

Design Critique

Visual Technologies 1 Final Project
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What was the motivation behind the visualization you chose to create for your data set?

Two things - One, I wanted to make a visualization that was based on an extremely simple dataset that was about something that we humans do *not* have a good intuitive sense of. Two, I wanted to make it about geology, since that's what my background is in, and because I'm currently interviewing for a position at the USGS and would like to show them some relevant work that leans on design. They are really good at the science, and are hiring someone who can bring a design eye to the team, so I wanted to get creative with that and try something that was both cool and really hard for me to figure out.

Does your visualization successfully achieve what you wanted it to achieve? Why or why not?

Sort of. It's not a great piece of design yet, in the sense that there's not great hierarchy and not a clear communication of when layers start and end. Everything appears, and tooltips work, and you can filter the data, and it truly takes forever to scroll to the end - which is intentional. There are lots of things that I'd like to have been able to make happen that would aid in the user's conceptual understanding, but that I just didn't have time to make happen.

For example - I tried some ideas for giving "senses" of change in temperature and pressure, by encoding that data into a background node network and into a changing background color. I figured out a lot, but just didn't have time to get it over the finish line. I also tried drawing line charts to encode the temperature and pressure directly onto the SVG canvas, but it ended up being visually busy and I hit some roadblocks that required me to prioritize my time elsewhere. I tried to make a dashboard to give current readings - which works! - but does not have some key user functions like an indicator showing how far we've gone and have to go (in percent, or visually by travelling down the page), or having visual encodings of depth / pressure / temperature themselves. I even tried giving some navigational tools to the user like a slider or buttons that let you jump from one landmark to the next, but each time hit some conceptual understanding roadblock that meant I had to reroute and get whatever I could done.

Something that I'm frustrated by is that a lot of the filtering functionality is done with opacity, rather than enter-update-exit patterns. I'd prefer to use the right code for the right job - so this filtering does the trick - but I wish I had realized that changing by code to remove this pattern also took out the only instance where I used that pattern, which was a requirement for the assignment. I had ideas for other visualizations I could add - like the force diagram in the background, encoding pressure data - but I just didn't have time to make it happen, and that is a stinky feeling.

I'd also really like to add more fun, and humor! I would love to go in and add some more *fun* landmarks, not just science-based ones, to help with the user enjoyment.

However, one of my main goals with this project was to actually get a conceptual grasp of the coding that we've covered this semester, and I think I've done a great job of that. The code for this visualization is not even 300 lines long, and my blocks of unused code add up to almost 400 lines. I tried a bunch of stuff, experimented with ideas, broke almost every idea I came across, and learned how to make things work for myself rather than just copying tutorial code. So in that sense - as a learning opportunity - it definitely achieved what I wanted.

Adopt a neutral perspective, imagining you are a user viewing the visualization for the first time. What works well about the visualization? What does not work well? Why?

The landing at the top and bottom work well, and the tooltips tell me extra information and fun facts. But there is so much that I'd change.

- The rectangles on the left hand side are supposed to delineate layers, but they aren't showing up quite right. They should also be labeled better, and are slow to load since they are so long.
- The dashboard isn't super well designed. The information is there, yes, but there should be an indicator that shows how far down through the depths we are, and give a better sense of the numbers. After all, we're trying to visualize the data, not just animate numbers!
- The scrolling takes a loooooooooooooong time. As a user, I'd like to be able to navigate better, rather than just suffer through the long distances between layers / landmarks.

What message is the visualization trying to convey? Does the visualization adequately convey that message, through content, visuals, and functionality? Why or why not?

The priority was to convey the scale of the earth. The features at the surface are soooooo thin, and so the scale of the whole svg canvas had to be huge, comparatively. That leads to really long scrolling times, and that slog, while annoying, is exactly what I'm trying to get across. The layers are huge!

The messages work, but I would like to have better ways to display text. The landmarks and tooltips are just floating text that's animated, and if I add layer information later, that's just more text.

What do you personally like about the visualization, in its final form, and why?

I like the constructivist design, and would like to do more with that. I do like that the landmarks can be filtered. One very confusing thing is that geologists use the words "crust" and "mantle" to distinguish chemical layers, and "lithosphere" and "aesthenosphere" to distinguish between physically different layers. That isn't well communicated in the science, and being able to filter whether we're seeing the layers through one lens or the other is useful.

I'm also super proud of the navigation bar that floats with you, and would like to bring more of the dashboard information up into there so it's not so busy in the middle of the svg canvas.

What do you personally dislike about the visualization, in its final form, and why?

There's lots of potential, but the rectangles delineating layers aren't working at all. That's partly because I want them to be expansive layers (extending the entire width of the page), but something in the coding isn't working (why are they overlapping, even when filtered appropriately?) so they don't appear right. Also, big blocks of background color are boring, so making the color change would be ideal, but I can't figure out how to make a gradient fill for an svg element.

The visualization also doesn't give a good sense of when boundaries are gradual or sudden. That's important in the science (specifically - the asthenosphere is special because it's a zone where the rock gradually softens and is allowed to flow, then rehardens, and that mushy layer of rock is what lets the continents move around on the crust), and I haven't figured out a way to communicate that in the visualization.

What are the strengths of the visualization? What are its weaknesses?

The strength is that it's an extremely simple dataset, and scrolling is an intuitive way to explore webspace that can easily translate into exploring physical space. Also, no one's ever seen the inside of the earth, so I get to have complete control over how it looks and can have fun with it!

The biggest weakness right now is the layout of the visual space. There's a lot that's communicated through text elements, and that gets boring really fast. I'd like to have been able to add more visual interest, but ran out of time to make the code work.

What could be improved, in terms of visual layout and functionality?

So much. Visually:

- I want to make the dashboard less about numbers, and more beautifully designed.
- I want the layers to be indicated better - the rectangles load slowly, and right now don't communicate that we're talking about a layer since there's no label or tooltip.

Functionality-wise:

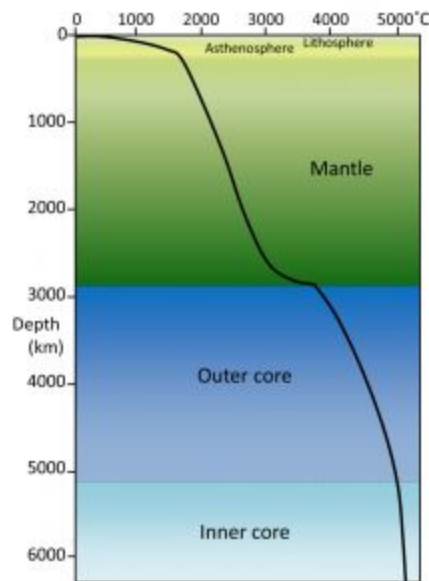
- I want to add navigational tools like buttons or sliders
- I want to add an indicator that floats with the view to pinpoint where exactly on the depth scale the viewer is.
- I want to add more landmarks to give information about some of the interesting things we know about interior-earth geophysics. We didn't even get to talk about p-waves and s-waves, or seismic shadows, or perovskite, or convection, or plate tectonics, or density, or planetary heating!

- While the filtering hides some layers and landmarks, they are still present on the svg, so their tooltip appears whether you see the label or not.

What are some alternative ways you could have used your data set to create a different kind of visualization?

I wonder if there's a way to encode this same information as radii within a geoJSON framework, and have an actual cutaway of the earth that gives a sense that these are spherical layers within a planet?

I could also have just made simple animations of the temperature and pressure line charts like so:



That kind of visualization could have focused on more of the interesting things that happen at layer boundaries, and would have a better way of emphasizing them. To be honest though, making a line chart didn't quite feel like enough of a challenge, and even though my visualization isn't quite what I'd want it to be, I learned so much and that's what I value.

Is your visualization choice a better or poorer representation of your data set? Justify your response.

I like mine better for achieving goals of "feeling" data - experiencing a sense of scale, distance, enormity. While an animated line chart could do that, I wanted to get across the feeling of hugeness that comes with enormous data like this, and a sense of how very teeny tiny we are and how little we know about our home planet. That would definitely *not* have happened with a line chart.