Title:

S-1A Range shifts of denoising vectors for GRDM, GRDH and OCN products

Description:

The problem is data dependent and does not affect all products.

When it happens:

- For Level 1 products: it only impacts GRD data in all sub-swaths but IW1 and EW1 with a smaller range shift of the denoising vectors. The SLC products are not impacted. The impact is only observed when user is applying the denoising vector to the data. This small range shift is then inducing a mismatch between the noise vector to be compensated and the one effectively compensated.
- For Level 2 products: the OWI denoising vectors are shifted and the OWI denoised NRCS variables are impacted (both are available in OCN products since 31 March 2016 and usage of IPF version 2.7 or later), and slight degradation of wind measurement is expected when the wind inversion takes into account denoised NRCS (this corresponds to products processed since 27 November 2019). While the impact may be visible on impacted products, it is not highlighted on statistical analysis over large number of products.

Illustration of the issue and improvement introduced since start of operation of IPF version 3.5.1 is provided at the end of this report.

Degradation types:

- ☐ DEGRADED_PRODUCT_RADIOMETRY
- ☒ DEGRADED_RADIOMETRIC_CALIBRATION
- ☐ DEGRADED_ORBIT_CONTROL
- ☐ COMPLETE_PRODUCT_DEGRADATION
- ☐ DEGRADED_PHASE
- ☐ DEGRADED_PRODUCT_GEOLOCATION
- ☐ DEGRADED_PLATFORM_POINTING
- ☐ DEGRADED_PERFORMANCE_INSTRUMENT_ANOMALY
- ☐ SLICE_PRODUCT_NON_CONCATENABLE
- ☐ OTHER

Degradation percentage[1]:

5%

Impacted products:

Platform: ☒ S-1A ☐ S-1B

Acquisition mode: ☒ EW ☒ IW ☐ SM ☐ WV ☐ RF

Product type: ☐ RAW ☐ SLC ☒ GRD ☒ OCN

Resolution class: ☒ MR ☒ HR ☐ FR ☒ N/A

Polarization: ☒ SH (Single pol. H) ☒ SV (Single pol. V) ☒ DH (Double pol. H) ☒ DV (Double pol. V)

Processing facility: N/A

IPF version:

Instrument Configuration ID (RDB): N/A

ADF files:

AUX_INS	N/A
AUX_CAL	N/A
AUX_PP1	N/A
AUX_PP2	N/A
AUX_SCS	N/A

[1] Percentage of degradation of the data in the product (100% means that the product should be masked in the product catalogue)

Beginning of the issue:

Start acquisition date: 2014-09-30T15:17:26
Start generation date:
Orbit: 2623
Datatake (hex): 002E84

End of the issue:

☐ not yet defined ☒ available

End acquisition date: 2022-03-23T10:25:10
End generation date:
Orbit: 42447
Datatake (hex): 050FD7

Cause:

The issue is related to the generation of the GRD thermal noise correction by the Sentinel-1 SAR processor. This process was improved in IPF version 3.5.0.
IPF version 3.5.0 was not deployed, however this improvement is part of more recent version of the processor, starting with IPF version 3.5.1

Status:

Improvement applied since start of operations of IPF version 3.5.1

References:

- **MPC ref:** MPCS-2377

Illustration of the improvement:

Following figures present examples of improvement introduced in generation of denoising vectors for EW and IW products. Those figures correspond to range profile of normalised radar cross section over homogeneous scene for the cross-polarisation channel and after compensation of the denoising vectors provided in the products. The two curves present the results obtained with product processed with IPF version 3.4.0 (impacted by the anomaly) and with IPF version 3.5.0 (including the correction).