IBCAO_py: A matplotlib library for using the International Bathymetric Chart of the Arctic Ocean with cartopy and matplotlib

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Summary

This is a python plotting toolbox for using the International Bathymetric Chart of the Arctic Ocean (Jakobsson et al. 2012) with Cartopy (Met Office 2010–2015) in matplotlib (Hunter 2007). The package is suitable for scientist creating figures for publications, automated visualization of data on the map, and querying the bathymetry of the Arctic ocean either for one-time use or in an automatic fashion.

The IBCAO is distributed using the Universal Polar Stereographic projection (UPS) with custom parameters and grid-spacing. This package sets up the projection correctly, and loads the map data in an efficient way. This ensures that no transformation is needed when plotting the map, and that data that is plotted on the map is correctly positioned when supplied with a projection that matches the data format. A ready figure with the map loaded is provided, with a plotting transformation to the Geodetic projection ready so that data provided in the familiar latitude and longitude degree coordinates may be plotted easily.

Additionally, efficient interpolation routines for reading the bathymetry (depth) from the map data at coordinates or tracks are provided so that these may be easily read.

The class may it self be used as demonstration, though plotting the IBCAO is a matter of four lines of python code:

```
from ibcao import * i = IBCAO () f = i.template () f.show
()
```

The documentation showcases plotting of the IBCAO, plotting of data on top of the map, and retrieval of a depth profile along a great circle. A test suite covers the functions and ensures that it operates correctly.

The International Bathymetric Chart of the Arctic Ocean

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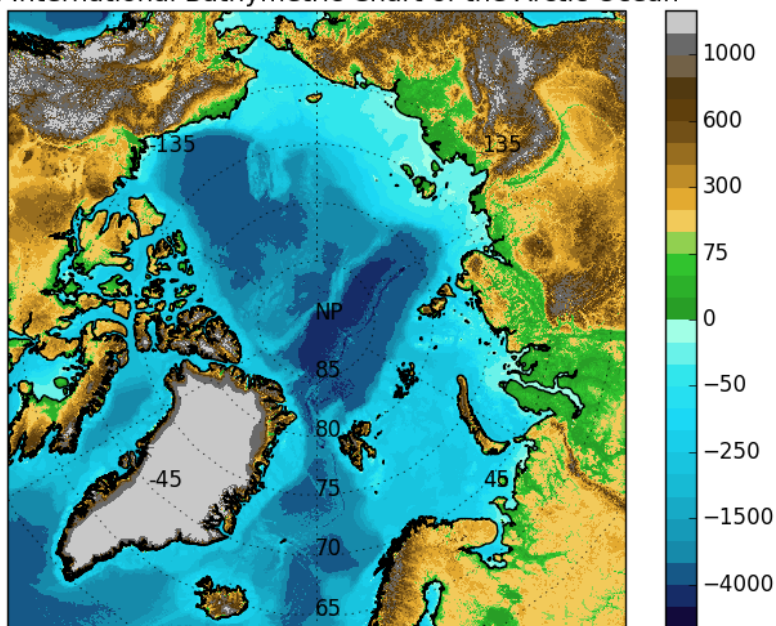
References

Hunter, J. D. 2007. "Matplotlib: A 2d Graphics Environment." *Computing in Science & Engineering* 9 (3). IEEE COMPUTER SOC: 90–95. doi:10.1109/MCSE.2007.55.

Jakobsson, M., L. Mayer, B. Coakley, J. A. Dowdeswell, S. Forbes, B. Fridman, H. Hodnesdal, et al. 2012. "The International Bathymetric Chart of the Arctic Ocean (IBCAO) Version 3.0." *Geophys. Res. Lett.* 39 (12). doi:10.1029/2012GL052219.

Met Office. 2010–2015. *Cartopy: A Cartographic Python Library with a Matplotlib Interface.* Exeter, Devon. http://scitools.org.uk/cartopy.