

Physics Hackathon

3 August 2023

Institute of Physics, London, UK and Online



Worksheet: advanced level

The data files we are using in the Hackathon are climate (temperature and bio-system related phytoplankton). These are Sea surface temperature and Ocean Plankton (recorded as CHL-a pigment intensity) arranged as two separate CSV files (which is the most generic format). They are also available here as an XLS file for those who have Microsoft office. Please obtain these from the link on the event page.

The data covers seven regions:

- 1: North Atlantic Gulf Stream
- 2: Arctic sea (north of Iceland)
- 3: South Atlantic Gyre
- 4: Antarctic sea (Atlantic sector)
- 5: North Pacific Gyre
- 6: Eastern Equatorial Pacific
- 7: South Pacific Gyre

Data sources: HadiSST data (monthly 1900 onwards), and Ocean Colour Climate Change Initiative (OCCI, monthly 1998 onwards). Note for regions 2 and 4 the wintertime series data for Plankton is omitted due to polar winter (and no sunlight).

Building on the entry level worksheet:

1. Read in the data (load the *.csv files into google sheets)
2. Do some basic exploration via charting:
 - a. Plot a time series of Temperature from one of the regions (you choose the region)
 - b. Obtain a histogram chart the data also
 - c. Do the same for the Ocean plankton
 - d. Think how to accommodate for the seasonal signal and obtain the climate anomaly (data – seasonal characteristic).
 - e. Explore the interaction between Temperature and Plankton for one area.
 - f. Explore the potential interaction between two different areas / discuss how to do this and what coding would be required.
3. Discuss your exploration findings in groups of 2 to 4.
4. Have a go at finding an interesting feature of the data: we will discuss this in the overall session also.