EUMETSAT GRAS reprocessing activities

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08-09-2022

Agenda

Introduction

Work done in the preparation of the Reprocessing Activities

- Yaw Steering Model.
- Degraded products Metop-A .
- SNR QC.

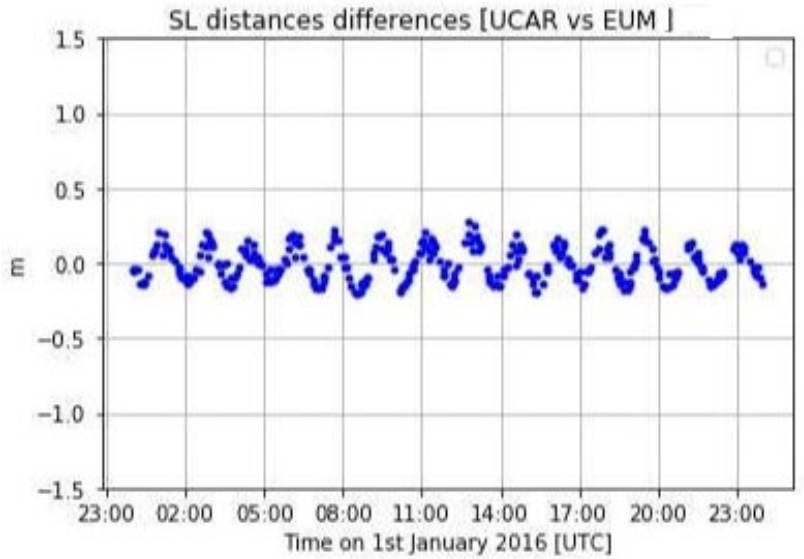
Conclusions

Introduction

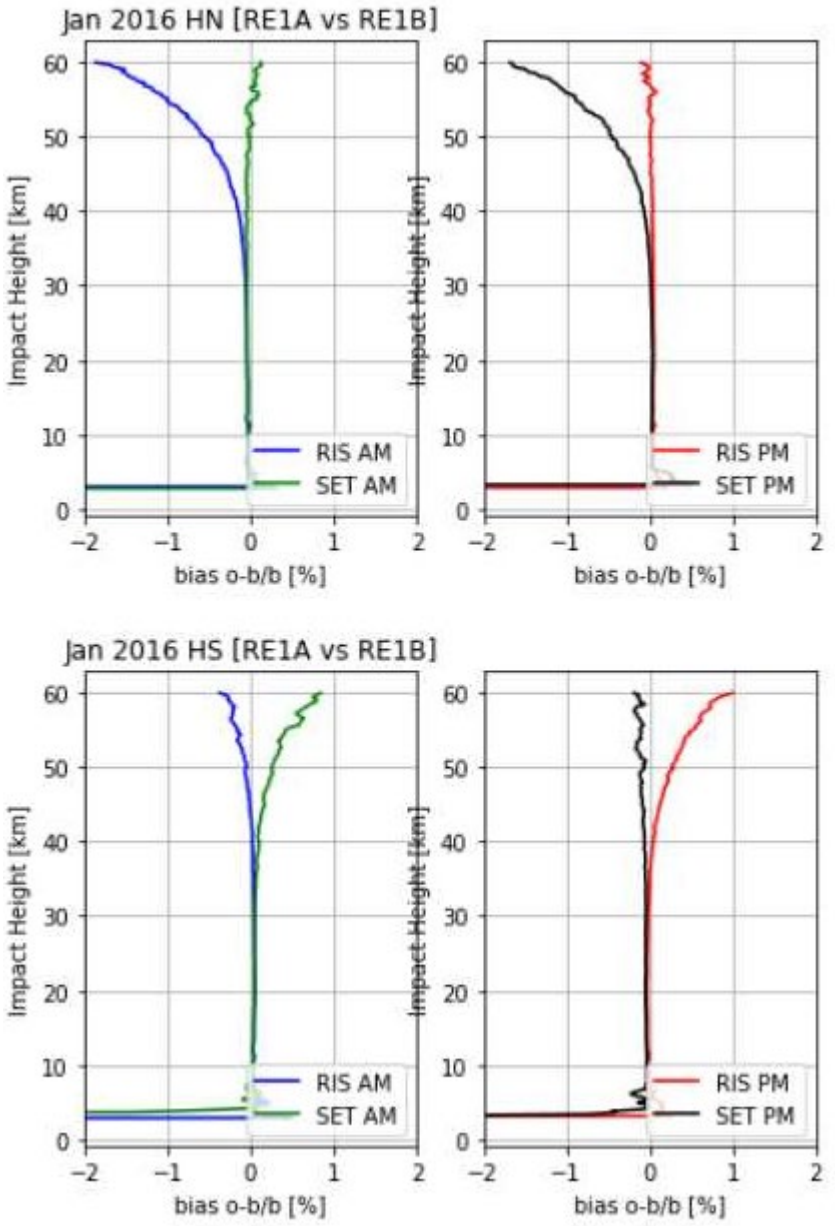
- EUMETSAT provides Operational Radio Occultation products of different RO missions such Metop GRAS, Sentinel-6, COSMIC, CHAMP, GRACE, and Commercial SPIRE.
- This is done via an in-house operational processor.
- This operational processor is based on a science prototype software called YAROS (Yet Another Radio Occultation Software) also developed at EUMETSAT.
- In addition to the operational processing, EUMETSAT also performs regular reprocessing activities to provide complete and consistently processed datasets.
- Improvements developed for successive reprocessing rounds include both bug fixes and algorithm improvements.
- In this context, we want to present some of the main work done in preparation of the next reprocessing activities.

Yaw-steering model

- From the ROM-SAF Validation Report (version 1.2), it was identified a systematic bias structure between RE1A and RE1B (where RE1A was based on EUMETSAT low level data, and RE1B was based on UCAR low level data).

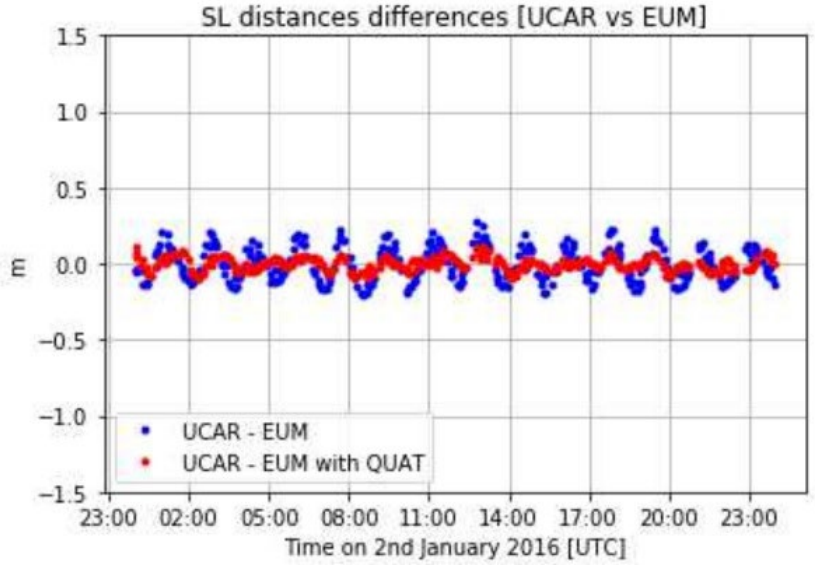


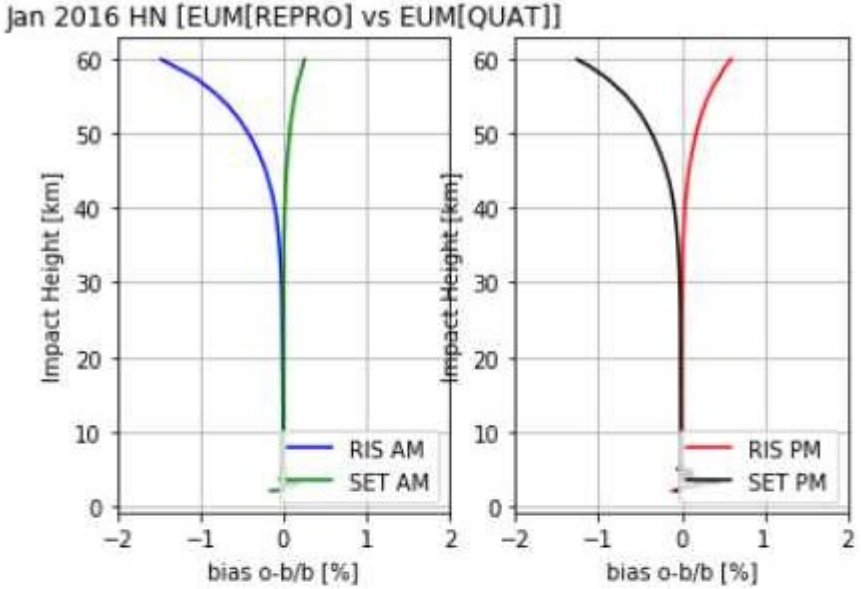
- Initially guess was a possible bias in the orbit determination in the reprocessed data from EUMETSAT.

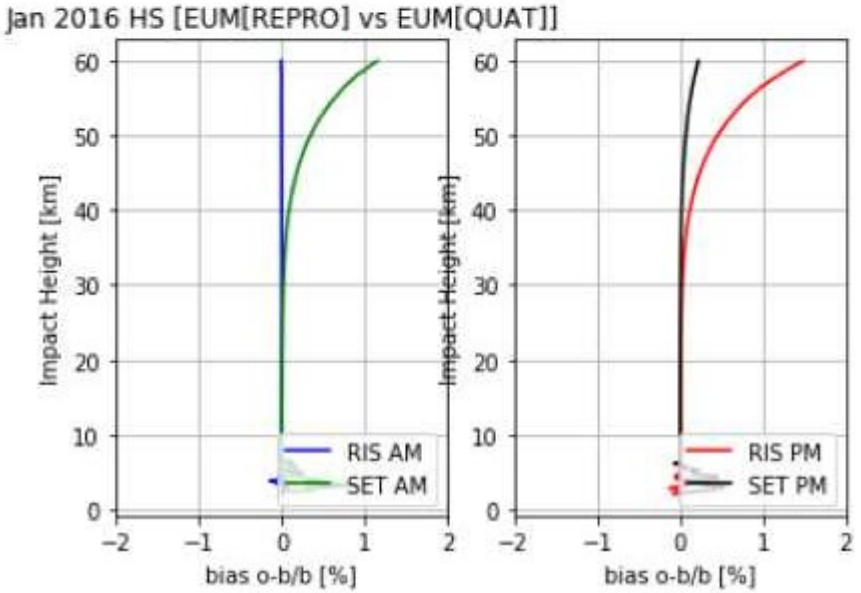


Yaw-steering model

- By including the yaw-steering model (satellite leo attitude) in the occultation process, this issue observed has been reduced.

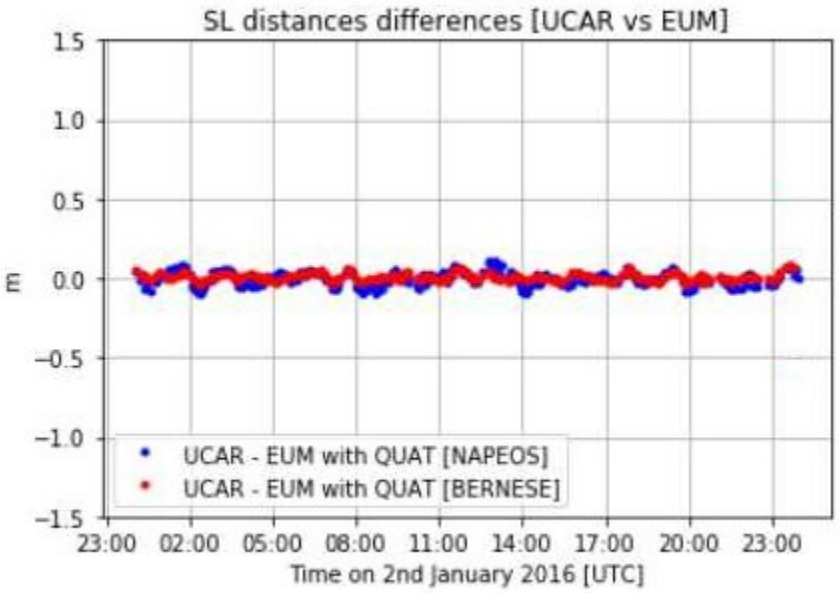


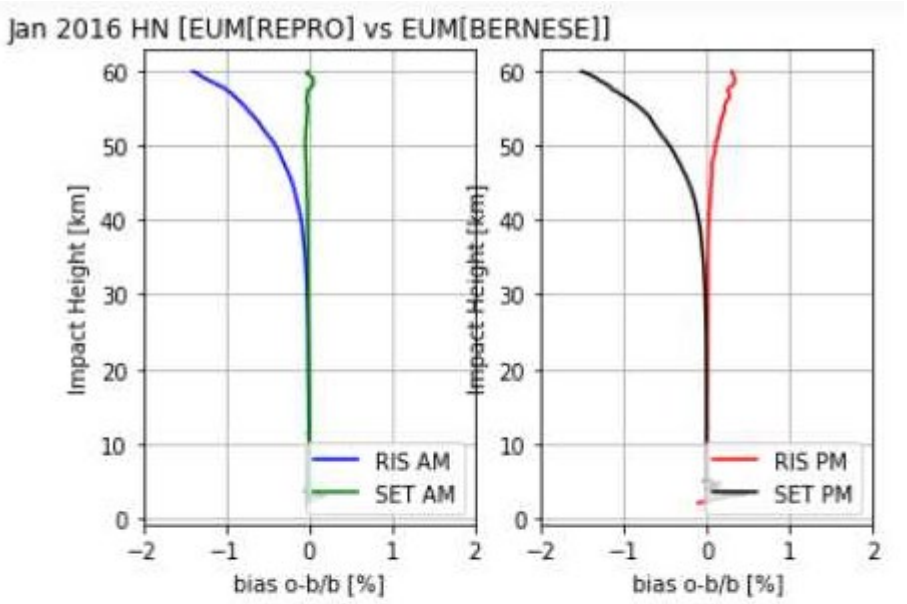


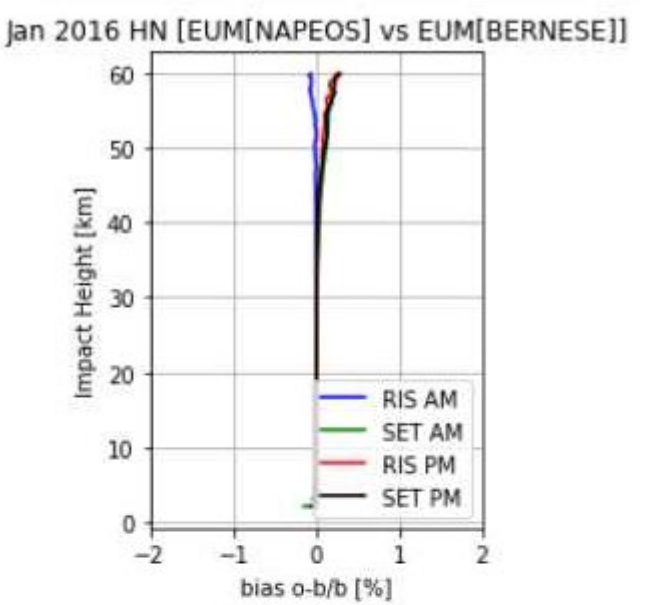


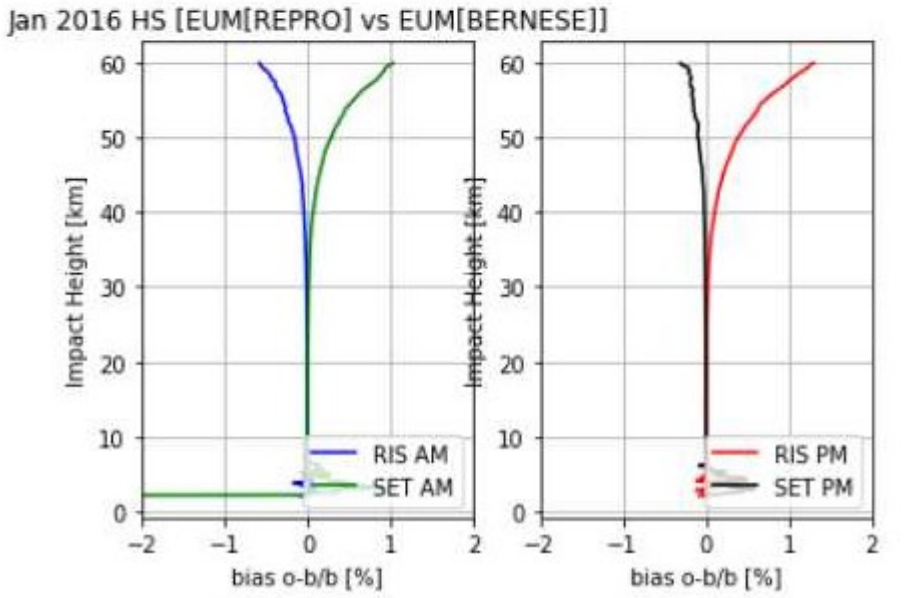
Yaw-steering model.

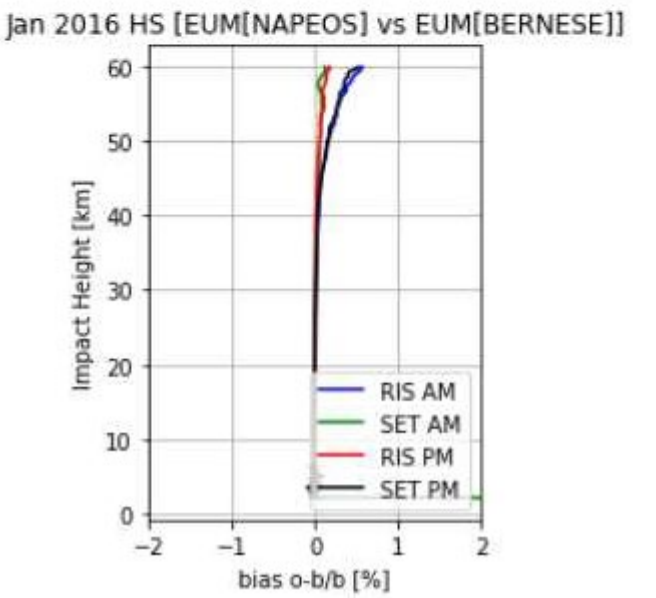
- Next step, use Bernese orbits?







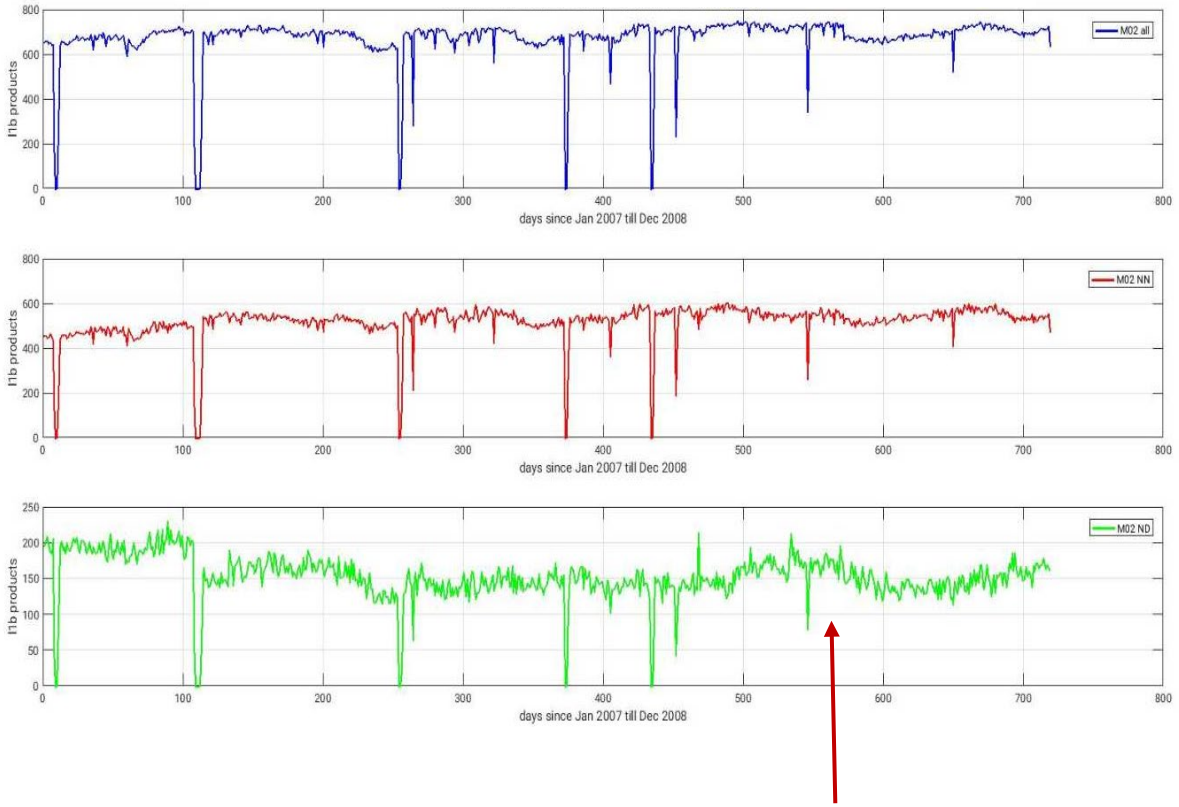




Degraded products Metop-A

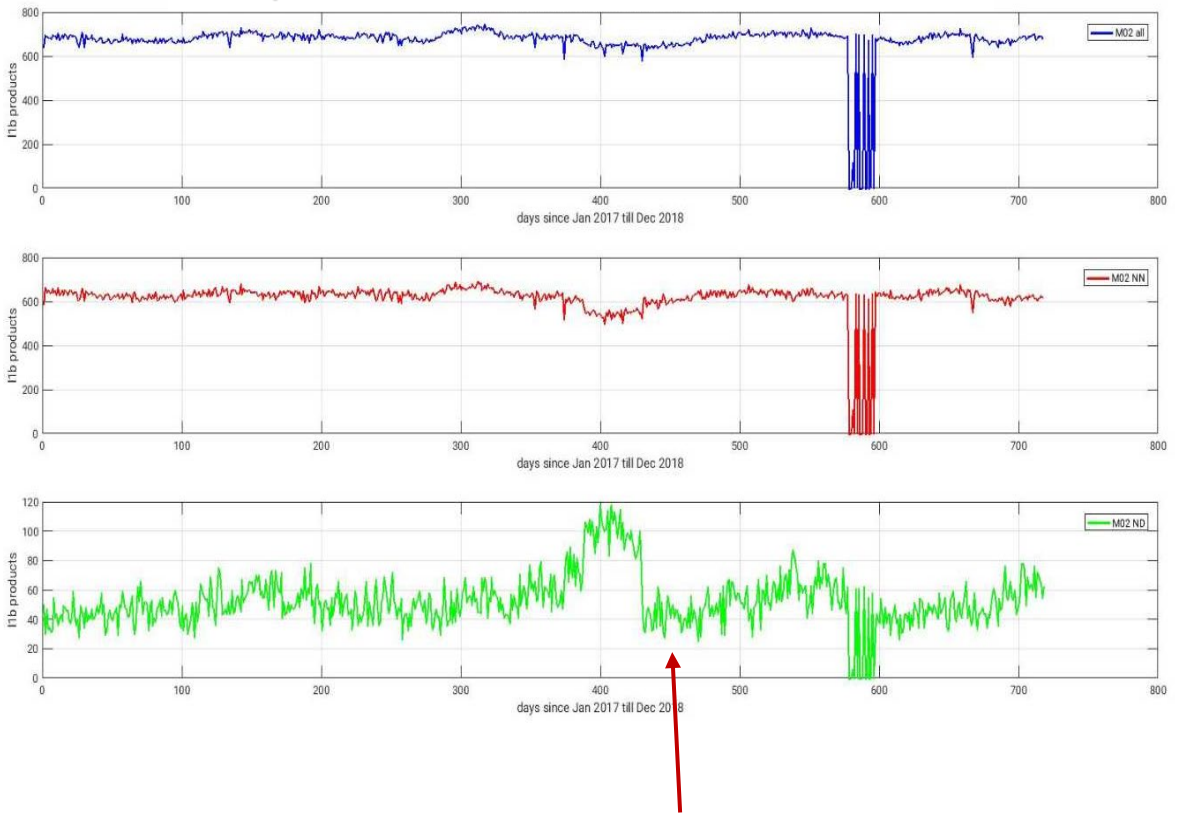
- Another open issue identified during the last reprocessing, and validation exercise, was the high amount of ND products obtained for Metop-A in the earlier years (i.e before 2009/2010).

L1b products M02 [Jan 2007-Dec 2008]



Between 150-200 ND products/day approx…

L1b products M02 [Jan 2017-Dec 2018]

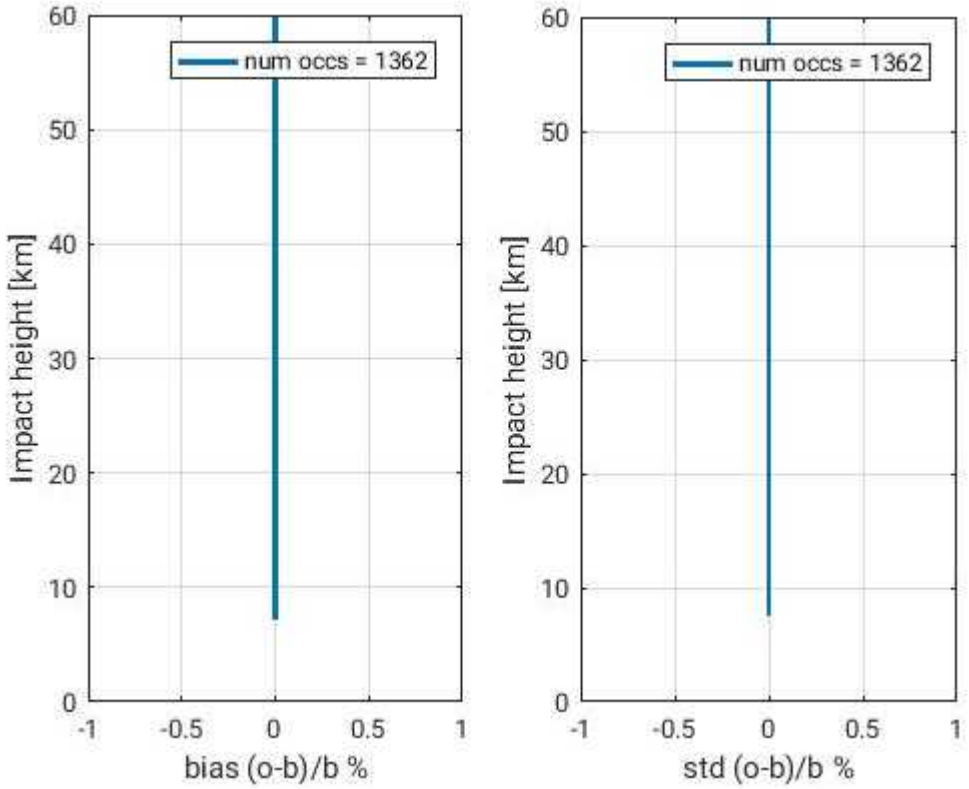


Between 40-80 ND products/day approx…

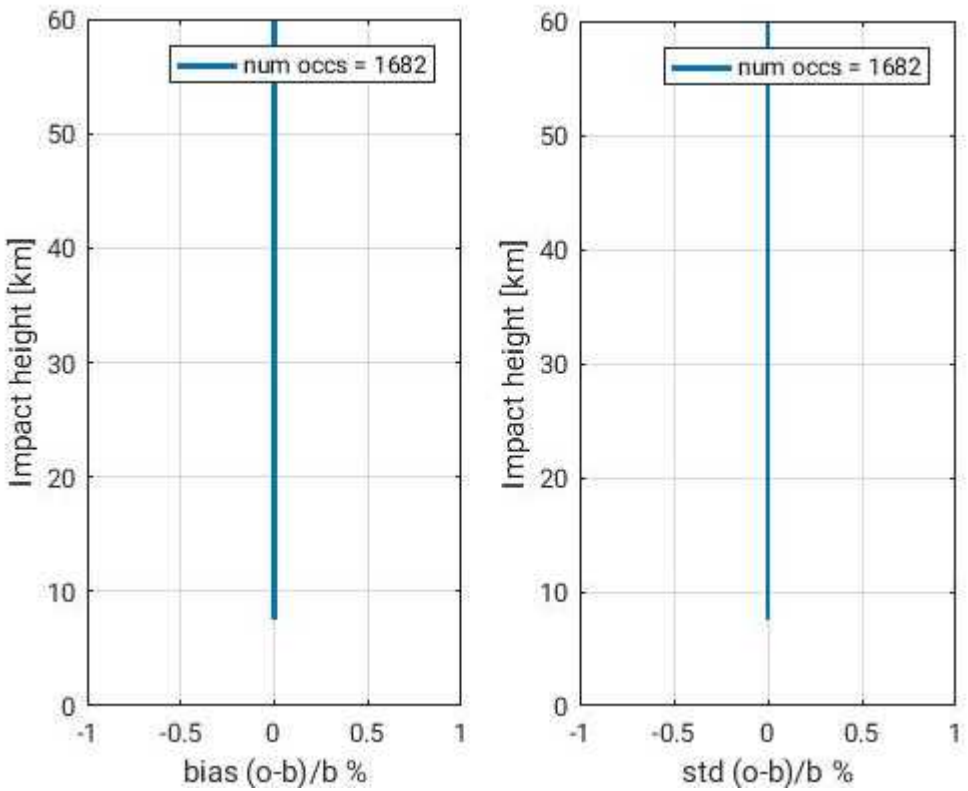
Degraded products Metop-A

- Most of those degraded products were observed in the FPT retrieval, during the signal rewrite.
- We fixed this issue, plus another small bags observed at low level processing.

M02-Doppler Enhanced Model vs Empirical [01-03-Jan-2007]

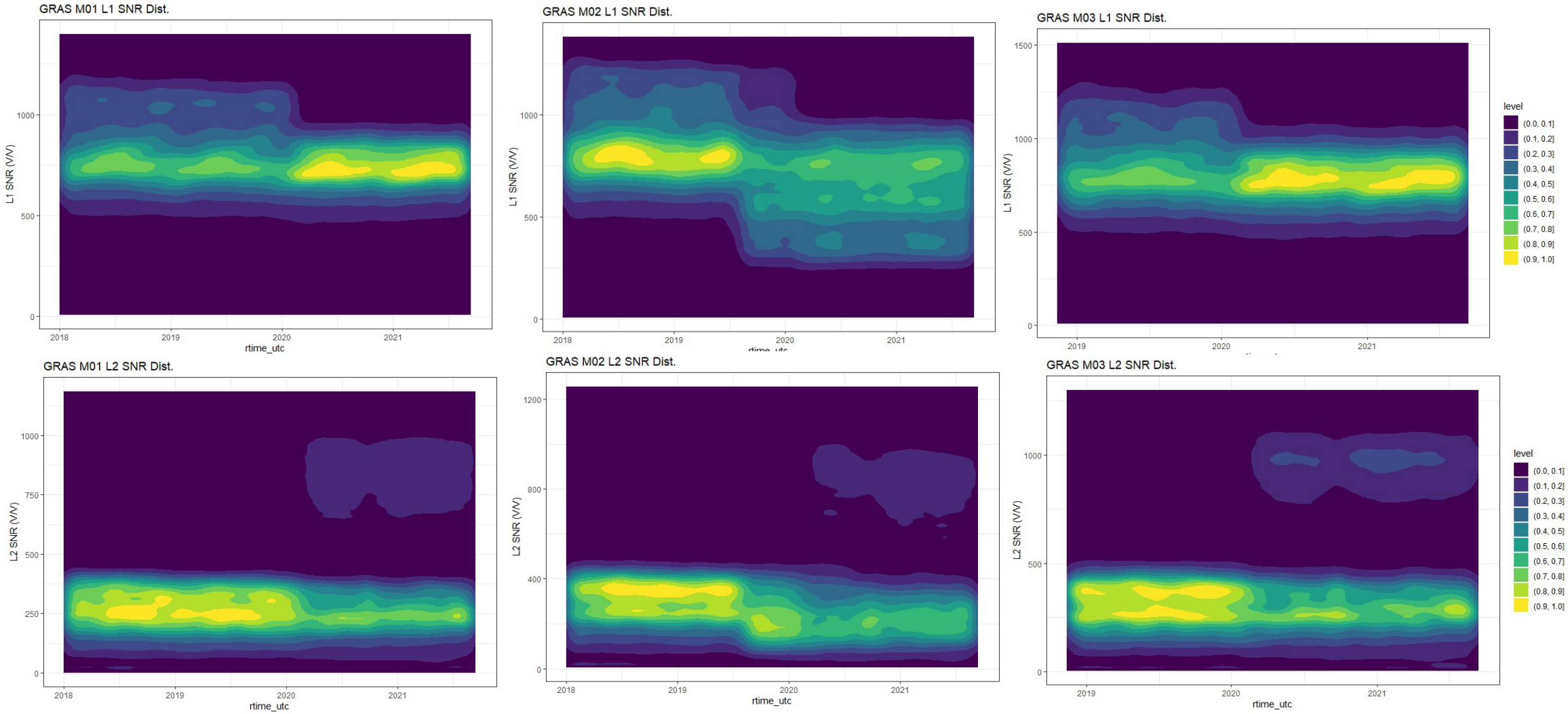


M02-Doppler Enhanced Model vs Empirical Updated [01-03-Jan-2007]



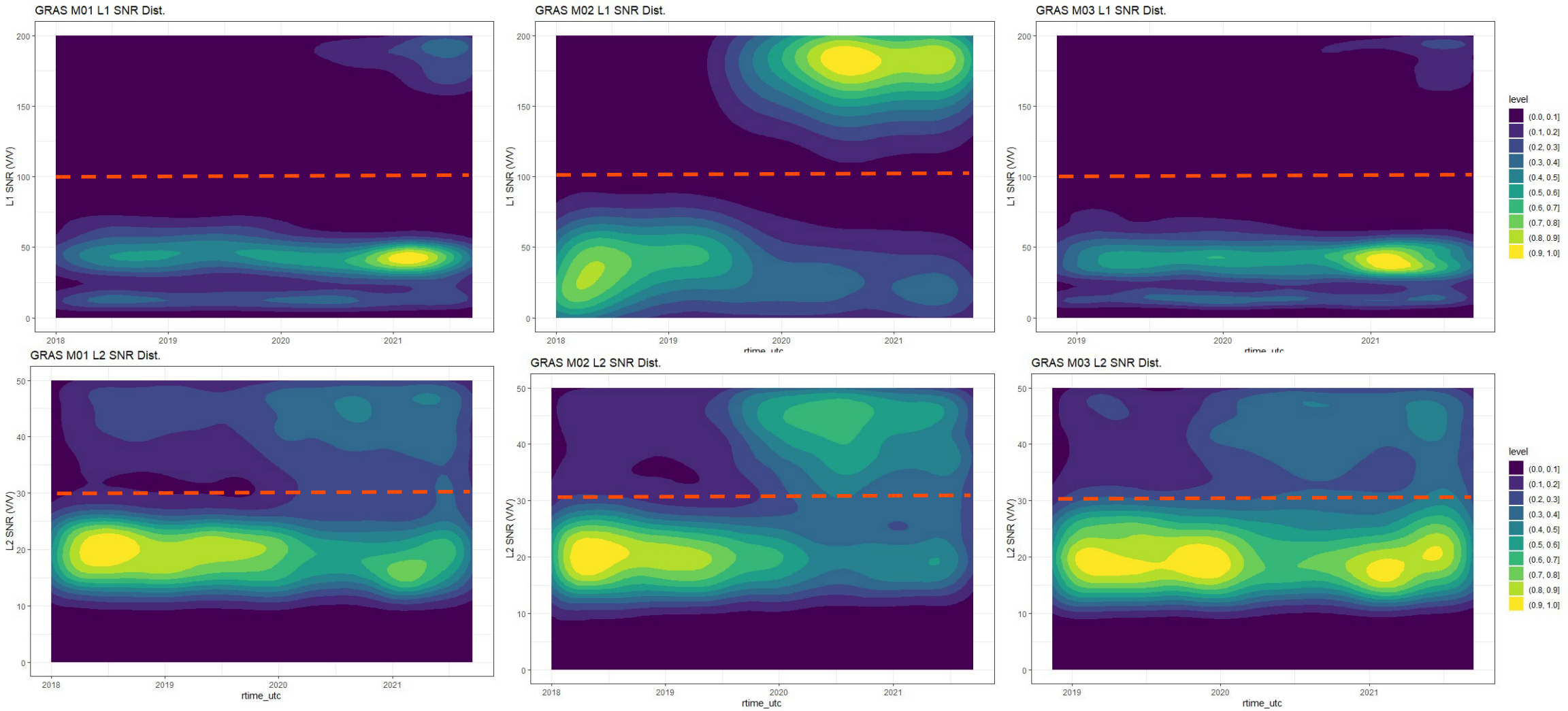
SNR QC

- One of our QC checks consist on ensure that average SNR values at a given altitudes are sufficiently high.



SNR QC

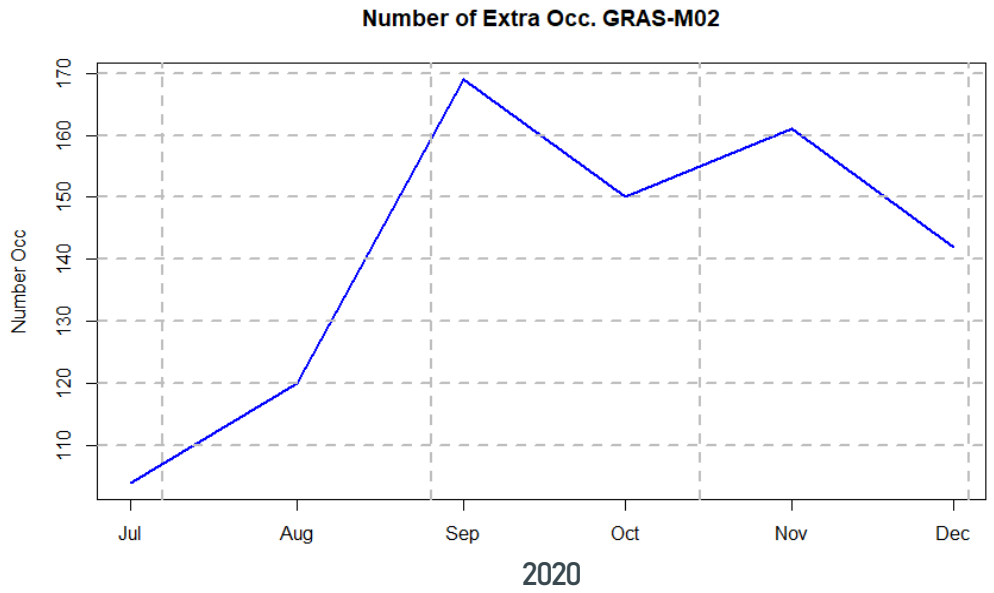
- Initial estimated SNR thresholds were 200, 50, and 50, for L1, L2 and L5 respectively.
- Can we relax a bit those SNR thresholds?

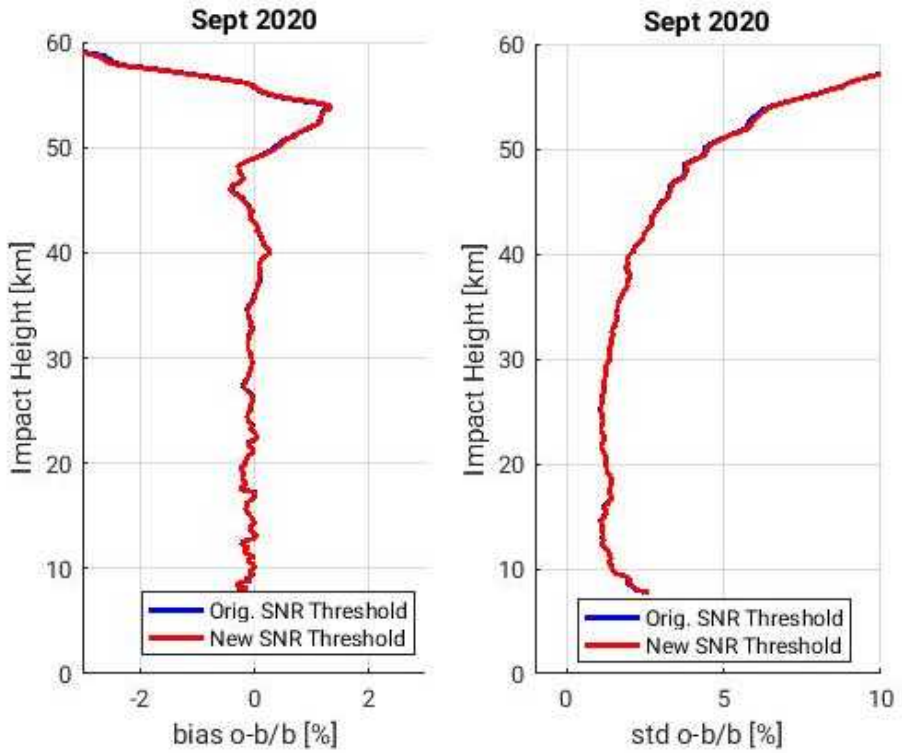


SNR QC

- We have run for Metop-02 the period July – Dec 2020 with the SNR thresholds suggested in the previous slide.

- Here we show the number of additional 'Nominal products' obtained with these new SNR thresholds, and the initial Global statistics obtained for September.





Conclusions

- In this presentation, we have presented some of the main work done in preparation of the next reprocessing activities.
- We started presenting the improvement achieved with the inclusion of the yaw-steering model (satellite leo attitude) in our occultation process, which helped to reduce the systematic bias note by the ROM-SAF Validation Report (version 1.2).
- In addition , we also provided initial results using Bernese orbits.
- We have fixed some issues/bugs in our low level processing steps.
- Main impact observed in the products obtained for Metop-A, concretely in the earlier years (i.e before 2009/2010), where the high amount of ND products observed during the last reprocessing have been reduced.
- Finally, we have reviewed the initial estimation of the SNR thresholds done for L1, L2 and L5, and the potential benefit (or not) of update those values.
- Preliminary results have been presented.

Thank you!

Questions are welcome.