Thursday, November 10, 2020 | **Class #12**

Lots of plots and colormaps too

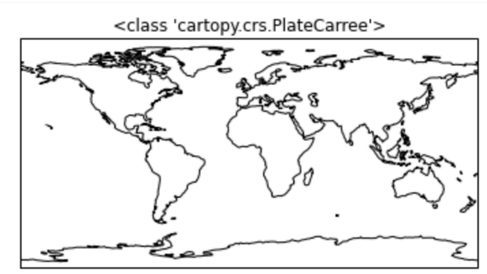
OCEAN 215 | Autumn 2020

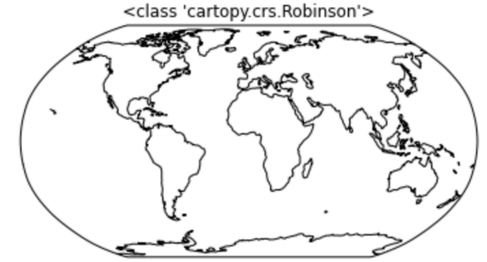
Ethan Campbell and **Katy Christensen**

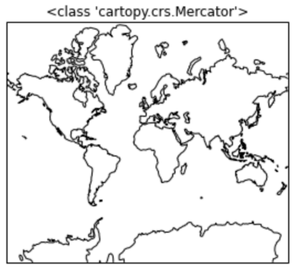
Mapping projections - quick activity

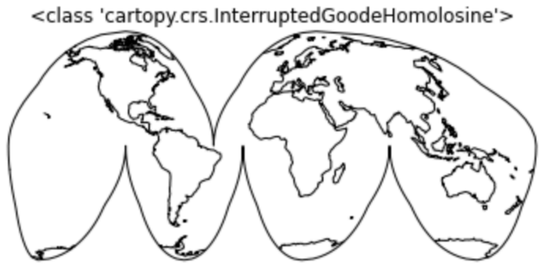
Follow this link (https://scitools.org.uk/cartopy/docs/latest/crs/projections.html) to find the cartopy mapping projections and answer the following questions.

1. How many projections are available in Cartopy?
2. What is the projection with a non-zero central_longitude default value?
3. Which two projections have the poles in the center of the map?
4. Which of these projections have you seen? Where? What purpose were they serving?



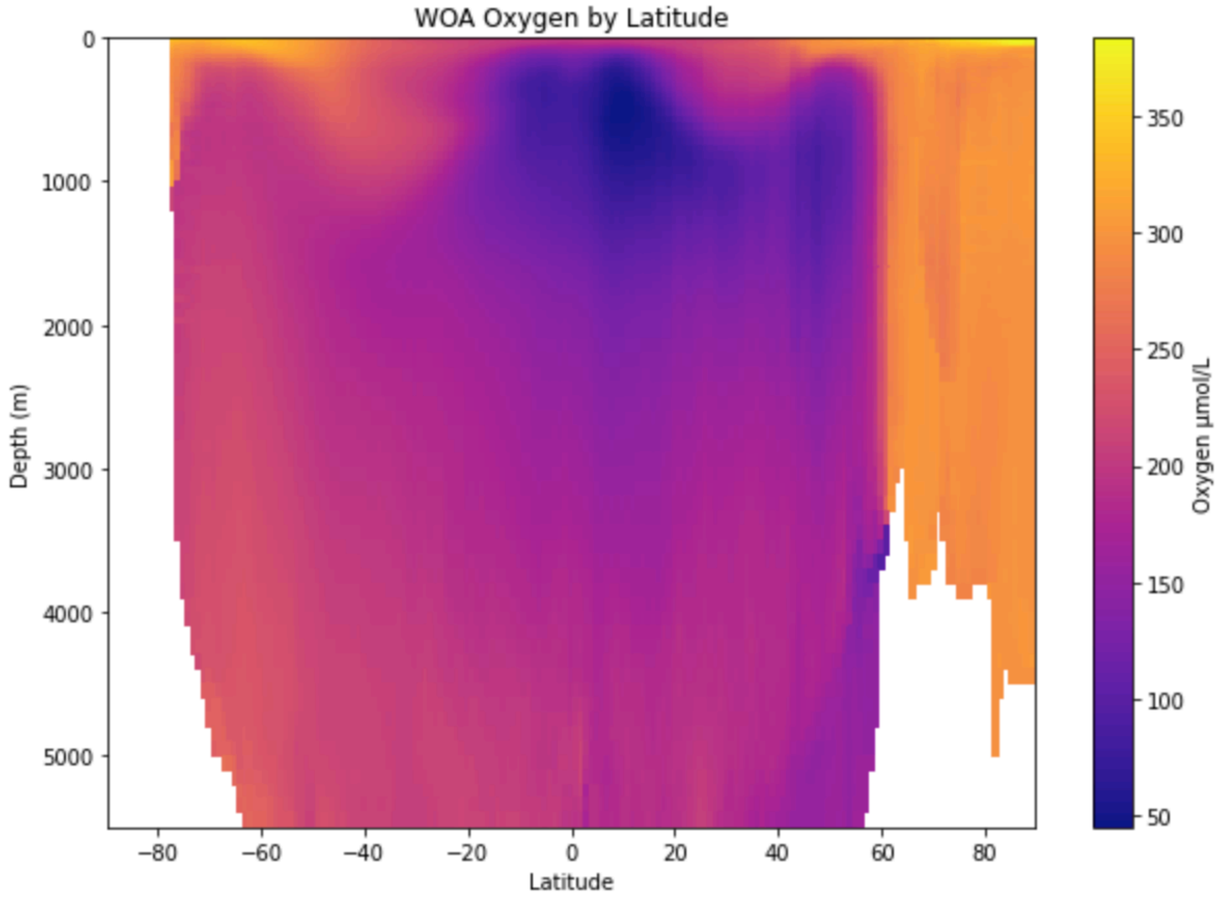




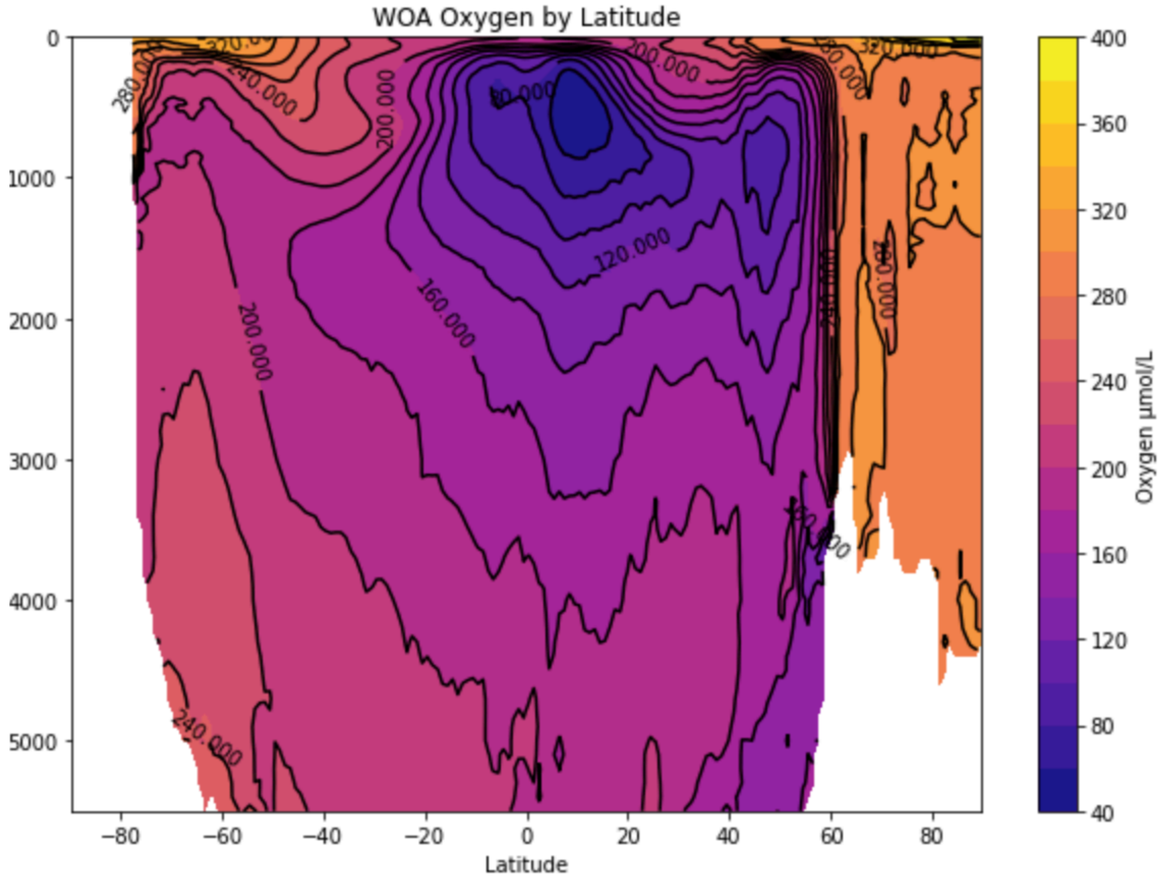


2-dimensional plotting

`pcolormesh()`



`contourf() + contour()`



Activity - load data and map it

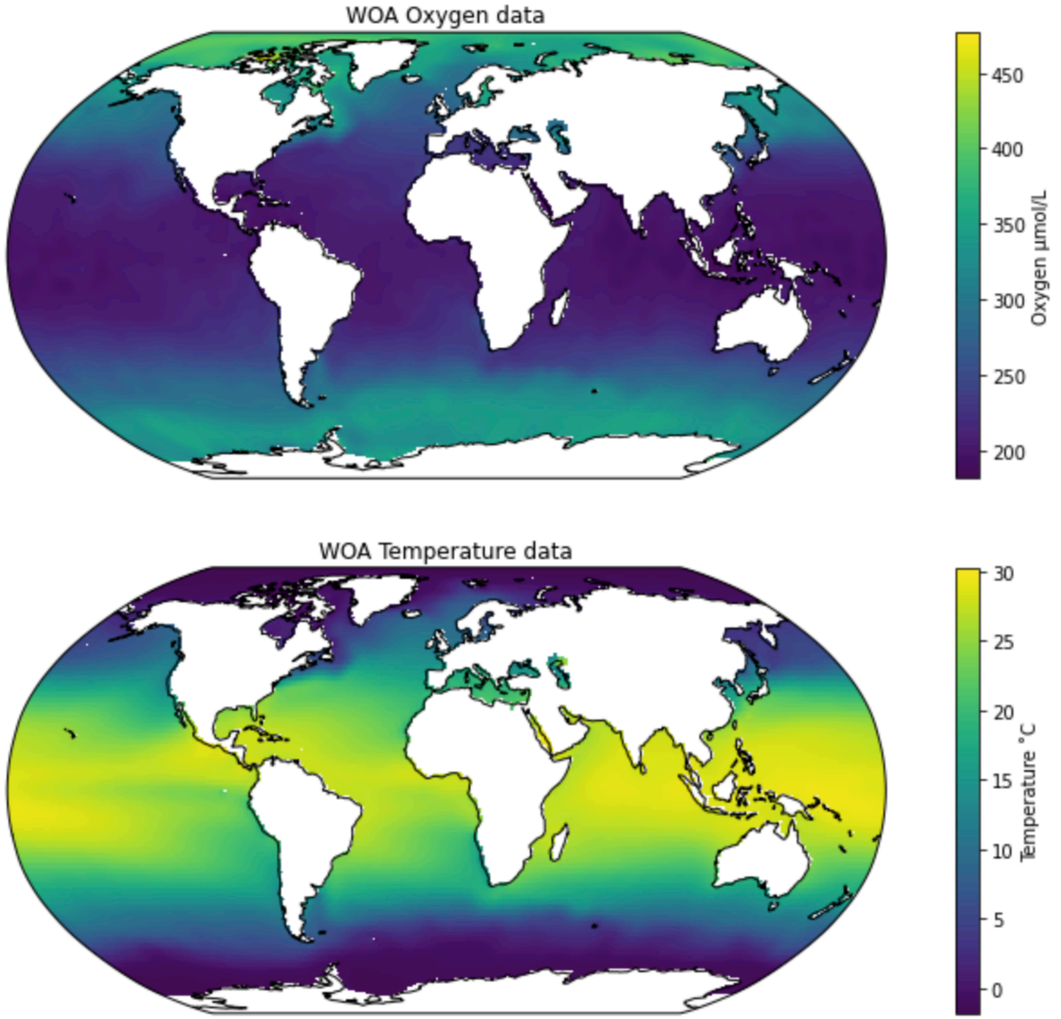
1. Create a new figure

Map the surface oxygen

2. Add a subplot to the figure using fig.add_subplot(). This subplot should be the first of 2 columns and should have the Robinson() projection. Add a coastline to your plot.
3. Put a pseudocolor plot (pcolormesh) of oxygen onto the plot (use a transform of PlatCarree()).
4. Put a colorbar on the plot. Label the colorbar.

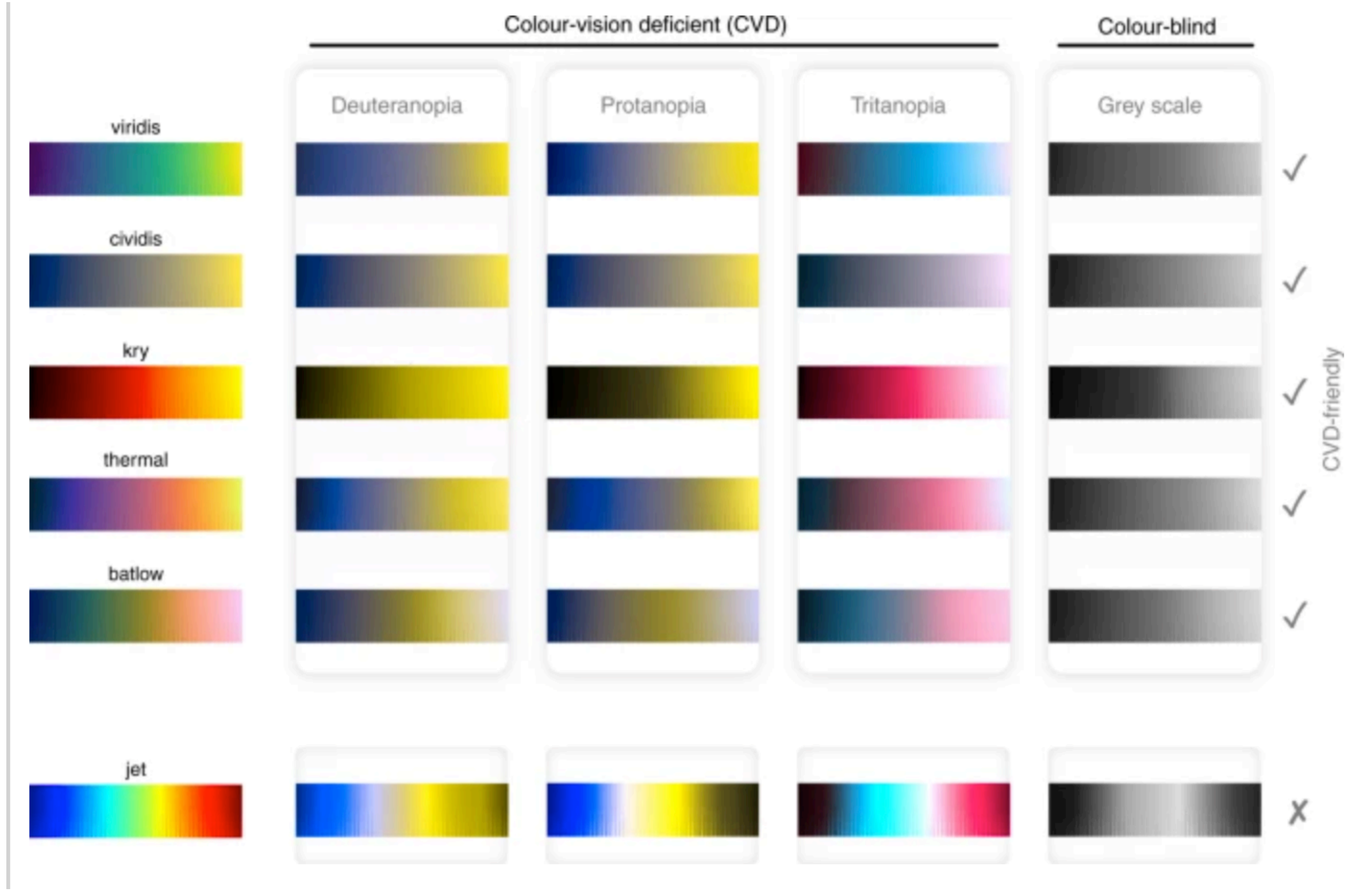
Repeat for the surface temperature

5. Add a subplot to the figure using fig.add_subplot(). This subplot should be the second of 2 columns and should have the Robinson() projection. Add a coastline to your plot.
6. Put a pseudocolor plot (pcolormesh) of oxygen onto the plot (use a transform of PlatCarree()).
7. Put a colorbar on the plot. Label the colorbar.

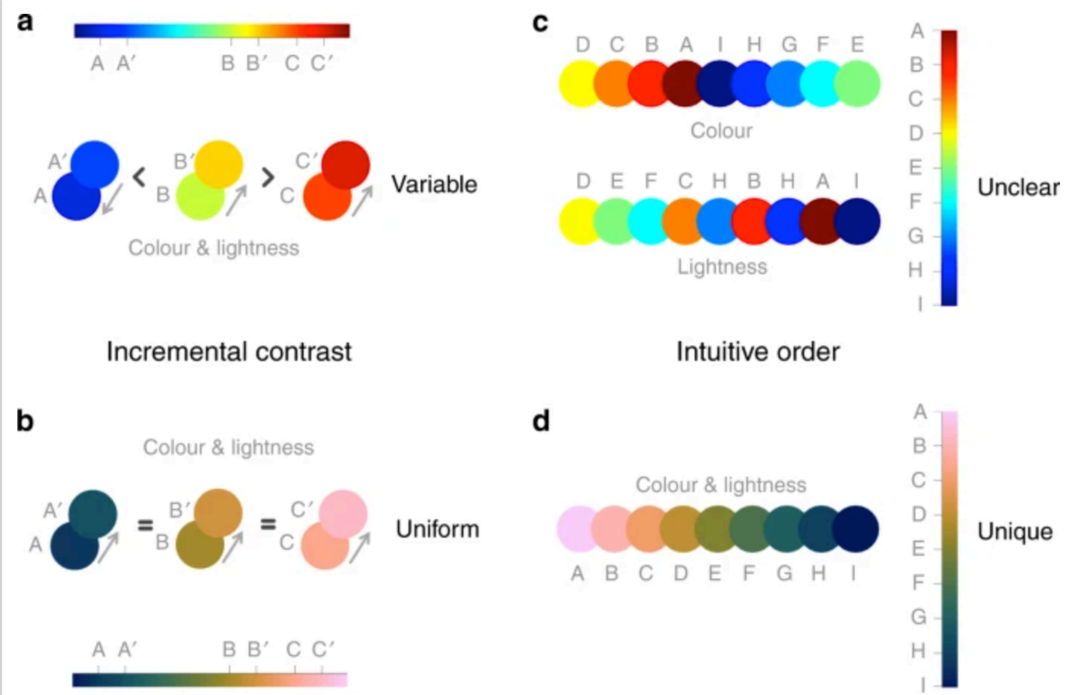


Colormap etiquette

Accessibility - colorblindness



Perceptually uniform



https://www.nature.com/articles/s41467-020-19160-7

Crameri, F., Shephard, G.E. & Heron, P.J. The misuse of colour in science communication. *Nat Commun* **11,** 5444 (2020). https://doi.org/10.1038/s41467-020-19160-7

Colormap etiquette

Why Not Grayscale For Everything?

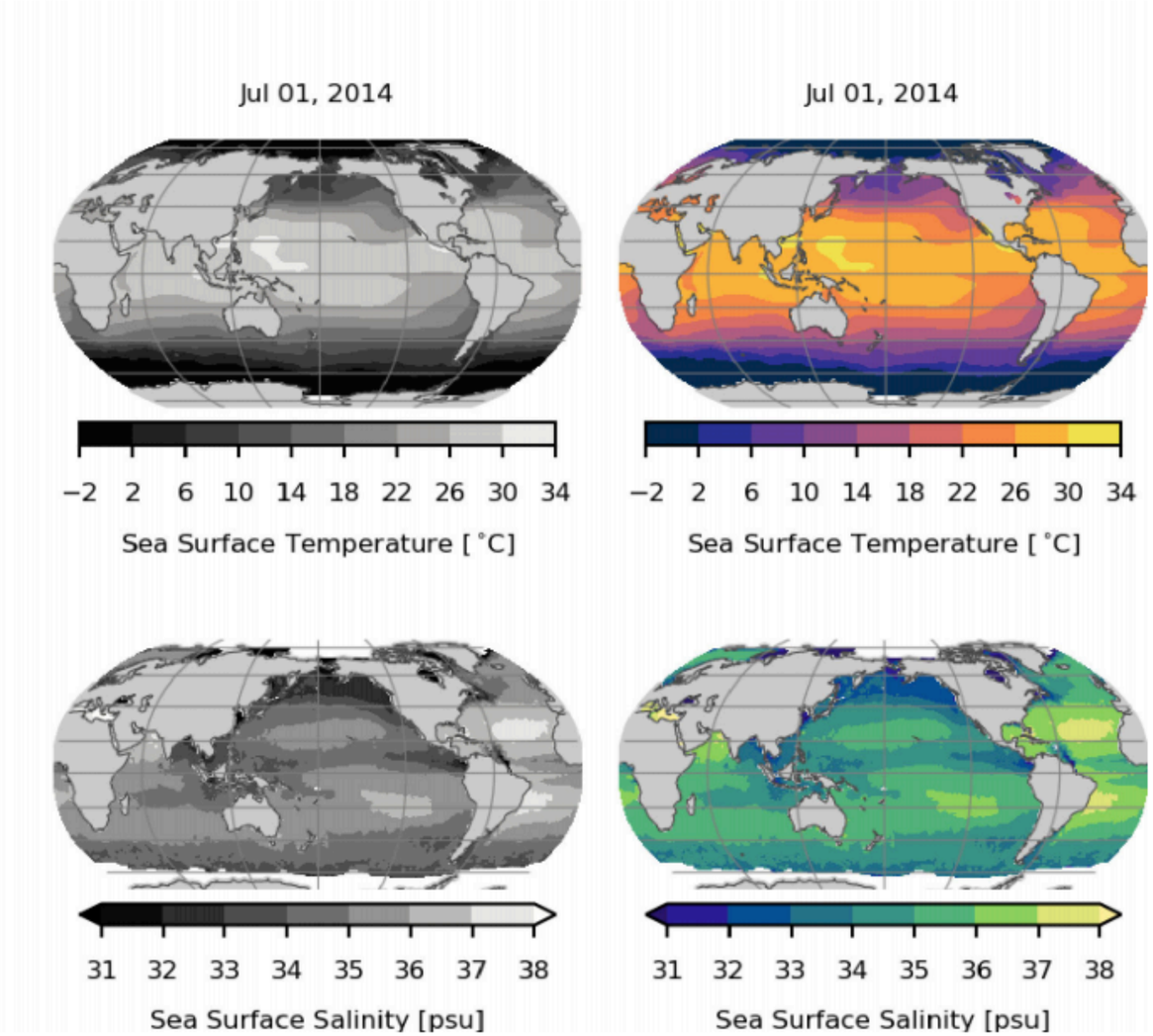
When in doubt, perceptually uniform grayscale is an excellent option.

However, using color allows tailoring colormap to data:

– Sequential vs diverging data

– Match intuition with variable

– Have one colormap per variable to build recognition

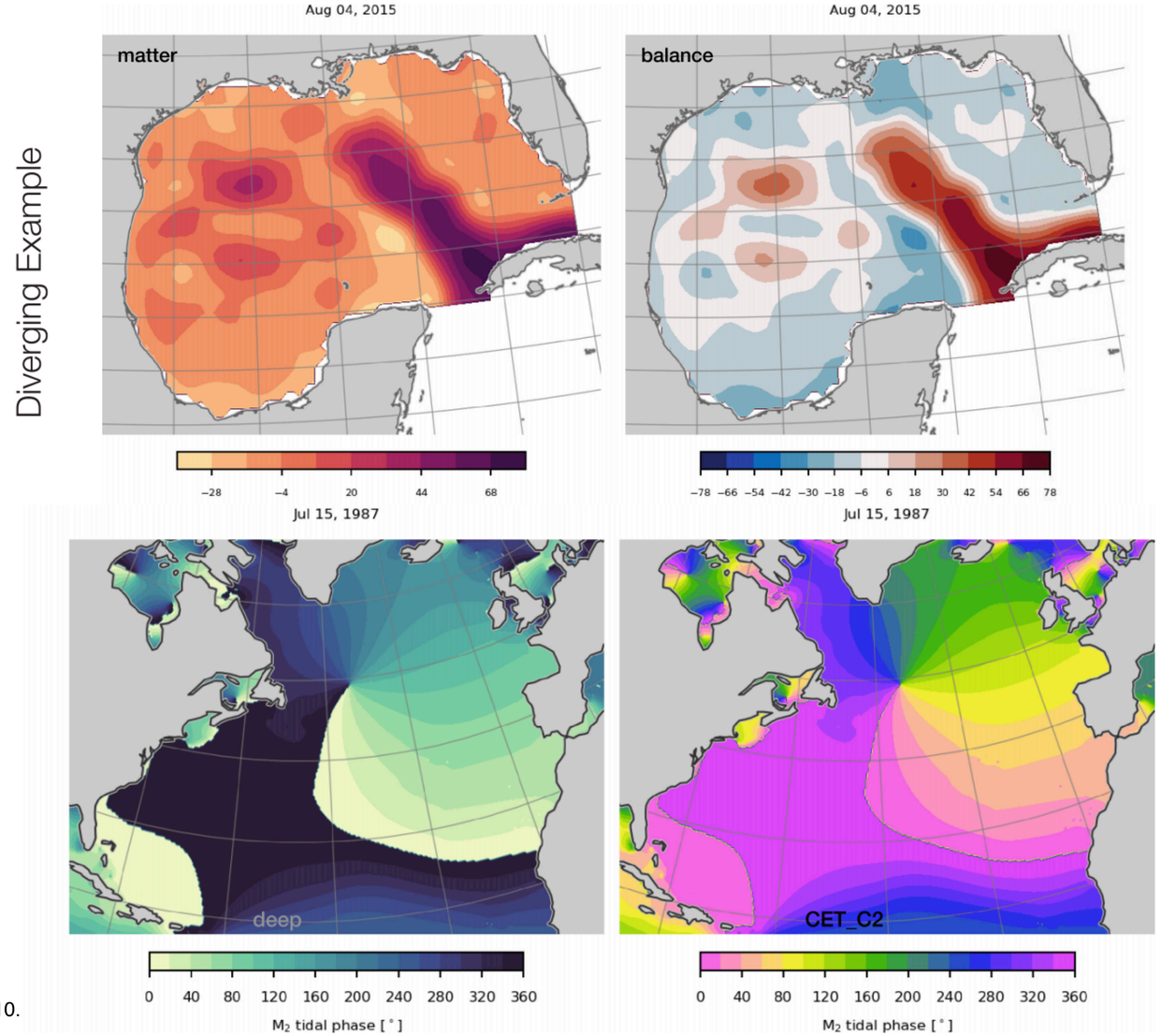


https://sci-hub.se/10.1109/MCSE.2020.3006946

Thyng, K. M., & Comba, J. (2020). *The Importance of Colormaps. Computing in Science & Engineering, 22(5), 96–102.* doi:10.1109/mcse.2020.3006946

Colormap etiquette

1. Use a perceptually uniform colormap
2. Check for colorblind accessibility
3. Use one colormap per variable in data.
4. Use intuitive colors (dark for low, bright for high / blue for cold, red for hot).
5. Avoid colormaps that have white as endpoints when possible (might imply missing data)
5. Use diverging or cyclical colormaps when needed.



https://sci-hub.se/10.1109/MCSE.2020.3006946

Thyng, K. M., & Comba, J. (2020). *The Importance of Colormaps. Computing in Science & Engineering, 22(5), 96–102.* doi:10.