What we did in class today:

Installed the API: https://cds.climate.copernicus.eu/api-how-to

Downloaded T2m data from here: https://cds.climate.copernicus.eu/

view file header: ncdump -h file.nc

view all data (not recommended, try it and see!!!): ncdump file.nc

point and click view of the data: ncview file.nc

installing cdo
LINUX: sudo apt-get install cdo
MAC: brew install cdo

cut out region: cdo sellonlatbox,lon1,lon2,lat1,lat2 in.nc out.nc

area average: cdo fldmean in.nc out.nc
[also var, std]

time average: cdo timmean in.nc out.nc
[also var, std]

subtract (add/mul/div) : cdo sub file1.nc file2.nc out.nc
[also add/mul/div]

NOTE: if compression causes issue convert to 32 (or 64) bit float with
cdo -b F32
NOTE: cdo detects that the second file is smaller in the time dimension and broadcasts the data.

Piping (just started to show – use the hyphen and start from right thus:

```
cdo timmean data.nc timemean.nc
cdo -b F32 sub data.nc timemean.nc anomaly.nc
```

can also be written on one line like this:

```
cdo -b F32 sub data.nc -timmean data.nc anomaly.nc
```

Homework:

1. download SST monthly averaged from 1979 to 2020
2. research online to find out which region is used for the Nino3.4 ENSO index
3. calculate the mean anomaly in this box to calculate your own ENSO index!

Advanced Users:

- Detrend the SST before calculating the anomaly (not always clear if all indices do this)
- Calculate the sometimes referred to as the **Dipole Mode Index**, or DMI for the Indian Ocean.