

IS2SITMOGR4 & IS2SITDAT4

Notes to users and known issues

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04/36/2021 (Version 1)

Notes to users and known issues

This document contains notes, which are of use in the analysis of the sea ice thickness products, and issues that are known to the developers, which may be fixed in future releases of these products.

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Note 1. Monthly gridded data product (IS2SITMOGR4)

Updated 08/16/21

The IS2SITMOGR4 monthly gridded ICESat-2 winter Arctic sea ice thickness dataset is produced using ICESat-2 ATL10 along-track sea ice freeboards (<https://nsidc.org/data/ATL10>) and NESOSIM snow loading (<https://github.com/akpetty/NESOSIM>). The basic methodology is described in Petty et al., (2020). In this Version 1 data product release we use the latest (rel004) ATL10 freeboards and v1.1. NESOSIM output (<https://doi.org/10.5281/zenodo.5164313>). The impact of the updated freeboards and snow loading on our sea ice thickness estimates is being summarized in a new publication (Petty et al., *in prep*). Preliminary results can be found in our EGUv21 presentation (<https://doi.org/10.5194/egusphere-egu21-13779>).

Note that we plan to produce and release the complete set of winter Arctic sea ice thickness data in one go in the subsequent late spring/early summer of each year.

(As of 08/16/21) – We have extended this data product to include September data as complete NESOSIM/ATL10 data is available and summer melt (which is not captured in NESOSIM and complicates ATL10 returns) is expected to be minimal – i.e., we expect the ice has generally refrozen.

Browse images are available for each monthly IS2SITMOGR4 file, as shown in Figure 1.

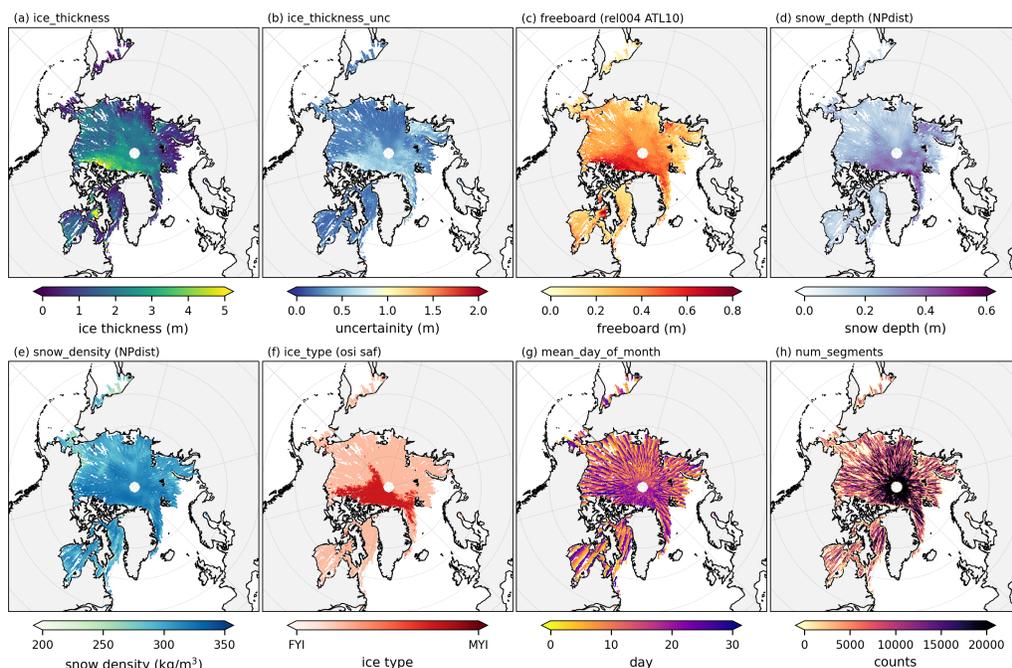


Figure 1: Example browse image for the April 2020 gridded sea ice thickness dataset (IS2SITMOGR4_01_202004_004_001.nc)

Note 2. Temporal sampling issues

The monthly gridded thickness data (IS2SITMOGR4) is produced using a simple ‘drop in the bucket’ binning approach weighted by segment length, as in the monthly gridded ICESat-2 sea

ice freeboard product (ATL20). Due to the profiling strategy of ICESat-2, this results in grid-cells that represent contrasting days of the given month. The ‘*mean_day_of_month*’ variable (panel g in Figure 1) represents the mean day of the data contained within the given monthly grid-cell and should be considered when using these data, especially for more regional studies. More sophisticated interpolation/smoothing procedures are being explored for use in future releases.

Note 3. Along-track data product (IS2SITDAT4)

Forthcoming (expected soon): We are releasing both the raw along-track thickness data (same segment resolution as ICESat-2 ATL10 freeboards) and a 10 km segment length-weighted mean along-track thickness product. The raw product is targeted towards the advanced data user, while the 10 km mean product is drastically smaller in size and is targeted towards those that want a balance between along-track data and smaller file sizes.

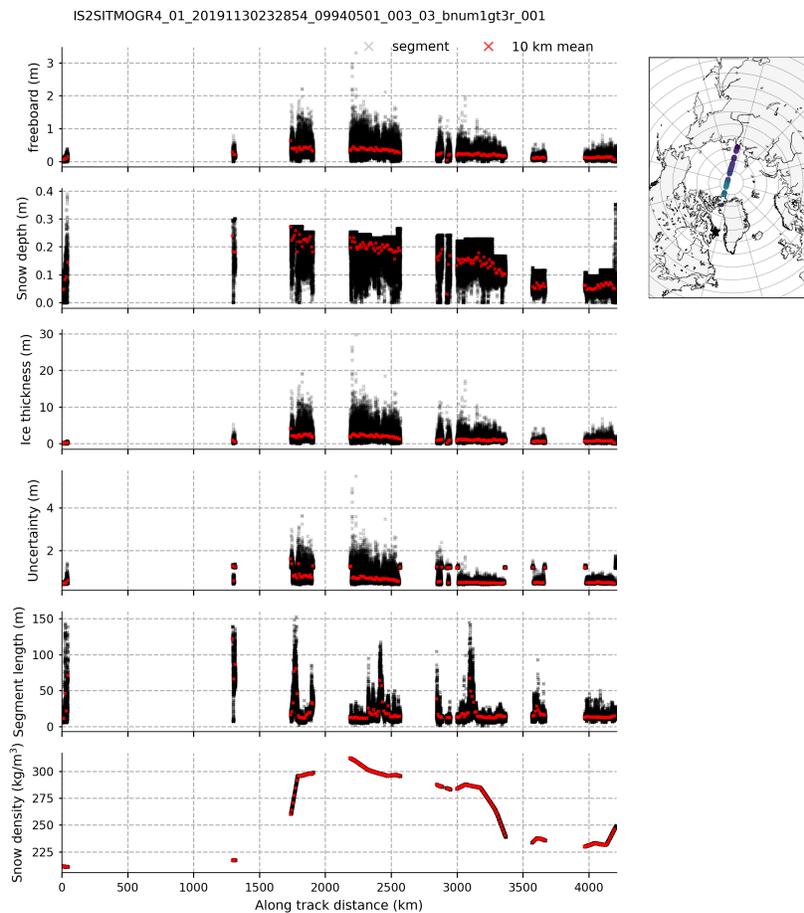


Figure 2: Example browse image for the along-track sea ice thickness product for November 30, 2019 (strong beam 1, gt3r). Raw data in black, 10 km segment length-weighted data in red. Star in the map indicates the start of the given granule.

References

Petty, A. A., N. T. Kurtz, R. Kwok, T. Markus, T. A. Neumann (2020), Winter Arctic sea ice thickness from ICESat - 2 freeboards, *Journal of Geophysical Research: Oceans*, 125, e2019JC015764. doi:10.1029/2019JC015764