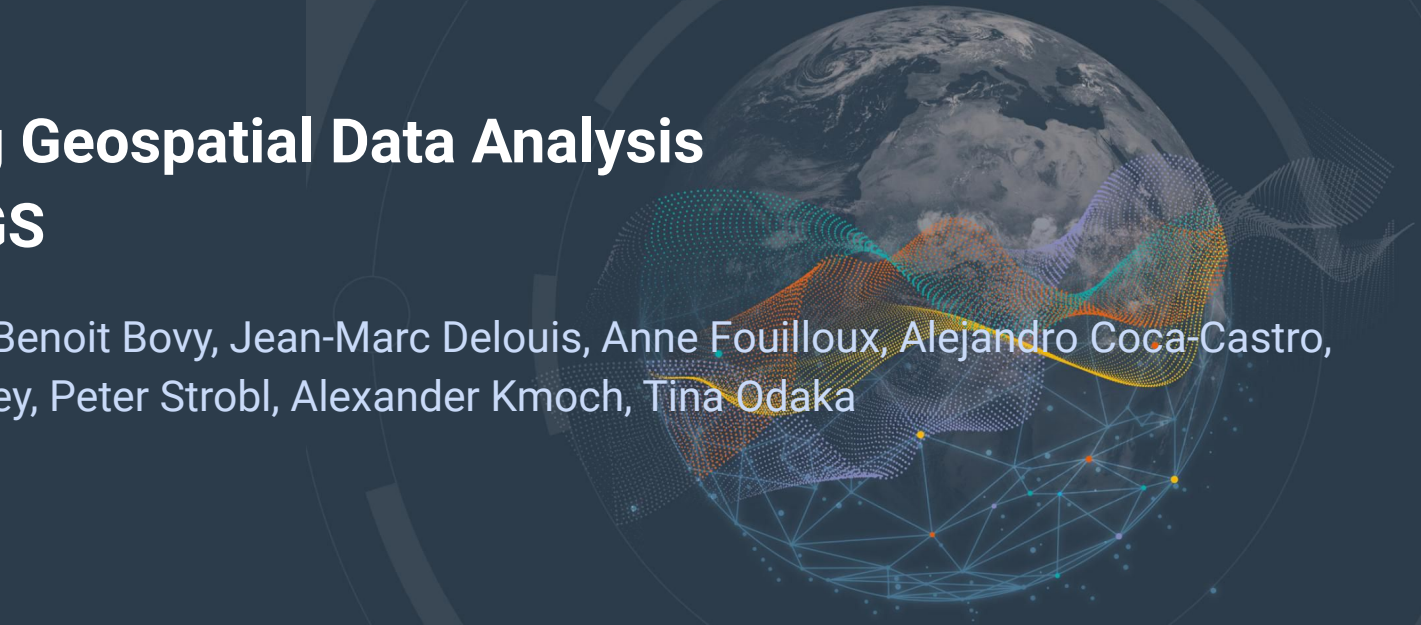
Third Destination Earth User eXchange
Darmstadt, Germany
15-16 October 2024

Advancing Geospatial Data Analysis with XDGGS

Justus Magin, Benoit Bovy, Jean-Marc Delouis, Anne Fouilloux, Alejandro Coca-Castro, Ryan Abernathey, Peter Strobl, Alexander Kmoch, Tina Odaka

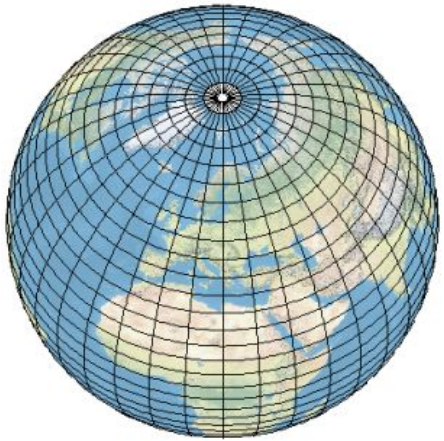


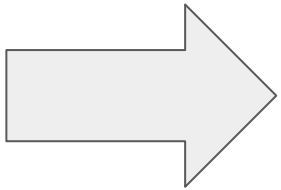
Funded by the European Union
Destination Earth
IMPLEMENTED BY EUMETSAT esa ECMWF

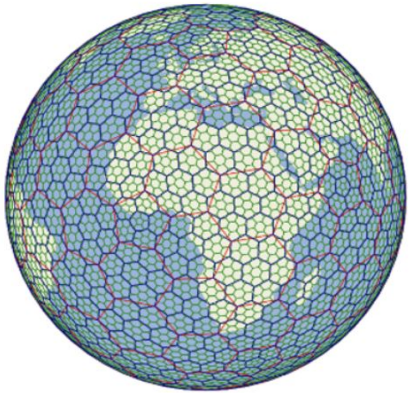
DGGS ?

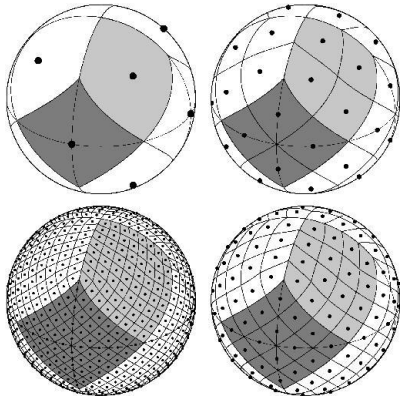
"A Discrete Global Grid System is a spatial reference system that uses a hierarchical tessellation of cells to partition and address the globe."

OGC Abstract Specification, 2017









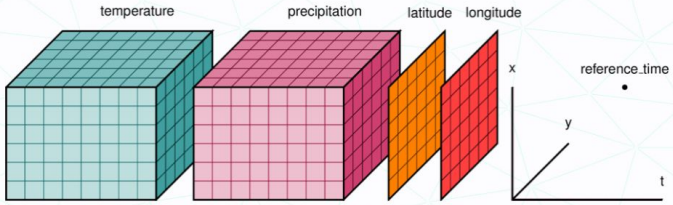
H3

Healpix

DestinE Climate Data (HealPIX)!!

Xarray

N-D labeled arrays and datasets in Python



Xarray is an open source project and Python package that introduces labels in the form of dimensions, coordinates, and attributes on top of raw NumPy-like arrays, which allows for more intuitive, more concise, and less error-prone user experience.

Xarray includes a large and growing library of domain-agnostic functions for advanced analytics and visualization with these data structures.

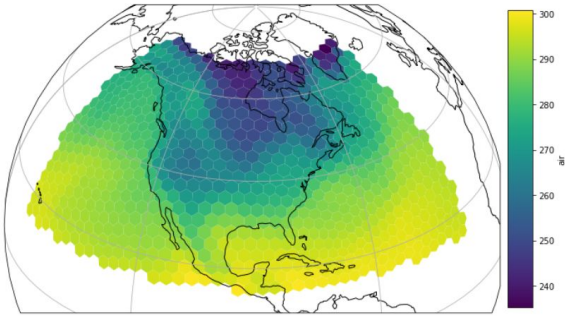
Get Started

Why Xarray?

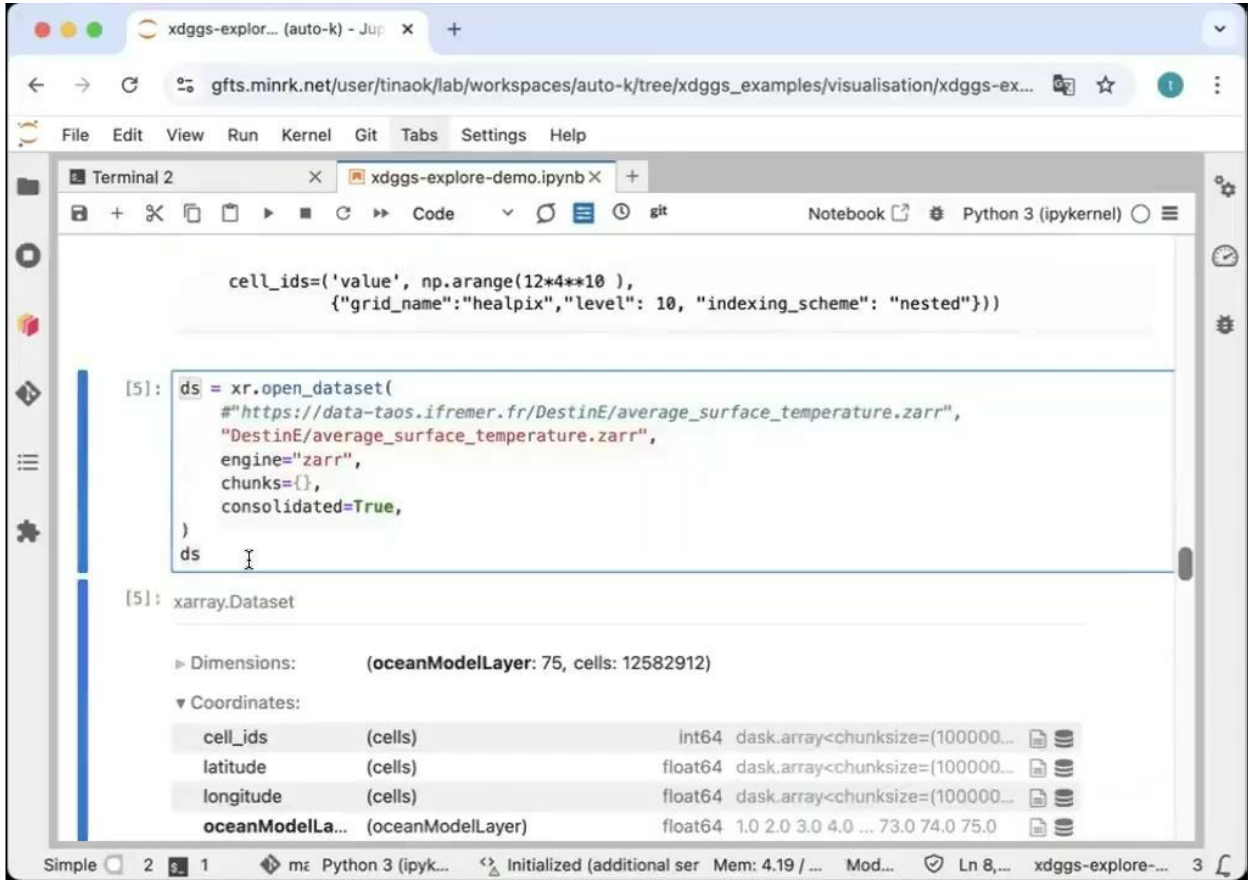
XDGGS

Xarray + DGGS

Result of our BIDS23 pangeo-osgeo sprint session



Kmoch, A., Bovy, B., Magin, J., Abernathey, R., Coca-Castro, A., Strobl, P., Fouilloux, A., Loos, D., Uuemaa, E., Chan, W. T., Delouis, J.-M., and Odaka, T.: XDGGS: A community-developed Xarray package to support planetary DGGS data cube computations, Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci., XLVIII-4/W12-2024, 75–80, https://doi.org/10.5194/isprs-archives-XLVIII-4-W12-2024-75-20


xdggs-explor... (auto-k) - Jup
gfts.minrk.net/user/tinaok/lab/workspaces/auto-k/tree/xdggs_examples/visualisation/xdggs-ex...
File Edit View Run Kernel Git Tabs Settings Help
Terminal 2
xdggs-explore-demo.ipynb
Code
Notebook
Python 3 (ipykernel)
cell_ids=('value', np.arange(12*4**10),
{"grid_name":"healpix","level": 10, "indexing_scheme": "nested"}))
[5]:
ds = xr.open_dataset(
#"https://data-taos.ifremer.fr/DestinE/average_surface_temperature.zarr",
"DestinE/average_surface_temperature.zarr",
engine="zarr",
chunks={},
consolidated=True,
)
ds
[5]:
xarray.Dataset
Dimensions:
(oceanModelLayer: 75, cells: 12582912)
Coordinates:
cell_ids (cells) int64 dask.array<chunksize=(100000...
latitude (cells) float64 dask.array<chunksize=(100000...
longitude (cells) float64 dask.array<chunksize=(100000...
oceanModelLa... (oceanModelLayer) float64 1.0 2.0 3.0 4.0 ... 73.0 74.0 75.0
Simple
Python 3 (ipyk...
Initialized (additional ser
Mem: 4.19 / ...
Mod...
Ln 8,...
xdggs-explore-...