

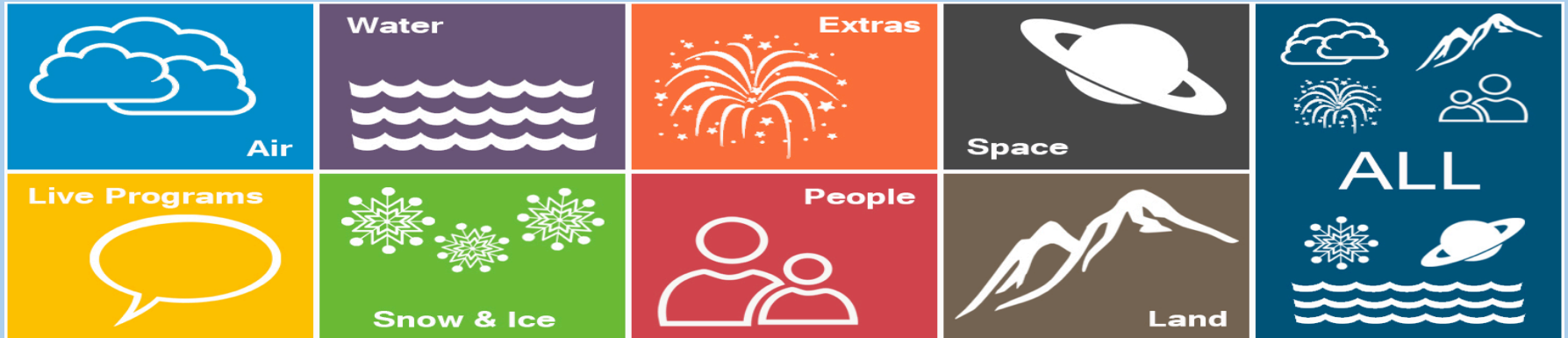
Working with the Science On a Sphere

By: Matthew Hamel



Outline

- Background on the Science On a Sphere (SOS)
- Creating a manual
- Creating a guide
- Created a video tutorial
- Creating visualizations
- My challenges
- Aspect ratio
- Colormap
- Seam
- My visualizations
- Conclusion



Background on the Science On a Sphere

- First permanent installation in 2004
- Developed initially for visualizing global data
- Now being used as an education tool as well
- Around 160 locations across the globe



Source: https://sos.noaa.gov/Gallery/galleries/NOAA_Headquarters/DSC02860.JPG



Source: https://sos.noaa.gov/Gallery/galleries/NOAA%60s_Earth_System_Research_Laboratory/DSC07153.jpg

Created a Manual

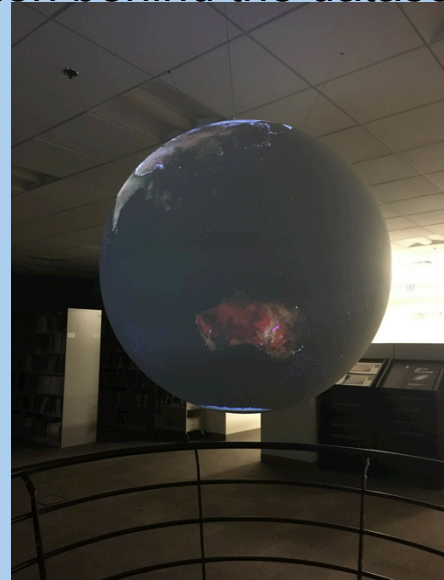
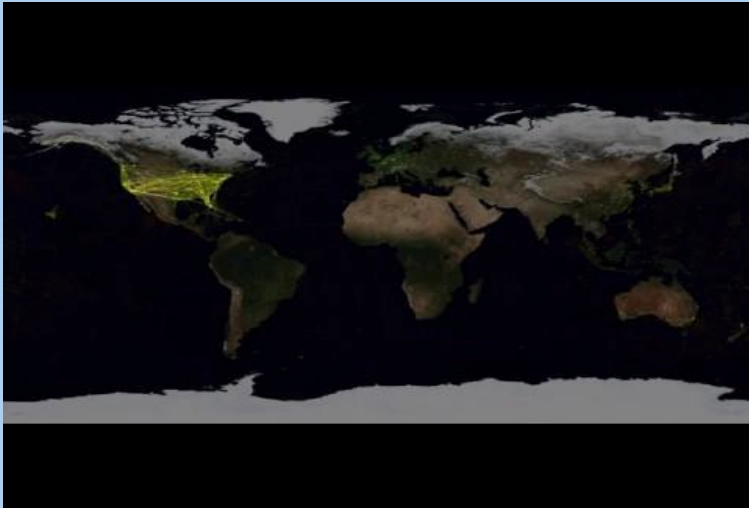
- Most manuals online for the SOS are very wordy
- Wrote a manual that was straight to the point
- Asked other student interns to test it
- Incorporated pictures after those tests

1. Opening up the app:
 - a. Open the Science on a Sphere on the iPad by clicking on the SOS Remote App icon.
 - b. Once opened, you will see a globe in the center of your screen surrounded by display features.



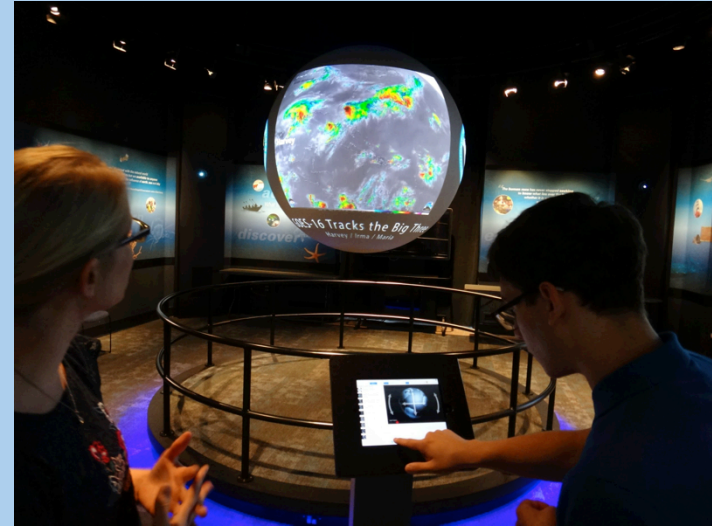
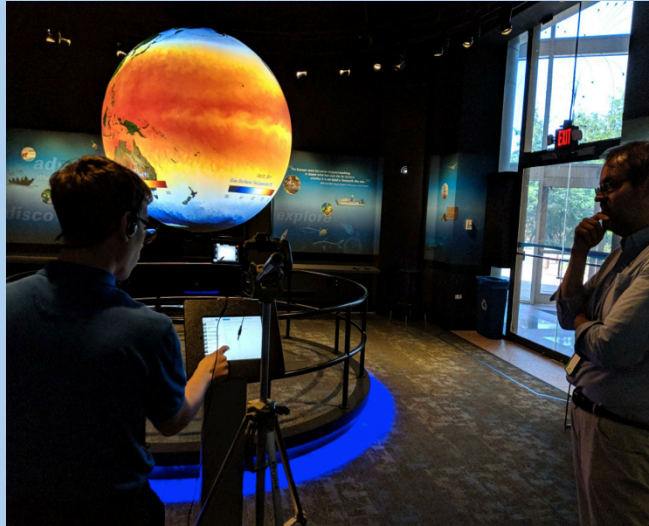
Created a Guide: How to Upload Content to the Sphere

- An extremely simple process
- Make sure you have the metadata for it
- Without the metadata no one knows the information behind the dataset



Created a Video Tutorial

- Created a video tutorial on how to operate the iPad
- Worked with members from both NCEP, NCWCP and NOAA Headquarters



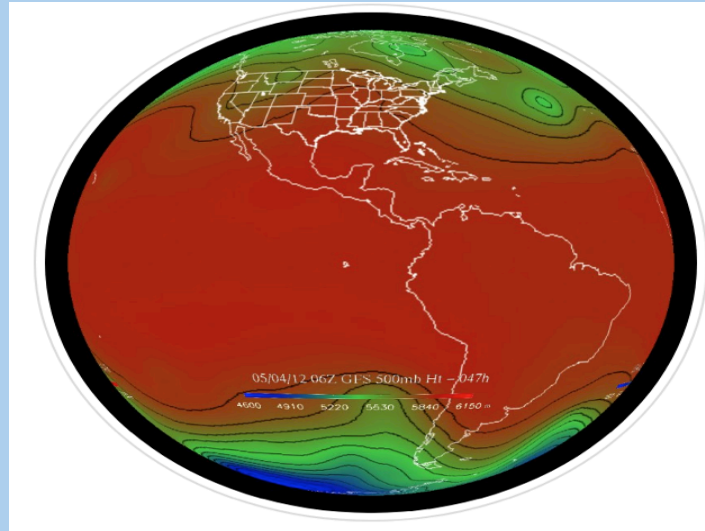
Created Visualizations

- Created visualizations using Python
- Utilized the wide variety of modules and packages within this programming language

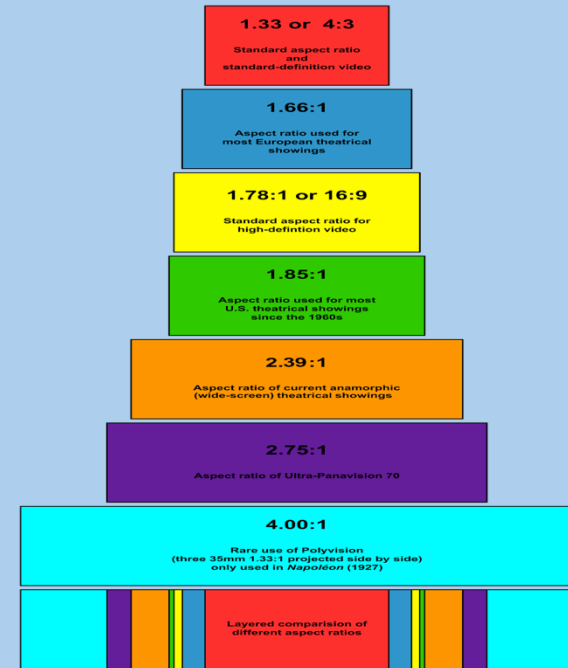


Challenges with Developing Visualizations

- Three main issues that I faced during this project
 - Aspect Ratio
 - Colormap
 - Seam



Source: <https://sos.noaa.gov/datasets/gfs-forecast-model-500mb-heights-real-time/>



Source: [https://en.wikipedia.org/wiki/Aspect_ratio_\(image\)](https://en.wikipedia.org/wiki/Aspect_ratio_(image))

Aspect Ratio

- Images and movies being displayed need to be in a 2x1 aspect ratio
- Larger than 2x1, image becomes stretched



2 x 1



3 x 1

Single Image

- For a single image dataset, the recommended aspect ratio is 4096 x 2048

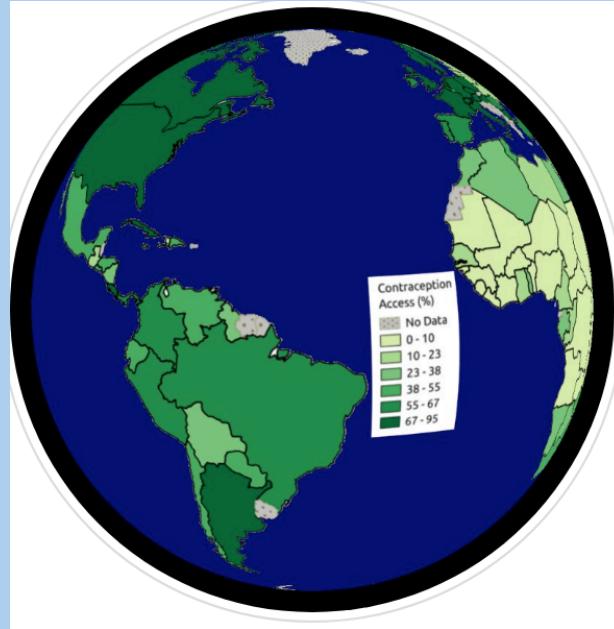
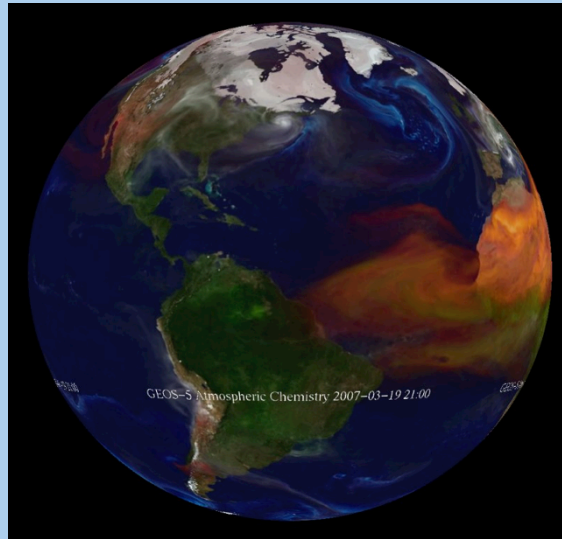


Image Sequence or Movie

- For a image sequence or movie, the recommended aspect ratio is 2048x1024



Source: <https://sos.noaa.gov/datasets/atmospheric-chemistry-geos-5-model/>

Colormap

- Extremely important to have a color map that relates to your data

Not Colorblind
Friendly

Sequential

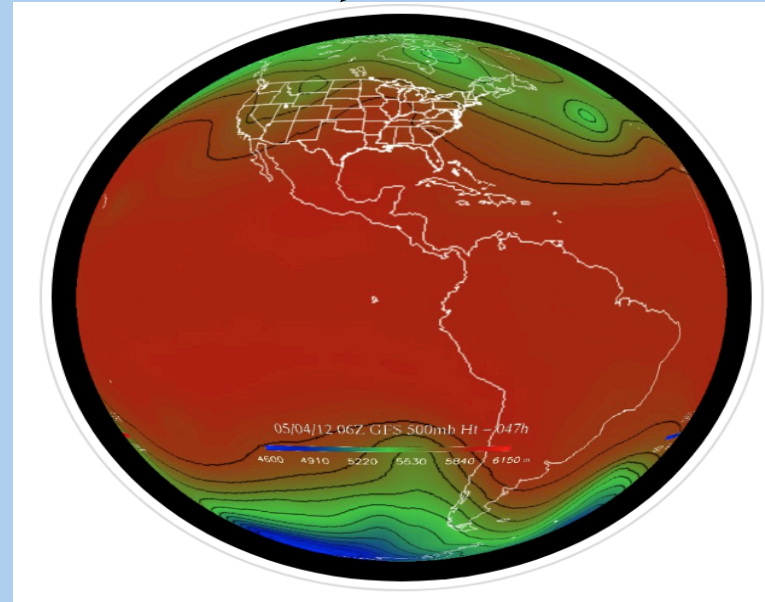


Diverging



95 100 105 110 115

Max Heat Index Temperatures (°F)



Source: <https://sos.noaa.gov/datasets/gfs-forecast-model-500mb-heights-real-time/>

Seam

- Issue when image is displayed onto the Sphere
- Solution is found while saving your figure in Python



Pad_inches = 0

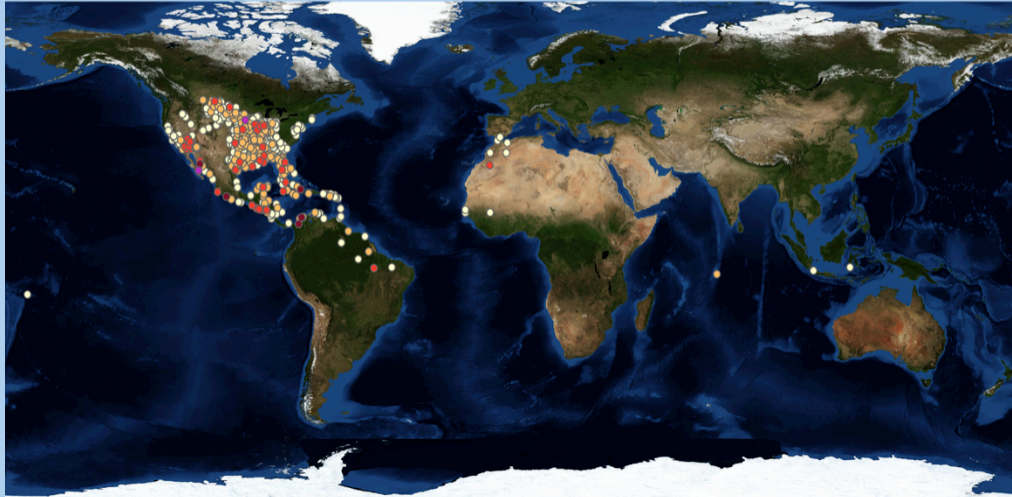


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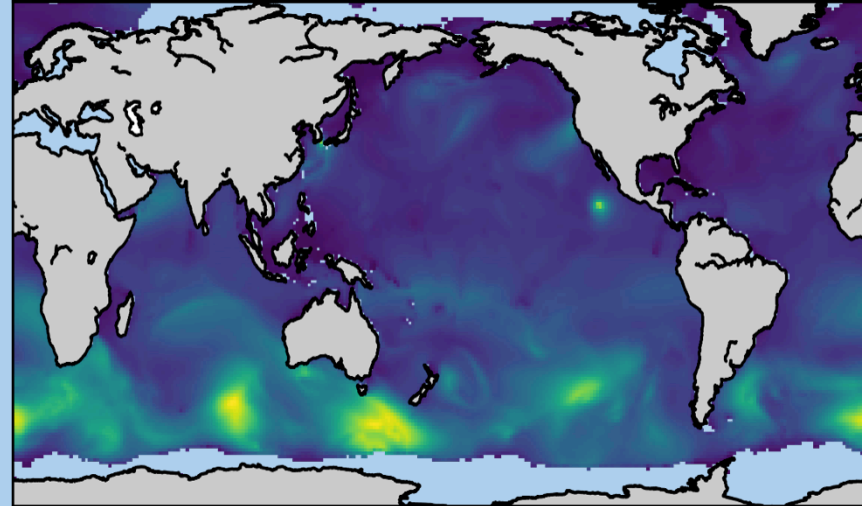
My visualizations

- Created two datasets

Max Heat Index Values for the month of July



Updated WAVEWATCH III



Improving the SOS

- Create a single program to do everything in one go
- Limit the amount of additional programs needed

Conclusion

- Created a manual, a guide, and a video tutorial
- Used Python to create new visualizations
- Tackled the challenges that came up
- Future work
 - Continue to develop content
 - Develop a more efficient system

Acknowledgements

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- NOAA Vizlab
- SOS Committee
- Office of the Director
- NCEP Student Interns



Questions?