Title:

Bias in OSW Wind Speed measurement for S-1B WV1 between 12th May 2020 and 23rd June 2020

Description:

Bias in WV OCN OSW Wind Speed (one single value per WV1 imagette) measurement for S-1B WV1 between 12th May 2020 and 23rd June 2020, induced by discrepancy between the radiometric calibration of the S-1A WV acquisition and the wind inversion model applied in the Level 2 Ocean Processor.

The bias is of -0.5 m/s on the impacted period for WV1 beam.

The WV OCN OWI Wind Speed measurement (gridded measurement) is not impacted by this anomaly.

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:	☐ PAC1 / UPA		☐ PAC2 / DPA		
	☐ CGS1 / Matera		☐ CGS2 / Svalbard		☐ CGS3 / Maspalomas

IPF version: 003.20
Instrument Configuration ID (RDB): N/A
ADF files:

AUX_INS	N/A
AUX_CAL	N/A
AUX_PP1	S1B_AUX_PP1_V20160422T000000_G20201215T123723
AUX_PP2	N/A
AUX_SCS	N/A

Beginning of the issue:

Start acquisition date: 2020-05-12 11:07:24 UT
Start generation date: 2020-05-12 13:19:31 UT
Orbit: 21547
Datatake (hex): 028E90

End of the issue:

☐ not yet defined ☒ available

End acquisition date: 2020-06-23 01:38:51 UT
End generation date: 2020-06-23 12:56:01 UT
Orbit: 33139
Datatake (hex): 03D6D1

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

Cause:

The radiometric calibration of S1A & B WV products is performed by geophysical validation of measured normalised radar cross section (NRCS) vs predicted NRCS from numerical weather forecast/analysis and a wind geophysical model function (GMF).

During the year 2020, the WV geophysical calibration was updated. While the Cmod-ifr2 (Quilfen, et al., 2002) was used up to now, the Cmod5n (Herbash, 2008) GMF is now used.

On the 12nd May 2020, an update of processing gain for S-1A WV1 and S1-B WV1 beam was put in place to apply the radiometric calibration derived from this new methodology and hence improve the radiometric calibration of S-1A and B WV Level 1 products (refer to Quality Disclaimer 66 and 67).

However, the Level 2 processing was not updated accordingly to take into account the Cmod5n GMF and a denoising of NRCS used in the wind inversion performed as a side product of the OSW (Ocean Swell) process, thus introducing a bias in wind measurement provided in the Level 2 WV OSW wind speed variable (one single measurement per WV imagette).

The WV OCN OWI Wind Speed measurement (gridded measurement) is not impacted by this discrepancy.

Status:

The bias was compensated by upgrade of the Sentinel-1 IPF processor on 23rd June 2020, introduction usage of Cmod5n GMF in the wind inversion process, thus aligned with the radiometric calibration of the WV1 beam.

The products generated after this date are not impacted.

References:

- **MPC ref:** MPCS-2402

Temporal evolution of S-1B WV OCN OSW Wind Speed measurement

For S1B WV1 OSW wind measurement a bias is introduced between 12 May 2020 and 23 June 2020.
The status of S1B WV2 OSW wind measurement is discussed in Quality Disclaimer number 65.

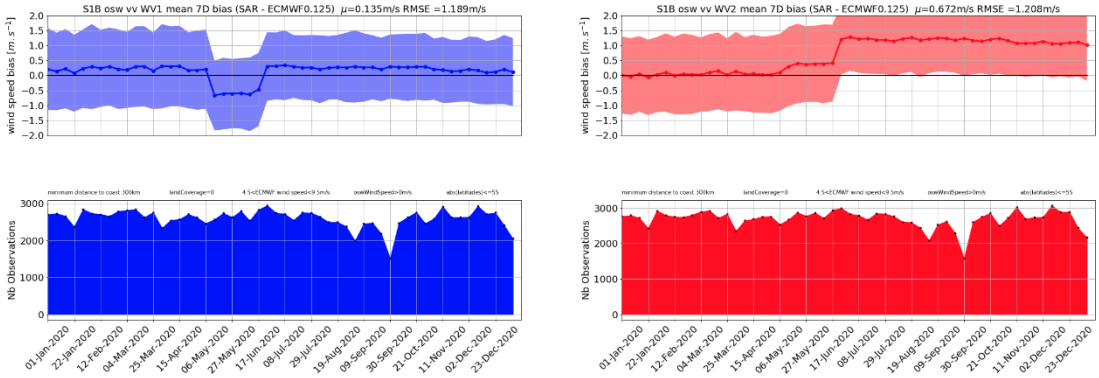

Figure 1: Difference in ocean surface wind speed between *oswWindspeed* S-1 WV OCN variable and ECMWF numerical model (0.125° spatial resolution grid and 3-hours for time resolution). Bold line is the daily mean of the individual measurement differences and the background colour is the daily standard deviation.

Temporal evolution of S-1B WV OCN NRCS measurement

Starting from 12 May 2020, the radiometric calibration of S1B WV1 and WV2 as computed using the Cmod5n geophysical model function and with a comparison to ECMWF 0.125° is improved.
The status of radiometric calibration of S1B WV 1 and WV2 before this date is discussed in Quality Disclaimers 67.

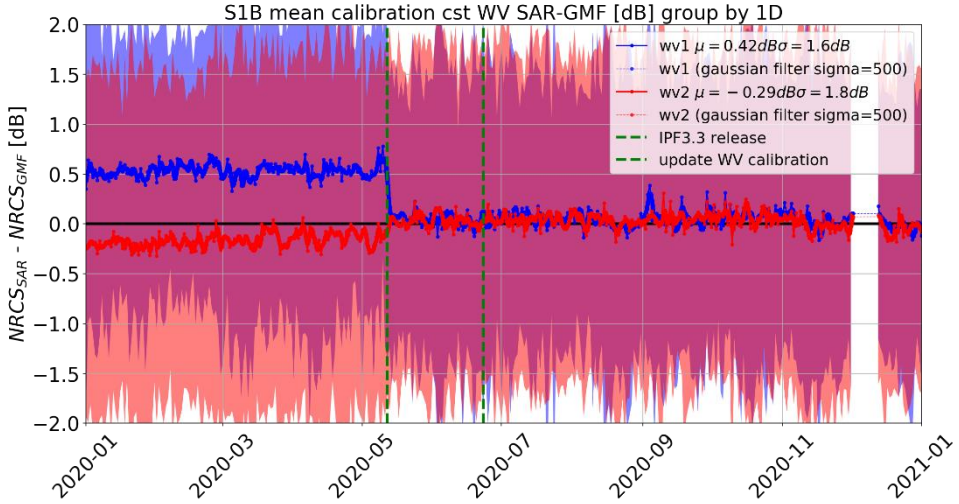

Figure 2: assessment of the WV SLC calibration (denoised Sigma0) using geophysical approach i.e. comparison with Cmod-5n with ECMWF0.125° (3h)