

Folder layout

The folder `dataAndCodeToAccompanyPaper/` contains two main subfolders: `code/` and `data/`.

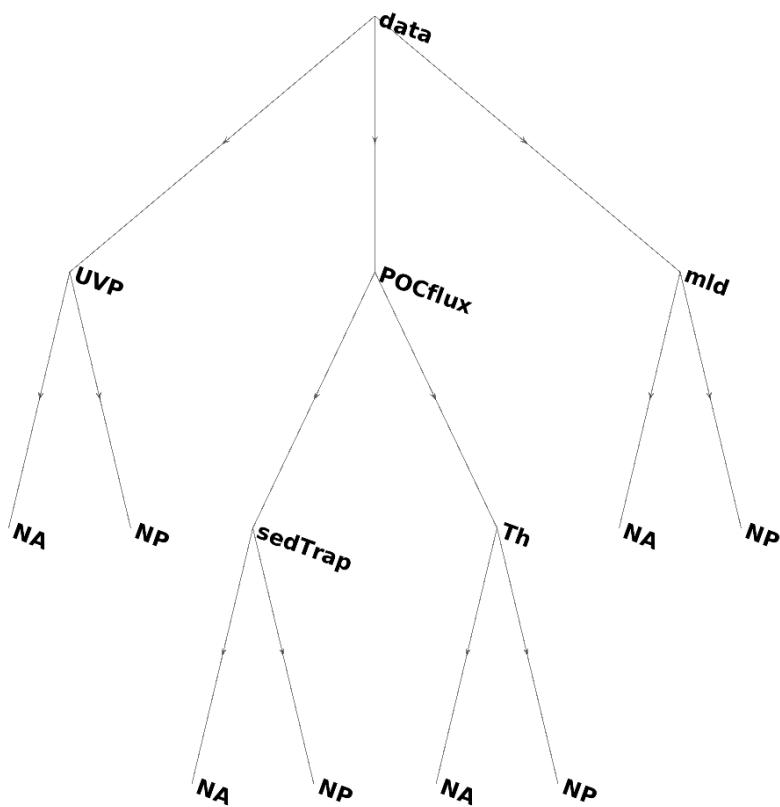
Data structure

The `data/` folder contains subfolders for `UVP/`, `POCflux/`, and mixed layer depth (`mld/`) data. The `POCflux/` folder contains measurements from:

- sediment traps (subfolder `sedTrap/`), and
- ^{234}Th (subfolder `Th/`).

Each data subfolder is further divided into `NP/` (North Pacific) and `NA/` (North Atlantic), corresponding to the two EXPORT project cruises.

The full directory structure is shown below.



Code structure

The `code/` folder consists of two main directories:

- `matchingAndFit/` - contains scripts for modeling POC fluxes from UVP data.
- `figures/` - contains subfolders for generating figures.

The folder `code/` also contains the following scripts (listed in alphabetical order):

- `calcPOCflux.m` - computes modeled POC flux from UVP, using a nonlinear model object, and size information.
- `definePathsAndFiles.m` - defines structures for sorting paths and file locations.
- `my_r2.m` – computes r^2 values.
- `tight_subplot.m` - a MATLAB function from the File Exchange that improves spacing in subplot layouts (alternative to `subplot` or `tile`).
Reference: Pekka Kumpulainen (2025). [tight subplot](#) Retrieved February 13, 2025.
- `viridis.m` - a colormap from *Reference:* Stephen23 (2025). [MatPlotLib Perceptually Uniform Colormaps](#) MATLAB Central File Exchange. Retrieved August 11, 2025.

Before running any scripts, the first line of `definePathsAndFiles.m` must be edited to match your working directory (i.e., the location where you open the zip file).

The relevant line in the script is:

```
HOME= '/yourPathHere/dataAndCodeToAccompanyPaper/' ;
```

Replace `yourPathHere` with the full path to the extracted folder on your system.

Note: this code was developed on a Linux system, so modifications might be needed for Windows compatibility.

The `matchingAndFit/` directory contains scripts for modeling POC fluxes from UVP data, using flux measurements from:

- sediment traps (subfolder `sedTrap/`), and
- 234Th (subfolder `Th/`).

Each of these subdirectories is further divided into `NP/` (North Pacific) and `NA/` (North Atlantic) for the two EXPORTS cruises.

The directory includes the following key scripts:

- `guidiFitsForTable1.m` – aggregates various fits into an Excel file for Table 1.
- `tallyOfCastsAndTrapsV2.m` – summarizes the total number of casts and traps for verification.

The subfolder `sedTrap/` contains the sediment trap-related scripts and results, which includes:

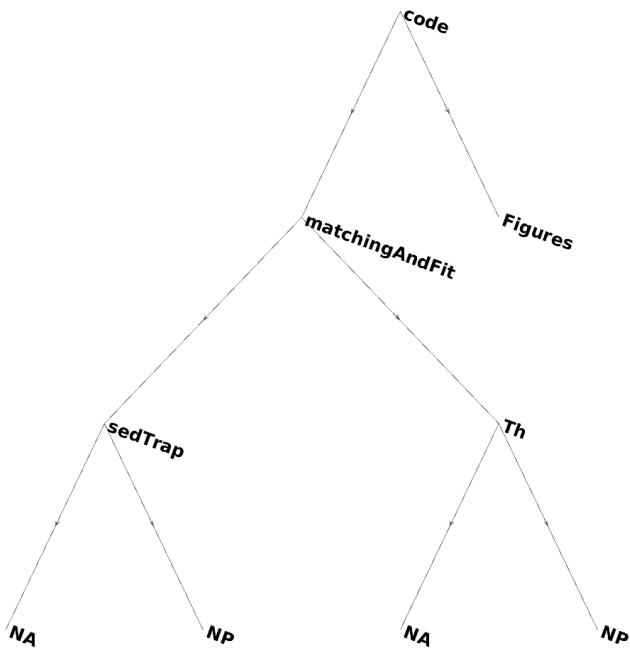
- `sedTrap/NP/matchTrapToUVP_NP.m` – matches and fits UVP with sediment traps (NP).
- `sedTrap/NA/matchTrapToUVP_NA.m` – matches and fits UVP with sediment traps (NA).
- `sedTrap/doMergedFit.m` – merges inputs from above for a combined fit.

The subfolder `Th/` contains the 234Th-related scripts and results, which includes:

- `Th/NA/matchThAndUVPThenFitNA.m` – matches and fits UVP with 234Th flux (NA).
- `Th/NP/matchThAndUVPThenFitNP.m` – matches and fits UVP with 234Th flux (NP).
- `Th/doMergedFitTh.m` – merges inputs from above for a combined fit.

Note: the scripts were written for MATLAB R2023b (Linux and MacOS). The code relies on the `fitnlm` function from MATLAB's Statistics and Machine Learning Toolbox for regression fitting.

The full directory structure is shown below.



The `figures/` folder contains subdirectories for each figure:

```
figure1/ figure2/ figure3/ figure4/ figure5/ figureS1/ figureS2/
figureS4/
```

Each subfolder includes the corresponding figure-related scripts and output files.

Data sources

UVP data

The UVP data from multiple instruments were intercalibrated and merged for each cruise. The dataset provided here is the processed version. The original raw UVP data were exported from *EcoPart* (<https://ecopart.obs-vlfr.fr>).

North Pacific:

- **R/V Sally Ride SR1812**
 - Project: `uvp5_sn207_2018_exports_np_sr1812_filtered`
 - Owner: Andrew McDonnell
- **R/V Roger Revelle RR1813**
 - Project: `uvp5_sn201_exports01_filtered`

- Owner: Emmanuel Boss (emmanuel.boss@maine.edu)

North Atlantic:

- **RRS James Cook JC214**
 - Project: [uvp5_sn201_exports02_filtered](#)
 - Owner: Lee Karp-Boss & Emmanuel Boss (lee.karp-boss@maine.edu)
- **RRS Discovery DY131**
 - Project: [uvp5_sn203_nasa_exports_north_atlantic_2021](#)
 - Owner: Andrew McDonnell
- **R/V Sarmiento de Gamboa**
 - Project: [uvp5_sn205_export_2021_filtered](#)
 - Owner: Rainer Kiko (rainer.kiko@imev-mer.fr)

Mixed Layer Depth (mld) data

The data were provided by **Andrew Thompson** (andrewt@caltech.edu) and downloaded from the EXPORTS project shared drive:

North Pacific:

Downloaded from the EXPORTS shared drive:

[Exports > North Pacific 2018 > North Pacific 2018 shared data > Mixed Layer Depths](#)

North Atlantic:

Downloaded from the EXPORTS shared drive:

[Exports > North Atlantic 2021 > North Atlantic 2021 shared data > CTD/AUV Profile Metrics > Ship CTD Metrics - MLD, Zeu, etc.](#)

POC Flux data

Sediment trap bulk fluxes:

The data were provided by **Margaret Estapa** and downloaded from the EXPORTS project shared drive:

North Pacific:

Exports > North Pacific 2018 > North Pacific 2018 shared data >
Sediment Trap Bulk Fluxes

North Atlantic:

Exports > North Atlantic 2021 > North Atlantic 2021 shared data >
Sediment Trap Bulk Fluxes

234Th NSS (non-steady state) POC fluxes:

The data were provided by researchers via email attachment:

North Pacific:

Provided by **Ken Buesseler** via email attachment:
"Tables for ms v6 modified for UVP Aug 2022.xlsx"

North Atlantic:

Provided by **Samantha Clevenger** via email attachment:
"POCfluxes.xlsx"