

Antarctic-Plots:

a Python Package to Help Conduct Antarctic Research

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<http://antarctic-plots.rtf.d.io/>



https://github.com/mdtanker/antarctic_plots



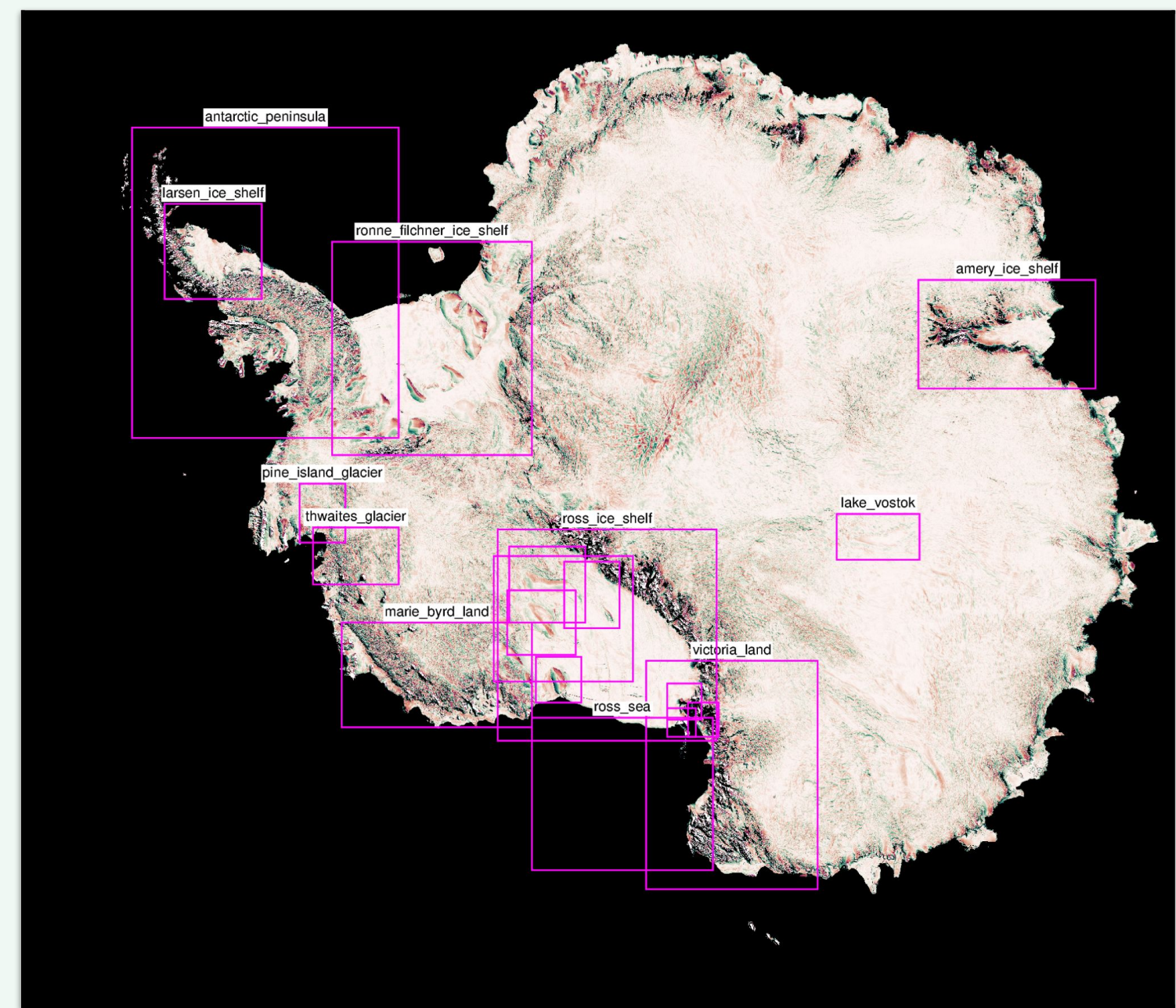
Overview

Antarctic-Plots is a Python package developed to help with conducting Antarctic science. It consists of 5 modules, presented here, each providing a unique set of tools to help with a variety of common tasks.

1) from antarctic_plots import regions

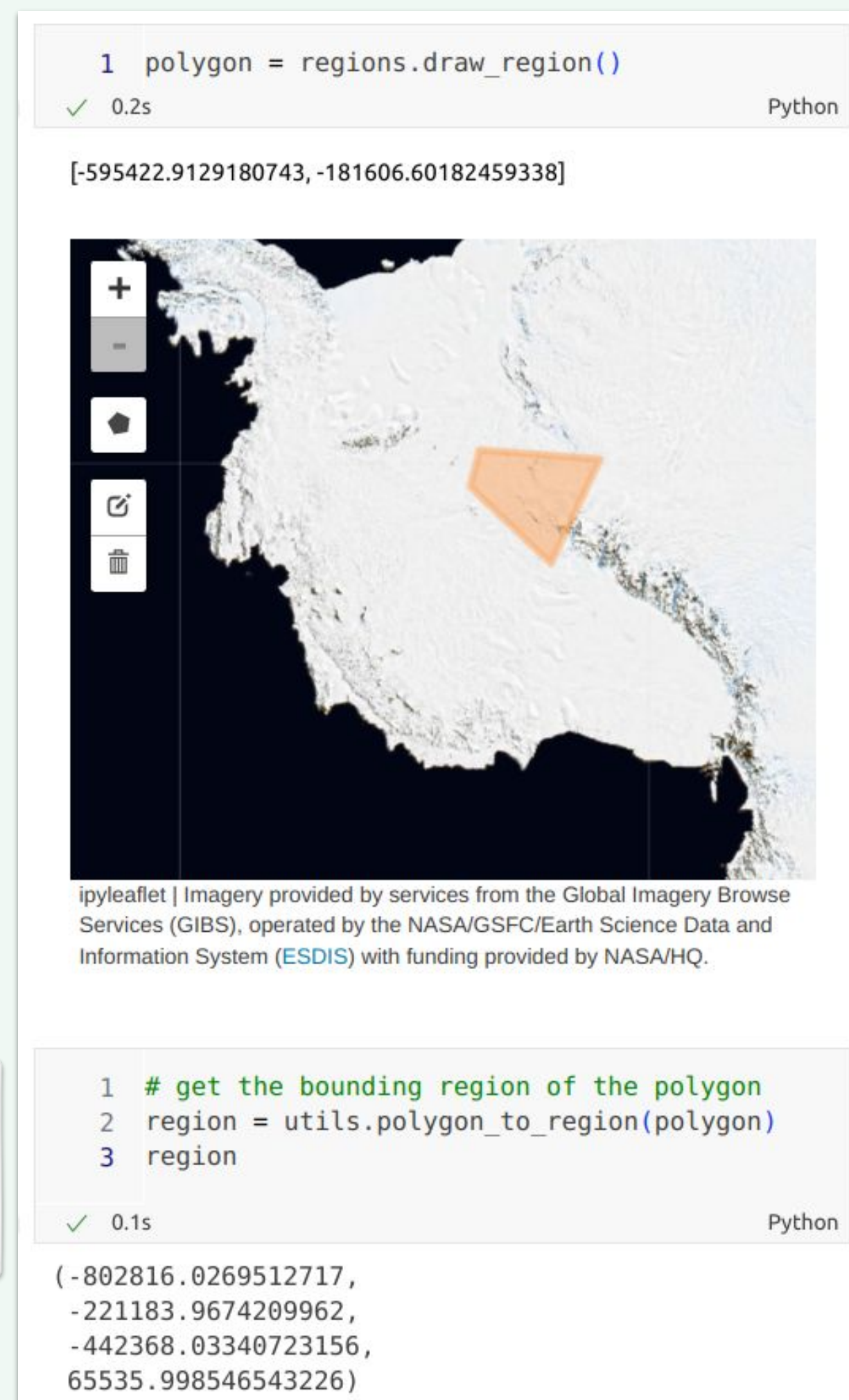
Pre-defined or interactively chosen geographic regions. Includes many ice shelves, glaciers, and general geographic regions. These can be used in functions throughout, such as subsetting data or specifying areas to plot.

available regions



```
>>> # get pre-defined region for Pine Island Glacier
>>> print(regions.pine_island_glacier)
(-1720000.0, -1480000.0, -380000.0, -70000.0)
```

interactively-defined



2) from antarctic_plots import fetch

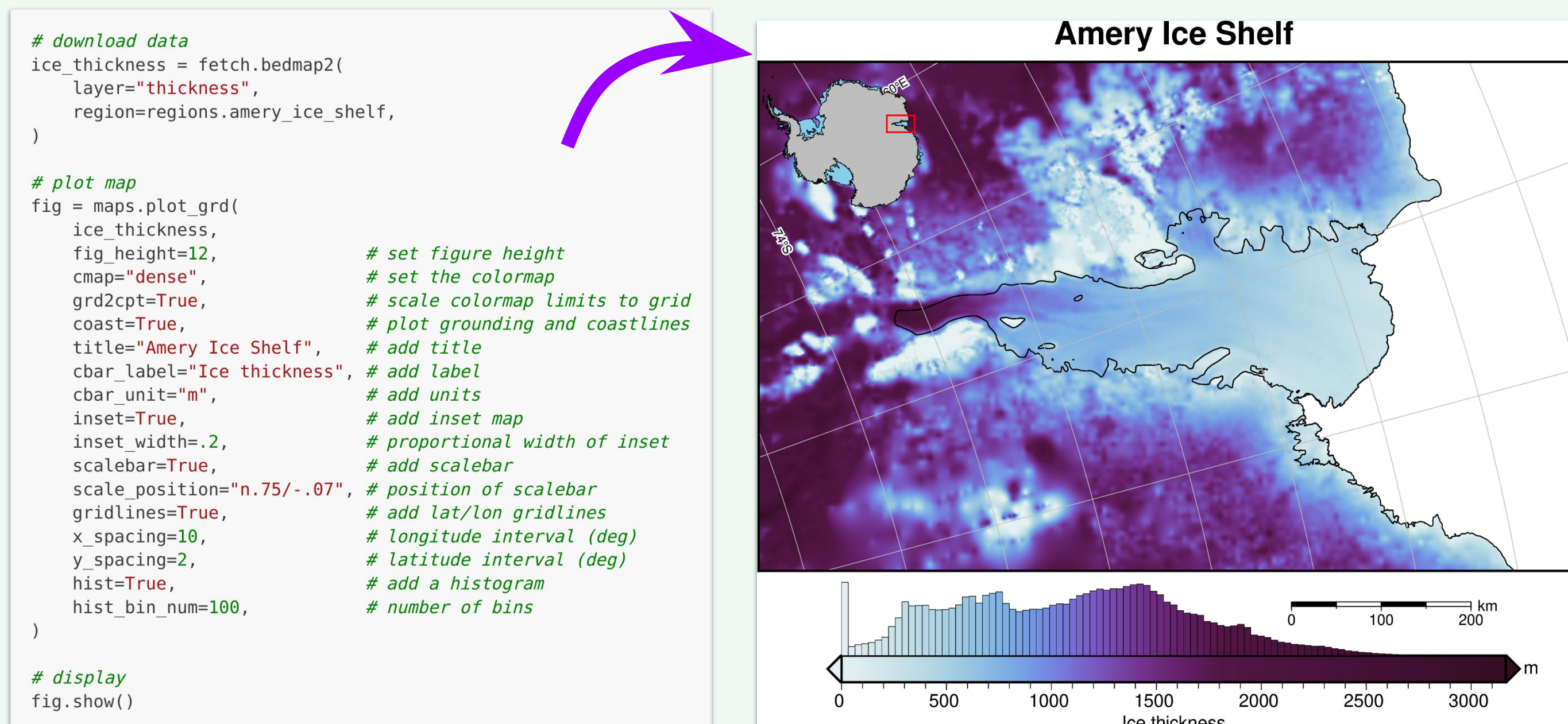
Easily download data sets to your computer, retrieve previously download data sets, and perform common gridded data manipulations. This module uses `Pooch` to managed the download, storage, and retrieve of data, and `PyGMT` for grid manipulations. Below are some of the currently implemented datasets:

- **Imagery:**
 - LIMA
 - MODIS MOA
- **Topographic data:**
 - BedMachine
 - Bedmap
 - REMA
 - ETOPO
 - geoid models
 - IBCSO
- **Glaciological data:**
 - basal melt
 - ice velocity
 - mass or height change
- **Geophysical data:**
 - gravity
 - magnetics
 - geothermal heat flux
 - glacio-isostatic adjustment
- **Derived data:**
 - basement topography
 - crustal thickness
 - sediment thickness
 - moho depths
- **Shapefiles:**
 - GeoMAP faults / outcrops
 - grounding / coast lines
 - ice shelf / catchment boundaries

```
>>> # download and resample data
>>> grid = fetch.bedmap2(
>>>     layer = "icebase",
>>>     spacing = 10e3,
>>>     region = regions.mcmurdo_dry_valleys,
>>>     reference = "ellipsoid",
>>>     registration = "p",
>>> )
>>> # print out grid info
>>> info = utils.get_grid_info(grid, print_info=True)
```

3) from antarctic_plots import maps

Create high-quality maps using PyGMT with functions specifically tailored to Antarctica. plot types: 2D, 3D, subplots, interactive maps



4) from antarctic_plots import profile

Define a line, sample layers & data along it, and plot the results.

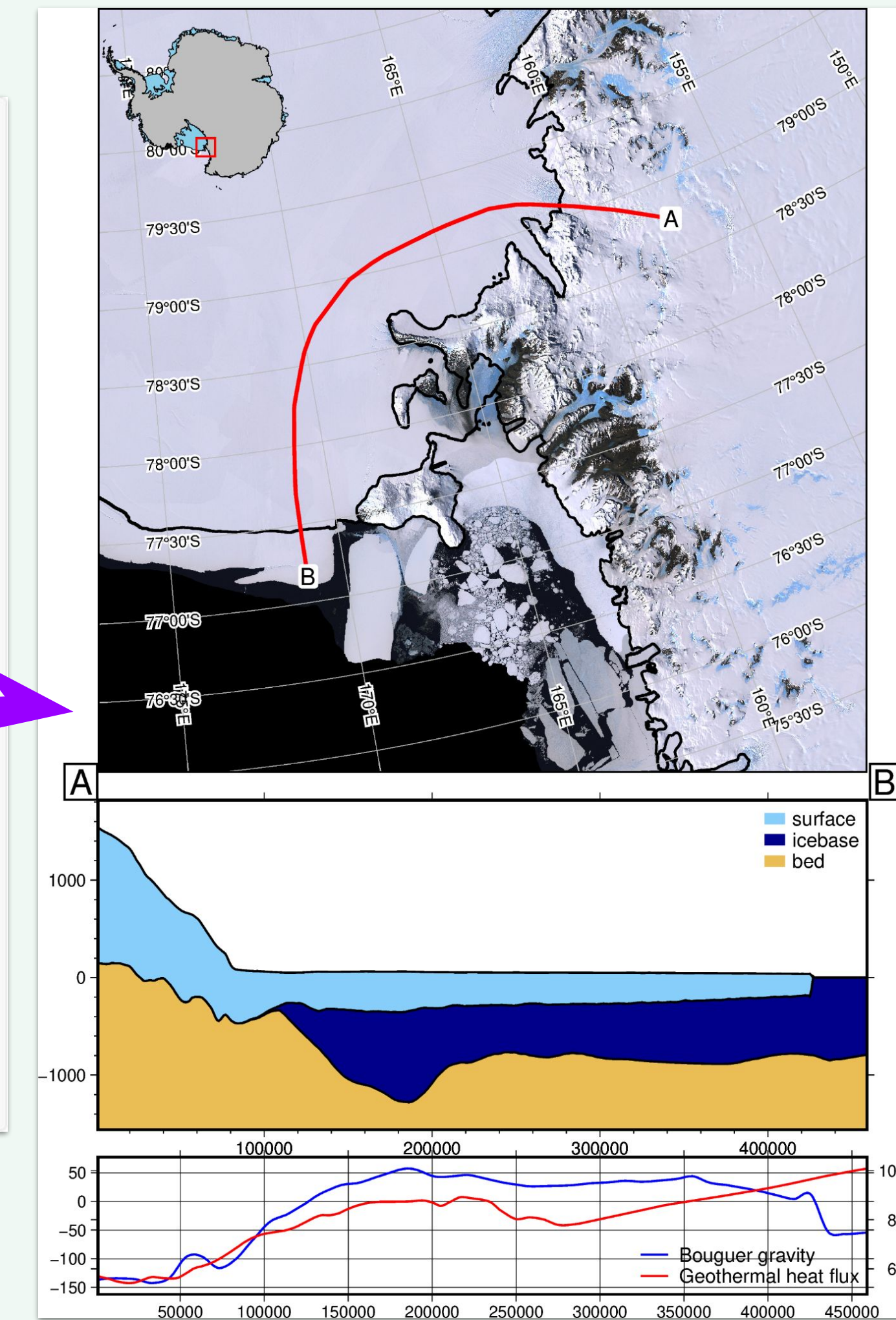
- 3 methods of defining a line:
 - straight line between 2 points
 - interactively draw a line
 - shapefile

```
# download data
gravity = fetch.gravity(
    version="antgg-update",
    anomaly_type="BA",
)
GHF = fetch.ghf(version='losing-ebbing-2021')

# add data and properties to a dictionary
data = profile.make_data_dict(
    names = ["Bouguer gravity", "Geothermal heat flux"],
    grids = [gravity, GHF],
    colors = ["blue", "red"],
    axes = [0,1], # use separate y axes for plotting
)

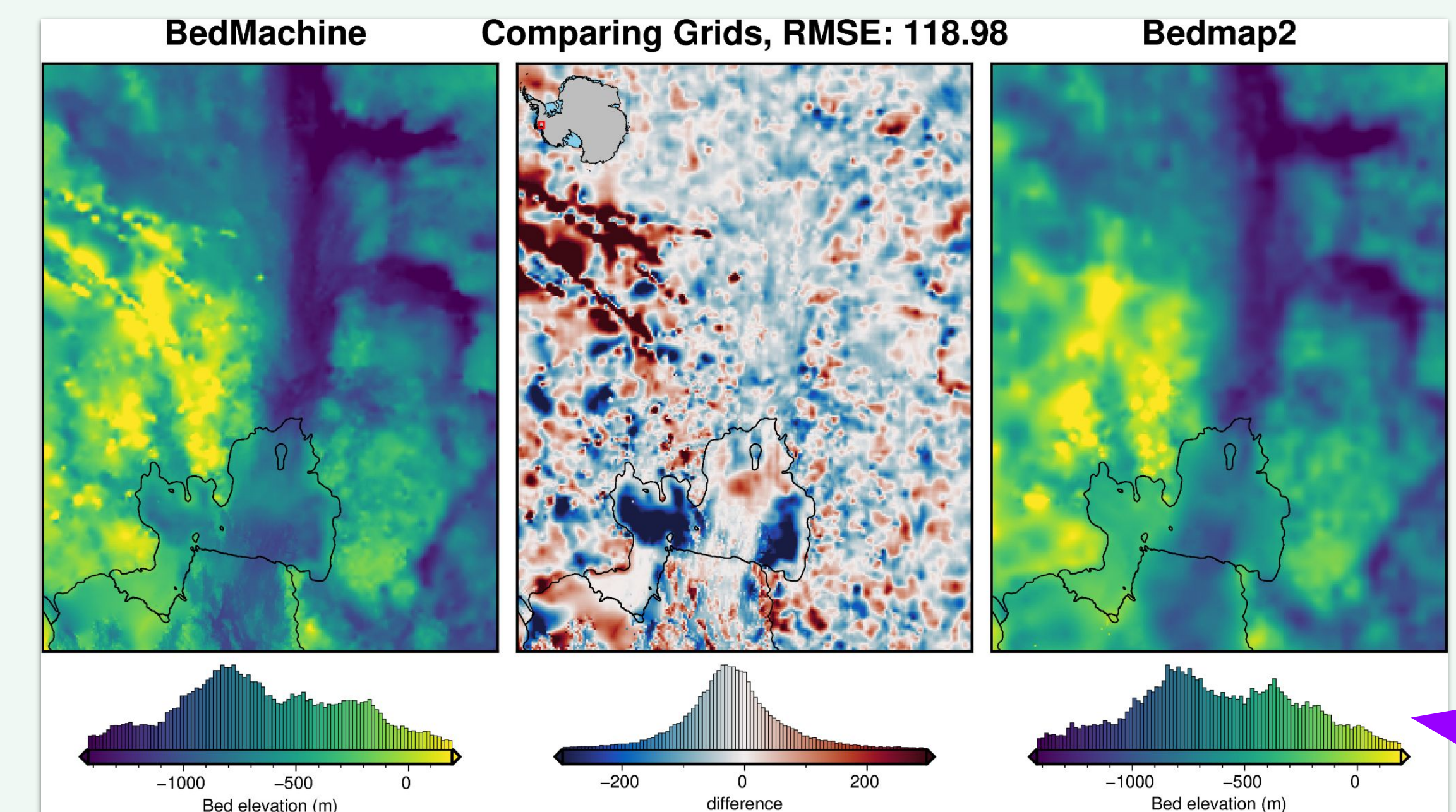
# get shapefile for profile location
shapefile=fetch.sample_shp("Disco_deep_transect")

# plot
fig, _ = profile.plot_profile(
    method = "shapefile",
    shapefile = shapefile,
    data_dict = data,
    add_map = True,
    subplot_orientation="vertical",
    data_legend_loc="JBR+JBR+00c",
    layers_legend_loc="JTR+JTR+00c",
)
fig.show()
```



5) from antarctic_plots import utils

Useful functions for common tasks: coordinate conversion, grid comparison, masking, de-trending.



```
# define a region
region = regions.pine_island_glacier

# download data
bedmachine = fetch.bedmachine(
    "bed",
    spacing=1e3,
    region=region,
)

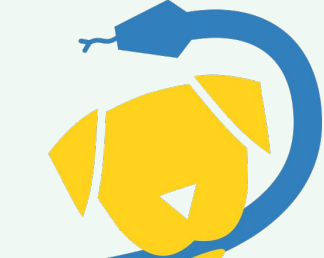
bedmap = fetch.bedmap2(
    "bed",
    spacing=1e3,
    region=region,
)

# compare grids and plot
_ = utils.grd.compare(
    bedmachine,
    bedmap,
    plot=True,
    coast=True,
    robust=True,
    grid1_name="BedMachine ",
    grid2_name="Bedmap2",
    cbar_label="Bed elevation (m)",
    hist=True,
)
```

Try it on your phone:
Open a Binder environment



Checkout the website:
antarctic-plots.rtf.d.io



- Have a dataset you want included?
 - Want to add your study region?
 - Want some additional mapping features?
- Raise an issue on GitHub or contribute yourself!

