










## A Tool to Explore cloud data

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Making public NetCDF/Zarr Data Accessible to Everyone



# NCZarr Viewer

-  **Load and explore** NetCDF and Zarr datasets
-  **Browse variables** and dimensions through a simple interface
-  **Subset data** by time, space, and other dimensions visually
-  **Visualize results** with interactive plots
-  **Access cloud data** directly from S3 buckets
-  **Work with large datasets** efficiently
-  **Containerized** for easy deployment and sharing



## Architecture Overview

 User Interface →  Dash App →  Data Engine

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 Web Browser  Python Core  Xarray

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 Interactive UI  Data Manager  NetCDF/Zarr



## Technology Stack

- **Frontend:** Dash + Bootstrap Components
- **Data Processing:** Xarray + NumPy
- **File Formats:** NetCDF4, Zarr
- **Visualization:** Plotly, Matplotlib, Cartopy
- **Cloud Access:** S3FS, FSSpec (cloud storage access)
- **Marine Data:** Copernicus Marine Toolbox integration



## Quick Start

```
# Option 1: Use Docker
docker run -p 8050:8050 samfooks/zarr-netcdf-viewer:latest

# Option 2: Local development (if you have Python)
git clone https://github.com/samuelfooks/nczarr-viewer
cd dash_nczarr-viewer
pip install -r requirements.txt
python run.py
```



**Access at:** <http://localhost:8050>

 **Tip:** Think of this as "R Shiny for NetCDF data" - but already built for you!



## Supported Data Sources

- **EDITO Integration:** ARCO datasets from the EDITO STAC
- **Personal Cloud Storage:** [Minio storage](#) on EDITO
- **Local Files:** NetCDF, Zarr



## Core Features

### Data Exploration

- **Variable Browser:** See all variables, dimensions, and metadata
- **Dimension Handling:** Time, depth, latitude, longitude
- **Data Subsetting:** Interactive selection of regions and time periods

### Visualization

- **Interactive Maps:** Cartopy-based geographic plots
- **Time Series:** Plotly charts for temporal data
- **Statistical Analysis:** Basic stats, and summaries



# Marine Data Examples

## EDITO Integration

- **Biodiversity:** Species distribution data
- **Chemistry:** Water quality parameters
- **Geology:** Seafloor characteristics
- **STAC Access:** Browse collections and datasets

## Copernicus Marine

- **Direct Access:** CMEMS credentials integration (you will need an account)
- **Multiple Formats:** NetCDF, Zarr (and others in future)
- **Real-time Data:** Latest ocean observations





## Performance Features

- **Chunked Processing:** Handle datasets larger than memory
- **Lazy Loading:** Only load data when needed
- **Cloud Optimization:** Efficient S3 data access



# Configuration & Deployment

## Setup

To access CMEMS datasets you may need an account using [Copernicus Marine Toolbox](#)

```
# CMEMS credentials
CMEMS_USERNAME=your_username
CMEMS_PASSWORD=your_password
```

## Docker Deployment

```
docker build -t nczarr-viewer .
docker run -p 8050:8050 nczarr-viewer
```

## Live Demo Time!

Loading a NetCDF from your Minio bucket on EDITO



## Live Demo Time!

Explore CMEMs data using a link to a zarr file, obtained from MyOceanViewer



## Live Demo Time!

Explore data on your local PC you downloaded(boring)



## Future Developments

- **More Interactive Visualization:** More interactive global maps and plots
- **Advanced Analytics:** Statistical modeling tools/plugins
- **New ARCO Data types:** Parquet, Geoparquet
- **Collaboration:** Multi-user editing and sharing



 **Thank You!**

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**GitHub:** <https://github.com/EDITO-Infra/nczarr-viewer>

**Docker Hub:** [samfooks/zarr-netcdf-viewer](https://hub.docker.com/r/samfooks/zarr-netcdf-viewer)

**Questions?**

