Surface Water and Ocean Topography (SWOT) Project

Release Note
Version D KaRIn Science Data Products

December 19, 2025

National Aeronautics and Space Administration
Jet Propulsion Laboratory
California Institute of Technology

cnes

Change Log

DATE	SECTIONS CHANGED	REASON FOR CHANGE
2024-03-06	ALL	Initial release
2024-06-13	6.2	Added new issues with project identifiers [393], [406], [410], [414], [420], [423], [425], [437].
2024-10-14	ALL	Updated for PIC2 product release.
2025-04-23	ALL	Updated for Version D product release (PID0 and PGD0)
2025-12-19	7,1 7.2 2, 6.1, 6.2	Added new feature for discrepancy between 2-D and 3-D media delay corrections and change to source for ice concentration and ice flag to Table 7. Added new issues with project identifiers [7][579], and [595]. Added L2_LR_PreCalSSH as product available in forward processing only.

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1 Purpose

This document serves as the Release Note for the Surface Water and Ocean Topography (SWOT) Version D Ka-band Radar Interferometer (KaRIn) science data products. This release note includes information on both the Version D and C products as the complete time series of Version D products will only be available in early 2026.

Users are strongly encouraged to review the descriptions of known features and issues with the Version D products (see Section 7) before using these products. There have been small, but relevant, updates to the SWOT User Handbook (see Section 0), as well as the respective Product Description Documents (see Section 5.2) since the versions distributed with the Version C products. Users are also advised to review the updated documents before using these products.

The Version D products resolve several known issues in the Version C KaRIn science data products. They are generated with updated processing algorithms and calibration parameters. The most significant changes from Version C to D products are summarized in Table 3.

Version D products will be generated for all measurements spanning the start of the calibration phase onward, and consist of:

1. Reprocessed products for observations from the start of the calibration phase (March 30, 2023) through the end of cycle 31 (~April 27, 2025). The reprocessing of SWOT KaRIn Version D products is scheduled to start in April 2025 and is expected to complete in early 2026. Data from the Calibration and Science phases are planned to be reprocessed in parallel, with data from each phase reprocessed in chronological order and products becoming available as they are generated.
2. Forward-processed products for measurements from April 28, 2025 onward. The last Version C products will be for measurements on April 27, 2025.

This release note provides the following information:

1. Section 2 provides a summary of the SWOT KaRIn science data products.
2. Section 3 provides a description of the product version identifier, or Composite Release Identifier (CRID), in the file names of KaRIn science data products. Users should use the CRID to distinguish the various versions of products.
3. Section 4 provides more details on the scope of this Version D product release, with Table 3 summarizing the most significant changes from Version C products.
4. Section 5 summarizes various sources of information that users are strongly encouraged to review.
5. Section 6 summarizes how the SWOT science data products can be accessed. Note that the data access areas for the Version D products are slightly different from the Version C products.
6. Section 7 summarizes the known features and issues in the SWOT KaRIn science data products, spanning Version C and D products.

2 Summary of KaRIn Science Data Products

Table 1 provides a list of the SWOT KaRIn science data products. Please refer to the SWOT User Handbook (see Section 0) for more details on these products. The KaRIn low rate (LR) data are downlinked globally, whereas KaRIn high rate (HR) data are downlinked only from regions defined by a programmable HR downlink mask. The associated LR and HR products are generated where the respective downlinked data are available. Refer to the presentation at the following link for more details on the HR downlink mask:
https://swotst.aviso.altimetry.fr/fileadmin/user_upload/SWOTST2023/20230922_1_going_forward/10h00-SWOT_HR_Coverage_Update.pdf.

Table 1. Summary of SWOT KaRIn Science Data Products.

Short Name	Product Name
L1B_LR_INTF	Level 1B KaRIn Low Rate Interferogram Data Product
L2_LR_PreCalSSH	Level 2 KaRIn Low Rate Sea Surface Height Pre Crossover Product
L2_LR_SSH	Level 2 KaRIn Low Rate Sea Surface Height Data Product
L1B_HR_SLC	Level 1B KaRIn High Rate Single Look Complex Product
L2_HR_PIXC	Level 1B KaRIn High Rate Single Look Complex Product
L2_HR_RiverSP	Level 2 KaRIn High Rate River Single Pass Vector Product
L2_HR_LakeSP	Level 2 KaRIn High Rate Lake Single Pass Vector Product
L2_HR_PIXCVec	Level 2 KaRIn High Rate Pixel Cloud Vector Attribute Product
L2_HR_Raster	Level 2 KaRIn High Rate Raster Product
L2_HR_RiverAvg	Level 2 KaRIn High Rate River Average Vector Product
L2_HR_LakeAvg	Level 2 KaRIn High Rate Lake Average Vector Product
L2_HR_FPDEM	Level 2 KaRIn High Rate Floodplain DEM Product

The L2_LR_PreCalSSH product is only available in forward processing to facilitate availability of the KaRIn measurements with shorter latency than the L2_LR_SSH product. The L2_LR_PreCalSSH product is not available from reprocessing. Data values from the L2_LR_SSH and corresponding L2_LR_PreCalSSH products are identical except that the crossover calibration correction is not reported on the L2_LR_PreCalSSH product. The L2_LR_PreCalSSH product started to become available in mid-December 2025.

The L2_HR_RiverAvg and L2_HR_LakeAvg products are cycle-average products and therefore only generated after the completion of a repeat cycle. They are only generated for data in the science phase of the mission. The L2_HR_FPDEM product is only generated after a long duration of science-phase data products have been generated. Therefore, the L2_HR_FPDEM product is not currently available.

Users of HR data products should refer to the following website for various changes to the HR downlink mask that have occurred since launch:
https://podaac.jpl.nasa.gov/SWOT-events/SWOT_events.html.

For reference, Table 2 provides a timeline of the primary SWOT orbit and mission phases.

Table 2. SWOT Orbit and Mission Phase Timeline

Date	Orbit and Mission Phase
December 16, 2022	Launch
December 16 - 24, 2023	Launch and Early Operations Phase (LEOP)
December 16 – January 14, 2023	Orbit Maneuvers and Drift
January 14, 2023	Start of 1-day Repeat Orbit
January 3 – March 30, 2023	Commissioning Phase
March 30 – July 10, 2023	Calibration Phase
July 11 – July 20, 2023	Orbit Maneuvers and Drift
July 21, 2023	Start of 21-day Repeat Orbit
July 21, 2023	Science Phase Begins (no useful KaRIn data from July 21-26, 2023)

3 Product Version Identifier

As described in the SWOT User Handbook (see Section 0) and each of the KaRIn product description documents (see Section 5.2), all KaRIn science data products include a Composite Release IDentifier (CRID) and a Product Counter in the individual product file names, for example <CRID>_<ProductCounter>.

The CRID distinguishes between forward-processed and reprocessed products and reflects the version of algorithms that are used to generate products. Forward-processed products are generated with relatively short latencies, typically less than 5 days, as data are received from the SWOT instruments. Reprocessed products are generated using higher accuracy auxiliary input data that are only available at longer latencies. For example, these might include higher accuracy estimates of the satellite orbit ephemeris.

The CRID consists of four characters. The first character is always “P”. The second character distinguishes between forward-processed and reprocessed products, where “I” is used for forward-processed products, and “G” is used for reprocessed products. The third character identifies the major product version number, which is “D” for this release, and “C” for the prior release. The fourth character identifies minor changes to the version.

For the Version C products the fourth character is “0” for the original release and “2” for the release that used updated algorithms with several resolved issues. In addition, the fourth character is “1” only for L2_HR_RiverSP and L2_HR_RiverAvg products (e.g., PGC1 and PIC1) that add river discharge values for some rivers to respective PGC0 and PIC0 products.

For this release of Version D products the fourth character is “0”.

The Product Counter reflects the number of attempts made by the automated production system to generate the particular granule (product file). It will typically have a value of “01” but can be higher if there are anomalies with the processing systems. Users are advised to use the granule with the highest Product Counter.

4 Scope of Product Release

4.1 Version D Products

The CRID for KaRIn Version D products have values of:

1. PGD0 for reprocessed Version D products spanning measurements from March 30, 2023 to April 27, 2025 (repeat cycles 475-578 of calibration phase, and repeat cycles 1-31 of science phase).
2. PID0 for forward-processed Version D products spanning April 28, 2025 onward (~repeat cycle 32 onward).

Where PID0 and PGD0 products both exist for a particular time, users are advised to use the PGD0 products. The data access mechanisms for the PID0 and PGD0 products are different from those for PIC0, PIC2, and PGC0 products, as they will have the same coverage at least up to April 27, 2025. Users are encouraged to use Version D products where both Version C and D products exist. As such, when the Version D reprocessing is complete in early 2026, users should only be using Version D products.

Note that all nadir altimeter and radiometer data products have also been reprocessed to support the reprocessing of the SWOT KaRIn Version D reprocessed products.

Table 3 provides a summary of the major changes in the Version D products with respect to the prior Version C (C0 and C2) products.

Table 8 lists known issues in the Version D products, which also exist in the Version C products.

Note that discharge estimates are not provided in the PID0 and PGD0 products. They will be provided after the reprocessing of Version D products is complete. The reprocessed Version D products will be used to compute discharge parameters that are consistent with the Version D products.

Table 3. Major Changes to Version D Products with respect to Versions C0 and C2.

Change	C0	C2	D0	Main Impacts
KaRIn height calibration refinement	No	No	Yes	LR+HR: O(5 mm) short-wavelength changes in SSH and WSE
KaRIn sigma0 calibration adjustment	No	No	Yes	LR+HR: KaRIn sigma0 is 2.5 dB lower in Version D.
Range-Doppler coupling correction	No	Yes	Yes	LR+HR: Fix O(3 cm) pass-scale height variations
Update radiometer (AMR) calibration	No	No	Yes	LR: Relative bias between two sides reduced to < 0.2 mm.
Crossover processing update	No	No	Yes	LR+HR: Performance and flagging enhancement
Geoid bug fix	No	No	Yes	LR+HR: Fix O(10 cm) errors in reported geoid values
Update CNES/CLS MSS Model	No	No	Yes	LR: From CNES/CLS 2022 to CNES/CLS/SIO/DTU Hybrid 2023.
Update DTU Mean Sea Surface Model	No	No	Yes	LR: From DTU 2018 to DTU2021
Update Mean Dynamic Topography Model	No	No	Yes	LR: From CNES/CLS 2022 to CNES/CLS 2024.
Update FES ocean and load tide models	No	No	Yes	LR+HR: From FES2014 to FES2022b
Update Sea Surface Height Anomaly	No	Yes	Yes	LR: Non-equilibrium long-period ocean tide applied
New variables in L2_LR_SSH	No	No	Yes	LR: SSHA also given at Unsmoothed posting; added mitigation Doppler. Spacecraft event flag added to Expert.
LR processing over land	No	Yes	Yes	LR: Fewer height artifacts over land
LR volumetric correlation processing	No	Yes	Yes	LR: Improved KaRIn SWH
HR improved dark-water projection	No	Yes	Yes	HR: Better dark-water and area performance
HR crossover flag handling fix	No	Yes	Yes	HR: Fewer areas with missing crossovers
HR bug fix for non-unwrapped pixels	No	Yes	Yes	HR: Fewer height artifacts and discontinuities
Updated Prior River Database	No	No	Yes	HR: From SWORD V16 to V17b. V17b has new reach definitions, improved topology
River processing enhancements	No	Partial	Yes	HR: Improved river width estimates and flagging
Updated Prior Lake Database	No	Partial	Yes	HR: From PLD V1.06 to V2.01. V2.01 adds lake catchment areas and reference heights.
Lake processing enhancements	No	Partial	Yes	HR: Improved pixel selection, new bitwise quality flag
Raster algorithm improvements	No	Yes	Yes	HR: Fewer height artifacts in Raster product

4.2 Version C Products

The CRID for KaRIn version C products have values of:

1. PGC0 for reprocessed version C products spanning March 30, 2023 to January 25, 2024 (repeat cycles 475-578 of calibration phase, and repeat cycles 1-9 of science phase).
2. PIC0 for forward-processed version C products spanning January 25, 2024 to October 15, 2024 (repeat cycle 10 to part of repeat cycle 22 of science phase).
3. PIC2 for forward-processed version C products spanning October 16, 2024 to April 27, 2025 (part of cycle 22 of science phase to end of cycle 31). Note that PGC2 products were not generated.

The best available science data processing algorithms in early 2024 were applied into the operational forward processing and reprocessing of KaRIn data to generate the PIC0 and PGC0 products. The PIC2 products resolved numerous algorithm and product issues that were identified in the PIC0/PGC0 products. The PIC2 products served as a step towards the Version D products in that they resolved numerous issues in the PIC0 products.

1. Table 9 lists the issues that exist in all Version C products (PIC0, PGC0, PIC2).
2. Table 10 lists the issues that exist in the original PIC0 and PGC0 products but which have been resolved in the PIC2 products.

Note that the CRID values PGC1 and PIC1 are reserved for L2_HR_RiverSP and L2_HR_RiverAvg products that add river discharge values for some rivers to respective PGC0 and PIC0 products. A separate announcement will be made when those become available.

Where PIC0 and PGC0 products both exist for a particular time, users are advised to use the PGC0 products. For example, this is expected for reprocessed LR products from cycles 7-9. There should not be any overlapping PIC0 and PIC2 products, but users are advised to use PIC2 products if an overlap is observed.

The data access areas for the PIC0, PGC0, and PIC2 products are the same as there is no expected overlap in coverage between PIC0/PGC0 and PIC2 products.

5 User Documentation

Minor updates have been made to the User Handbook and all SWOT KaRIn Product Description Documents for this Version D release. Please refer to the provided links for the most recent release of these documents.

5.1 User Handbook

Users are strongly encouraged to consult the SWOT User Handbook before using SWOT science data products. The User Handbook provides significant information about the SWOT mission, measurement system, KaRIn measurement concept, and science data products. A link to the User Handbook is available at:
https://podaac.jpl.nasa.gov/swot?tab=datasets-information&sections=about.

5.2 Product Description Documents

Links to individual product description documents for all of the products in this release are available at: https://podaac.jpl.nasa.gov/swot?tab=datasets-information&sections=about.

5.3 Algorithm Theoretical Basis Documents

Algorithm Theoretical Basis Documents describe the algorithms that are used to perform the ground processing of instrument data. Links to these documents are available at: https://podaac.jpl.nasa.gov/swot?tab=datasets-information&sections=about.

5.4 Satellite Events Impacting Data Quality and Availability

Satellite events that impact data quality and availability as well as changes to the HR downlink mask are updated regularly and provided at: https://podaac.jpl.nasa.gov/SWOT-events/SWOT_events.html.

5.5 User Feedback

The SWOT KaRIn measurement system, science data processing algorithms, and science data products are all novel. Our experience and knowledge of their features and issues are expected to continually evolve. **Users are strongly encouraged to review Section 7 below for the currently known features and issues.** We welcome user feedback on features and issues not identified in Section 7. User feedback can be provided via:

- Email to podaac@podaac.jpl.nasa.gov or through the PODAAC forum topic titled "SWOT Data Product User Feedback". The PODAAC forum is at: https://forum.earthdata.nasa.gov/viewforum.php?f=7&tagMatch=all&DAAC=146&keywords=&.
- Email to exp.hysope2@cnes.fr or simply using the "contact us" icon on https://hydroweb.next.theia-land.fr for SWOT KaRIn HR data products.
- Email to aviso@altimetry.fr for SWOT KaRIn LR data products.

6 Data Access

Identical SWOT data can be accessed from both the CNES and NASA PO.DAAC data centers. Access details are provided below.

6.1 NASA PO.DAAC

The KaRIn datasets in the Version D release are available through NASA Earthdata Search client (https://search.earthdata.nasa.gov/search?q=SWOT_*_D) and downloadable using PO.DAAC scripts by their unique collection IDs, which are given in Table 4 below with usage examples for each dataset. Additional tips for searching HR data products can be found in the PO.DAAC Cookbook - SWOT Chapter. The Version C products continue to be available at the PO.DAAC (https://search.earthdata.nasa.gov/search?q=SWOT_*_2.0).

Table 4. PO.DAAC KaRIn Data Collection IDs and Examples to Access

NASA PO.DAAC Collection ID	Dataset Name	Example data access script (Obtain PO.DAAC data download tool)
SWOT_L1B_LR_INTF_D DOI:10.5067/SWOT-INTF-D	Level 1B KaRIn Low Rate Interferogram Data Product	INTF products for 2025-04-01 to 2025-04-30: podaac-data-downloader -c SWOT_L1B_LR_INTF_D -d ./SWOT_L1B_LR_INTF_D/ --start-date 2025-04-01T00:00:00Z –end-date 2025-04-30T23:59:59Z
SWOT_L2_LR_PreCalSSH_D DOI:10.5067/SWOT-SSH-D	Level 2 KaRIn Low Rate Sea Surface Height Pre Crossover Data Product	SSH products for 2025-04-01 to 2025-04-30: podaac-data-downloader -c SWOT_L2_LR_PreCalSSH_D -d ./SWOT_L2_LR_PreCalSSH_D/ --start-date 2025-04-01T00:00:00Z –end-date 2025-04-30T23:59:59Z
SWOT_L2_LR_SSH_D DOI:10.5067/SWOT-SSH-D Sub-collections: • Basic • Expert • Windwave • Unsmoothed	Level 2 KaRIn Low Rate Sea Surface Height Data Product	SSH products for 2025-04-01 to 2025-04-30: podaac-data-downloader -c SWOT_L2_LR_SSH_D -d ./SWOT_L2_LR_SSH_D/ --start-date 2025-04-01T00:00:00Z –end-date 2025-04-30T23:59:59Z
SWOT_L1B_HR_SLC_D DOI:10.5067/SWOT-SLC-D	Level 1B KaRIn High Rate Single Look Complex Product	SLC products for 2025-04-01 to 2025-04-30: podaac-data-downloader -c SWOT_L1B_HR_SLC_D -d ./SWOT_L1B_HR_SLC_D/ --start-date 2025-04-01T00:00:00Z --end-date 2025-04-30T23:59:59Z
SWOT_L2_HR_PIXC_D DOI:10.5067/SWOT-PIXC-D	Level 2 KaRIn High Rate Water Mask Pixel Cloud Product	PIXC products for 2025-04-01 to 2025-04-30: podaac-data-downloader -c SWOT_L2_HR_PIXC_D -d ./SWOT_L2_HR_PIXC_D/ --start-date 2025-04-01T00:00:00Z –end-date 2025-04-30T23:59:59Z
SWOT_L2_HR_PIXCVec_D DOI:10.5067/SWOT-PIXCVEC-D	Level 2 KaRIn High Rate Water Mask Pixel Cloud Auxiliary Data Product	PIXC products for 2025-04-01 to 2025-04-30: podaac-data-downloader -c SWOT_L2_HR_PIXCVec_D -d ./SWOT_L2_HR_PIXCVec_D/ --

		start-date 2025-04-01T00:00:00Z –end-date 2025-04-30T23:59:59Z
SWOT_L2_HR_RiverSP_D DOI:10.5067/SWOT-RIVERSP-D Sub-collections: • Nodes • Reaches	Level 2 KaRIn High Rate River Single Pass Vector Product	RiverSP products for 2025-04-01 to 2025-04-30: podaac-data-downloader -c SWOT_L2_HR_RiverSP_D -d ./SWOT_L2_HR_RiverSP_D/ --start-date 2025-04-01T00:00:00Z --end-date 2025-04-30T23:59:59Z
SWOT_L2_HR_RiverAvg_D DOI:10.5067/SWOT-RIVERAVG-D	Level 2 KaRIn High Rate River Cycle-Averaged Data Product	RiverAvg products for 2025-04-01 to 2025-04-30: podaac-data-downloader -c SWOT_L2_HR_RiverAvg_D -d ./SWOT_L2_HR_RiverAvg_D/ --start-date 2025-04-01T00:00:00Z --end-date 2025-04-30T23:59:59Z
SWOT_L2_HR_LakeSP_D DOI:10.5067/SWOT-LAKESP-D Sub-collections: • Obs • Prior • Unassigned	Level 2 KaRIn High Rate Lake Single Pass Vector Product	LakeSP products for 2025-04-01 to 2025-04-30: podaac-data-downloader -c SWOT_L2_HR_LakeSP_D -d ./SWOT_L2_HR_LakeSP_D/ --start-date 2025-04-01T00:00:00Z --end-date 2025-04-30T23:59:59Z
SWOT_L2_HR_LakeAvg_D DOI:10.5067/SWOT-LAKEAVG-D	Level 2 KaRIn High Rate Lake Cycle-Averaged Data Product	LakeAvg products for 2025-04-01 to 2025-04-30: podaac-data-downloader -c SWOT_L2_HR_LakeAvg_D -d ./SWOT_L2_HR_LakeAvg_D/ --start-date 2025-04-01T00:00:00Z --end-date 2025-04-30T23:59:59Z
SWOT_L2_HR_Raster_D DOI: 10.5067/SWOT-RASTER-D Sub-collections: • 100m • 250m	Level 2 KaRIn High Rate Raster Product	Raster products for 2025-04-01 to 2025-04-30: podaac-data-downloader -c SWOT_L2_HR_Raster_D -d ./SWOT_L2_HR_Raster_D/ --start-date 2025-04-01T00:00:00Z --end-date 2025-04-30T23:59:59Z

Note: Several datasets listed in Table 4 are available through “sub-collections” that simplify access to KaRIn products that are distributed in multiple formats.

Resources for users of SWOT datasets distributed by the PO.DAAC

Note: At the time of this Release Note, the resources linked below refer to Version C (i.e. v2.0) SWOT data. Their content is also applicable to the Version D datasets included in this release. (Replace the "SWOT_*_2.0" collection IDs with the new IDs listed in the table above.)

Search, Download, and Access:

- PO.DAAC Cookbook - SWOT Chapter
- PO.DAAC Data Subscriber/Downloader
  - Video tutorial on using the podaac-data-subscriber
- Data search
  - Earthdata Search (GUI)
  - Earthdata Search tutorial
  - Earthaccess python library (using CMR API on backend)
- General information about NASA Earthdata
  - Obtain Earthdata Login Account
  - Earthdata Common Metadata Repository (CMR) API
- API access to SWOT KaRIn HR River Products via Hydrocron

Subsetting and Visualization:

SSH products can be subset using the High-level Tool for Interactive Data Extraction (HiTIDE):

- SWOT_L2_LR_SSH_BASIC_D
- SWOT_L2_LR_SSH_EXPERT_D
- SWOT_L2_LR_SSH_WINDWAVE_D
- SWOT_L2_LR_SSH_UNSMOOTHED_D products are not available in HiTIDE.

6.2 CNES AVISO

Identical KaRIn L2_LR_SSH products are also available at the CNES AVISO distribution center (https://www.aviso.altimetry.fr/en/data/products/sea-surface-height-products/global/swot-karin-low-rate-ocean-products.html). They can be accessed via FTP/SFTP and a THREDDS Data Server (TDS) using AVISO+ credentials. The L1B_LR_INTF products are available by specific request only.

CNES AVISO FTP/SFTP (with AVISO+ credentials):

- FTP access: ftp-access.aviso.altimetry.fr:21/
- SFTP access: ftp-access.aviso.altimetry.fr:2122/

FTP/SFTP Server Directory Main Tree

- /swot_products/l2_karin/l2_lr_ssh

CNES AVISO TDS (with AVISO+ credentials):

- TDS access: https://tds-odatis.aviso.altimetry.fr/thredds/catalog.html

TDS Directory Main Tree

- https://tds-odatis.aviso.altimetry.fr/thredds/catalog/L2/L2-SWOT-DATA/L2-SWOT.html

Identical KaRIn L2_LR_PreCalSSH product is also available at the CNES AVISO Data Archiving Center (HTTPS data access using AVISO+ credentials).

The KaRIn L2_LR_PreCalSSH and L2_LR_SSH products in this release are listed below along with the corresponding Digital Object Identifier (DOI) landing pages:

KaRIn L2_LR product files
* L2_LR_PreCalSSH (https://doi.org/10.24400/527896/a01-2025.012)* L2_LR_SSH_Basic (https://doi.org/10.24400/527896/a01-2023.013)
* L2_LR_SSH_Basic (https://doi.org/10.24400/527896/a01-2023.013)
* L2_LR_SSH_WindWave (https://doi.org/10.24400/527896/a01-2023.014)
* L2_LR_SSH_Expert (https://doi.org/10.24400/527896/a01-2023.015)
* L2_LR_SSH_Unsmoothed (https://doi.org/10.24400/527896/a01-2023.016)

6.3 CNES hydroweb.next

The KaRIn global High Rate (HR) hydrology products can be accessed via the CNES hydroweb.next portal: https://hydroweb.next.theia-land.fr, with the exception of the Level-1B Single Look Complex products which are currently only available at PO.DAAC, see Table 4.

hydroweb.next provides a centralized access to a collection of hydrology data products complementing SWOT HR that may be of interest for users.
The following instructions will guide you through your first visit. They are not an exhaustive list of possibilities. Those can be found in the help section  .

Searching for SWOT datasets:
Once on hydroweb.next.theia-land.fr, simply type SWOT in the searchbar. This will (i) trigger an autocompletion feature proposing some SWOT dataset or (ii) if you press enter, add a SWOT keyword filter and update the results Pane accordingly. Control the filters 

and remove  unwanted ones, if any. You may also add spatial 

or temporal 

filters.

Visualization:
The visualization of datasets is possible –for some datasets- once imported in your project. Some of the products are available for visualization on the map  or directly as timeseries  , see Table 5.

From the Results pane 

, click on “add product into project” - 

or 

- for each dataset of interest. The 

icon indicates that the dataset will be available for visualization. You can have several projects, and retrieve them when you come back, they will be automatically stored in your browser local storage.

Once added to your project 

, and if the dataset is available for visualization, the corresponding layers will appear on the map, providing:

- your map is zoomed on a region that is consistent with the spatial filters, if any, set for this dataset when you added it (filters are static once in the project)
- the timeline 

is set on dates compatible with the product. Contrary to spatial restrictions, you can visualize dates that where outside your time filters, if any.

You can rename all layers, change the order, group, etc just as any GIS software.

Use Select 

to click on the map. For all active layers  , the select pane will show the precise values of the pixel/feature for the selected dates. For some datasets (vector datasets such as Lake Single Pass – Prior and River - Reach), a timeseries  icon will appear. Click on it to visualize the time evolution in a graph.

Download:

Downloading datasets is only possible once you are logged in. You must first create an account, or use your Theia account if already have one.

Once logged in, the download icons will be unlocked. You may either download your datasets individually from the Result 

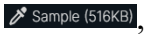
pane with 

, or download your entire Project 

with 

. In either case, this will open the download pane and propose several options:

- download an archive 

, or a sample archive 

, in your browser *(ndlr: not recommended if the archive exceeds 10GB)*
- download a python script 

. All necessary instructions are in the script. You can also modify it later (dataset, region of interest, time restrictions), it is quite straightforward. It requires you to provide an API-Key that you can create from the settings  . Your API-Key is private and has no time limitation.

Table 5. hydroweb.next KaRIn High Rate Data Dataset Names and IDs

Dataset Name	hydroweb.next Dataset ID (for STAC Search purposes)	Visualization
SWOT Level-2 HR Pixel Cloud	SWOT_L2_HR_PIXC	no
SWOT Level-2 HR River Single Pass - Reach	SWOT_L2_HR_RIVERSP_REACH	map, timeseries
SWOT Level-2 HR River Single Pass - Node	SWOT_L2_HR_RIVERSP_NODE	no
SWOT Level-2 HR Lake Single Pass - Prior	SWOT_L2_HR_LAKESP_PRIOR	map, timeseries
SWOT Level-2 HR Lake Single Pass - Observed	SWOT_L2_HR_LAKESP_OBS	no
SWOT Level-2 HR Lake Single Pass - Unassigned	SWOT_L2_HR_LAKESP_UNASSIGNED	no
SWOT Level-2 HR River Average	SWOT_L2_HR_RIVERAVG	map, timeseries
SWOT Level-2 HR Lake Average	SWOT_L2_HR_LAKEAVG	map, timeseries
SWOT Level-2 HR Pixel Cloud Vector	SWOT_L2_HR_PIXCVEC	no
SWOT Level-2 HR Raster - 100m	SWOT_L2_HR_RASTER_100M	map
SWOT Level-2 HR Raster - 250m	SWOT_L2_HR_RASTER_250M	map

Table 6: hydroweb.next ancillary datasets for SWOT

Dataset Name	hydroweb.next Dataset ID (for STAC Search purposes)	Visualization
SWOT Prior Lake Database	SWOT_PRIOR_LAKE_DATABASE	map
SWOT Prior River Database - SWORD	SWOT_PRIOR_RIVER_DATABASE	map

7 Known Features and Issues

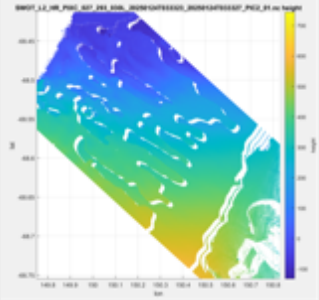
7.1 Known Features

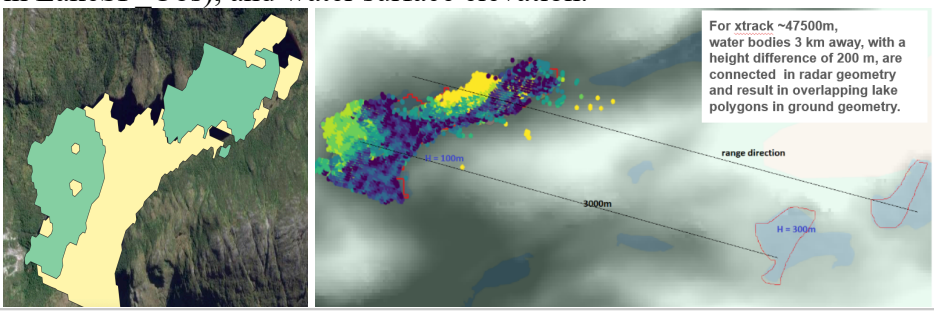
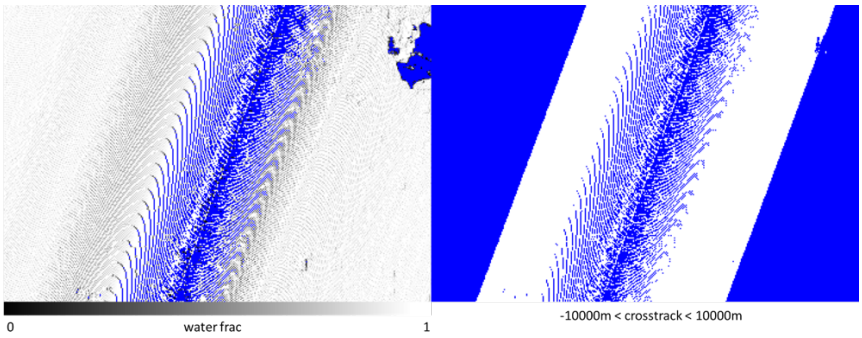
There are various known features of the SWOT measurement system, science processing algorithms, and science data products. Many of these are already described in the SWOT User Handbook (see Section 0) and the individual product description documents (see Section 5.2). Some of these are emphasized in Table 7 below.

Table 7. Known Features of KaRIn Science Data Products.

Product	Description of Feature
All	**Spacecraft Events Impact Data Quality.** Various spacecraft events may degrade the quality of the KaRIn data. These are typically flagged in the data products. These include potentially degraded KaRIn data for a few hours after satellite maneuvers, for a few hours after satellite yaw flips, for ~15 minutes after solar panel rotations, and for a few minutes during entry and exit of solar and lunar eclipses.
All	**Solid State Recorder (SSR) Data Loss.** Some data gaps may occur due to occasional single event upsets in the SSR. Lengthy SSR data loss events are provided at https://podaac.jpl.nasa.gov/SWOT-events/SWOT_events.html.
LR and HR L2 Products	**L3 Crossover Corrections Used for Calibration Orbit.** L2 LR and HR products from the calibration or 1-day orbit are generated with "L3" crossover-correction solutions rather than the operational or "L2" crossover solutions. This is because the geometry of the ground tracks in the calibration orbit gives too few crossovers for reliable solutions using the L2 algorithm. The L3 algorithm instead relies on along-track averaging of the pre-calibration LR SSH to estimate bias, linear, and quadratic corrections.
LR Products	**Reference Surface Values In 2-km Product.** The On-Board Processor and L1B_LR_INTF reference surfaces have a much finer native spacing than the 2 km fixed grid on which they are reported in the L2_LR_SSH fixed grid products. Users are advised that these variables are for information only; they should not be treated as perfectly accurate representations of the reference surfaces. The *doppler_centroid* reported on the 2-km fixed grid is similarly intended for information only.
LR Products	**Unreliable Height Estimates Over Land and Ice.** Height estimates over land and ice are often unreliable because the LR on-board and ground processing is optimized for ocean surfaces. The PID0, PGD0, and PIC2 products should provide a noticeable improvement over the PGC0/PIC0 products in this regard, but the later products may still be unreliable. [563][589][590]
LR Products	**Discrepancies Between 2-D and 3-D Media Delay Corrections.** In some locations such as the Caspian Sea, discrepancies of up to ~1 cm exist between the 2-D media delay corrections used in the LR products and the 3-D media delay corrections used in the HR and Nadir Altimeter

	products. This occurs where the surface has large deviations from the reference surface used by ECMWF for the 2-D media delay fields.
L2_LR_SSH	**Crossover Correction Not Applied to Reported SSH and SSHA.** The crossover correction is reported in the product but is not applied. Large cross-track tilts will therefore be evident in the reported SSH and SSHA unless users themselves apply *height_cor_xover.*
L2_LR_SSH	**Global Attribute *good_ocean_data_percent.*** This attribute refers to the percent of the fixed grid pixels for which ocean is flagged "good". Since the SWOT swath does not fill up the entire fixed grid, this value is not expected to reach 100% (it typically maxes out at about 75%).
L2_LR_SSH	**Global Attribute *ssha_variance.*** This attribute is computed for *ssha_karin_2* without *height_cor_xover* applied, so the variance may be larger than one might expect.
L2_LR_SSH	**Discontinuity in *sea_state_bias_cor_2* correction (and therefore *ssh_karin_2* and *ssha_karin_2*) when *swh_model* becomes fill-valued (typically below 66°S, due to the presence of ice).** When entering the region where *model_swh* is filled, the *sea_state_bias_cor_2* correction cannot be computed and no ssb correction is applied, making *ssh_karin_2* and *ssha_karin_2* discontinuous at the boundary. Inside that region, the data is appropriately flagged since no SSB correction has been applied.
L2_LR_SSH	**Change of data source for *ice_conc* and *dynamic_ice_flag*.** SWOT products for data collected before July 30, 2025 use SSMI radiometer data from EUMETSAT OSI SAF for *ice_conc* and *dynamic_ice_flag*, while data collected after July 30, 2025 use AMSR-2 radiometer data.
HR Products	**Areas Incorrectly Flagged as Dark Water.** Areas may be incorrectly flagged as dark water where the historical occurrence of water is characterized by large changes in the actual location of the water (for example, river channels that migrate significantly). Currently unclear if this can be improved.
HR Products	**Specular Ringing.** Ringing of very bright, specular features near nadir can contaminate the measurements areas far from nadir. This may cause false detection of water and consequent errors in assigning pixels to water features in the river, lake, and raster products. This may also cause missing data that results in "holes" in some water features. Mitigation of the effects of specular ringing has improved somewhat in the Version D products.
HR Products	**Phase Unwrapping Errors.** Phase unwrapping errors can cause very large errors in the height and cross-track geolocation of contiguous water features. Currently unclear if this can be improved.
HR Products	**Classification Errors.** Classification errors are not uncommon: • Dark water is common. Dark water may be flagged, but the dark water flag itself has errors. • Overdetection of water ("bright land") is common due to highly reflective features such as urban areas, ice, snow, wet fields, and layover.

	• Boundaries between water and land may be especially prone to classification errors
HR Products	**Layover Errors.** Layover is known to cause errors. These errors tend to be worst when bright features (including other water features) lay over into an observed water feature. They are especially significant if the desired water feature is itself dark.
HR Products	**Unreliable Height Estimates Over Snow and Ice.** Height estimates over snow and ice are often unreliable because the HR algorithms are optimized for water surfaces. Large artifacts in the height over ice sheets and snow-covered areas may be present. [558] 
HR Products	**Water Fraction Outside Physical Limits.** The reported water fraction in the L2_HR_PIXC product may be less than 0 or greater than 1 because of noise; this field is meant to be aggregated, not used at the pixel level. It is therefore also possible for the reported water area in downstream products to be slightly negative.
L2_HR_PIXC	**Noisy Geolocations.** Pixel-level geolocations are quite noisy (as expected), and the variability is generally larger than the pixel size itself.
L2_HR_RiverSP	**Discharge Not Yet Available.** Discharge estimates are not expected to be available in river products until after sufficient SWOT data are collected and processed to inform the selection of appropriate algorithm parameters. A first release of discharge estimates for some (~10%) reaches generated from PIC0 and PGC0 products is expected to be available as PIC1 and PGC1 products by May 2025. Discharge estimates are not provided in the PID0 and PGD0 products. They will be computed after all PGD0 products have been generated.
L2_HR_LakeSP	**Lakes Missing in Shapefiles.** Lakes may be missing in the LakeSP_Prior and LakeSP_Obs shapefiles for several reasons: • Lake not identified in the Prior Lake Database (or with an erroneous extent or location). Note that such unknown lakes, if correctly detected, should be represented in the LakeSP_Unassigned shapefile. There have been some improvements in the Version D products, and future versions of the PLD may provide additional improvements. • Water body is not detected in the L2_HR_PIXC product. Note that unobserved lakes within the swath will be present in LakeSP_Prior (as an empty shape), but not in LakeSP_Obs.

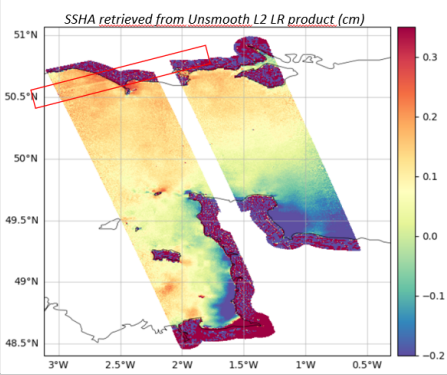
L2_HR_LakeSP	**Water-water Layover.** Water-water layover (e.g. separate lakes at different altitudes, intersecting each other in radar geometry) may cause errors in lake extent (joint polygon LakeSP_Prior, overlapping polygons in LakeSP_Obs), and water surface elevation. 
L2_HR_LakeSP	**Storage Change Not Computed for All Lakes.** Storage change is only computed for the lakes where it has been possible to robustly estimate a reference WSE from the time series of L2_HR_LakeSP products. Storage change has been computed for ~5.3 million lakes out a total of ~5.9 million PLD lakes in Version D products.
L2_HR_Raster	**Artifacts in Water Area and Fraction Near Nadir.** Artifacts are present in the water area and fraction near nadir, where the intrinsic KaRIn resolution is coarse compared to the resolution of the L2_HR_Raster product. Areas within 10 km of nadir are flagged. 

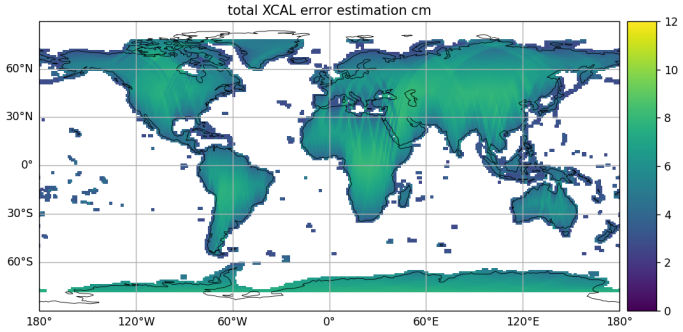
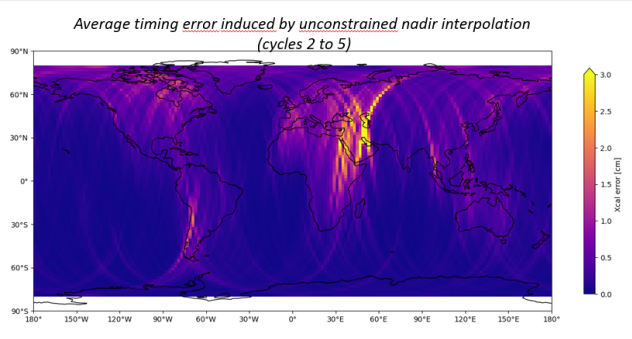
7.2 Known Issues in Version D Products

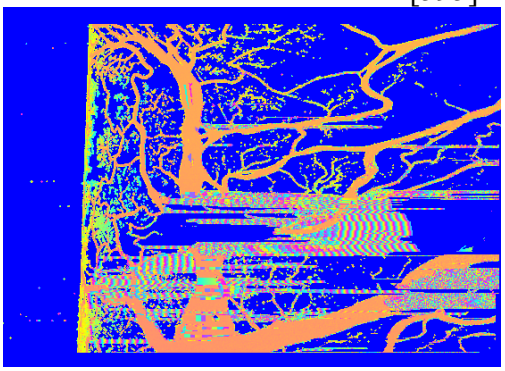
There are various known issues with this Version D release of the KaRIn science data products that are either under investigation or will be corrected in a future release. Known issues in the Version D products (PGD0 and PID0) are summarized in Table 8 below. All of these issues also exist in all of the Version C products, unless otherwise noted. Users can ignore the issue identifiers in []'s as they are for project tracking purposes only.

Table 8. Known Issues with all Version C and Version D KaRIn Science Data Products (PIC0, PGC0, PIC2, PID0, PGD0).

Product	Description of Issue

LR Products	**Temporal Errors.** KaRIn height errors of ~1 mm or smaller with slow temporal variations (orbital and beta-cycle time scales) are present in the data and are being investigated. [329]
LR Products	**Artifacts due to radiation upsets are not flagged.** Artifacts that appear as stripes in the along-track direction are present and not flagged in some granules. They are due to radiation events that affect on-board processing. A flagging approach is under investigation. [231, 337]
LR products	**Artifacts in Cross-Track Direction Near Coasts.** Artifacts that appear as stripes in the cross-track direction exist and are not flagged. They may be most observable in the L2_LR_SSH Unsmoothed files. They are often observed close to the coast and mainly impact the SSHA and sigma0 variables. They are due to OBP Doppler centroid jumps. A mitigation approach is under investigation. [549] 
LR Products	**Inland Water and Near Coasts Not Validated.** Data over inland water and near coasts have not been well validated and sometimes contain large errors due to the optimization of the on-board and ground processing for ocean surfaces. Validation is ongoing. [549, 552]
L1B_LR_INTF	**Mitigation Power Scaling Not Validated.** The scaling factors reported for the *power_miti* and *power_miti_squared* variables are not validated and may not be correct. [541]
L2_LR_SSH	**Ice and Rain Flags Not Always Reliable.** The ice and rain flags are not always reliable as they are based upon meteorological models. (for example, *ssha_karin_qual* may be 0, indicating "good" data, even if *rain_flag* and/or *dynamic_ice_flag* are nonzero). The reliability of those flags is a subject of investigation.
L2_LR_SSH	**Icebergs, Ships Not Flagged.** Icebergs, ships, and other features that may affect the quality of the reported SSH and SSHA may not be flagged. This is a subject of investigation.
L2_LR_SSH	**Radiometer Land and Rain Contamination Impact to *ssh_karin* and *ssha_karin*.** The current implementation of the interpolation of the radiometer measurements on each swath can result in degraded or defaulted *ssh_karin* and *ssha_karin* measurements at surrounding measurements.
L2_LR_SSH	**Residual Errors in *swh_karin* That Vary with Beta Angle.** The algorithms that compute SWH from KaRIn volumetric correlation do not

	account for instrumental variations over beta angle, so residual errors with time scales of ~78 days are present in the data.
HR Products	**Validation of Crossover Correction.** Currently, the crossover correction has not been fully validated over land. The relationship between residual error after correction and distance to the nearest crossover was obtained from a simulation experiment (crossover dissemination over ocean). Based on this relationship a mean residual error of 5.7 cm was found (over cycle 3), with geographical variations described in the figure here below. Further validation using in-situ and airborne sensors at global scales is still ongoing. 
HR Products	**Incorrect Crossover Timing Corrections.** O(cm) errors in the crossover timing correction exist in specific conditions where nadir measurements are missing and retrieved from unconstrained interpolation over a large time window. This timing error can be different for the left and right swaths. This will be corrected in a future release. 
HR Products	**Uncertainty Estimates Not Validated.** Uncertainty estimates reported in the products have not been validated and should not be relied upon for science interpretation. Validation is ongoing.
HR Products	**Height Artifacts in Antarctica.** HR height artifacts over Antarctica may be unreliable due to artifacts in the reference digital elevation model used for processing. [7][579]
HR Products	**Height Artifacts due to Missing Reference DEM Values.** HR heights may contain artifacts in a few areas globally (all near coasts) where the reference DEM had missing (void) values. The artifacts are worse in

	Version D0 than in C0 or C2 products due to an algorithm change that exacerbated the issue. A fix has been identified. [595]  Slant-plane height (wrapped at 50 m) showing artifacts due to missing RefDEM values (PIXC PID0 034_283_153L).
L2_HR_RiverSP	**Node Quality Flags.** Many nodes are flagged as suspect or degraded (quality flag variables *node_q* and *node_q_b*) due primarily to an over-sensitive propagation of pixel-level quality flags to node-level quality flags and the large number of suspect and/or degraded PIXC pixels. The PGD0, PID0, and PIC2 products contain some improvements in quality flag computation relative to the PIC2 and PGC0/PIC0 products, but additional improvements are still being investigated. [390]
L2_HR_RiverSP	**Reach Level Quality Flags.** Nearly all reach-level quality flags (variables *reach_q* and *reach_q_b*) are non-zero due to the propagation of node-level quality flags to reach-level quality flags. The PGD0/PID0 and PIC2 products contain some improvements in quality flag computation relative to the PIC2 and PGC0/PIC0 products, respectively, but additional improvements are still being investigated. See above. [390]
L2_HR_RiverSP	**Extra Pixels Assigned to Rivers.** Water over-detection in L2_HR_PIXC leads to extra pixels assigned to river channels (affecting both reaches and nodes). This causes overestimates in river area and spurious heights for some river nodes near bright fields, cities, wetlands, and/or snow and ice. There have been some improvements in the Version D products, but efforts to mitigate this issue are continuing. [118]
L2_HR_RiverSP	**Leap seconds not reported correctly.** The information on when a leap second occurs within a granule is not reported correctly in the .shp.xml metadata [565].
L2_HR_RiverSP	**Duplicate Reach Entries.** On rare occasions, reaches and nodes may be represented twice (possibly with different measurement values) in products from the forward-processing system. [560]
L2_HR_RiverSP	**Incorrect Sign for flow_angle Variable.** The flow_angle variable has the opposite sign convention from that described in the product metadata and documentation. [567]

L2_HR_RiverAvg	**Impact of L2_HR_RiverSP.** The above-mentioned errors in L2_HR_RiverSP will propagate into similar errors in the L2_HR_RiverAvg product.
L2_HR_RiverAvg	**Quality flags not propagated correctly.** The reach_qual variable reported in the RiverAvg may not properly capture quality information from the input RiverSP data, especially when suspect and degraded reaches are used. [572]
L2_HR_LakeSP	**Validation of Storage Change.** The storage change estimates and the underlying reference WSE values in the PLD have not been well validated yet and should be used with caution.
L2_HR_LakeSP	**River Portions Included in Lakes.** River portions connected to lakes may be erroneously included in the lake object (polygon) if the river reach is not present in SWORD (SWOT Prior River Database). This can propagate to larger areas, e.g. an estuary, if the river reach between the lake and an estuary is missing in SWORD. There have been some improvements in the Version D products, and future versions of SWORD may provide additional improvements.
L2_HR_LakeSP	**Missing Water Surfaces in the Middle of Reservoirs.** Water surfaces in the middle of reservoirs may be missing if SWORD identifies it as a regular river reach rather than a reservoir (connected lake). There have been some improvements in the Version D products, and future versions of SWORD may provide additional improvements.
L2_HR_LakeSP	**Lakes Divided into Several Polygons.** Some lakes are erroneously divided into several polygons, with small gaps in between, due to a bug in the handling of height-constrained geolocations for dark water patches. This will be correct in a future product release.
L2_HR_LakeAvg	**Impact of L2_HR_LakeSP.** The above-mentioned errors in L2_HR_LakeSP will propagate into similar errors in the L2_HR_LakeAvg product.
L2_HR_RiverAvg and L2_HR_LakeAvg	**Validation of L2_HR_RiverAvg and L2_HR_LakeAvg Products.** Currently these two products have not been well validated. Validation is ongoing.
L2_HR_Raster	**Handling of Bright Land.** Areas that are flagged as bright land are reported but may also affect surrounding areas. The handling of bright land may change in future releases of the product.

7.3 Known Issues in Version C Products

There are various known issues with the Version C release of the KaRIn science data products. Some issues are corrected in the PIC2 release. Known issues in all of the version C products (PGC0, PIC0, and PIC2) that are resolved in Version D products are summarized in Table 9 below. Issues that are resolved in the PIC2 products but exist in PIC0/PGC0 products are provided in Table 10. Users can ignore the issue identifiers in []'s as they are for project tracking purposes only.

Table 9. Known Issues with all Version C KaRIn Science Data Products that are Resolved in Version D products.

Product	Description of Issue
All	**Absolute Radiometric Calibration.** The reported sigma0 values are approximately 2.5 dB larger than they should be, as measured by comparisons to Global Precipitation Measurements (GPM). They will be revised in a future release. [238]
All	**KaRIn height calibration.** Changes to the KaRIn calibration that affect heights at the level of ~1 cm will be applied in a future release. [307]
All	**Temporal Errors.** KaRIn height errors of ~1 cm or smaller with slow temporal variations (orbital and beta-cycle time scales) are present in the data and are being investigated. [329]
All	**Moon Eclipse Flagging.** Possible data degradation when the spacecraft enters or exits eclipse by the moon are not flagged. This will be corrected in a future release. [331]
L2 LR and HR Products	**Error with geoid height provided on products.** The source 1x1 arcminute geoid height file was erroneously shifted by 0.5 arcminutes in longitude and latitude before interpolation to the measurement longitude and latitude. The error is largest where there are steep geoid gradients. The error is within +/- 50 cm, but is more typically within +/- 10 cm. [553]
LR and HR L2 Products	**Incorrect crossover calibration flags.** In some cases, the crossover correction is zero filled but only flagged as suspect when it should be flagged as bad. This may cause large height errors when the crossover correction is applied and interpreted as zero.
L2_LR_SSH	**Valid min/max too tight for SSHA over land.** The valid_min/max attributes of the SSHA variables are too tight for inland water surfaces that are far from the geoid (ocean surfaces should be fine). This will be corrected in a future product version. [492]
HR Products	**Validation of Crossover Correction.** Currently, the crossover correction has not been well validated over land. Validation is ongoing.
HR Products	**Classification Discontinuity at +78 deg Latitude.** The prior water probability used for ground processing is filled with zero north of 78 deg latitude, so a discontinuity may be present in the classification information of L2 HR products. This will be mitigated but not completely fixed in a future release. [487]
L2_HR_RiverSP	**Occasional Discrepancy in p_dist_out.** In rare cases, the distance to outlet disagrees between the netcdf version of SWORD used for processing and the shapefile version of SWORD that is available for public download. This will be fixed in a future product release. [420]
L2_HR_RiverSP	**Inconsistent area and width normalization at reach level.** Estimated river width and area are not necessarily consistent with the relationship that area = length*width for partially observed reaches due to inconsistent normalization in the estimates [490, 528, 529].

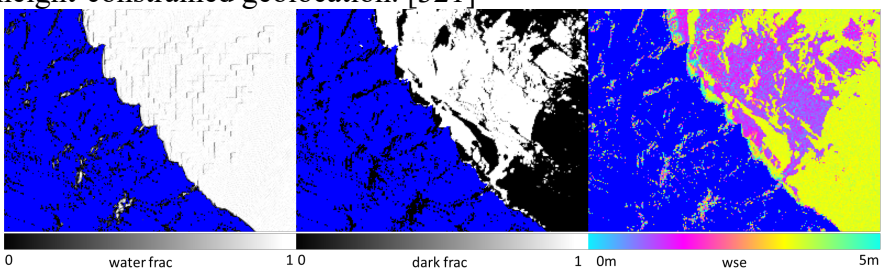
L2_HR_RiverSP	**Incorrect river database topology for some reaches.** Topology errors in the river database (SWORD v16) may cause unexpected behavior when considering flow direction and connectivity.
L2_HR_RiverSP	**Input PIXC Tiles Not Merged Correctly.** The processing to generate L2_HR_RiverSP products from input L2_HR_PIXC data does not handle the PIXC tile boundaries correctly, so minor artifacts near tile boundaries may occasionally be present. [561]
L2_HR_RiverSP	**Incorrect Time Tags.** The time tags of reach and node data in the L2_HR_RiverSP product are not computed correctly and are usually around 10-20 seconds too early. This will be corrected in a future release. [562]
L2_HR_RiverAvg	**Impact of L2_HR_RiverSP.** The above-mentioned errors in L2_HR_RiverSP will propagate into similar errors in the L2_HR_RiverAvg product.
L2_HR_LakeSP	**Storage Change Only for a Few Lakes.** Storage change is only available for the following 26 lakes: • North America: Achigan, Argent, Becancour, Bois-Verts, Bouard, Brome, Brompton, Camatose, Canimina, Carre, Elgin, Kiamika, Lovering, Massawippi, Montagne-Noire, Nord-Est, Stukely, Theodore, Victoria, and Waterloo • South America: Bariri, Caconde, and Segredo • Europe: Estanyol, Fontargente, and Orient This will be improved through updates of the Prior Lake Database.
L2_HR_LakeSP	**Incorrect overlap attribute.** There is an error in the computation of the overlap attribute in the L2_HR_LakeSP_Obs file.
L2_HR_LakeAvg	**Impact of L2_HR_LakeSP.** The above-mentioned errors in L2_HR_LakeSP will propagate into similar errors in the L2_HR_LakeAvg product.
L2_HR_RiverAvg and L2_HR_LakeAvg	**Limited availability of L2_HR_RiverAvg and L2_HR_LakeAvg Products**. Very few L2_HR_RiverAvg and L2_HR_LakeAvg products were generated from Version C products. This is expected to be resolved in Version D products.

Table 10. Known Issues with KaRIn PIC0/PGC0 Science Data Products that are Resolved in PIC2 products.

Product	Description of Issue
All	**Doppler Correction.** Range-Doppler coupling results with a slowly varying height error of up to 2.5 cm that is proportional to the vertical component of the spacecraft velocity. Application of the crossover correction to the heights may remove some of this effect.[338]
All	**Contact Global Attribute.** The 'contact' global attribute or metadata field in most products is incorrect. [366]

LR Products	**Artifacts Near Land-Water Boundaries.** Data near land-water boundaries often have artifacts due to the interpolation of the L1B phase bias correction. [341]
LR Products	**Missing Values Due to Fill Values In Reference Surface.** Some ocean areas (especially at high latitudes and/or near coasts) have fill values due to missing values in the reference surface used for Level 1B processing. These areas were unintentionally handled differently between the beta pre-validated (PIB0) products and the current version due to an unrelated software change. [365, 437]
L1B_LR_INTF	**Missing Auxiliary Parameters.** Some auxiliary parameters used to generate this product are not reported in the global attributes. [340]
L2_LR_SSH	**Occasional large values in *mean_wave_period_t02*, *mean_wave_direction*, and *swh_model*.** These variables occasionally have large values where a fill value was intended. The erroneous values may impact the quality flag bits for SSH and SSHA. [347]
L2_LR_SSH	**Incorrect Quality Flag Bits.** The quality flag bits *suspect_large_ssh_delta*, *suspect_large_ssh_std*, *suspect_large_ssh_window_std*, *suspect_large_nrcs_delta*, *suspect_large_nrcs_std*, and *suspect_large_nrcs_window_std* may sometimes be set incorrectly over cross-track spans of pixels at processing boundaries due to a software bug. [368]
L2_LR_SSH	**Tuning of *swh_karin*.** The algorithm used to compute this parameter has not been tuned [416]
L2_LR_SSH	**Non-equilibrium ocean tide not applied to SSHA.** The reported SSHA does not apply the non-equilibrium ocean tide correction (ocean_tide_non_eq), whereas it is applied in the nadir altimeter SSHA field. [349]
L2_LR_SSH	**Radiometer pass-through data in L2_LR_SSH are left/right flipped.** Some data from the radiometer reported in the L2_LR_SSH product (specifically, L2_LR_SSH variables *wind_speed_rad, rad_surface_type_flag, rad_tmb_187, rad_tmb_238, rad_tmb_340, rad_water_vapor, rad_cloud_liquid_water*) are reported on the opposite swath side from where they should be reported. [440]
HR Products	**Crossover Correction Quality Flag.** The crossover correction quality flag reported in the HR products has a deficiency such that the indicated quality of the correction is marked as “bad” more than expected. [374]
HR Products	**Duplicate Water Features.** Errors in the reference digital elevation model (DEM) sometimes cause dark water or bright land flags to be set for features at the incorrect horizontal locations. This can cause what appears as a “doubling” of water features. In such cases, the feature itself is correctly detected as water and is correctly geolocated, but an improperly geolocated copy of the feature is also identified as dark water at a shifted location in cross track.

HR Products	**HR Products Not Available Around Times of Bad Attitude.** A bug in a check for bad attitude data may prevents the generation of products even for data with good attitude data on the same day as the bad attitude data. [414]
HR Products	**Occasional Erroneous Cross-Track Tilts.** A bug in the handling of missing dynamic calibration data causes phase errors that give large cross-track ramps in the reported heights (e.g., cycle 010, pass 396, tile 138L). [406]
HR Products	**Parts of Tiles Occasionally Not Available.** On rare occasions, a bug in an error check for bad ephemeris data causes parts of some tiles to not be processed when data were collected and good. [393]
L1B_HR_SLC	**Geospatial Global Attributes.** These attributes may be populated incorrectly, particularly in granules that include missing data. [386]
L1B_HR_SLC	**Filled Complex SLC Values.** The complex SLC values for some granules may be filled with zero even though the flag values indicate good data. These data are related to an off-nominal KaRIn state [373]
L2_HR_PIXC	**Geospatial Global Attributes.** These attributes may be populated incorrectly, particularly in granules that include missing data. [386]
L2_HR_PIXC	**Incorrect Heights for Pixels That Are Not Unwrapped.** The heights of pixels that are not explicitly unwrapped have erroneous offsets that are unrelated to phase unwrapping due to a bug in computing the reference locations. [423]
L2_HR_RiverSP	**Clipped River Widths.** River widths are sometimes clipped. The prior *max_width* in SWORD (Prior River Database) is too narrow in some places, leading to overly narrow pixel assignment where the extreme distance is small and/or there are multiple segments. Inaccuracies in the position of SWORD centerlines exacerbate this issue. [385]
L2_HR_RiverSP	**Inconsistent valid_min and valid_max for *dark_frac*.** The valid_min and valid_max metadata fields for the *dark_frac* variable are inconsistent between the node and reach files. [376]
L2_HR_RiverSP	**Lower than Expected Water Areas.** A software bug causes some water areas to be computed incorrectly, resulting in estimates that are lower than they should be (water fraction is applied twice). [370]
L2_HR_RiverSP	**Enhanced Slope Uncertainty.** A software bug causes the uncertainty for the enhanced slope (*slope2*) to be computed incorrectly. [377]
L2_HR_RiverSP	**Errors Near +/- 180-degree longitude.** A software bug may cause incorrect behavior for input L2_HR_PIXC tiles that span +/-180˚ longitude. [387]
L2_HR_LakeSP	**Exclusion of Bright Land.** The lake processing does not yet actively use the “bright land” flag in the L2_HR_PIXC product to exclude bright land (in particular urban areas, buildings) from lake features.

L2_HR_LakeSP	**Exclusion of Specular Ringing.** The lake processing does not yet actively use the "specular ringing" bitflags in the L2_HR_PIXC product to avoid that lake features are polluted by this phenomenon.
L2_HR_LakeSP	**Near Nadir Pixels Geolocated on Other Side of Nadir.** Near-nadir pixels are in some cases erroneously geolocated on the other side of nadir.
L2_HR_LakeSP	**Metric of Layover Effect.** A software bug causes the metric of layover effect (*layovr_val*) to be computed incorrectly.
L2_HR_PIXCVec	**Near Nadir Pixels Geolocated on Other Side of Nadir.** Near-nadir pixels are in some cases erroneously geolocated on the other side of nadir, leading to spurious extensions of lake polygons towards and across nadir.
L2_HR_PIXCVec	**Climatological Ice Cover Flag.** A software bug causes the climatological ice cover flag (*ice_clim_f*) to be computed incorrectly.
L2_HR_PIXCVec	**PIXCVec NetCDF Compression Not Enabled.** The file size of L2_HR_PIXCVec granules is larger than intended because NetCDF compression is not enabled. [425]
L2_HR_Raster	**"Blocky Artifacts".** "Blocky" artifacts in the reported water area and fraction can occur due to large variance in the heights used for height-constrained geolocation. [321] 

Acronyms

AMR	Advanced Microwave Radiometer
ATBD	Algorithm Theoretical Basis Document
CNES	Centre National d'Études Spatiales
CRID	Composite Release IDentifier
HR	High Rate
IGDR	Interim Geophysical Data Record
JPL	Jet Propulsion Laboratory
KaRIn	Ka-band Radar Interferometer
LR	Low Rate
NALT	Nadir Altimeter
NASA	National Aeronautics and Space Administration
OGDR	Operational Geophysical Data Record
SWOT	Surface Water Ocean Topography
TBC	To Be Confirmed
TBD	To Be Determined