National Oceanography Centre
NATURAL ENVIRONMENT RESEARCH COUNCIL

CryOcean-QCV - quality control/validation for CryoSat-2

NOP Daily Data Quality report for 21/06/2022

DOCUMENT INFORMATION			
Document history			
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NOP DAILY QUALITY ASSESSMENT FOR 21/06/2022

Report issued on **22/06/22**
Date and time of the first record: **21 06 2022 00:00:00.340**
Date and time of the last record: **21 06 2022 14:37:42.993**
Range of complete orbits in present day: **64672** to **64679**

WARNINGS (see Appendix A for details)
latency_fail: 4.1% of records delivered with a delay of more than 6.4 hours
orbit_dropout: 79.6% of records over ocean for orbit 64671
orbit_dropout: 74.2% of records over ocean for orbit 64678
ocean_dropout: 58.6% of records over ocean for 21/06/2022

1 Data latency

Median latency [min max]: 2.0 days [0.3 - 8.3]

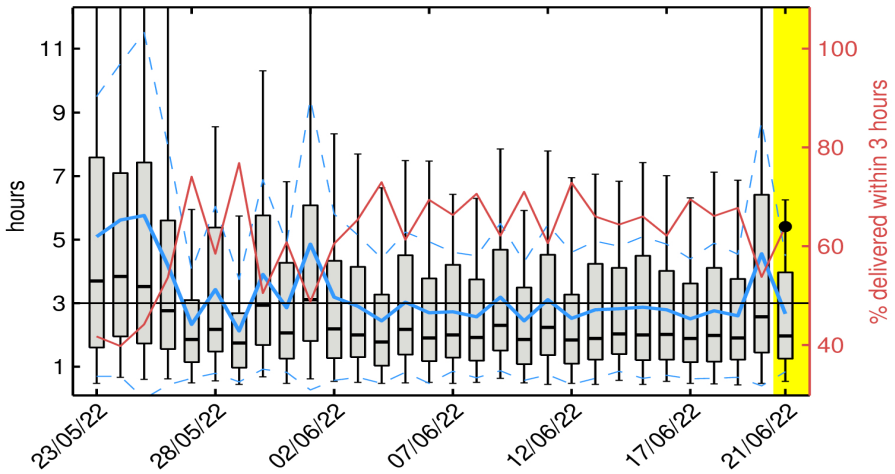


Figure 1. Box-and-whiskers plot for the latency showing for each day in last 30-day window the first and third quartiles (bottom and top of the box), the median (thick black), the 5% and 95% percentiles (lower and upper whiskers), the mean (blue) and the mean ±1 standard deviation (blue dashed line). The percentage of records delivered within 3 days is also shown (red, right y-axis). The yellow shading highlights the day analyzed in this report whereas the horizontal black line denotes the 3 days threshold.

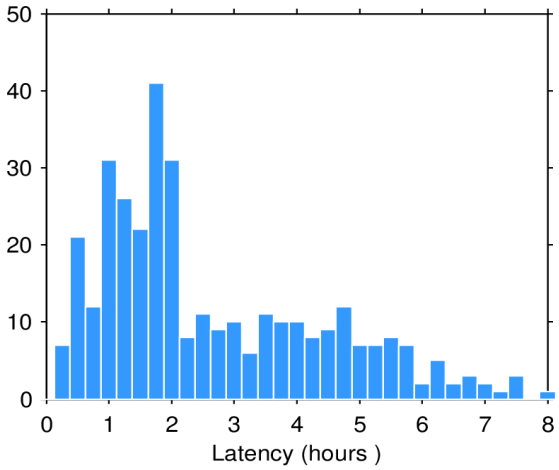


Figure 2. Histogram of the data latency for 21/06/2022. The y-axis denotes the number of files that are made available with a delay of x-hours with respect to the mean time of the records stored in the file.

2 Data coverage and completeness

	Present in day	Theoretical max.	Percentage (%)
Total	42850	73958	57.9
Oceans and lakes	34318	58594	58.6

Table 1. Number of total (land and ocean/lake) and only ocean/lake records (based on the surface_type flag) together with their percentage relative to the theoretically expected number of measurements from the orbits ground tracks for 21/06/2022. Theoretical values are also shown.

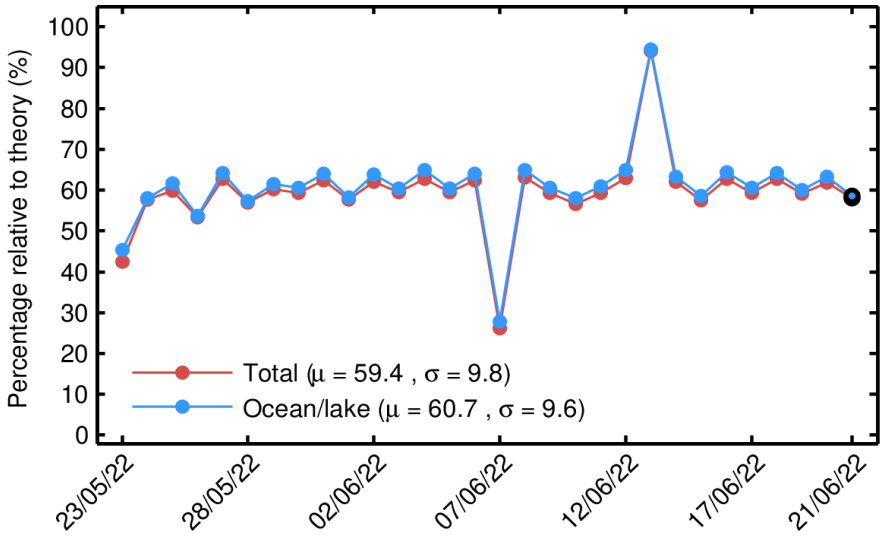


Figure 3. Percentage of 1-Hz records over land and ocean/lake (red) and only over ocean/lake (blue) relative to the theoretically expected number from the orbits ground tracks for each day in last 30-day window. The black circle at the end of the time series highlights the day analyzed in this report.

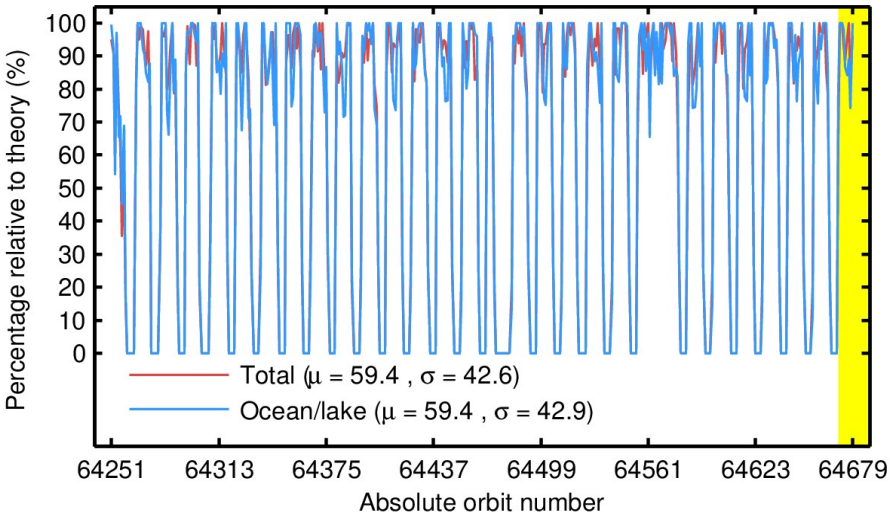


Figure 4. Percentage of 1-Hz records over land and ocean/lake (red) and only over ocean/lake (blue) relative to the theoretically expected number from the orbits ground tracks for each orbit in last 30-day window. The yellow shading highlights the day analyzed in this report. The mean (μ) and standard deviation (σ) are also shown.

3 SSH anomaly coverage and validity

Note 3.1: *unless otherwise stated, measurements taken over polar polygons have been excluded from the computation of all statistics shown in this section.*

Note 3.2: *the extent of the regions defining the geographical mode mask of the reference mission is shown in Figure A1 (Appendix A).*

Note 3.3: *most statistics shown in this section have been computed separately for the low resolution mode (LRM), synthetic-aperture radar mode (SAR), and the pseudo low resolution mode (PLRM).*

3.1. Validity based on flags

Note 3.4: *here "flag-valid" refers to those records that have not been flagged as bad by either the average status flag or the measurement confidence flag.*

Number of flag-valid 1-Hz SSH records over oceans and lakes (including polar regions): **29547**

Percentage of flag-valid 1-Hz SSH records over oceans and lakes (including polar regions) relative to theoretical maximum: **50.4%**

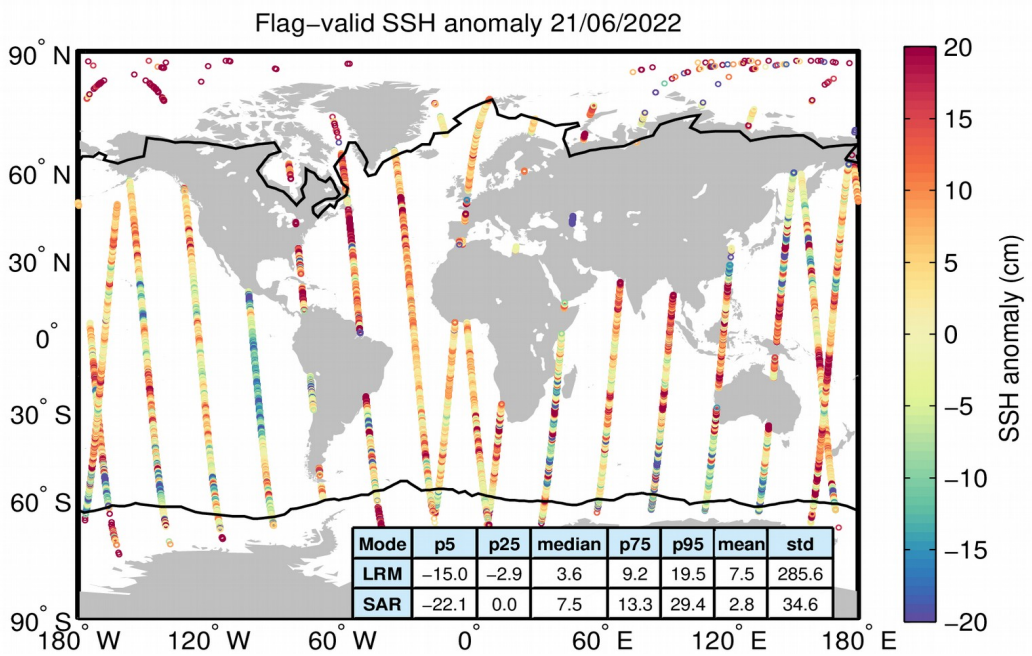


Figure 5. Geographical distribution of flag-valid 1-Hz SSH anomaly data over oceans and lakes for 21/06/2022. The statistical values shown in the table refer to the SSH anomaly in cm and are calculated separately for LRM and SAR regions. Measurements taken over polar polygons have been excluded from the computation of the statistical values. The black lines mark the outer limit of the Arctic and Antarctic polar polygons.

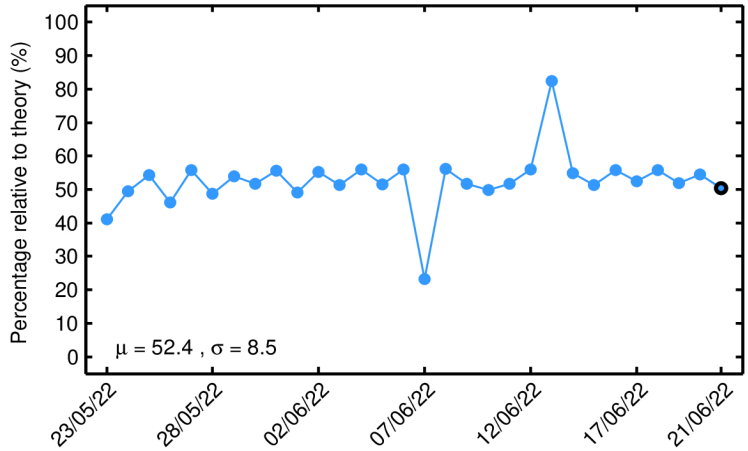


Figure 6. Percentage of flag-valid 1-Hz SSH records over ocean and lakes (including polar regions) relative to theory for each day in last 30-day window. The mean (μ) and standard deviation (σ) are also shown.

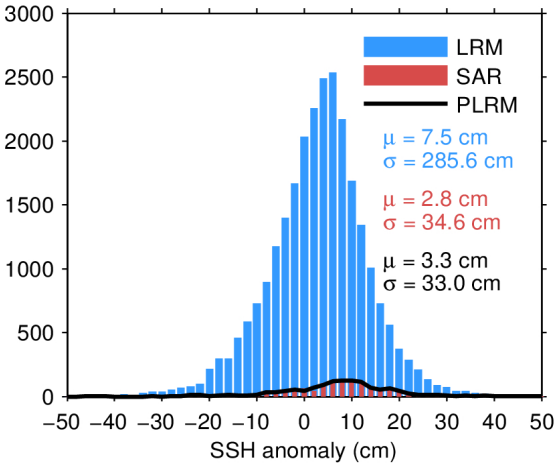


Figure 7. Histogram of flag-valid SSH anomaly over oceans and lakes for LRM (blue), SAR (red), and PLRM (black) for 21/06/2022. The mean (μ) and standard deviation (σ) are also shown. Note that values outside [-50 50] cm are excluded from the histogram for the sake of readability but not from the computation of μ and σ.

3.2. Analysis of measurement noise

20-Hz measurement noise (average std of 20-Hz sample blocks) for the flag-valid SSH anomaly over oceans and lakes for LRM and SAR, respectively: **8.4 cm** and **7.9 cm**

Equivalent 1-Hz measurement noise for the flag-valid SSH anomaly for LRM and SAR, respectively: **1.9 cm** and **1.8 cm**

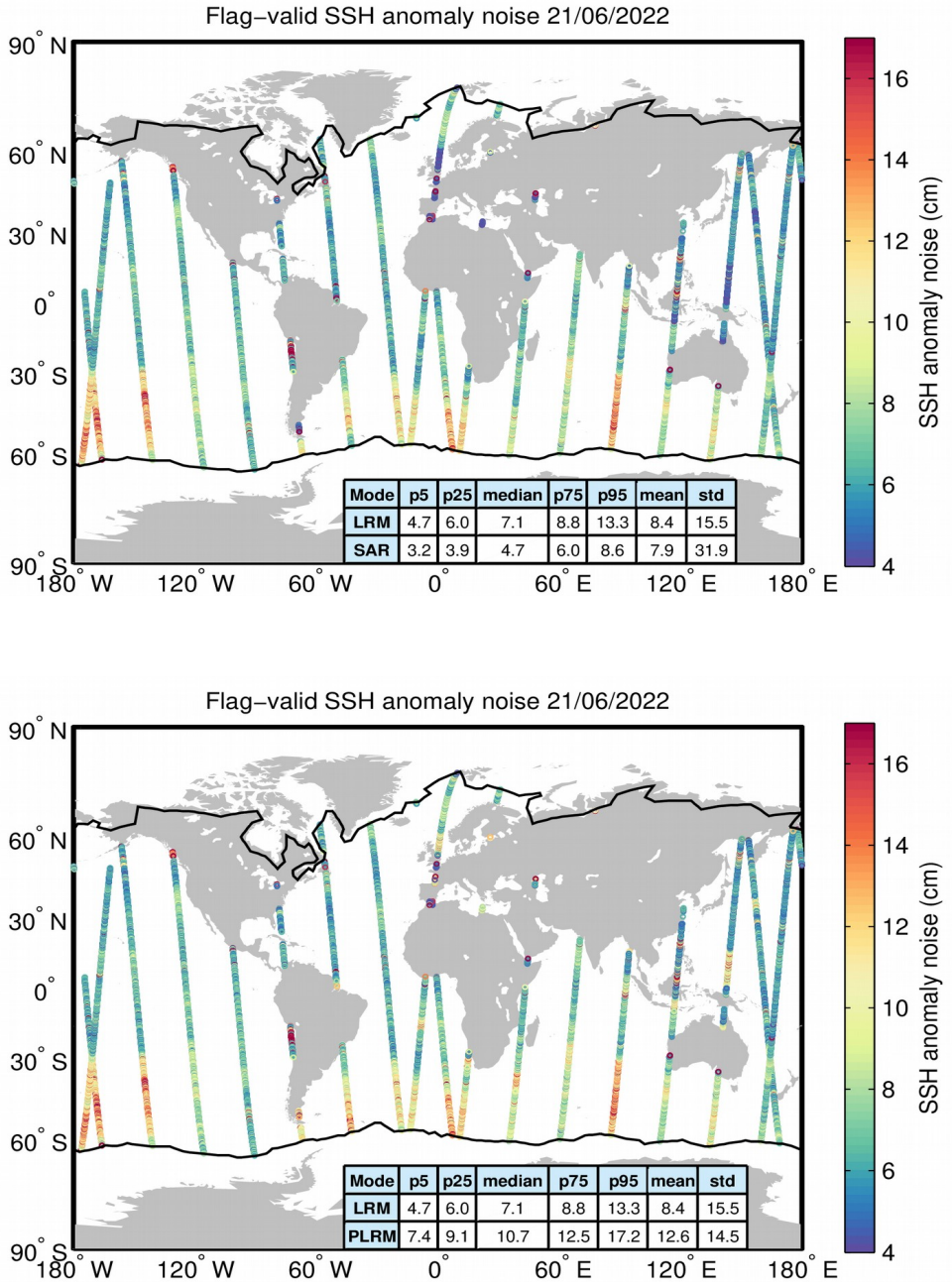
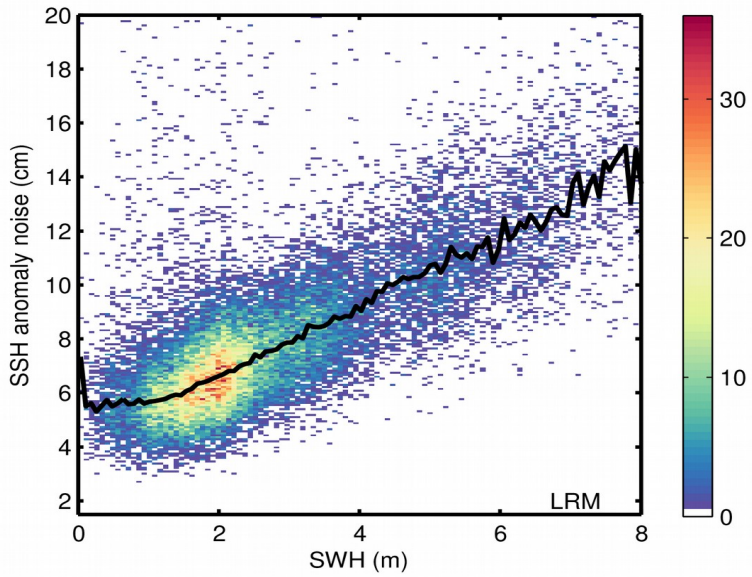
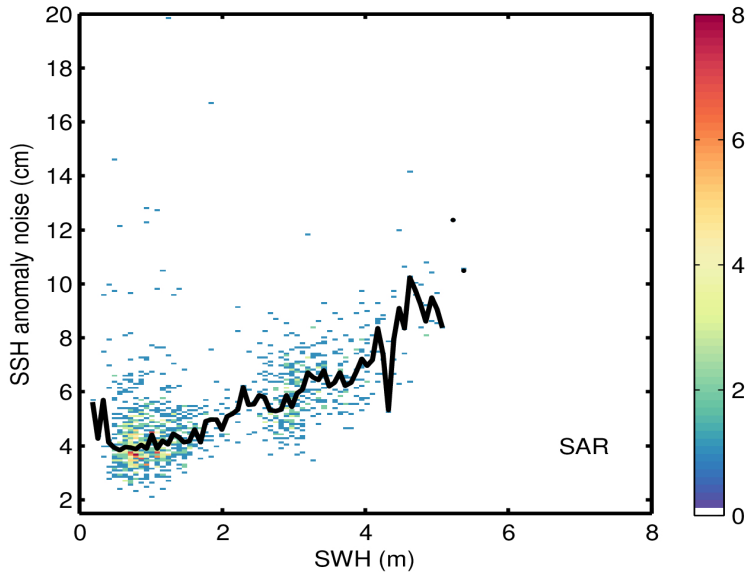


Figure 8. Geographical distribution of flag-valid 20-Hz SSH anomaly measurement noise over oceans and lakes for LRM/SAR (top) and LRM/PLRM (bottom) and for 21/06/2022. The statistical values shown in the tables refer to the SSH anomaly noise and are calculated separately for LRM and SAR/PLRM regions. Measurements taken over polar polygons have been excluded from the computation of the statistical values. The black lines mark the outer limit of the Arctic and Antarctic polar polygons.


SSH anomaly noise (cm)
SWH (m)
LRM
0
2
4
6
8
10
12
14
16
18
20
30


SSH anomaly noise (cm)
SWH (m)
SAR
0
2
4
6
8
10
12
14
16
18
20

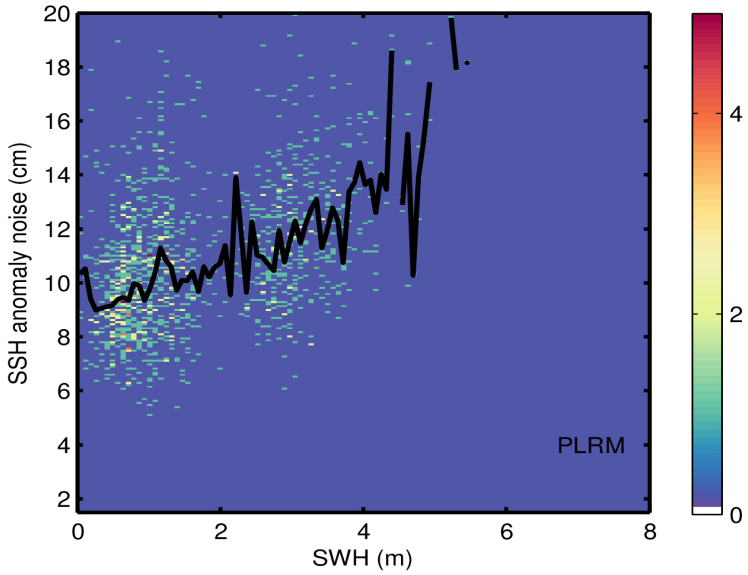


Figure 9. 2D histogram showing flag-valid SSH anomaly noise as a function of SWH for LRM (top), SAR (middle), and PLRM (bottom) for 21/06/2022. The black line denotes the median SSH anomaly noise as a function of SWH.

3.3. Validity based on scientific editing criteria

Note 3.5: *here "science-valid" refers to the flag-valid SSH records over oceans and lakes (excluding polar regions) that meet the editing criteria described in Table 2.*

Parameter	Min threshold	Max threshold	Percentage edited
SSH anomaly	-3 m	3 m	0.0%
Standard deviation of SSH anomaly	0 m	0.20 m	1.0%
Inverse barometer correction	-2 m	2 m	0.0%
Biased orbit	0 m	0 m	0.0%
Wet tropospheric correction	-0.5 m	-0.001 m	0.0%
Dry tropospheric correction	-2.5 m	-1.9 m	0.0%
Ionospheric correction	-0.4 m	0.04 m	0.0%
Sea state bias	-0.5 m	0 m	0.1%
Sigma0	7 dB	30 dB	0.0%
Standard deviation of sigma0	0 dB	0.23 dB	4.3%

All together	-	-	4.4%

Table 2. Editing criteria. The biased orbit criteria in the table refers to the orbits highlighted in the 'Warnings' table at the beginning of this report as being suspicious of suffering from a significant orbit bias. For such orbits, all records are rejected, hence the 0 m thresholds. The percentage of rejected flag-valid records (excluding polar regions) for each criteria is shown.

Number of science-valid 1-Hz SSH records over oceans and lakes (excluding polar regions): **26615**

Percentage of science-valid 1-Hz SSH records over oceans and lakes (excluding polar regions) relative to theoretical maximum: **56.6%**

20-Hz measurement noise (average std of 20-Hz sample blocks) for the science-valid SSH anomaly for LRM and SAR, respectively: **7.6 cm** and **5.0 cm**

Equivalent 1-Hz measurement noise for the science-valid SSH anomaly for LRM and SAR, respectively: **1.7 cm** and **1.1 cm**

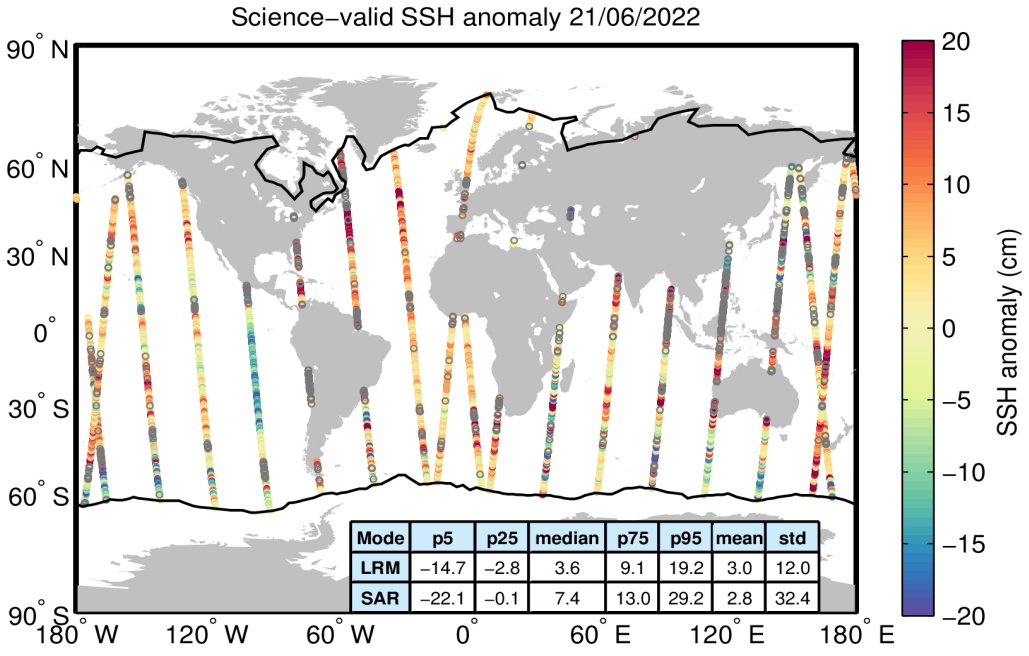


Figure 10. Geographical distribution of science-valid SSH anomaly data over oceans and lakes for 21/06/2022. The statistical values shown in the table refer to the SSH anomaly in cm and are calculated separately for LRM and SAR regions. The black lines mark the outer limit of the Arctic and Antarctic polar polygons. Gray circles denote records that have been rejected based on the editing criteria described in Table 2.

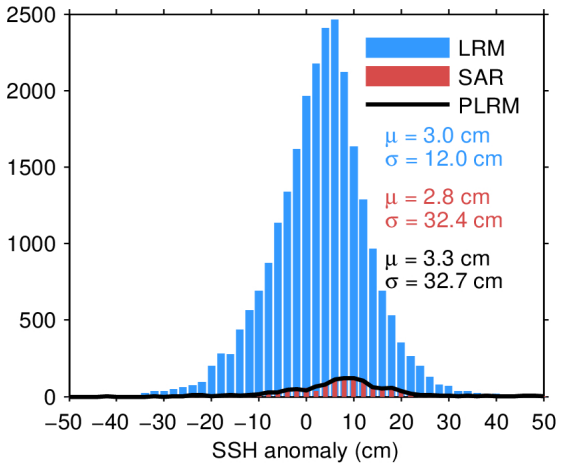


Figure 11. Histogram of science-valid SSH anomaly over oceans and lakes for LRM (blue), SAR (red), and PLRM (black) for 21/06/2022. The mean (μ) and standard deviation (σ) are also shown. Note that values outside [-50 50] cm are excluded from the histogram for the sake of readability but not from the computation of μ and σ.

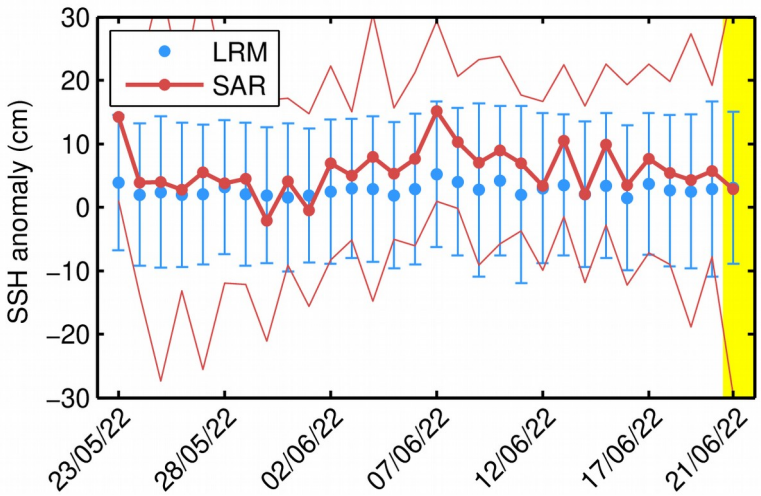


Figure 12. Mean science-valid SSH anomaly for LRM (blue dot) and SAR (red dot). The corresponding standard deviation (blue error bar and thin red lines, respectively) for each day in last 30-day window is also shown. The yellow shading highlights the day analyzed in this report.

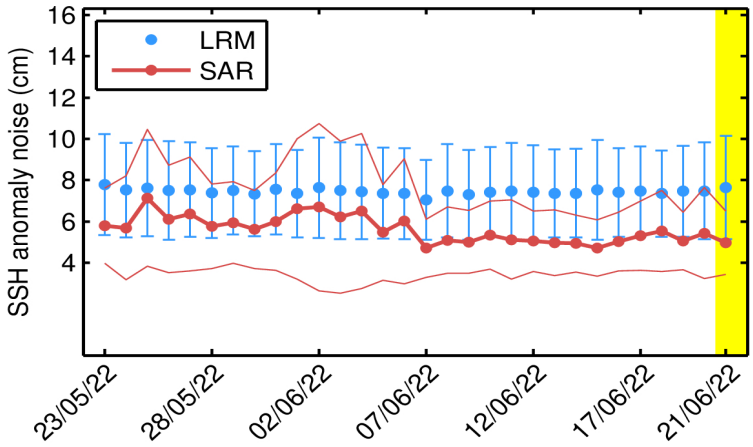


Figure 13. Average science-valid SSH anomaly noise for LRM (blue dot) and SAR (red dot). The corresponding standard deviation (blue error bar and thin red lines, respectively) for each day in last 30-day window is also shown. The yellow shading highlights the day analyzed in this report.

3.4. Crossover analysis

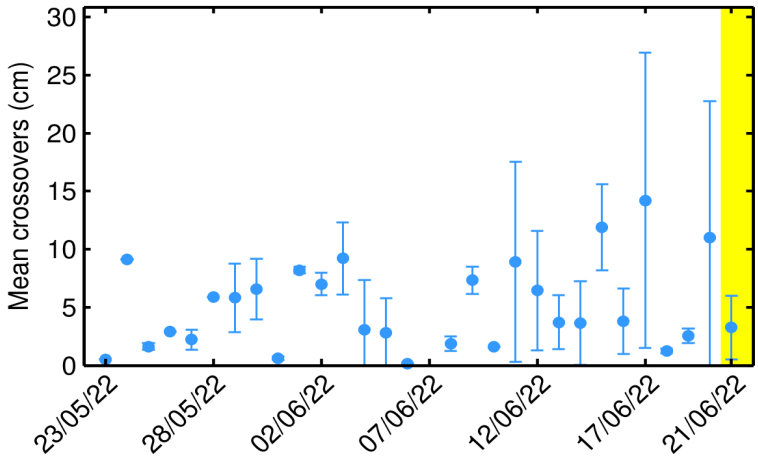


Figure 14. Mean crossover differences (absolute values) for the science-valid SSH anomaly (blue dot) and the corresponding standard deviation (error bar) for each day in last 30-day window. Mean crossover differences are calculated daily by averaging all crossover differences in a day (there are about 12-13 crossovers per day). The difference at each crossover is computed as the difference between median values over 2-s windows centered about the crossover. The yellow shading highlights the day analyzed in this report.

4 SWH coverage and validity

Note 4.1: *unless otherwise stated, measurements taken over polar polygons have been excluded from the computation of all statistics shown in this section.*

Note 4.2: *the extent of the regions defining the geographical mode mask of the reference mission is shown in Figure A1 (Appendix A).*

Note 4.3: *most statistics shown in this section have been computed separately for the low resolution mode (LRM), synthetic-aperture radar mode (SAR), and the pseudo low resolution mode (PLRM).*

4.1. Validity based on flags

Note 4.4: *here "flag-valid" refers to those records that have not been flagged as bad by either the average status flag or the measurement confidence flag.*

Number of flag-valid 1-Hz SWH records over oceans and lakes (including polar regions): **30275**

Percentage of flag-valid 1-Hz SWH records over oceans and lakes (including polar regions) relative to theoretical maximum: **51.7%**

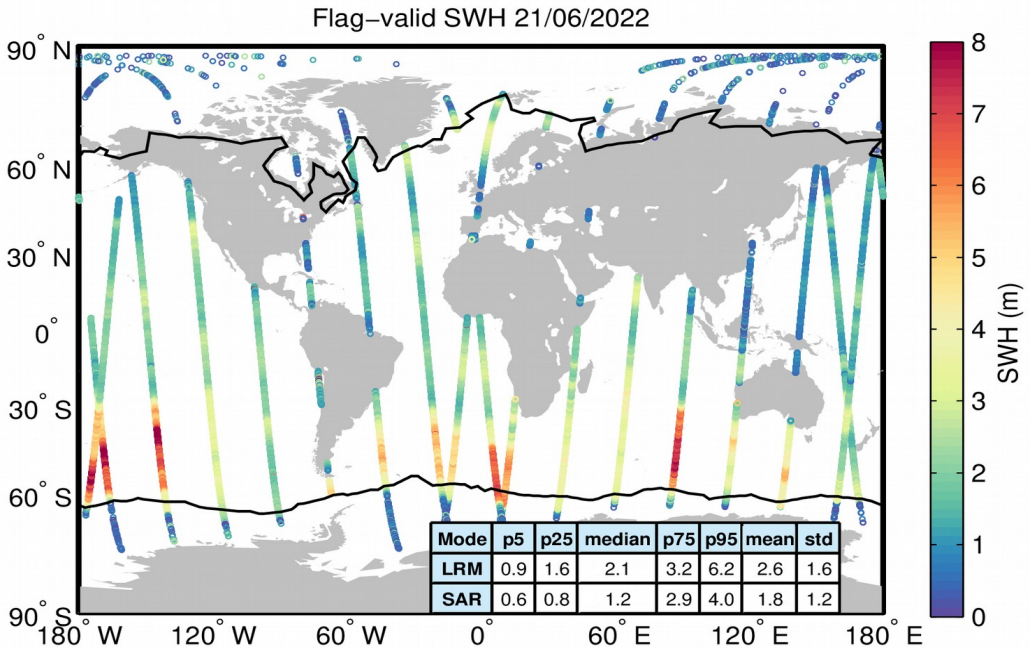


Figure 15. Geographical distribution of flag-valid SWH data over oceans and lakes for 21/06/2022. The statistical values shown in the table refer to the SWH in m and are calculated separately for LRM and SAR regions. Measurements taken over polar polygons

have been excluded from the computation of the statistical values. The black lines mark the outer limit of the Arctic and Antarctic polar polygons.

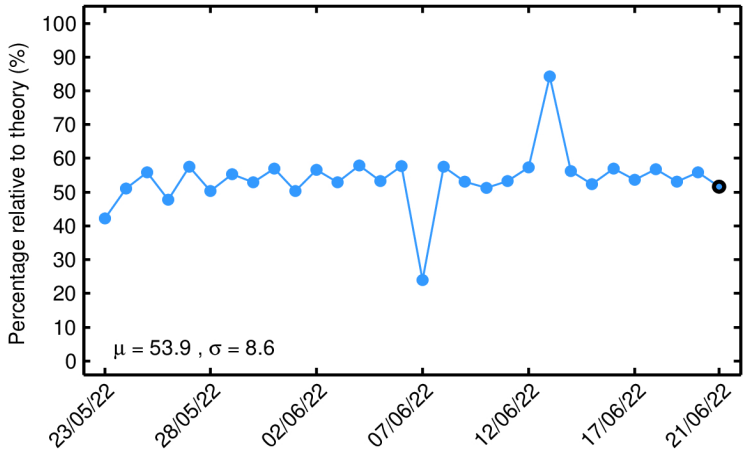


Figure 16. Percentage of flag-valid 1-Hz SWH records over ocean and lakes (including polar regions) relative to theory for each day in last 30-day window. The mean (μ) and standard deviation (σ) are also shown.

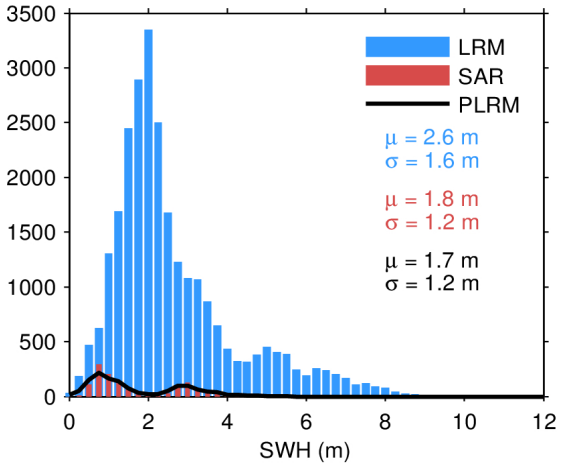
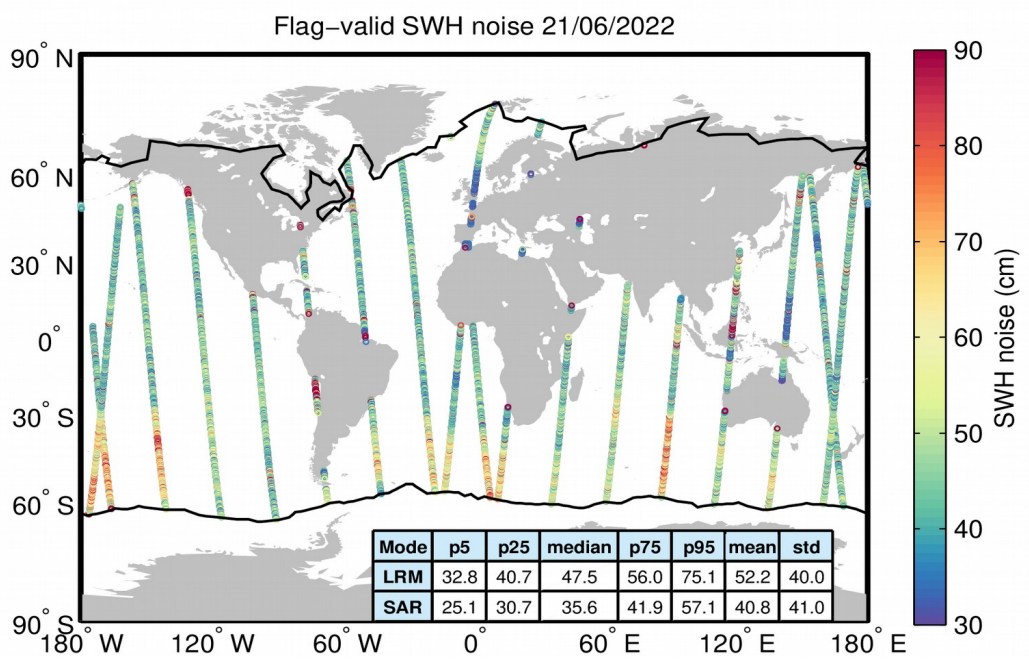


Figure 17. Histogram of flag-valid SWH over oceans and lakes for LRM (blue), SAR (red), and PLRM(black) for 21/06/2022. The mean (μ) and standard deviation (σ) are also shown. Note that values larger than 12 m are excluded from the histogram for the sake of readability but not from the computation of μ and σ.

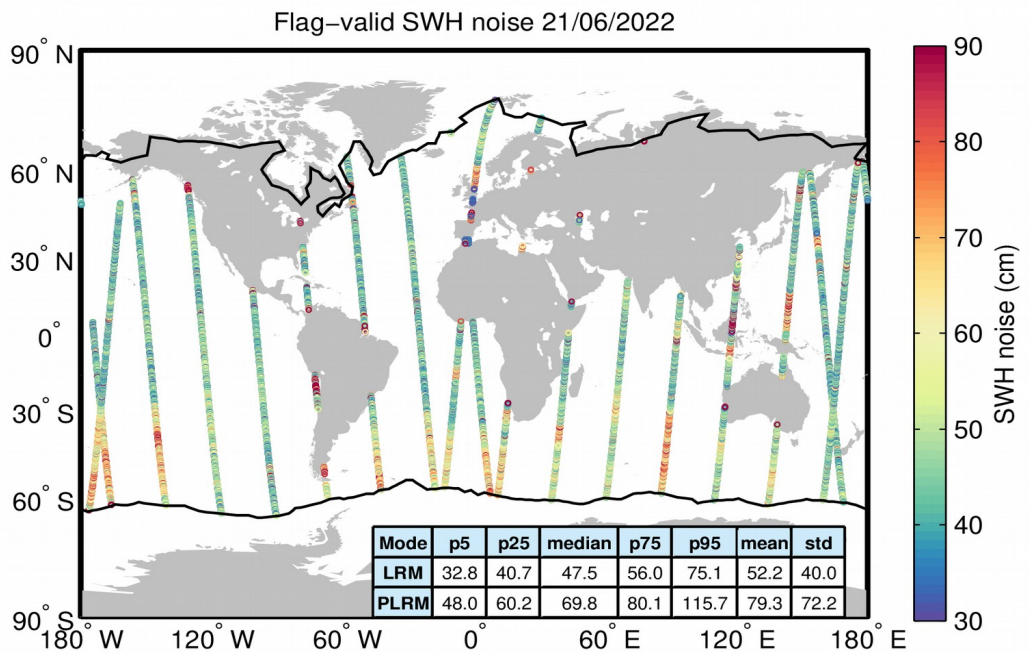
4.2. Analysis of measurement noise

20-Hz measurement noise (average std of 20-Hz sample blocks) for the flag-valid SWH over oceans and lakes for LRM and SAR, respectively: **52.2 cm** and **40.8 cm**

Equivalent 1-Hz measurement noise for the flag-valid SWH for LRM and SAR, respectively: **11.7 cm** and **9.1 cm**



Mode	p5	p25	median	p75	p95	mean	std
LRM	32.8	40.7	47.5	56.0	75.1	52.2	40.0
SAR	25.1	30.7	35.6	41.9	57.1	40.8	41.0



Mode	p5	p25	median	p75	p95	mean	std
LRM	32.8	40.7	47.5	56.0	75.1	52.2	40.0
PLRM	48.0	60.2	69.8	80.1	115.7	79.3	72.2

Figure 18. Geographical distribution of flag-valid 20-Hz SWH measurement noise over oceans and lakes for LRM/SAR (top) and LRM/PLRM (bottom) and for 21/06/2022. The statistical values shown in the table refer to the SWH noise and are calculated separately for LRM and SAR/PLRM regions. Measurements taken over polar polygons have been excluded from the computation of the statistical values. The black lines mark the outer limit of the Arctic and Antarctic polar polygons.

4.3. Validity based on scientific editing criteria

Note 4.5: *here "science-valid" refers to the flag-valid SWH records over oceans and lakes that meet the editing criteria described in Table 3.*

Parameter	Min threshold	Max threshold	Percentage edited
SWH	0 m	15 m	0.0%
Standard deviation of SWH (1-Hz block)	0 m	1 m	1.4%
All together	-	-	1.4%

Table 3. Editing criteria. The percentage of rejected flag-valid records (excluding polar regions) for each criteria is shown.

Number of science-valid 1-Hz SWH records over oceans and lakes (excluding polar regions): **27590**

Percentage of science-valid 1-Hz SWH records over oceans and lakes (excluding polar regions) relative to theoretical maximum: **58.7%**

20-Hz measurement noise (average std of 20-Hz sample blocks) for the science-valid SWH for LRM and SAR, respectively: **49.1 cm** and **36.9 cm**

Equivalent 1-Hz measurement noise for the science-valid SWH for LRM and SAR, respectively: **11.0 cm** and **8.3 cm**

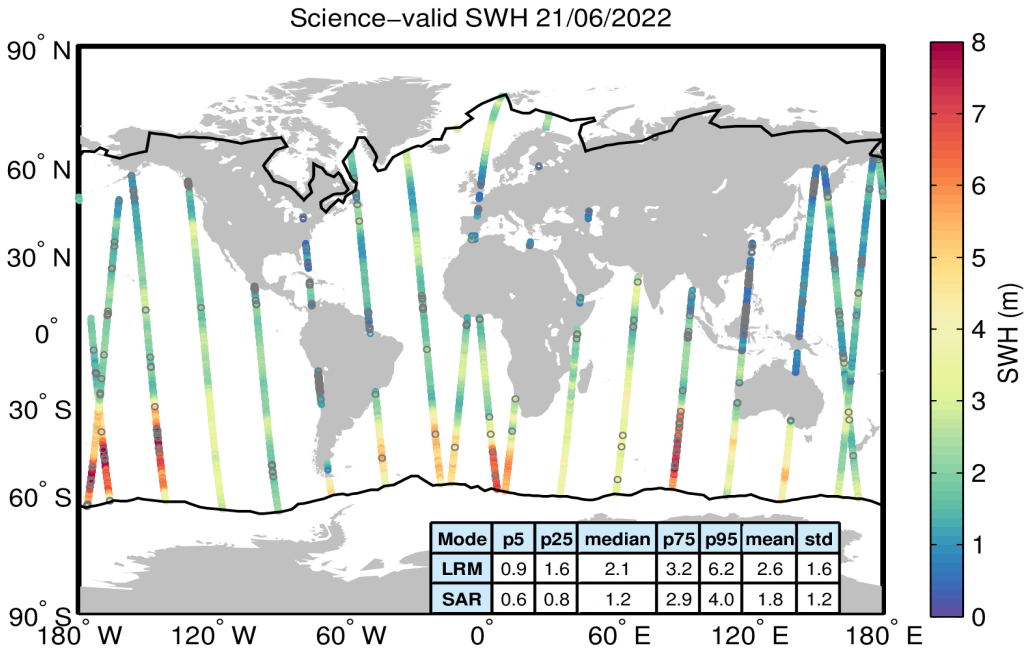


Figure 19. Geographical distribution of science-valid SWH data over oceans and lakes for 21/06/2022. The statistical values shown in the table refer to the SWH in m and are calculated separately for LRM and SAR regions. The black lines mark the outer limit of the Arctic and Antarctic polar polygons. Gray circles denote records that have been rejected based on the editing criteria described in Table 3.

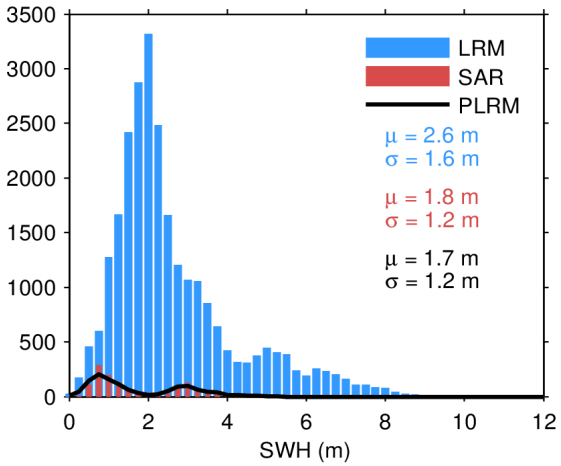


Figure 20. Histogram of science-valid SWH over oceans and lakes for LRM (blue), SAR (red), and PLRM(black) for 21/06/2022. The mean (μ) and standard deviation (σ) are also shown. Note that values larger than 12 m are excluded from the histogram for the sake of readability but not from the computation of μ and σ.

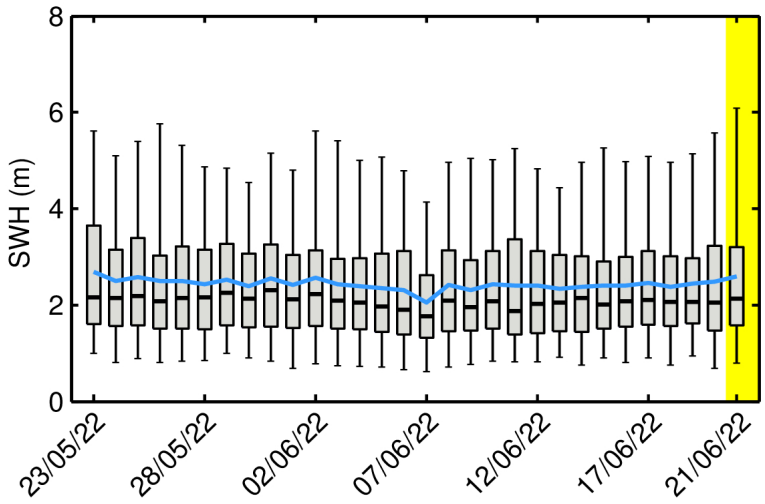


Figure 21. Box-and-whiskers plot for the science-valid SWH showing for each day in last 30-day window the first and third quartiles (bottom and top of the box), the median (thick black), the 5% and 95% percentiles (lower and upper whiskers), and the mean (blue). The yellow shading highlights the day analyzed in this report.

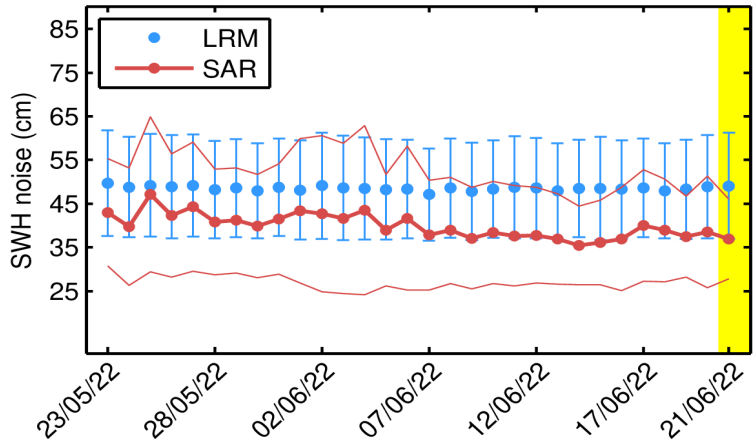


Figure 22. Average science-valid SWH noise for LRM (blue dot) and SAR (red dot). The corresponding standard deviation (blue error bar and thin red lines, respectively) for each day in last 30-day window is also shown. The yellow shading highlights the day analyzed in this report.

5 Sigma0 coverage and validity

Note 5.1: *unless otherwise stated, measurements taken over polar polygons have been excluded from the computation of all statistics shown in this section.*

Note 5.2: *the extent of the regions defining the geographical mode mask of the reference mission is shown in Figure A1 (Appendix A).*

Note 5.3: *most statistics shown in this section have been computed separately for the low resolution mode (LRM), synthetic-aperture radar mode (SAR), and the pseudo low resolution mode (PLRM).*

5.1. Validity based on flags

Note 5.4: *here "flag-valid" refers to those records that have not been flagged as bad by either the average status flag or the measurement confidence.*

Number of flag-valid 1-Hz sigma0 records over oceans and lakes (including polar regions): **30275**

Percentage of flag-valid 1-Hz sigma0 records over oceans and lakes (including polar regions) relative to theoretical maximum: **51.7%**

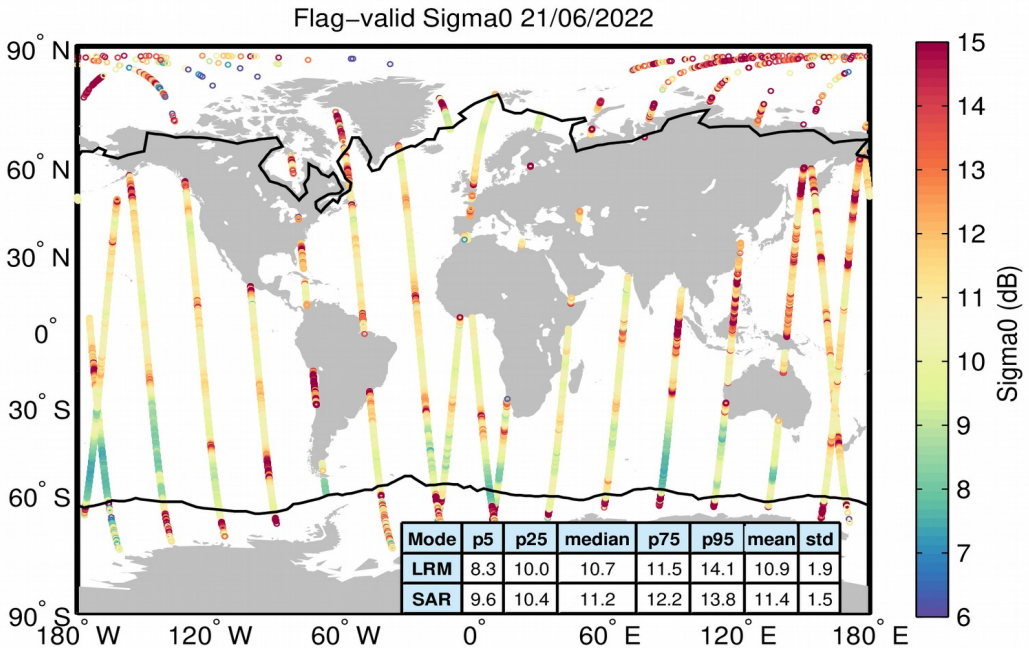


Figure 23. Geographical distribution of flag-valid sigma0 data over oceans and lakes for 21/06/2022. The statistical values shown in the table refer to the sigma0 in dB and are calculated separately for LRM and SAR regions. Measurements taken over polar polygons

have been excluded from the computation of the statistical values. The black lines mark the outer limit of the Arctic and Antarctic polar polygons.

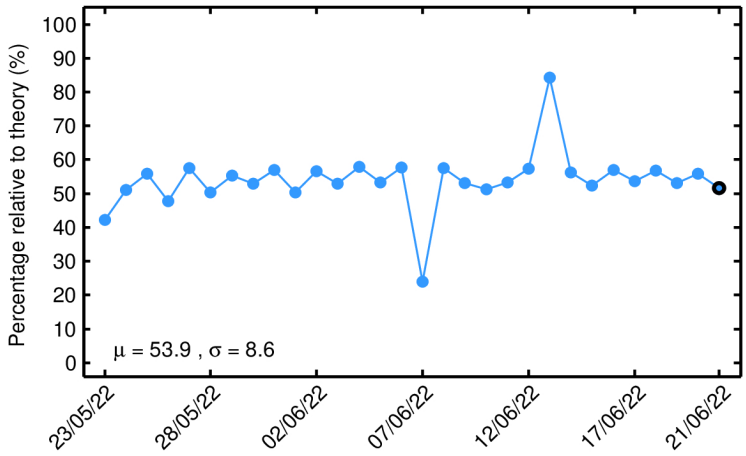


Figure 24. Percentage of flag-valid 1-Hz sigma0 records over ocean and lakes (including polar regions) relative to theory for each day in last 30-day window. The mean (μ) and standard deviation (σ) are also shown.

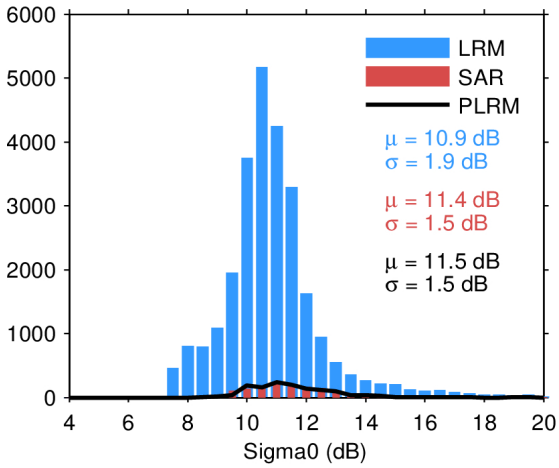


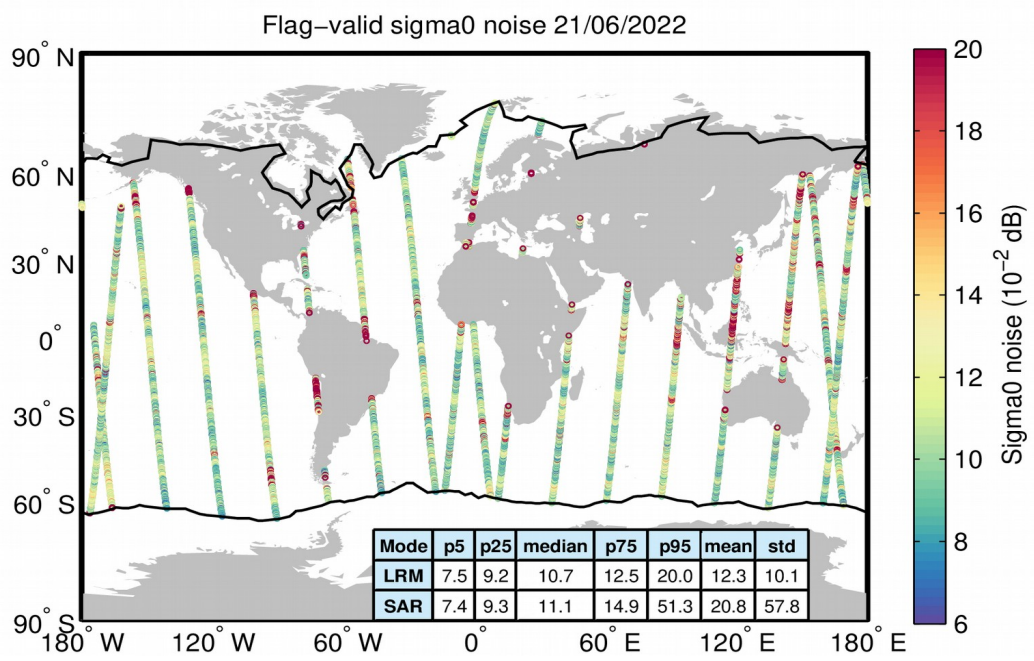
Figure 25. Histogram of flag-valid sigma0 over oceans and lakes for LRM (blue), SAR (red), and PLRM(black) for 21/06/2022. The mean (μ) and standard deviation (σ) are also

shown. Note that values outside [4 20] dB are excluded from the histogram for the sake of readability but not from the computation of μ and σ.

5.2. Analysis of measurement noise

20-Hz measurement noise (average std of 20-Hz sample blocks) for the flag-valid SWH over oceans and lakes for LRM and SAR, respectively: **12.3 10^{-2} dB** and **20.8 10^{-2} dB**

Equivalent 1-Hz measurement noise for the flag-valid SWH for LRM and SAR, respectively: **2.8 10^{-2} dB** and **4.6 10^{-2} dB**



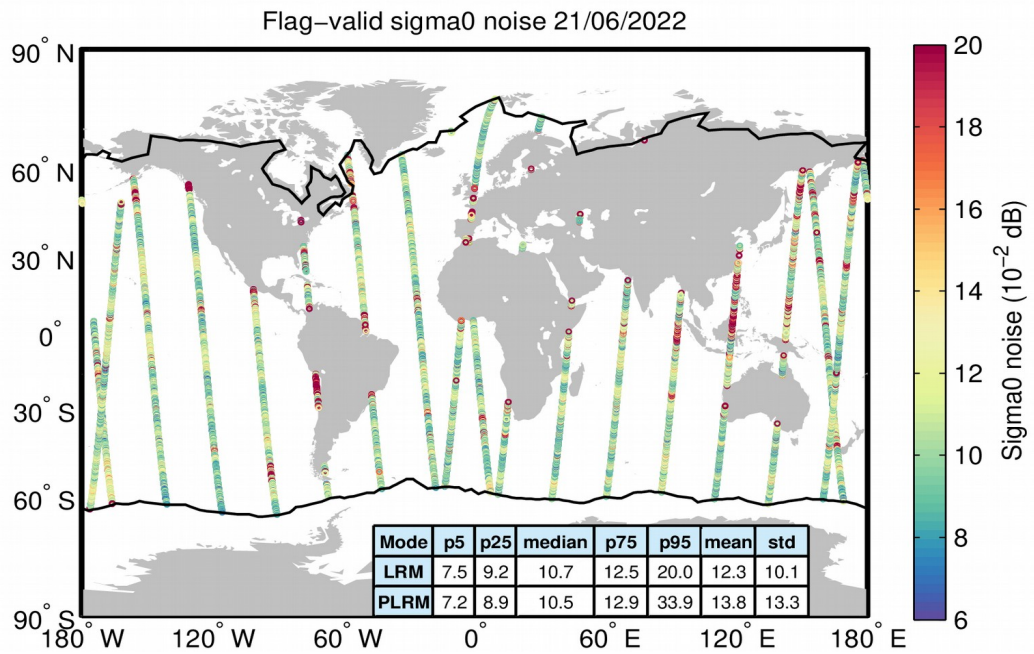


Figure 26. Geographical distribution of flag-valid 20-Hz sigma0 measurement noise over oceans and lakes for LRM/SAR (top) and LRM/PLRM (bottom) and for 21/06/2022. The statistical values shown in the table refer to the sigma0 noise and are calculated separately for LRM and SAR/PLRM regions. Measurements taken over polar polygons have been excluded from the computation of the statistical values. The black lines mark the outer limit of the Arctic and Antarctic polar polygons.

5.3. Validity based on scientific editing criteria

Note 5.5: *here "science-valid" refers to the flag-valid sigma0 records over oceans and lakes that meet the editing criteria described in Table 4.*

Parameter	Min threshold	Max threshold	Percentage edited
Sigma0	7 dB	30 dB	0.0%
Standard deviation of Sigma0 (1-Hz block)	0 dB	0.23 dB	4.3%
All together	-	-	4.3%

Table 4. Editing criteria. The percentage of rejected flag-valid records (excluding polar regions) for each criteria is shown.

Number of science-valid 1-Hz sigma0 records over oceans and lakes (excluding polar regions): **26760**

Percentage of science-valid 1-Hz sigma0 records over oceans and lakes relative to theoretical maximum (excluding polar regions): **57.0%**

20-Hz measurement noise (average std of 20-Hz sample blocks) for the science-valid sigma0 for LRM and SAR, respectively: **10.9 10^{-2} dB** and **11.4 10^{-2} dB**

Equivalent 1-Hz measurement noise for the science-valid sigma0 for LRM and SAR, respectively: **2.4 10^{-2} dB** and **2.6 10^{-2} dB**

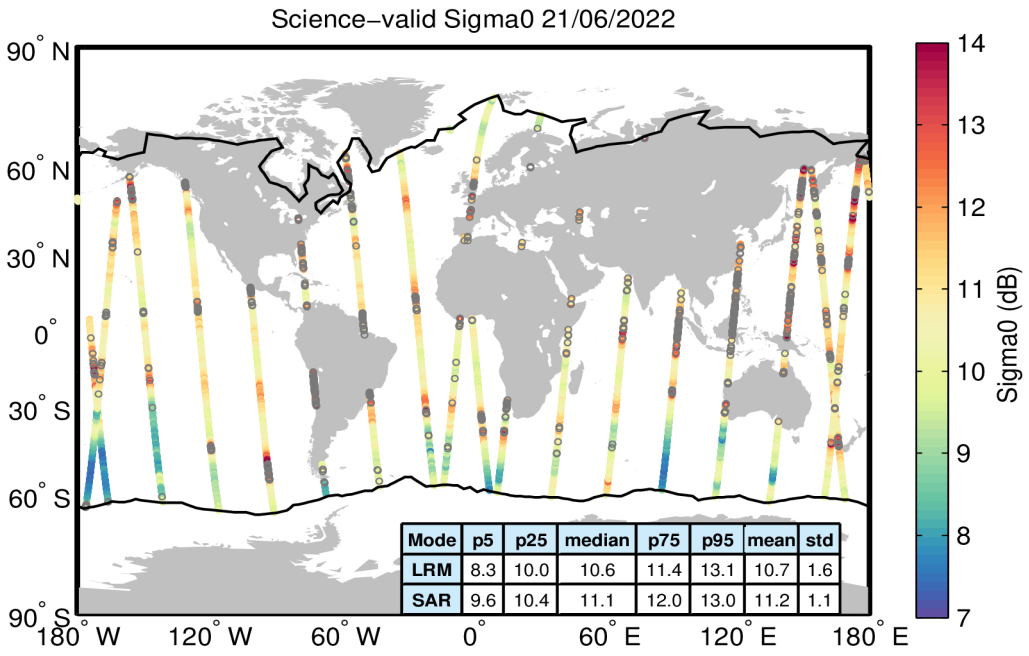


Figure 27. Geographical distribution of science-valid sigma0 data over oceans and lakes for 21/06/2022. The statistical values shown in the table refer to the sigma0 in dB and are calculated separately for LRM and SAR regions. The black lines mark the outer limit of the Arctic and Antarctic polar polygons. Gray circles denote records that have been rejected based on the editing criteria described in Table 4.

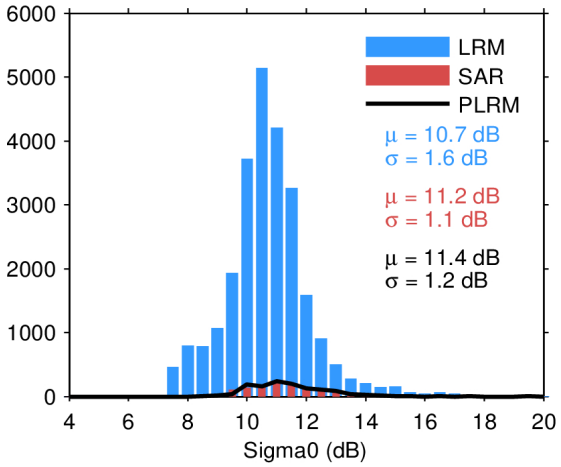


Figure 28. Histogram of science-valid sigma0 over oceans and lakes for LRM (blue), SAR (red), and PLRM(black) for 21/06/2022. The mean (μ) and standard deviation (σ) are also shown. Note that values outside [4 20] dB are excluded from the histogram for the sake of readability but not from the computation of μ and σ.

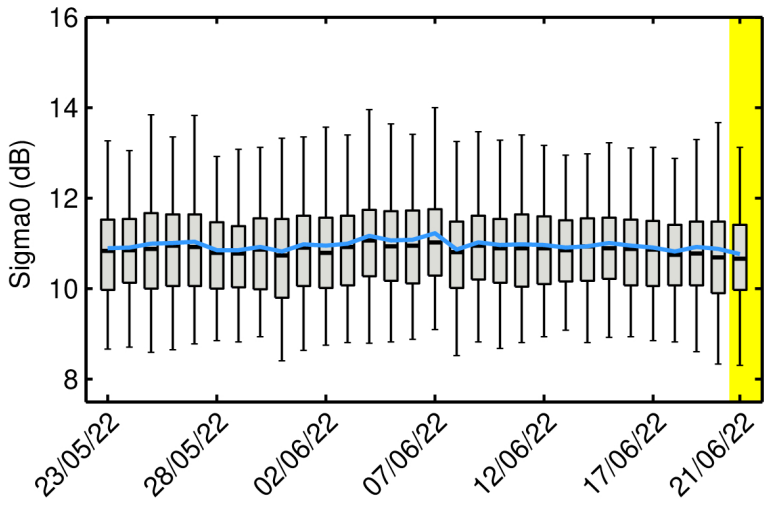


Figure 29. Box-and-whiskers plot for science-valid sigma0 showing for each day in last 30-day window the first and third quartiles (bottom and top of the box), the median (thick black), the 5% and 95% percentiles (lower and upper whiskers), and the mean (blue). The yellow shading highlights the day analyzed in this report.

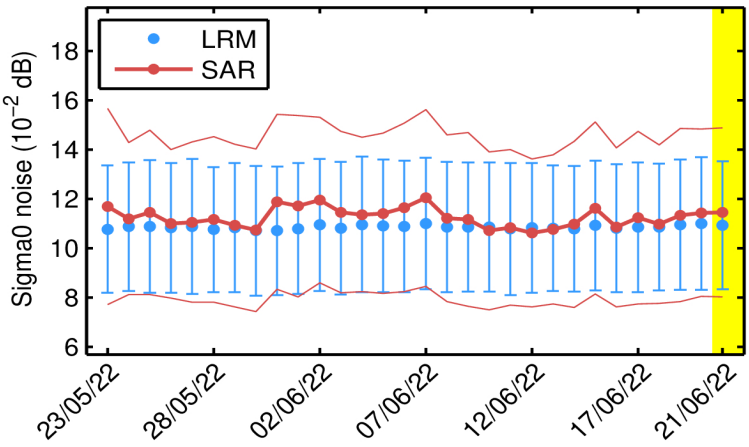


Figure 30. Average science-valid sigma0 noise for LRM (blue dot) and SAR (red dot). The corresponding standard deviation (blue error bar and thin red lines, respectively) for each day in last 30-day window is also shown. The yellow shading highlights the day analyzed in this report.

6 Altimeter wind speed coverage and validity

Note 6.1: *unless otherwise stated, measurements taken over polar polygons have been excluded from the computation of all statistics shown in this section.*

Note 6.2: *the extent of the regions defining the geographical mode mask of the reference mission is shown in Figure A1 (Appendix A).*

Note 6.3: *most statistics shown in this section have been computed separately for the low resolution mode (LRM), synthetic-aperture radar mode (SAR), and the pseudo low resolution mode (PLRM).*

6.1. Validity based on flags

Note 6.4: *here "flag-valid" refers to those records that have not been flagged as bad by either the average status flag or the measurement confidence flag.*

Number of flag-valid 1-Hz wind records over oceans and lakes (including polar regions): **30293**

Percentage of flag-valid 1-Hz wind records over oceans and lakes (including polar regions) relative to theoretical maximum: **51.7%**

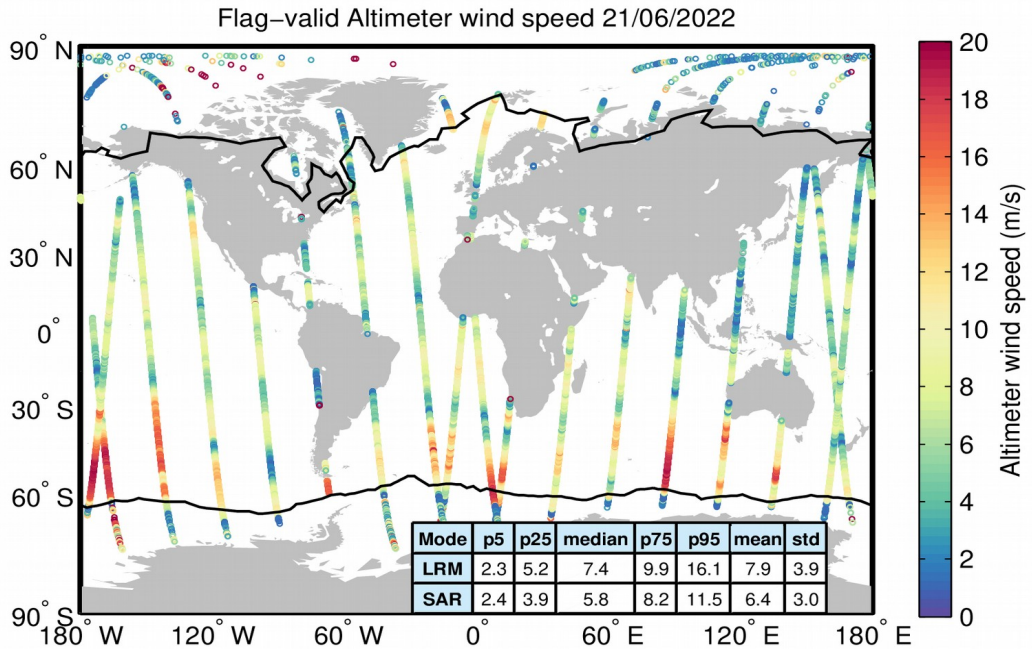


Figure 31. Geographical distribution of flag-valid wind data over oceans and lakes for 21/06/2022. The statistical values shown in the table refer to the wind in m/s and are calculated separately for LRM and SAR regions. Measurements taken over polar polygons have been excluded from the computation of the statistical values. The black lines mark the outer limit of the Arctic and Antarctic polar polygons.

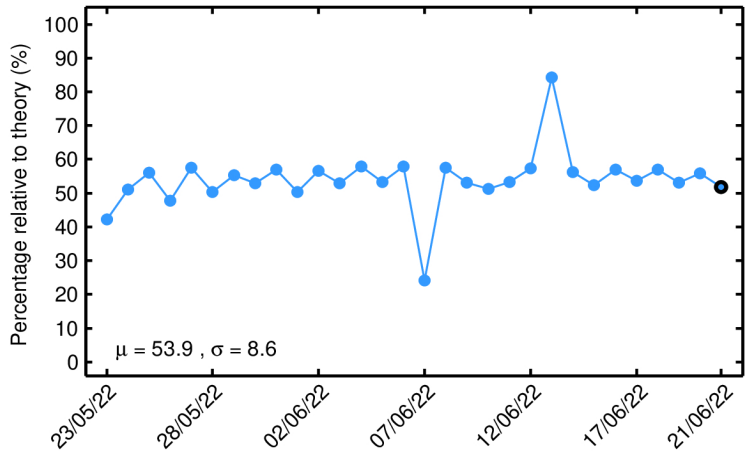


Figure 32. Percentage of flag-valid 1-Hz wind records over ocean and lakes (including polar regions) relative to theory for each day in last 30-day window. The mean (μ) and standard deviation (σ) are also shown.

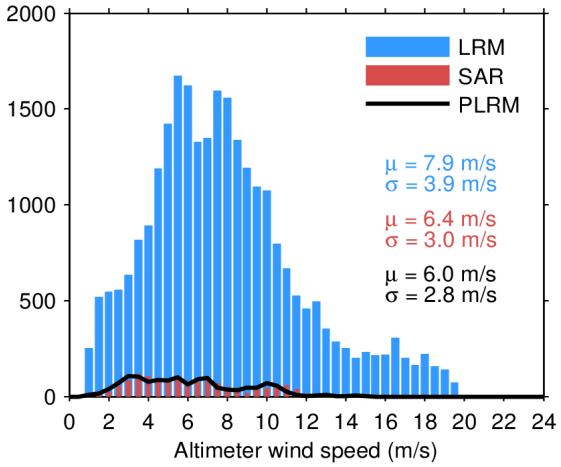


Figure 33. Histogram of flag-valid wind over oceans and lakes for LRM (blue), SAR (red), and PLRM(black) for 21/06/2022. The mean (μ) and standard deviation (σ) are also shown. Note that values larger than 24 m/s are excluded from the histogram for the sake of readability but not from the computation of μ and σ.

6.2. Validity based on scientific editing criteria

Note 6.5: *here "science-valid" refers to the flag-valid wind records over oceans and lakes that meet the editing criteria described in Table 5.*

Parameter	Min threshold	Max threshold	Percentage edited
Altimeter wind speed	0 m/s	30 m/s	0.0%

Table 5. Editing criteria. The percentage of rejected flag-valid records (excluding polar regions) for each criteria is shown.

Number of science-valid 1-Hz wind records over oceans and lakes (excluding polar regions): **27991**

Percentage of science-valid 1-Hz wind records over oceans and lakes relative to theoretical maximum (excluding polar regions): **59.6%**

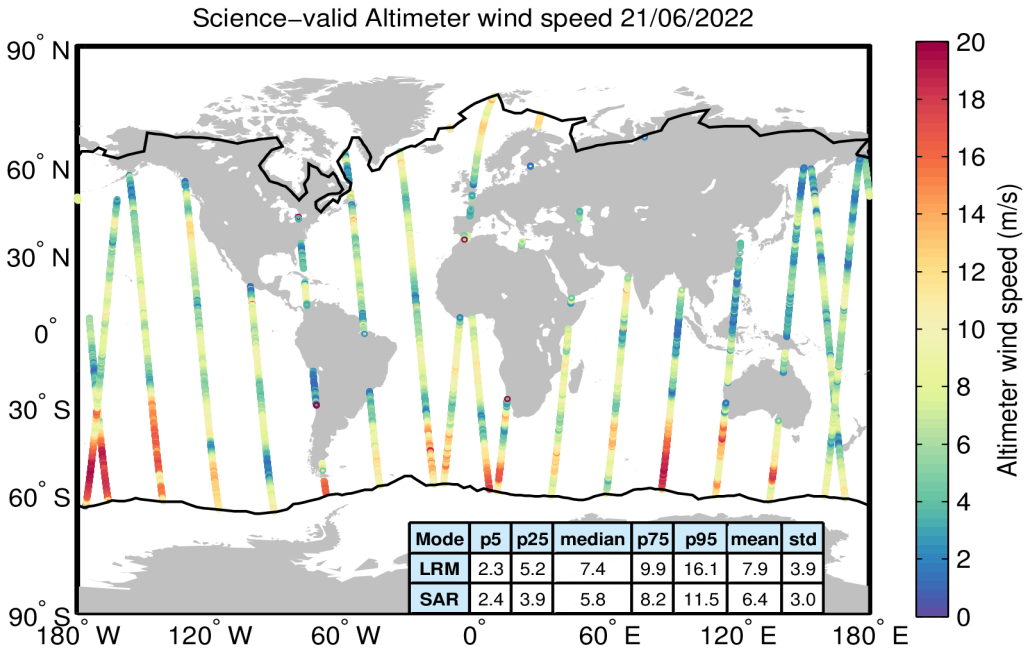


Figure 34. Geographical distribution of science-valid wind data over oceans and lakes for 21/06/2022. The statistical values shown in the table refer to the wind in m/s and are calculated separately for LRM and SAR regions. The black lines mark the outer limit of the Arctic and Antarctic polar polygons. Gray circles denote records that have been rejected based on the editing criteria described in Table 5.

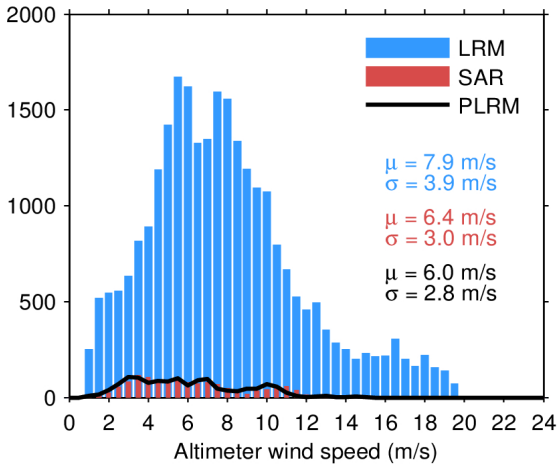


Figure 35. Histogram of science-valid wind over oceans and lakes for LRM (blue), SAR (red), and PLRM(black) for 21/06/2022. The mean (μ) and standard deviation (σ) are also shown. Note that values larger than 24 m/s are excluded from the histogram for the sake of readability but not from the computation of μ and σ.

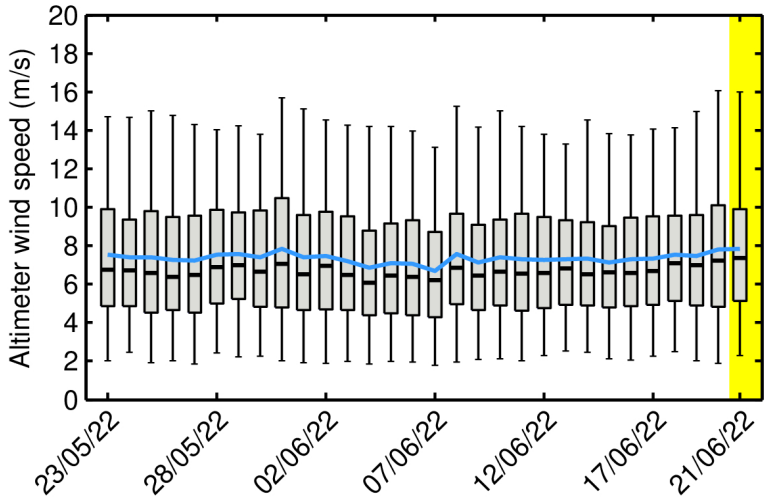


Figure 36. Box-and-whiskers plot for the science-valid wind showing for each day in last 30-day window the first and third quartiles (bottom and top of the box), the median (thick black), the 5% and 95% percentiles (lower and upper whiskers), and the mean (blue). The yellow shading highlights the day analyzed in this report.

7 Mispointing coverage and validity

Note 7.1: *unless otherwise stated, measurements taken over polar polygons have been excluded from the computation of all statistics shown in this section.*

Note 7.2: *the extent of the regions defining the geographical mode mask of the reference mission is shown in Figure A1 (Appendix A).*

Note 7.3: *most statistics shown in this section have been computed separately for the low resolution mode (LRM), synthetic-aperture radar mode (SAR), and the pseudo low resolution mode (PLRM).*

Note 7.4: here "flag-valid" refers to those records that have not been flagged as bad by either the average status flag or the measurement confidence flag.

Number of flag-valid 1-Hz mispointing records over oceans and lakes (including polar regions): **29076**

Percentage of flag-valid 1-Hz mispointing records over oceans and lakes (including polar regions) relative to theoretical maximum: **49.6%**

Percentage of positive flag-valid 1-Hz mispointing records over oceans and lakes (including polar regions) relative to theoretical maximum: **49.0%**

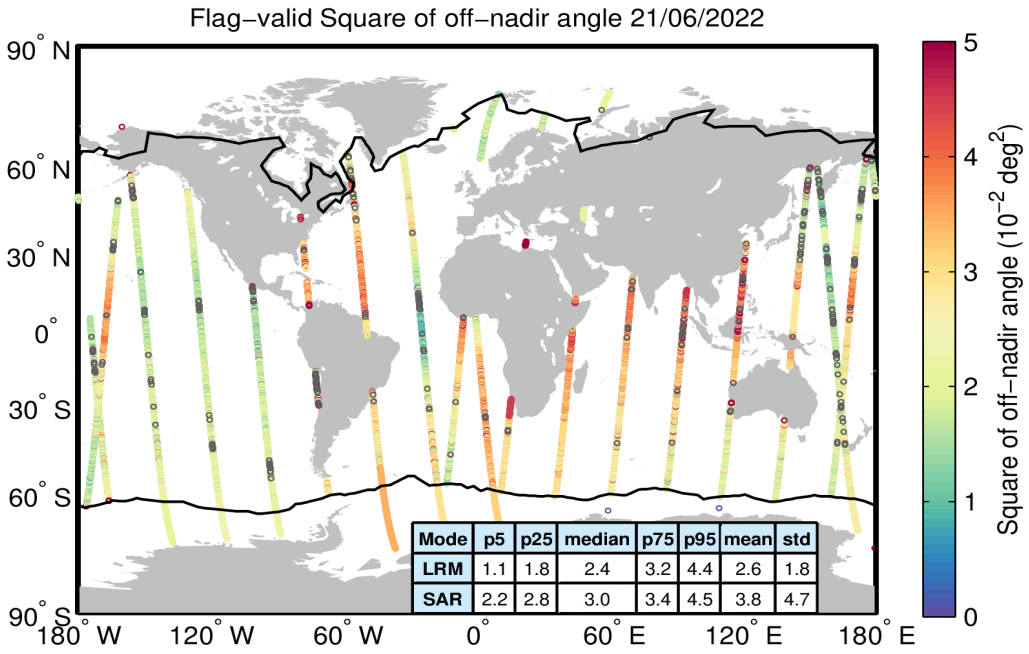


Figure 37. Geographical distribution of flag-valid mispointing data over oceans and lakes for 21/06/2022. The statistical values shown in the table refer to the mispointing in 10^{-2} deg^2 and are calculated separately for LRM and SAR regions. Measurements taken over polar polygons have been excluded from the computation of the statistical values. The black lines mark the outer limit of the Arctic and Antarctic polar polygons. Gray circles denote negative values.

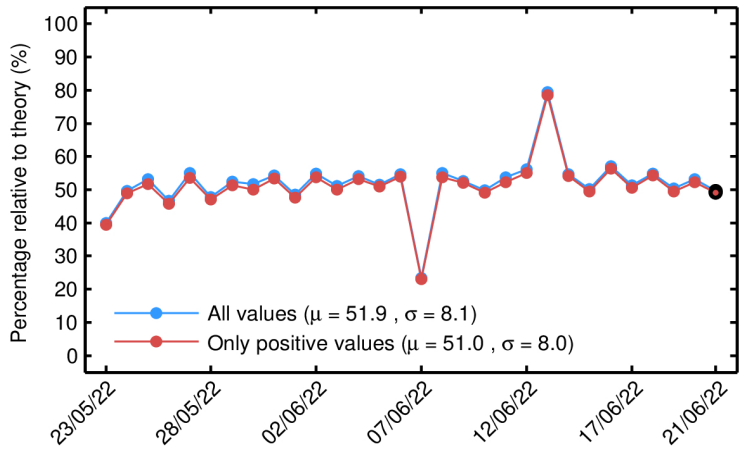


Figure 38. Percentage of flag-valid 1-Hz mispointing records over ocean and lakes (including polar regions) relative to theory for all values (blue) and only positive values (red) for each day in last 30-day window. The mean (μ) and standard deviation (σ) are also shown.

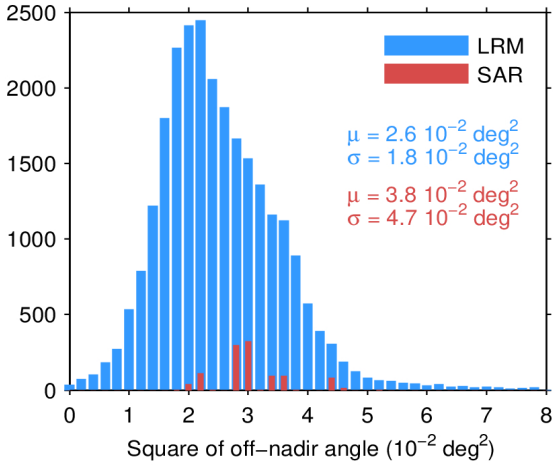


Figure 39. Histogram of flag-valid mispointing over oceans and lakes for LRM (blue) and SAR (red) for 21/06/2022. Only positive values have been considered. The mean (μ) and standard deviation (σ) are also shown. Note that values larger than 8 10^{-2} deg ^{2} are excluded from the histogram for the sake of readability but not from the computation of μ and σ.

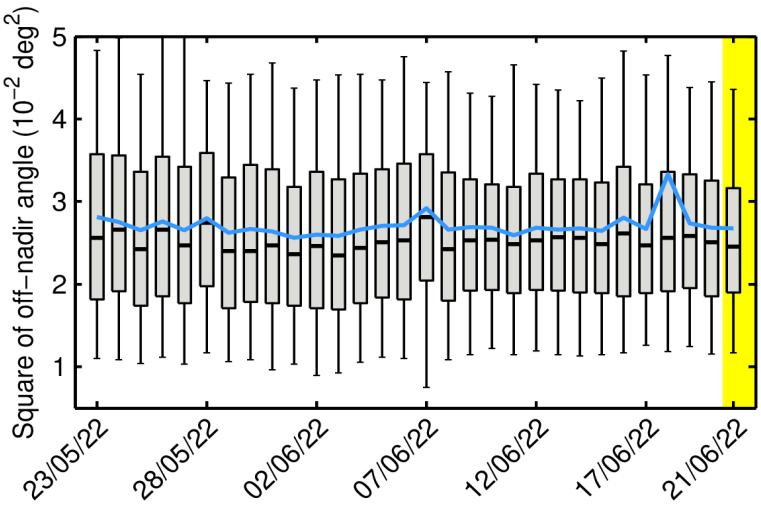


Figure 40. Box-and-whiskers plot for flag-valid mispointing showing for each day in last 30-day window the first and third quartiles (bottom and top of the box), the median (thick black), the 5% and 95% percentiles (lower and upper whiskers), and the mean (blue). The

yellow shading highlights the day analyzed in this report. Only positive values have been considered.

APPENDIX A

In this appendix we briefly describe the meaning of the warning codes summarized in page 2 of the document.

- **latency_fail:** this warning is issued whenever one or more data files for the day analyzed in this report are made available with a delay of more than 3 days with respect to the mean time of the records stored in the file.
- **latency_mean_high:** this warning is issued whenever the mean of the latencies over all data files for the day analyzed in this report is larger than 2 days.
- **ocean_dropout:** this warning is issued whenever the percentage of 1-Hz records over ocean and lakes relative to the theoretically expected number per day is smaller than 80% for the day analyzed in this report.
- **orbit_dropout:** this warning refers to individual orbits and is issued whenever the percentage of 1-Hz records over oceans and lakes relative to the theoretically expected number per orbit is smaller than 80% for one or more orbits for the day analyzed in this report.
- **large_orbit_bias:** this warning refers to individual orbits and is issued whenever there are more than 100 flag-valid records with a SSH anomaly larger than ±90 cm.
- **iono_missing:** the whole ionospheric correction is missing for the day analyzed in this report.
- **dry_missing:** the whole dry tropospheric correction is missing for the day analyzed in this report.
- **wet_missing:** the whole wet tropospheric correction is missing for the day analyzed in this report.
- **atm_missing:** the whole atmospheric (both IB and DAC) correction is missing for the day analyzed in this report.
- **ssb_missing:** the whole sea state bias correction is missing for the day analyzed in this report.

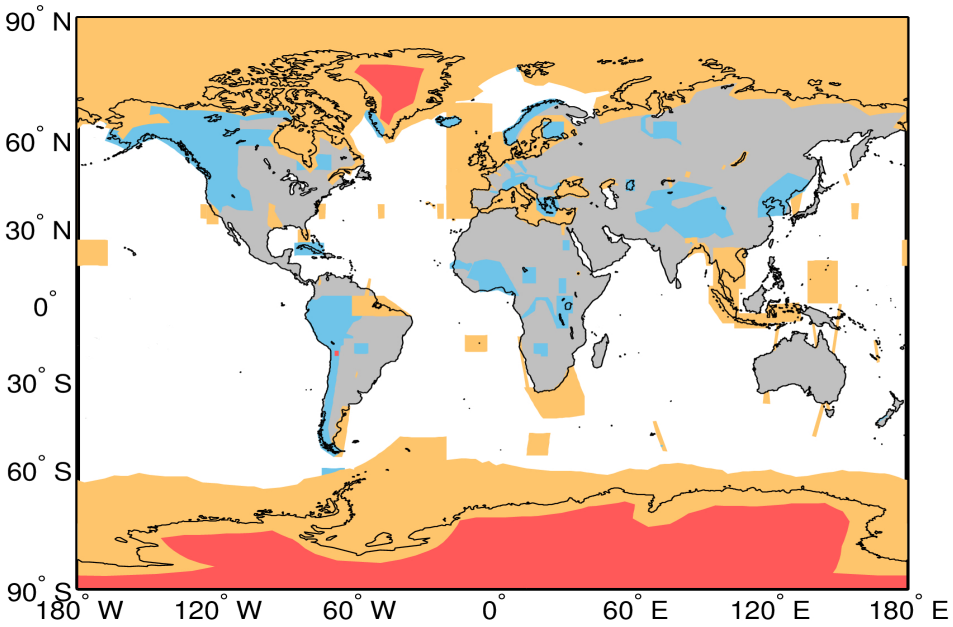


Figure A1. Extent of the regions defining the geographical mode mask for 21/06/2022. The regions where SAR, and SARIn are operated are denoted by the orange and blue polygons, respectively. LRM is operated over areas of the continental ice sheets (red polygons) and over oceans and land not covered by other modes.

(end of Document)