

Submitted to session:

C012 - Community tools and products for cryosphere discovery and application

<https://agu.confex.com/agu/fm21/prelim.cgi/Session/123349>

1. e-Lightning (if it's an option)
2. Poster
3. presentation

Title:

Collaborative Computational Resource Development around ICESat-2 Data: the icepyx Community and Library

Authors:

Jessica Scheick, Kelsey Bisson, Tian Li, Wei Ji Leong, Anthony Arendt

Abstract:

Cryospheric data is increasing in size, demanding highly computational analyses. Open science principles, including collaboration, enable efficient, tested, reproducible, and diverse computational resource development. The ICESat-2 science community continues to coalesce around these ideals through contributions to icepyx, a community and open-source Python library for obtaining and working with large (~500 GB/day) data products from the ICESat-2 satellite/ATLAS laser altimeter. Our presentation will focus on the history, motivation, and process of creating this community, developing shared computational tools, and collating a set of example workflows within Jupyter Notebooks focused on ICESat-2 data. We will present new and in-the-works examples and features of the library, including enhanced pre-data-download visualizations, collaborative developments for multi-mission and -sensor data access, and data read-in/merging functionality. We will also highlight the community building events (including hackweeks) that drive this group and showcase some of the research supported and enabled by this software library.

Plain language abstract:

Ice covers a significant portion of the world's surfaces (both land and sea) and plays an important role in the Earth's climate system. It helps regulate temperature and rain/snowfall and provides a critical source of nutrients and water to many communities around the world. Thus, it is important for us to measure where the ice is and how thick it is. One way that scientists measure the world's ice is by pointing lasers from space down to Earth using a special tool (called a laser altimeter) that circles the Earth on a satellite named ICESat-2. To better make use of the rich information measured by the satellite and help new people quickly get familiar with it, a group of interested people came together and created a computer tool called icepyx.

The tool makes many common tasks easier, including finding data and producing interactive maps. Icepyx also happens to be a welcoming place where like-minded people gather to brainstorm new ideas, share challenges, and offer help to one another on ICESat-2. We hope that you too will be inspired by the creative outputs icepyx has enabled as a community.

Brainstorming: topics/themes/ideas

1. How to not make it fundamentally the same as the two previous years' (though perhaps an ongoing/targeted update is a good thing to show progress and new features?) Ref 2019 poster at <https://doi.org/10.1002/essoar.10501423.1>
2. Updates/new features
 - a. Superclass and framework for adding new datasets
 - b. Data read-in (including merging across beams)
3. Upcoming hackweek and looking towards a collaborative future
4. Value/principles of open science and collaborative dev
5. Focus on ICESat-2 papers/science that use icepyx -> ask authors for figures
 - a. <https://storymaps.arcgis.com/stories/d3cc2fdd0b534a2d9f1f0a19f012f40e>
 - b. <https://agupubs.onlinelibrary.wiley.com/doi/abs/10.1029/2020GL091207>
 - c. Kelsey
https://www.researchgate.net/profile/Kelsey-Bisson/publication/353113440_Phytoplankton_under_Southern_Ocean_Sea_Ice/links/60ef75f116f9f3130083d64b/Phytoplankton-under-Southern-Ocean-Sea-Ice.pdf
 - d. Tian's papers <https://doi.org/10.5194/tc-14-3629-2020>
 - e.