Decoding the climate

A guide for journalists to understand climate data

Aral Sea, 2019 - Copernicus ESA

if only I knew …

Where can i find the data?

Weather, climate, but what is **‘anomaly’**?

Why do I always encounter the ‘**ERA5**’ acronym?

Total precipitation, Standardized precipitation, Standardized precipitation evapotranspiration…and now what do I choose?

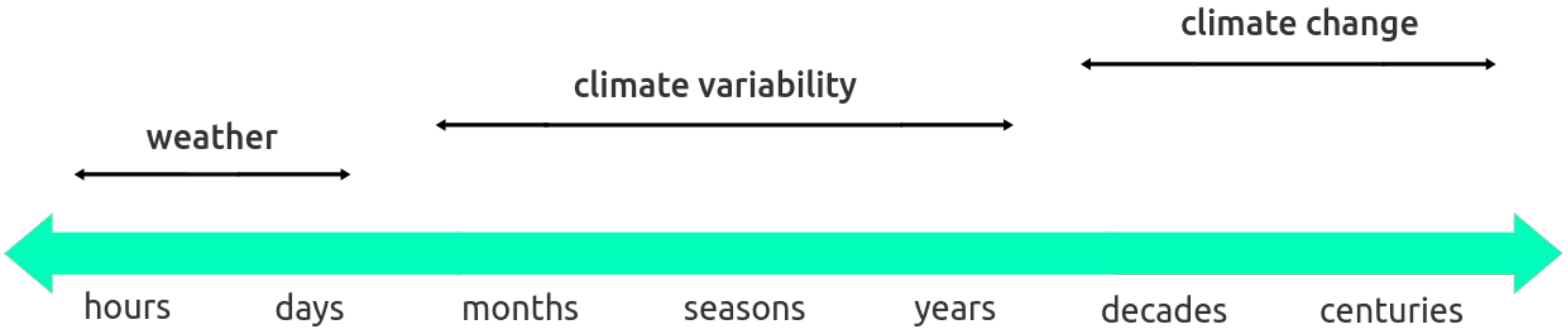
What are **.nc** files and how can I read them?

Is **reanalysis** a kind of analysis?

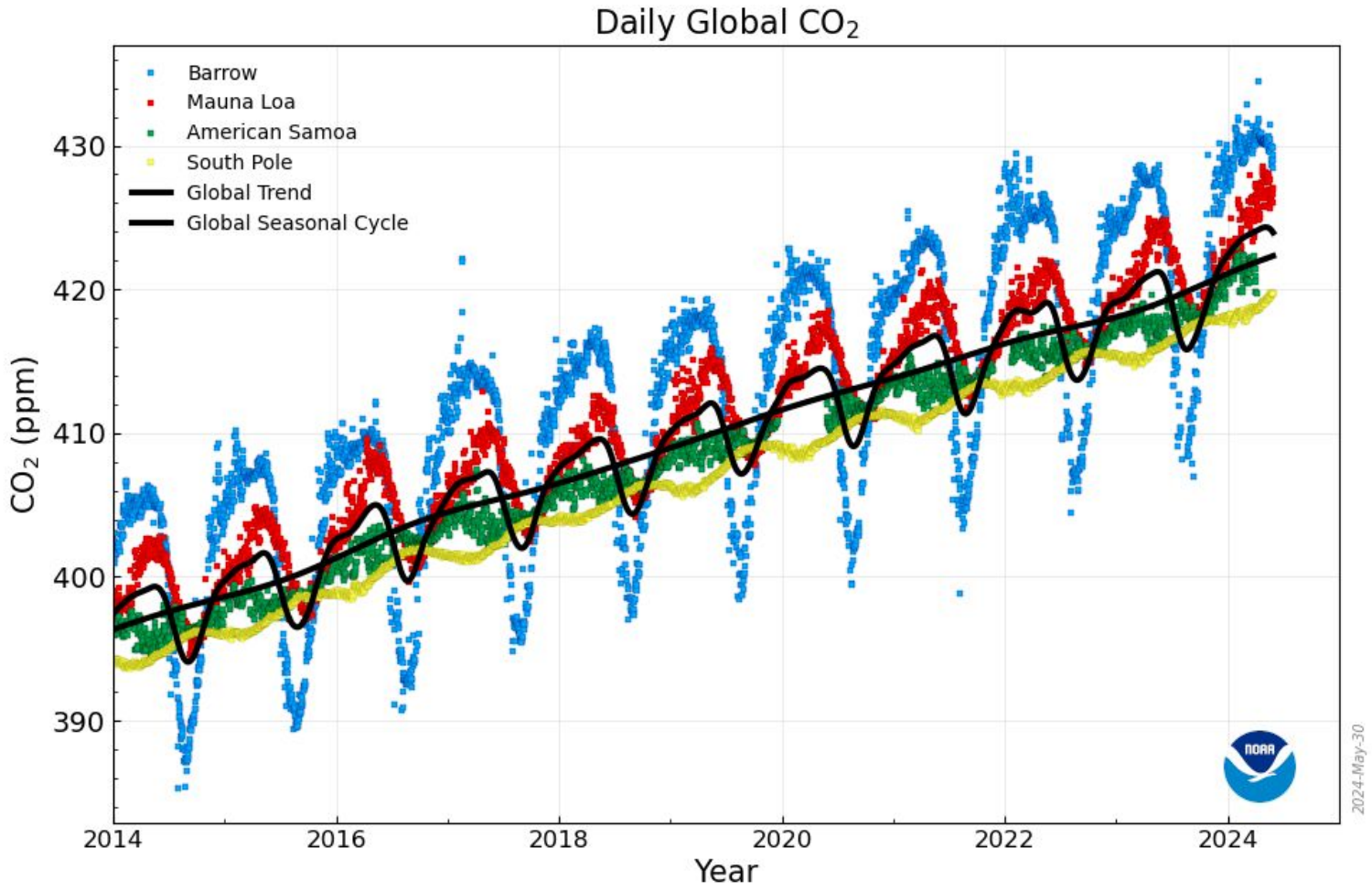
What we will do today

- Climate toolkit for beginners
- Let’s get hands-on

Weather, climate, but what is ‘anomaly’?



Trend *vs* variation



NOAA Global Monitoring Laboratory

Tp, SPI, SPEI…and now what do I choose?

Climate variables

Atmosphere

Surface

- Precipitation
- Pressure
- Radiation budget
- Temperature
- Water vapour
- Wind speed and direction

Upper-air

- Earth radiation budget
- Lightning
- Temperature
- Water vapor
- Wind speed and direction
- Clouds

Atmospheric Composition

- Aerosols
- Carbon dioxide, methane and other greenhouse gases
- Ozone
- Precursors for aerosols and ozone

Land

Hydrosphere

- Groundwater
- Lakes
- River discharge
- Terrestrial water storage

Cryosphere

- Glaciers
- Ice sheets and ice shelves
- Permafrost
- Snow

Biosphere

- Above-ground biomass
- Albedo
- Evaporation from land
- Fire
- Fraction of absorbed photosynthetically active radiation (FAPAR)
- Land cover
- Land surface temperature
- Leaf area index
- Soil carbon
- Soil moisture

Anthroposphere

- Anthropogenic Greenhouse gas fluxes
- Anthropogenic water use

Ocean

Physical

- Ocean surface heat flux
- Sea ice
- Sea level
- Sea state
- Sea surface currents
- Sea surface salinity
- Sea surface stress
- Sea surface temperature
- Subsurface currents
- Subsurface salinity
- Subsurface temperature

Biogeochemical

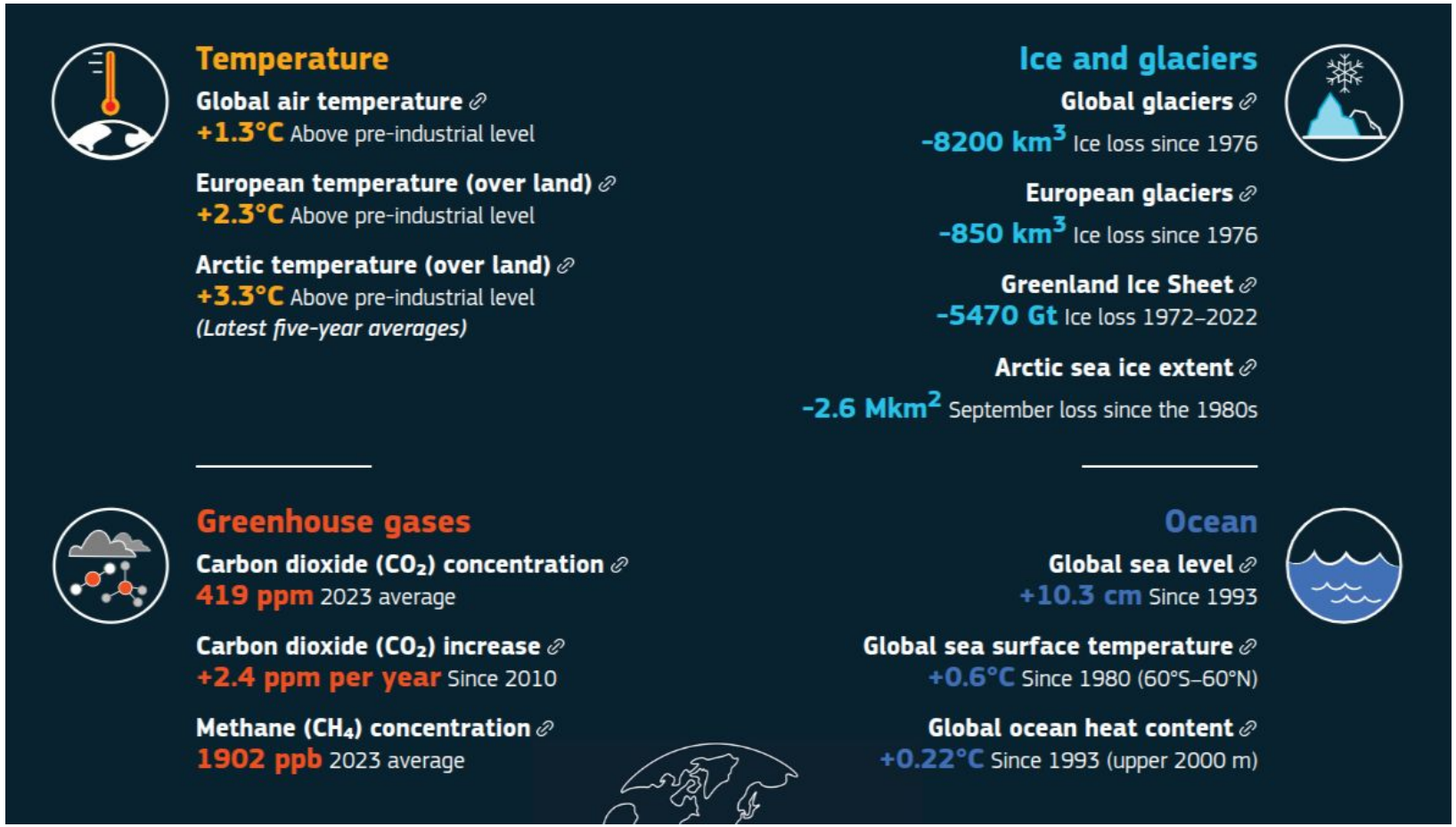
- Inorganic carbon
- Nitrous oxide
- Nutrients
- Ocean colour
- Oxygen
- Transient tracers

Biological/ecosystems

- Marine habitats
- Plankton

Global Climate Observing System (GCOS) website

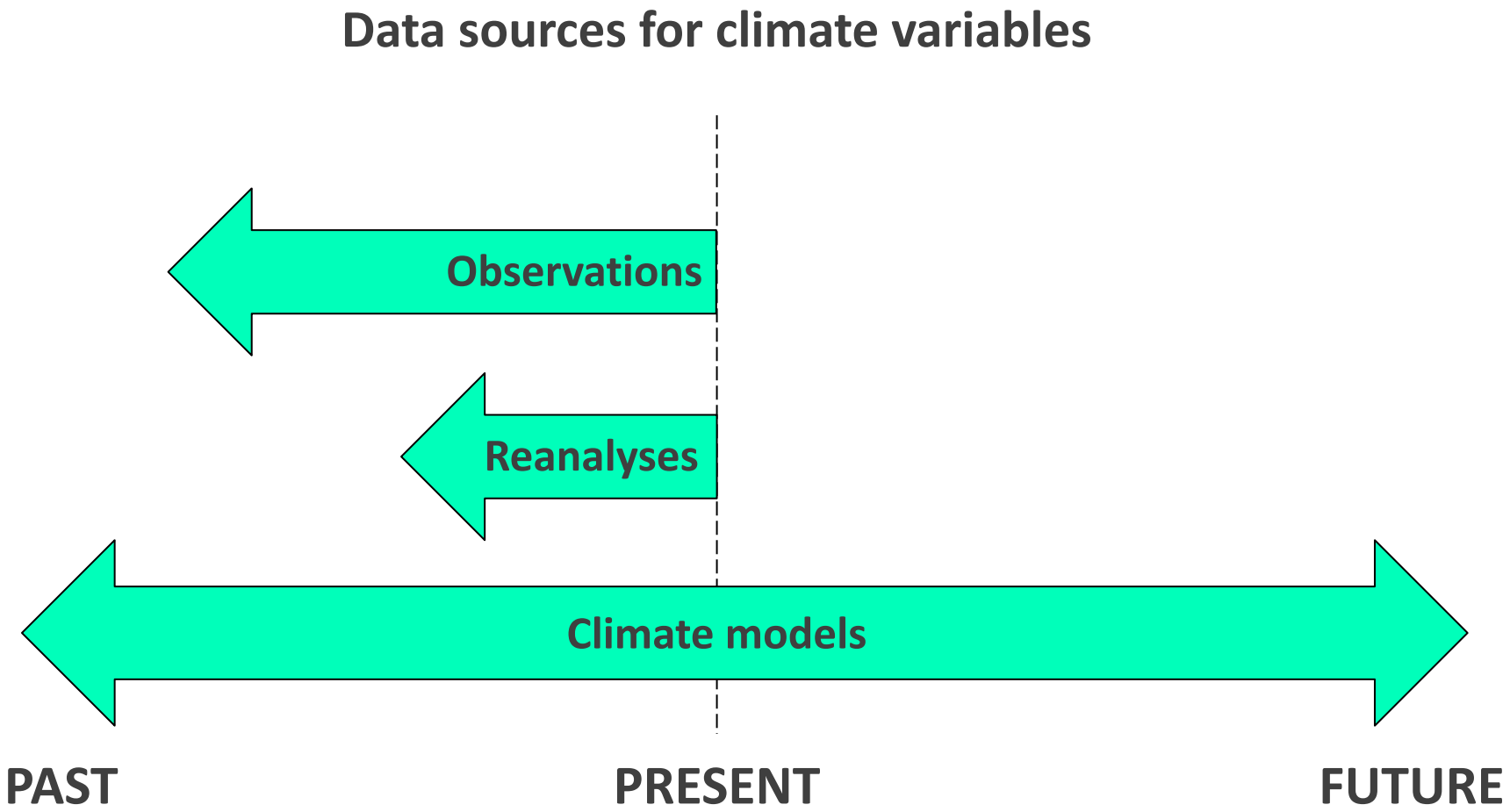
Tp, SPI, SPEI…and now what do I choose?



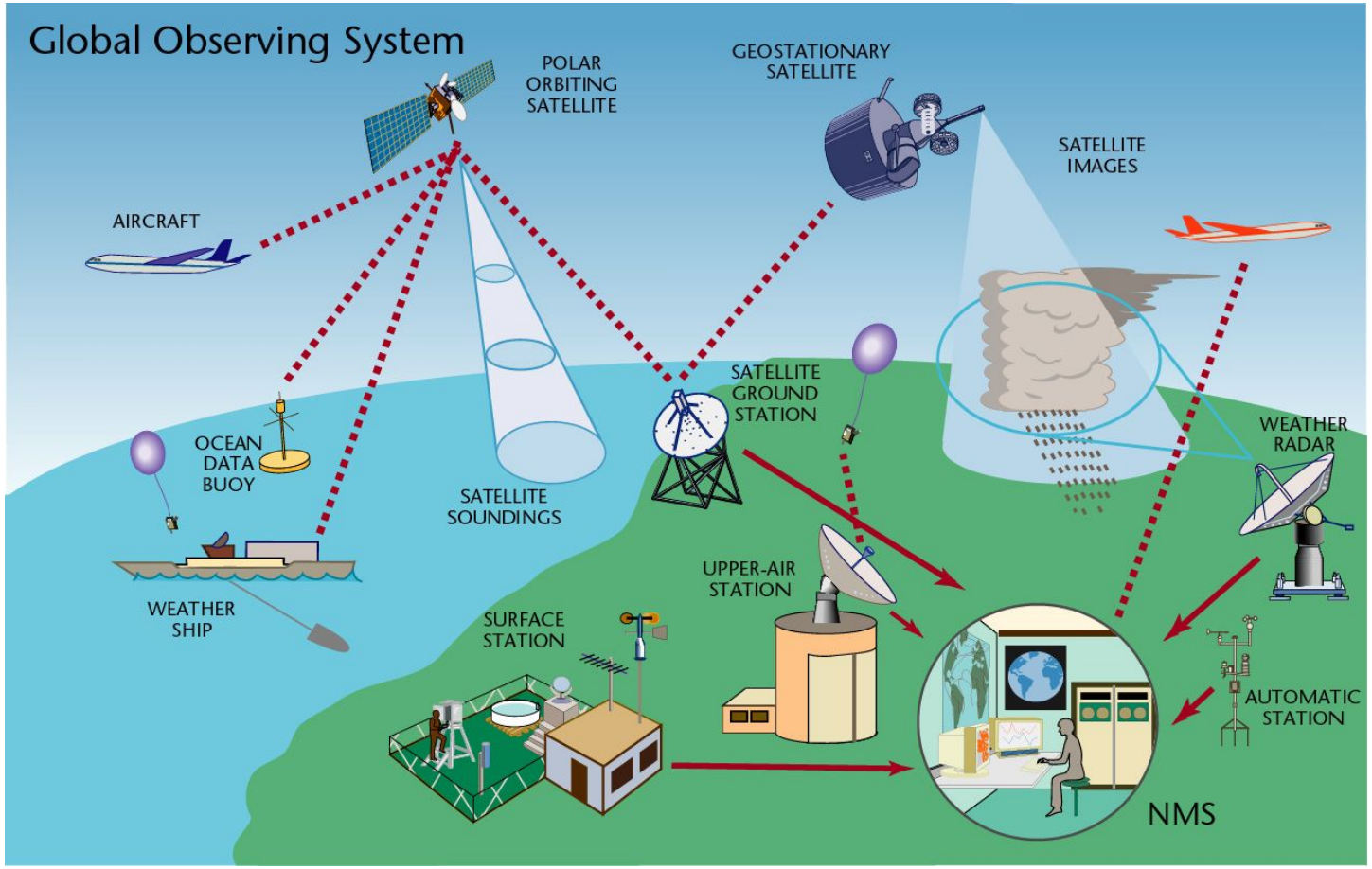
Climate indicators

Copernicus website

Is reanalysis a kind of analysis?



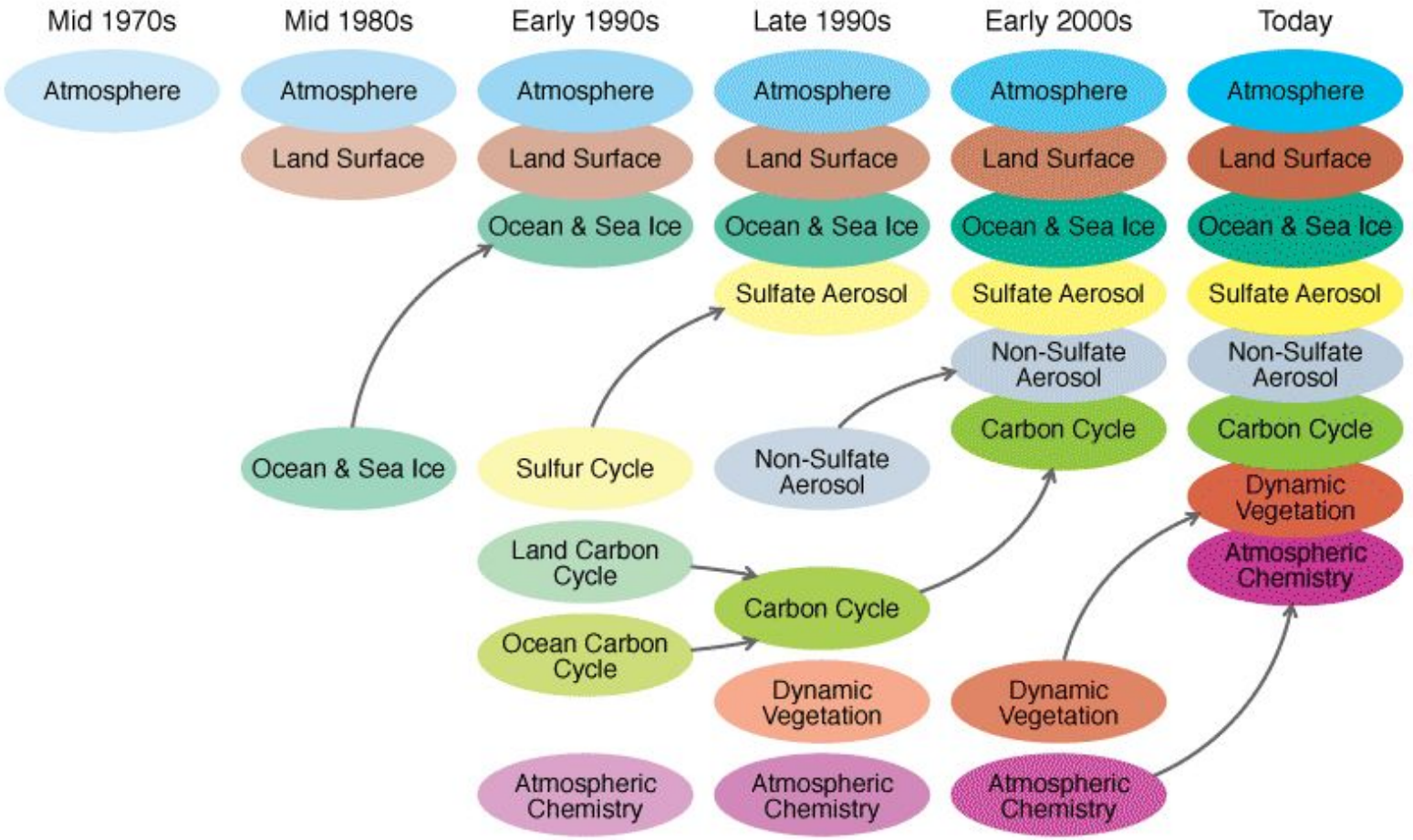
(Direct) Observations



WMO - Observation components of the Global Observing System

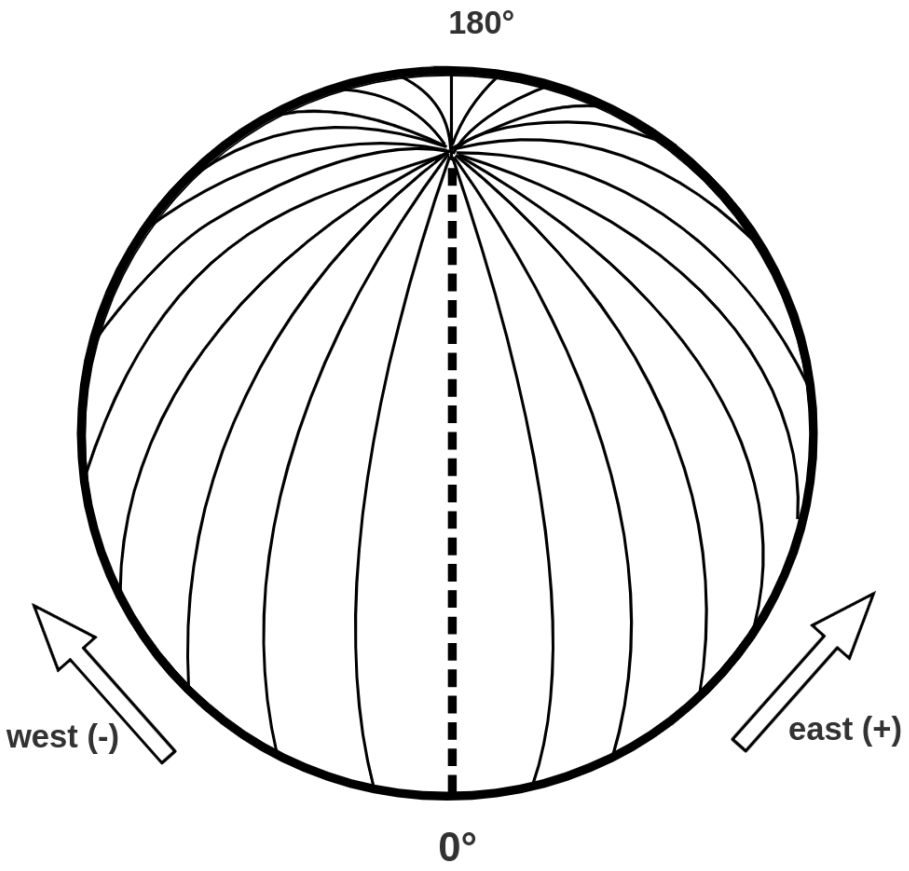
Climate models

The development of climate models (NASA)

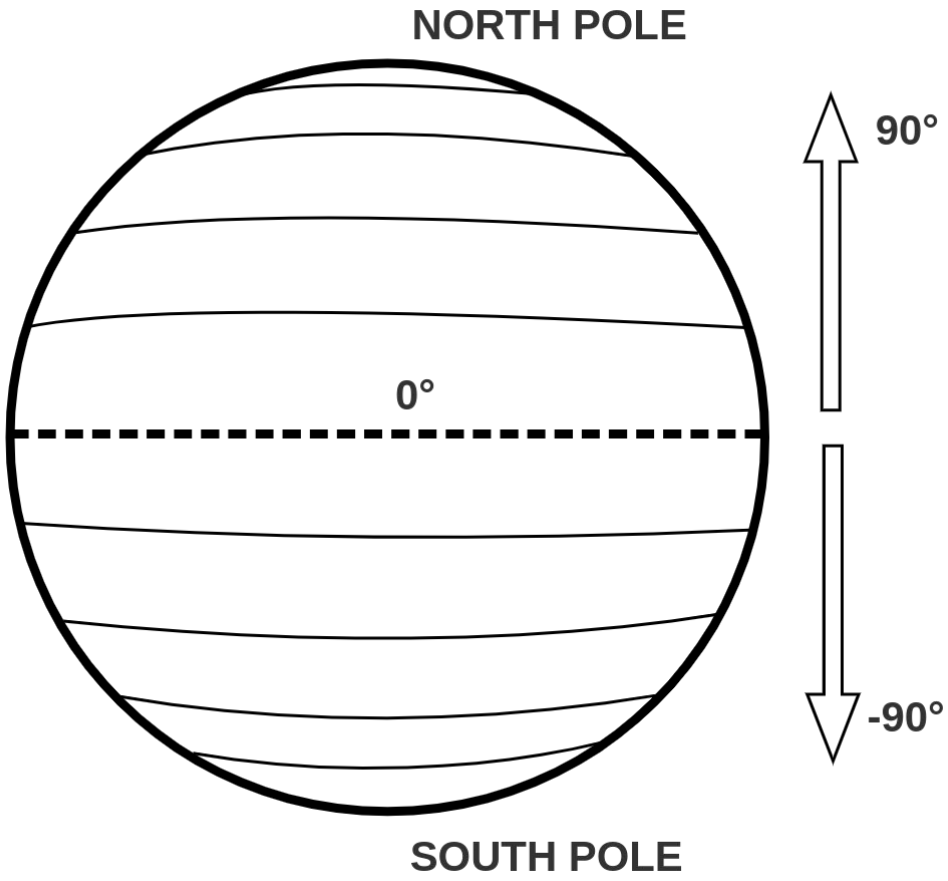


Back to school (The Earth's coordinate system)

Meridians and longitude



Parallels and latitude



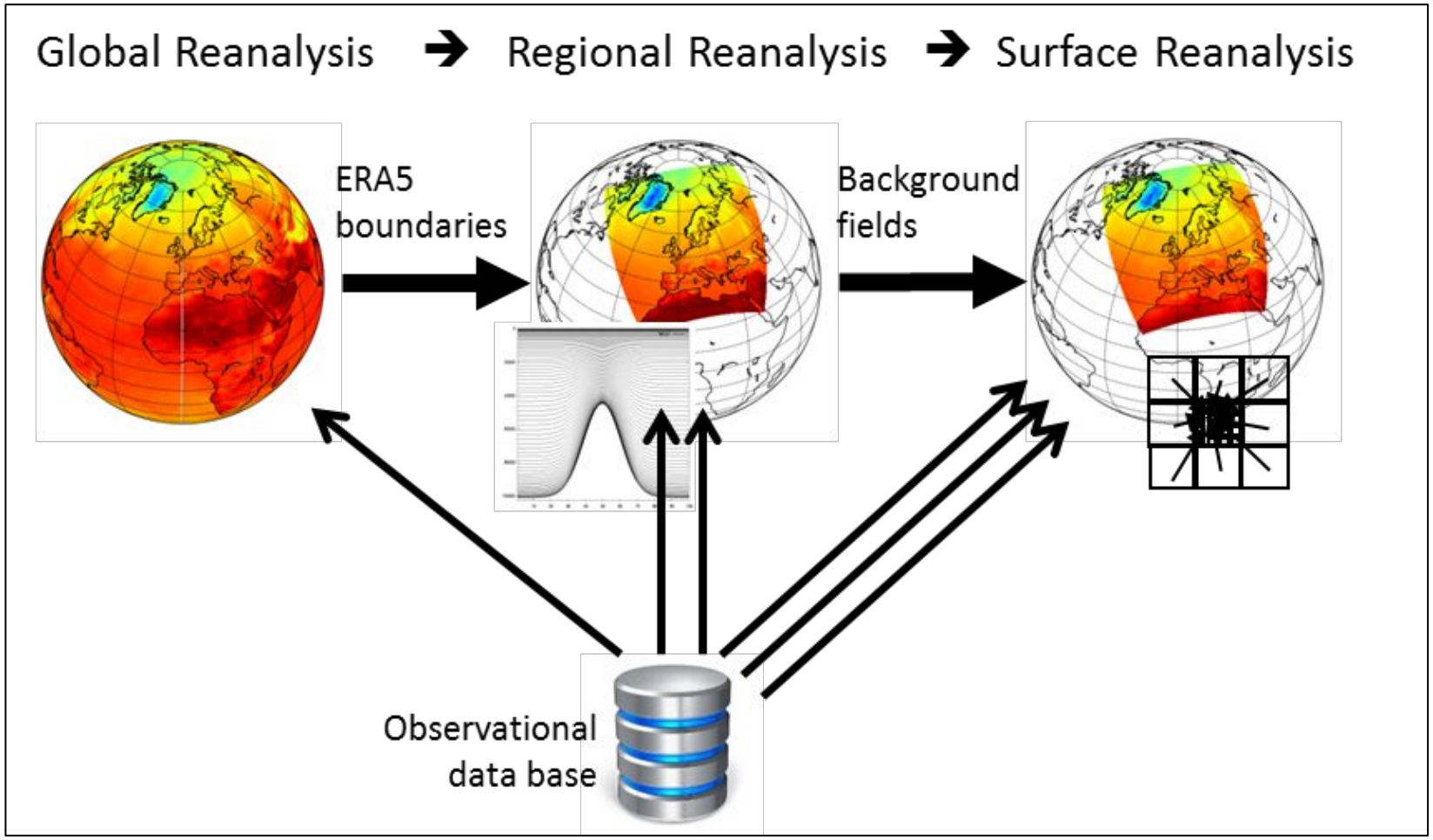
Climate models

History of climate modeling (figure 2)

Resolution of climate models

A national strategy for advancing climate modeling (page 64)

Why do I always encounter the ‘ERA5’ acronym?

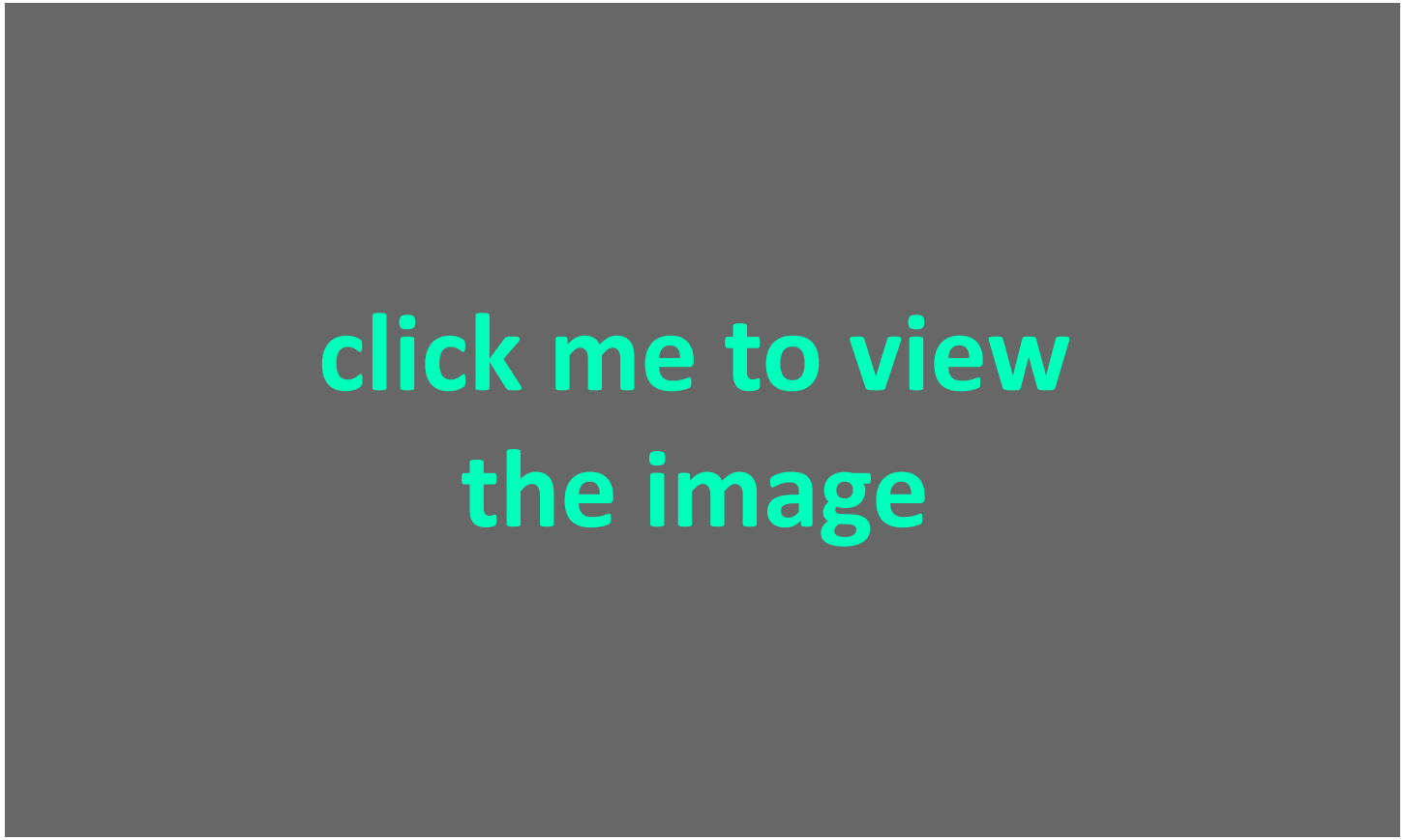


Copernicus Climate Change Service

Uncertainties

- Natural variability
- Measuring errors
- Inhomogeneities
- Uncertainties in statistics due to limited data
- Biases of the models
- Imperfect knowledge about the development of the climate system
- Imperfect knowledge about the socio-economic future

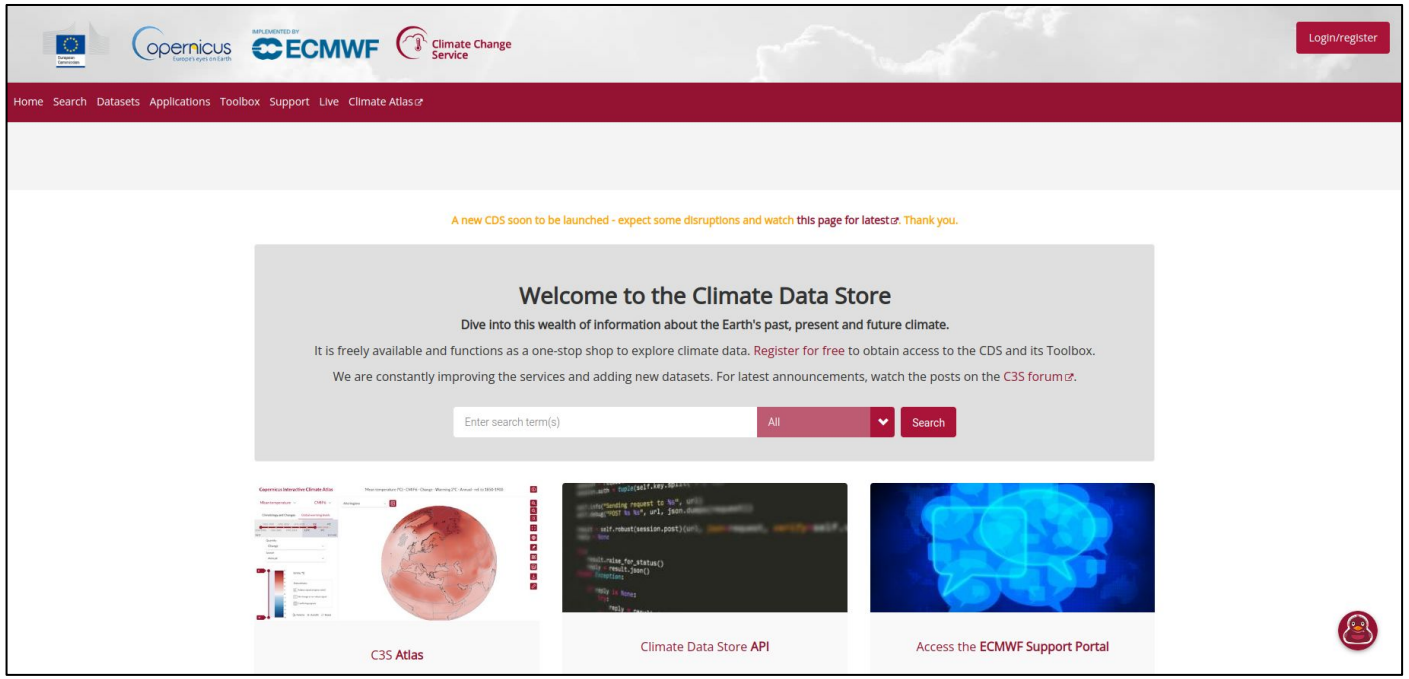
What are .nc files and how can I read them?



netCDF overview

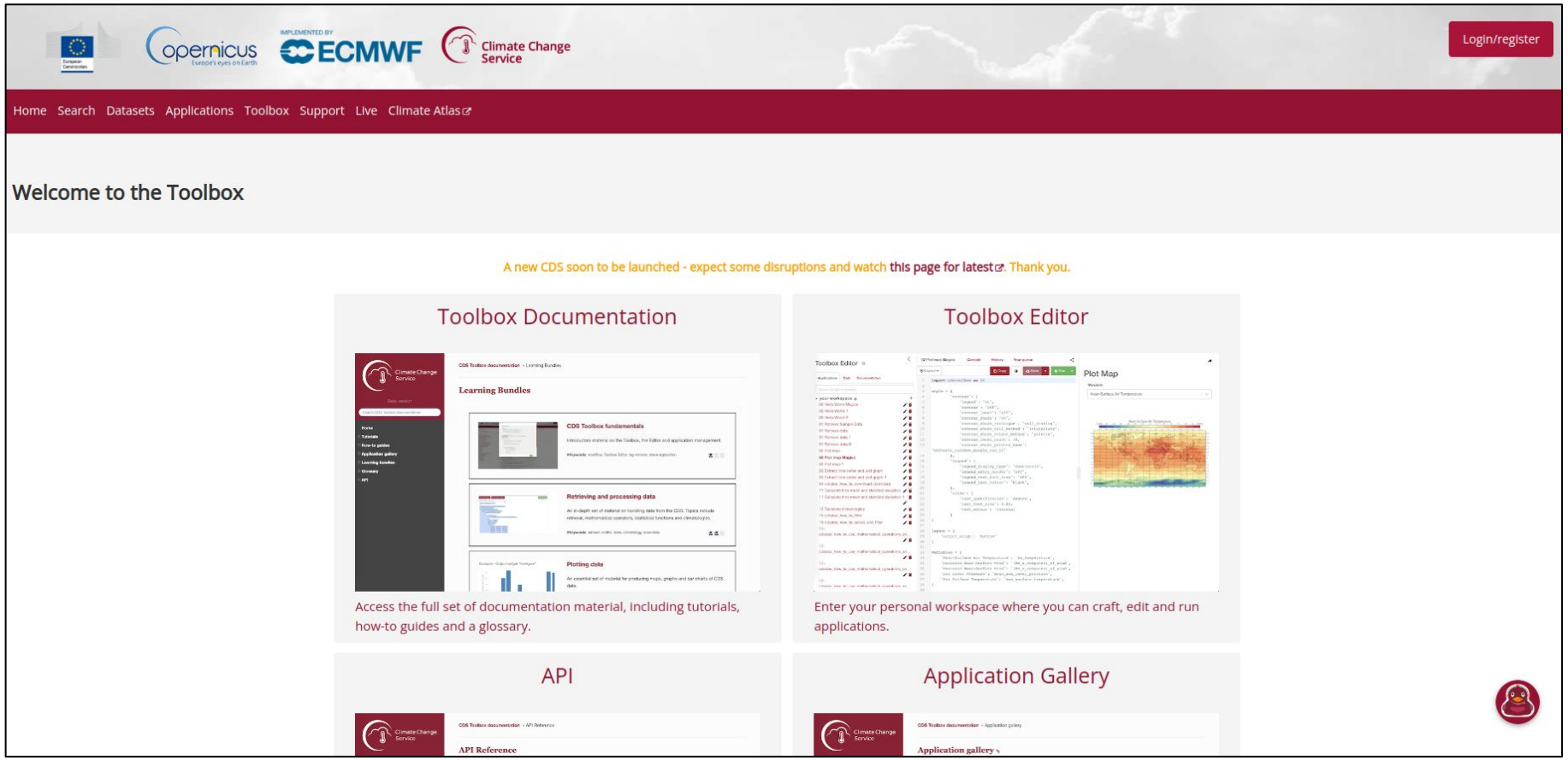
Where can i find the data?

Copernicus Data Store



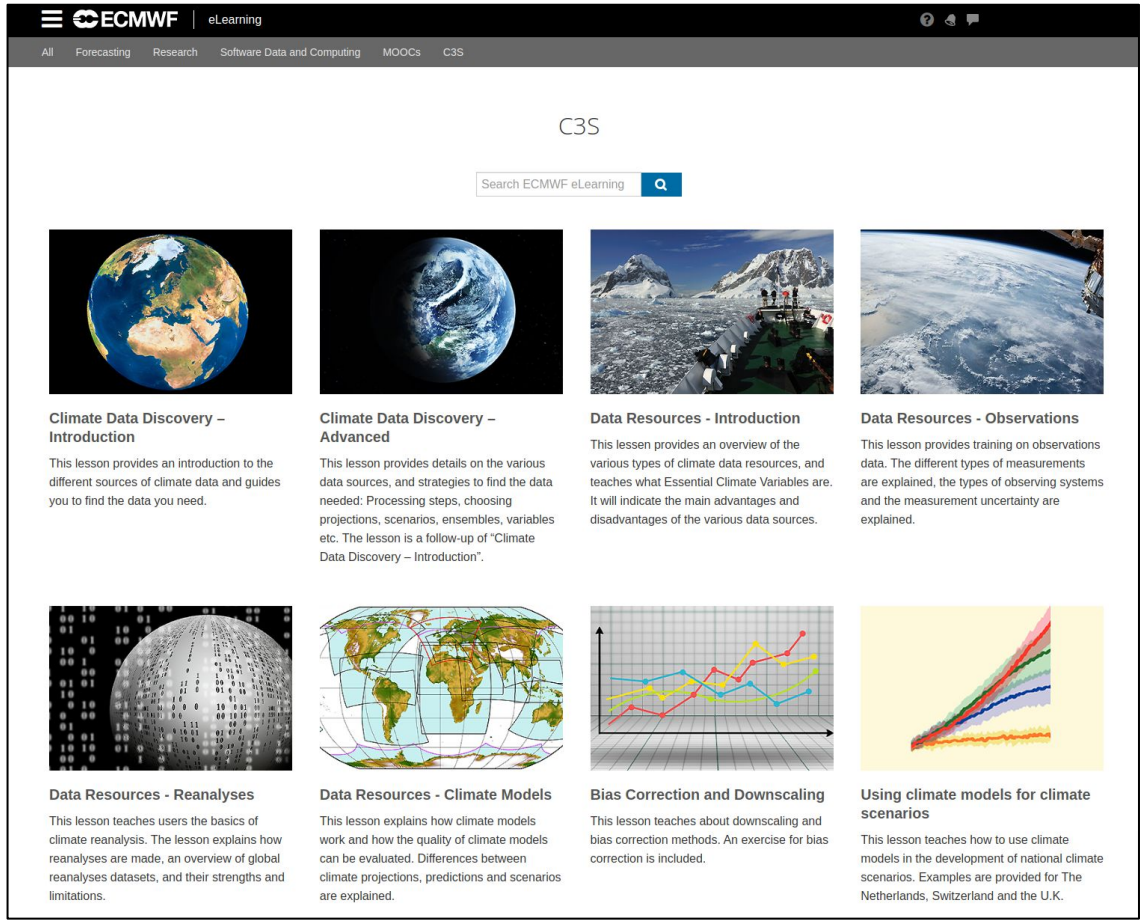
https://cds.climate.copernicus.eu/

Climate Data Store Toolbox



https://cds.climate.copernicus.eu/cdsapp#!/toolbox

Find out more



ECMWF moocs

- Climate Data Discovery – Introduction
- Climate Data Discovery – Advanced
- Data Resources - Introduction
- Data Resources - Observations
- Data Resources - Reanalyses
- Data Resources - Climate Models
- Bias correction and Downscaling

image by gstudioimagen/vecteezy