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Psyplot: Visualizing rectangular and triangular Climate Model Data with Python

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The development and use of climate models often requires the visualization of geo-referenced data. Creating visualizations should be fast, attractive, flexible, easily applicable and easily reproducible. There is a wide range of software tools available for visualizing raster data, but they often are inaccessible to many users (e.g. because they are difficult to use in a script or have low flexibility). In order to facilitate easy visualization of geo-referenced data, we developed a new framework called "psyplot," which can aid earth system scientists with their daily work. It is purely written in the programming language Python and primarily built upon the python packages matplotlib, cartopy and xray. The package can visualize data stored on the hard disk (e.g. NetCDF, GeoTIFF, any other file format supported by the xray package), or directly from the memory or Climate Data Operators (CDOs). Furthermore, data can be visualized on a rectangular grid (following or not following the CF Conventions) and on a triangular grid (following the CF or UGRID Conventions). Psyplot visualizes 2D scalar and vector fields, enabling the user to easily manage and format multiple plots at the same time, and to export the plots into all common picture formats and movies covered by the matplotlib package. The package can currently be used in an interactive python session or in python scripts, and will soon be developed for use with a graphical user interface (GUI). Finally, the psyplot framework enables flexible configuration, allows easy integration into other scripts that uses matplotlib, and provides a flexible foundation for further development.