Progress Report 2/20

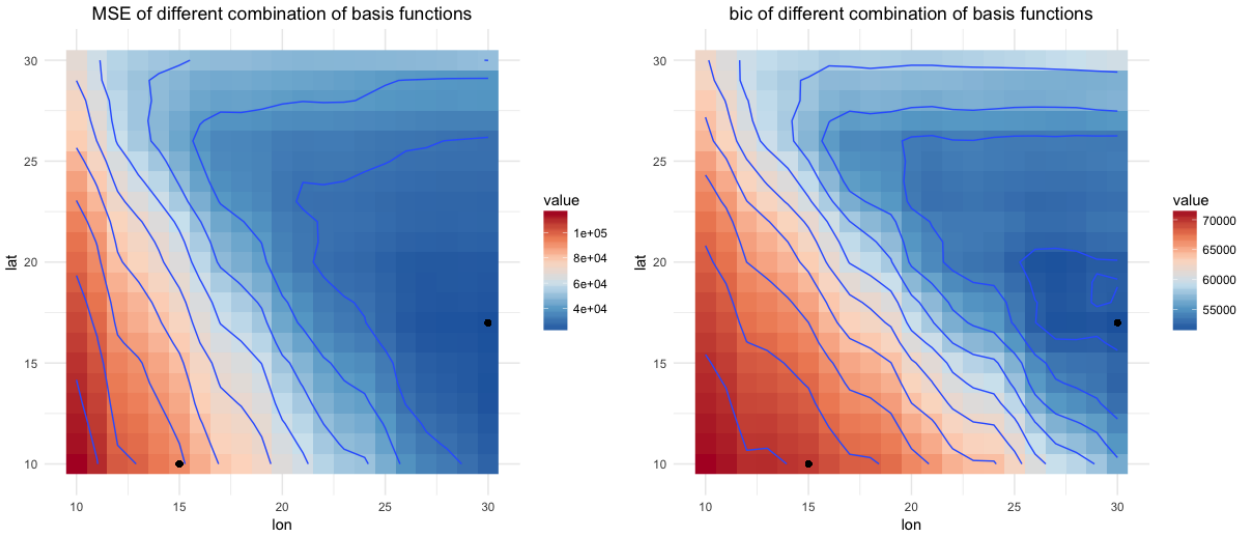
Last Week

1. Choose number of basis functions to use
2. Visualize differences between the prior and the central regions
3. Switch to new data and check code

Results

Basis Functions

I looked at the MSE and the BIC of the approximate field using between 100 to 900 basis functions. 150 (15 x 10) seemed to provide a decently low MSE and BIC for a "low res" approximation of the field. 510 (30 x 17) was used for a "hi res" approximation since this combination minimized the BIC.



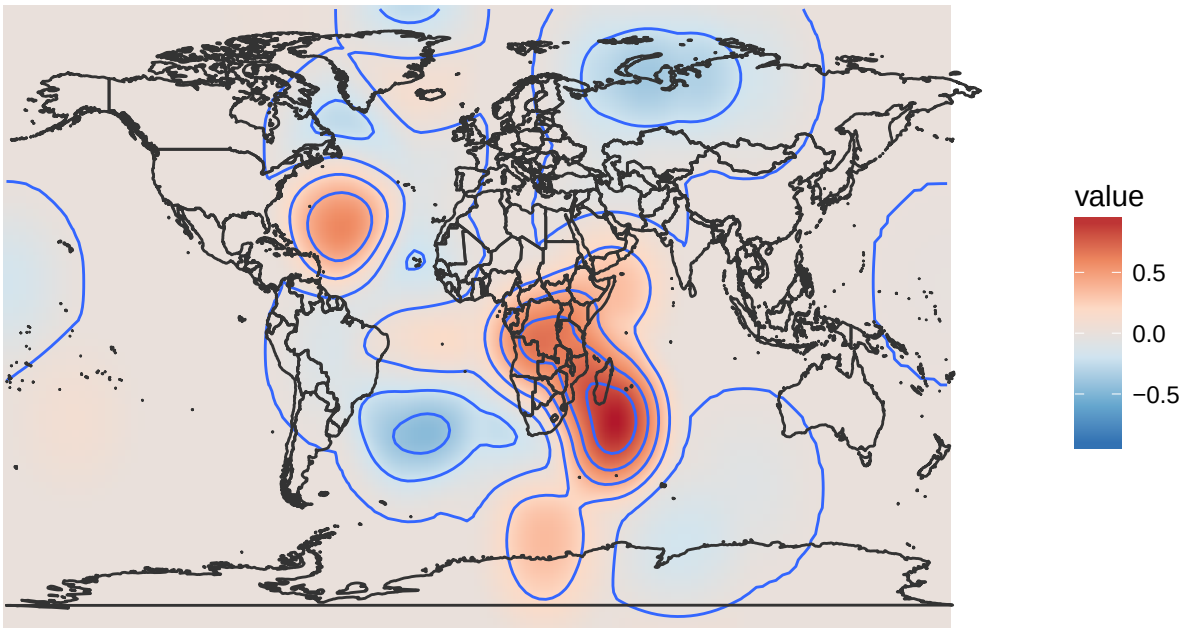
Visualization

To visualize the differences between the central regions and the prior I first found how far each coefficient was above or below the 95% central region (being in the central region counted as 0). I then mapped these distances back to a spatial field using the (low res) basis functions to get the following plots.

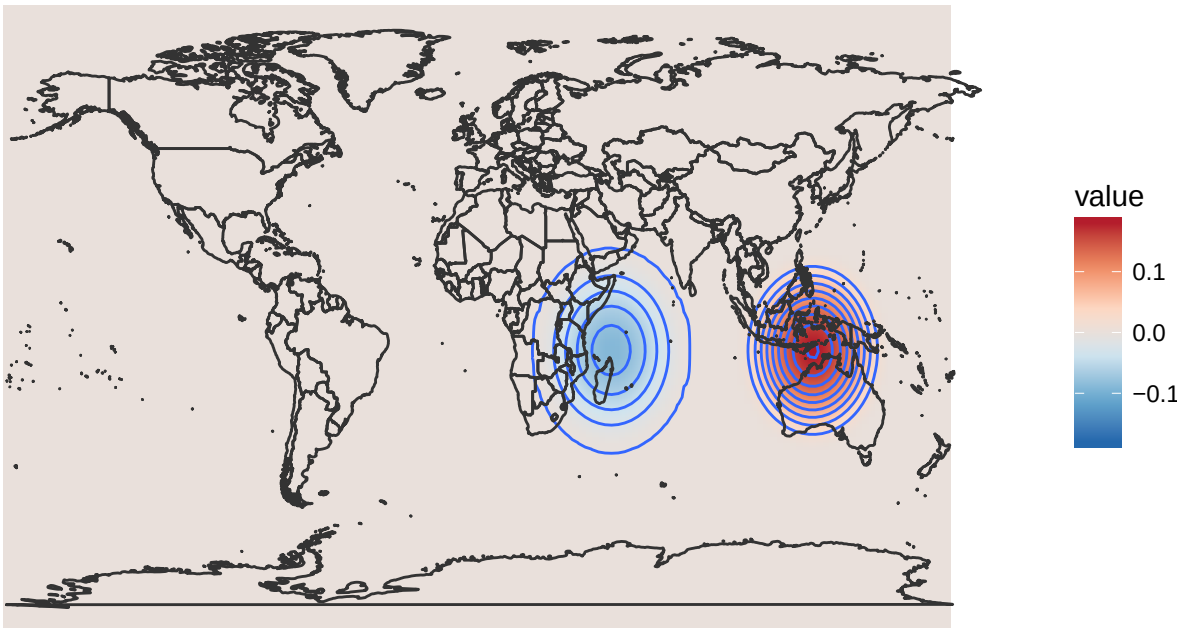
I plotted the "distance fields" at 3 widely spaced time points that show that: 1. Where the prior differs from the ensemble changes over time 2. How much it differs can change over time

Additionally I suspected that the places where the prior signficantly differed from the ensemble would be around the proxy sites, so I pulled the graph of proxy network from the Smerdon paper. Visually it looks like the prior is most likely to be outside of the 95% central regions near the proxy sites. However, not all proxy sites cause the ensemble and prior to differ significantly.

T = 100



T = 400



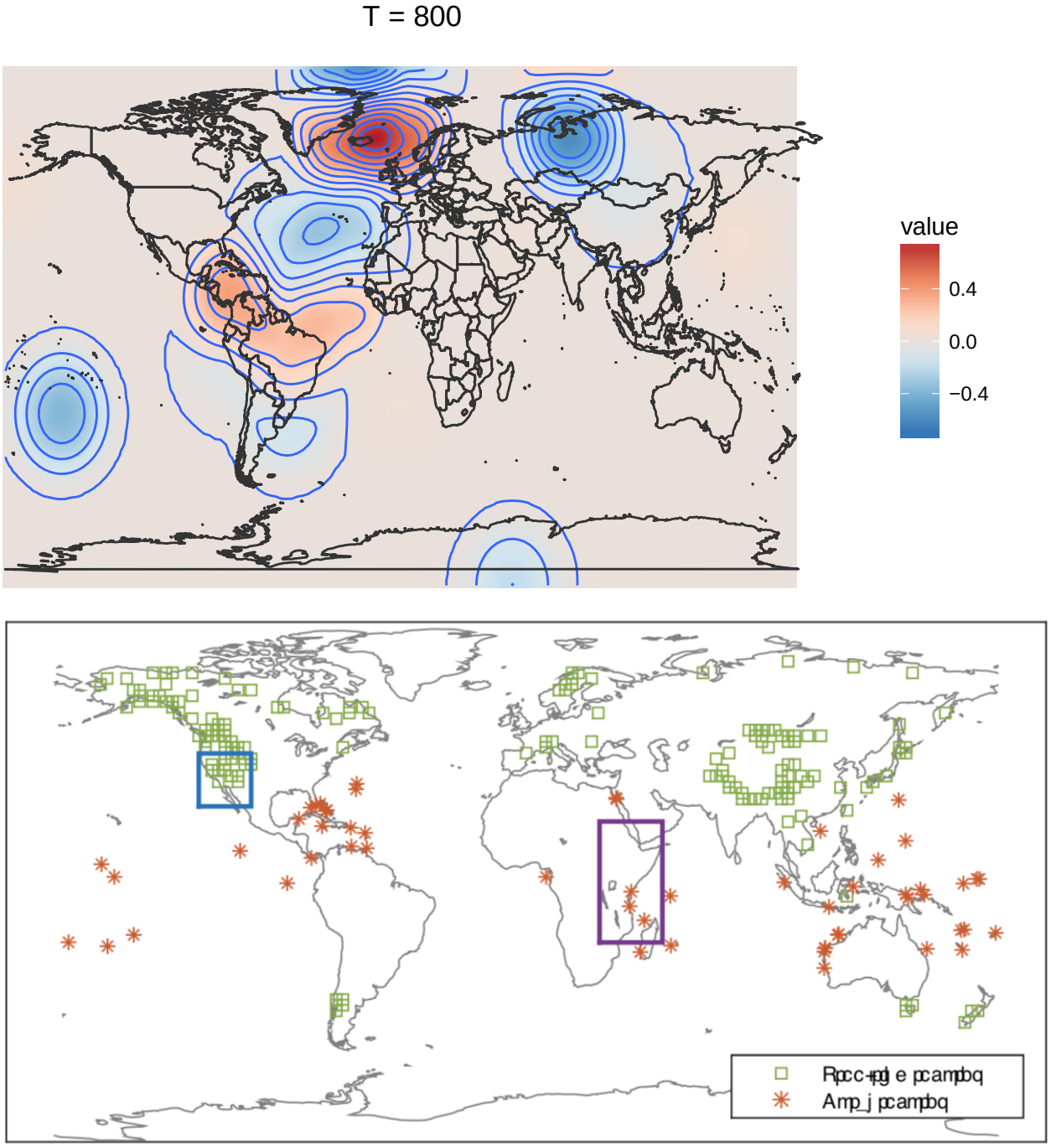


Figure 1: "Proxy Sites"

Issues

1. The world map and the heatmap might be misaligned. Russia clips a little and antarctica appears to be shifted north. Setting the xlim and ylim doesn't seem to work and deletes countries from the map...
2. It would be nice if I could add the proxy locations into my graphs

3. More basis functions = much slower run times. Not a problem now when I'm just inspecting 5-10 time points but could be a problem later if I need to run all 998 times.

Next Week

1. Fix the graphs. Clean up and optimize code.
2. Implement outlier detection from the paper and see how results differ vs 95% central regions
3. Meet with collaborators. Find out whats interesting to pursue from here.
4. Anything else?
5. (Maybe) Talk to Naveen again about quanitifying differences between the fields