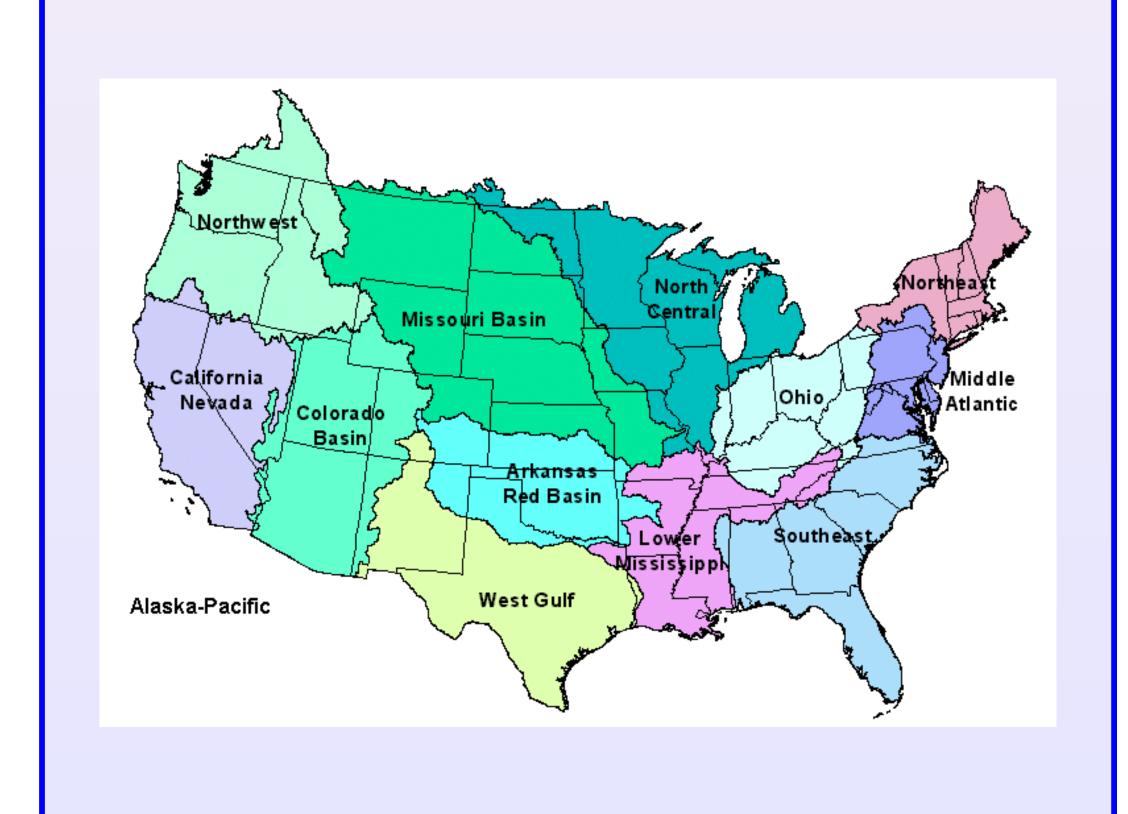
A GUI for Visualization and Preparing GCM Data for Use in SWAT

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Background

- The USDA-NIFA supports the endeavor to assess the impacts of natural decadal climate variability on agricultural yields in the Missouri River Basin (MRB).
- The UMBC-JCET team uses data provided by Global Climate Models (GCMs), specifically MIROC5.
- The GCM data is used to generate input to the Soil, Water Assessment Tool (SWAT), a modeling tool that predicts long term agricultural yields



Problem Statement Historical Observational Historical Historical Climate Climate Model Coefficients Generate Simulations Downscaling grids) decades Coefficients t 10x10 km ~100x100 Linear Regression-based downscaling Tobit regression-based downscaling Code Developed at UMBC (Mathematics and Statistics, JCET) in R Streamline the computational procedure of the above figure and generate

• Improve computational efficiency.

appropriate visualization.

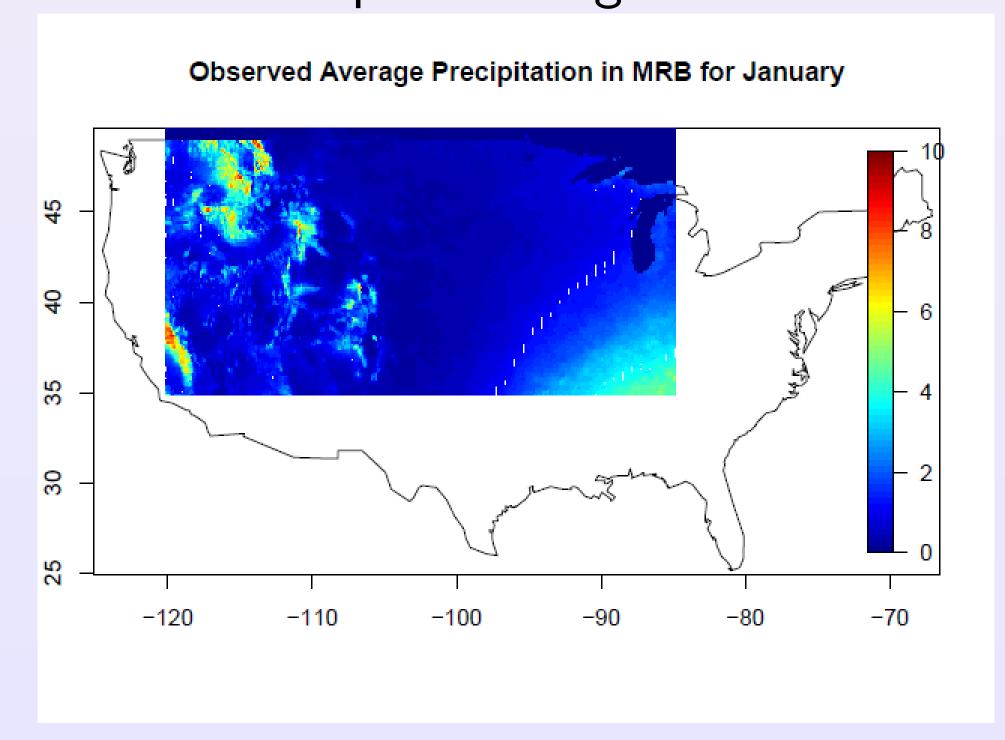
Methods

- Develop GUI: Streamline modelling process of downscaling, run SWAT and visualize data
- Improve Accuracy: Implement Tobit Regression for precipitation
- Parallelization: Write routine using parSapplyLB to perform regression at 30,000+ locations for 57 years of data

Screenshot of GUI

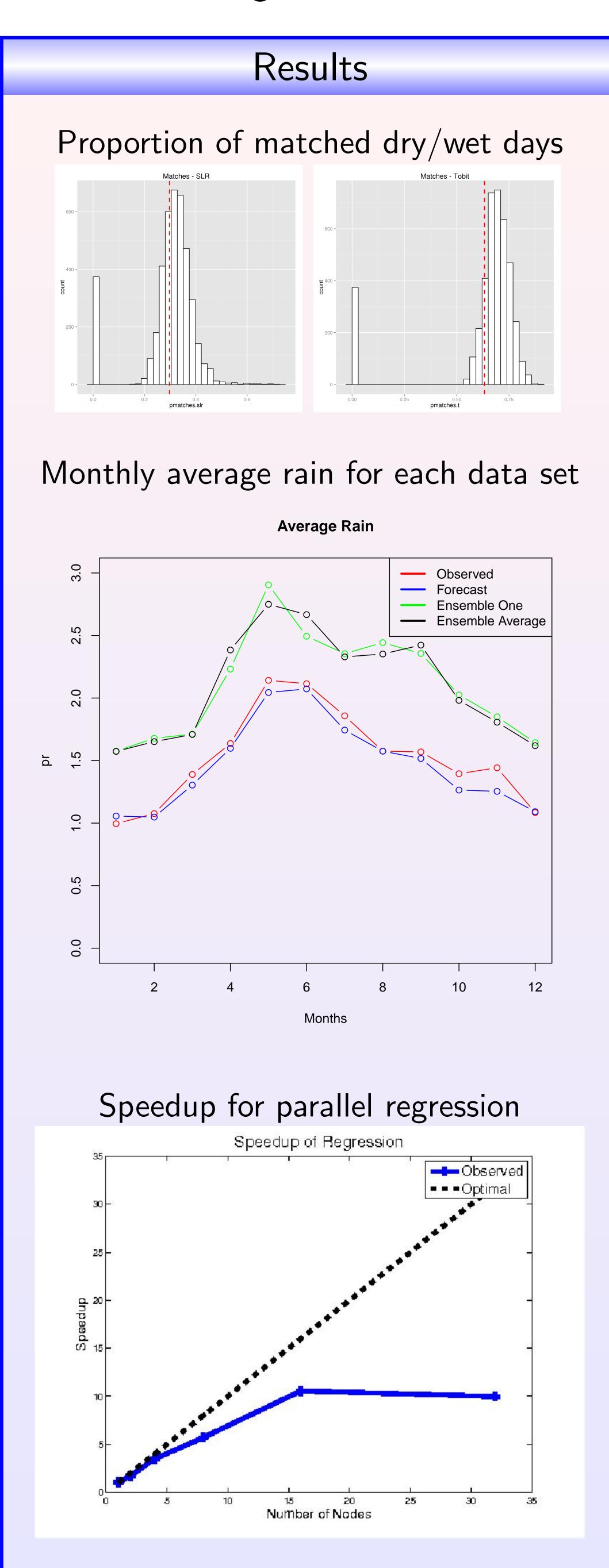
Select downscaling mode Downscale Select Interpolation method Bilinear Kriging Load observed data Select Regression method NO REGRESSION Linear Tobit Start Downscale	Parallel (Seri	Run SWAT Run SWAT from month year to month year Run SWAT	Plots Spatial Visualization Observed Model Forecast Difference of Observed and Model Make map	Time series from year to year Plot Time Series
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Map of average rain



References

- Full technical report: HPCF-2014-12 www.umbc.edu/hpcf > Publications.
- Background picture taken from http://water.weather.gov/ ahps/rfc/rfc.gif
- Problem statement flow chart taken from Client project proposal



Acknowledgments

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