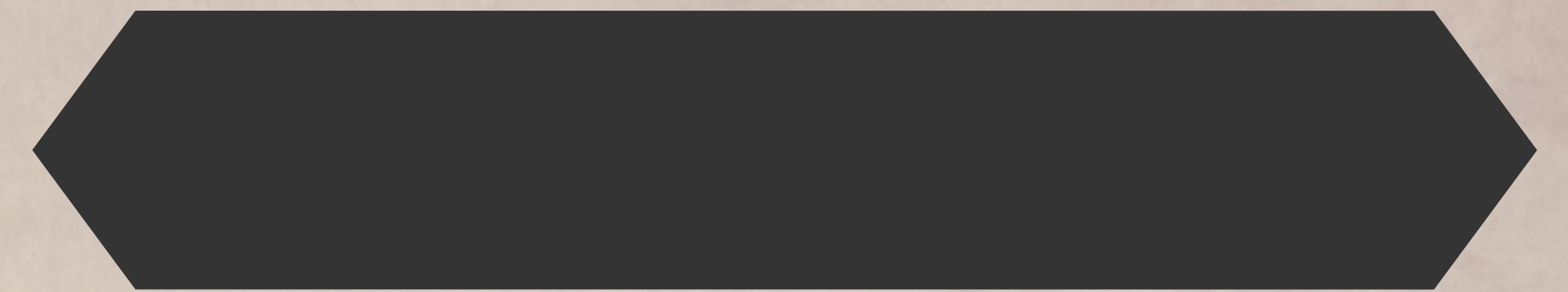
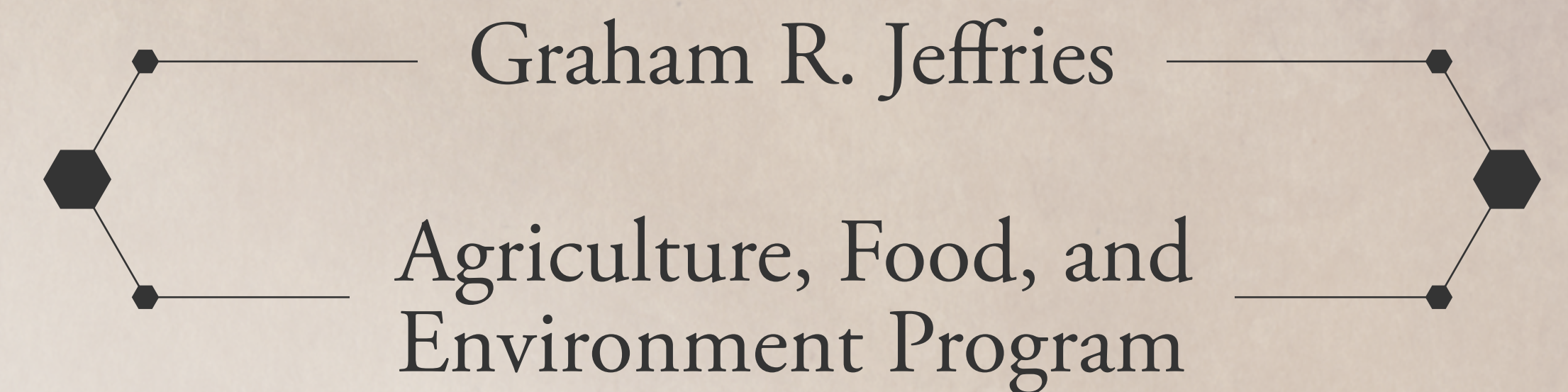


SPATIAL METEOROLOGY DATA FOR FOOD SYSTEM SCENARIO MODELING



In this research we develop geostatistical methods to create daily gridded meteorology datasets for the coterminous United States. The dataset is used in conjunction with crop growth simulation models to study how climate change may impact crop yields. A pilot study in Oxford County, Maine is used to test

geostatistical methods. Different spatial resolutions of interpolated data are employed to quantify crop model sensitivity to the quality and scale of meteorological data inputs.

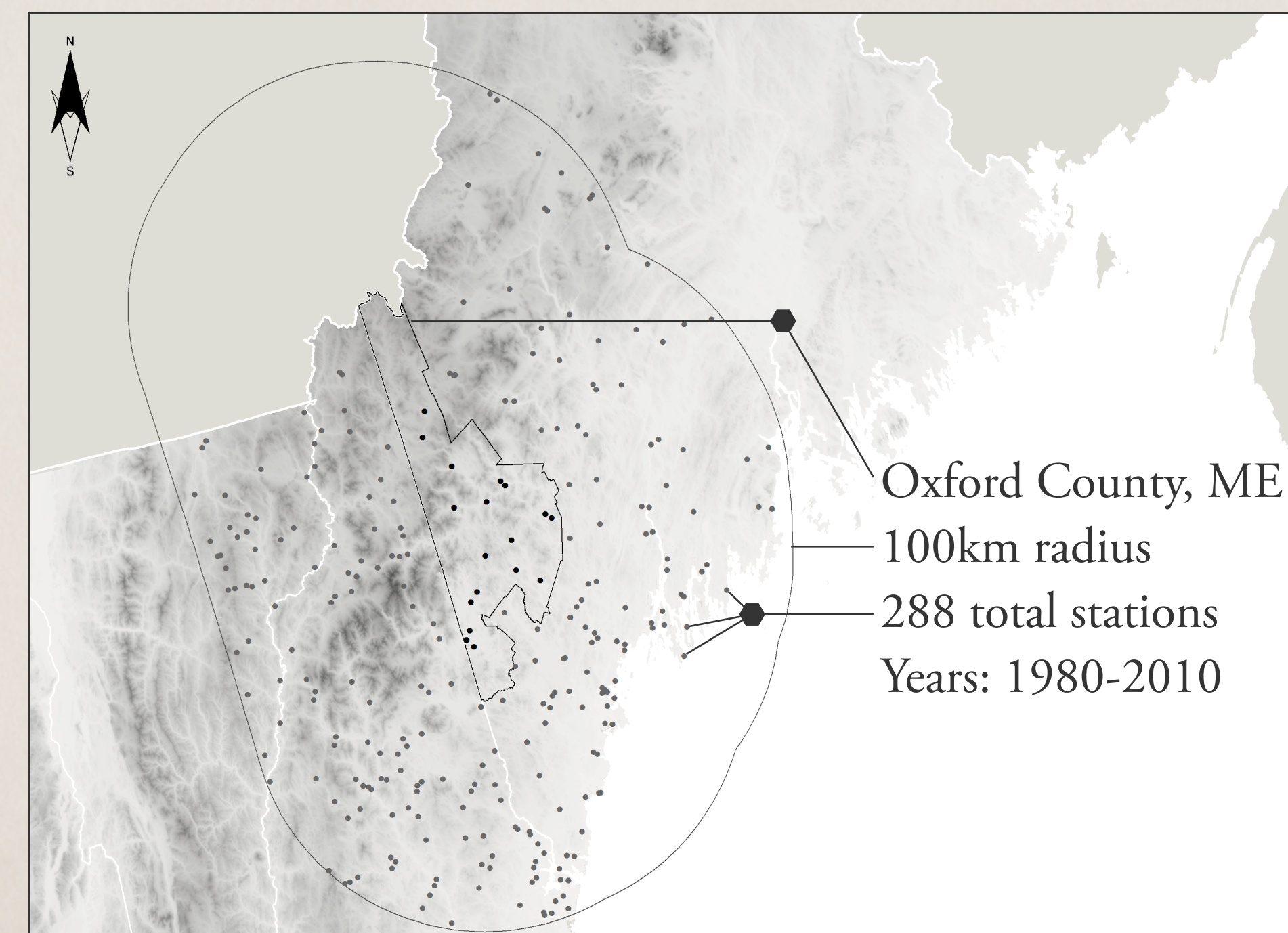
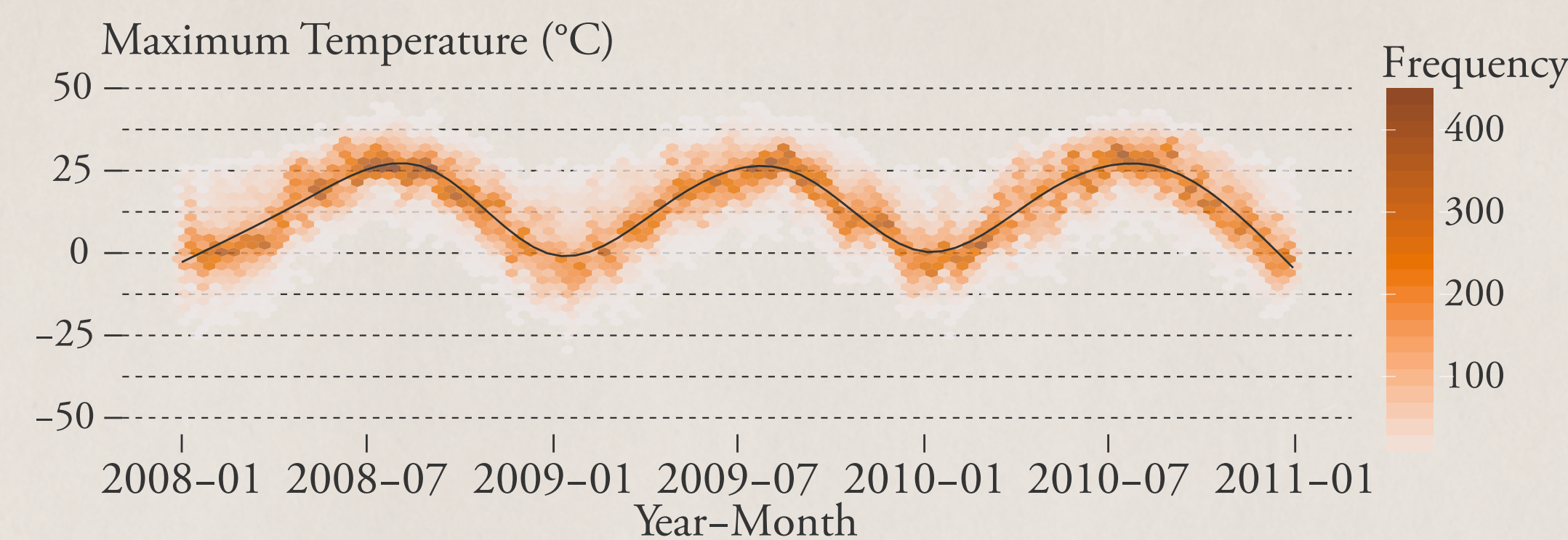


INTRODUCTION

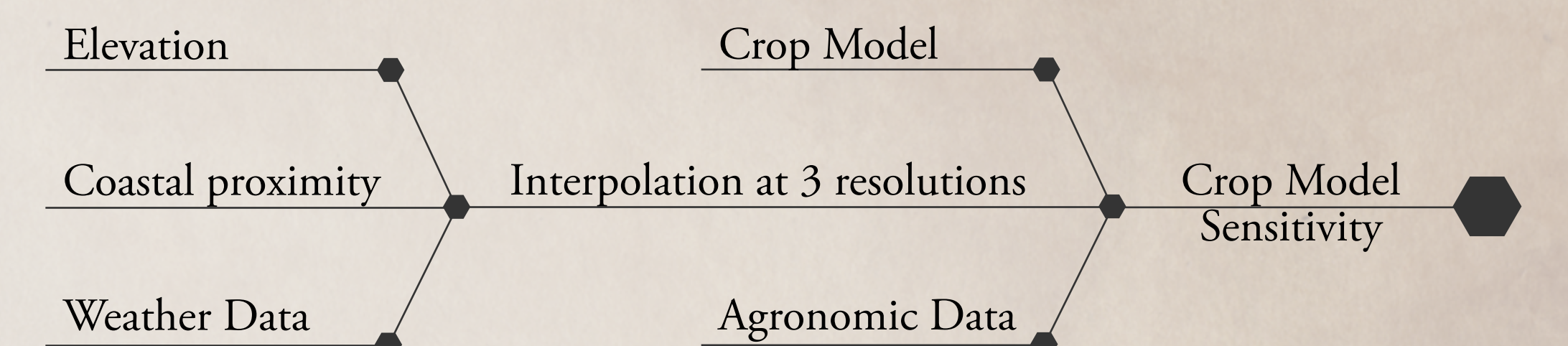
High-resolution meteorological data is essential for building robust interdisciplinary models of present and potential food production. Weather is continuous across space, but data is distributed only for weather station locations. For most environmental modeling, weather data must be spatially interpolated.

METHODS

Following Daly et al. (2007) and Di Luzio et al. (2008) geostatistical models are used to interpolate maximum and minimum temperature while accounting for elevation change and proximity to major water bodies. The ordinary kriging with external drift model is used. Building on Spadavecchia and Williams (2009), models incorporate spatial and temporal factors. Data for nearly 45,000 weather stations is programmatically scraped from the iAIMS climatic data portal (Yang et al. 2010). A subset for Oxford County, ME is used to develop and cross-validate the statistical models. Trend analysis is used to address temporal associations.



MODEL



PRELIMINARY RESULTS

Modeling efforts have confirmed and quantified the contribution of altitude and proximity to major water bodies to temperature distribution. Interpolations for Oxford County are complete and crop simulations are in progress.

NEXT

Complete crop model yield sensitivity analysis in Oxford

Scale up geostatistical interpolation methods

Visualize meteorological data with dynamic maps

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