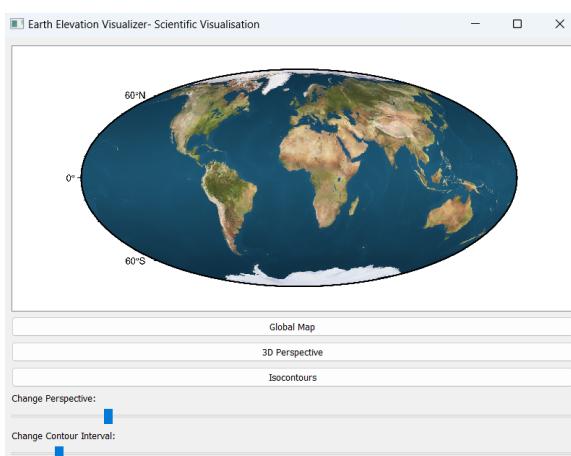


# Report

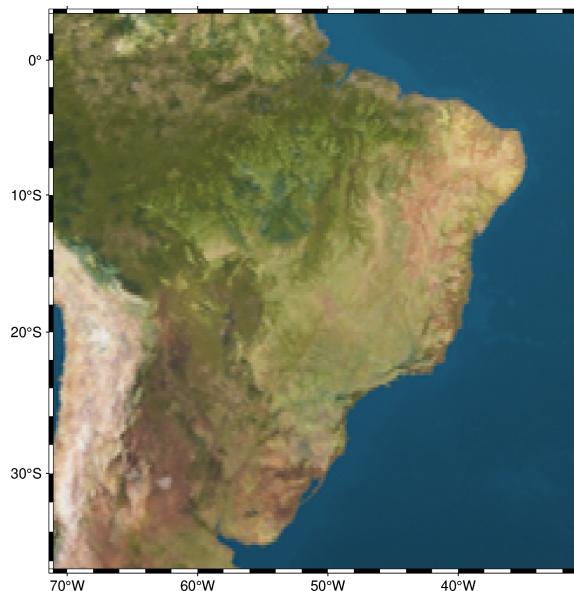
## Problem 1



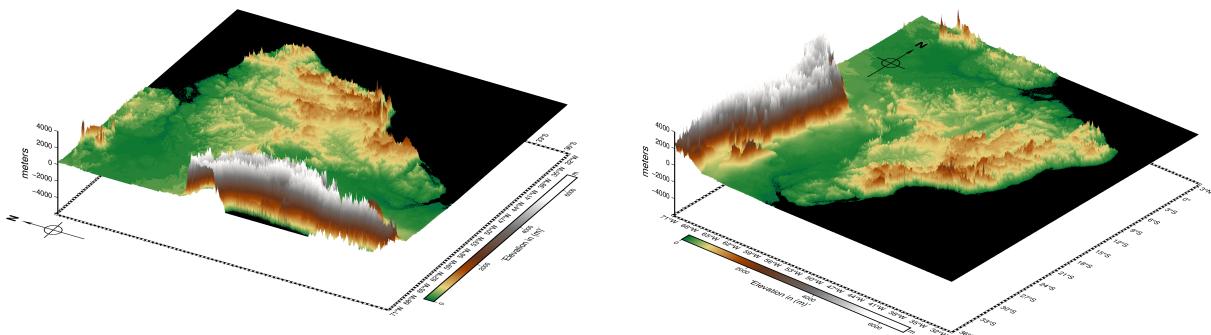
The user can zoom in and out on the global map and choose a point by clicking. After clicking, only a region of the map is rendered corresponding to a 40 degrees difference between the bordering latitudes and longitudes.

The program uses the given color map and created a xarray.DataArray that can be used as a grid in pygmt functions. Same is done for the displacement map that contains now the elevation data.

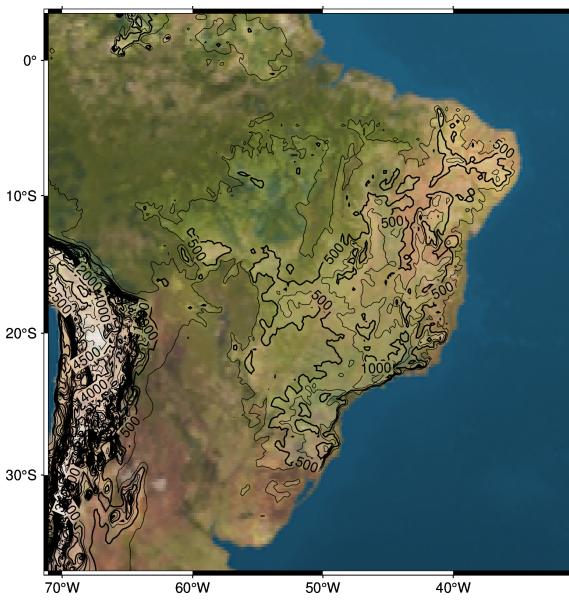
PyQt5 is used for GUI implementation and interactivity with the displayed maps.



Now the user can choose to see a 3D perspective image of this region, perspective angle can be changed using a slider which allows the user to pick the most appropriate angle to extract the needed information from the plot. For this visualisation the displacement map has been used to plot the elevation accordingly.



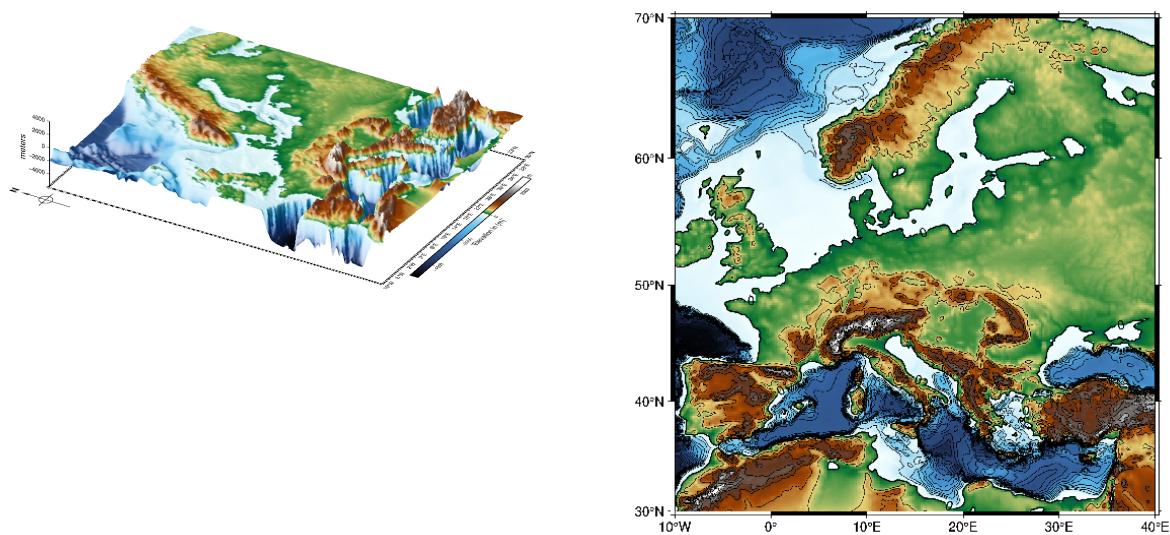
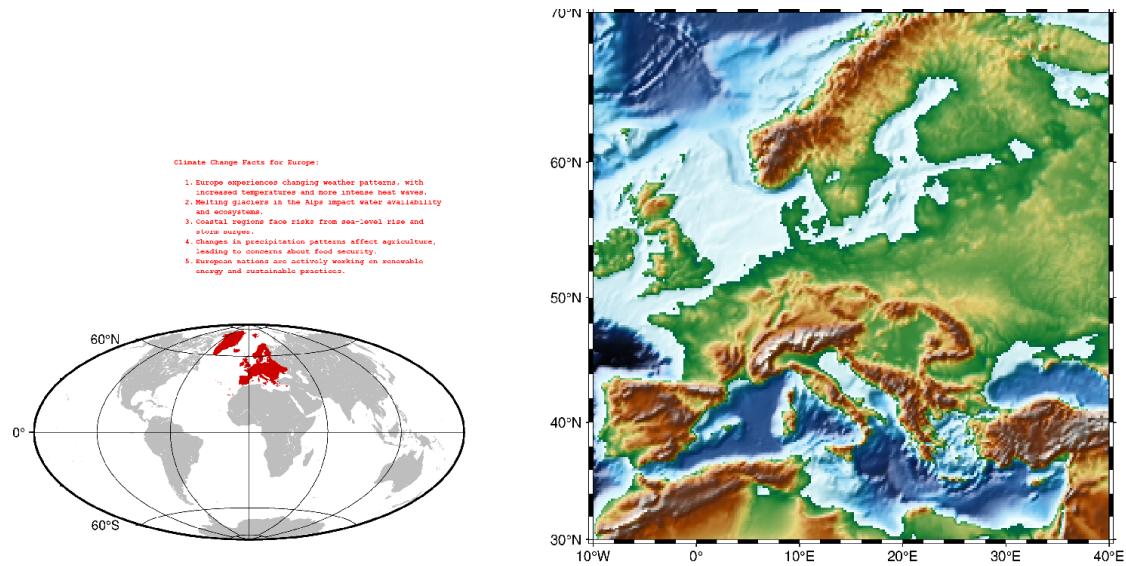
A map rendering using isolines option is also provided. A 2D map showing contour lines for a default interval of 250m. The user can use the “change contour interval” slider to adjust the interval at which the contour lines are shown. For this visualisation the color map provided has been used and for the contour lines a pygmt dataset (`load_earth_relief`) has been used for a more accurate representation of isolines.



## Problem 2

In this visualisation the user sees the global map and can pick a continent. After clicking, an attempt at an infographic is shown. A shaded 2D map of the continent attracts attention for further observation. Some general climate change facts about the continent are given (note: the facts are AI generated) and a map highlighting where the continent is on the map. Out of curiosity the user can see a 3D perspective image of the continent. This visualisation exclusively used the pygmt dataset `load_earth_relief` to create a striking shading effect that closely mimics the earth terrain and showcases the beauty of our earth, inviting the user to analyse it and discover more by changing the perspective of the plot. Given the advantages and disadvantages discussed above, I consider the 3D perspective image to be the suitable option for displaying earth's relief to the general public. It can be intuitively understood even with the few distortion artefacts.

Moreover, the user has the option to also view the isolines map and choose for themselves which map is more valuable for bettering their understanding of earth's relief.



## Notes for the user

- 3D perspective and isoline buttons and sliders can not be used in global view and will cause the program to crash
- The user can not select a region by clicking on the currently selected region, in most cases the program will crash. The user needs to go back to global view to select a region again.

