Building software documentation for community engagement: lessons learned with OGGM

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Abstract

The Open Global Glacier Model (http://oggm.org) is an open source modelling framework, helping various research groups to simulate and understand mountain glacier change at the regional or global scale. OGGM is modular, which means that we encourage users to develop their own physical parameterizations while staying compatible with the OGGM workflow. To achieve this goal, we need OGGM to be easy to understand, install, apply, and extend. In this presentation, I will talk about how we make use of the wealth of open-source tools available in the python and Jupyter ecosystems to provide an online documentation platform for OGGM. Our documentation combines text with interactive examples that run in your web browser, avoiding the typical installation and data download burden for newcomers. With selected examples from the collaborative educational content platform OGGM-Edu (http://edu.oggm.org), I will show how anyone can apply these ideas and tools to their own documentation or outreach project. Finally, I will talk about some of the challenges faced by the OGGM project in its pursuit of becoming a community model. With the increasing pressure on geoscientists who have to learn new complex technologies while navigating the "publish or perish" career model, the growing demand for better open science practices can be a blessing as well as a curse for many early career scientists.

BUILDING SOFTWARE DOCUMENTATION FOR COMMUNITY ENGAGEMENT

Lessons learned with OGGM

AGU Fall Meeting 2021
C51A - Community Tools and Products for Cryosphere Discovery and Application

Fabien Maussion and the OGGM community
Department of Atmospheric and Cryospheric Sciences (ACINN)
University of Innsbruck

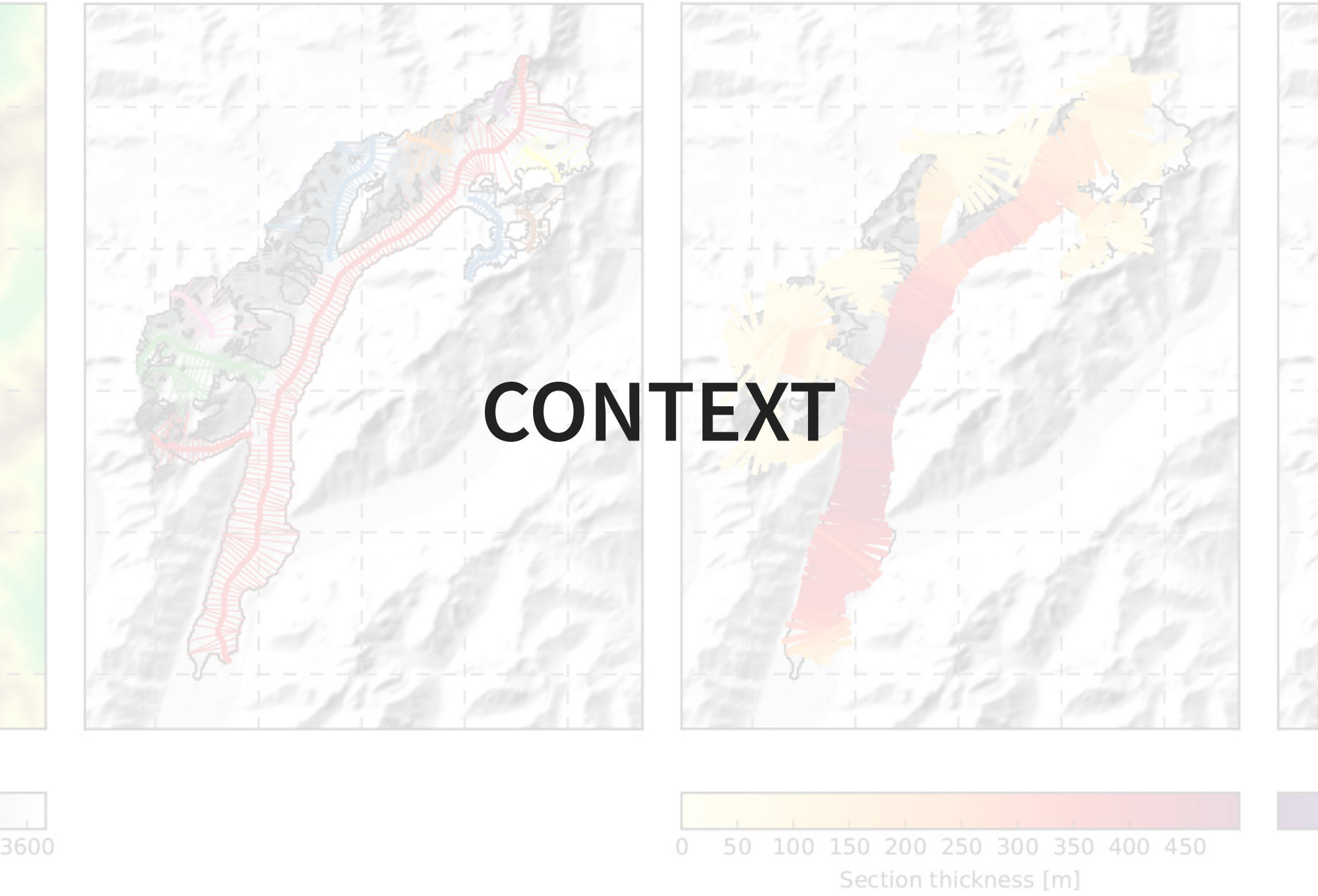
Talk recording, slides and links:
oggm.org and click on "news" or
oggm.org/2021/12/05/agu21

TAKE HOME MESSAGES

1. **Building scientific software documentation has never been so easy.** Feel free to use the OGGM repositories as a template for your project.

2. Even the best documentation won't prevent misunderstandings and disappointments. **Be prepared for long-term support**.

3. Open-source and open-science take time! We need a **fundamental change in the skills traditionally valued in academia to better reward open science practices and improve code literacy**.



CONTEXT

THE OPEN GLOBAL GLACIER MODEL

- **Modelling framework** facilitating the modelling of many glaciers
- **Fully open source**, using modern scientific python

OGGM-EDU

- edu.oggm.org
- tools and materials **for instructors** who want to teach about glaciers at school, in workshops or at university.

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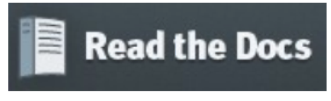
- **Reusability:** documentation, tests, support.
- **Reproducibility:** installation instructions and computational environments capsules (e.g. MyBinder, Jupyter-Hub).


DOCUMENTATION MADE EASY

Project Website

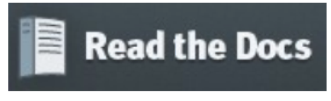


Code Documentation

Community Forum

Tutorials

Project Website



Code Documentation

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STATIC WEB GENERATORS

Sphinx, JupyterBook, Jekyll...

```
.. figure:: _static/oggm.gif

Welcome to OGGM-Edu!
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This platform is an educational website about glaciers.

Our main goal is to **provide tools and materials for instructors** who
want to teach about glaciers at school, in workshops or at the university
level. For example, OGGM-Edu was used to conduct
a `weeklong workshop <https://oggm.org/2019/12/06/OGGM-Edu-AGU/>`_
on glaciology and glacial water resources for Peruvian students.

**OGGM-Edu has four independent components**, serving complementary purposes:

1. :ref:`title_apps`, to illustrate glaciological processes with the
   help of interactive graphics on the web. The targeted audience is very
   broad, from school children to adults, with or without scientific background.
2. :ref:`title_graphics`, open access images and graphics that can be used
   for lectures or presentations.
3. :ref:`title_notebooks`, for students willing to run and develop
   their own experiments. The targeted audience are students at the undergrad
   or graduate level with some programming experience, or under the supervision
   of an instructor who can show them how to run the experiments.
4. :ref:`title_tuto`, for current and future users of the Open Global Glacier
   Model. These notebooks are targetting graduate students or scientists aiming
   to learn how the model works.

OGGM-Edu focuses on interactive content and numerical glacier experiments.
We do not provide resources about fundamentals in glaciology or
climate science: for good textbook material refer to
:ref:`other_resources`, which OGGM-Edu intends to complement.

.. _title_apps:

Interactive apps
^^^^^^^^^^^^^^^^

These interactive apps can be run on any computer with an internet connection.

* :doc:`gallery`
* :doc:`explorer`
* :doc:`simulator`
* :doc:`alps_future`

.. toctree::
    :maxdepth: 1
    :hidden:
    :caption: Interactive apps

    gallery.rst
    explorer.rst
    simulator.rst
    alps_future.rst


..  title graphics:
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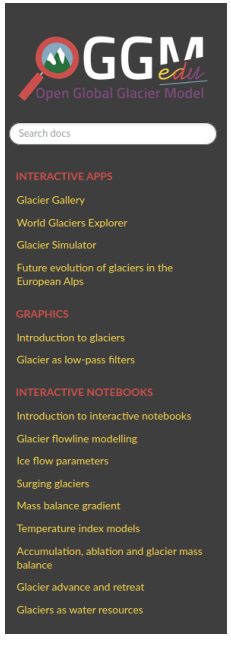

Interactive tutorials:
doc.oggm.org/tutorials

Decentralized content example:

Clubes de Ciencia Peru with Lizz Ultee

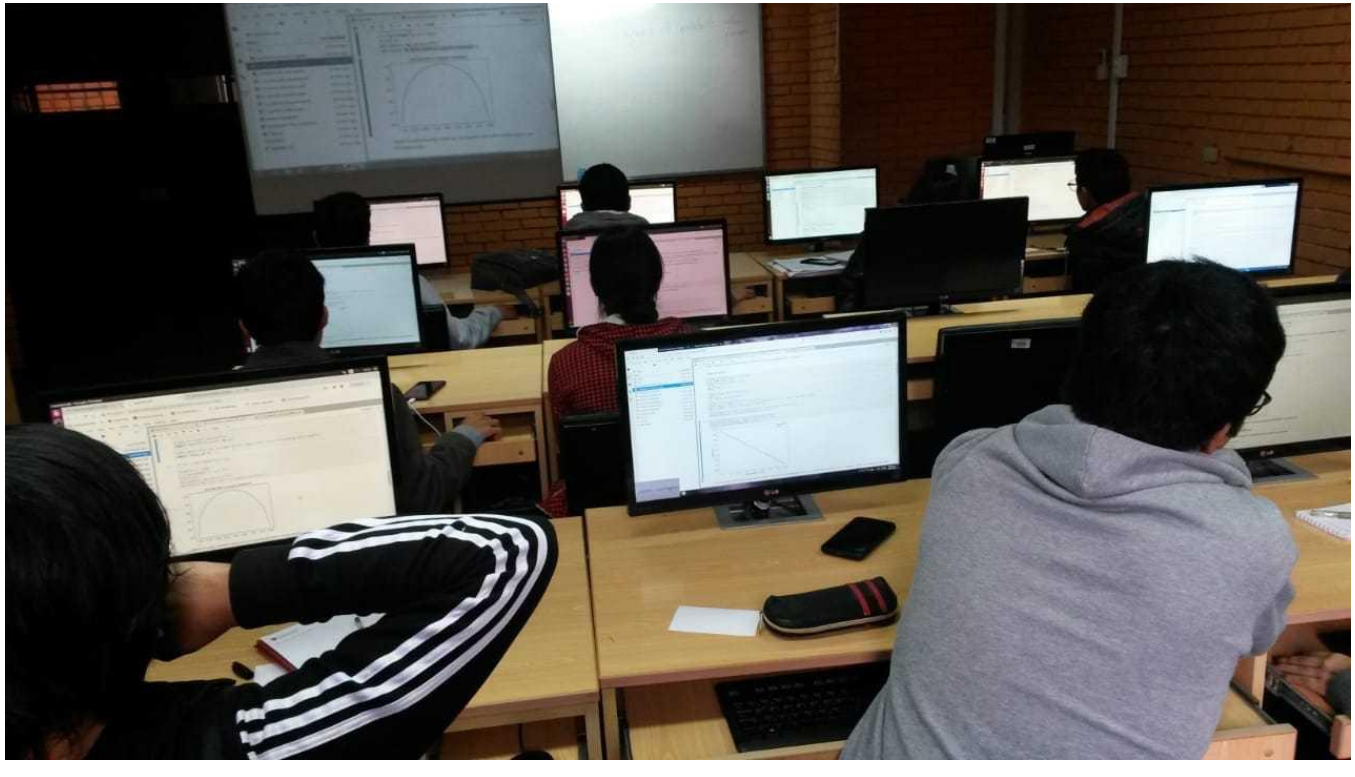

Photo: T. León Rojas

Links:

- Project website (general audience) oggm.org
- Static documentation (potential and returning users) doc.oggm.org
- Interactive tutorials (active learning) doc.oggm.org/tutorials
- Community communication channels (github, Slack)

BE PREPARED FOR LONG-TERM SUPPORT

The invisible cost of maintenance and support

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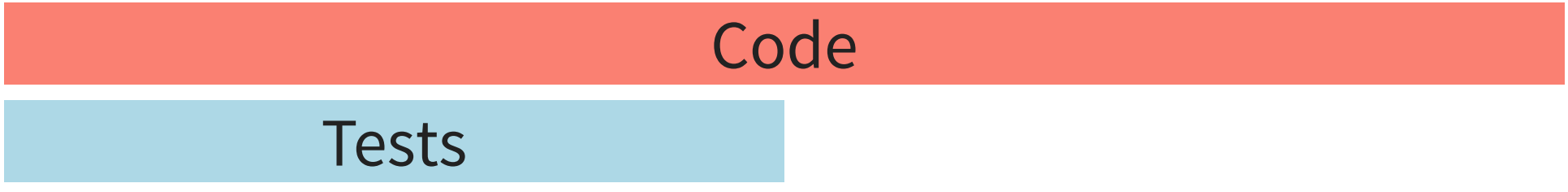
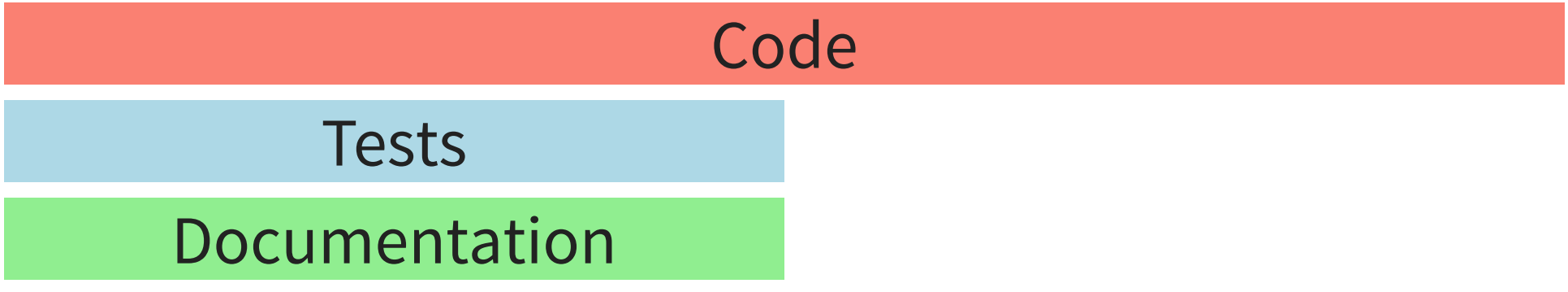
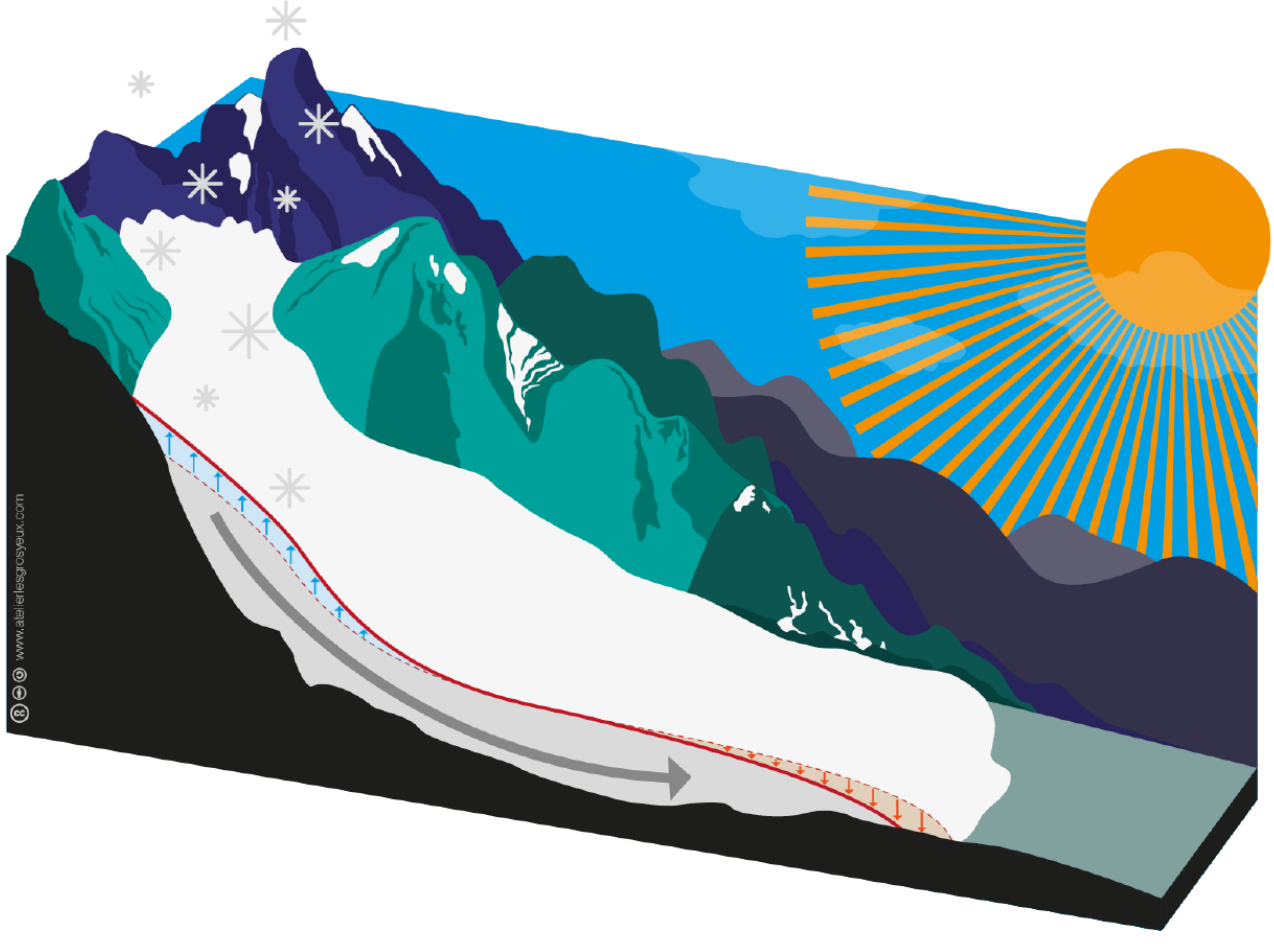


The invisible cost of maintenance and support




TECHNICAL DEBT
I DON'T UNDERSTAND WHY IT TAKES SO LONG TO ADD A NEW WINDOW.
@VINCENTDNL

Documenting a parameterized model



Click on the image to advance. Source: Anne Maussion, Atelier les Gros yeux.

OPEN SOURCE & ACADEMIC CAREERS

Open science takes time! Scientific papers should be evaluated according to new standards: transparency and reproducibility of the analysis chain, availability of data/code and its documentation.

Open source takes time! The work of open source developers should be acknowledged and should become an asset for academic jobs, not a handicap.

Learning code takes time! Formal training at University and high-school curricula still not adapted to the challenges ahead - we have to close the gap and make everyone feel welcome!

THANK YOU!

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