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ALFRED-WEGENER-INSTITUT
HELMHOLTZ-ZENTRUM FÜR POLAR- UND MEERESFORSCHUNG

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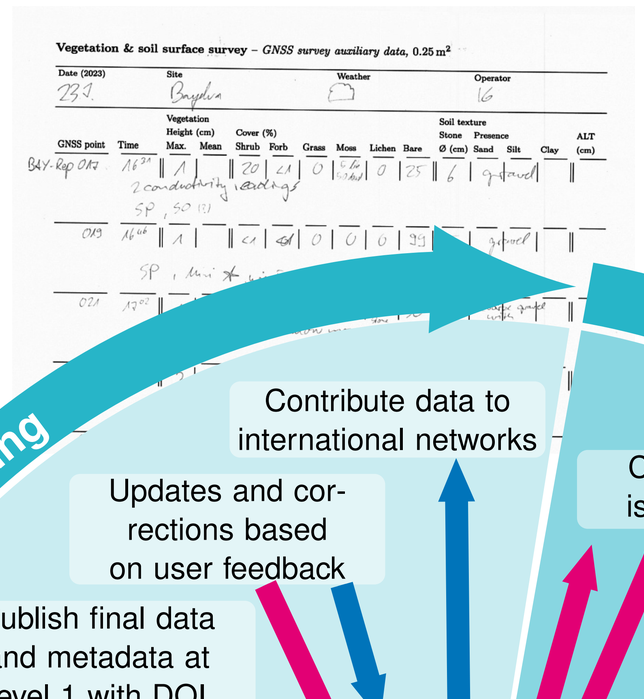
Strategies for good and comprehensive metadata in field-based permafrost research

From research question to global data sharing: good metadata documentation is key to ensure continuous collaboration and data availability for future research.

We outline stages of data acquisition, processing, and analysis, culminating in the publication of results and distribution of high-quality, long-term data sets.

Publish your data!

- For your colleagues and your future self
- Choose a FAIR repository
- Publish all data with quality contol flags
- Publish different levels (raw, quality controlled, …)
- Add all metadata that might be of interest



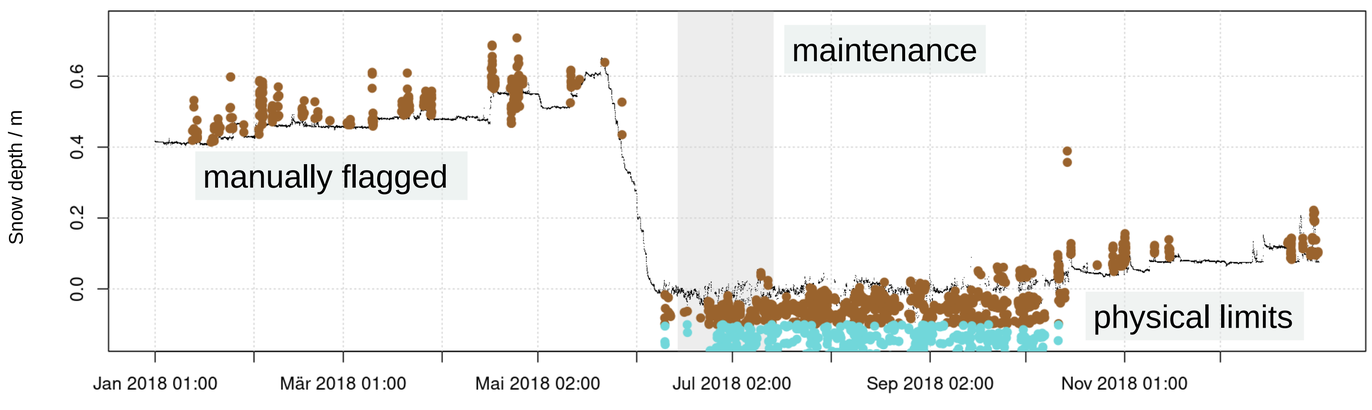
Plan beforehand!

- What data do you need for your science?
- What metadata do you need to understand your data?
  - What pictures do you need?
    - Prepare data collection tools: list of parameters, field book, printed sheets, apps...)

Flag	Meaning
0	Good data
1	No data
2	System error, e.g. power break, sensor removal
3	Maintenance periods
4	Physical limits, possible or likely
5	Gradient, constant periods of high/low spikes
6	Plausibility: **Manually flagged!**
7	Decreased accuracy
8	Snow covered, but good data

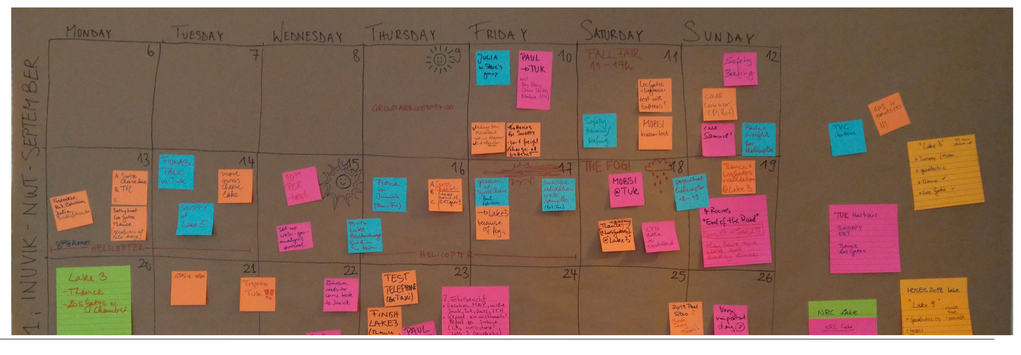
Do quality checks!

- Automatic checks for physical limits, sensor failure, etc.
- Cross-check with auxillary data, e.g. camera footage, to check if sensor is snow covered
- Manual flagging of maintenance periods, suspicious data or inplausible values with **visual tool**



Note everything!

- Keep a calendar / diary
- Write down all that seems relevant
- Write down all that does not seem relevant at first (weather, reasons for/against a location, person…)
- Take lots of pictures with added information (scale, IDs, ...)
- Digitize data and metadata ideally still in the field



Boike, Julia; Grünberg, Inge; Miesner, Frederieke; Bornemann, Niko; Cable, William L (2022): Continuous measurements in soil and air at the permafrost long-term observatory at the Bayelva station near Ny-Ålesund (2018 et seq). PANGAEA, https://doi.org/10.1594/PANGAEA.948951

Boike, Julia; Cable, William L; Bolshiyanov, Dimitry Yu; Bornemann, Niko; Grigoriev, Mikhail N; Grünberg, Inge; Miesner, Frederieke (2022): Continuous measurements in soil and air at the permafrost long-term observatory at Samoylov Station (2002 et seq). Alfred Wegener Institute - Research Unit Potsdam, PANGAEA, https://doi.org/10.1594/PANGAEA.947032

Boike, Julia; Miesner, Frederieke; Bornemann, Niko; Cable, William L; Grünberg, Inge (2023): Trail Valley Creek, NWT, Canada Soil Moisture and Temperature 2016 et seq. PANGAEA, https://doi.org/10.1594/PANGAEA.962726

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