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Assignment P2

Plotting oceanographic data and timeseries

Part 1

Two-panel plot showing temperature and salinity profiles from the data that was collected with a CTD on the the 29th of November 2008 at 6:52.

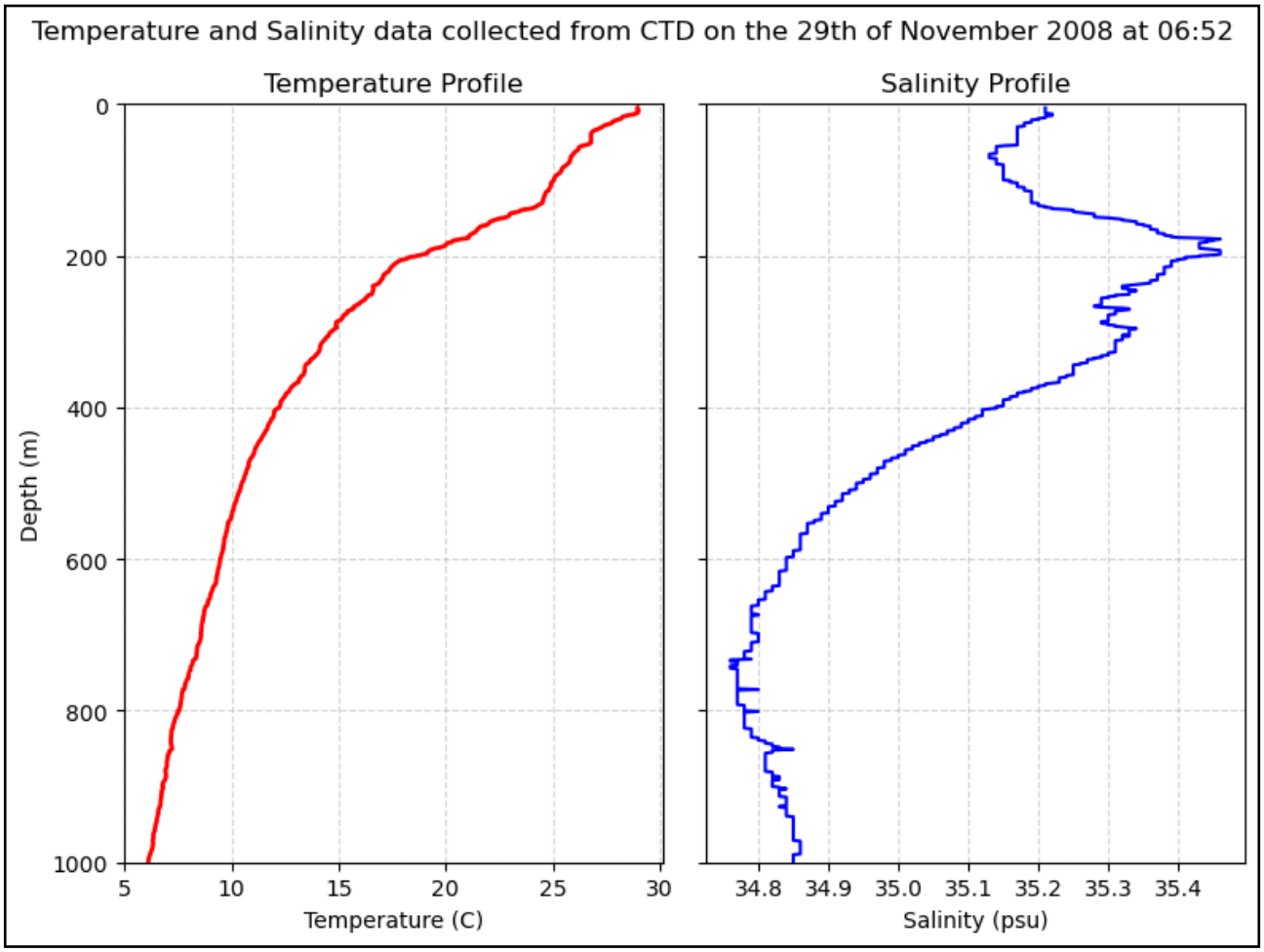

Figure 1. The CTD (Conductivity-Temperature-Depth) profile two-panel plot shows temperature (C) and salinity (psu) changes with depth from a CTD cast taken on November 29, 2008, at 06:52. The left panel shows the temperature profile (red line) and the left panel shows the salinity profile (blue line). Temperature decreases with depth from ~30°C at the surface to ~5°C at 1000m. Salinity increases slightly with depth, from ~34.8 PSU (Practical Salinity Units) at the surface to ~35.4 PSU at 1000m. The rapid surface temperature drop suggests a well-defined thermocline, likely in a tropical or subtropical ocean region. The rapid surface temperature drop suggests a well-defined thermocline, likely in a tropical or subtropical ocean region.

Part 2

In this part we used data from the flat file (**SAA2_WC_2017_metocean_10min_avg.csv**) which contains the data log from the SA Agulhas II winter cruise in the Southern Ocean in 2017. Based on that we created different plots:

1. Time series plot of temperature

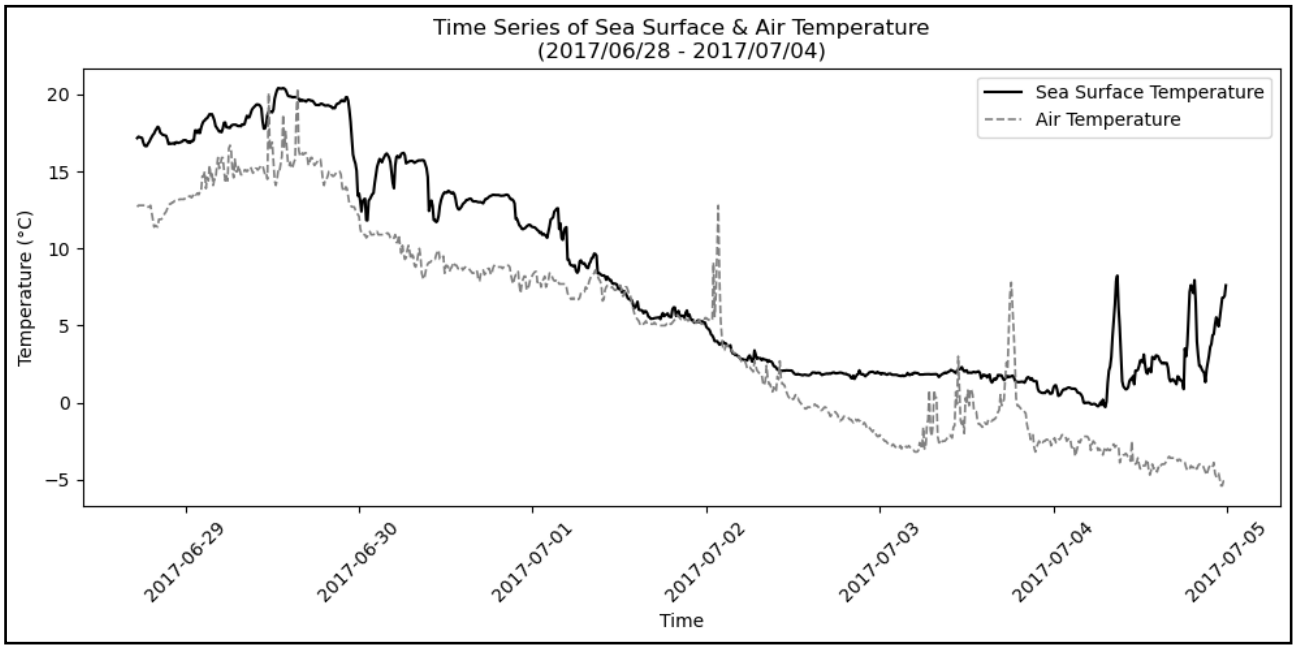

Figure 2. The time series plot displays Sea Surface Temperature (SST) and Air Temperature (AT) measured aboard the SA Agulhas II during its Southern Ocean winter cruise between June 28, 2017, and July 4, 2017. Both sea surface temperature (black solid line) and air temperature (grey dashed line) start relatively warm (~15-20°C). Around June 30, both SST and AT show a sharp decline. By July 2-3, temperatures stabilise at much colder values (~5°C or lower). The cooling trend suggests that the ship was traveling southward toward colder waters, potentially approaching Antarctic waters. The sharp temperature drops could indicate crossing major oceanographic fronts, such as the Polar Front or Antarctic Convergence Zone.

2. Histogram showing salinity distribution (30-35 psu)

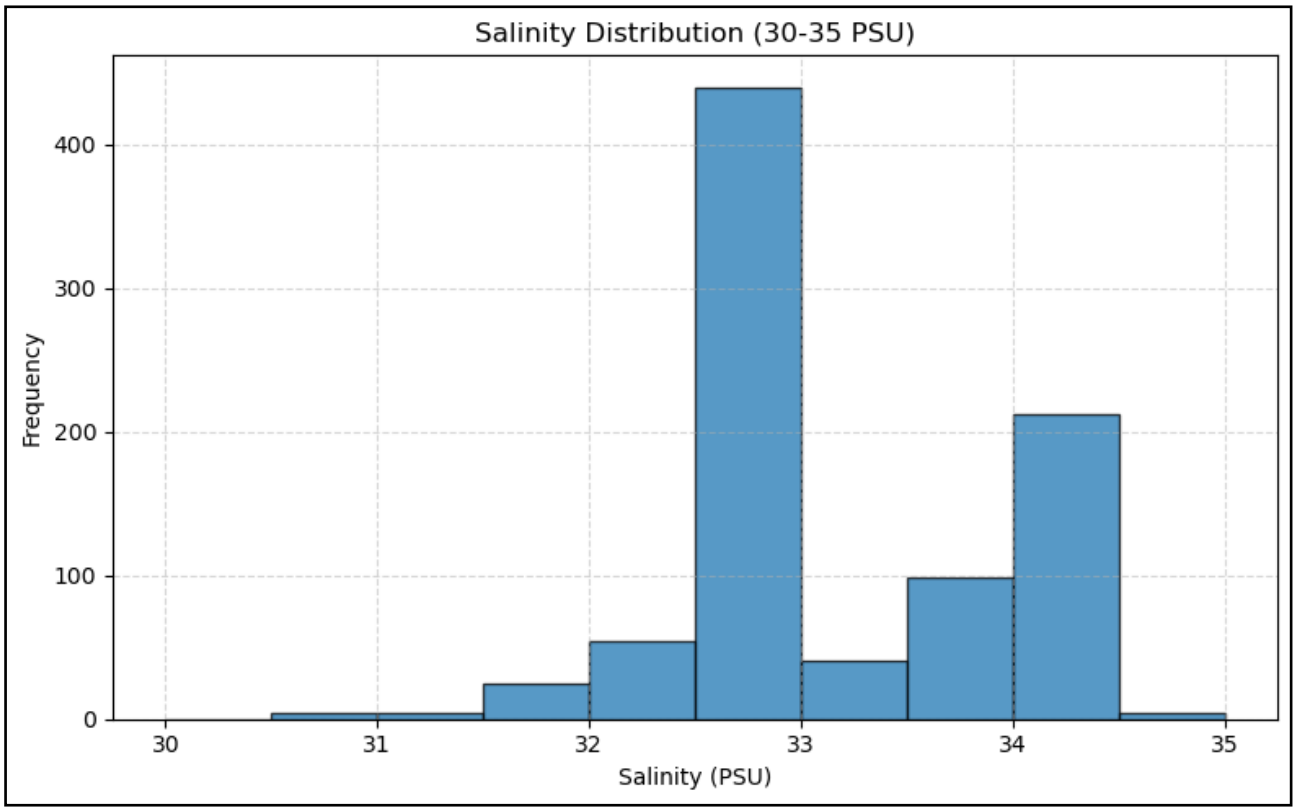

Figure 3. This histogram displays the distribution of salinity values (measured in PSU - Practical Salinity Units) within the range of 30 to 35 PSU. Typical open-ocean salinity ranges from ~32 to 37 PSU, depending on location, evaporation, precipitation, river input, and ocean currents. The peak at 33 PSU suggests that this dataset is from a region with relatively stable oceanic conditions, possibly in a subtropical or mid-latitude region. The smaller peak near 34 PSU could indicate variability due to oceanographic processes, such as vertical mixing, freshwater influx, or seasonal changes.

3. Mean, standard deviation and the interquartile range for temperature and salinity

Table showing mean, standard deviation, and the interquartile range for temperature and salinity

Parameter	Mean	Standard Deviation	Interquartile Range
Sea Surface Temperature (°C)	8.1303	6.7372	11.7491
Salinity (PSU)	33.1106	1.1374	1.2714

Figure 4. This table summarises key statistical measures (mean, standard deviation, and interquartile range) for Sea Surface Temperature (SST) and Salinity (PSU) from the dataset.

4. Scatter plot of wind speed vs air temperature

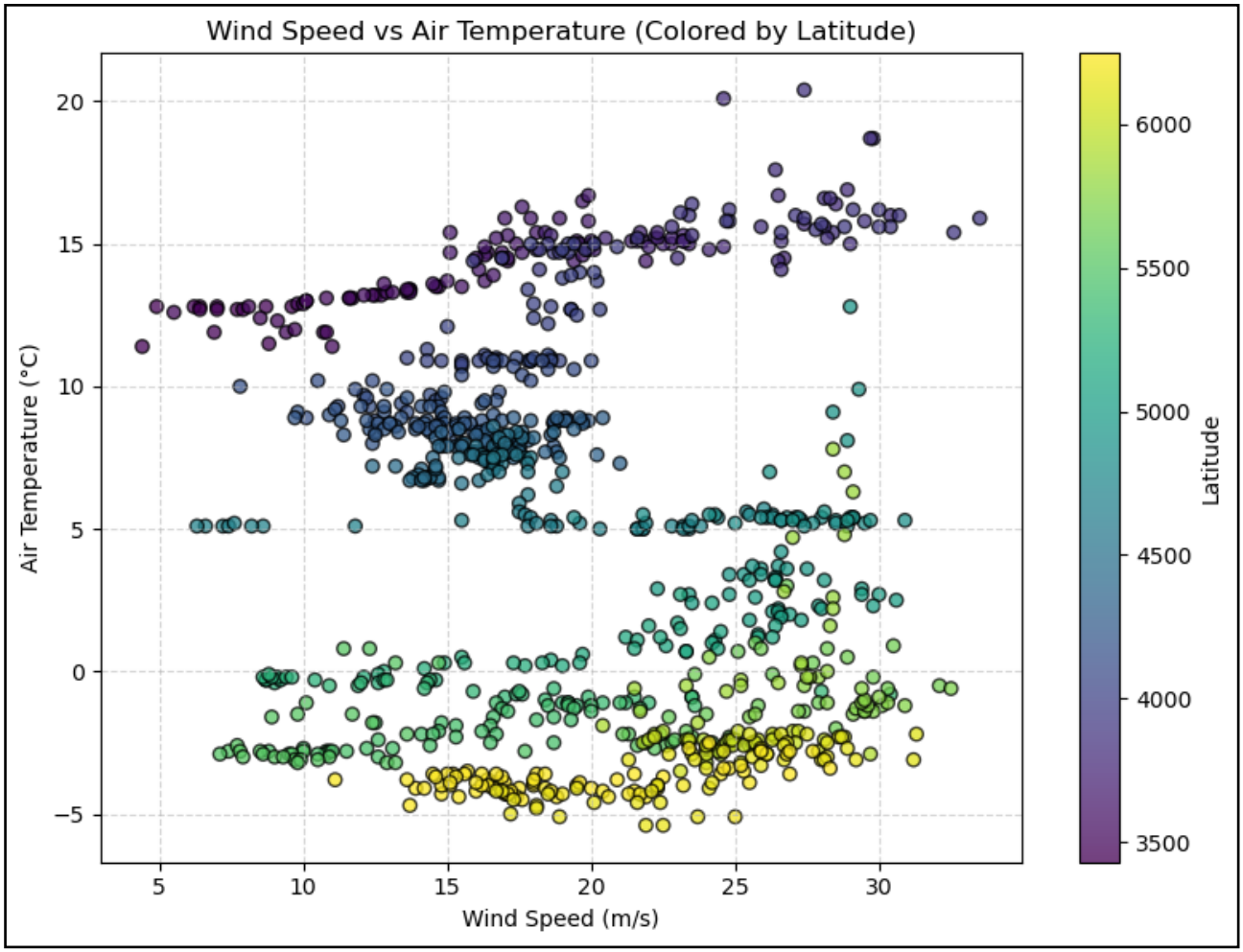

Figure 5. This scatter plot shows the relationship between Wind Speed (m/s) and Air Temperature (°C), with latitude encoded as color. Warmer air (~15°C) dominates lower latitudes, with weaker winds (~5-15 m/s). Colder air (~-5°C) dominates higher latitudes, where wind speeds exceed 25-30 m/s. This pattern aligns with Antarctic polar fronts, where warm subtropical air meets frigid polar air, creating strong winds and storms.