

Reconstruction of Historical Atmospheric Data over Lake Tahoe

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Presentation Outline

- Introduction
- MM5 Model Description
- The Reconstructed Data
- Validation
- Conclusions

Introduction

- Limited observed data of atmospheric variables within the Lake Tahoe Basin
- Available observed data often has gaps due to missing data
- Hydrologic model of watersheds in the basin require distributed data to function
- Lake clarity model requires atmospheric data as input

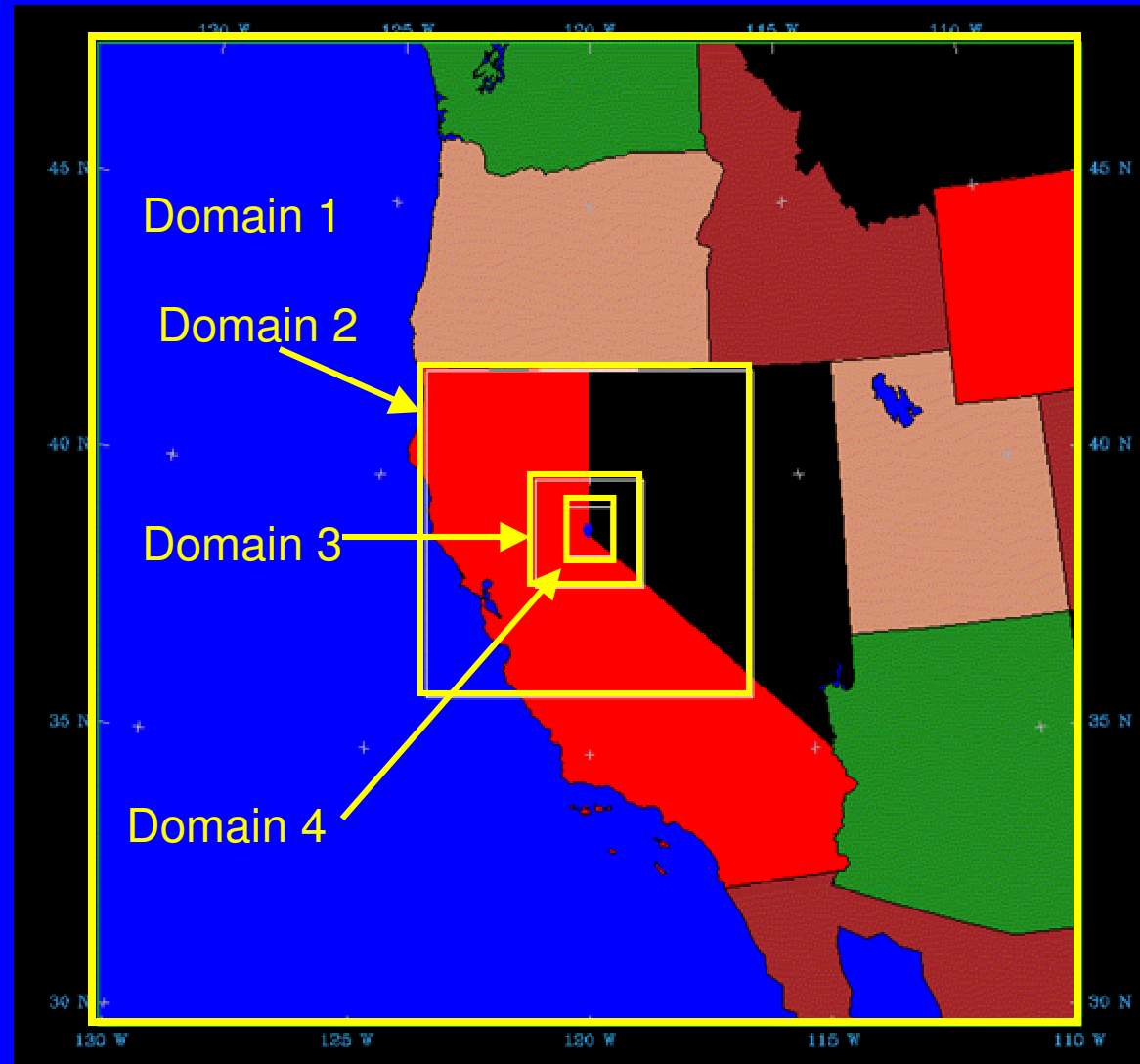
The MM5 Atmospheric Model

- MM5 stands for the 5th generation atmospheric mesoscale model from Penn State/NCAR
- Model can simulate the full three-dimensional atmospheric dynamics over a variety of space and time scales
- MM5 uses archived global gridded atmospheric data as initial/boundary conditions

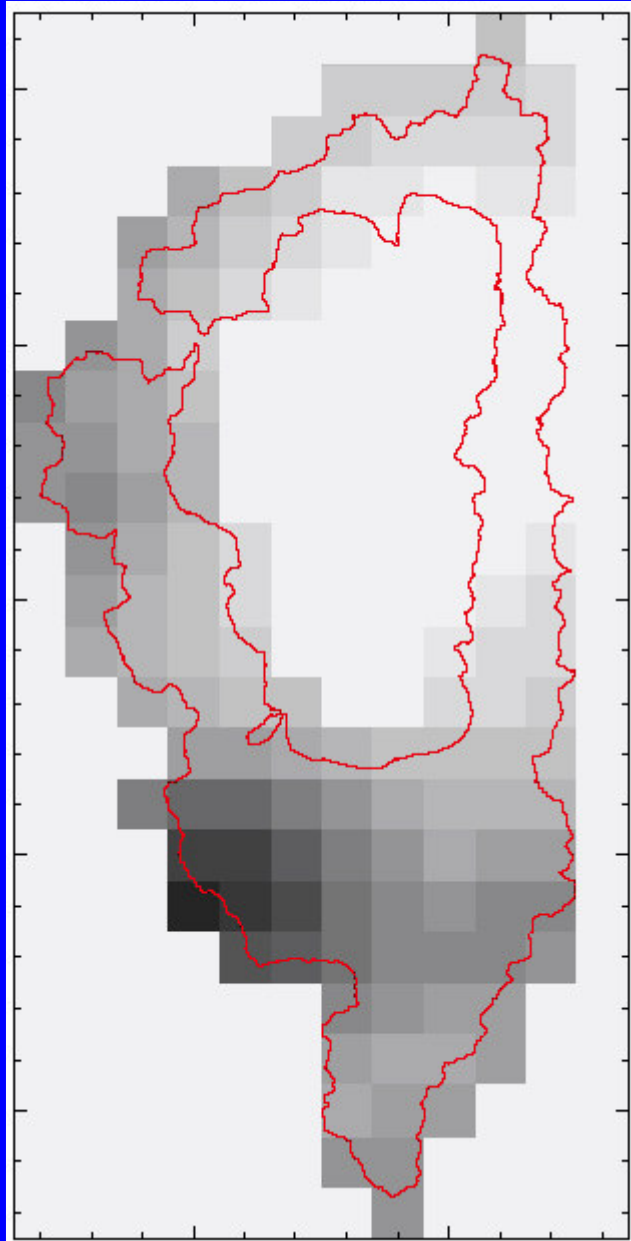
Lake Tahoe Data Reconstruction

- 4 model domains to downscale data from 270 km to 3 km horizontal resolution
- Hourly data simulated for 7 atmospheric variables: air temperature, relative humidity, precipitation, latent heat flux, solar radiation, net longwave radiation, and wind speed
- Data set spans from 1958-2000

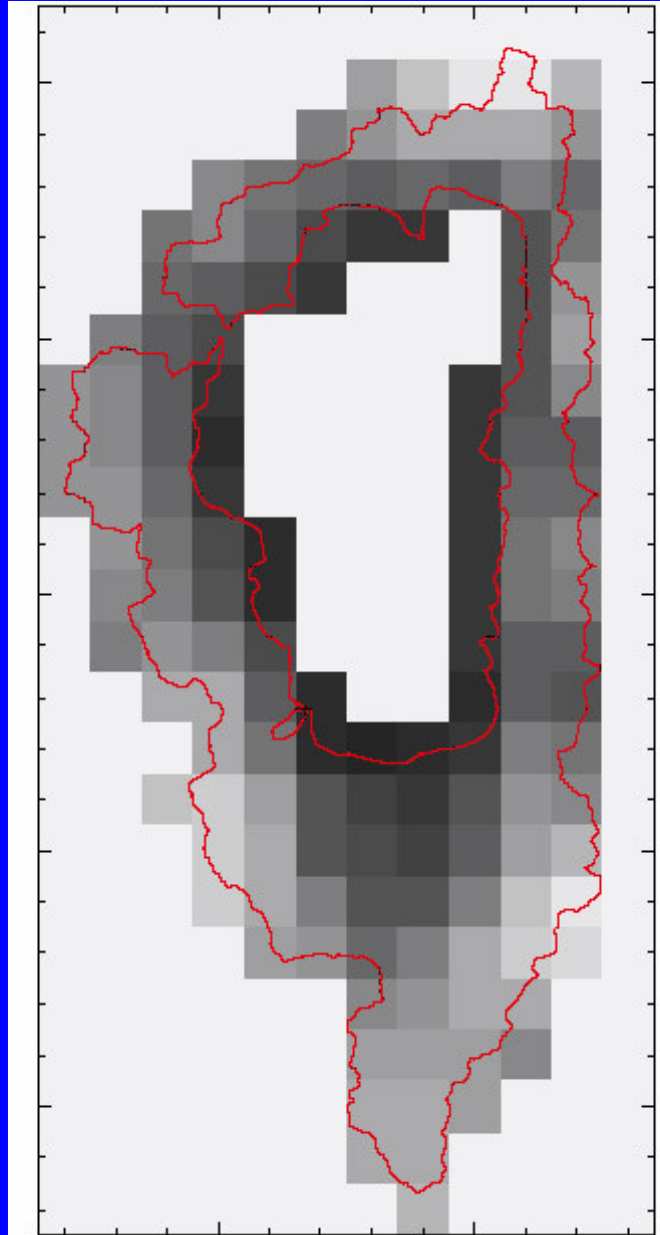
Lake Tahoe Modeling Domains



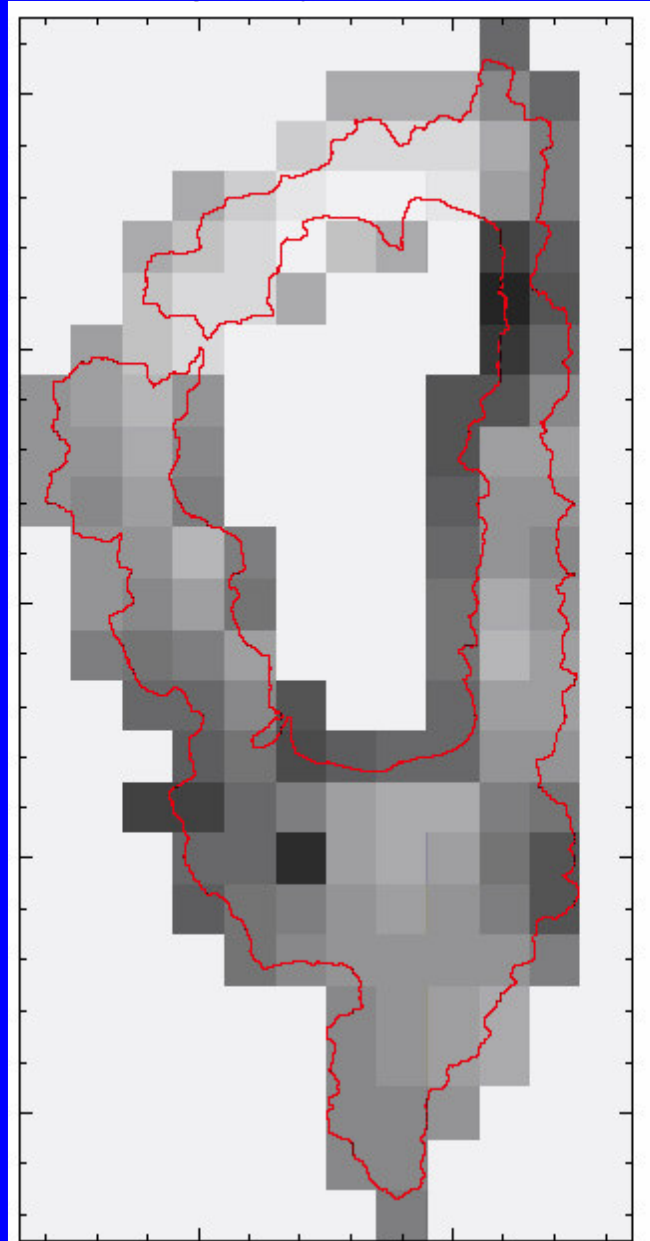
Sample Simulated Precipitation



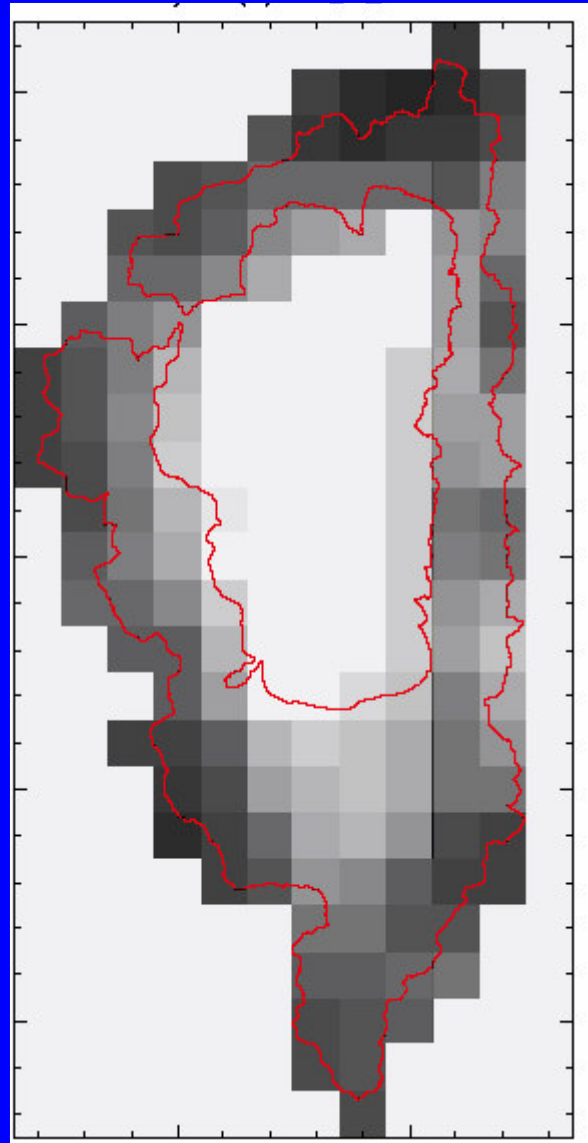
Sample Simulated Air Temperature



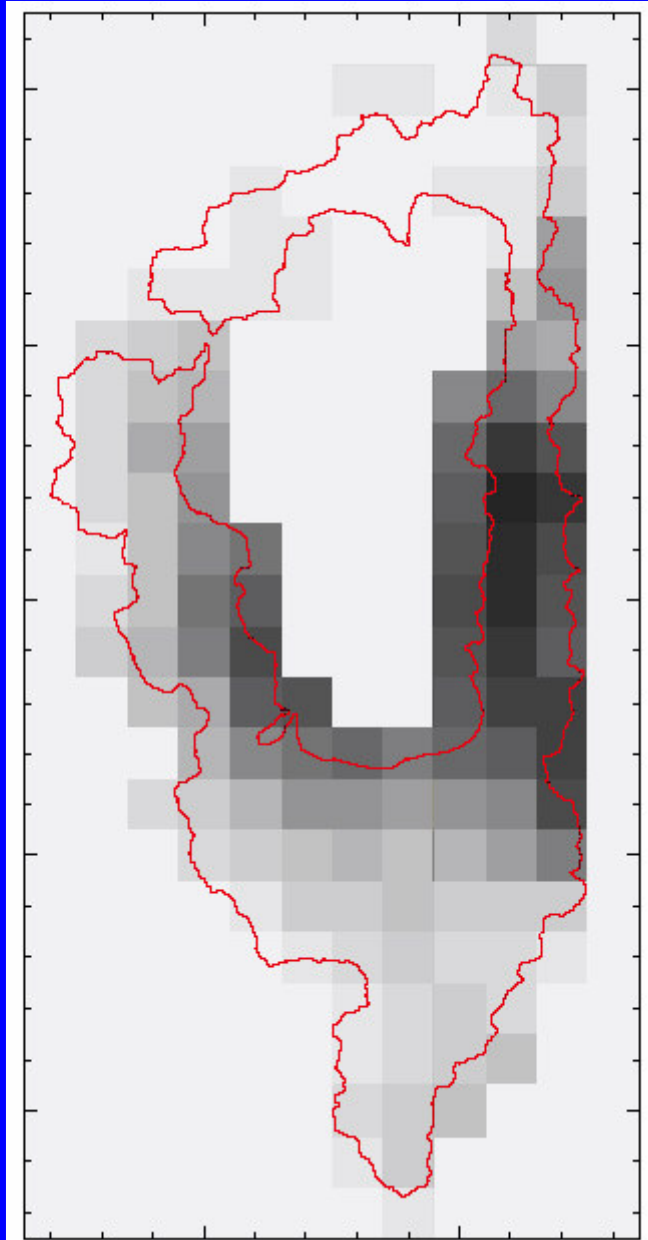
Sample Simulated Wind Speed



Sample Simulated Relative Humidity

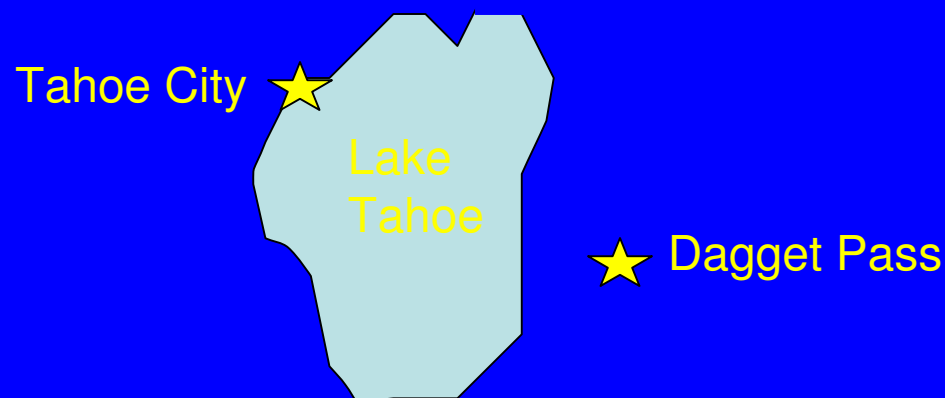


Sample Simulated Solar Radiation

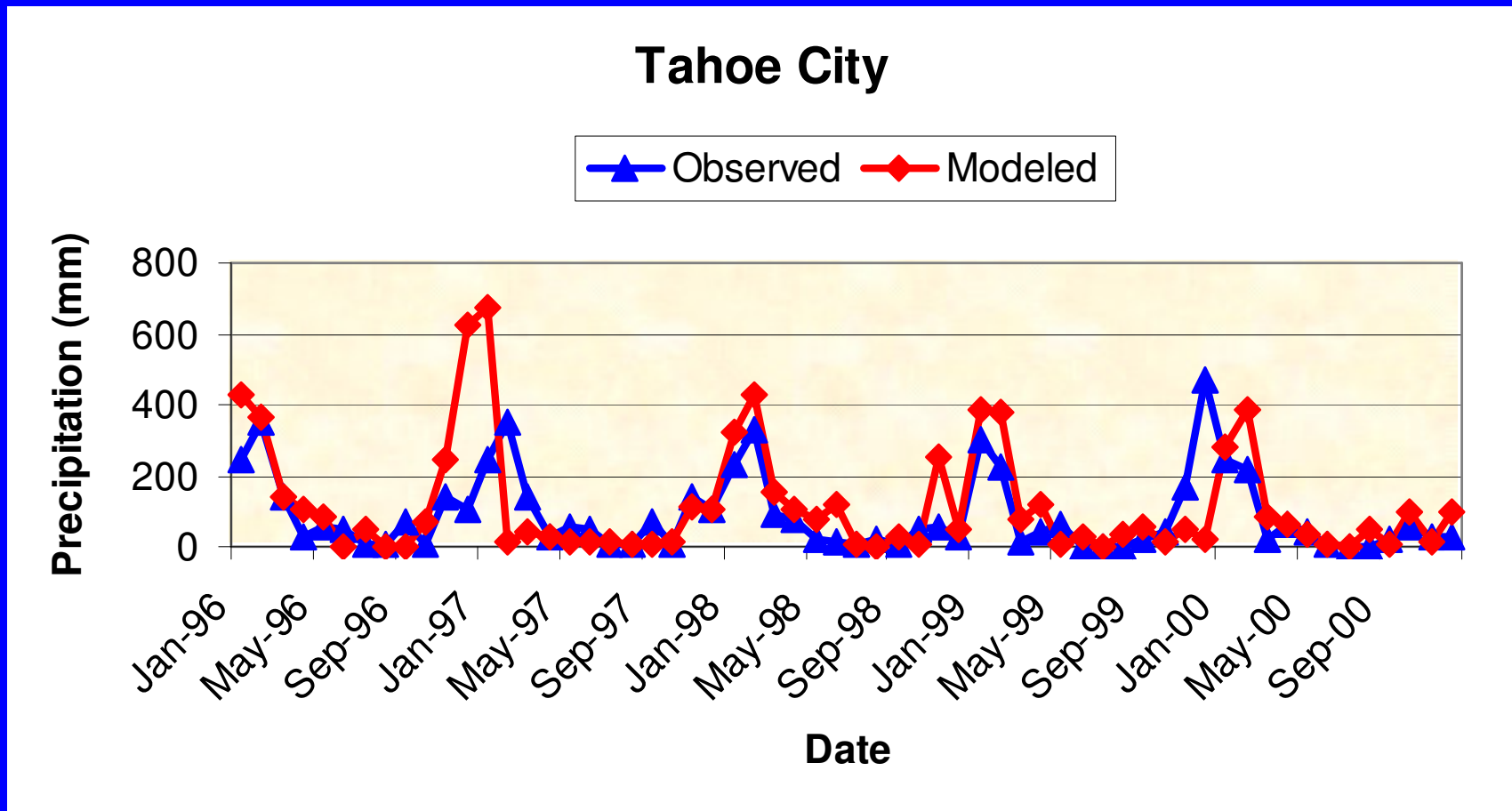


Lake Tahoe Comparison Locations

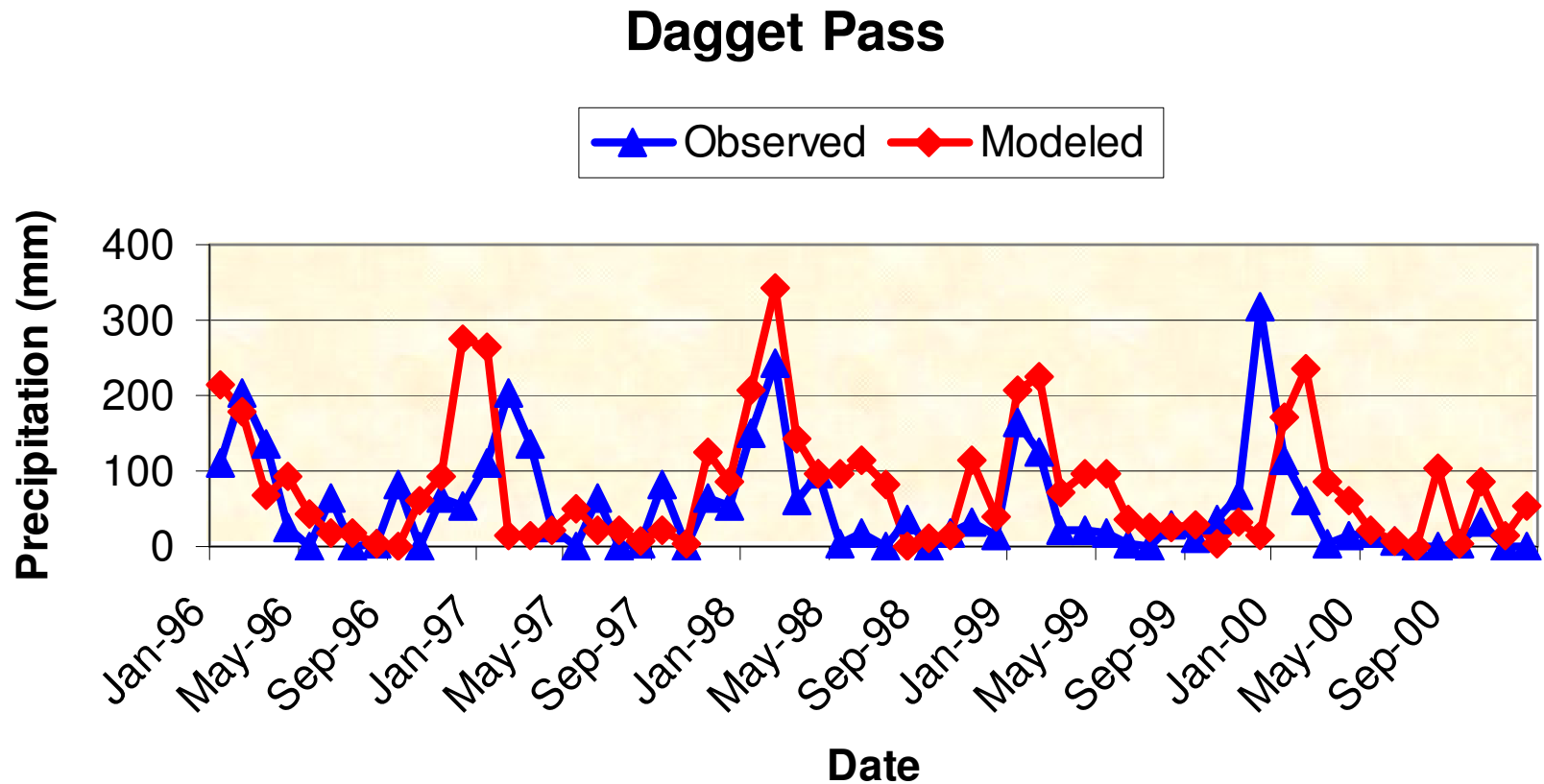
- 2 Sites used for data comparison of precipitation and temperature due to limited observed data in basin
- 1 west side site (Tahoe City) and 1 east side site (Dagget Pass)



West Side Tahoe Precipitation



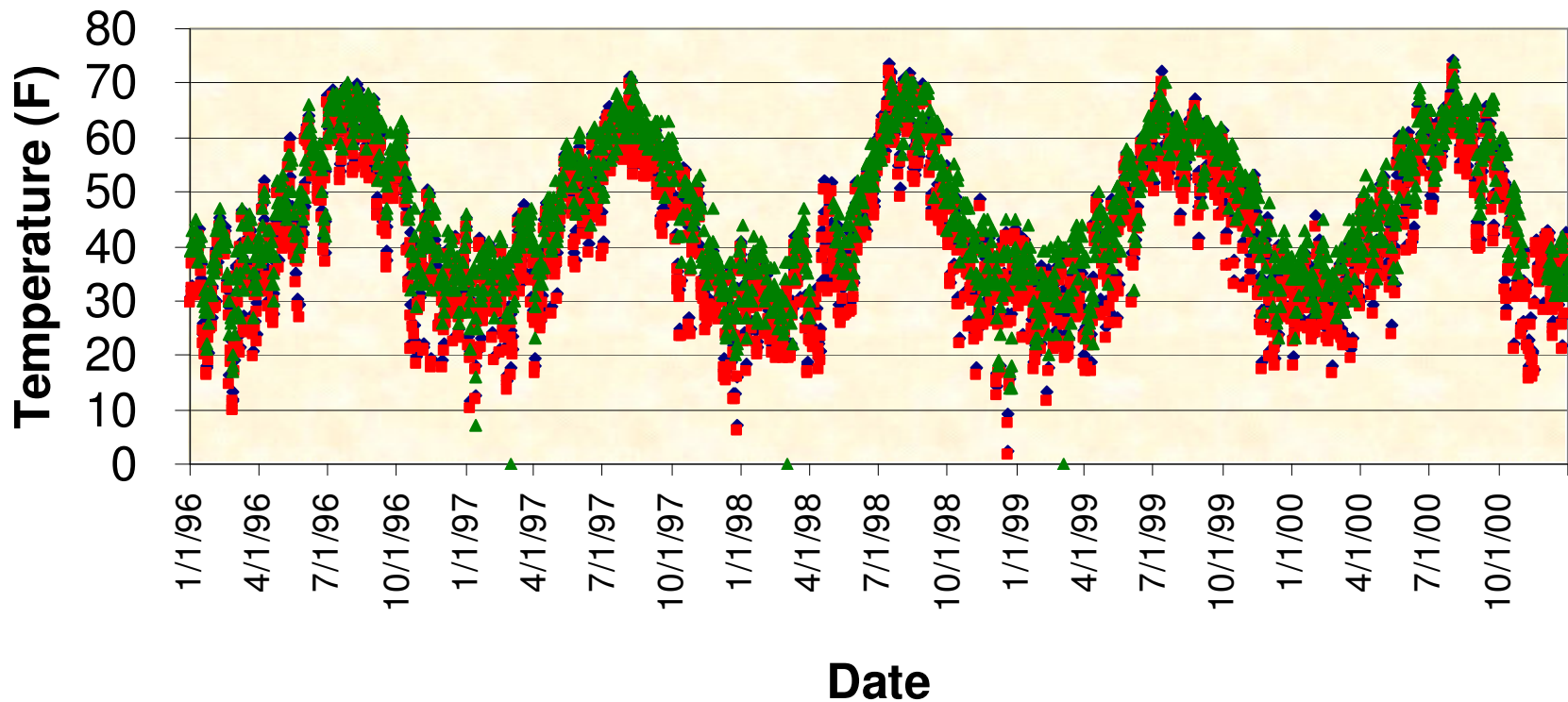
East Side Tahoe Precipitation



West Side Tahoe Temperature

Tahoe City

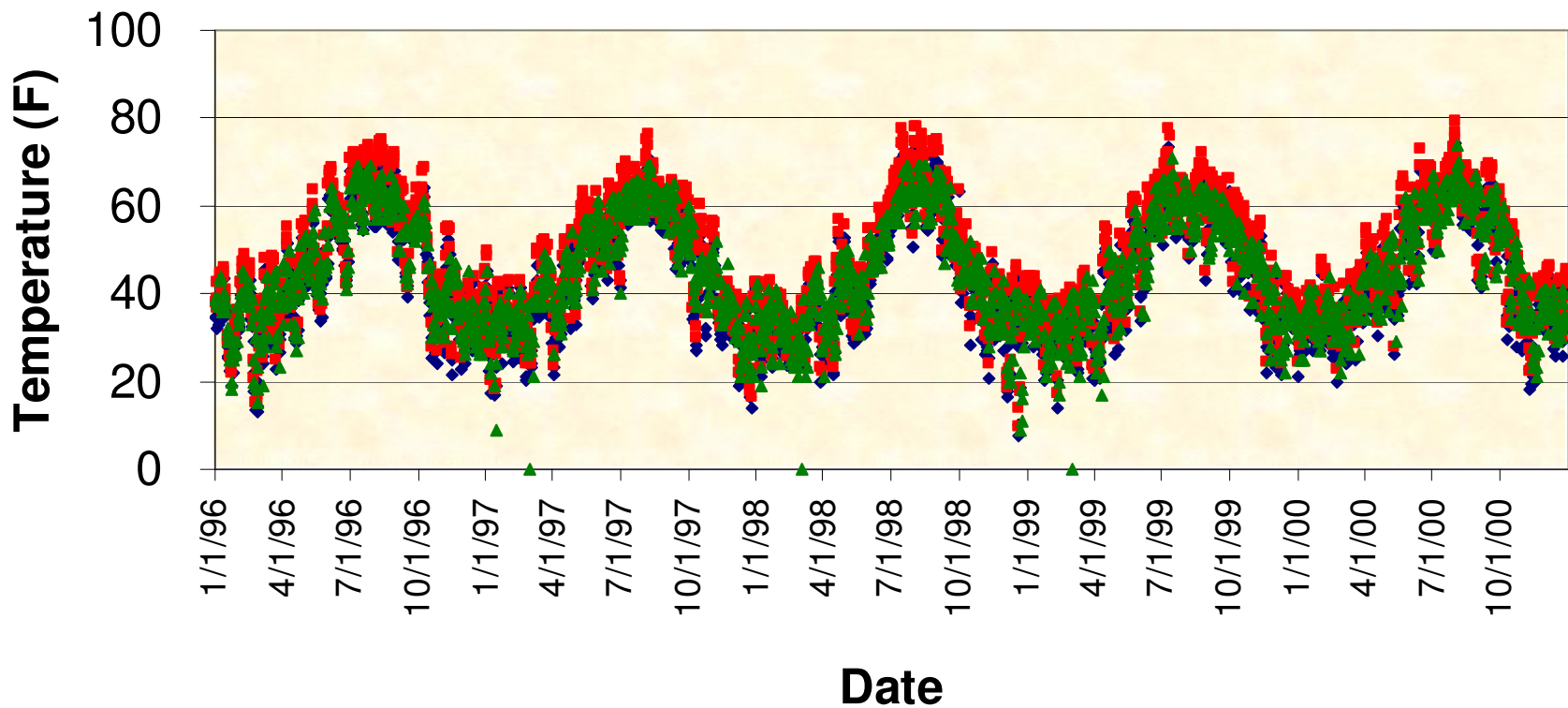
◆ MM5 Grid 99 ■ MM5 Grid 100 ▲ NCDC Obs



East Side Tahoe Temperature

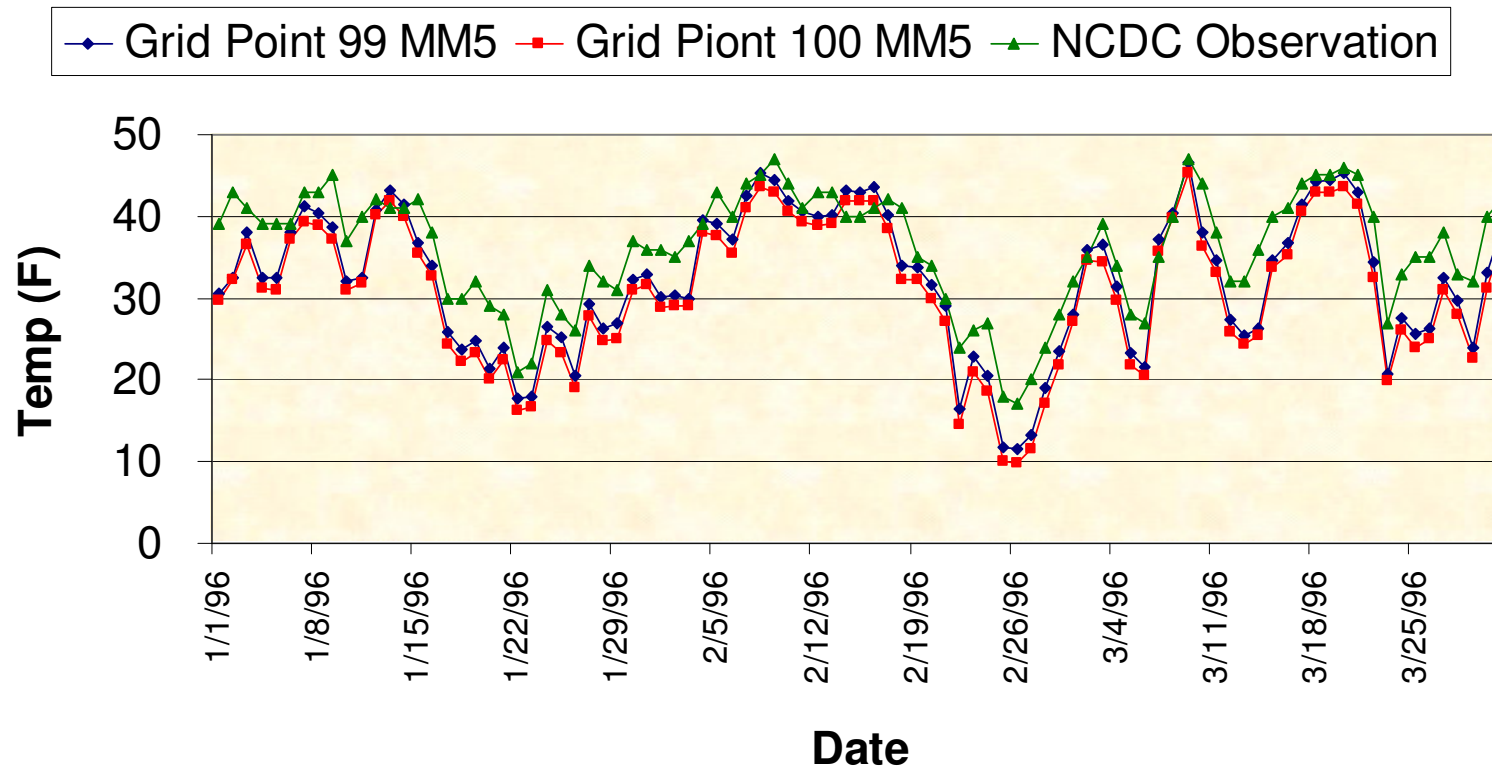
Dagget Pass

◆ MM5 Grid 68 ■ MM5 Grid 75 ▲ NCDC Obs

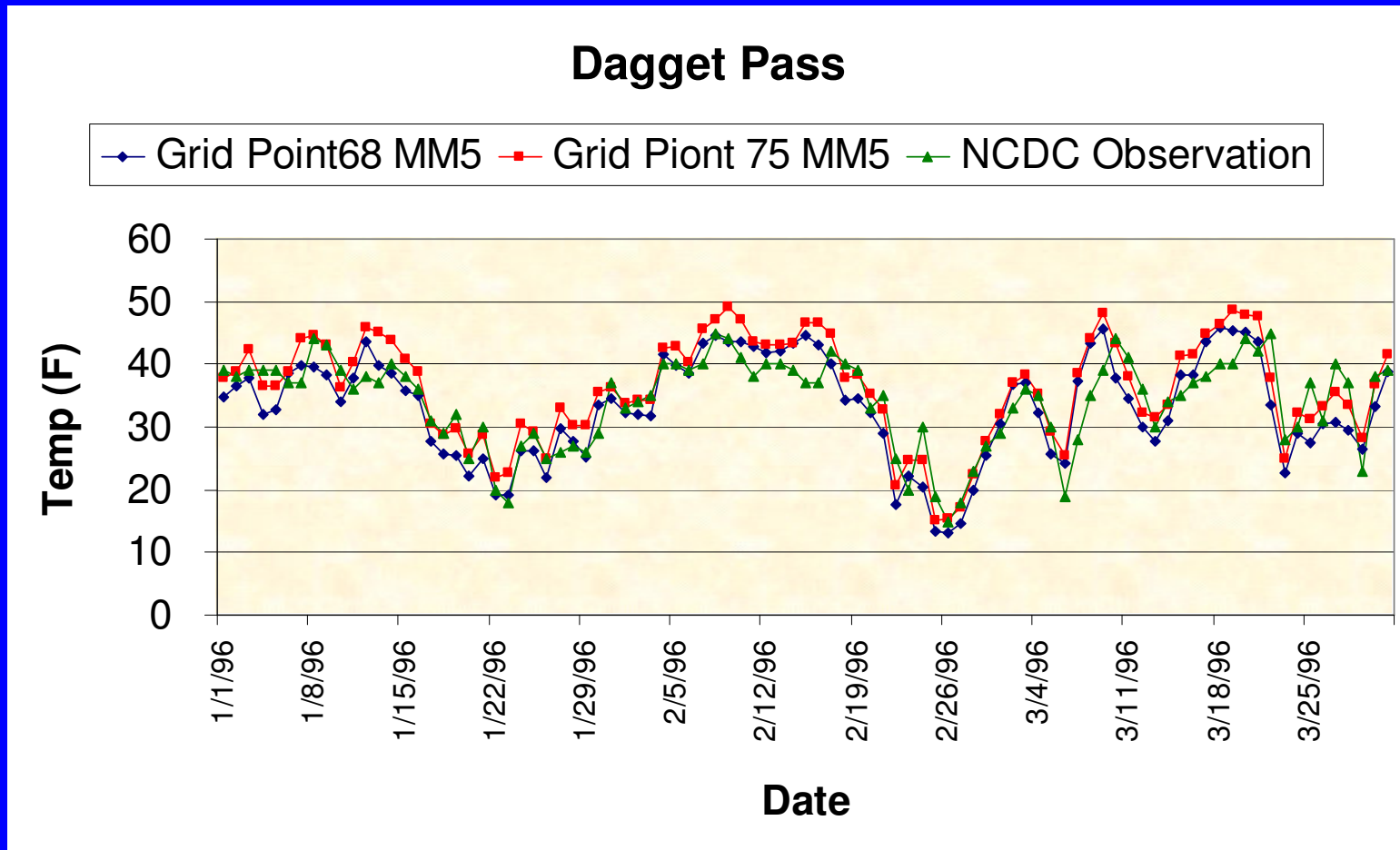


West Side Tahoe Temperature

Tahoe City



East Side Tahoe Temperature



Conclusions

- Model-derived dataset provides distributed atmospheric data over a 43 year time period at hourly intervals
- Dataset is consistent with observed data in the basin
- Dataset is an innovative tool for use in basinwide watershed management projects

Questions?

