Summary of *Present and Future Köppen-Geiger climate classification maps at 1-km resolution*

In this paper the authors discuss the methods they used to manipulate existing climate data and fit it to a much higher resolution map. The authors recognized a need for higher resolution climate map data as the current maps have low resolution (≥ 0.1°), or do not correct for topographical variations. None of these older maps included uncertainty estimations, either. As well as providing a higher resolution, more accurate climate map, that also gives the researchers confidence levels in their measurements for the past, they used several predictive data sets to provide high resolution climate change maps until the year 2100.

The method the authors used to develop these maps took me a bit of time to understand. To develop the present day climate maps, the authors collected temperature data from 3 different data sets, and precipitation data from 4. Then they created 12 different Köppen-Geiger maps by correlating each temperature dataset with every precipitation database and assigning a climate class to each 0.0083° grid square. At this point is where I feel the authors developed an excellent system for assigning the climate classes. They took the 12 different maps and assigned each grid a climate class based on the most commonly appearing class in the group of maps. They then calculated a confidence map based on how frequently that climate class appeared on the 12 different maps. This, to me, makes great sense as it allows one to see just how confident the authors are that the assigned class is correct, which is useful in transitional areas.

The future climate data was assembled similarly, but with the datasets from 32 different future climate prediction models. This information was bi-linearly interpolated, which I learned is just a calculation to change the 'y' coordinate from one position 'x_1' to a new position 'x_2' in 2 different directions. This bilinear interpolation is used to change the resolution of the predictive maps to 0.0083°. Once this was done the authors used the same method to select the appropriate climate class and created the confidence map the same way as before.

The overall method used to develop these high resolution maps is intelligent, I believe. Using multiple datasets to choose the climate class, then providing a confidence map gives the user a certain degree of knowledge about how accurate the data they are using is. What I found most interesting though, is that the future prediction map shows a significant temperature change the further North, with a less significant change towards the South. One would imagine the temperature change gradient should be similar starting from the Equator and moving towards the poles. This prediction map shows the temperature increase gradient relatively the same (≅ +2° C to +4° C) from the South pole through the Equator, then increasing in temperature change to the North Pole, eventually reaching +8° C.

References

Beck, H. E., Zimmermann, N. E., Mcvicar, T. R., Vergopolan, N., Berg, A., & Wood, E. F. (2018). Present and future Köppen-Geiger climate classification maps at 1-km resolution. *Scientific Data, 5*(1). doi:10.1038/sdata.2018.214