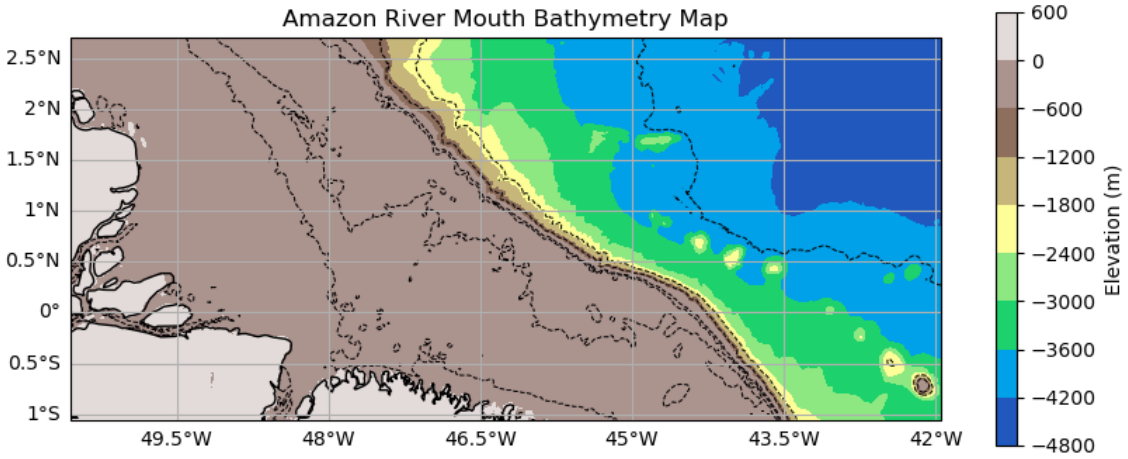
Ajani Mnyandu – SEA4001W Assignment 10: Advanced Python – Putting all together

In order to comprehend nutrient dynamics, primary production, and ecosystem health in coastal marine habitats, it is essential to analyze the quantity of chlorophyll near river mouths. River mouths are important channels for the transfer of nutrients from the land to the ocean, which affects the distribution of chlorophyll and the growth of phytoplankton. Furthermore, river mouths are essential for the movement of sediment, which has an impact on the dynamics of chlorophyll and ecosystem performance. Increased levels of chlorophyll at river mouths may be a sign of eutrophication, or increased sediment transport into the ocean. This is the reason I decided to focus my chlorophyll analysis on the Amazon River, which is one of the world's largest and most important river systems and has a big impact on the nearby marine ecosystem.

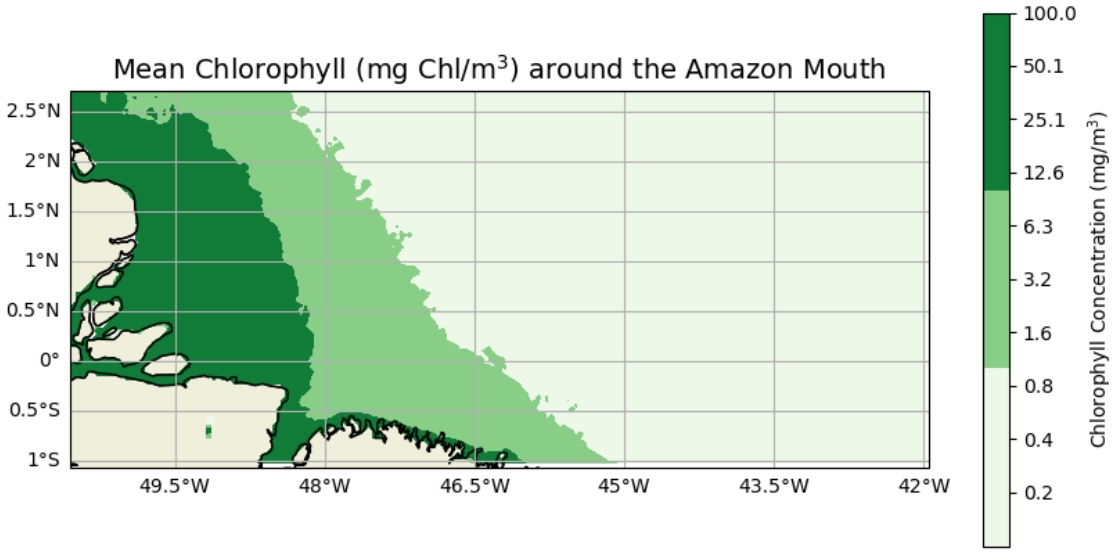
Figures

Figure 1:



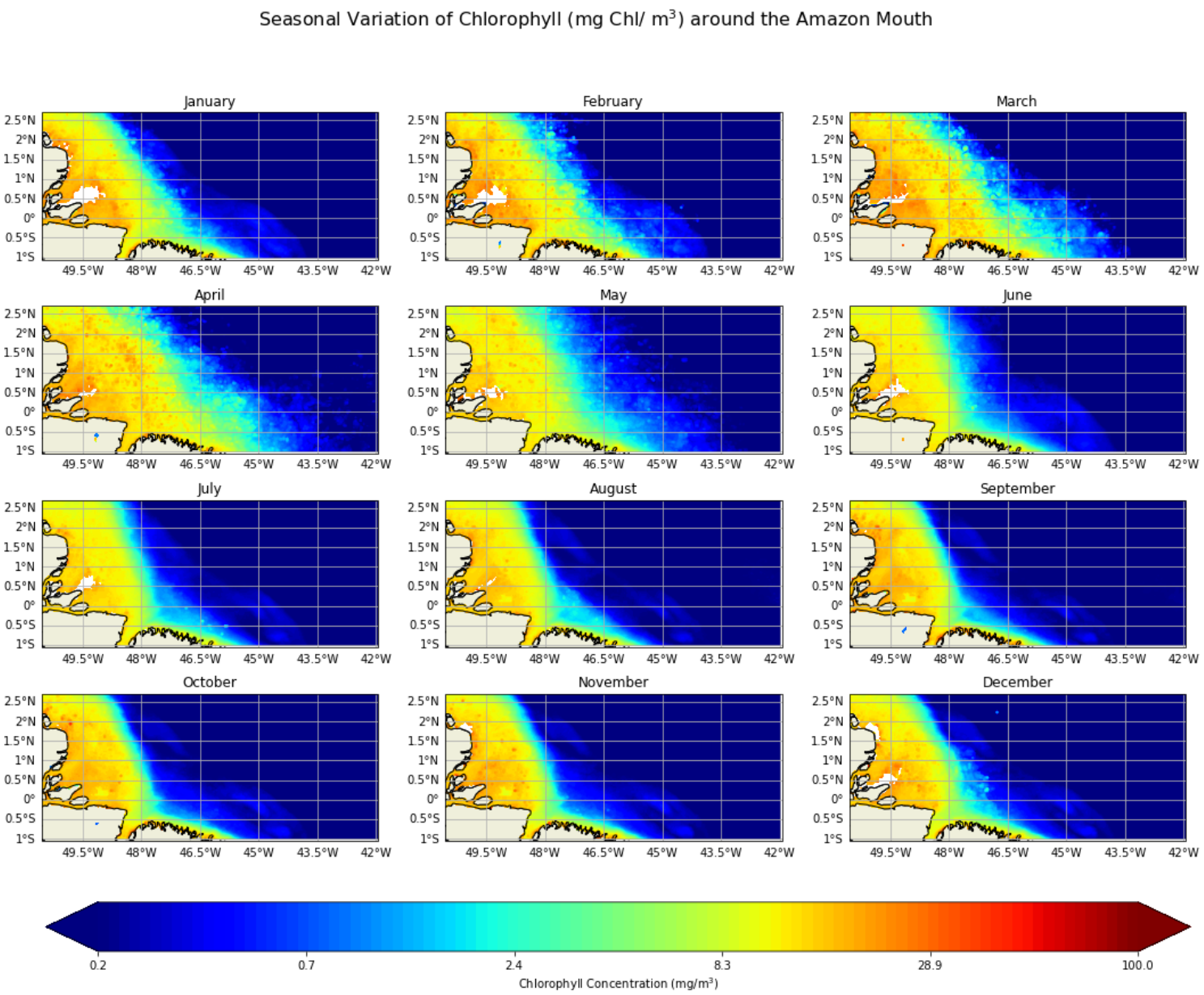
Contour colormap illustrating the bathymetry surrounding the Amazon River Mouth, emphasizing the continental shelf off the northeastern coast of Brazil, known for its substantial expanse. The contour lines delineate depths of 20m, 50m, 100m, 200m, 500m, 1000m, 2000m, and 4000m, providing insight into the underwater topography of the region.

Figure 2:



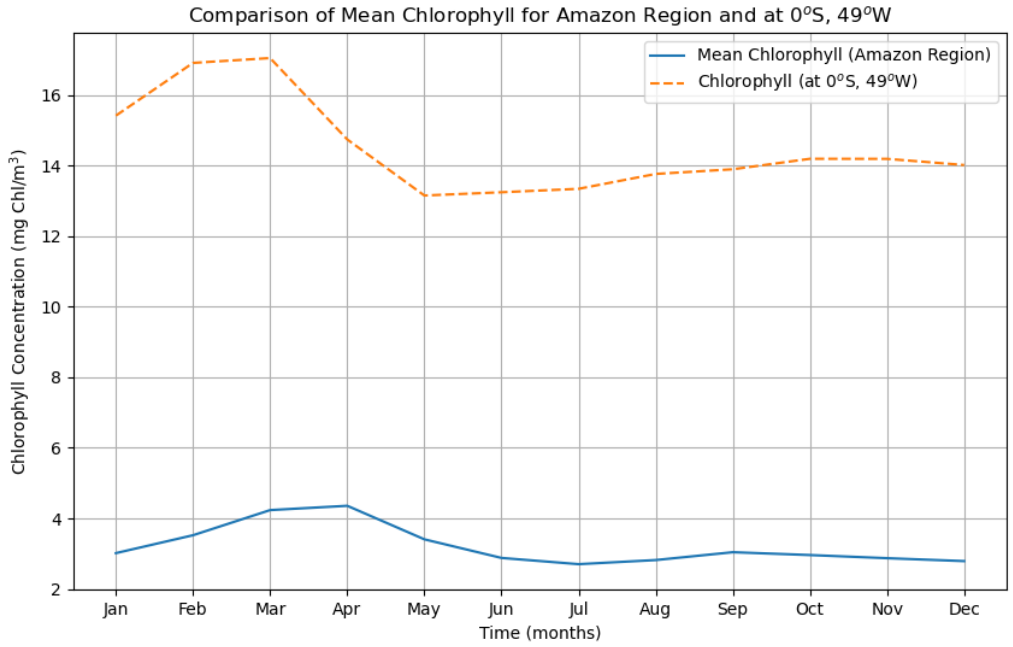
A logarithmic contour map illustrating mean chlorophyll concentrations around the Amazon Mouth region, with elevated values near the river mouth and Brazilian coast, gradually decreasing towards the open ocean.

Figure 3:



Monthly contour logarithmic colormaps showing the seasonal cycle of chlorophyll around the Amazon Mouth. Chlorophyll values peak during April, which is the height of the summer rainy season in the Amazon Basin, while the extent of productivity peaks between March and May.

Figure 4:



The above graph shows changes in the chlorophyll concentration over time. The average chlorophyll concentrations throughout the region are much lower than the chlorophyll concentration at 0°, 49°W. The chlorophyll concentration at 0°, 49°W follows the same seasonal cycle as the mean concentration in the region, which also confirms the seasonal cycle seen in figure 3 above.

References:

1. GEBCO Compilation Group (2023) GEBCO 2023 Grid (doi:10.5285/f98b053b-0cbc-6c23-e053-6c86abc0af7b)