EDITO

European Digital Twin Ocean

NCZarr Viewer

Exploring and Subsetting Zarr & NetCDF Data

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NCZarr Viewer

- 📊 **Load and explore** Analysis Ready Cloud Optimized(ARCO) 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
- 🐋 **Containerized** for easy deployment and sharing
- In EDITO Datalab!

🛠️ Technology Stack

- **Frontend**: Dash + Bootstrap Components
- **Data Processing**: Xarray + NumPy
- **File Formats**: NetCDF4, Zarr
- **Visualization**: Plotly, Matplotlib, Cartopy

🚀 Quick Start

On EDITO

DOCKER

```
docker run -p 8050:8050 samfooks/nczarr-viewer:latest
```

LOCAL DEV

```
git clone https://github.com/EDITO-Infra/nczarr-viewer
cd 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

- **ARCO data on EDITO**: Analysis Ready Cloud Optimized 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 STAC

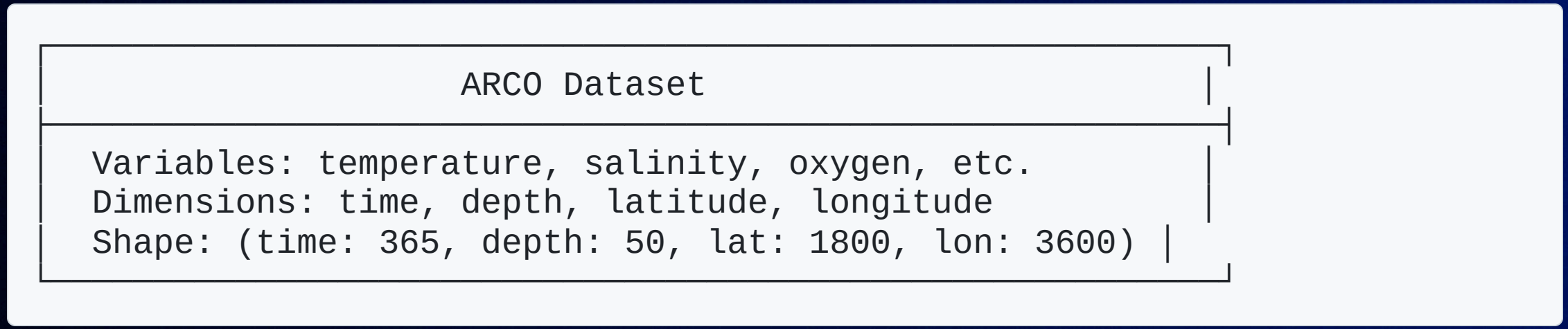
- **Chemistry**: Water quality parameters
- **Geology**: Seafloor characteristics
- **Biodiversity**: Species distribution data

Copernicus Marine

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

🔍 Subsetting ARCO Data: Core Concepts

Multidimensional Data Structure



Subsetting Operations

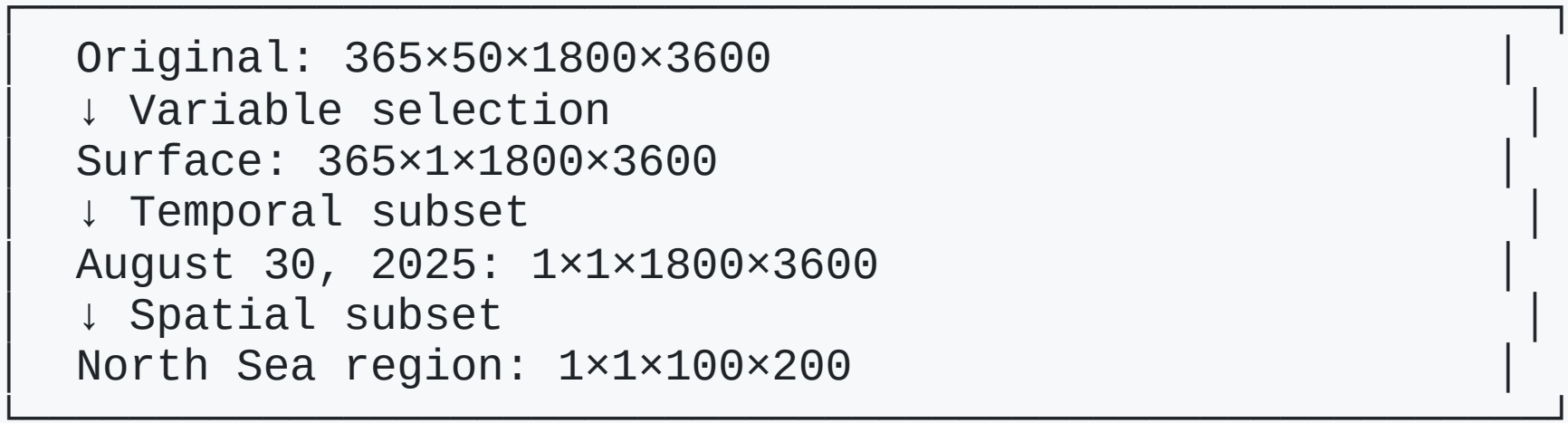
- **Variable**: Pick specific parameters
- **Temporal**: Select specific dates
- **Spatial**: Choose latitude/longitude boundaries

🎯 Subsetting in Practice

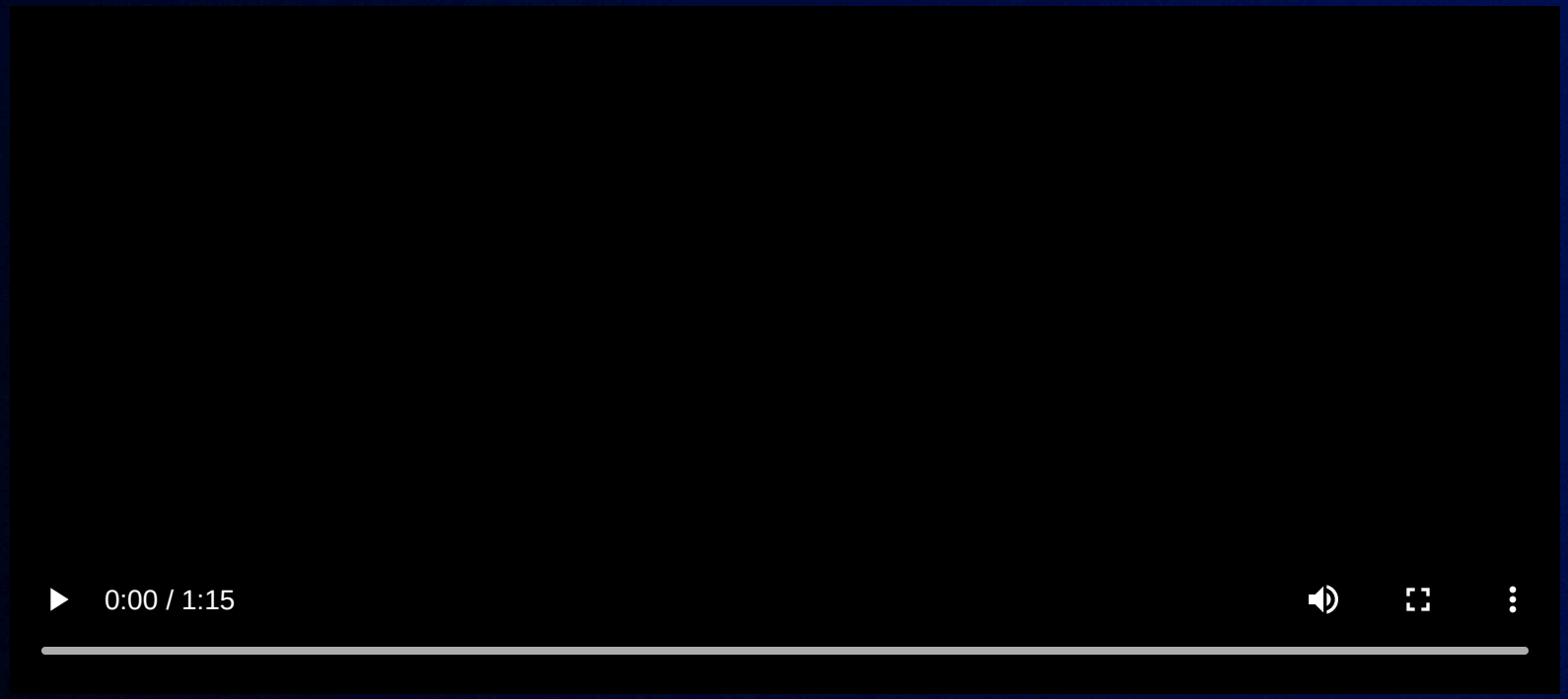
Example: Extract Surface Temperature for North Sea

```
import xarray as xr

# Load ARCO dataset
ds = xr.open_zarr("s3://arco-data/ocean-temp.zarr")

# Variable: surface temperature
temp_surface = ds['temperature'].sel(depth=0)

# Temporal: August 30
august30_data = temp_surface.sel(
    time='2025-08-30'
)
# Spatial bounds: North Sea region
north_sea = august30_data.sel(
    latitude=slice(51.0, 61.0),    # 51°N to 61°N
    longitude=slice(-5.0, 15.0)    # 5°W to 15°E
```

Visual Representation

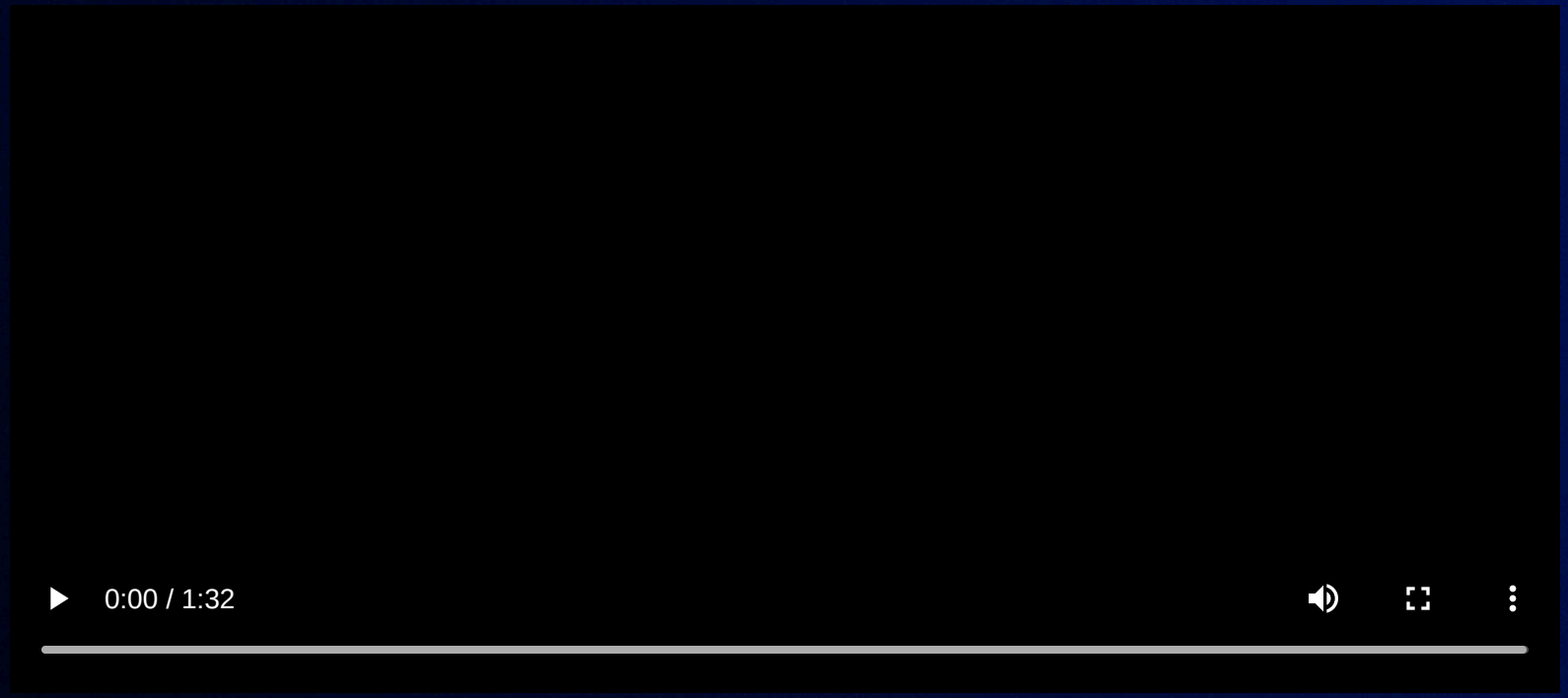


Use the NCZarr Viewer locally or on EDITO



Video link

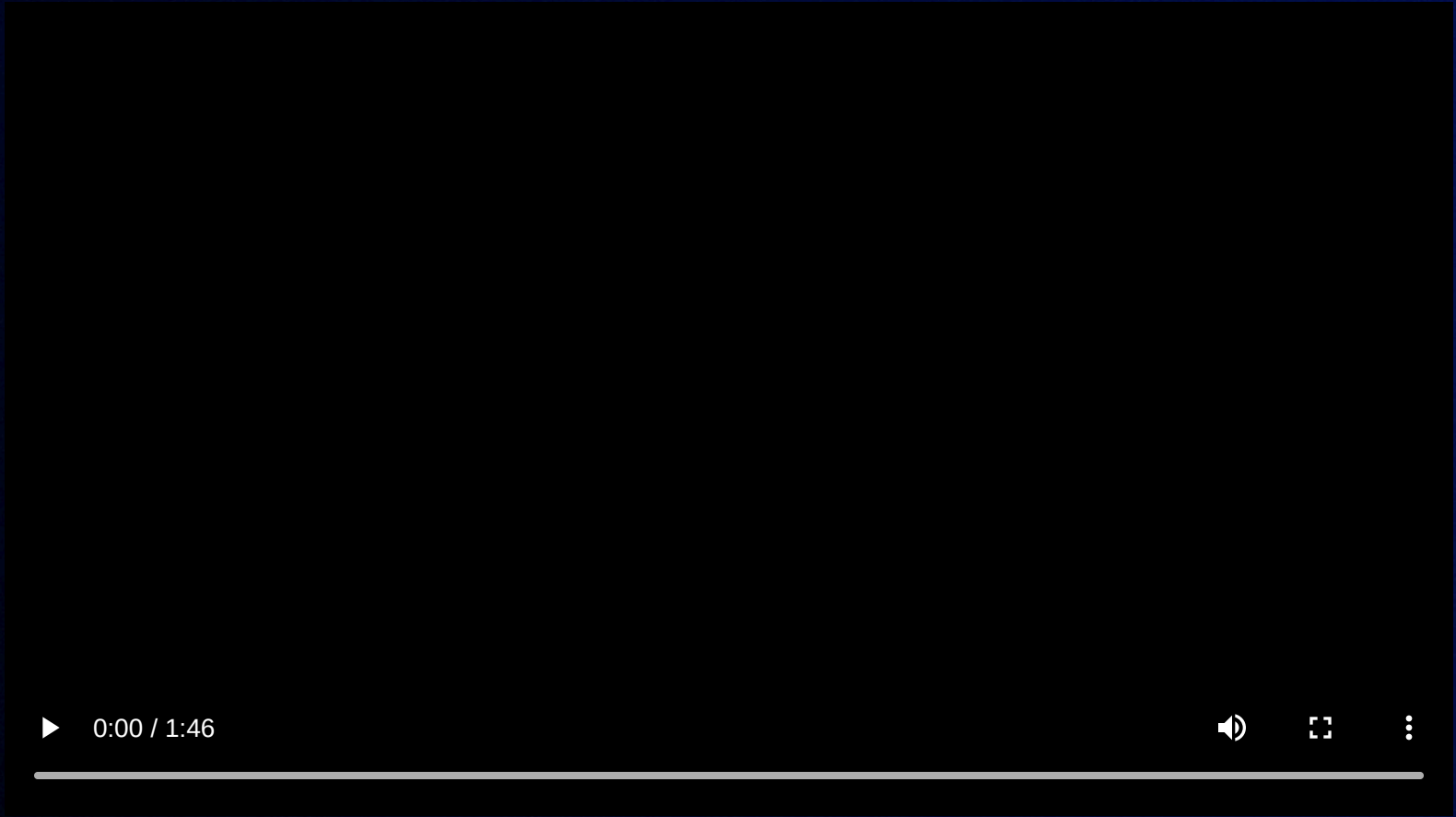
Explore a NetCDF from your Minio bucket on EDITO



Video link

Live Demo Time!

Explore CMEMs dataset using zarr link from EDITO STAC



Video link

🔮 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

DOC Pages https://edito-infra.github.io/nczarr-viewer

Docker Hub: samfooks/nczarr-viewer:latest

Questions?