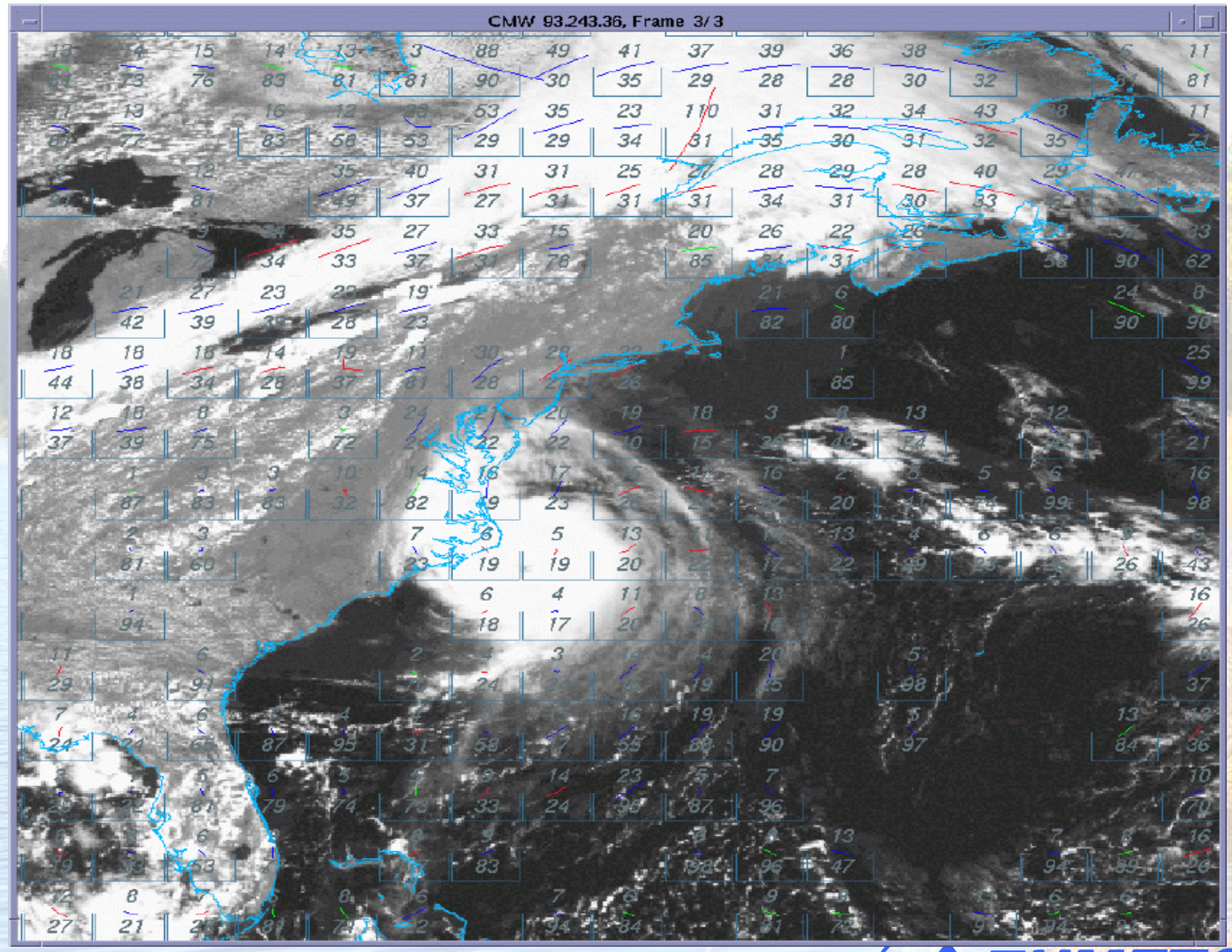
AMV change 22 March 2007

- Dynamic Clustering with low-level scenes merging instead of layering
- Selection of scene with coldest EBBT
- AMV located at point of maximum local SD instead of max difference
- Enhancement of CO2 method in temperature inversion areas.
- STC and IR/WV heights used for a narrow selection of AMVs (all channels)
- Cloud Base Height assignmen corrects now downwards only
- Inversion Height Correction corrects now downwards only
- Inversion Height Correction disabled for 6.2 and 7.3 AMVs
- Modified Final AMV averaging.
- Impact:
- A general increase in AMV pressure, small for high levels, bigger for low levels. An increased number of High-QI AMVs for high levels (all channels) and at low levels (IR 10.8, VIS 0.8 and HRV), together with a reduced numbers of outliers at medium levels

And then there was three…

- Locations of Meteosat-3
- In addition to 0-degree primary mission
- August 1991 – February 1993 (ADC)
- August 1993 – May 1995 (XADC)

AMV Example ADC Mission



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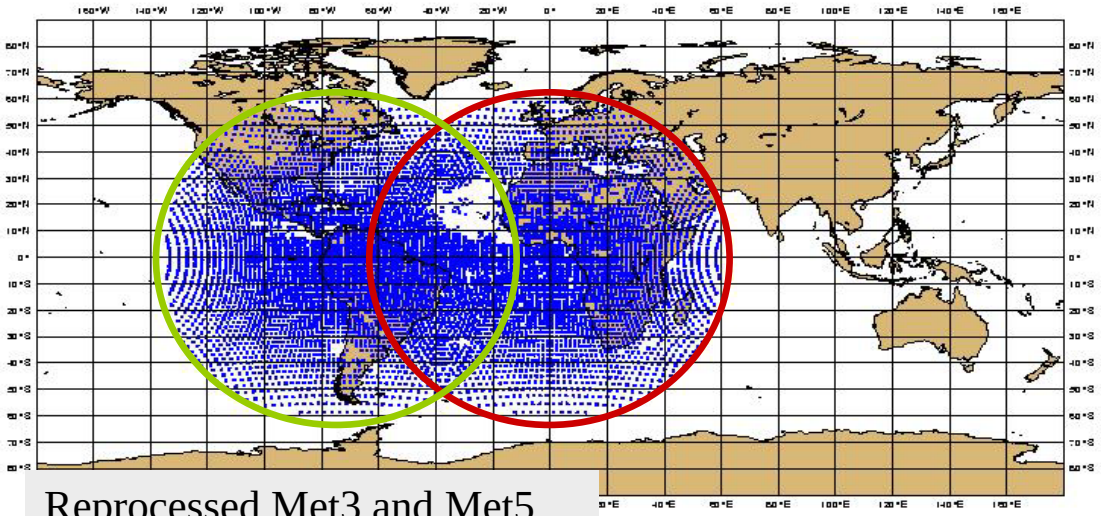
AMV monitoring and impact study II: XADC period

Interim IFS configuration: CY31R2 T255 (T159) L60 (4DVAR 12hr window)

Data: reprocessed Meteosat-5 (0º) and Meteosat-3 (75º W) for 3 months: 1st Jan to 31st Mar 1995

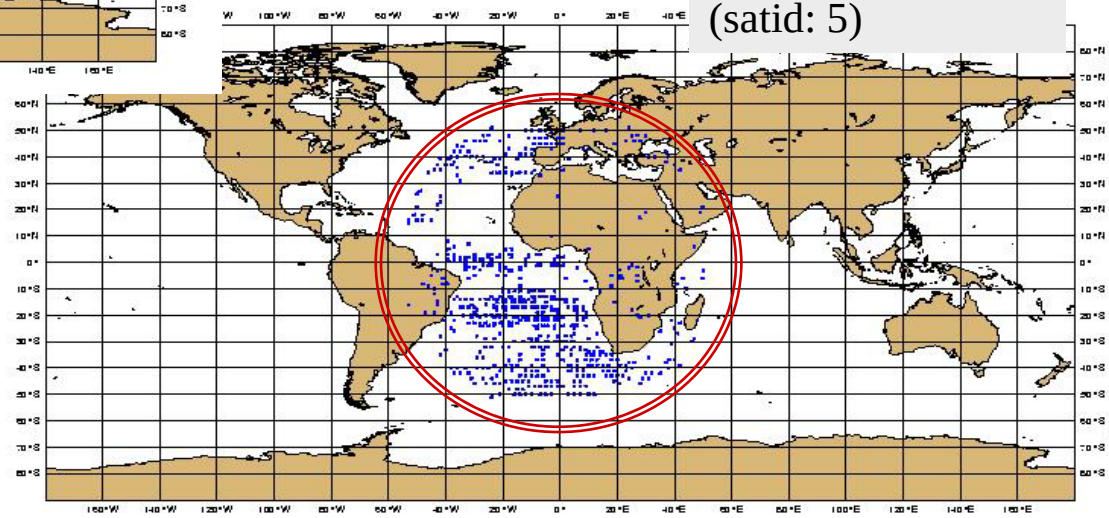
QC: The data and experimental set-up followed closely that for the 1989 experiment. Both satellites – same QI



Reprocessed Met3 and Met5 (satid: 50 and 52)

For more info see Delsol, ECMWF !

Original Met5 (satid: 5)



Example of coverage: 19950102

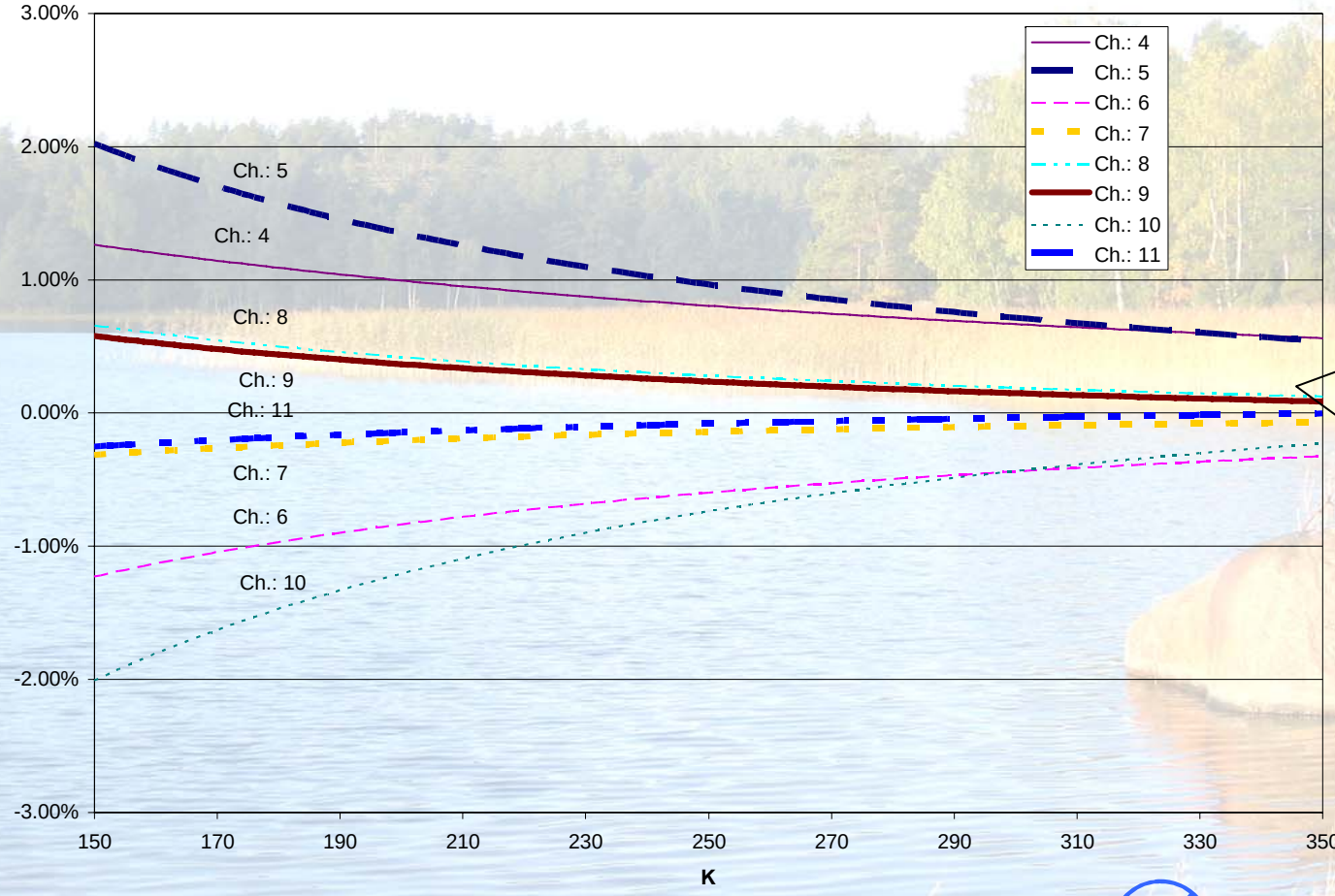
MSG radiance definition

Change From "Spectral Blackbody" to "Effective" Radiance

$$L^{15} = B_\nu(EBBT) \quad \Rightarrow \quad L^{15} = \frac{\int B_\nu r_\nu d\nu}{\int r_\nu d\nu}$$

- This will clear the discrepancy between the current Level 1.5 product definition and the user expectation (i.e. effective radiance)

Effective Radiance From Meteosat 8 – Meteosat 9 versus Temperature for an Idealised Blackbody Scene



Please note that this figure gives no physical information, just the numerical difference.

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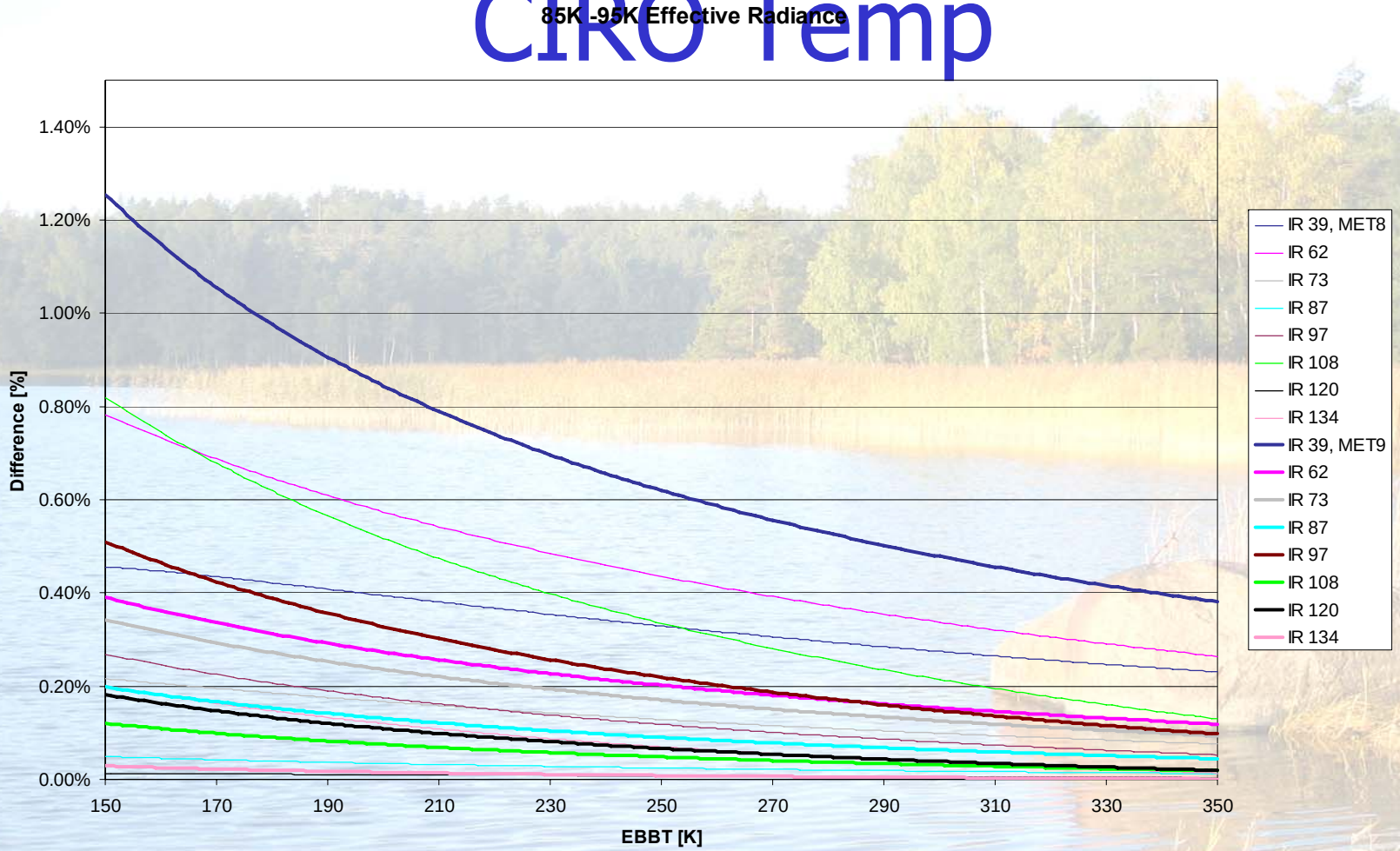
Change of Effective Radiance with CIRO Temp



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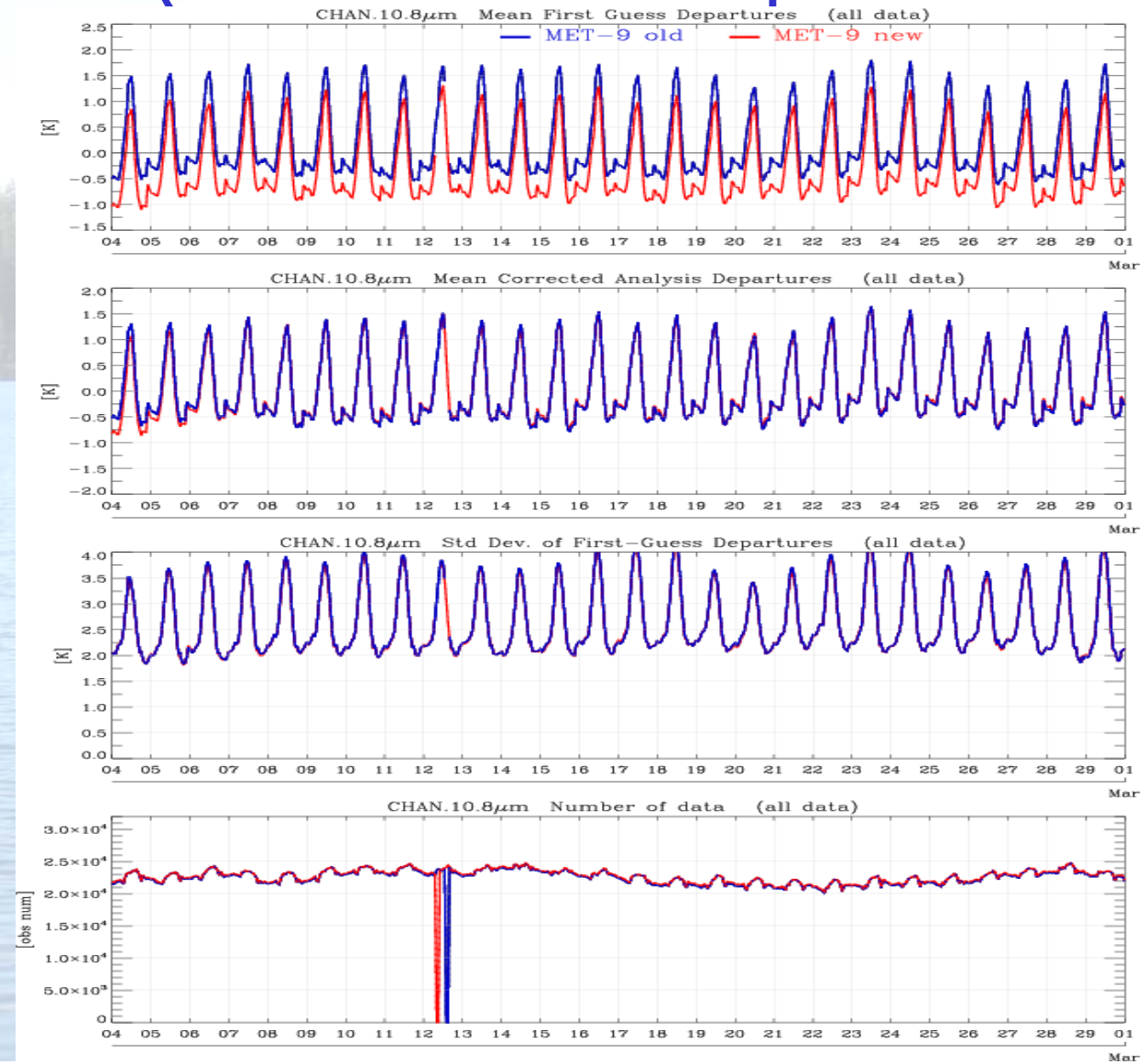
Impact on data and products

- Image Data Changes
  - **Channel 3.9 µm: Warmer with about 0.4 K**
  - **Channel 6.2 µm: Warmer with about 0.5 K**
  - **Channel 10.8 µm: Colder with about 0.5 K**
- Cloud Detection Modifications
- Main Product Impacted:
  - **Cloud Analysis**
  - **Clear Sky Radiance**
  - **Calibration Monitoring**
  - **Tropospheric Humidity**
  - **Active Fire Monitoring**

Clear Sky Radiance Product Impact
(IR Channel 10.8 µm First Guess Departures)



Old Definition

New Definition

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Calibration Monitoring

(Bias in radiance and brightness temperature due to change in radiance definition scheme)

Channel	Wavelength	Radiance change [%]	EBBT change [K]
4	3.9	1.71880	0.40
5	6.2	2.10557	0.54
6	7.3	0.34882	0.12
7	8.7	0.20165	0.10
8	9.7	0.03993	0.02
9	10.8	-0.78618	-0.50
10	12.0	-0.37752	-0.26
11	13.4	-0.32365	-0.21

Conclusion: Consistent with CSR Results

Upper-level Divergence

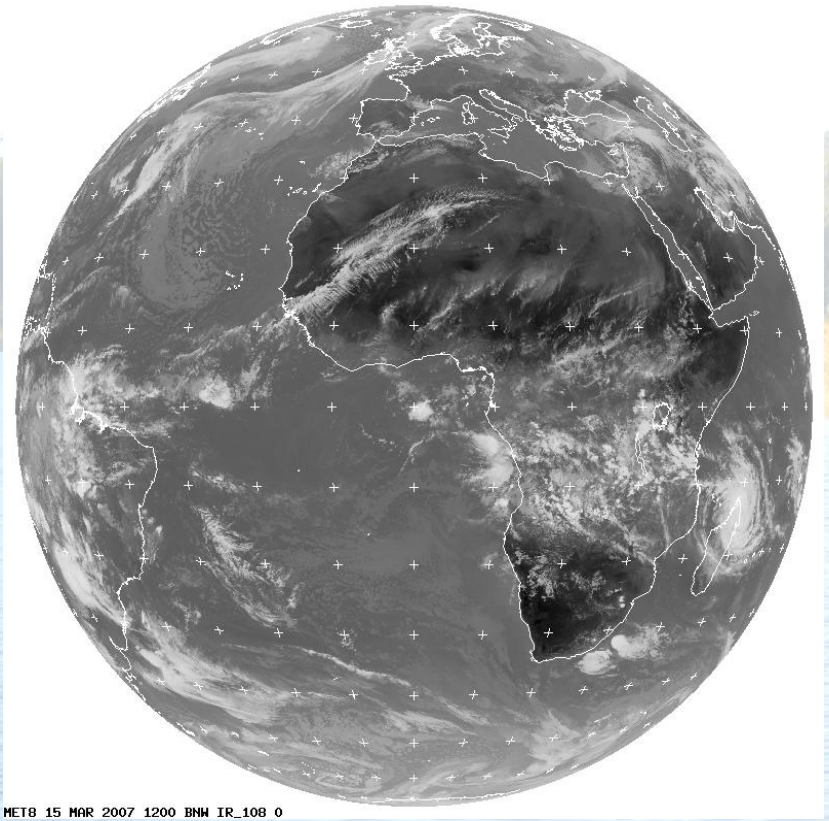
- Derived from WV-6.2 (channel 5) winds
- One product per hour
- BUFR encoded
- QI threshold = 0.30
- Atmospheric layer: 100 – 400 hPa

Rapid scanning

- Start 15 May 2008
- European coverage
- 5-min imagery
- AMVs based on 4 images
- Dissemination in real-time

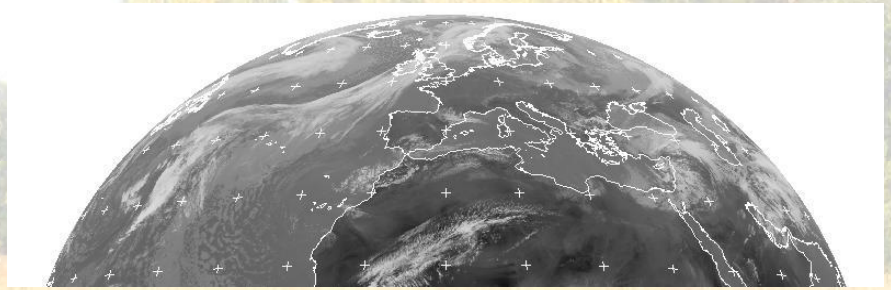
With MSG we can scan in 15 minutes either:

The full disc

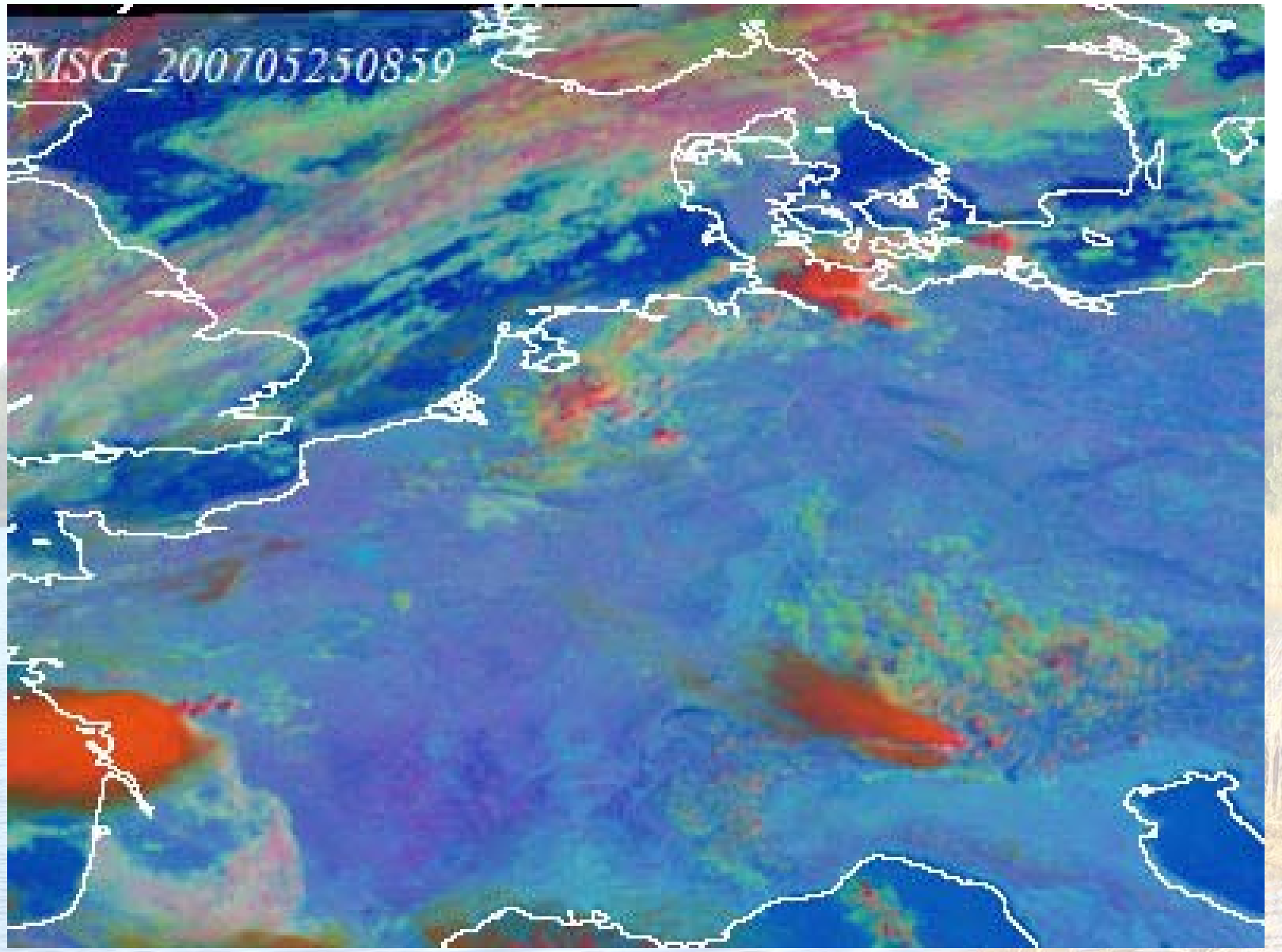


15 minute scan of the full Earth disc

The same reduced area several times



3 x 5 minute scan of the top 1/3 of the Earth



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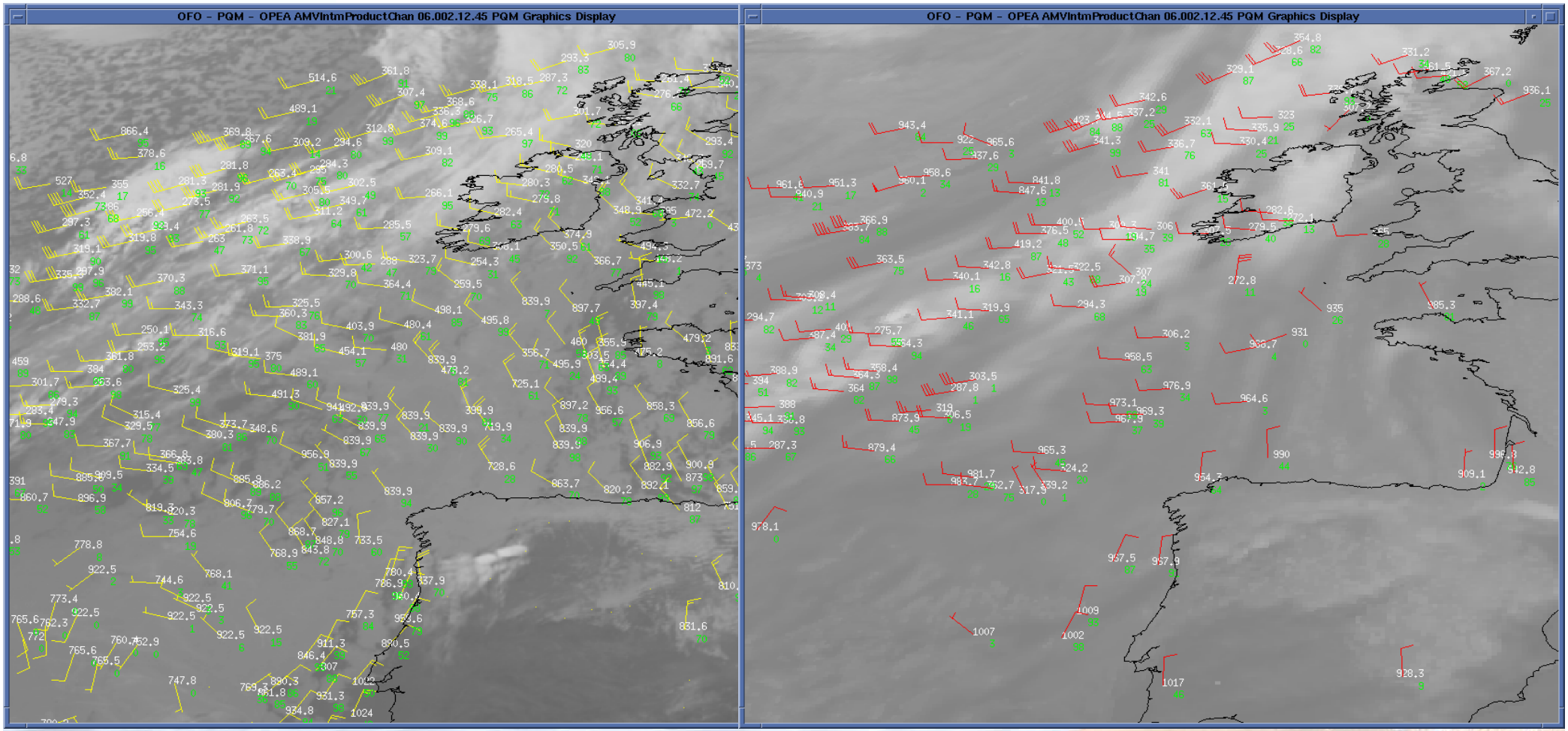
Tracking simulated data



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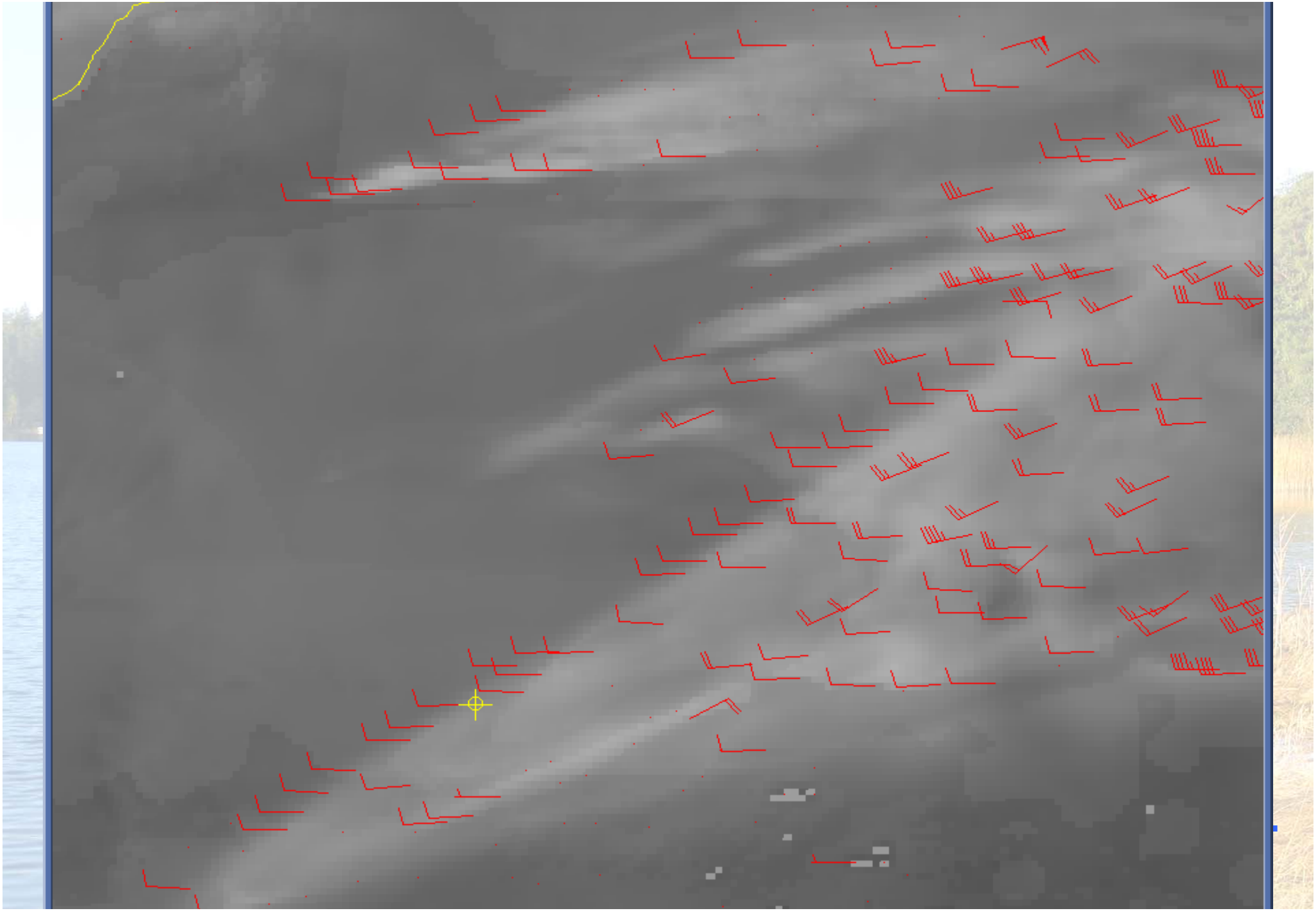

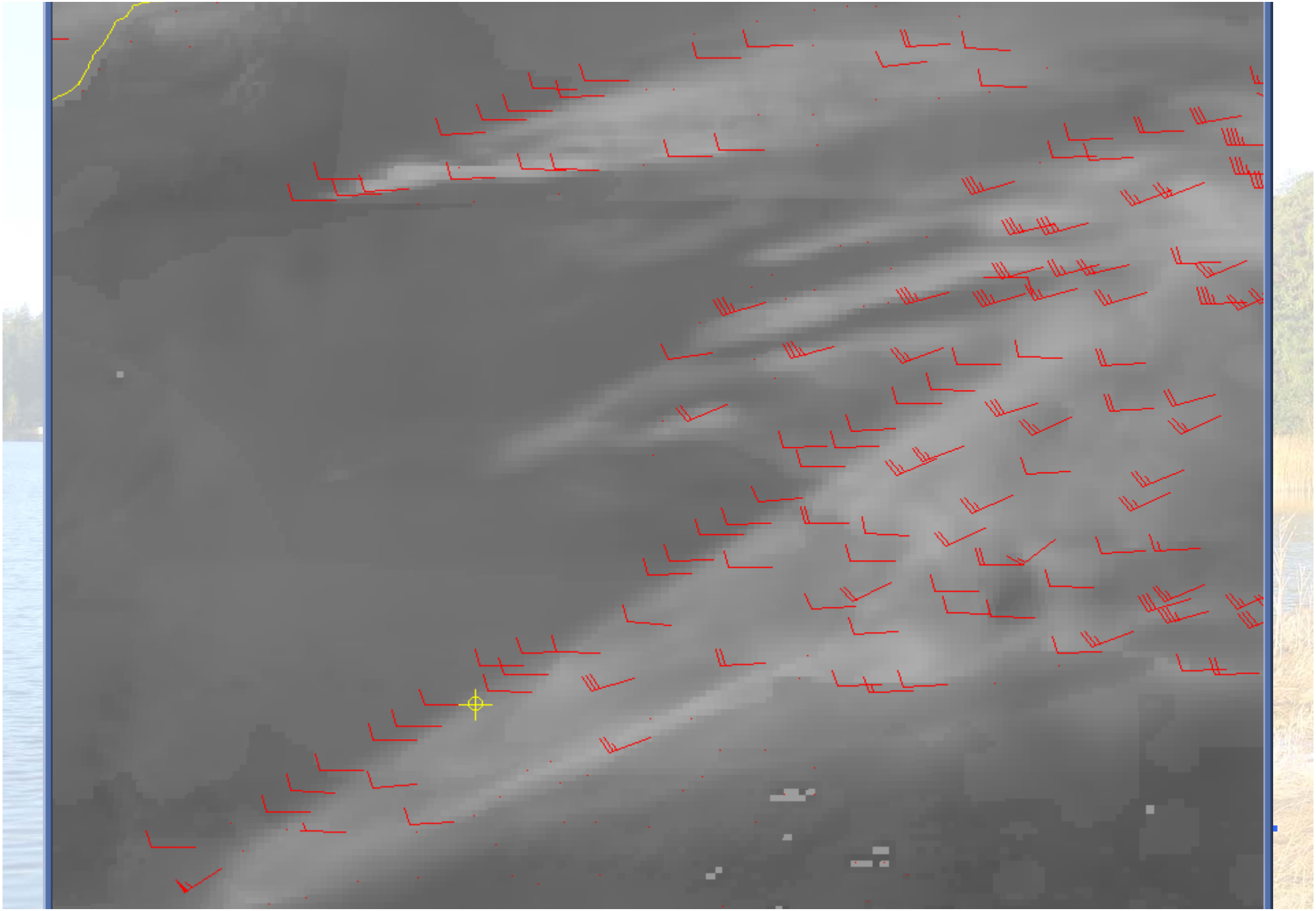

Outlook

- Further improvements (e.g see Borde)
- Introduction of RTTOV-9 as baseline RTM
- Introduction of Polar winds (see Dew)
- Coastal winds with ASCAT