Utilisation des produits OSI-SAF pour l'editing des glaces

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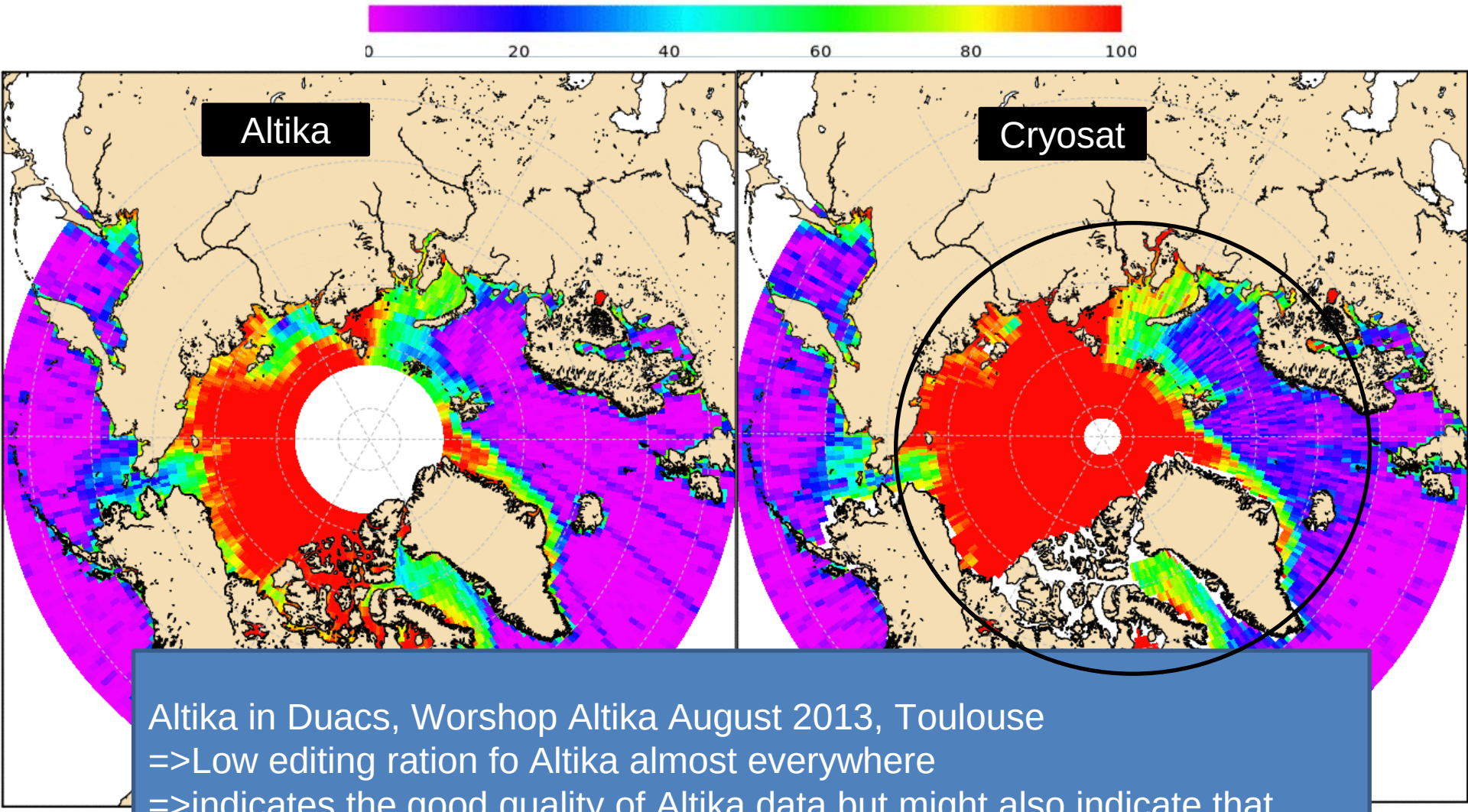
Introduction

- Since 2011, 4 missions are injected in SALP/DUACS products, bringing a precious information at high latitudes :
  - Cryosat-2 < 88°
  - AltiKa < 82°
  - Hy2a < 81°
  - Jason-2 < 66°
- For SALP/DUACS purpose (ocean), ice must be removed by an « editing » step, based on :
  - Altimetric parameters, mostly waveform parameters, impacted by inhomogeneous content such as ice/sea ice…
  - Thresholds on radiometric (if any: Jason-2+AltiKa)

  ➔ HY2A and C2: no radiometer available ➔ different approach needed

Ratio of Edited Measurement on 3 month (%)



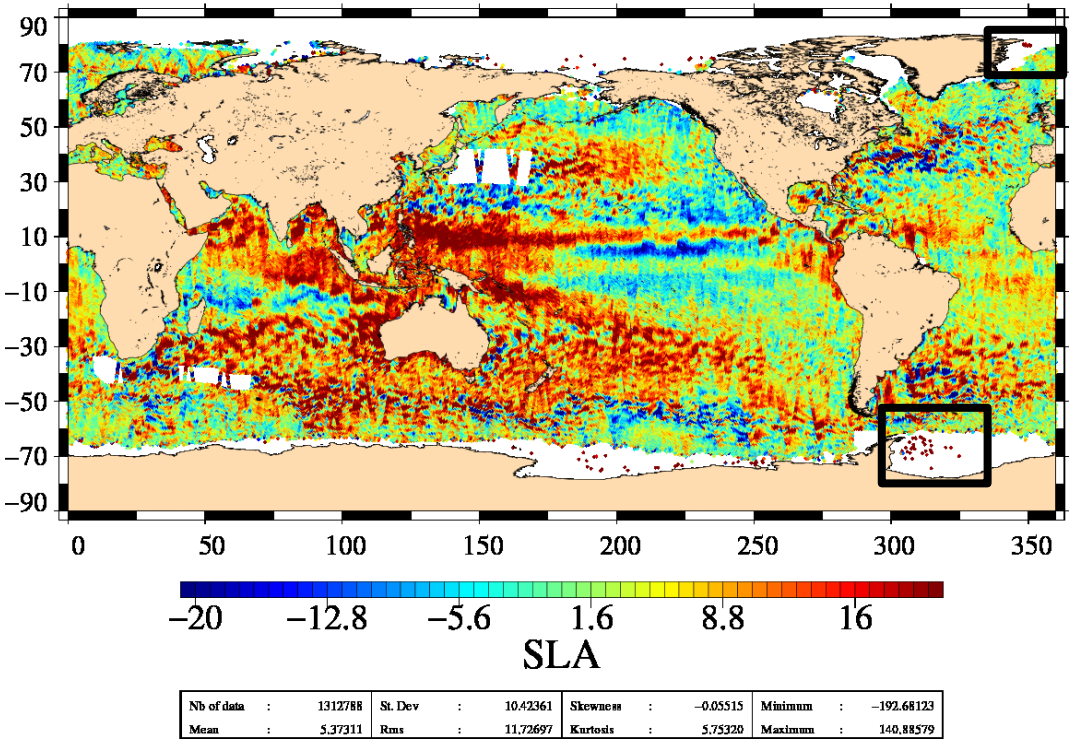
Altika in Duacs, Worshop Altika August 2013, Toulouse
=>Low editing ration fo Altika almost everywhere
=>indicates the good quality of Altika data but might also indicate that some threshold are too permissive on Altika, at least for a global product

Current Editing without radiometer information

Quality assesment dedicated to C2.

- No radiometer
  - ice flagging is more difficult.
  - ➔ new study to improve it at high latitudes

Cryosat–2 Cycle 030 (04/05/2012 / 02/06/2012)



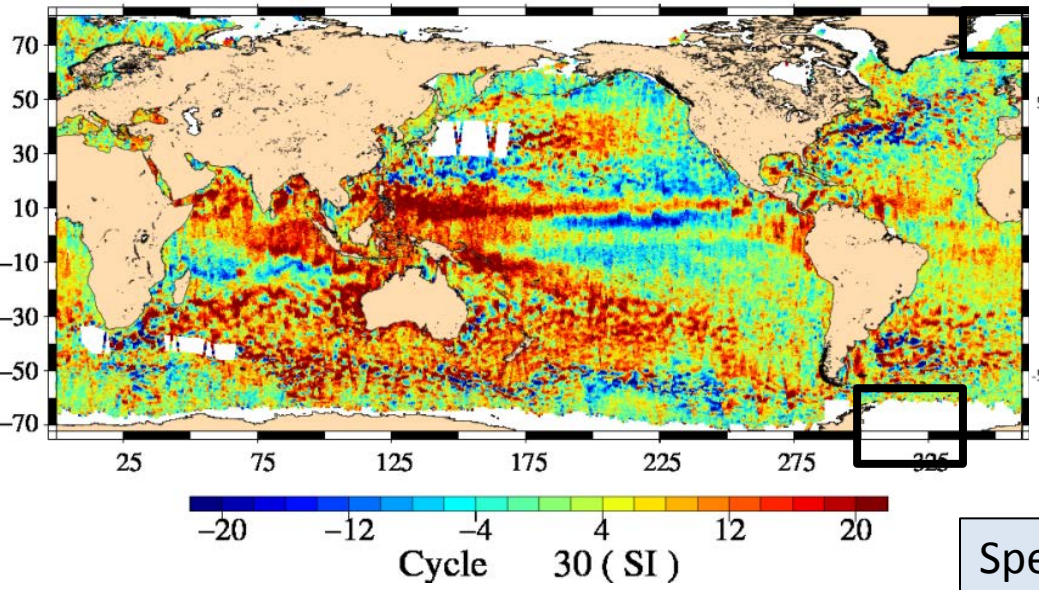
Without the radiometer information (Cryosat-, HY2A), the usual editing is not severe enough

Current Editing without radiometer information

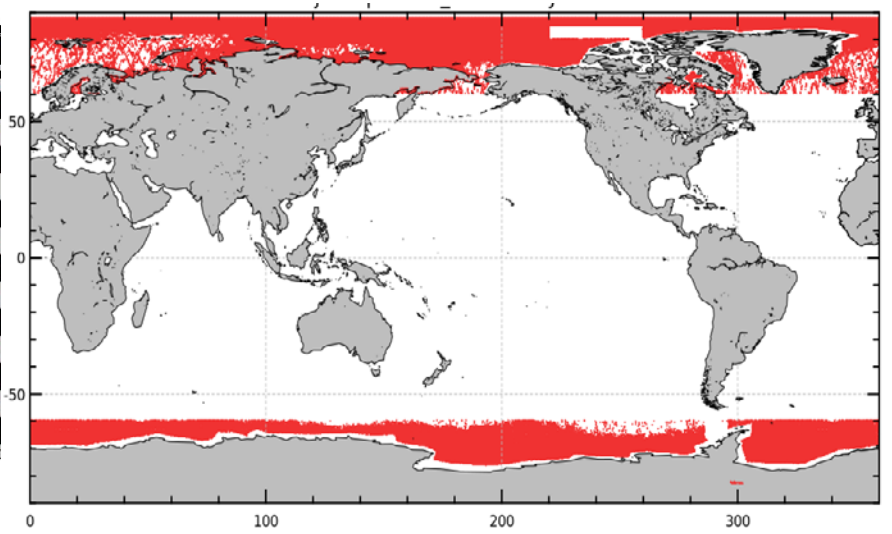
Quality assesment dedicated to C2.

- Method of iterative editing (2013) good but too severe over ocean.
  - ➔ new study to improve it at high latitudes: change limitation of 60° to a more physical source

Valid SLA map



Map of isolated points flagged as ice for C2



Specific iterative editing based on the signal variability (Cryosat-2, HY2A), ice is properly removed but it is too severe : 60° limit is not physical

Using external radiometer information (OSI-SAF)

⇒ Use of an **external** reference: **OSI SAF Ice Edge grids (EUMETSAT Ocean & Sea Ice Satellite Application Facility** => http://www.osi-saf.org/)

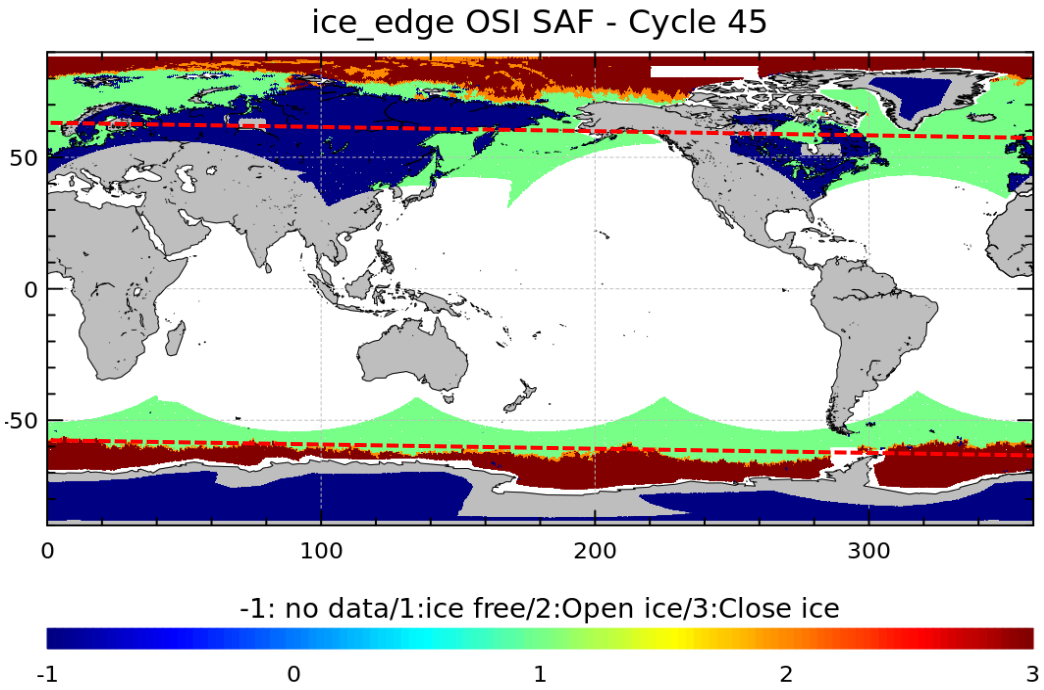
⇒ Based on a reconstruction of multiple wide swath radiometers (AMSRE…)

⇒ Available products:

- **Global Sea Ice concentration**
- Global Sea Ice Edge
- Global Sea Ice Type
- Low Resolution Sea Ice Drift

Global Sea Ice concentration = the largest coverage = best canditate for our need

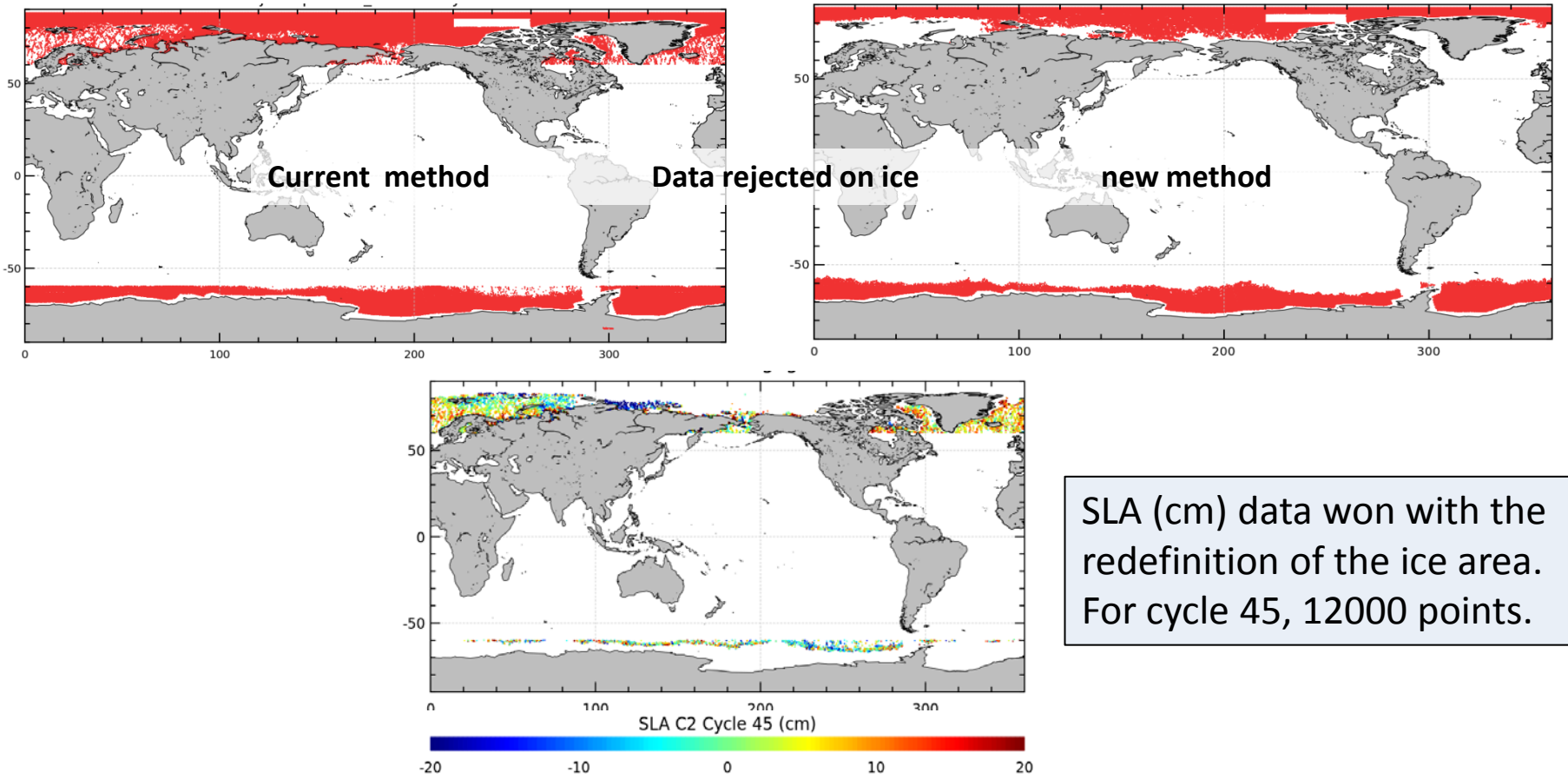
Interpolation of the daily **Global Sea Ice Concentration** > 0% along track



⇒ One grid by day, for each hemispheric zone. Polar stereographic projection, 10km gridded.

Using external radiometer information (OSI-SAF)

- Less points detected as ice, but based on a multi-source reference => more coherent
- Erroneous data previously detected as ice by iterative filtering of mispointing for |lat|>60° are now rejected by the global thresholds editing step => more coherent



SLA (cm) data won with the redefinition of the ice area. For cycle 45, 12000 points.

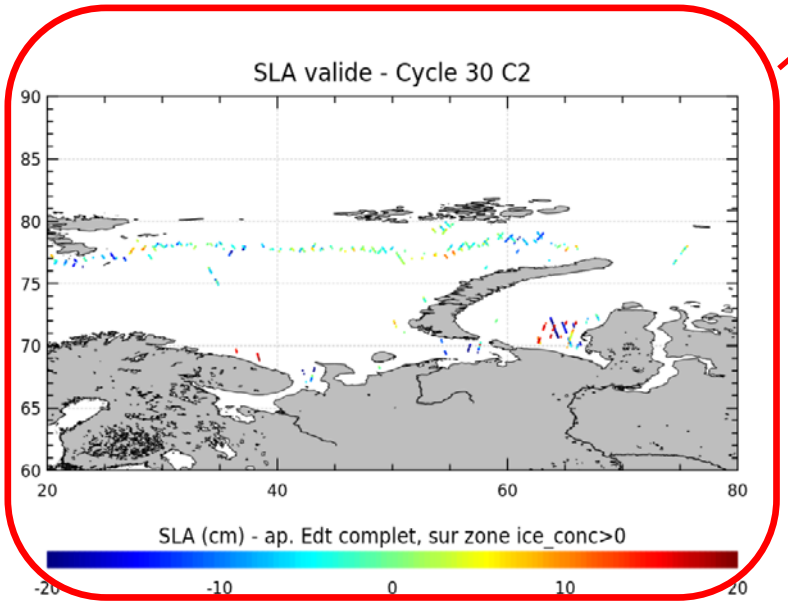
Using external radiometer information (OSI-SAF)

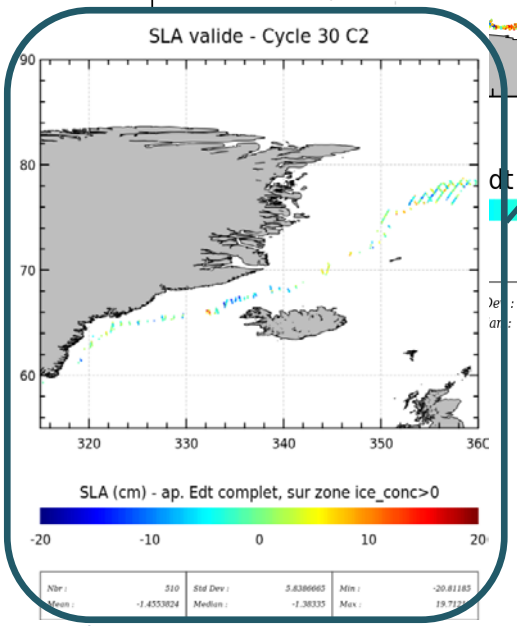
- OSI-SAF is taken as a mask to apply the iterative editing based on the data themselves wich selects valid/unvalid data:
- Combinaison iterative editing + OSI-SAF:

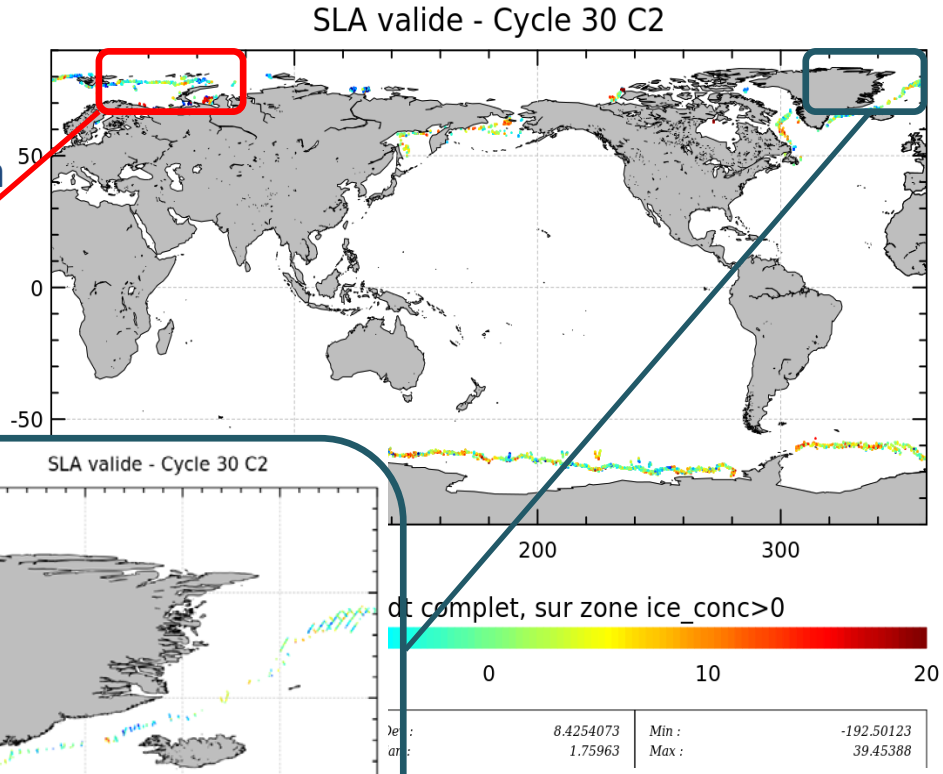
➔ Less severe than OSI-SAF alone

➔ Less severe than iterative editing alone

➔ Severe enough to remove ice corrupted data







C30: 6709 pts more than OSI_SAF mask only (concentration>0)

Conclusion

- The use of OSI-SAF products is an efficient way of masking ice zones.
- Global Sea Ice concentration is a continuous information ➔ % can be tuned whether we want:
  - **To be sure to be over ice OR**
  - **To have a risk/chance of having a bit of ice**
- We decide to take the largest mask (CSIC > 0%) because we combine it afterwards with an iterative threshold based of the data statistics of the waveform outputs afterwards ➔ avoids the temporal/spatial errors much more physical than a 60° threshold.
- This method has many advantages:
  - It can be used for **any mission** which does not have a precise radiometer on board (alone of combined with other selections
  - It can be used to detect polluted **pixels** in general (SWOT?)
- It will be applied is DUACS products for Cryosat-2, HY2A at least
- For other missions, the impact could be compared to the current editing