Additional Material for the submission
Data Driven Color Mapping
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1 Information

In this additional material you will find larger version of the original images shown in the paper plus some annotations. We hope this helps you to see the benefit of our framework, which gives the user a convenient way to interpolate between different objectives in the color mapping transfer function at his or her convenience in order to emphasize different important aspects of the dataset.

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2 Choropleth Map

Figures 1 to 7 show examples of choropleth maps of the U.S.A. for the county-level unemployment data of 2009 from the Bureau of Labor Statistics using only six different colors.

Finding the right transformation function to map data values to color values in a meaningful way can be very difficult. In 1 a linear scaling was used. Outliers can be easily detected, e.g. in California, but especially in the mid-west the discriminability suffers. Logharithmic scaling, Figure 2, can help sometimes, but it is hard to find the right basis and the mapping does not work sufficiently in all cases. The same is true for any other transformation scheme. Our framework on the other hand is based on a mathematical framework that allows for smooth interpolation between a linear transform, which helps to keep the visual connection to the underlying data values, and a histogram equalization, which maximizes contrast and therefore discriminability for more similar values, Figure 3 to 8.

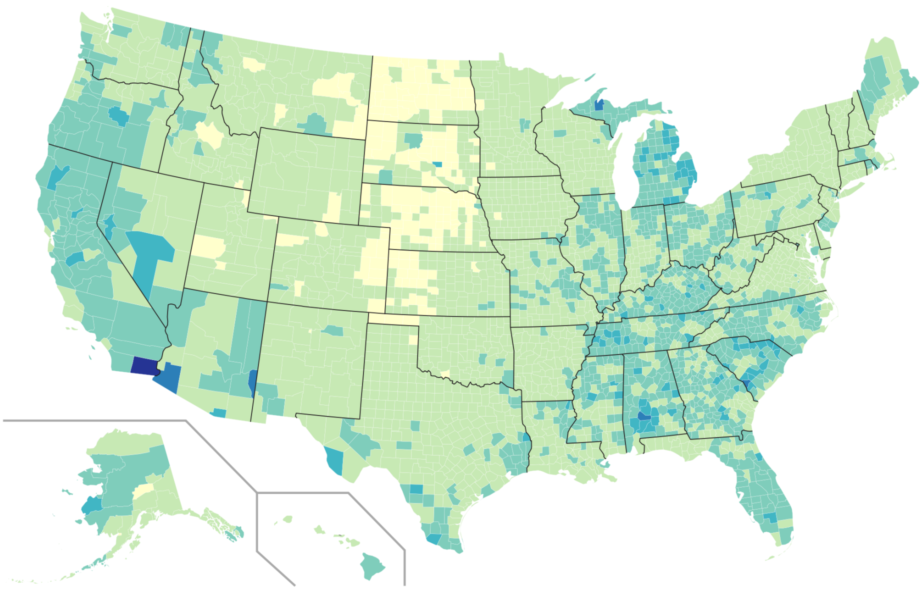


Figure 1: Linear scaling

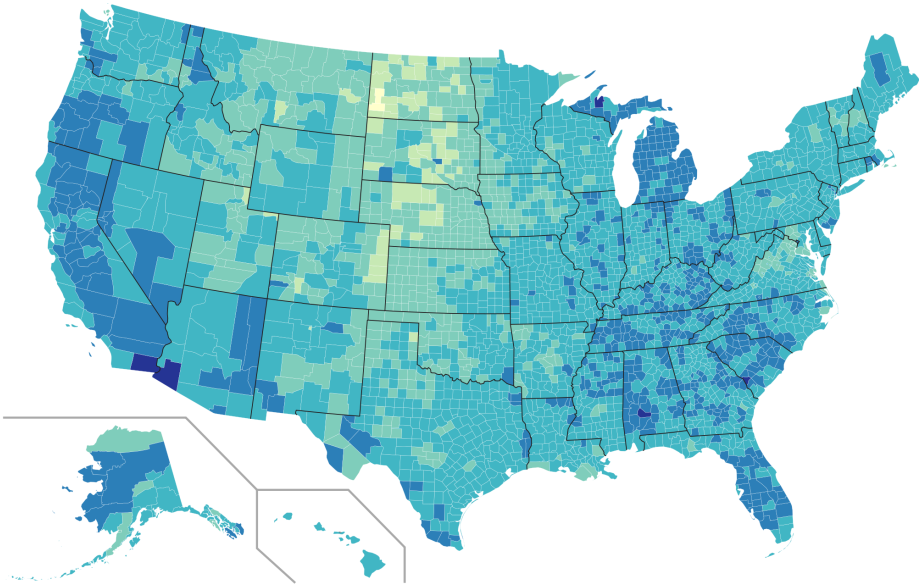


Figure 2: Logarithmic scaling

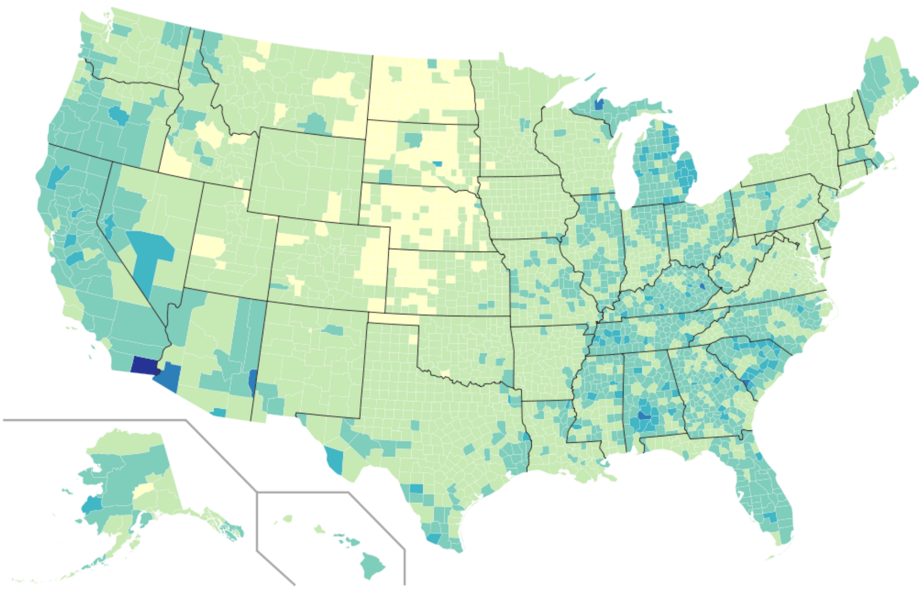


Figure 3: Our method. The angular value was set to $\alpha = 89.99$

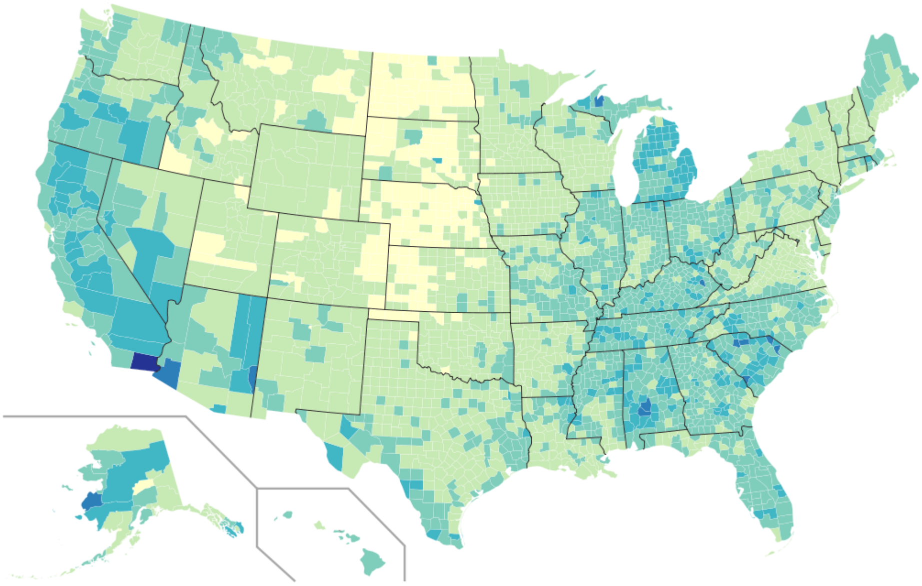


Figure 4: Our method. The angular value was set to $\alpha = 89.9$

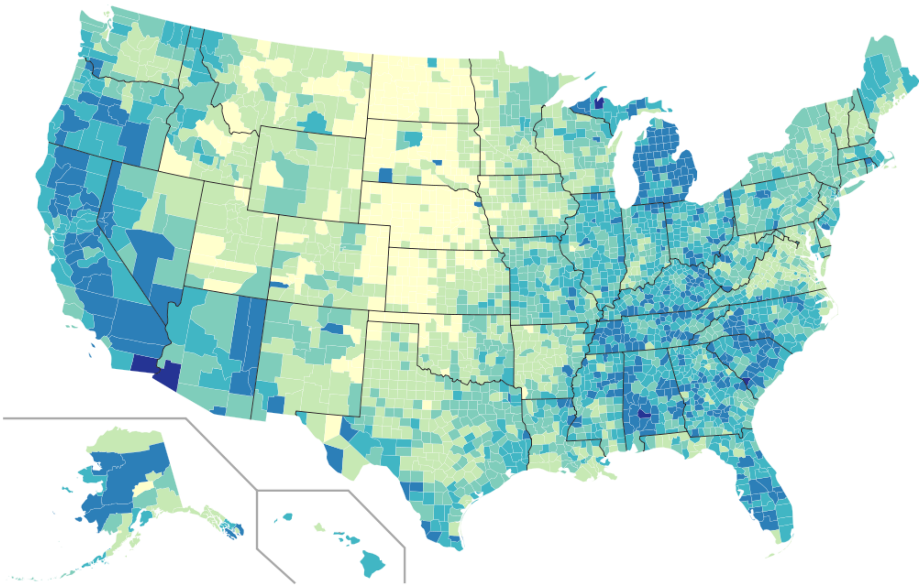


Figure 5: Our method. The angular value was set to $\alpha = 89$

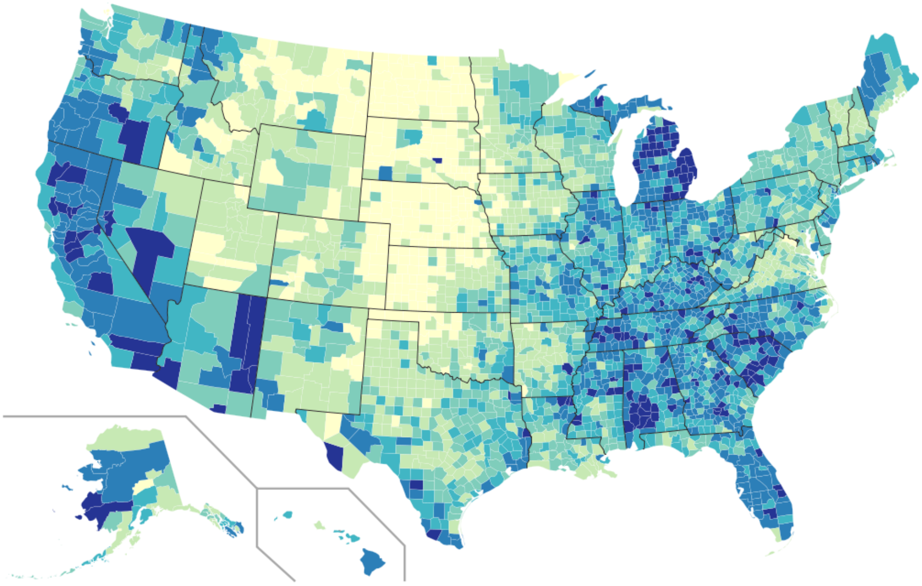


Figure 6: Our method. The angular value was set to $\alpha = 80$

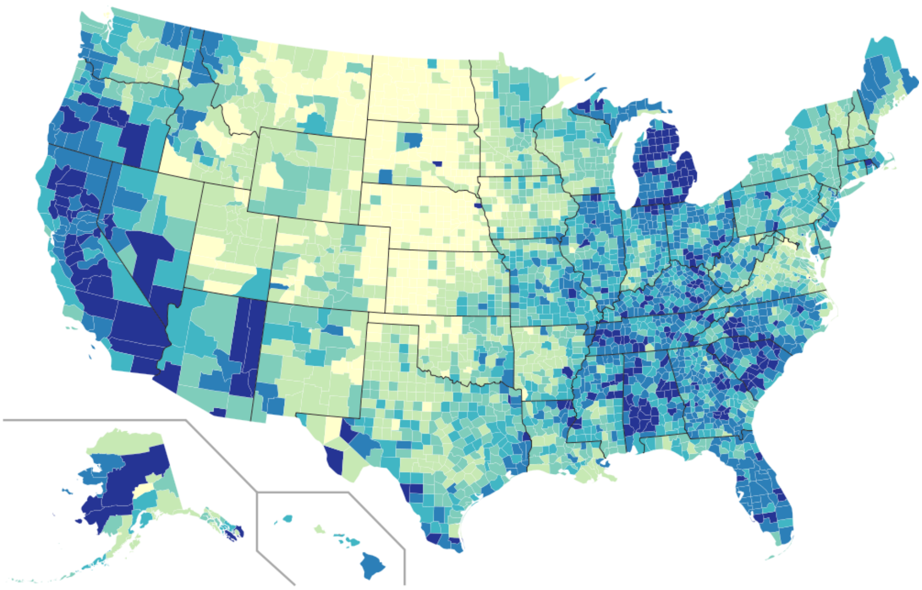
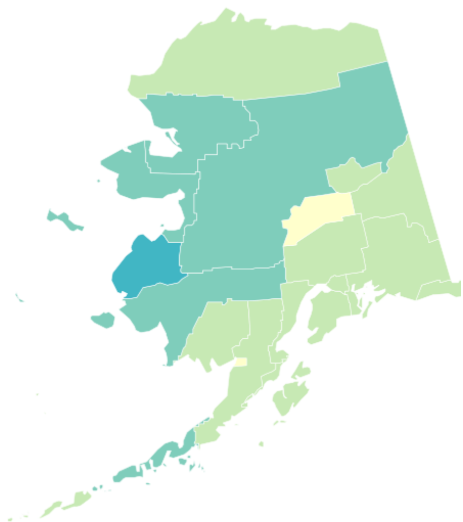
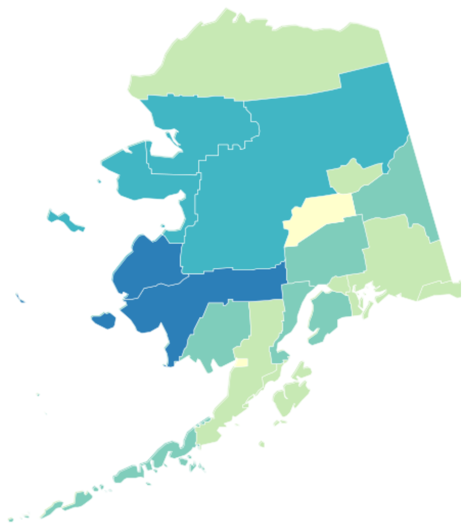


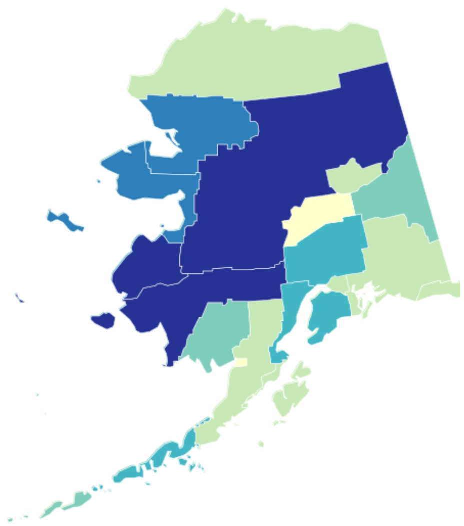
Figure 7: Our method. The angular value was set to $\alpha = 0.01$



(a) 90°



(b) 89.3°

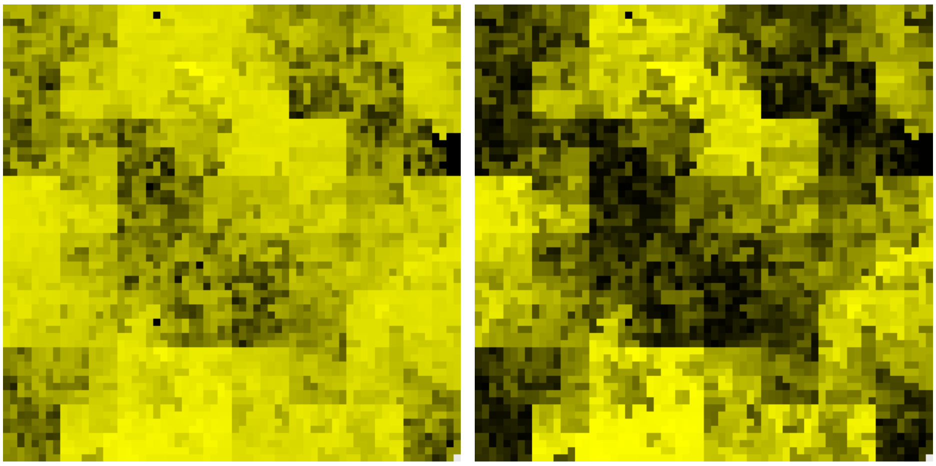


(c) 0.01°

Figure 8: Close-up of Alaska. (a) At 90° our method is equal to a linear scaling of the data values. (b) Our interpolation technique with an angular value of 89.3. (c) Choosing a value of almost 0 degree, the visual mapping equals a histogram equalization where the subtle differences become more obvious.

3 Jigsaw Maps

In Figure 9 the 35^{th} dimension of the Ozone data set [2] is shown as a Jigsaw map [1] which depicts the temperature at 8am in the morning throughout several years.



(a) 90° (b) 0.01°

Figure 9: Jigsaw Map of the 35^{th} dimension of the Ozone data set. While the linear color mapping with a 90° angle for a Jigsaw map [1] results in a rather dull appearance, our method is also able to create a more crispy result which makes it easier to depict the changes in temperature throughout the years.

References

[1] M. Wattenberg. A note on space-filling visualizations and space-filling curves. In *INFOVIS '05: Proceedings of the Proceedings of the 2005 IEEE Symposium on Information Visualization*, page 24, Washington, DC, USA, 2005. IEEE Computer Society.

[2] K. Zhang and W. Fan. Forecasting skewed biased stochastic ozone days: analyses, solutions and beyond. *Knowl. Inf. Syst.*, 14(3):299–326, 2008.