IASI OBSERVATIONS IN LANNION, FRANCE

DIRECT BROADCAST AND LOCAL vs GLOBAL PROCESSING

a new real-time monitoring website

Mathieu Asseray, Pascale Roquet, Jérôme Vidot, Jean-Marie Lalande (CNRM)

OUTLINE

- IASI LOCAL PROCESSING
- USE OF IASI PRODUCTS
- IASI MONITORING WEBSITE

OUTLINE

- **IASI LOCAL PROCESSING**

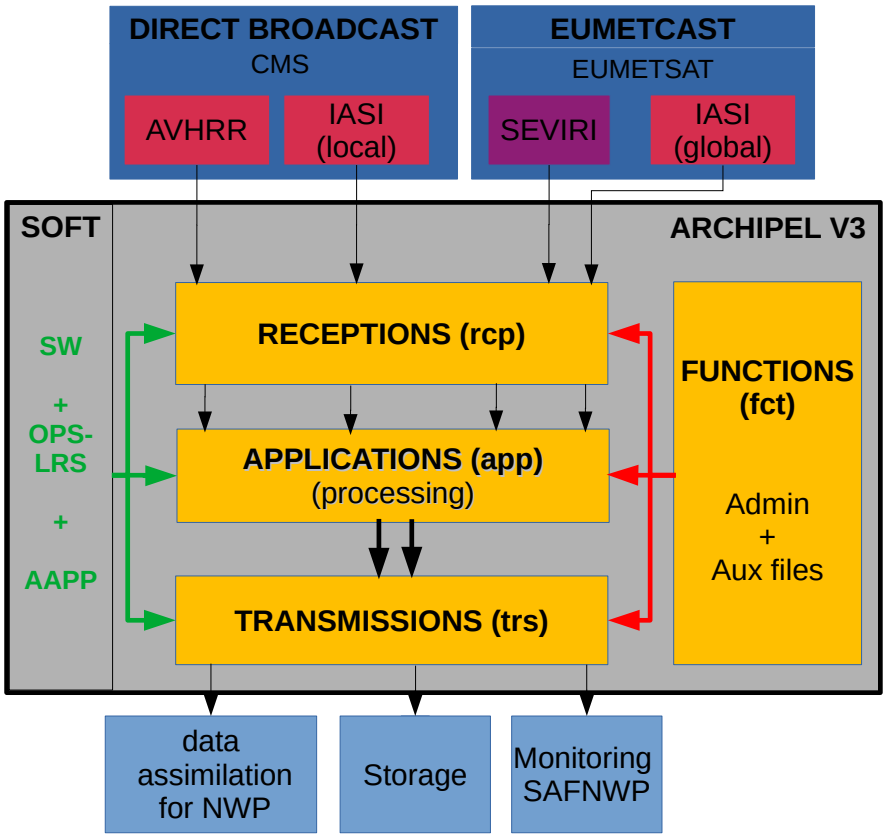
OUTLINE

- **IASI LOCAL PROCESSING**

  - General pattern and services description.

  - AAPP & OPS-LRS processing.

GENERAL PATTERN



- **2 reception modes**
  - Local data by direct broadcast
  - Global data by Eumetcast network

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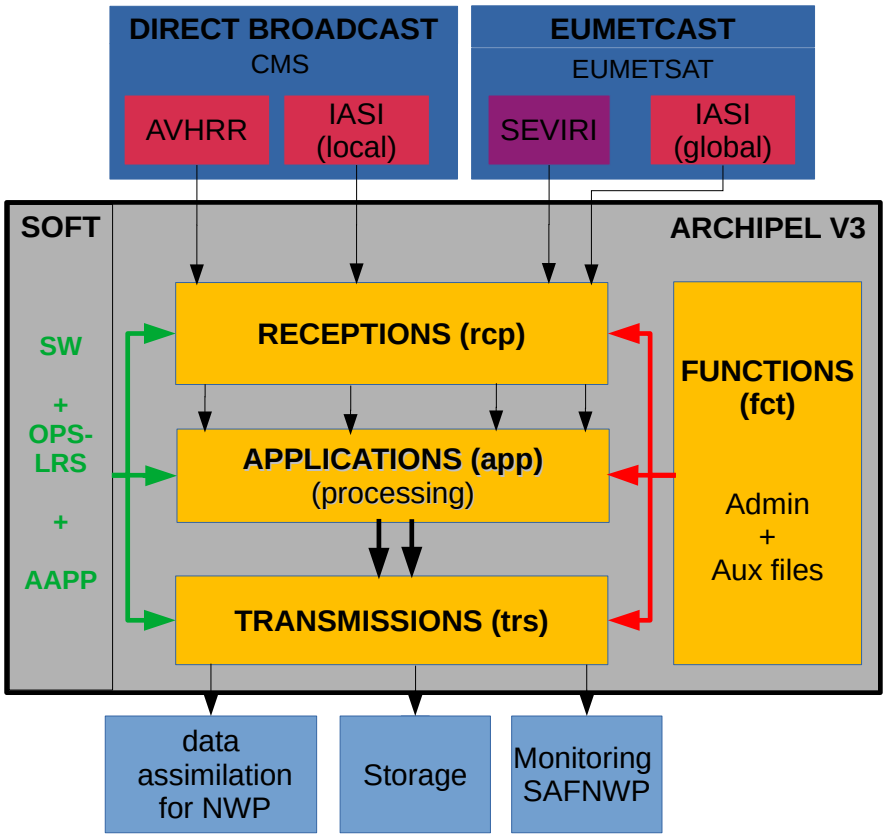

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  - **ArchiPEL V3**:
    - Sequence of local processing applications
    - 4 embeded services.
  - **SOFT**: AAPP, OPS-LRS and other software.

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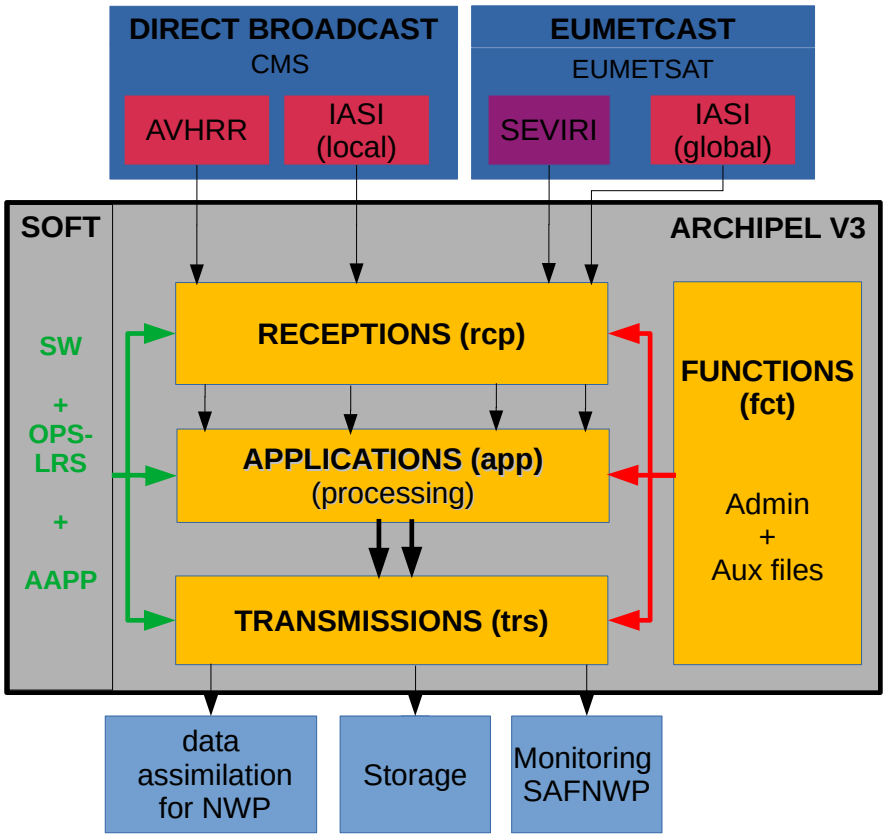

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- **3 destinations for products**
  - Data assimilation for NWP
  - Local storage
  - Monitoring web site

DETAIL OF THE SERVICES

- **rcp:** input data reception

Input data	Lenght	level	Rec
AVHRR	1mn	0	DB
IASI local	3mn	0	DB
IASI global	3mn	1C	Eum
SEVIRI	global	1B	Eum

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  - Renaming data
  - Initializing software
  - Providing auxiliary files
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- **fct:** processing administration
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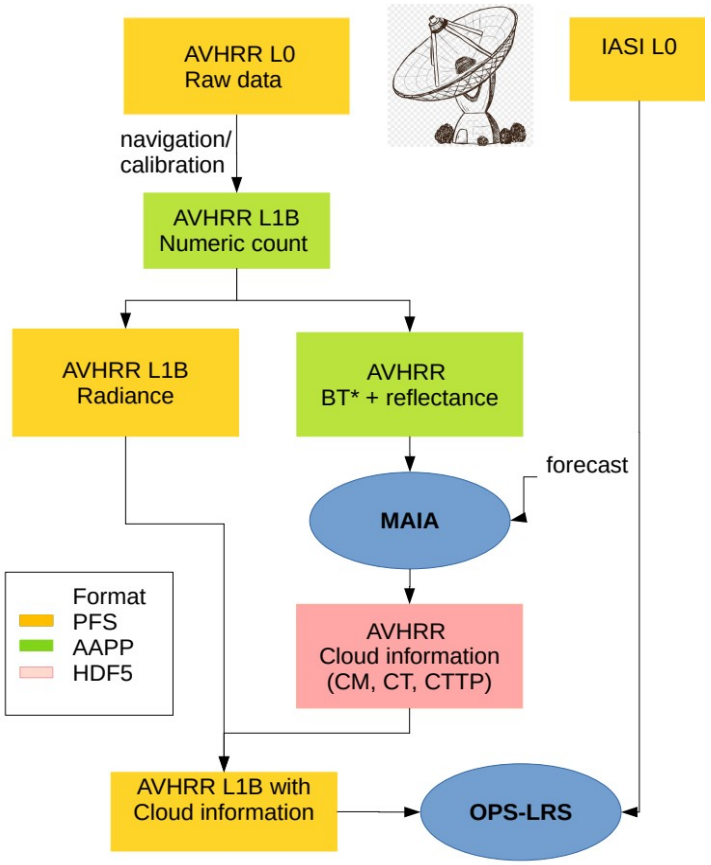
- **trs:** data transmission

output products	level	destination
PC IASI	1C	DA for NWP/ local storage
Maps, graphs, stats	1C/ 1B	Monitoring comp website

AVHRR PROCESSING WITH AAPP



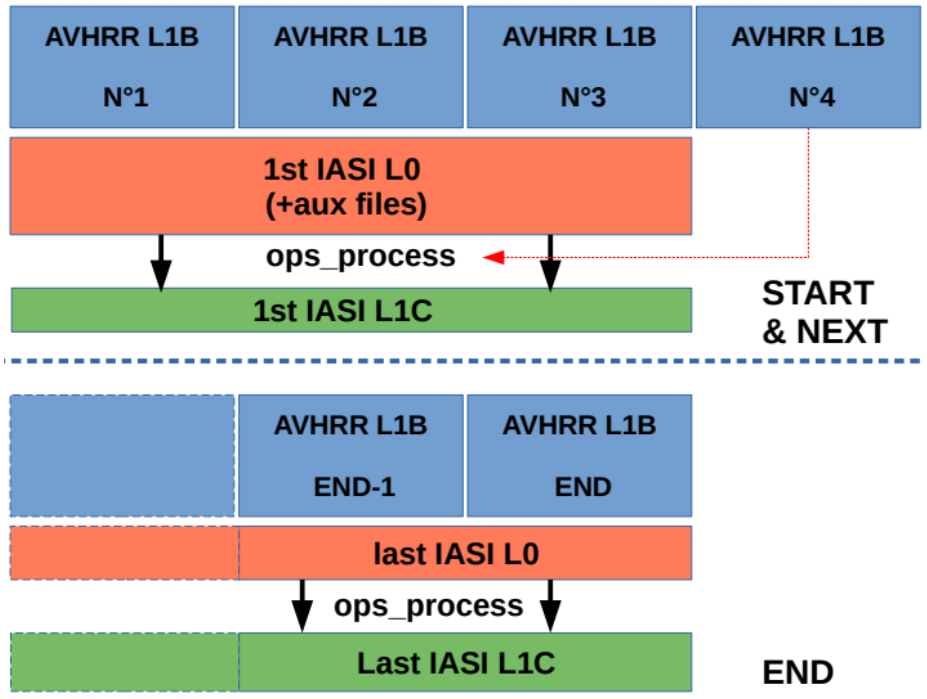
- AVHRR processing
  - **AAPP** package → L0 to L1B
  - **MAIA4** algorithm → cloud information

- Auxiliary files:
  - **Forecast** for MAIA
  - **Navigation** for satellite position & pixels lon/lat
  - **Calibration** for coefficients

- AVHRR L1B + cloud information + IASI L0

OPS-LRS
(IASI processing)

IASI PROCESSING AT LANNION
ops-lrs in granule mode



- **Input**

Start & Next	End
3 AVHRR L1B 1mn	1-3 last AVHRR L1B
1 IASI L0 3mn	Last IASI L0
Auxiliary files	

- **Processing**
  - OPS-LRS launch at the 4th AVHRR granule
  - IASI L0 + 3 previous AVHHR1B (except for end)

- **Output**
  - IASI L1C granule ⟶ data assimilation /NWP

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- **USE OF IASI PRODUCTS**

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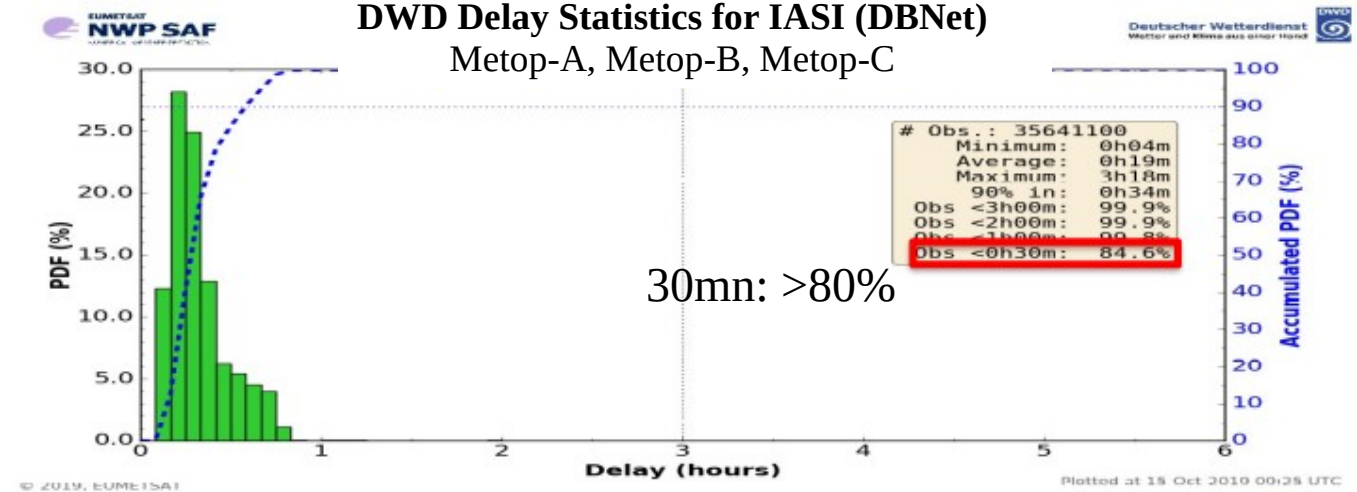
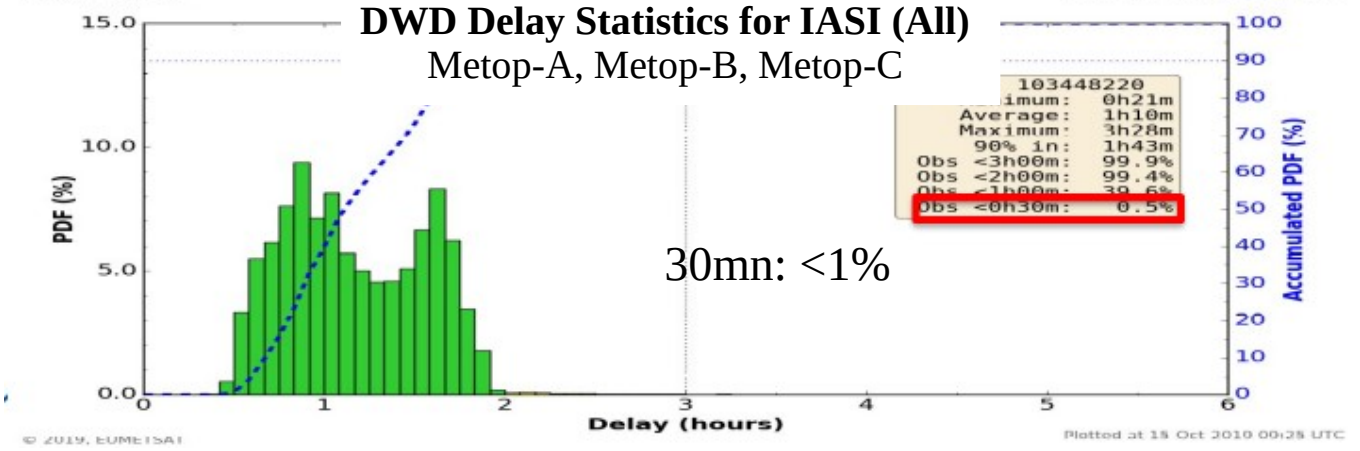
- **USE OF IASI PRODUCTS**
  - **Benefits of the local processing**
  - **Use of the results of the global vs local comparison**

BENEFITS OF THE LOCAL PROCESSING

DBNet data latency

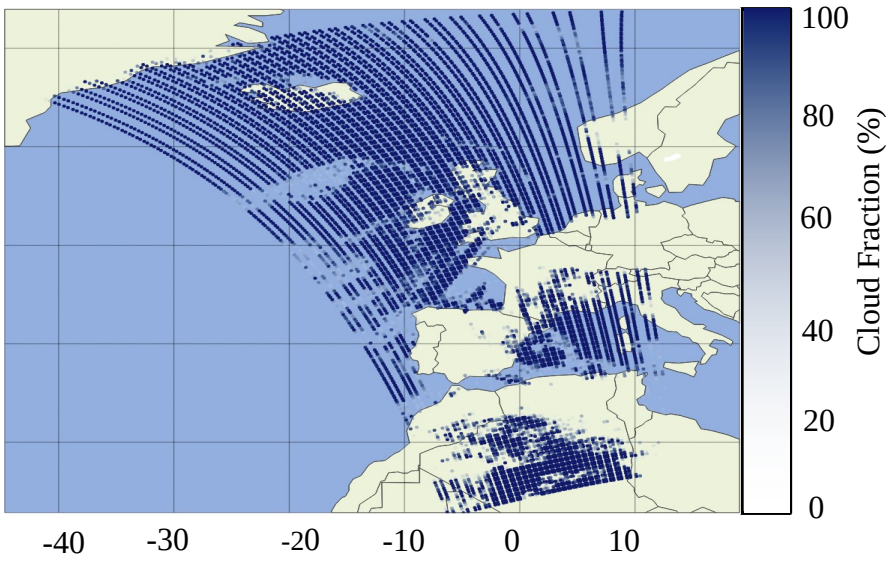




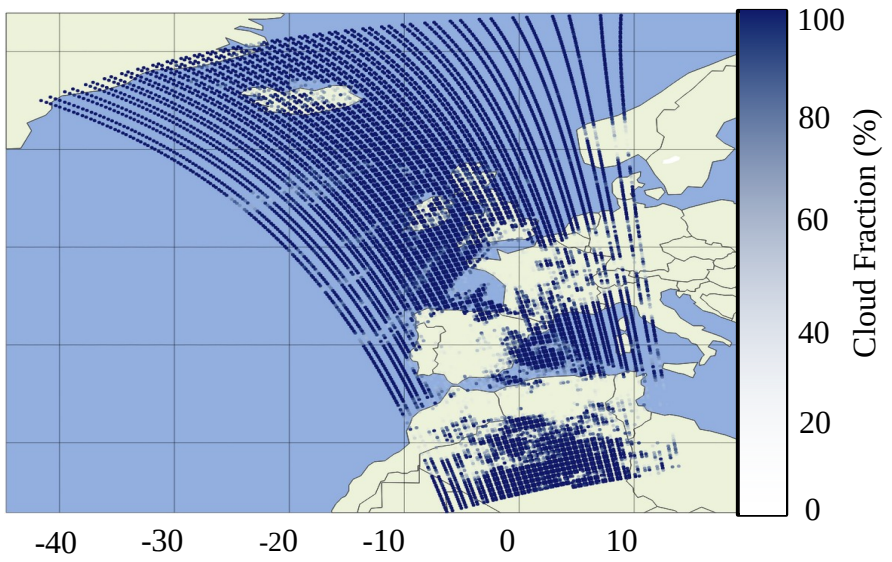
COMPARISON OF THE GLOBAL vs LOCAL PROCESSING FOR THE CLOUD FRACTION IN IASI FOV

- EUMETSAT processing: old MAIA algorithm version (V2) + OPS
- Meteo France processing : last MAIA algorithm (V4) + OPS-LRS.

IASI CF Global processing



IASI CF Local processing

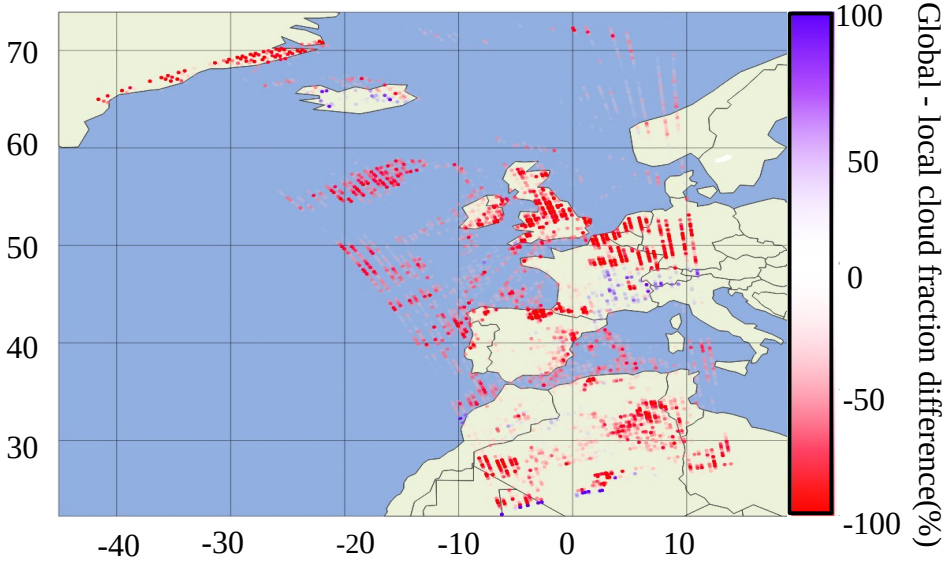


11th November 2021 at 21h00 UTC

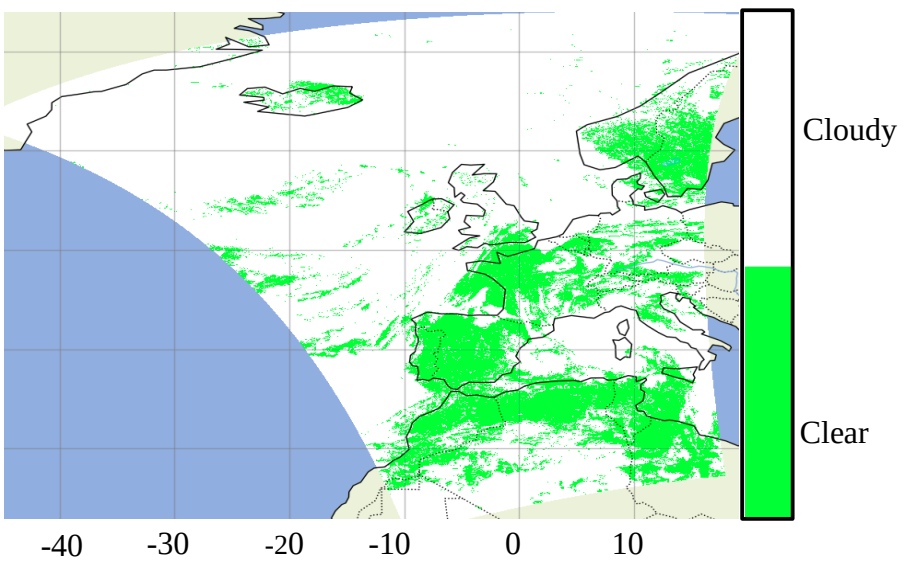
GLOBAL - LOCAL CLOUD FRACTION DIFFERENCES VS MAIA4 CLOUD MASK

global – local CF difference ⟶ local processing overestimations.
Red : local overestimation,
Blue : global overestimation.

Global - local cloud fraction difference for IASI



MAIA4 cloud mask for AVHRR

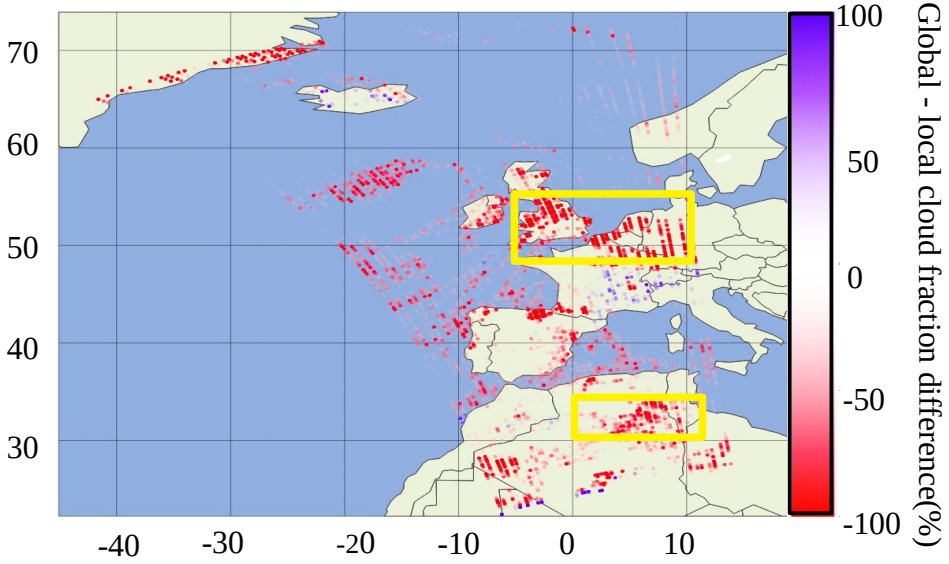


11th November 2021 at 21h00 UTC

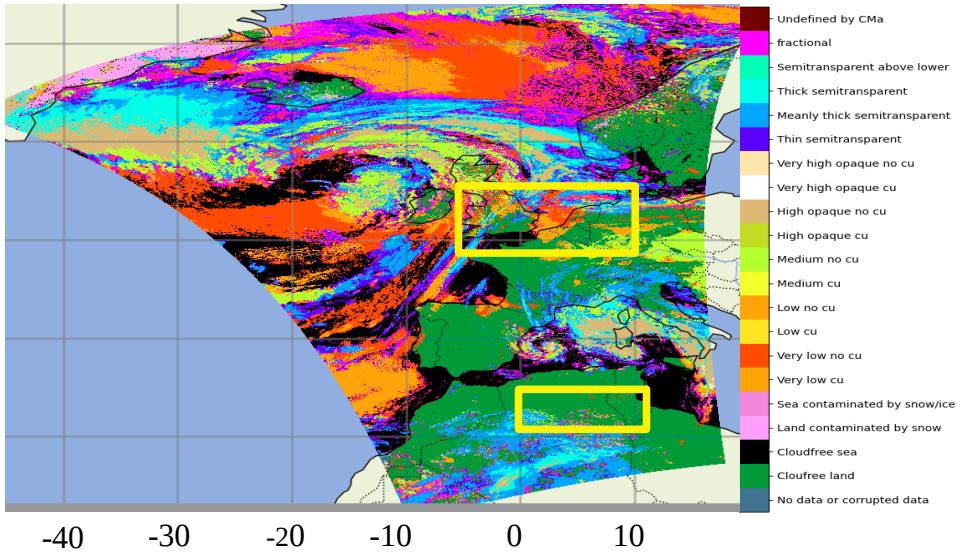
GLOBAL - LOCAL CLOUD FRACTION DIFFERENCES VS MAIA4 CLOUD TYPE

overestimation	Cloud Type
Local	low clouds, fractional clouds, reflectance cloud free surfaces

Global - local cloud fraction difference for IASI



MAIA4 cloud type for AVHRR



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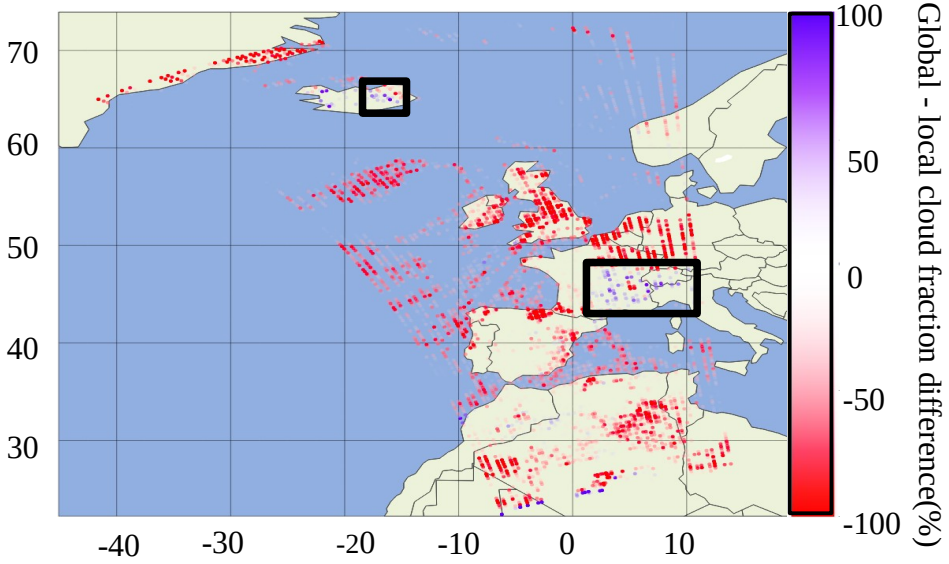
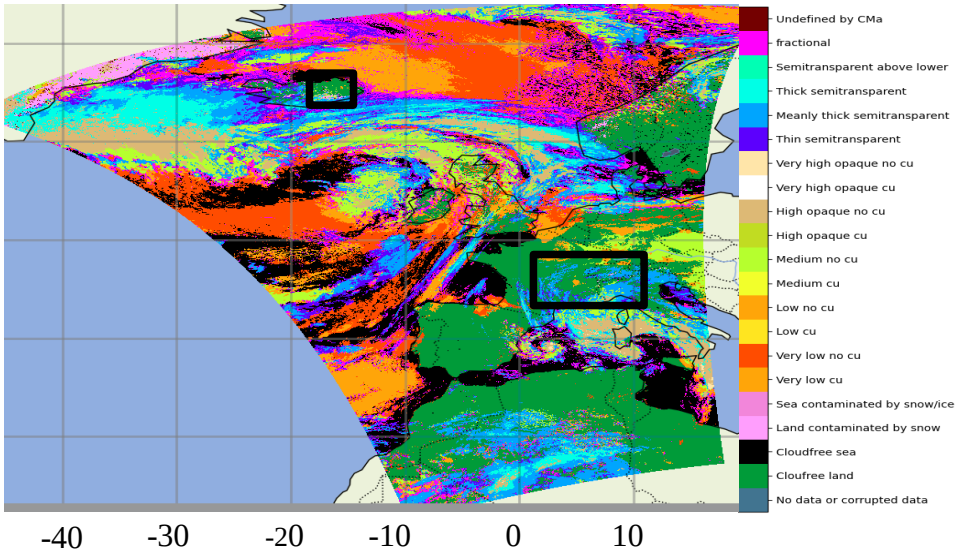
GLOBAL - LOCAL CLOUD FRACTION DIFFERENCES VS MAIA4 CLOUD TYPE

overestimation	Cloud Type
Global	clear sky over land, semitransparent clouds

Global - local cloud fraction difference for IASI



MAIA4 cloud type for AVHRR



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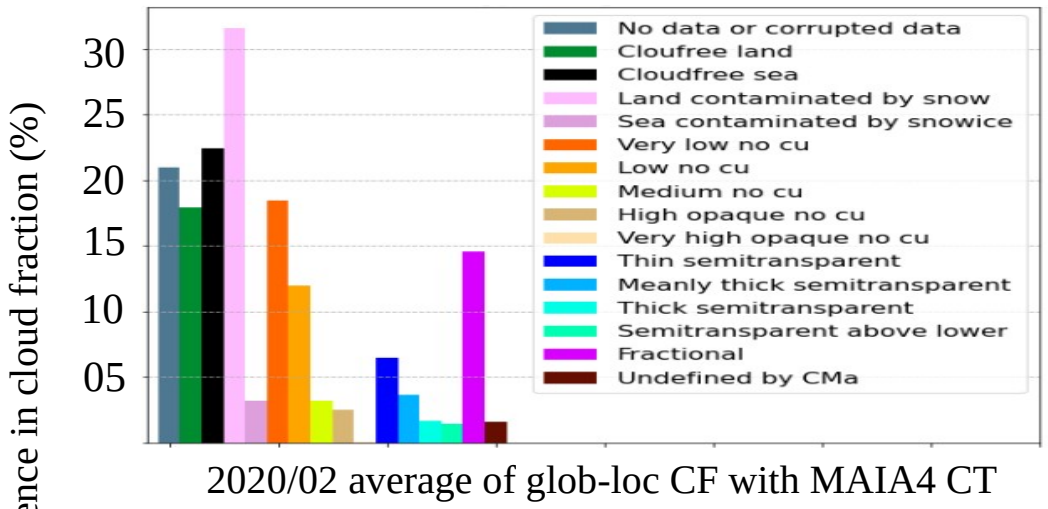
MONTHLY AVERAGE OF GLOBAL-LOCAL DIFFERENCES OF CLOUD FRACTION

according to maia4 and clavr-x cloud type



2020/02 average of glob-loc CF with MAIA4 CT

- CT & CF differences (> 5%) link
  - **cloud free surf contaminated by snow**
  - **cloud free over see** and **land surfaces**
  - **very low** and **low no cumuliform clouds**
  - **fractional clouds**
  - **(thin semitransparents clouds)**

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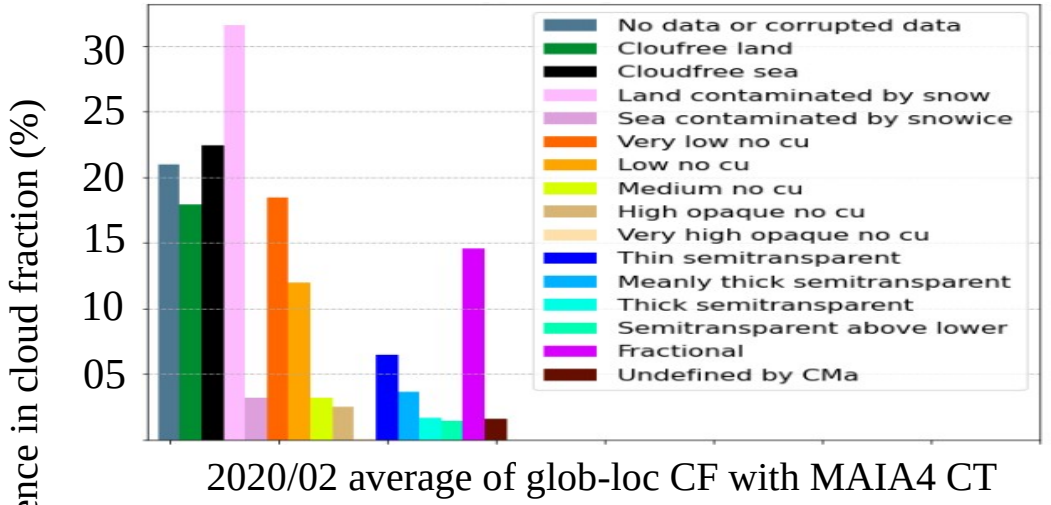

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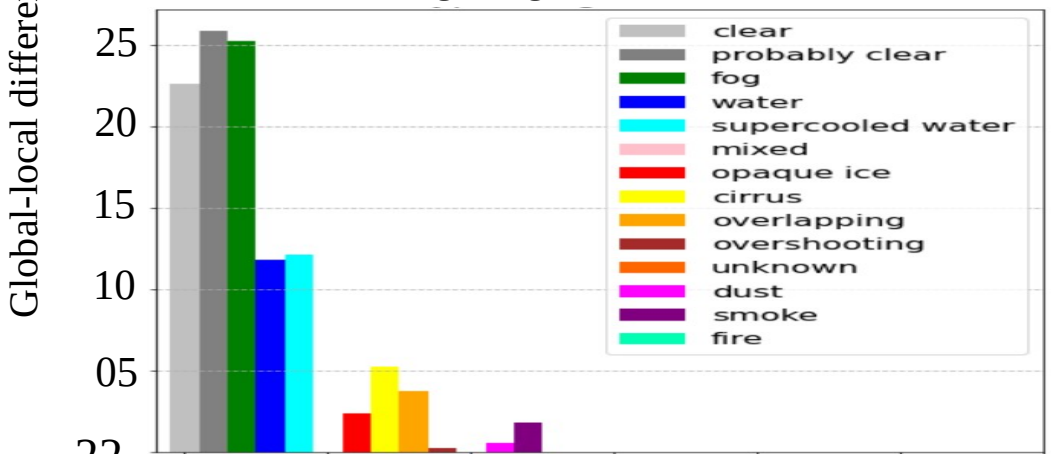

2020/02 average of glob-loc CF with CLAVR-X CT

- CT & CF differences (> 5%) link
  - **cloud free surf contaminated by snow**
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  - **very low** and **low no cumuliform clouds**
  - **fractional clouds**
  - **(thin semitransparents clouds)**

- CLAVR-X CT :
  - **Independant reference**
    (processing and situation closest to reality)
  - **Confirms MAIA4 algortihm**
    greatest difference with low & very low clouds

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  - presentation
  - help in detecting and correcting anomalies

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http://nwpsaf.meteo-spatiale.fr/

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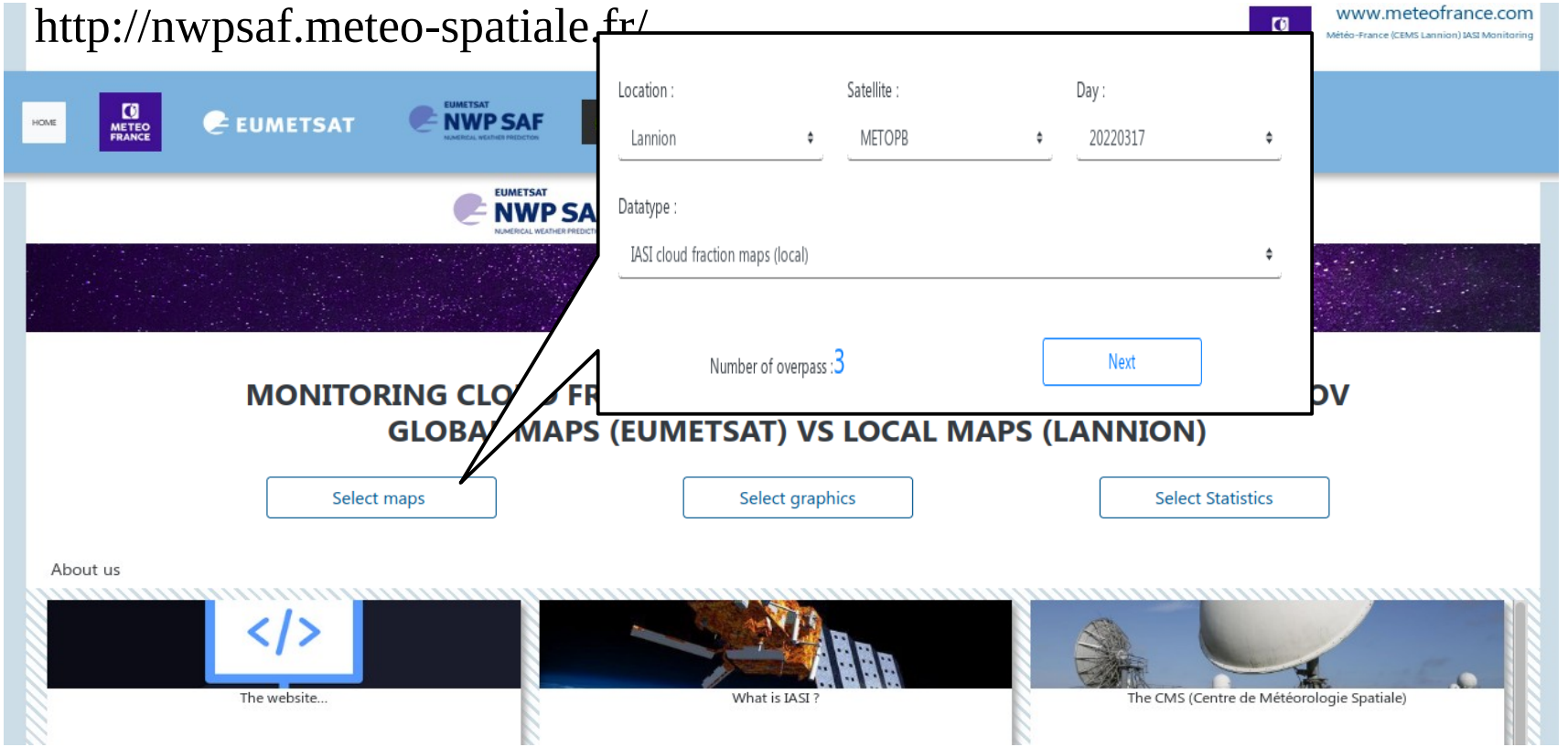
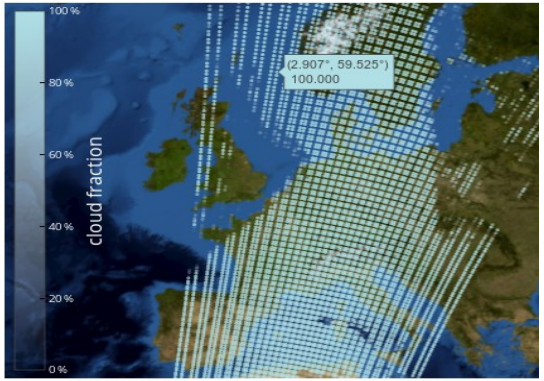
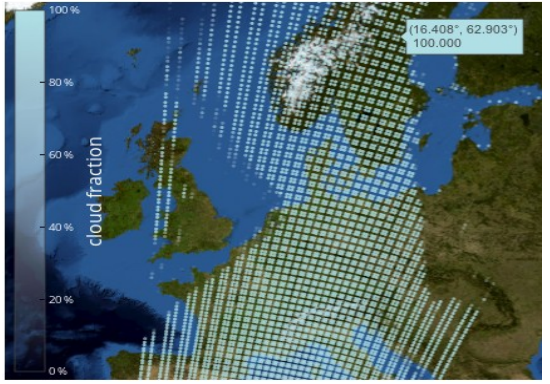


CLOUD FRACTION & CLOUD TYPE MAPS

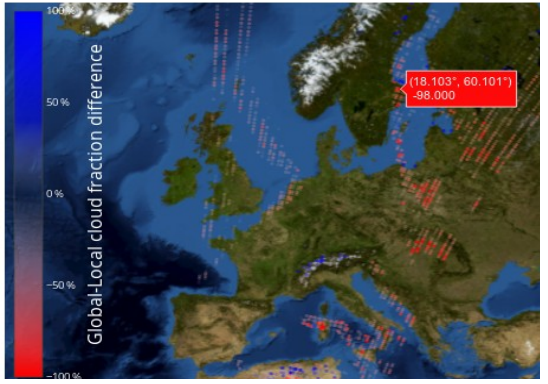
METOPC 20220317 092745



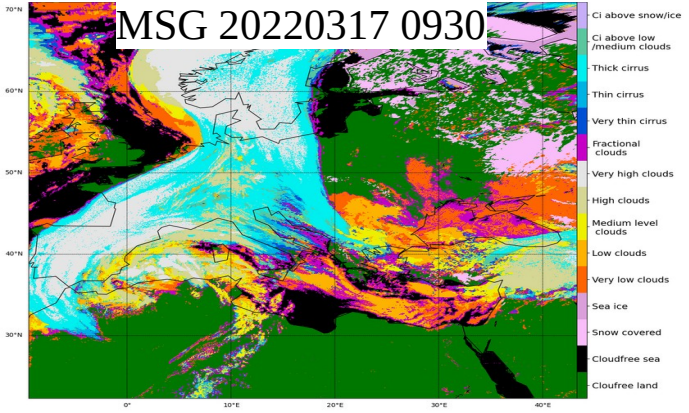
Local cloud fraction (Lannion)



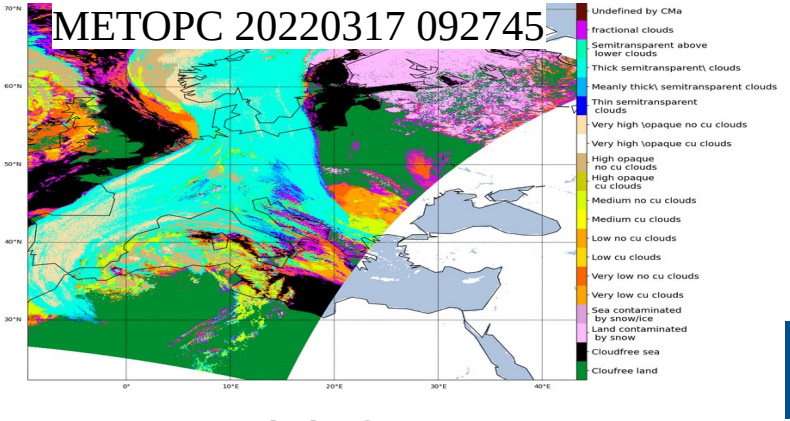
Global cloud fraction (Eumetsat)



Difference global - local cloud fraction



SEVIRI CT map



MAIA4 CT map

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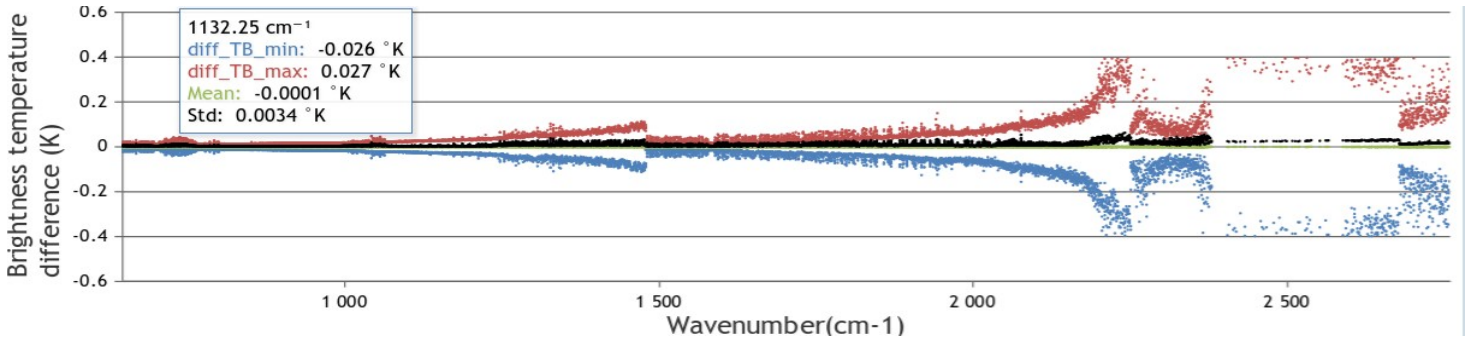
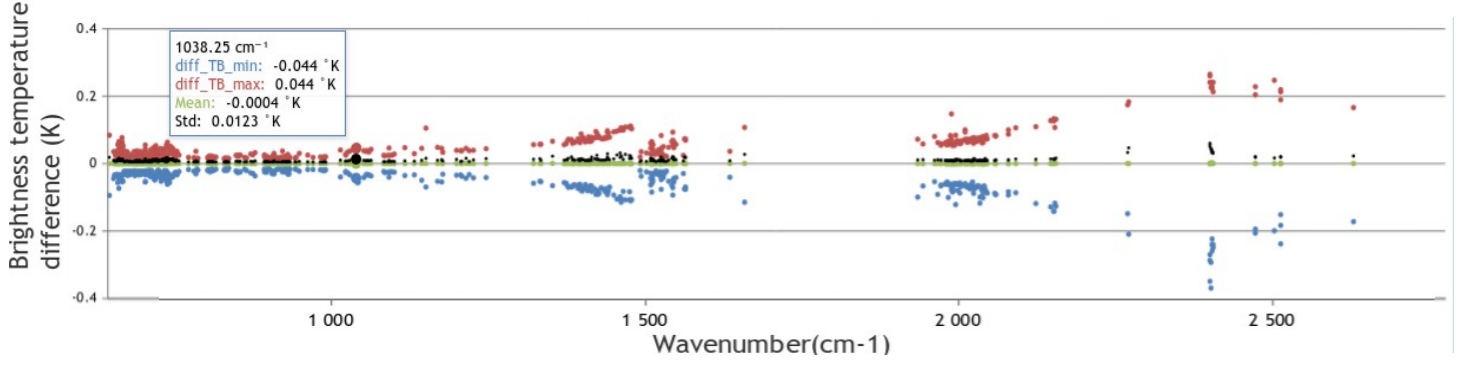
MIN AND MAX FOR GLOBAL - LOCAL BT

all IASI channels



reconstruction from PC in 500 IASI channels



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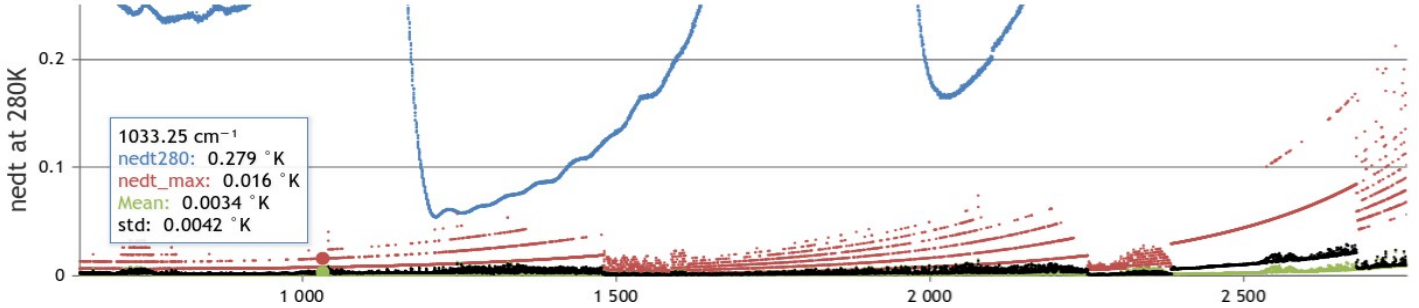
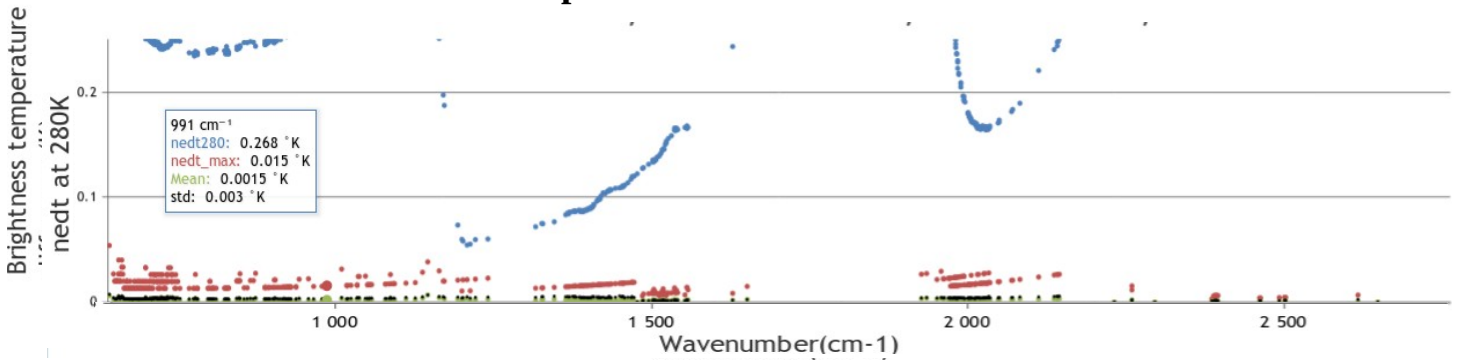
MAX NEDT FOR GLOBAL – LOCAL RADIANCE

all IASI channels VS NEDT at 280K



recontructed radiances computed from PC in 500 IASI channels VS NEDT at 280K



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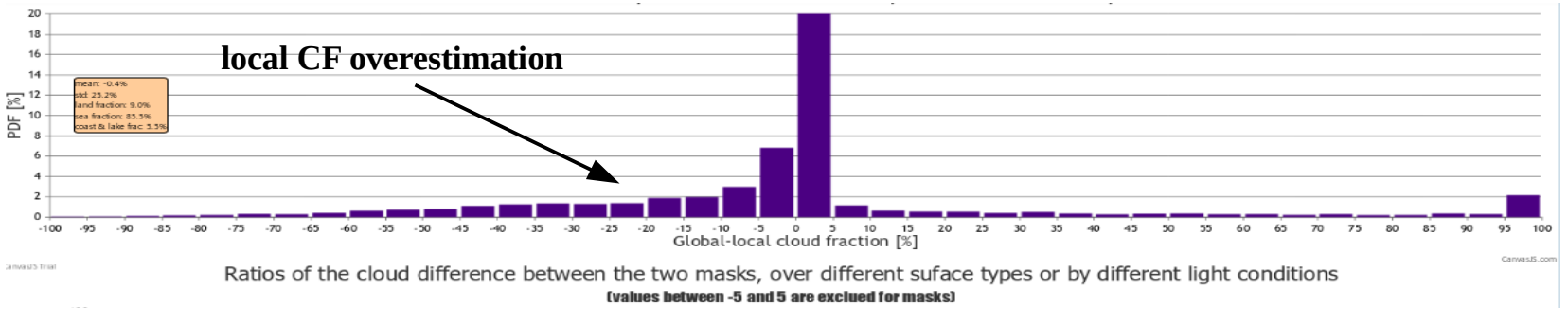
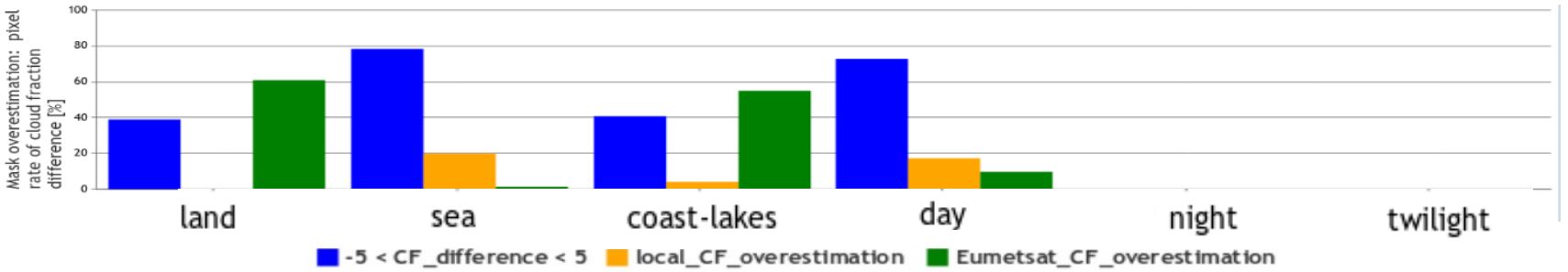
STATISTICS OF GLOBAL–LOCAL CLOUD FRACTION

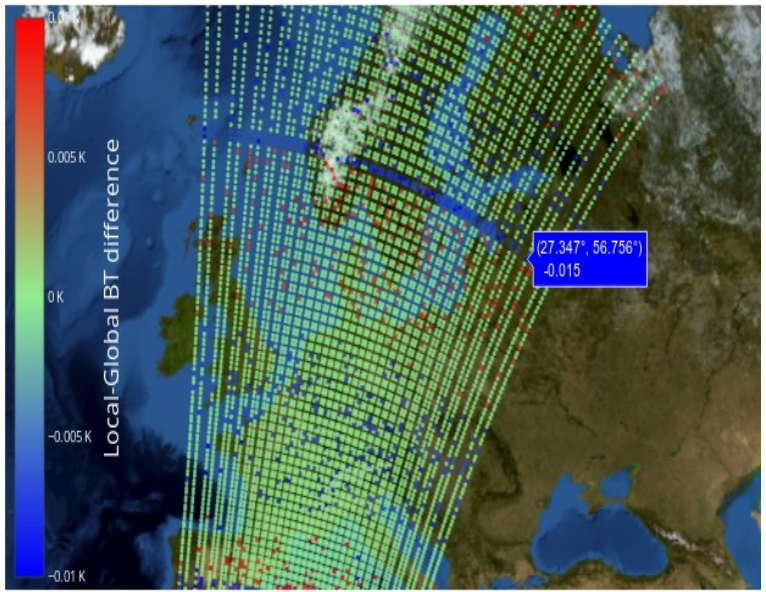




GLOBAL – LOCAL IASI DIFFERENCES

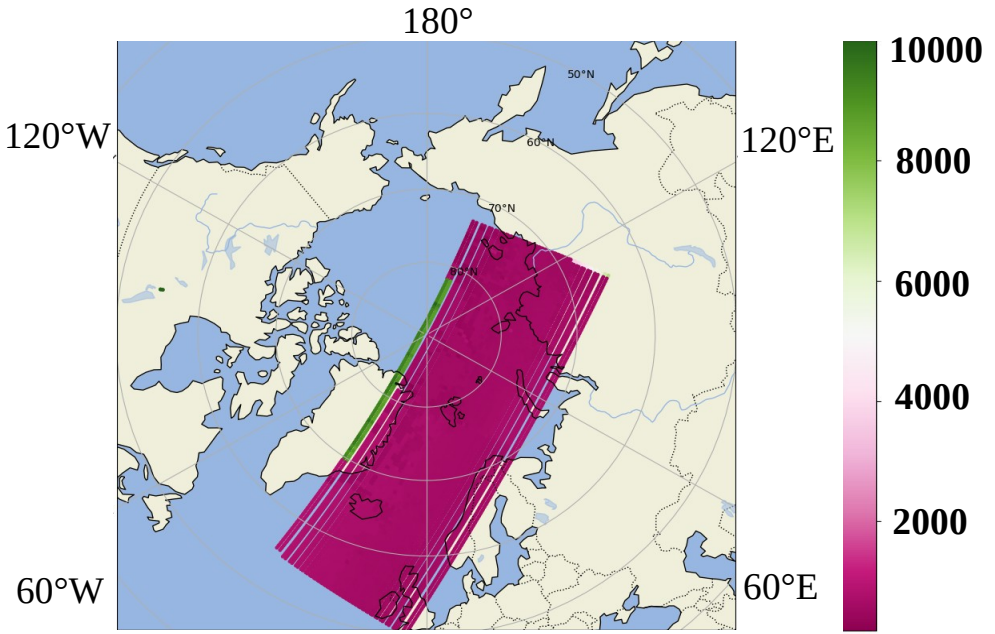
detection and correction of anomalies

METOPB 20220319 093317Z



IASI METOPB Global-local BT difference map

METOPC 20191024 111524Z



IASI METOPC Global-local geolocation difference map

SUMMARY

- **Local processing**
  - based on **Archipel3** architecture with 4 services
  - Software delivered by an external system (**SOFT**)
  - **AAPP with MAIA4:** AVHRR L0 ⟶ L1B + cloud information
  - **OPS-LRS:** IASI L0 + AVHRR L1B + cloud information ⟶ IASI L1C (with cloud fraction)
  - Processing in **granular mode,** reduction in **principal component** and concatenation
  - New application to **compare** the **local** (Lannion) and **global** (Eumetsat) IASI processing

- **Use of the IASI products**
  - **Benefits of the local processing**: provide products for the assimilation **very quickly**
  - Study of the comparison between local and global products
  - local overestimation; low and very low clouds related to CF differences

- **website**: http://nwpsaf.meteo-spatiale.fr/
  - IASI local vs global discrepancies display and monitoring
  - Anomalies detection and monitoring

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