**04/11/2024 PlioMIP2 Summary**

**File Naming and Organization:**

**Folders:**

Preprocessing Notebooks:

* Path: /glade/u/home/nwrye/OceanTemps\_Compiles/Preprocessing Notebooks
  + Contains all model preprocessing, original Excel for proxy data preprocessing, and a final .nc file that contains the results of the proxy data preprocessing.

Preprocessing Model Files:

* Path: /glade/u/home/nwrye/OceanTemps\_Compiles/Preprocessed Model Files
  + Contains all models, including MMM, sliced (-2, 2 lat, and depth) .nc files that are used in the main notebooks.

Plot Images:

* Path: /glade/u/home/nwrye/OceanTemps\_Compiles/Plot Images
  + This is the home of images for the final study.

PlioMIP2\_EquatorV#:

* Path: /glade/ u/home/nwrye/OceanTemps\_Compiles/PlioMIP2\_Equator\_V#
  + Contains the main notebooks used in creating proxy data comparison plots and analysis. There are five versions of the code. The fourth and fifth versions are practically the same but with the fifth being stripped of all experimental and data checks.

Finished Depth and Temp Plots:

* Path: /glade/u/home/nwrye/OceanTemps\_Compiles/Finished Depth and Temp Plots
  + Should be self-explanatory as they contain some finished depth vs. Lat and and global SST plots.

Equator Anomaly Files:

* Path: /glade/u/home/nwrye/OceanTemps\_Compiles/Equator Anomaly Files
  + Contains all models, excluding MMM, anomaly data (in which the zonal/horizontal difference function has been applied to the data) so that it does not need to be calculated in the main notebooks anymore. (This calculation is still included in version 1 for reference on how it was performed.)

**Notebook Paths:**

PlioMIP2\_Equator\_V1.ipynb à/glade/ u/home/nwrye/OceanTemps\_Compiles/PlioMIP2\_Equator\_V#/PlioMIP2\_Equator\_V1.ipynb

PlioMIP2\_Equator\_V2.ipynb à/glade/ u/home/nwrye/OceanTemps\_Compiles/PlioMIP2\_Equator\_V#/PlioMIP2\_Equator\_V2.ipynb

PlioMIP2\_Equator\_V3.ipynb à/glade/ u/home/nwrye/OceanTemps\_Compiles/PlioMIP2\_Equator\_V#/PlioMIP2\_Equator\_V3.ipynb

PlioMIP2\_Equator\_V4.ipynb à/glade/ u/home/nwrye/OceanTemps\_Compiles/PlioMIP2\_Equator\_V#/PlioMIP2\_Equator\_V4.ipynb

PlioMIP2\_Equator\_V5.ipynb à/glade/ u/home/nwrye/OceanTemps\_Compiles/PlioMIP2\_Equator\_V#/PlioMIP2\_Equator\_V5.ipynb

Final\_Lat\_Depth\_TEMP\_Plots.ipynb à /glade/u/home/nwrye/OceanTemps\_Compiles/Finished Depth and Temp Plots/Final\_Lat\_Depth\_TEMP\_Plots.ipynb

Final\_Global\_SST\_Plots.ipynb à/glade/u/home/nwrye/OceanTemps\_Compiles/Finished Depth and Temp Plots/Final\_Global\_SST\_Plots.ipynb

OceanTEMP\_Plots.ipynb à/glade/u/home/nwrye/OceanTemps\_Compiles/Preprocessing Notebooks/OceanTEMP\_Plots.ipynb

**Notebook Descriptions:**

PlioMIP2\_Equator\_V1 – This is the first version of the main notebook that I have been working on for the whole length of the project. It contains the plots that will be manipulated in V2 for final plots.

* Pitfalls:
  + Includes RSME values and unreliable bias values.
  + Hard to understand coding with the bias and RSME calculations.
  + Unnecessary calculations and lengthy coding.

PlioMIP2\_Equator\_V2 – Accomplishes almost all that V1 does with many improvements and is the current main notebook I am working on. I am still working on getting reliable bias values, but it should be easier because of the new and improved data structure.

Some improvements are as follows:

* + I do not create the anomoly files in V2. I do this in V1.
  + The function h\_diff found in V1 is replaced with the original horizontal\_difference function for consistency.
  + Violin plots are now opaque for better comparative viewing to temperature anomoly background.
  + The gathering and plotting of RGBA values have been streamlined to be more condensed and easier to interpret.
  + Contour plot dashes for areas greater than 5C have been removed.
  + Removed RSME analysis entirely.
  + Moved the multimodel mean into the anomaly files dataset array.
  + Adds the bias values to the plots.
  + K- Cluster analysis was added
  + Moved cells to make more logical sense
  + Performs Shapiro-Wilks test to determine gaussian distributions and plots the mean and variance according to a gaussian distribution.
  + All species have been added to the plots.

PlioMIP2\_Equator\_V3 – This version obtains the correct values and plots.

Some improvements are as follows:

* + Important Version Differences:
  + Resizing of colorbar
  + Computed Silhouette Scores
  + Determined three clusters based on elbow method using distortion
  + Created bias only plots

PlioMIP2\_Equator\_V4 – This is a more polished version of V3 and includes distortion analysis

Some improvements are as follows and are subject to change:

* Added distortion method for validation on value of k for clustering
  + Saving figures and plots using pdf instead of png for formatting reasons.

PlioMIP2\_Equator\_V5 – All methods have been verified to be correct and should be the final version of this code.

**Final Images and Notebooks:**

* The finished images and notebooks are in the GitHub repository under their respective naming conventions. If you have any questions about them or the organization, please let me know!