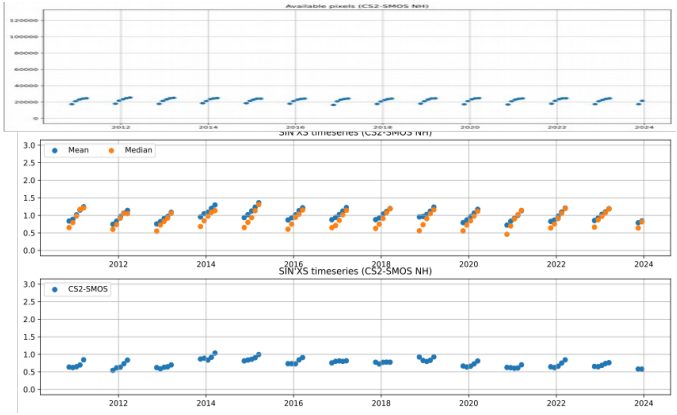
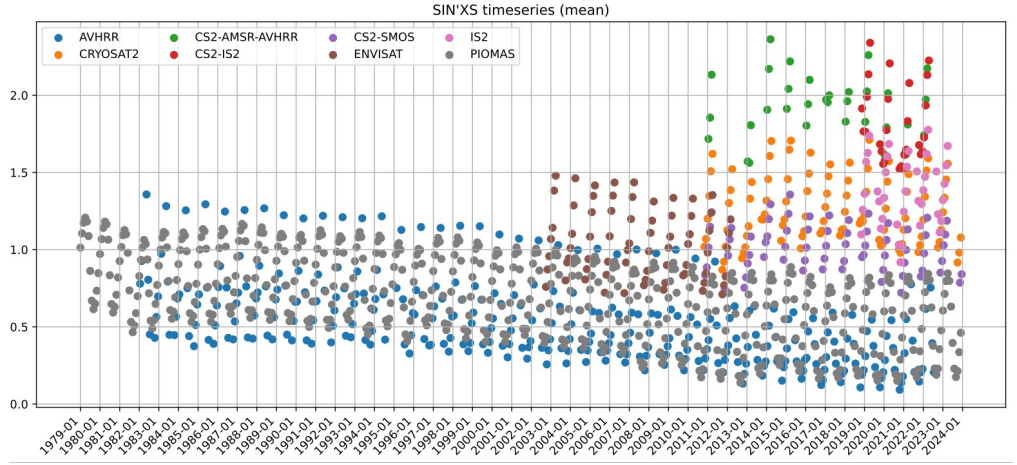
Time-series and Quality checks

Number of available pixels

Mean and median

Standard deviation





Multi-products comparisons

Database

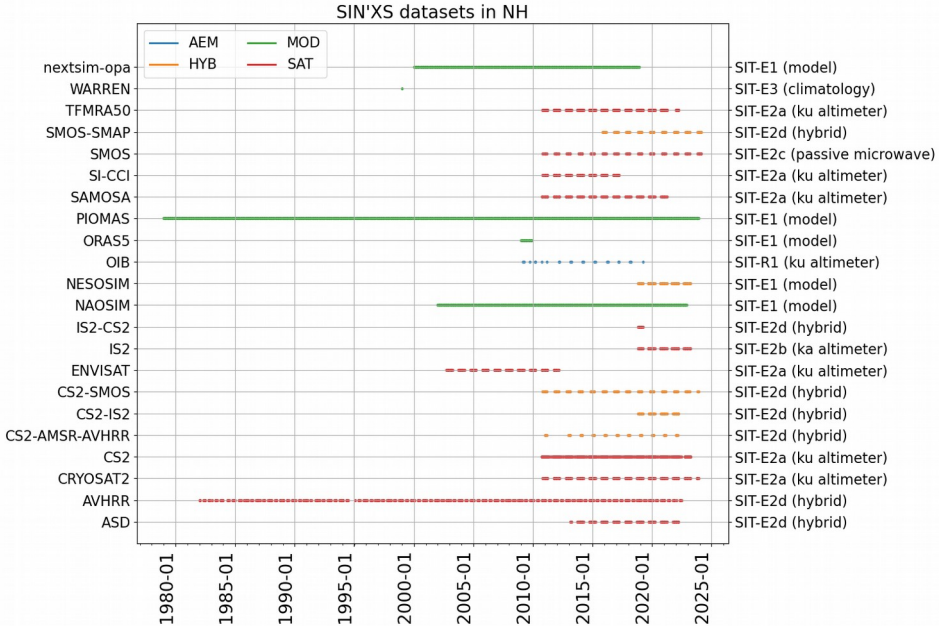
Contributors from providers around the world have submitted their datasets to help strengthen the initiative.

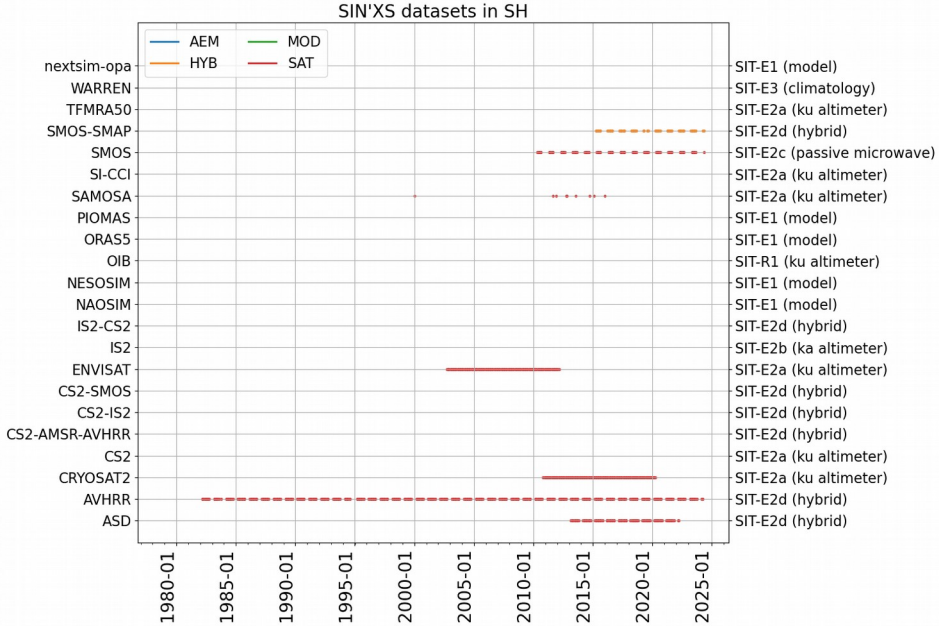
To date, we have collected:

- Over 30 datasets
- Spanning nearly 50 years (models) or 30 years (satellites + in-situ)
- Covering NH and SH

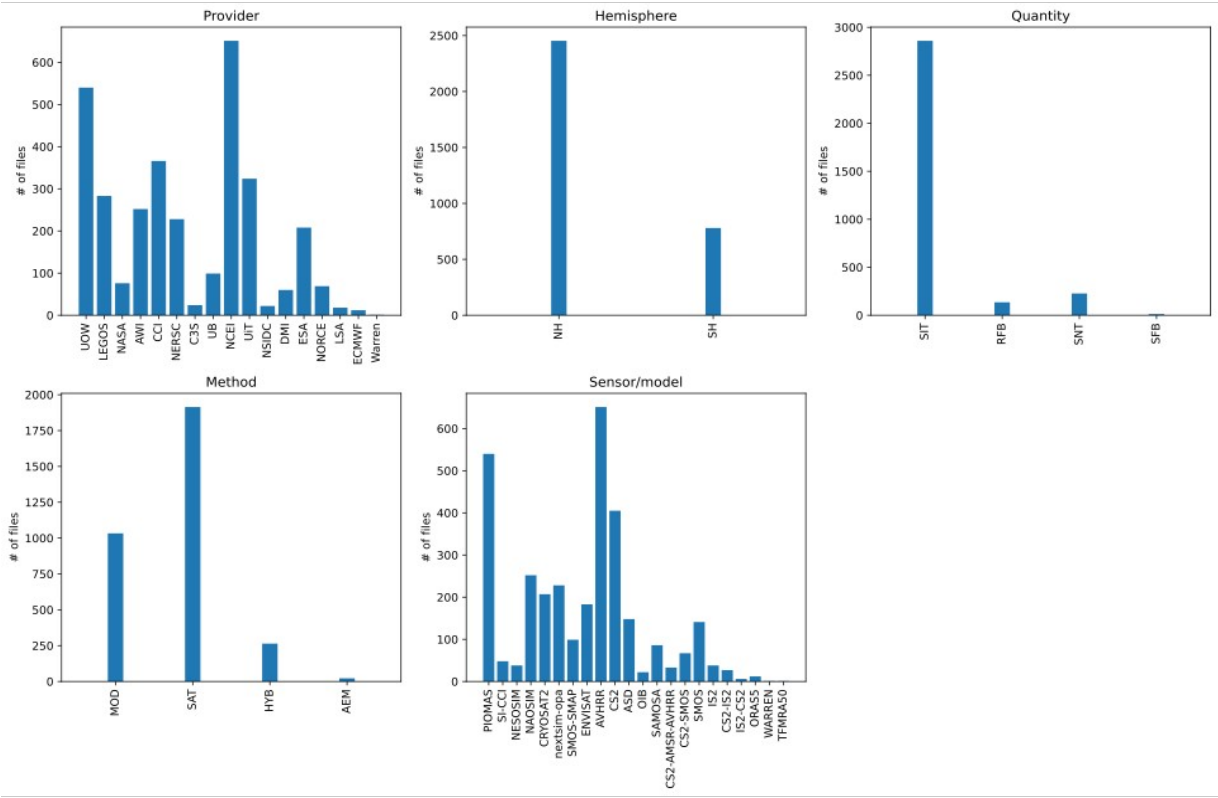
Most importantly, we have **created a community** and we **would be happy to further develop it with your participation!**

Database current status (data already available)





Database current status (submission statistics)

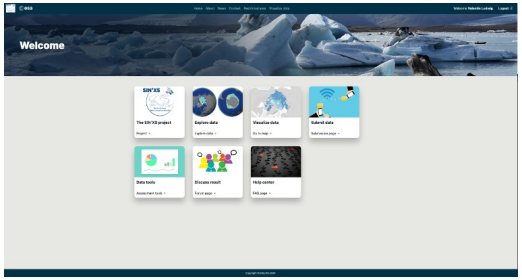


Characteristics:

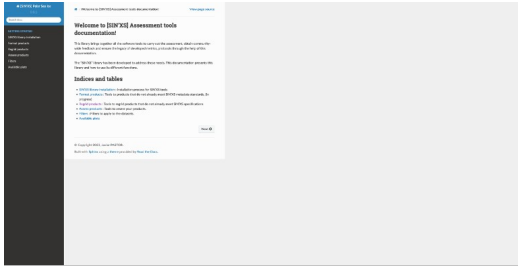
- Monthly means
- EASE2 projection (12.5/25 km)
- Nearest neighbour regridding
- nc files with consistent metadata

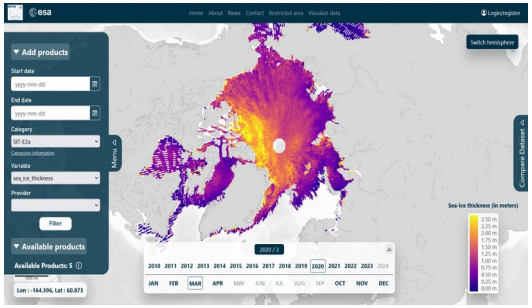
Material produced within the project scope

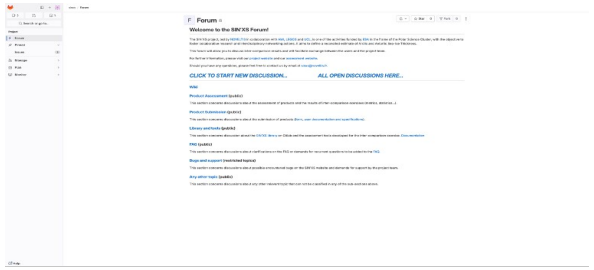
- The project website
- Interactive assessment tool
- An open-source library that is already available to the community
- Data tools to help contributors to provide well formatted data
- A forum for the community to exchange



https://sinxs-tools.noveltis.fr



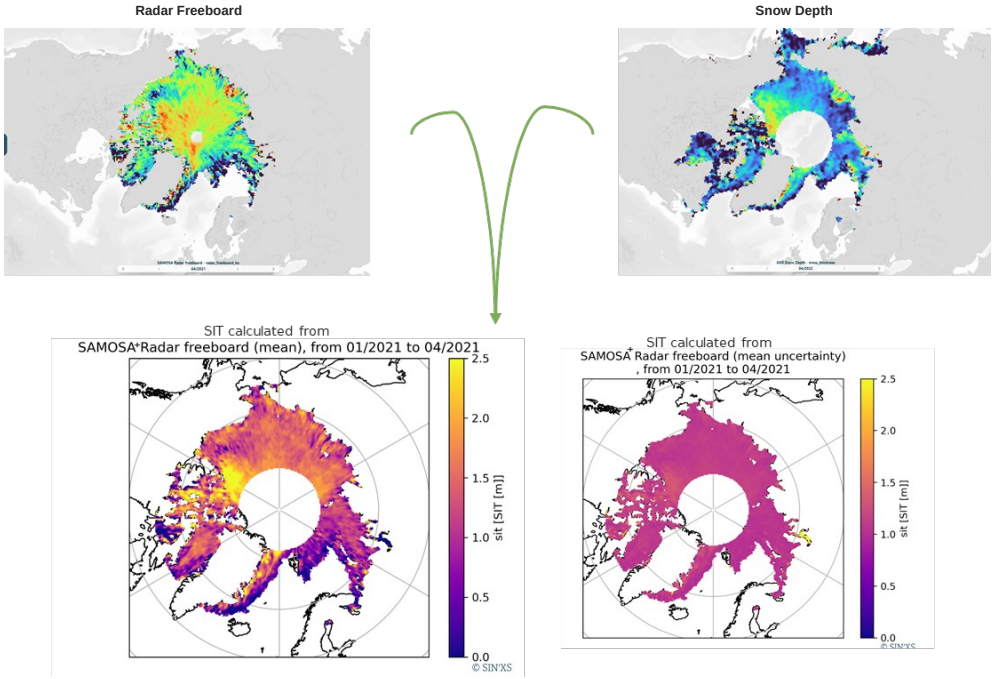




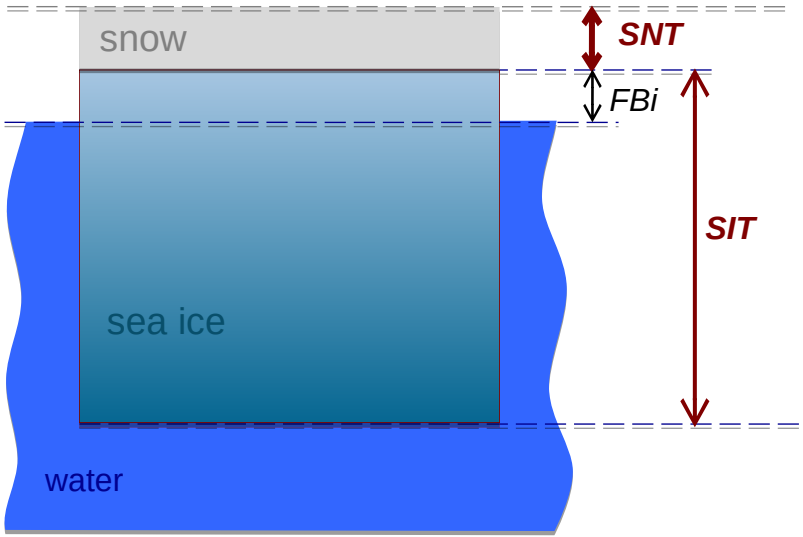
New! A conversion library with uncertainty propagation

Allows to compare datasets using a sea ice dimensions not directly available

- E.g a SIT calculated from one radar freeboard + one snow depth datasets
- Resulting uncertainties are calculated by propagation



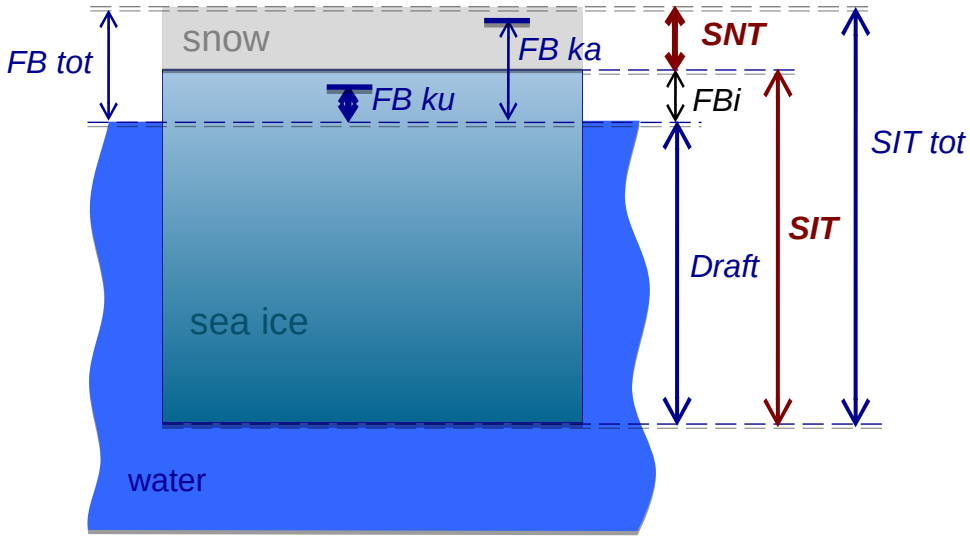
Conversion library with uncertainty propagation



Wanted parameters:
- sea ice thickness *SIT*
- snow thickness *SNT*

Intermediate parameter:
- ice freeboard *FBi*

Conversion library with uncertainty propagation



Wanted parameters:

sea ice thickness	*SIT*
snow thickness	*SNT*

Intermediate parameter:

ice freeboard	*FBi*

Observed parameters:

Ku radar freeboard	*FBku*	(eg, CryoSat-2)
Ka radar freeboard	*FBka*	(eg, Saral/AtiKa)
Total freeboard	*FBt*	(eg, IceSat-2)
Total SIT	*SITt*	(eg, IceBird EM31)
Draft	*Draft*	(eg, moorings)
Snow thickness	*SNT*	(eg, snow radar)

Conversion library with uncertainty propagation

- Need for conversion between these 8 parameters (SIT, SNT, FBice, Draft, FBku, FBku, FBt, SITt)
- These 8 parameters are linked by 6 equations:

$$\begin{cases} Draft + FB_{ice} - SIT = 0 \\ FB_{ice} + SD - FB_{total} = 0 \\ SIT + SD - SIT_{total} = 0 \end{cases} \qquad \begin{cases} \rho_w\, Draft - \rho_i\, SIT - \rho_s\, SD = 0 \\ FB_{total} - FB_{Ku} - \delta_{pku}(1+U\,\rho_s)^{1.5}\, SD = 0 \\ FB_{total} - FB_{Ka} - \delta_{pka}(1+U\,\rho_s)^{1.5}\, SD = 0 \end{cases}$$

=> With any pair of parameters, the 6 others can be computed

- 28 possible pairs x 6 parameters to compute = 168 equations !
- For each equation, computation of the uncertainty propagation using Gaussian hypothesis

$$\epsilon_y^2 = \sum_{i=1}^{n} \left(\frac{\partial f}{\partial x_i}\right)^2 \epsilon_{xi}^2$$

Next steps

- Statistical assessment
- Uncertainty estimates (Gaussian, Monte Carlo)
- Sensitivity studies (uncertainty library)
- Data paper in preparation (*Scientific Data*, stay tuned!)
- Reconciled estimates (based on uncertainties), which will be published in a **high-profile paper** – your contributions are welcome!

Collaborating with SIN’XS

We would love to hear about **your experience** using our platform and the data supplied on it!

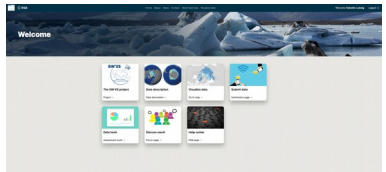
Do not hesitate to explore it and reach out to us to share the results with the community.

We welcome data submissions from all providers - the submission period officially ends on September 30, but you can still contact us for submission at sinxs@noveltis.fr afterwards ;-)

For more information on SIN’XS

- Visit the SIN‘XS website: https://sinxs-tools.noveltis.fr
- Drop us a line at sinxs@noveltis.fr
- Stay tuned for our upcoming workshops: Q4 2024, Q2 2025
- Come and talk to the project team here at Cryo2Ice

  Sara Fleury (LEGOS), Mahmoud El Hajj (NOVELTIS)



Thank you on behalf of the **SIN'XS** team!

Mean timeseries

- Differences between satellite products
- Coverage biases (ENVISAT coverage only until 81.5°N)
- Methodological differences: IS2: SIT+SNT, CS2: SIT only, CS2-SMOS: More thin ice included
- Rough agreement between models