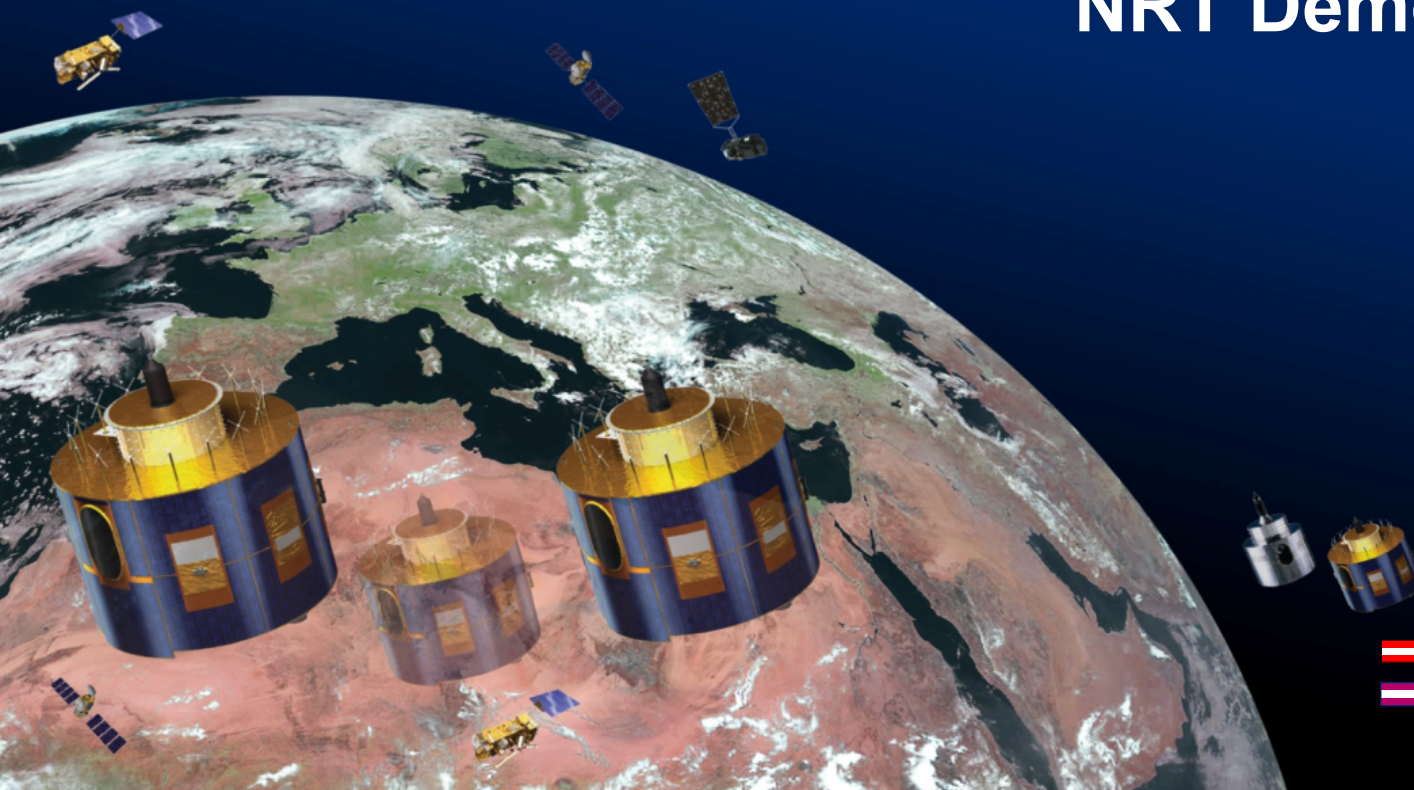


NRT Demo Expert Meeting

Stephen Tjemkes



Overview

- NRT Demo Project
 - Background
- Expert Meeting
 - Outcome and Recommendations
- Way forward

NRT Demo Project: Background

- **Outreach** to potential user community of hyperspectral level 2 products
 - Regular products: direct use by forecasters
 - Innovative product (scaled projected state): assimilation in NWP (regional and global)
- **Evaluation** of product quality and completeness by representatives of user community

Example: Outreach and Validation

Message from M.Koutek, KNMI (received 8 Oct 2017)

Wij hebben hier gekeken o.a. naar de diff-velden om te zien wat de retrieval anders heeft dan de apriori data. Toen we dat met onze meteorologen (met name Frans) hebben bekeken zagen we in de ochtend data onstabiele temp-profielen op hoogte met soms (onverwacht) hoge temperatuur verschillen op lagere elevaties;

Frans heeft mij verteld dat als je een dergelijk profiel al in de ochtend ziet dan kun je verwachten met verder stijgende temperatuur onderaan dat het zal ook straks beneden onstabiel wordt.

Op advies van Frans hebben we de "verdachte" profielen niet weggegooid. We hebben gekeken op welke plekken en welke hoogtes de vochtwaardes niet realistisch zijn.

Behalve dat het "cloud-contamination" in de retrieval kon zijn, kon het ook iets anders zijn wat zekere informatiewaarde zou moeten hebben, want een paar uur later ontstond er zware convectie rondom deze punten.

Wellicht hebben jullie iets aan onze observaties en plaatjes.

Translation

- Based on analysis of a june 2017 case, presented at EUM conference.
- They looked at the increments (difference between posterior and prior) for all convergent retrievals (including the suspect cases where $RH > 100\%$)
- Found (in this case) unexpected large T difference at the lower levels, which according to the forecaster, could be interpret as an early sign for instability.
- Especially in combination with the suspect profiles.
- As indeed convection was observed later that day at these location.

NRT Demo Project: the Project and Participants

- Processing of actual IASI observations using a fully physical retrieval package
 - A-priori from ECMWF Ensemble system
 - OSS radiative transfer code
 - OE method
 - Channel selection based on fidelity of spectroscopy
 - No bias correction,
 - Extensively validated in stand alone mode (e.g. his/iasi/cris observations, gii study, in support of 1st nwc ws)
- Distribution of level 2 product (regular and specialised) to participants via restricted ftp
- Running nearly continuously from June 2016 - 16 October 2017.
- Participants:
 - Direct use: AEMET, ARSO, COMET, DWD, FMI, KNMI
 - DA use : CETEMPS, ECMWF, KNMI

NRT Demo Expert Meeting

- 18 – 19 May 2017, EUMETSAT
- To provide unabridged feedback on product quality and completeness
 - Questionnaire with open questions was distributed prior to meeting to initiate discussion and feedback
- Discussed results from both nwc and da applications.
- To agree on way forward

Summary of NRT Demo experience

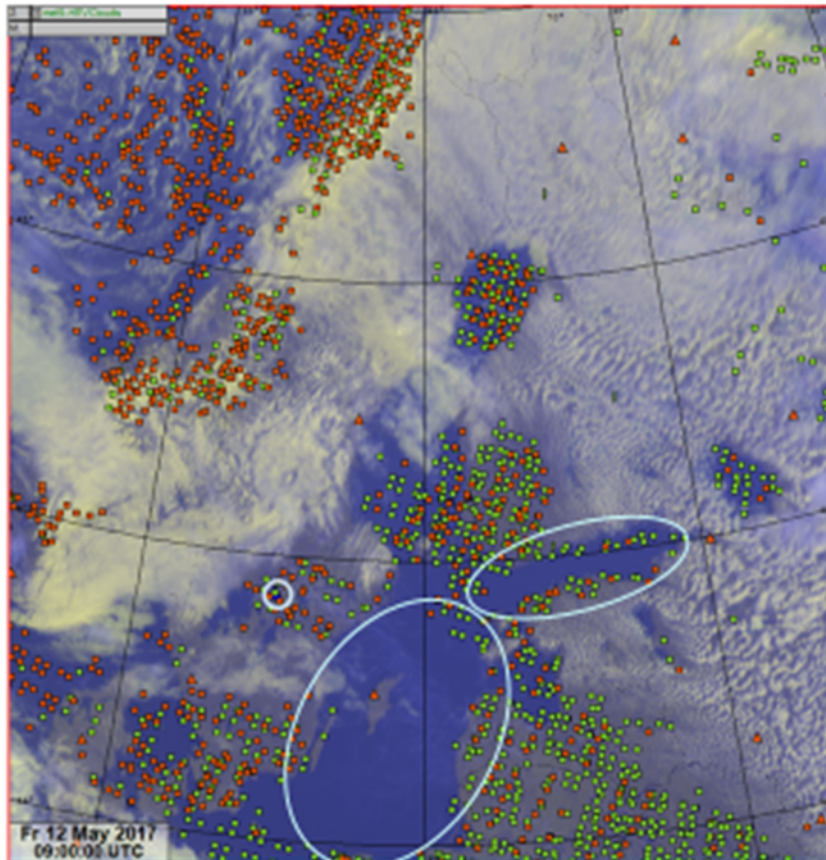
- Technical problems at EUMETSAT and at participant side were identified.
- Some were resolved, other not:
 - Timely access of operational ECMWF ELDA data used in the processor
 - Format of output data (affects the use of QI, Cloud Mask),
 - ..

Some examples: FMI (E. Gregow and P. Lahtinen)



MTGIRS – NRT project: Proxy-IRS retrievals at FMI, SMARTMET visualization

Figure: Example of visualization in FMI-SMARTMET workstation (MetopA-IASI)

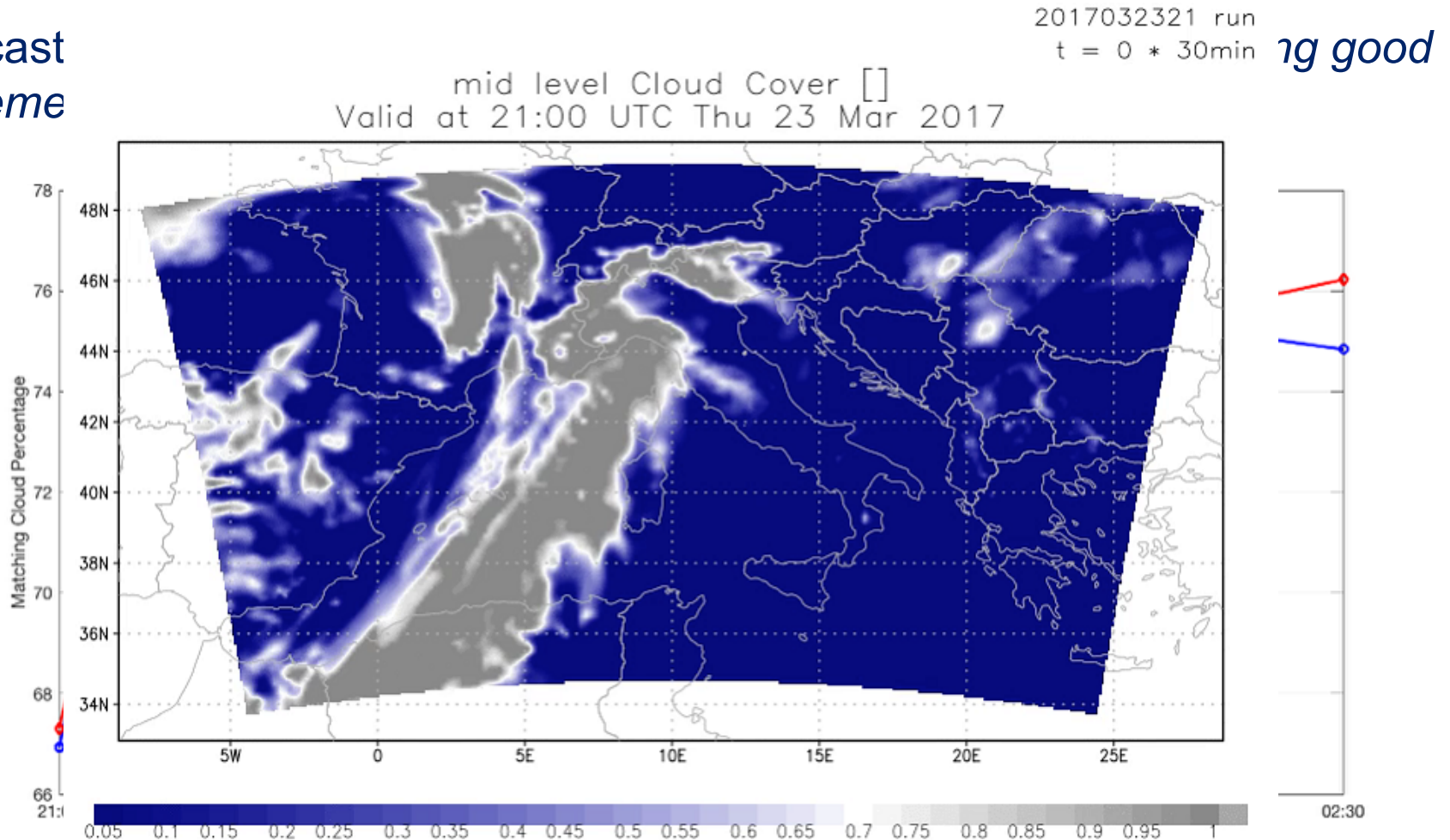


Missing retrievals?

CETEMPS (P. Antonelli and co-workers)

- Testing of SPS assimilation for cloud cover in CETEMPS (L'Aquila, IT) severe weather regional model by P. Antonelli (SSEC)

- Forecast
agreement

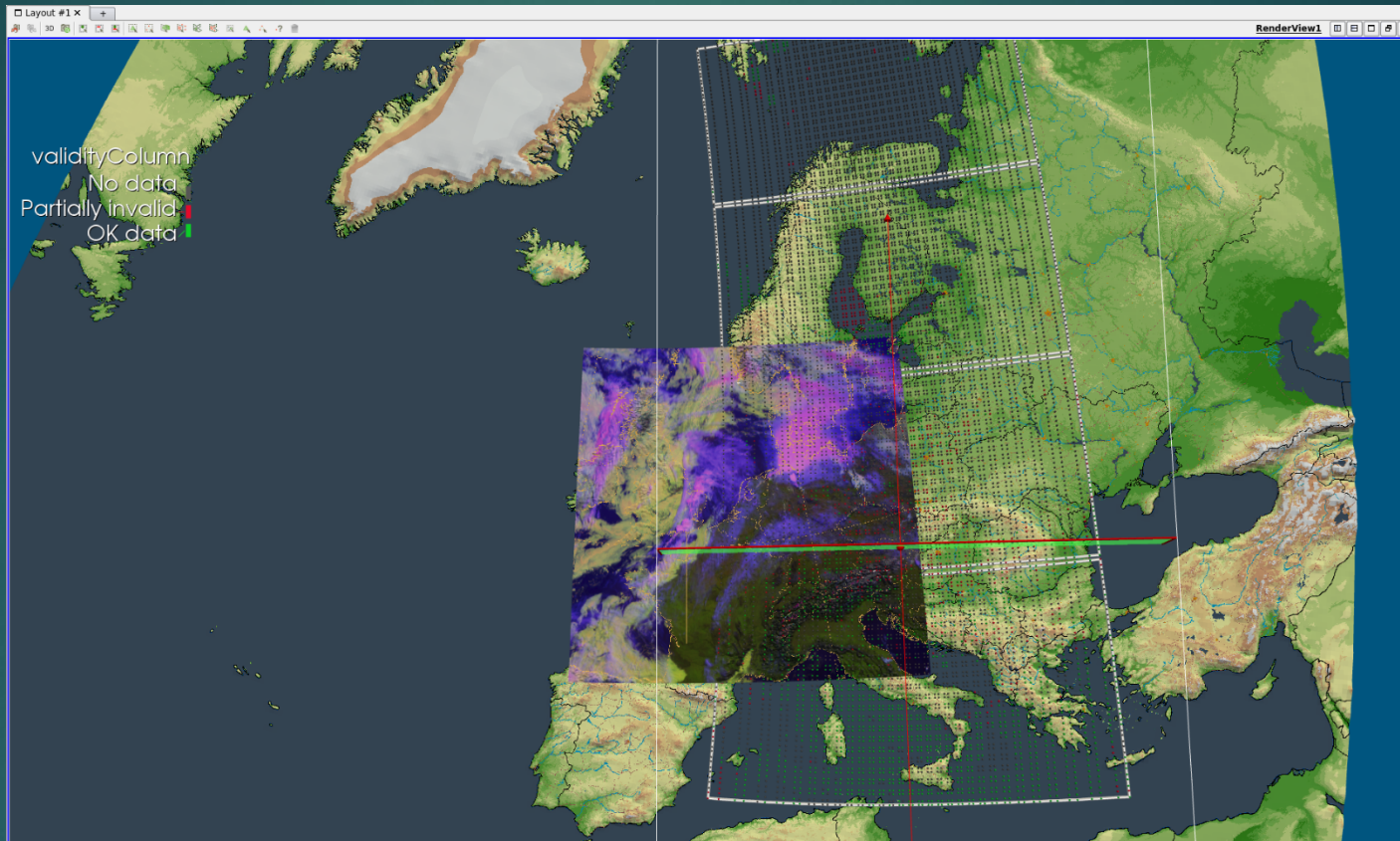


Results

- FMI (E. Gregow, P. Lathinen, see next presentation)
- KNMI (M.Koutek et al)
- ECMWF (K. Salonen, T. McNally)
- WRF (P. Antonelli)

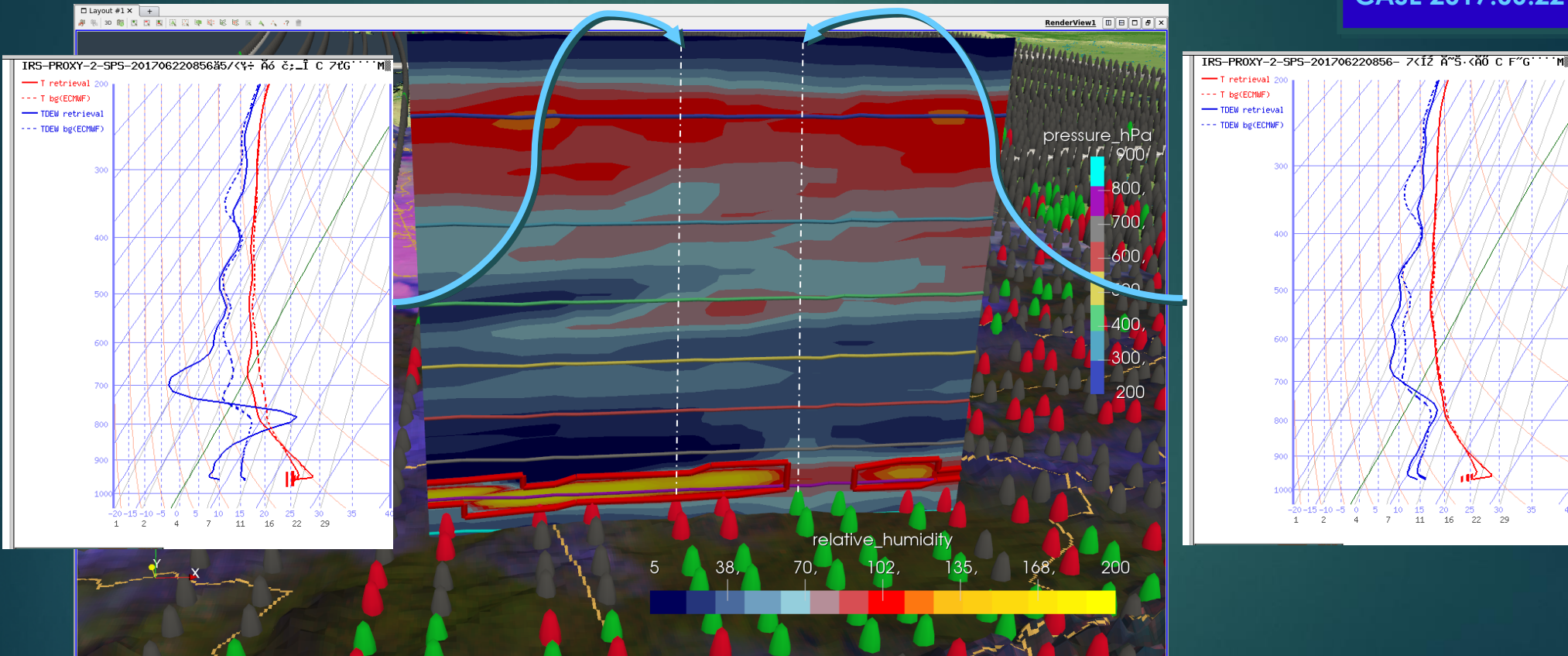
3D Exploration

CASE 2017.06.22

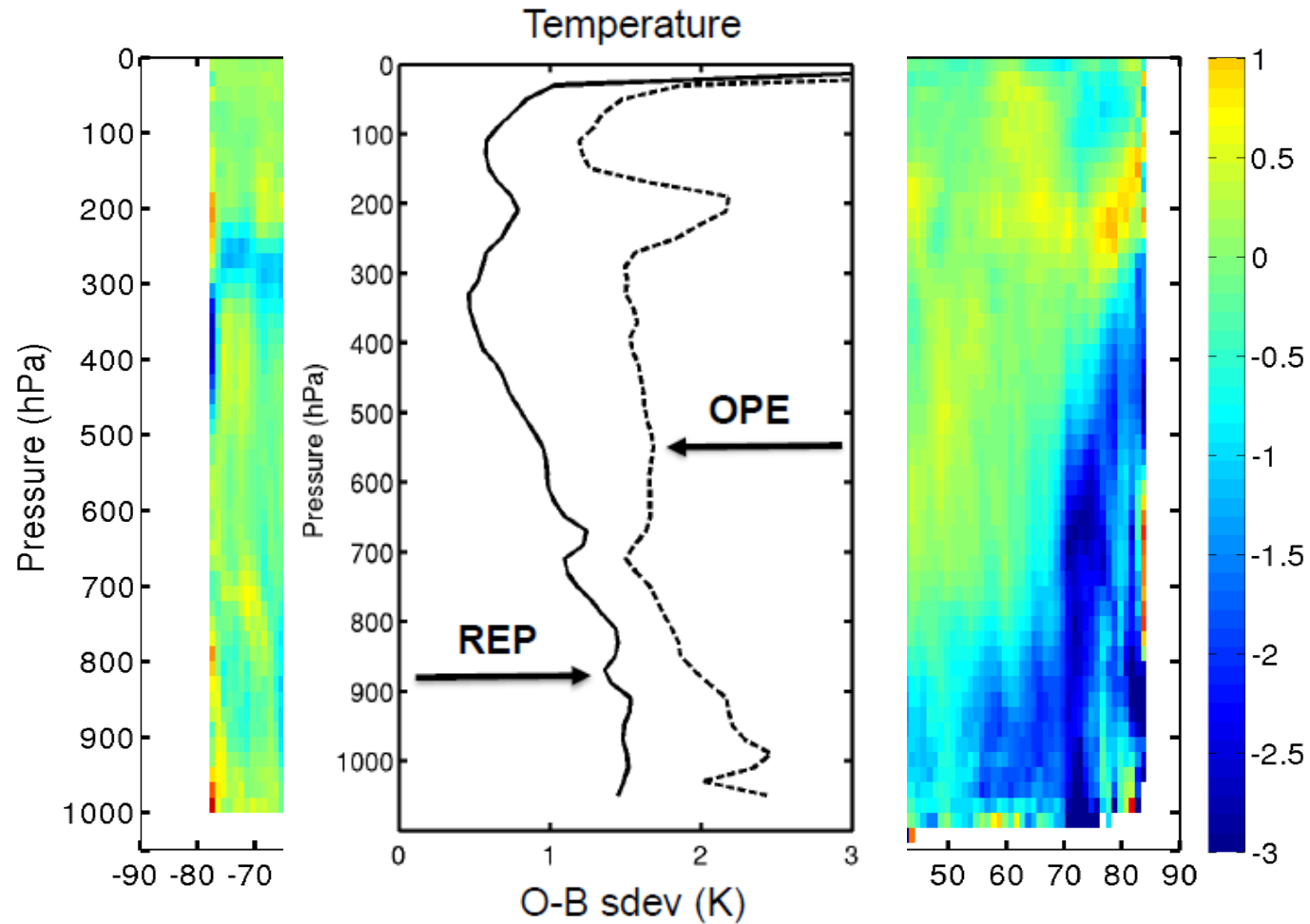


3D Exploration

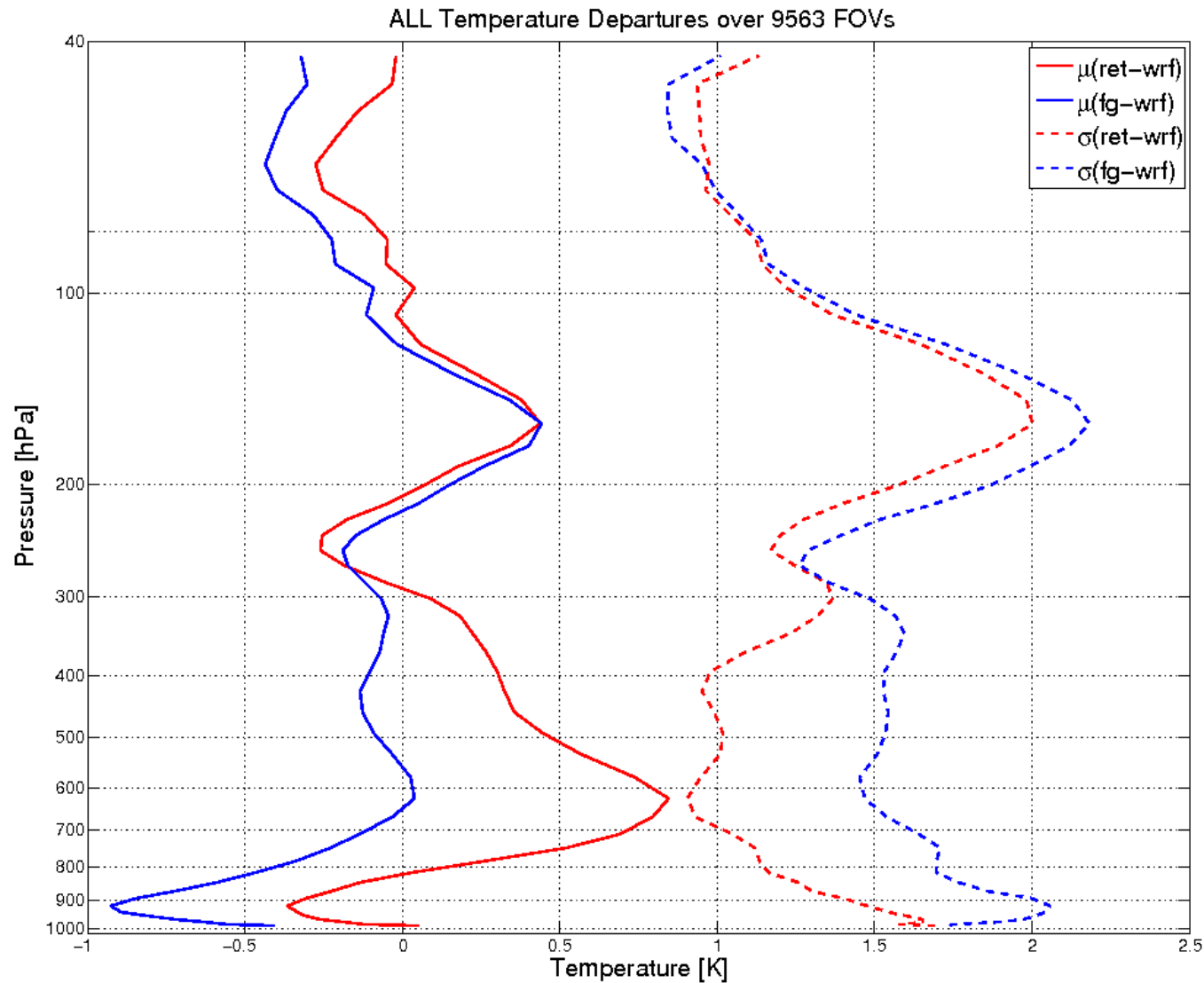
CASE 2017.06.22



OmB statistics ECMWF (K. Salonen)



OmB statistics WRF (Antonelli, Operational stream)



Summary of NRT Demo experience

- Involved NWC bench forecasters identified a potential but quality needs to be improved and needs to be sustained.
- DA applications: identified a potential but more work needs to be done before consolidated results are obtained

Main Conclusion from meeting

- Recommended EUMETSAT to continue the MTG-IRS NRT-Demonstration project as an efficient way to explore with the user community the potential of MTG-IRS for NWC applications and further, to prepare the operational user community for the upcoming MTG-IRS era.

Way forward:

- Support for a 2nd phase:
- Recommended:
 - Explore the use of direct broadcast data to improve timeliness.
 - Explore with ECMWF to improve access ELDA stream to improve quality
 - Investigate reported inconsistencies in cloud mask
 - ..

Current Status:

- DA in global NWP:
 - Global (IASI/CrIS) data service being prepared
- DA in regional NWP / NWC applications:
 - Regional data (IASI/CrIS) service based on DWD direct broadcast receiving station
- ECMWF data
 - A dedicated dataset is being prepared to investigate optimal setting of the forecast + variances.
 - Once settings identified, explore with ECMWF if and how it can be made available routinely (potentially in 2nd half of 2018)
- Processor:
 - F(irst) G(uess) A(propriate) T(ime) processor is running, settings are now being optimised and demonstrated
 - Generation of SPS is being consolidated
 - Consolidation of SCE is put on hold (resources)
 - Current retrieval in physical space is replaced by retrieval in feature space (potentially in 2nd half 2018)
- Outreach
 - web page is prepared (will contain documents, monitoring results)
 - monitoring information on web page are being developed.
- Participants:
 - Potential participants will be approached shortly.

Future performance (Goal)

	NRT Demo 1 st phase		NRT Demo 2 nd phase (FGAT)
	OPE	REP configuration	
Difference in validity of the first guess and observation time	> 7 – 19+ hour	0 – 12 hour	< 1 hour
Random errors: T [K]	2 - 4	1 - 2	0.75 – 1.5
Random errors: q [Kg/Kg]	< 2.5 – 3 10 ⁻³	< 2.0 10 ⁻³	< 1.0 – 1.5 10 ⁻³
Timeliness [hours]	1.5 – 2 (IASI) > 2 (CrIS)	na	0.45

Summary

- Presented outcome of NRT Demo 1.0 and plans for the sequel activity
 - Start: 1 Q 2018
- Activities to resolve identified technical issues ongoing.
- Questions / comments?