**Replication for Climate Data for Côte d'Ivoire**

1. Visit ERA5 (link: <https://cds.climate.copernicus.eu/cdsapp#!/dataset/reanalysis-era5-single-levels-monthly-means?tab=form>) and check the boxes accordingly:
   * **Product Type:** Monthly averaged reanalysis
   * **Popular:** 2m temperature & Total Precipitation
     + This will automatically check the 2m temperature and total precipitation variables under **temperature and pressure** and **precipitation and rain** categories
   * **Year:** 1997~2021
   * **Month:** January ~ December
   * **Time:** It will be set to 00:00 as default
   * **Geographical Area (sub-region extraction):**
     + North = 10.7
     + West = -9
     + East = -2.4
     + South = 4.4
   * **Format:** NetCDF
   * **Click Submit Form**

**Once you click “Submit Form”, you will be redirected to Your request section (as shown in the photo below). It takes 2 to 5 minutes on average for your request to be approved. You will see the green download button after the approval. (Notes: you will have to register your account at ERA to be able to download the data)**

Graphical user interface, application

Description automatically generated

1. Afterwards, you can refer to the Rmarkdown script. I accomplish the following in the script:
   * 1. Extract the temperature and precipitation variables from the dataset into a tidy dataframe and transform it into a point geometric object
   * 2. Import the multipolygon shapefile for administrative regions of interests using the raster package
   * 3. Conduct spatial join for two datasets – the multipolygon shapefile recognizes the administrative boundaries and hence the point geometric object can be sorted in accordance with the specified boundaries using the **st\_join** function from the **sf package in R.** This is a crucial step that does the **spatial aggregation**
   * 4. Afterwards, everything is sorted in your administrative region. Get your desired statistics such as mean and median by grouping by administrative region and/or time to conduct your own analysis.