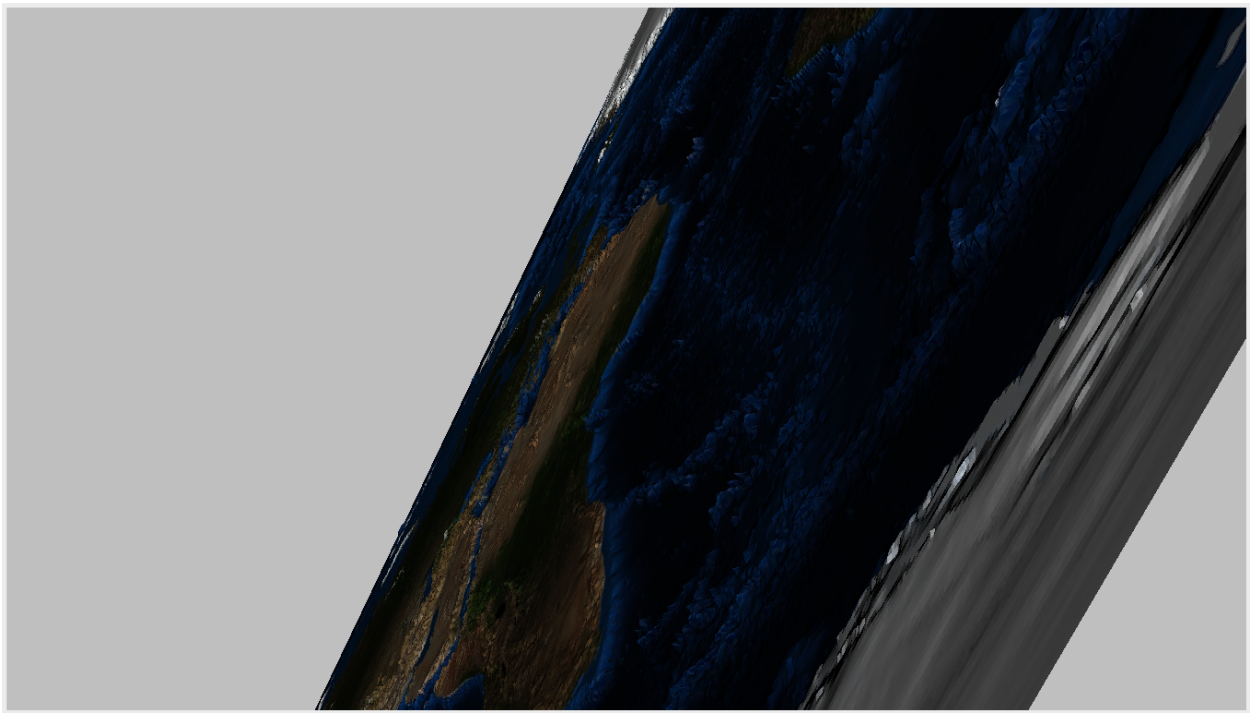
CS 530 Project 1

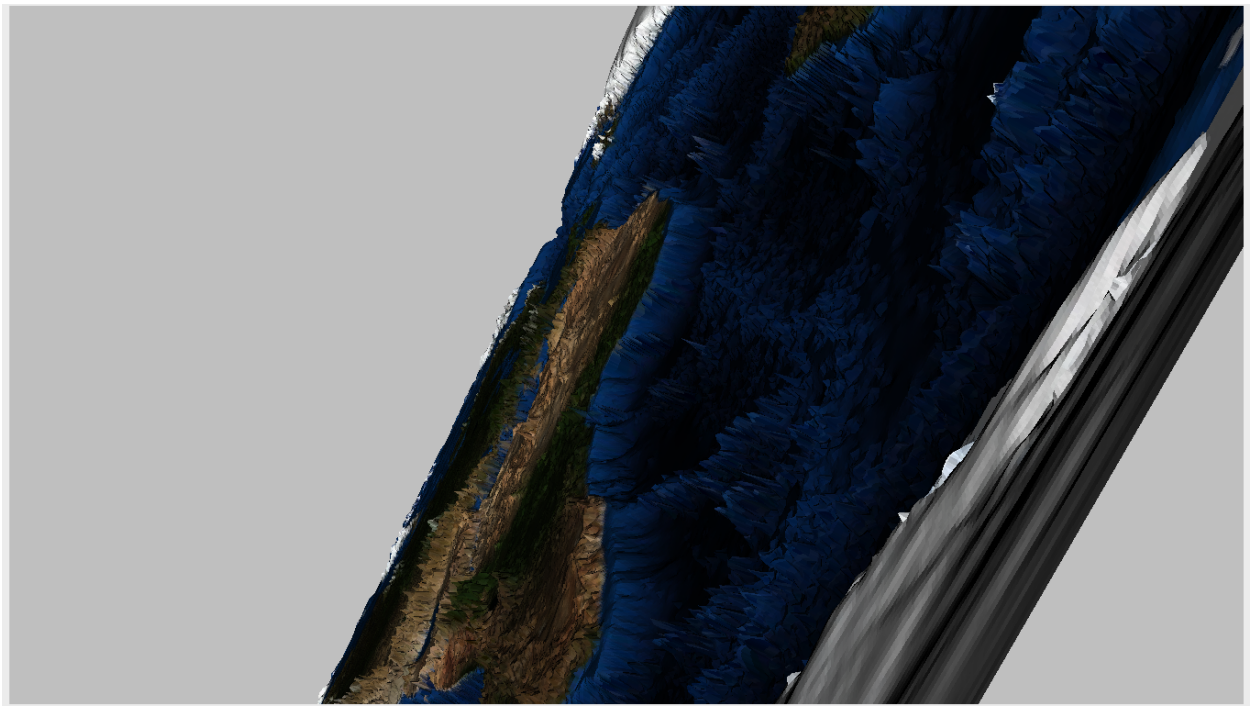
Luke Jiang (0028440468)
02/03/2020

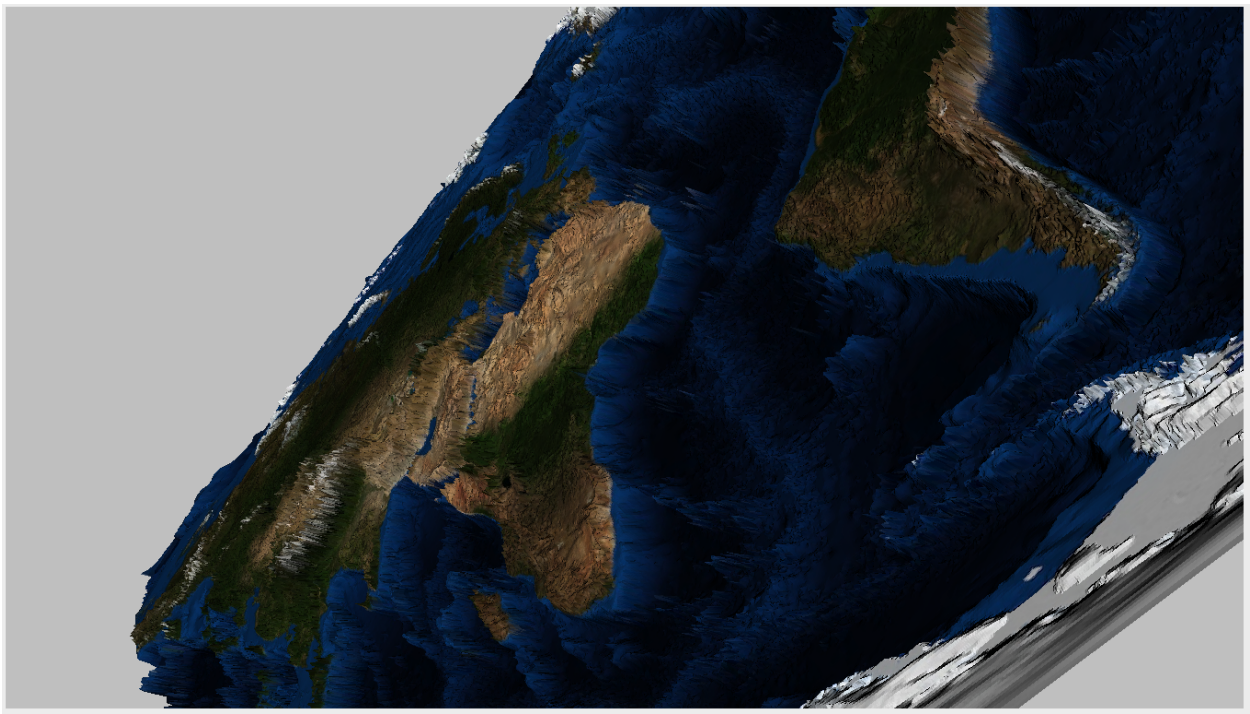
Part I: Results

Task 1:

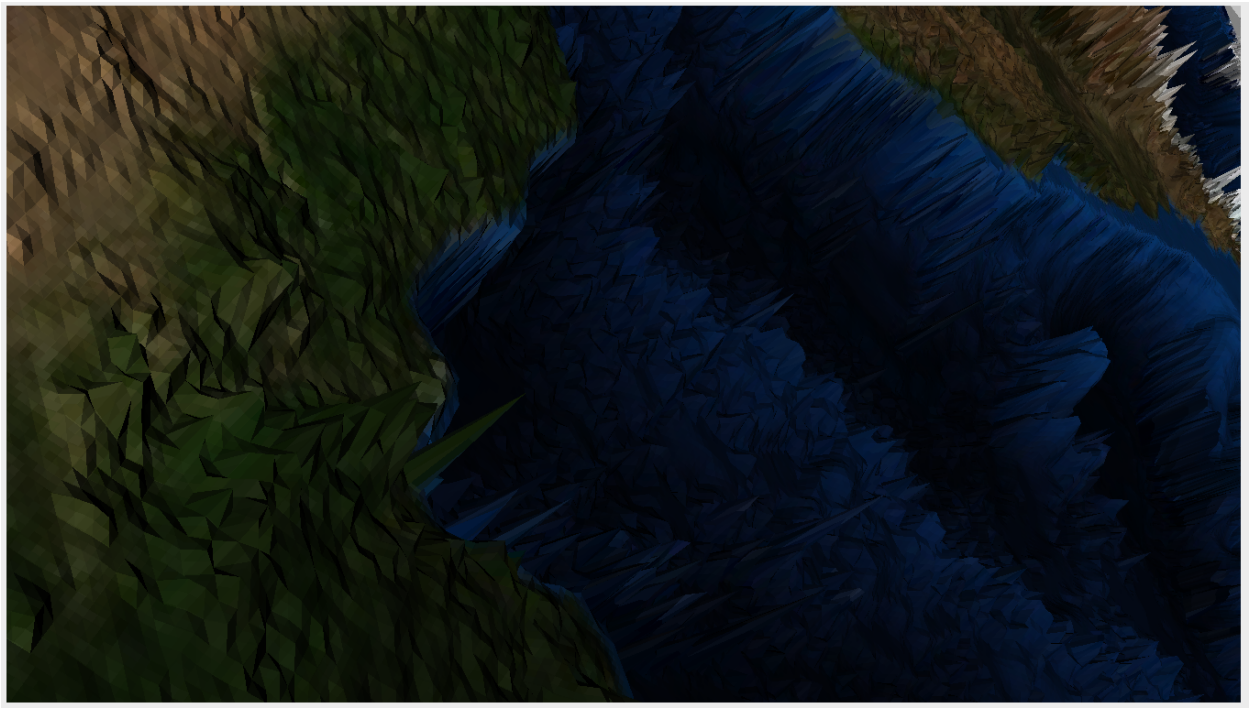


Low-scale factor



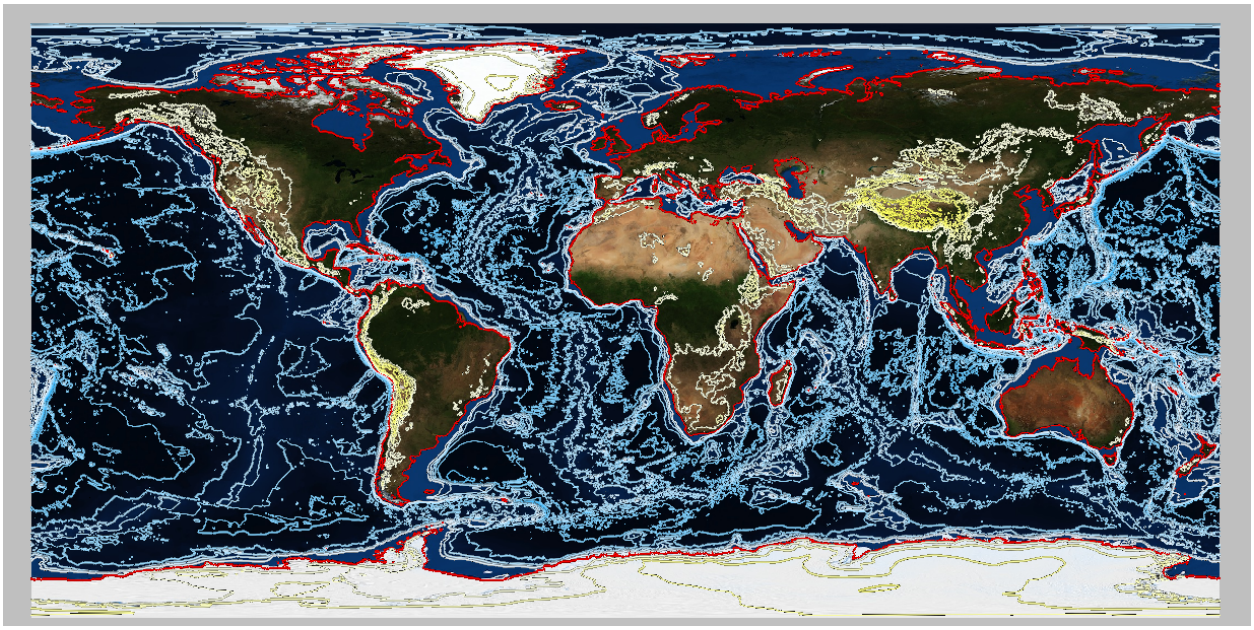


High-scale factor

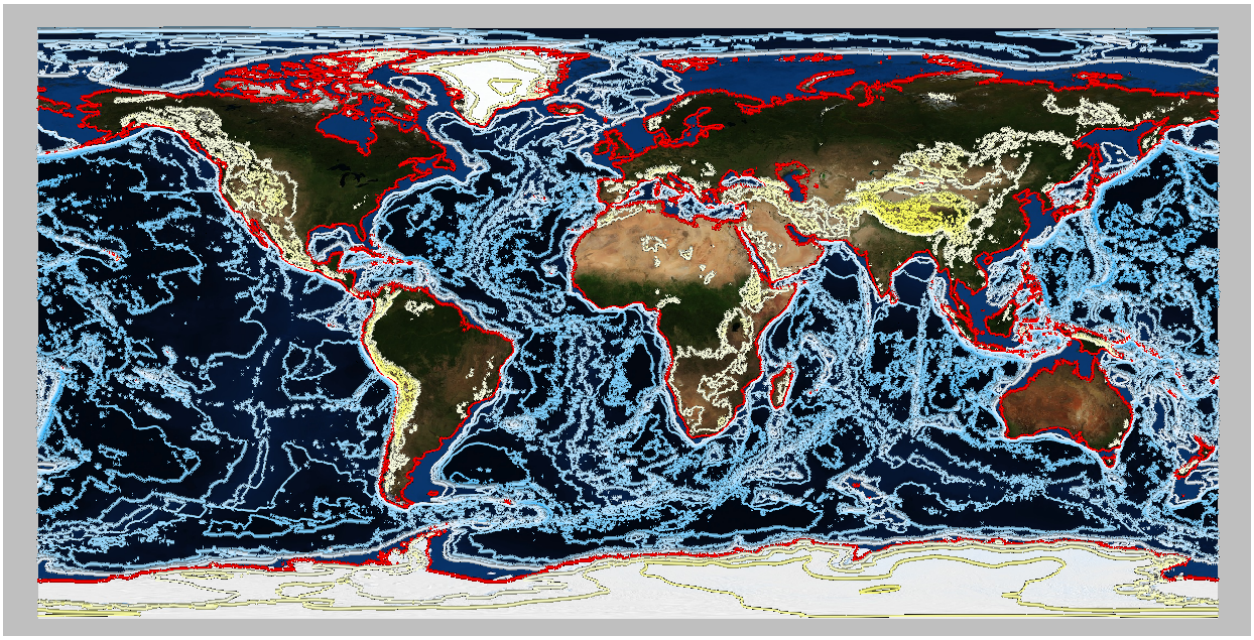


Close-up images

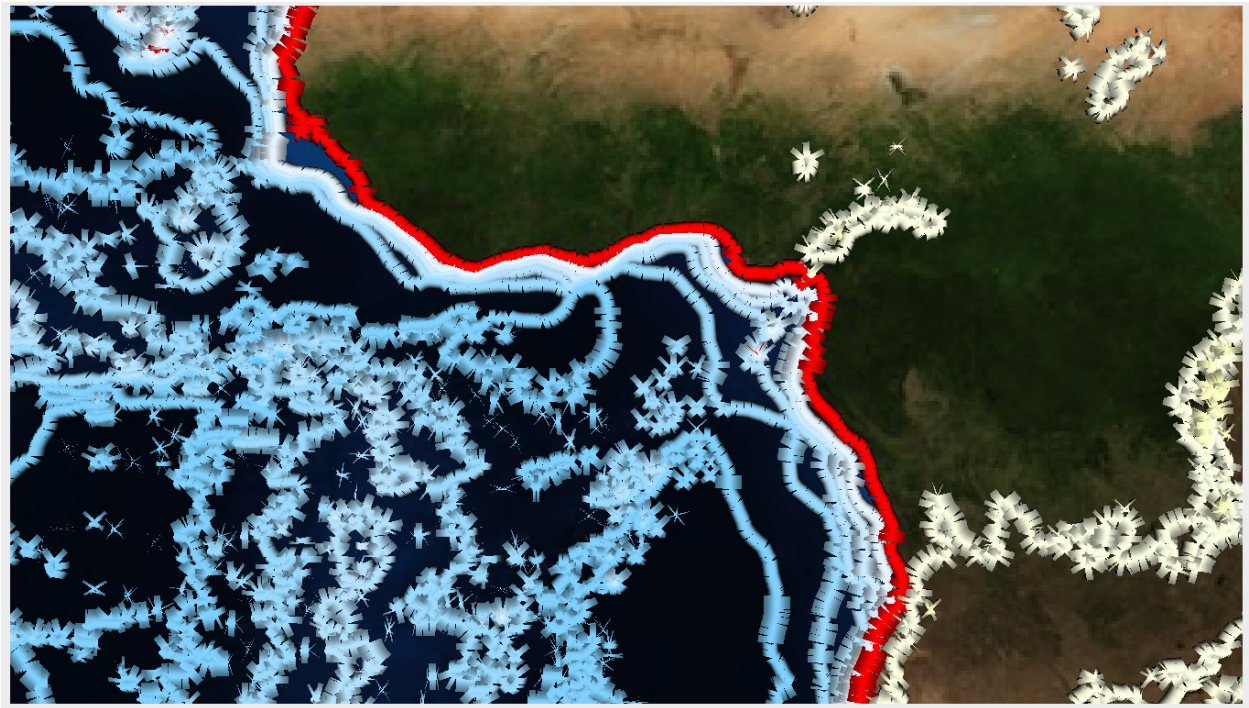
Task 2:



Low radius

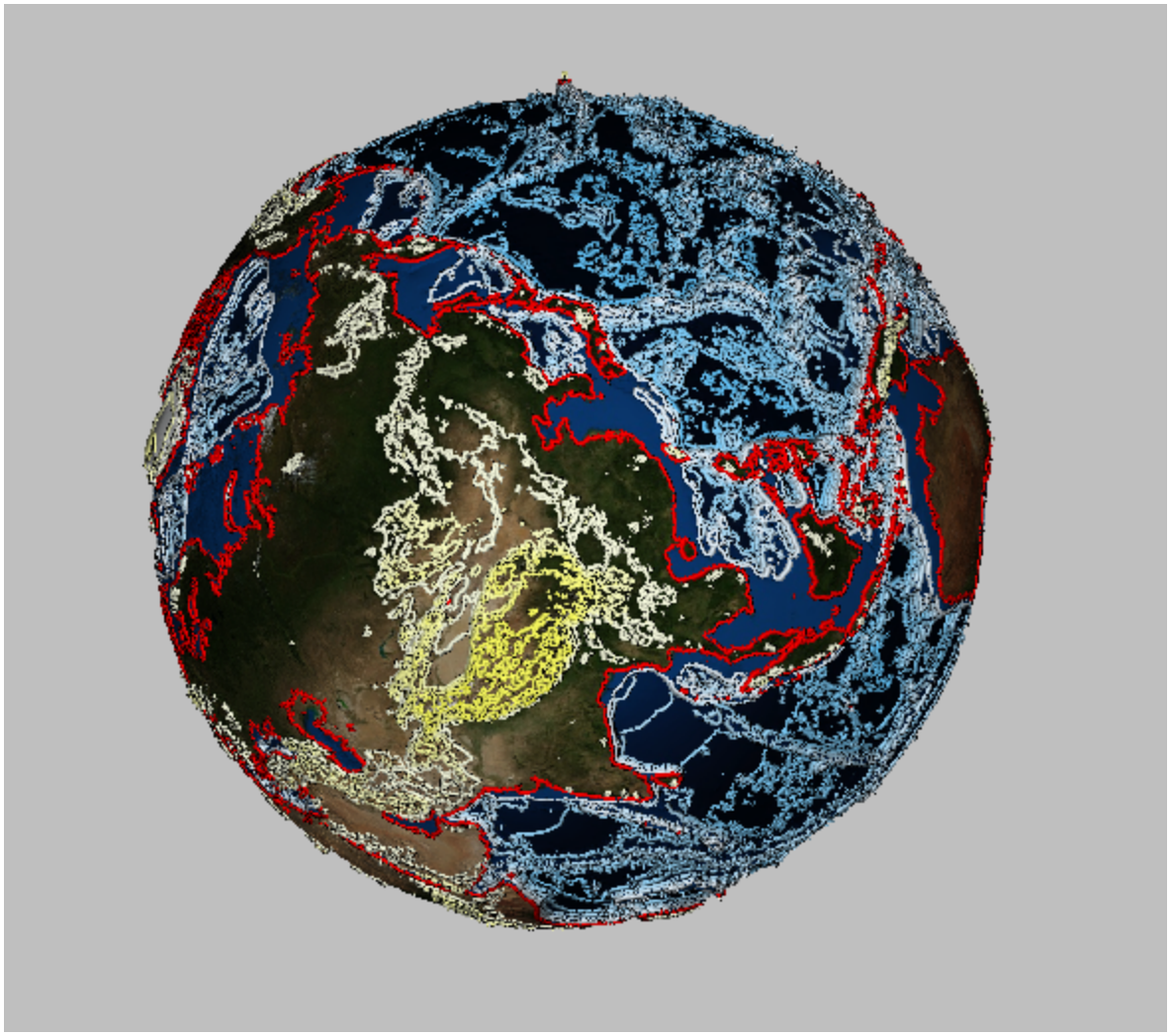


High radius

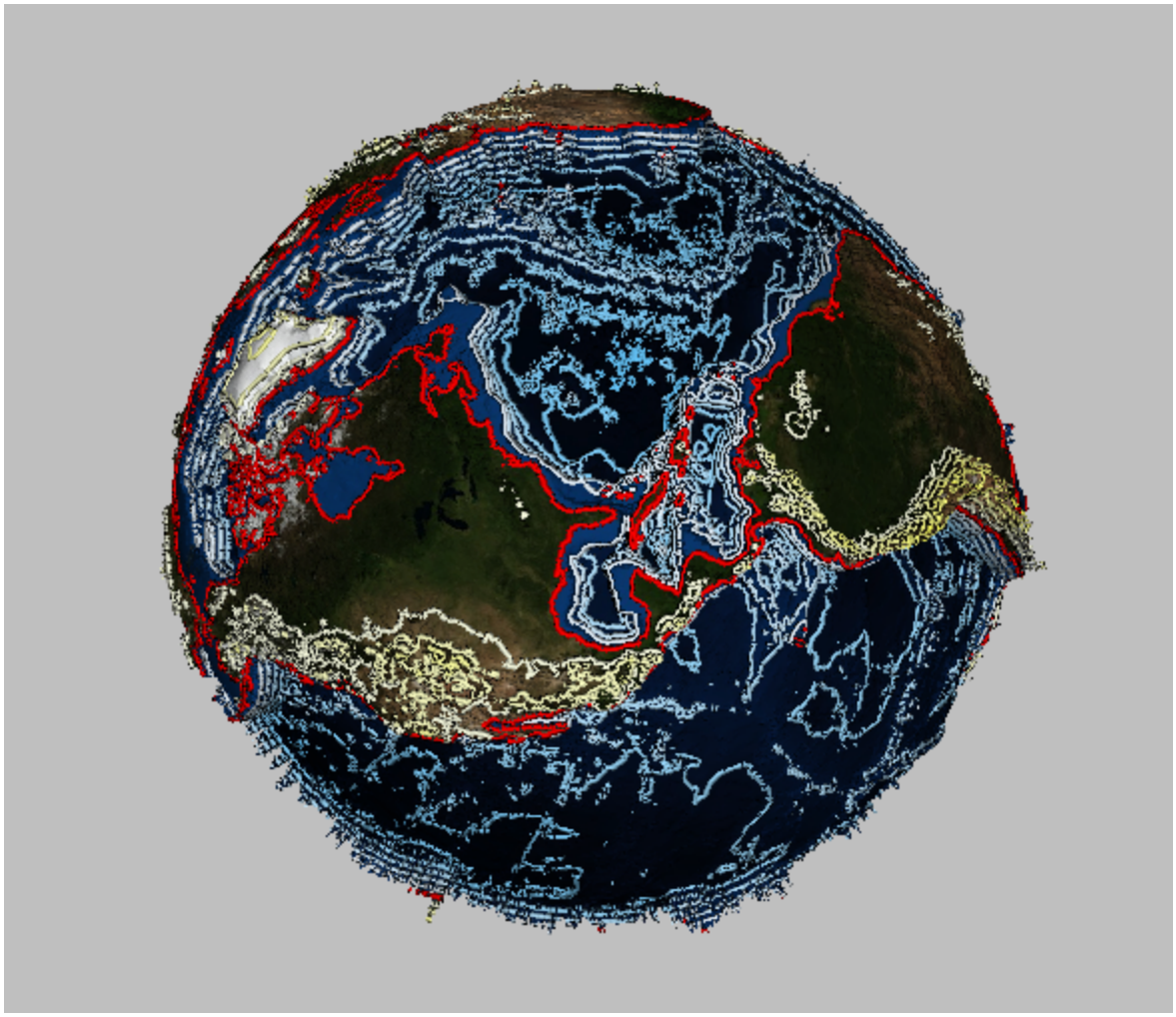


Close-up image

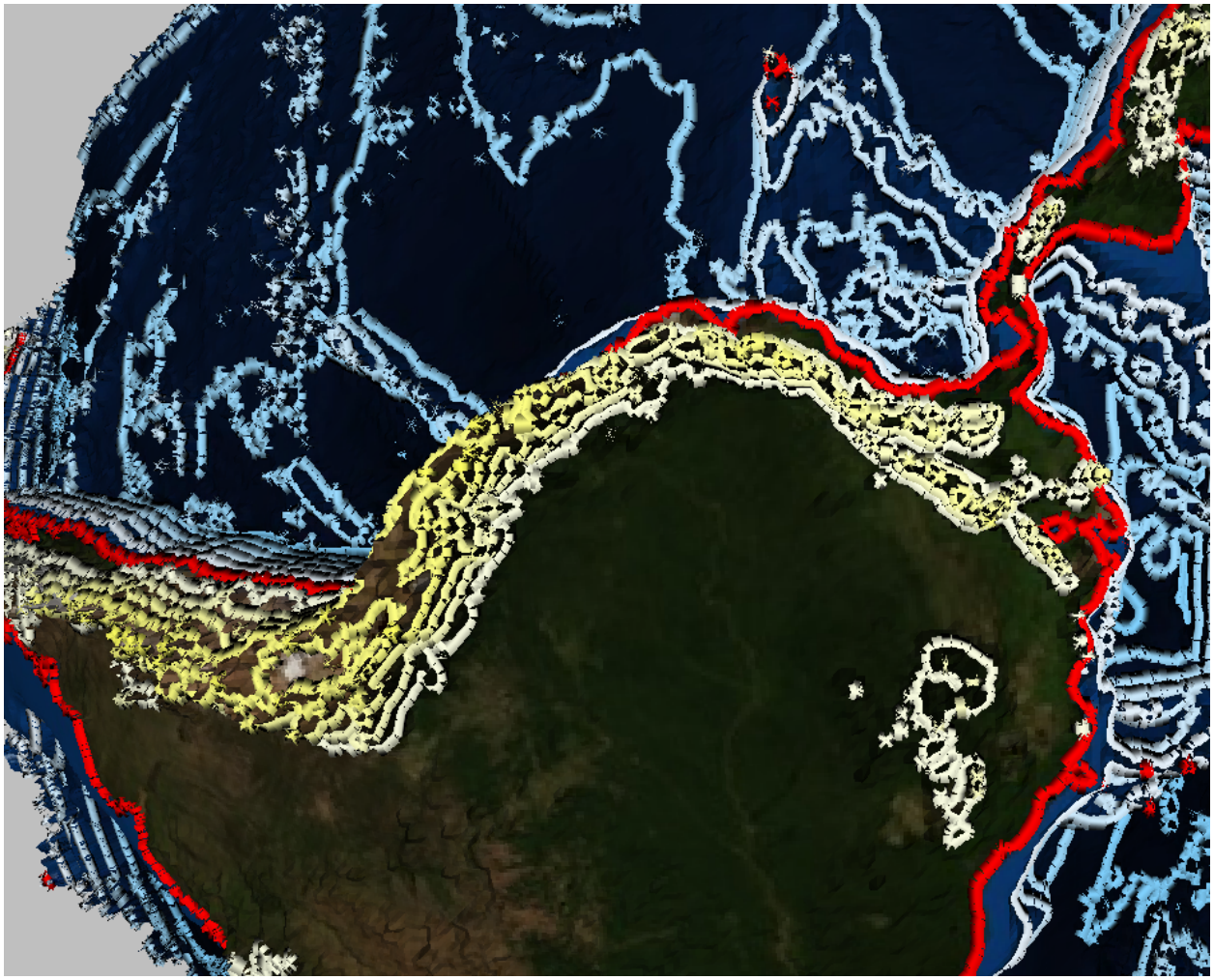
Task 3:



Low scale factor -- Asia



High scale factor -- North America



Close-up image -- South America

Part II: Discussion

Task 1:

1. **What properties of the dataset were effectively visualized with this technique?**
   The height value associated with each data point.
2. **What are in your opinion the main limitations of this technique and how could you address them?**
   It's hard to compare the height/depth of points on the graph intuitively. I can add contour lines as suggested in task 2.
3. **How useful did you find the slider interface in your usage of the height field representation?**

The slider interface is quite useful for debugging and visualization. By adjusting the slider, I can easily see the behavior of my code so that I wouldn't have to run my code again with different parameters. I can also control the visualization result based on local terrain: If I want to see the result in a close-up image, I can simply adjust the slider to make the contrast more obvious.

Task 2:

1. **What specific aspects of the data were readily visible with isocontours?**
   The height/depth and the slope (density of contour lines) of each point.
2. **How useful did you find the color map and why?**
   The color map is very useful. Firstly, it shows the sea-level contours of Earth's geography, which makes the user easier to identify small islands. The color map also maps the height/depth of each point to an intuitive impression, which makes the mountainous regions more obvious.

Task 3:

1. **What benefits did you see to the perform the visualization on a sphere?**
   Visualization on a sphere shows Earth's real geography in an intuitive manner.
   It also makes the result easier to interact with for the viewer.
2. **How did the resulting visualization compare to the previous ones?**
   The result became more intuitive and easy to understand.

Overall:

1. **Did you find that the combined use of these visualization techniques in <u>Task 3</u> improved** upon the results of each technique applied separately? Why or why not?
   Yes. If only the contour filter or the height map is applied, the result is not as intuitive as applying two techniques together. By applying the contour filter directly on the height map, we can create a 3D-like visual effect that actually maps the contour line to Earth's geography.