1.0 DATA DICTIONARY

The following subsections list the data content of ATL15. Each subsection corresponds to a HDF5 group on the data product. The ATLAS Standard Data Products are designed to be self-documenting and contain additional descriptive information not presented here. The descriptive information within the data dictionary is limited to preserve readability.

description	This data set (ATL15) contains seasonal, annual, and multiannual gridded land ice elevation change.
level	L3B
short_name	ATL15
title	SET_BY_META

1.1 Group: /

This data set (ATL15) contains seasonal, annual, and multiannual gridded land ice elevation change.

1.1.1 Attributes

Conventions	CF-1.7
GDAL_AREA_OR_POINT	Area
_NCProperties	version=2,netcdf=4.9.2,hdf5=1.14.3
citation	Cite these data in publications as follows: The data used in this study were produced by the ICESat-2 Science Project Office at NASA/GSFC. The data archive site is the NASA National Snow and Ice Data Center Distributed Active Archive Center.
contributor_name	Benjamin Smith (besmith@uw.edu), Tyler Sutterley (tsutterl@uw.edu), Suzanne Dickinson (sdickins@uw.edu), Benjamin Jelley (benjamin.p.jelley@nasa.gov), Denis Felikson (denis.felikson@nasa.gov), Thomas A Neumann (thomas.neumann@nasa.gov), Helen Fricker (hafricker@ucsd.edu), Alex Gardner (alex.s.gardner@jpl.nasa.gov), Laurence Padman (padman@esr.org), Thorsten Markus (thorsten.markus@nasa.gov), Nathan Kurtz (nathan.t.kurtz@nasa.gov), Suneel Bhardwaj (suneel.bhardwaj@nasa.gov), David W Hancock III (david.w.hancock@nasa.gov), Jeffrey Lee (jeffrey.e.lee@nasa.gov)

contributor_role	Investigator, Investigator, Algorithm Developer, Algorithm Developer, Investigator, Investigator, Investigator, Investigator, Investigator, Investigator, Investigator, Investigator, Algorithm Developer
creator_name	GSFC I-SIPS > ICESat-2 Science Investigator-led Processing System
date_created	2024-06-27T08:22:11.088579Z
date_type	UTC
fileName	ATL15_IS_0321_01km_004_01.nc
geospatial_lat_max	[66.42222879]
geospatial_lat_min	[63.42510903]
geospatial_lat_units	degrees_north
geospatial_lon_max	[-14.66056647]
geospatial_lon_min	[-24.12793435]
geospatial_lon_units	degrees_east
granule_type	ATL15
history	2024-06-27T08:22:11.088579Z
identifier_file_uuid	3b17e71e-8eab-4c17-ab00-58d8117a1427
identifier_product_doi	doi:10.5067/ATLAS/ATL15.004
identifier_product_doi_authority	http://dx.doi.org
identifier_product_format_version	3.0
identifier_product_type	ATL15
institution	National Aeronautics and Space Administration (NASA)
instrument	ATLAS > Advanced Topographic Laser Altimeter System
keywords	EARTH SCIENCE > CRYOSPHERE > GLACIERS/ICE SHEETS > GLACIER ELEVATION/ICE SHEET ELEVATION > NONE > NONE > NONE
keywords_vocabulary	NASA/GCMD Science Keywords
license	Data may not be reproduced or distributed without including the citation for this product included in this metadata. Data may not be distributed in an altered form without the written

	permission of the ICESat-2 Science Project Office at NASA/GSFC.
naming_authority	http://dx.doi.org
netcdfversion	4.9.2
platform	ICESat-2 > Ice, Cloud, and land Elevation Satellite-2
processing_level	3B
project	ICESat-2 > Ice, Cloud, and land Elevation Satellite-2
publisher_email	nsidc@nsidc.org
publisher_name	NSIDC DAAC > NASA National Snow and Ice Data Center Distributed Active Archive Center
publisher_url	http://nsidc.org/daac/
reference_frame	ITRF2014
references	http://nsidc.org/data/icesat2/data.html
shortName	ATL15_META
source	Spacecraft
spatial_coverage_type	Horizontal
standard_name_vocabulary	CF-1.6
summary	The purpose of ATL15 is to provide an IceSat-2 gridded satellite summary of height changes of land-based ice.
time_coverage_duration	[1.57285799e+08]
time_coverage_end	2023-12-26T10:29:59.152511Z
time_coverage_start	2019-01-01T00:00:00.000000Z
time_type	CCSDS UTC-A
vertical_datum	WGS84

1.2 Group: /METADATA

ISO19115 Structured Metadata Represented within HDF5

1.2.1 Attributes

iso_19139_dataset_xml	SET_BY_META

iso_19139_series_xml	SET_BY_META

1.3 Group: /METADATA/AcquisitionInformation

Describe the group

1.4 Group: /METADATA/AcquisitionInformation/lidar

Describe the group

1.4.1 Attributes

description	ATLAS on ICESat-2 determines the range between the satellite and the Earth's surface by measuring the two-way time delay of short pulses of laser light that it transmits in six beams. It is different from previous operational ice-sheet altimeters in that it is a photon-counting LIDAR. ATLAS records a set of arrival times for individual photons, which are then analyzed to derive surface, vegetation, and cloud properties. ATLAS has six beams arranged in three pairs, so that it samples each of three reference pair tracks with a pair of beams; ATLAS transmits pulses at 10 kHz, giving approximately one pulse every 0.7 m along track; ATLAS's expected pointing control will be better than 90 m RMS.
identifier	ATLAS
pulse_rate	10000 pps
type	Laser Altimeter
wavelength	532 nm

1.5 Group: /METADATA/AcquisitionInformation/lidarDocument

Describe the group

1.5.1 Attributes

edition	Pre-Release
publicationDate	12/31/17
title	A document describing the ATLAS instrument will be provided by the ICESat-2 Project Science Office.

1.6 Group: /METADATA/AcquisitionInformation/platform

Describe the group

1.6.1 Attributes

description	Ice, Cloud, and land Elevation Satellite-2
identifier	ICESat-2
type	Spacecraft

1.7 Group: /METADATA/AcquisitionInformation/platformDocument

Describe the group

1.7.1 Attributes

edition	31-Dec-16
publicationDate	31-Dec-16
title	The Ice, Cloud, and land Elevation Satellite-2 (ICESat-2): Science requirements, concept, and implementation. Thorsten Markus, Tom Neumann, Anthony Martino, Waleed Abdalati, Kelly Brunt, Beata Csatho, Sinead Farrell, Helen Fricker, Alex Gardner, David Harding, Michael Jasinski, Ron Kwok, Lori Magruder, Dan Lubin, Scott Luthcke, James Morison, Ross Nelson, Amy Neuenschwander, Stephen Palm, Sorin Popescu, CK Shum, Bob E. Schutz, Benjamin Smith, Yuekui Yang, Jay Zwally. http://dx.doi.org/10.1016/j.rse.2016.12.029

1.8 Group: /METADATA/DataQuality

Describe the group

1.8.1 Attributes

scope	NOT_SET

1.9 Group: /METADATA/DataQuality/CompletenessOmission

Describe the group

1.9.1 Attributes

evaluationMethodType	directInternal
measureDescription	TBD
nameOfMeasure	TBD

unitofMeasure	TBD
value	NOT_SET

1.10 Group: /METADATA/DataQuality/DomainConsistency

Describe the group

1.10.1 Attributes

evaluationMethodType	directInternal
measureDescription	TBD
nameOfMeasure	TBD
unitofMeasure	TBD
value	NOT_SET

1.11 Group: /METADATA/DatasetIdentification

Describe the group

1.11.1 Attributes

VersionID	004
abstract	The ICESat-2 ATL15 standard data product reports a land ice elevation change as comapred to an ice sheet digital elevation model (DEM).
characterSet	utf8
creationDate	2024-06-27
credit	The software that generates the ATL15 product was designed and implemented within the ICESat-2 Science Investigator-led Processing System at the NASA Goddard Space Flight Center in Greenbelt, Maryland.
fileName	ATL15_IS_0321_01km_004_01.nc
language	eng
originatorOrganizationName	GSFC I-SIPS > ICESat-2 Science Investigator-led Processing System
purpose	The purpose of ATL15 is to provide an IceSat-2 gridded satellite summary of height changes of land-based ice.

shortName	ATL15
spatialRepresentationType	along-track
status	onGoing
topicCategory	geoscientificInformation
uuid	bccddf49-1a99-4ddd-994c-e59fee581905

1.12 Group: /METADATA/Extent

Describe the group

1.12.1 Attributes

eastBoundLongitude	[-14.66056647]
northBoundLatitude	[66.42222879]
rangeBeginningDateTime	2019-01-01T00:00:00.000000Z
rangeEndingDateTime	2023-12-26T10:29:59.152511Z
southBoundLatitude	[63.42510903]
westBoundLongitude	[-24.12793435]

1.13 Group: /METADATA/Lineage

Describe the group

1.14 Group: /METADATA/Lineage/ANC19

Describe the group

1.14.1 Attributes

description	TAI to UTC leapsecond file retrieved from ftp://maia.usno.navy.mil/ser7/tai-utc.dat
fileName	SET_BY_PGE
shortName	SET_BY_PGE
uuid	SET_BY_PGE
version	SET_BY_PGE

1.15 Group: /METADATA/Lineage/ANC36-15

Describe the group

1.15.1 Attributes

description	ISO 19139 XML file containing Series-level metadata information.
fileName	DsESDTAtATL15.001.series.xml
shortName	ANC36-15
uuid	5BFCCB48-D68E-4897-92C6-389DE6A1C32B
version	001

1.16 Group: /METADATA/Lineage/ANC38-15

Describe the group

1.16.1 Attributes

description	ISO 19139 XML file containing DataSet-level metadata information.
fileName	DsESDTAtATL15.001.dataset.xml
shortName	ANC38-15
uuid	95BF65A6-F1E7-445E-9E94-ADD030917038
version	001

1.17 Group: /METADATA/Lineage/ATL11

Describe the group

1.17.1 Attributes

description	ATLAS/L3B Land Ice Height
end_cycle	SET_BY_PGE
end_geoseg	SET_BY_PGE
end_orbit	SET_BY_PGE
end_region	SET_BY_PGE

end_rgt	SET_BY_PGE
fileName	SET_BY_PGE
shortName	SET_BY_PGE
start_cycle	SET_BY_PGE
start_geoseg	SET_BY_PGE
start_orbit	SET_BY_PGE
start_region	SET_BY_PGE
start_rgt	SET_BY_PGE
uuid	SET_BY_PGE
version	SET_BY_PGE

1.18 Group: /METADATA/Lineage/Control

Describe the group

1.18.1 Attributes

description	Text-based keyword=value file generated automatically within the ICESat-2 data system that specifies all of the conditions required for each individual run of the software.
fileName	SET_BY_PGE
shortName	SET_BY_PGE
version	SET_BY_PGE

1.19 Group: /METADATA/ProcessStep

Describe the group

1.20 Group: /METADATA/ProcessStep/Browse

Describe the group

1.20.1 Attributes

identifier	SET_BY_PGE
processDescription	Browse processing is performed for each granule SIPS produces. The browse utility reads data from the granule and

	produces browse images as defined in the respective product ATBD. The utility then embeds each browse image into the product within the /Browse group.
runTimeParameters	SET_BY_PGE
softwareDate	SET_BY_PGE
softwareTitle	SET_BY_PGE
softwareVersion	SET_BY_PGE
stepDateTime	SET_BY_PGE

1.21 Group: /METADATA/ProcessStep/Metadata

Describe the group

1.21.1 Attributes

identifier	atlas_meta
processDescription	Metadata information is processed by the metadata utility for each granule produced by SIPS. During PGE processing, dynamic metadata are written to the product. Additional static information is provided with the metadata template. The metadata utility reads ISO Dataset and Series metadata files and updates the product with static information from within those files. The utility then merges the static and dynamic metadata to creates output ISO19139 Dataset and Series XML files. Finally the utility reads the ISO19139 Dataset and Series XML files into memory and stores the textual representations as attributes attached to the /METADATA group.
runTimeParameters	ATL15_IS_0321_01km_004_01.ctl
softwareDate	Jun 14 2023
softwareTitle	Creates ATLAS XML metadata files
softwareVersion	Version 5.1
stepDateTime	2024-06-27T12:22:12.000000Z

1.22 Group: /METADATA/ProcessStep/PGE

Describe the group

1.22.1 Attributes

ATBDDate	12/04/2019
ATBDTitle	Algorithm Theoretical Basis Document (ATBD) For Sea Ice Products
ATBDVersion	N/A
documentDate	Feb 2020
documentation	ATLAS Science Algorithm Software Design Description (SDD) - Volume 14 (atlas_l3b_is)
identifier	SET_BY_PGE
processDescription	Computes seasonal, annual, biennial land ice elevation change.
runTimeParameters	SET_BY_PGE
softwareDate	May 01 2024
softwareTitle	ASAS L3B Land Ice PGE
softwareVersion	3.0
stepDateTime	SET_BY_PGE

1.23 Group: /METADATA/ProcessStep/QA

Describe the group

1.23.1 Attributes

identifier	atl15_qa_util
processDescription	QA processing is performed by an external utility on each granule produced by SIPS. The utility reads the granule, performs both generic and product-specific quality-assessment calculations, and writes a text-based quality assessment report. The name and creation data of this report are identified within the QADatasetIdentification metadata
runTimeParameters	ATL15_IS_0321_01km_004_01.ctl
softwareDate	Jun 14 2023
softwareTitle	ATL15 QA Utility
softwareVersion	Version 1.0

stepDateTime	2024-06-27T12:22:12.000000Z

1.24 Group: /METADATA/ProductSpecificationDocument

Describe the group

1.24.1 Attributes

ShortName	ATL15_SDP
characterSet	utf8
edition	v1.0
language	eng
publicationDate	Feb 2020
title	ICESat-2-SIPS-SPEC-4269 - ATLAS Science Algorithm Standard Data Product (SDP) Volume 14 (ATL15). Revision -.

1.25 Group: /METADATA/QADatasetIdentification

Describe the group

1.25.1 Attributes

abstract	An ASCII product that contains statistical information on data product results. These statistics enable data producers and users to assess the quality of the data in the data product granule
creationDate	2024-06-27T12:22:12.000000Z
fileName	ATL15_IS_0321_01km_004_01.nc.qa

1.26 Group: /METADATA/SeriesIdentification

Describe the group

1.26.1 Attributes

VersionID	3.0
abstract	The ICESat-2 ATL15 standard data product reports a land ice elevation change as comapred to an ice sheet digital elevation model (DEM).

characterSet	utf8
credit	The software that generates the ATL15 product was designed and implemented within the ICESat-2 Science Investigator-led Processing System at the NASA Goddard Space Flight Center in Greenbelt, Maryland.
format	HDF
formatVersion	5
identifier_product_DOI	doi:10.5067/ATLAS/ATL15.004
language	eng
longName	ATLAS/ICESat-2 L3B Seasonal, Annual, and Biennial Land Ice Height Change
maintenanceAndUpdateFrequency	asNeeded
maintenanceDate	SET_BY_META
mission	ICESat-2 > Ice, Cloud, and land Elevation Satellite-2
pointOfContact	NSIDC DAAC > NASA National Snow and Ice Data Center Distributed Active Archive Center
purpose	The purpose of ATL15 is to provide an IceSat-2 gridded satellite summary of height changes of land-based ice.
resourceProviderOrganizationName	National Aeronautics and Space Administration (NASA)
revisionDate	2024-05-15
shortName	ATL15
status	onGoing
topicCategory	geoscientificInformation

1.27 Group: /delta_h

1.27.1 Attributes

description	delta_h group includes variables describing height differences between the model surface at any time and the DEM surface at a resolution of 1 km.

1.27.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units Source	Description
Polar_Stereographic None	INTEGER_1[] -127	None	None (Source: None)
data_count data count	FLOAT(:,:,:) INVALID_R4B	counts	Weighted number of data contributing to each node in the 1-km height-change grid (Source: ATBD section 5.2.4.4)
delta_h height change at 1 km	FLOAT(:,:,:) INVALID_R4B	meters	Height change relative to the datum (Jan 1, 2020) surface (Source: ATBD section 3.4)
delta_h_sigma height change uncertainty at 1 km	FLOAT(:,:,:) INVALID_R4B	meters	Estimated error in height change relative to the datum (Jan 1, 2020) surface (Source: ATBD section 3.4)
ice_area ice-covered area at 1 km	FLOAT(:,:,:) INVALID_R4B	meters^2	Ice-covered area of each 1x1 km grid cell, accounting for the area distortion in the polar-stereographic projections (Source: ATBD section 3.4)
misfit_rms rms misfit	FLOAT(:,:,:) INVALID_R4B	meters	Misfit associated with each node in the 1-km height-change grid (Source: ATBD section 5.2.4.4)
misfit_scaled_rms scaled rms misfit	FLOAT(:,:,:) INVALID_R4B	counts	Scaled misfit associated with each node in the 1-km height-change grid (Source: ATBD section 5.2.4.4)
time quarterly h(t) time	DOUBLE(:) INVALID_R8B	days since 2018-01-01	Time for each node, in days since 2018-01-01:T00.00.00 UTC (Source: ATBD section 4.2)
x polar stereographic x at 1km	DOUBLE(:) INVALID_R8B	meters	x coordinate of the 1-km cell centers, in projected coordinates (Source: ATBD section 3.2)
y polar stereographic y at 1km	DOUBLE(:) INVALID_R8B	meters	y coordinate of the 1-km cell centers, in projected coordinates (Source: ATBD section 3.2)

1.28 Group: /dhdt_lag1

1.28.1 Attributes

description	dhdt_lag1 group includes variables describing height difference rates, at a resolution of 1 km, between subsequent quarterly height-difference surfaces.

1.28.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units Source	Description
Polar_Stereographic None	INTEGER_1[] -127	None	None (Source: None)
dhdt quarterly height-change rate at 1 km	FLOAT(:,:,:) INVALID_R4B	meters years^-1	Quarterly height-change rate (Source: ATBD section 3.4)
dhdt_sigma quarterly height-change rate uncertainty at 1 km	FLOAT(:,:,:) INVALID_R4B	meters years^-1	Estimated error in quarterly height-change rate (Source: ATBD section 3.4)
ice_area ice-covered area at 1 km, for quarterly change in height	FLOAT(:,:,:) INVALID_R4B	meters^2	Ice-covered area of each 1x1 km grid cell for quarterly change in height, accounting for the area distortion in the polar-stereographic projections (Source: ATBD section 3.4)
time quarterly dh/dt time	DOUBLE(:) INVALID_R8B	days since 2018-01-01	Time for the midpoint of each quarterly height-change rate, in days since 2018-01-01:T00.00.00 UTC (Source: ATBD section 4.2)
x polar stereographic x at 1km	DOUBLE(:) INVALID_R8B	meters	x coordinate of the 1-km cell centers, in projected coordinates (Source: ATBD section 3.2)
y polar stereographic y at 1km	DOUBLE(:) INVALID_R8B	meters	y coordinate of the 1-km cell centers, in projected coordinates (Source: ATBD section 3.2)

1.29 Group: /dhdt_lag12

1.29.1 Attributes

description	dhdt_lag12 group includes variables describing triennial height-change-rate estimates, at a resolution of 1km.

1.29.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units Source	Description
Polar_Stereographic None	INTEGER_1[] -127	None	None (Source: None)

Name Standard Name	Type(Dims) FillValue	Units Source	Description
dhdt triennial height-change rate at 1 km	FLOAT(:,:,:) INVALID_R4B	meters years^-1	Triennial height-change rate (Source: ATBD section 3.4)
dhdt_sigma triennial height-change rate uncertainty at 1 km	FLOAT(:,:,:) INVALID_R4B	meters years^-1	Estimated error in triennial height-change rate (Source: ATBD section 3.4)
ice_area ice-covered area at 1 km, for triennial change in height	FLOAT(:,:,:) INVALID_R4B	meters^2	Ice-covered area of each 1x1 km grid cell for triennial change in height, accounting for the area distortion in the polar-stereographic projections (Source: ATBD section 3.4)
time triennial dh/dt time	DOUBLE(:) INVALID_R8B	days since 2018-01-01	Time for the midpoint of each triennial height-change rate, in days since 2018-01-01:T00.00.00 UTC (Source: ATBD section 4.2)
x polar stereographic x at 1km	DOUBLE(:) INVALID_R8B	meters	x coordinate of the 1-km cell centers, in projected coordinates (Source: ATBD section 3.2)
y polar stereographic y at 1km	DOUBLE(:) INVALID_R8B	meters	y coordinate of the 1-km cell centers, in projected coordinates (Source: ATBD section 3.2)

1.30 Group: /dhdt_lag16

1.30.1 Attributes

description	dhdt_lag16 group includes variables describing quadrennial height-change-rate estimates, at a resolution of 1km.

1.30.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units Source	Description
Polar_Stereographic None	INTEGER_1[] -127	None	None (Source: None)
dhdt quadrennial height-change rate at 1 km	FLOAT(:,:,:) INVALID_R4B	meters years^-1	Quadrennial height-change rate (Source: ATBD section 3.4)
dhdt_sigma quadrennial height-change rate uncertainty at 1 km	FLOAT(:,:,:) INVALID_R4B	meters years^-1	Estimated error in quadrennial height-change rate (Source: ATBD section 3.4)

Name Standard Name	Type(Dims) FillValue	Units Source	Description
ice_area ice-covered area at 1 km, for quadrennial change in height	FLOAT(:,:,:) INVALID_R4B	meters^2	Ice-covered area of each 1x1 km grid cell for quadrennial change in height, accounting for the area distortion in the polar-stereographic projections (Source: ATBD section 3.4)
time quadrennial dh/dt time	DOUBLE(:) INVALID_R8B	days since 2018-01-01	Time for the midpoint of each quadrennial height-change rate, in days since 2018-01-01:T00.00.00 UTC (Source: ATBD section 4.2)
x polar stereographic x at 1km	DOUBLE(:) INVALID_R8B	meters	x coordinate of the 1-km cell centers, in projected coordinates (Source: ATBD section 3.2)
y polar stereographic y at 1km	DOUBLE(:) INVALID_R8B	meters	y coordinate of the 1-km cell centers, in projected coordinates (Source: ATBD section 3.2)

1.31 Group: /dhdt_lag20

1.31.1 Attributes

description	dhdt_lag20 group includes variables describing pentennial height-change-rate estimates, at a resolution of 1km.

1.31.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units Source	Description
Polar_Stereographic None	INTEGER_1[] -127	None	None (Source: None)
dhdt pentennial height-change rate at 1 km	FLOAT(:,:,:) INVALID_R4B	meters years^-1	Pentennial height-change rate (Source: ATBD section 3.4)
dhdt_sigma pentennial height-change rate uncertainty at 1 km	FLOAT(:,:,:) INVALID_R4B	meters years^-1	Estimated error in pentennial height-change rate (Source: ATBD section 3.4)
ice_area ice-covered area at 1 km, for pentennial change in height	FLOAT(:,:,:) INVALID_R4B	meters^2	Ice-covered area of each 1x1 km grid cell for pentennial change in height, accounting for the area distortion in the polar-stereographic projections (Source: ATBD section 3.4)
time pentennial dh/dt time	DOUBLE(:) INVALID_R8B	days since	Time for the midpoint of each pentennial height-change rate, in days since 2018-01-01:T00.00.00 UTC (Source: ATBD section 4.2)

Name Standard Name	Type(Dims) FillValue	Units Source	Description
		2018-01-01	
x polar stereographic x at 1km	DOUBLE(:) INVALID_R8B	meters	x coordinate of the 1-km cell centers, in projected coordinates (Source: ATBD section 3.2)
y polar stereographic y at 1km	DOUBLE(:) INVALID_R8B	meters	y coordinate of the 1-km cell centers, in projected coordinates (Source: ATBD section 3.2)

1.32 Group: /dhdt_lag4

1.32.1 Attributes

description	dhdt_lag4 group includes variables describing annual height-change-rate estimates, at a resolution of 1 km.

1.32.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units Source	Description
Polar_Stereographic None	INTEGER_1[] -127	None	None (Source: None)
dhdt annual height-change rate at 1 km	FLOAT(:,:,:) INVALID_R4B	meters years^-1	Annual height-change rate (Source: ATBD section 3.4)
dhdt_sigma annual height-change rate uncertainty at 1 km	FLOAT(:,:,:) INVALID_R4B	meters years^-1	Estimated error in annual height-change rate (Source: ATBD section 3.4)
ice_area ice-covered area at 1 km, for annual change in height	FLOAT(:,:,:) INVALID_R4B	meters^2	Ice-covered area of each 1x1 km grid cell for annual change in height, accounting for the area distortion in the polar-stereographic projections (Source: ATBD section 3.4)
time annual dh/dt time	DOUBLE(:) INVALID_R8B	days since 2018-01-01	Time for the midpoint of each annual height-change rate, in days since 2018-01-01:T00.00.00 UTC (Source: ATBD section 4.2)
x polar stereographic x at 1km	DOUBLE(:) INVALID_R8B	meters	x coordinate of the 1-km cell centers, in projected coordinates (Source: ATBD section 3.2)

Name Standard Name	Type(Dims) FillValue	Units Source	Description
y polar stereographic y at 1km	DOUBLE(:) INVALID_R8B	meters	y coordinate of the 1-km cell centers, in projected coordinates (Source: ATBD section 3.2)

1.33 Group: /dhdt_lag8

1.33.1 Attributes

description	dhdt_lag8 group includes variables describing biennial height-change-rate estimates, at a resolution of 1km.

1.33.2 Datasets

Name Standard Name	Type(Dims) FillValue	Units Source	Description
Polar_Stereographic None	INTEGER_1[] -127	None	None (Source: None)
dhdt biennial height-change rate at 1 km	FLOAT(:,:,:) INVALID_R4B	meters years^-1	Biennial height-change rate (Source: ATBD section 3.4)
dhdt_sigma biennial height-change rate uncertainty at 1 km	FLOAT(:,:,:) INVALID_R4B	meters years^-1	Estimated error in biennial height-change rate (Source: ATBD section 3.4)
ice_area ice-covered area at 1 km, for biennial change in height	FLOAT(:,:,:) INVALID_R4B	meters^2	Ice-covered area of each 1x1 km grid cell for biennial change in height, accounting for the area distortion in the polar-stereographic projections (Source: ATBD section 3.4)
time biennial dh/dt time	DOUBLE(:) INVALID_R8B	days since 2018-01-01	Time for the midpoint of each biennial height-change rate, in days since 2018-01-01:T00.00.00 UTC (Source: ATBD section 4.2)
x polar stereographic x at 1km	DOUBLE(:) INVALID_R8B	meters	x coordinate of the 1-km cell centers, in projected coordinates (Source: ATBD section 3.2)
y polar stereographic y at 1km	DOUBLE(:) INVALID_R8B	meters	y coordinate of the 1-km cell centers, in projected coordinates (Source: ATBD section 3.2)

1.34 Group: /orbit_info

1.34.1 Datasets

Name Standard Name	Type(Dims) FillValue	Units Source	Description
bounding_polygon_dim1 Polygon vertex count	INTEGER(:) -2147483647	1	Polygon extent vertex count (Source: model)
bounding_polygon_lat1 Polygon vertex latitude	FLOAT(:) 9.969209968386869e+36	degrees North	Polygon extent vertex latitude (Source: model)
bounding_polygon_lon1 Polygon vertex longitude	FLOAT(:) 9.969209968386869e+36	degrees East	Polygon extent vertex longitude (Source: model)

1.35 Group: /quality_assessment

1.35.1 Datasets

Name Standard Name	Type(Dims) FillValue	Units Source	Description
phony_dim_1 None	None(:) None	None	None (Source: None)
qa_granule_fail_reason Granule Failure Reason	INTEGER(:) -2147483647	1	Flag indicating granule failure reason. 0=no failure; 1=processing error; 2=Insufficient output data was generated; 3=TBD Failure; 4=TBD_Failure; 5=other failure.; (Meanings: [0 1 2 3 4 5]) (Values: ['no_failure', 'PROCESS_ERROR', 'INSUFFICIENT_OUTPUT', 'failure_3', 'failure_4', 'OTHER_FAILURE']) (Source: Operations)
qa_granule_pass_fail Granule Pass Flag	INTEGER(:) -2147483647	1	Flag indicating granule quality. 0=granule passes automatic QA. 1=granule fails automatic QA.; (Meanings: [0 1]) (Values: ['PASS', 'FAIL']) (Source: Operations)

1.36 Group: /tile_stats

1.36.1 Datasets

Name Standard Name	Type(Dims) FillValue	Units Source	Description
N_bias N_bias	INTEGER(:,:) INVALID_I4B	counts	number of bias values solved for (Source: 4.1.2.1)

Name Standard Name	Type(Dims) FillValue	Units Source	Description
N_data N_data	INTEGER(:,:) INVALID_I4B	counts	number of data used in fit (Source: 4.1.2.1)
Polar_Stereographic None	INTEGER_1[] -127	None	None (Source: None)
RMS_bias RMS_bias	FLOAT(:,:) INVALID_R4B	meters	root mean of squared, scaled bias values (Source: 4.1.2.1)
RMS_d2z0dx2 RMS_d2z0dx2	FLOAT(:,:) INVALID_R4B	meters^-1	root mean square of the constraint equation residuals for the second spatial derivative of z0 (Source: 4.1.2.1)
RMS_d2zdt2 RMS_d2zdt2	FLOAT(:,:) INVALID_R4B	meters years^2	root mean square of the constraint equation residuals for the second temporal derivative of dz (Source: 4.1.2.1)
RMS_d2zdx2dt RMS_d2zdx2dt	FLOAT(:,:) INVALID_R4B	meters^-1 years^-1	root mean square of the constraint equation residuals for the second temporal derivative of dz/dt (Source: 4.1.2.1)
RMS_data RMS_data	FLOAT(:,:) INVALID_R4B	meters	root mean of squared, scaled data misfits (Source: 4.1.2.1)
sigma_tt sigma_tt	FLOAT(:,:) INVALID_R4B	meters years^-2	weighting values for the constraint equations on the second temporal derivatives of the surface height (Source: 4.1.2.1)
sigma_xx0 sigma_xx0	FLOAT(:,:) INVALID_R4B	meters^-1	weighting values for the constraint equations on the second spatial derivatives of the DEM (Source: 4.1.2.1)
sigma_xxt sigma_xxt	FLOAT(:,:) INVALID_R4B	meters^-1 years^-1	weighting values for the constraint equations on the second spatial derivatives of the height-change rate (Source: 4.1.2.1)
x x	DOUBLE(:) INVALID_R8B	meters	tile-center x-coordinate, in projected coordinates (Source: 4.1.2.1)
y y	DOUBLE(:) INVALID_R8B	meters	tile-center y-coordinate, in projected coordinates (Source: 4.1.2.1)