Antarctic-Plots

A Python package to help **download**, **visualize**, and **present** Antarctic datasets

Introduction

Antarctic-Plots is a new Python package developed to help with conducting Antarctic science. The 5 modules shown here provide tools to help with a variety of uses.

from antarctic_plots import fetch

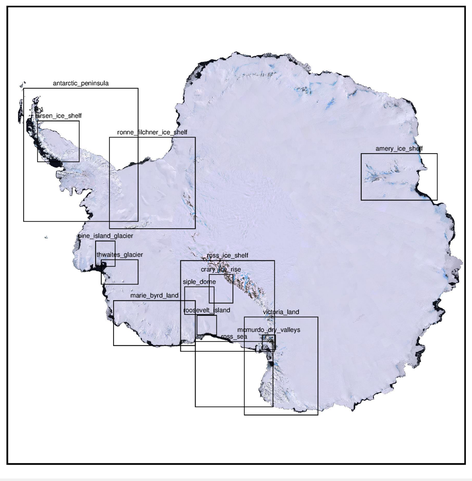
- download, store and retrieve datasets
- no need to remember file paths
- enables reproducible and shareable code
- easy to add more datasets!

- Bedmachine
- Bedmap2
- DeepBedMap
- Geothermal heat flux
- Gravity
- Magnetics
- Grounding line
- Coastline
- Satellite imagery
- Ice velocity

```
fetch.bedmap2(layer="icebase")
```

from antarctic_plots import regions

- helps with defining geographic regions
- pre-set regions for common areas
- custom regions from an interactive map

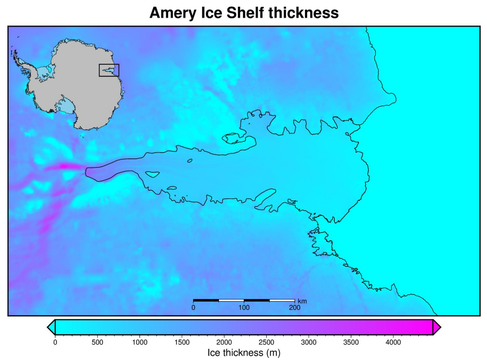



```
ross_ice_shelf = regions.ross_ice_shelf
```

from antarctic_plots import maps

- easily create high-quality maps (uses **PyGMT** in the background)
- use independently or use it as an extension to **PyGMT**

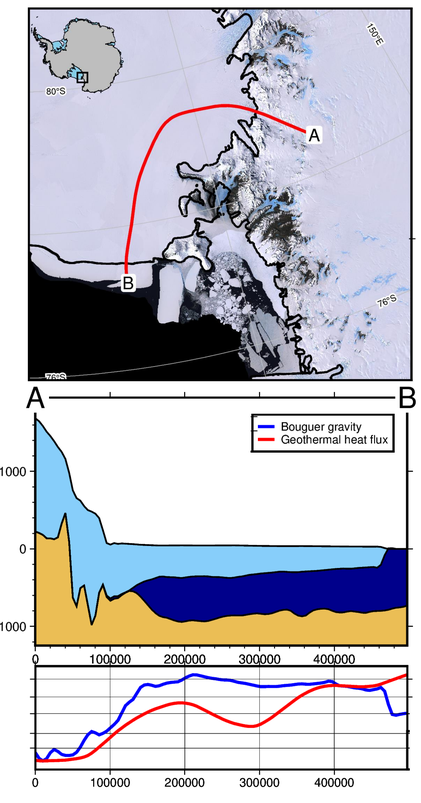
```
# download
ice_thickness = fetch.bedmachine(
    layer = "thickness",
    region = regions.amery_ice_shelf,
    spacing = 1000)

# plot
fig = maps.plot_grd(
    grid = ice_thickness,
    cmap = "cool",
    coast = True,
    title = "Amery Ice Shelf thickness",
    cbar_label = "Ice thickness (m)",
    inset = True,
    scalebar = True)

fig.show()
```



from antarctic_plots import profile

- sample of datasets along lines
- plot cross sections and profiles
- 3 methods of defining a profile line:
  - straight line between 2 points
  - shapefile
  - interactively draw a line

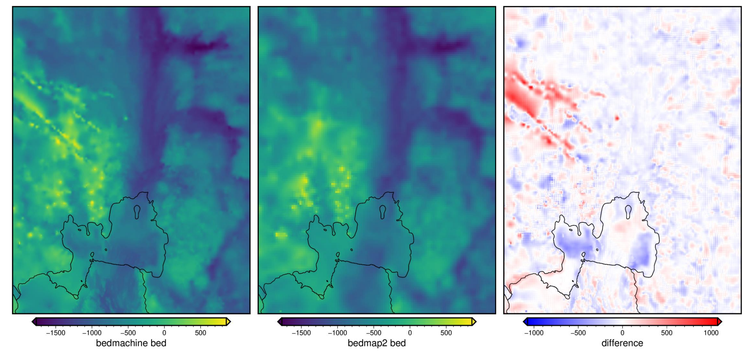
```
# download
gravity = fetch.gravity('BA')
GHF = fetch.geothermal('losing-ebbing-2021')

# set properties
data = profile.make_data_dict(
    ["Bouguer gravity",
     "Geothermal heat flux"],
    [gravity, GHF],
    ["blue", "red"])

# draw profile location
lines = maps.draw_lines()
line = utils.shapes_to_df(lines)

# plot
profile.plot_profile(
    method = "polyline",
    polyline = line,
    num = 100,
    data_dict = data,
    add_map = True)
```



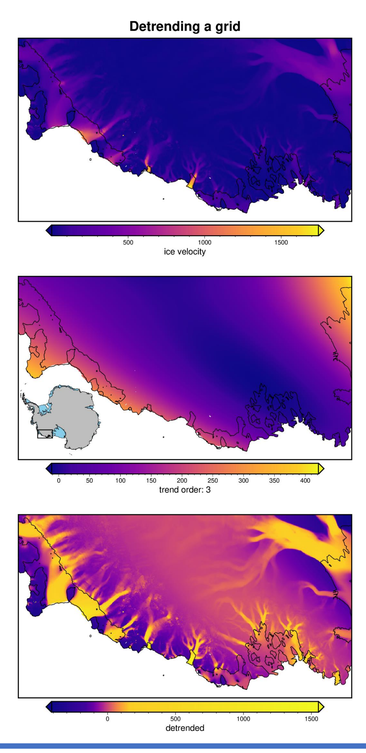
from antarctic_plots import utils

- useful functions for general geoscience applications
- ex. compare two grids, fit a trend to a grid, mask grids based on shapefiles, various coordinate conversions

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

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

# compare
dif, grid1, grid2 = utils.grd_compare(bedmachine, bedmap,
    plot=True, grid1_name="bedmachine bed", grid2_name="bedmap2 bed")
```




```
# download
ice_velocity = fetch.ice_vel(
    region=regions.marie_byrd_land,
    spacing=1e3)

# extract and detrend
fit, detrend = utils.grd_trend(
    ice_velocity, deg=3)

# plot
fig = maps.plot_grd(detrend,
    fig_height=10, cmap='plasma',
    grd2cpt=True, coast=True,
    cbar_label='detrended')

fig = maps.plot_grd(fit, fig=fig,
    fig_height=10, cmap='plasma',
    grd2cpt=True, coast=True,
    cbar_label='trend order: 3',
    inset=True, inset_pos='BL',
    origin_shift='yshift')

fig = maps.plot_grd(ice_velocity,
   fig=fig,
    fig_height=10, cmap='plasma',
    grd2cpt=True, coast=True,
    cbar_label='ice velocity',
    title="Detrending a grid",
    origin_shift='yshift')

fig.show()
```



Try it on your phone:
Open a Binder environment
https://bndr.it/54sde

Download the poster:
doi: 10.6084/m9.figshare.21183931

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http://antarctic-plots.rtfd.io/
https://github.com/mdtanker/antarctic_plots

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