

Extreme Value Analysis of Kansas Temperature Data

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This work is supported in part by the US Department of Energy under Grant DE-SC0005359,

in part by the Kansas NSF EPSCoR under Grant EPS 0903806

and in part by a Kansas technology Enterprise Corporation grant on

Understanding Climate Change in the Great Plains: Source, Impact, and Mitigation.

Outline

- Kansas weather stations and data source
- Project
- A strategic plan of stochastic and statistical modeling
- Exploratory data analysis

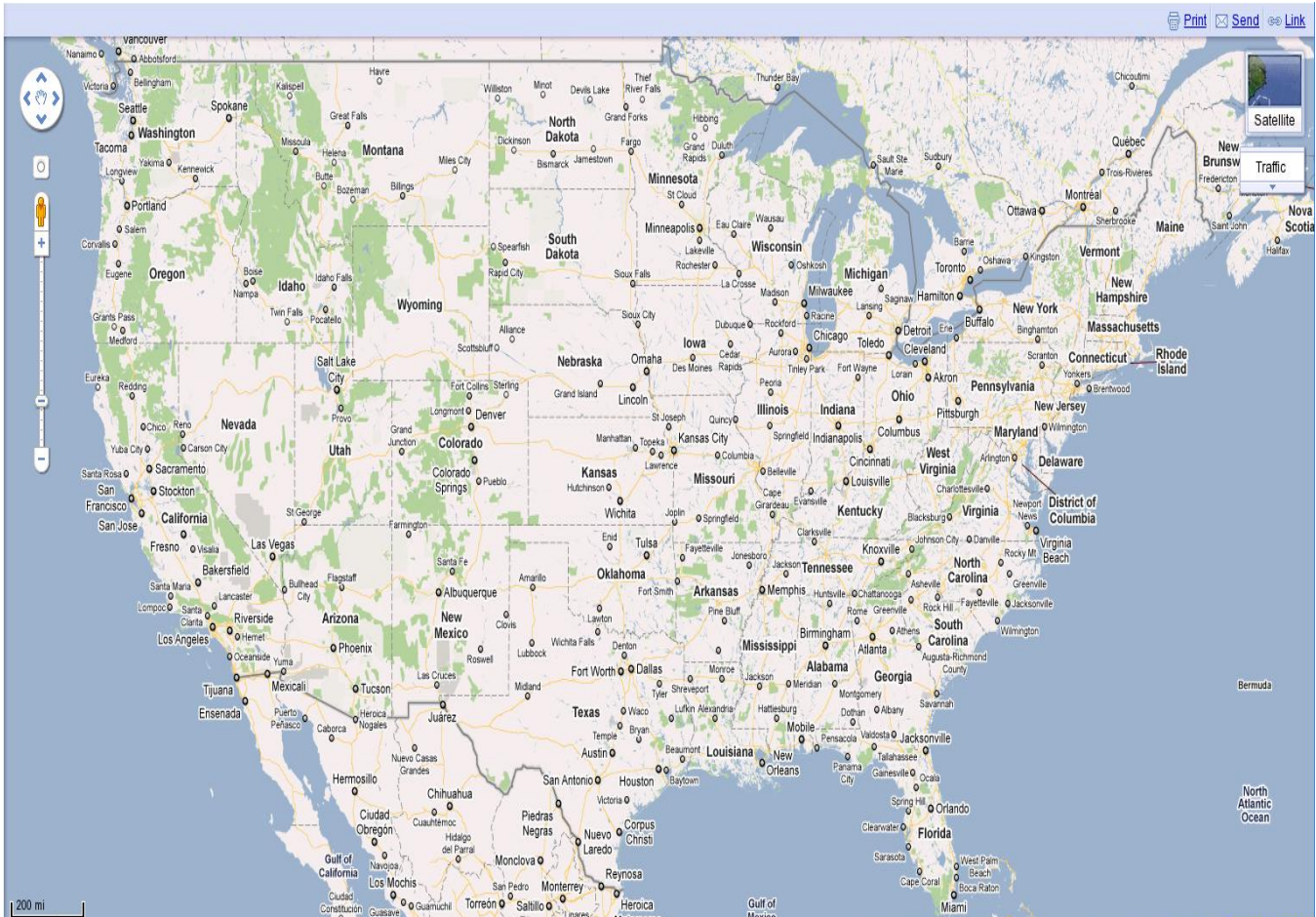
1. Kansas weather stations and data source

Weather data source

- National Oceanic and Atmospheric Administration (NOAA) <http://www.noaa.gov/>

National Weather Service <http://www.nws.noaa.gov/>

National Climatic Data Center (NCDC) <http://www.ncdc.noaa.gov/oa/ncdc.html>
- High Plains Regional Climate Center (HPRCC) at University of Nebraska at Lincoln <http://www.hprcc.unl.edu/>



2. Project

Understanding Climate Change in the Great Plains: Source, Impact, and Mitigation (2009-2014)

PI: Charles Rice, Department of Agronomy, Kansas State University

Co-PIs:

Johannes Feddema, Department of Geography, University of Kansas

John A. Harrington, Department of Geography, Kansas State University

Chunsheng Ma, Department of Mathematics and Statistics, Wichita State University

3. A strategic plan of stochastic and statistical modeling

- (i) Time series analysis of historical data at each station (Purely temporal)
- (ii) Spatial statistical modeling at the fixed time (Purely spatial)
- (iii) (Univariate) Spatio-temporal data analysis
- (iv) (Multivariate, or vector) Spatio-temporal data analysis

Weather data: Temperature, wind speed, wind direction, precipitation ...

Related data: Agricultural, environment, public health ...

- (v) Extreme weather events

4. Exploratory data analysis

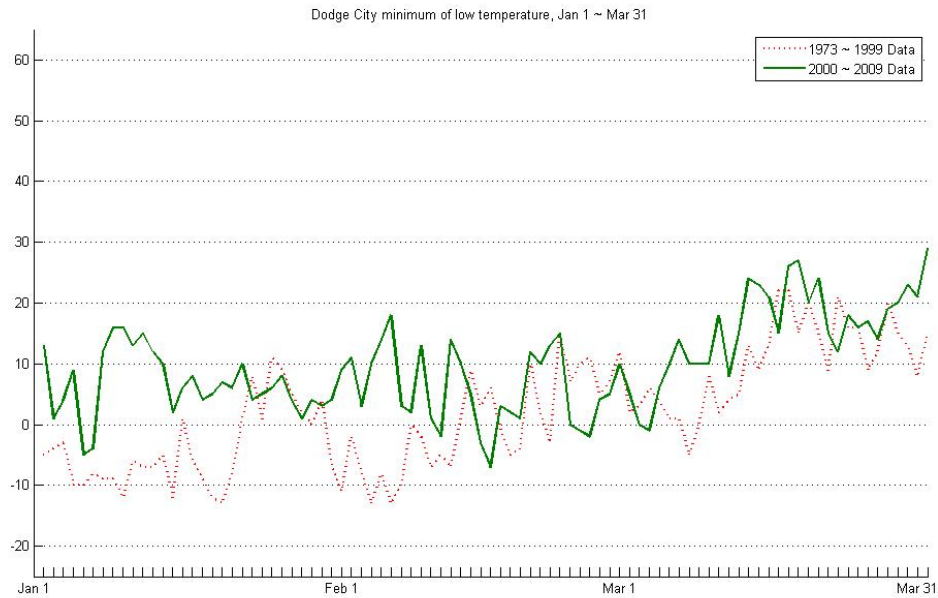


Figure 3: Original Data: Dodge City daily low temperature between Jan. 1 and March 31

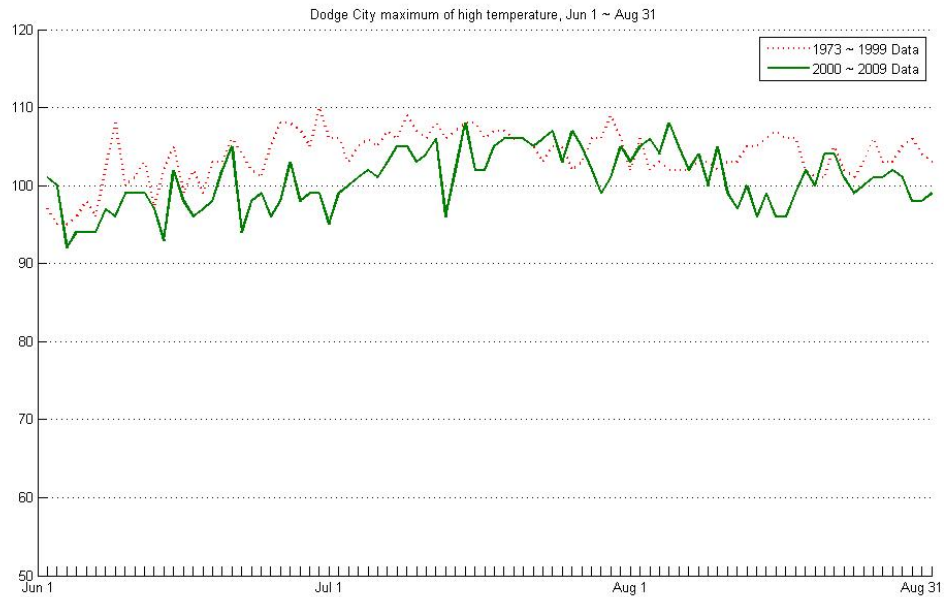
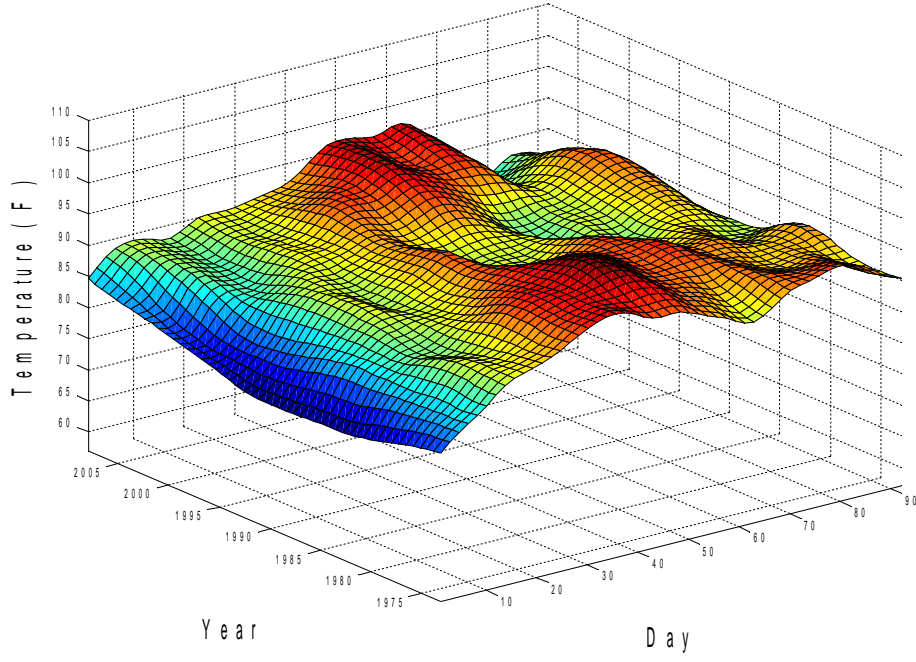
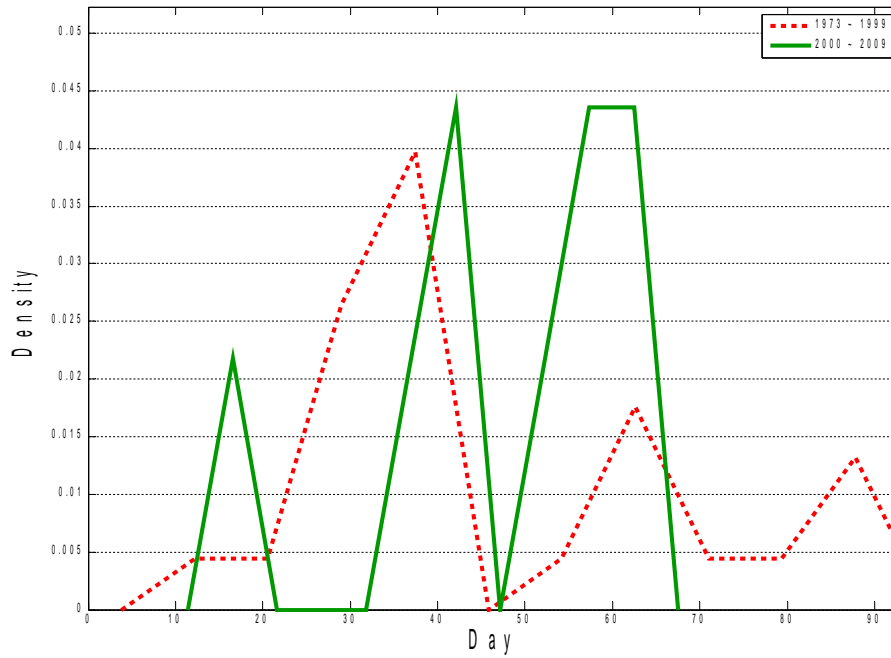


Figure 4: Original Data: Dodge City daily high temperature between June 1 and Aug. 31

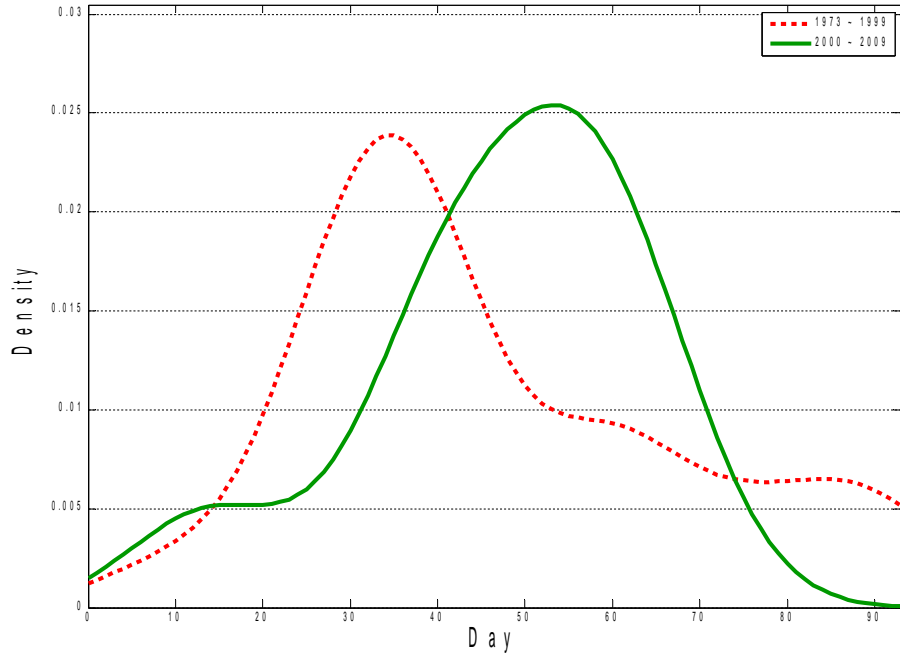
Dodge June 1 - August 31 with smoothing parameter 0.00081282



Dodge June 1 - August 31 Probability Day is Hottest of the Year



Dodge June 1 - August 31 Probability Day is Hottest of the Year



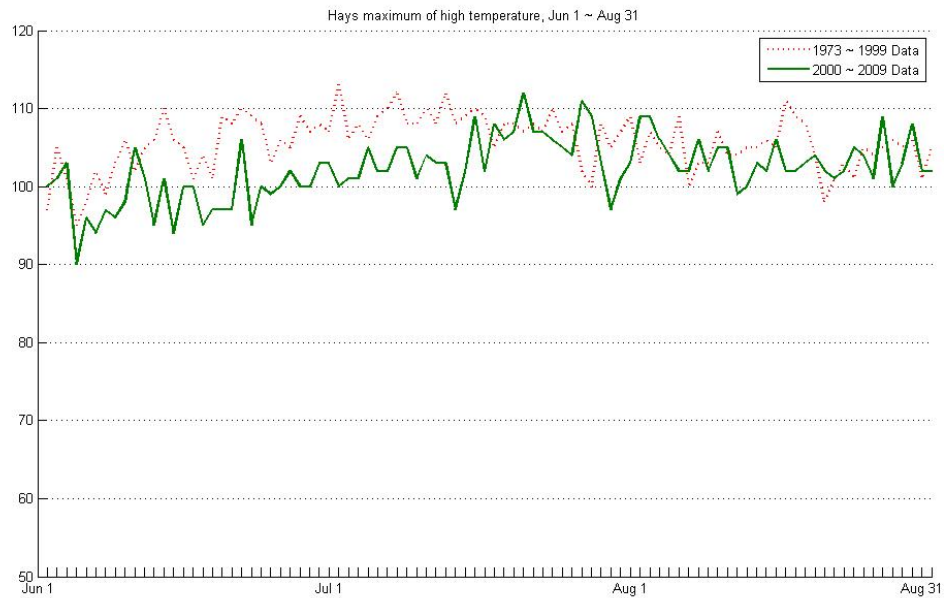


Figure 8: Original Data: Hays daily high temperature between June 1 and Aug. 31

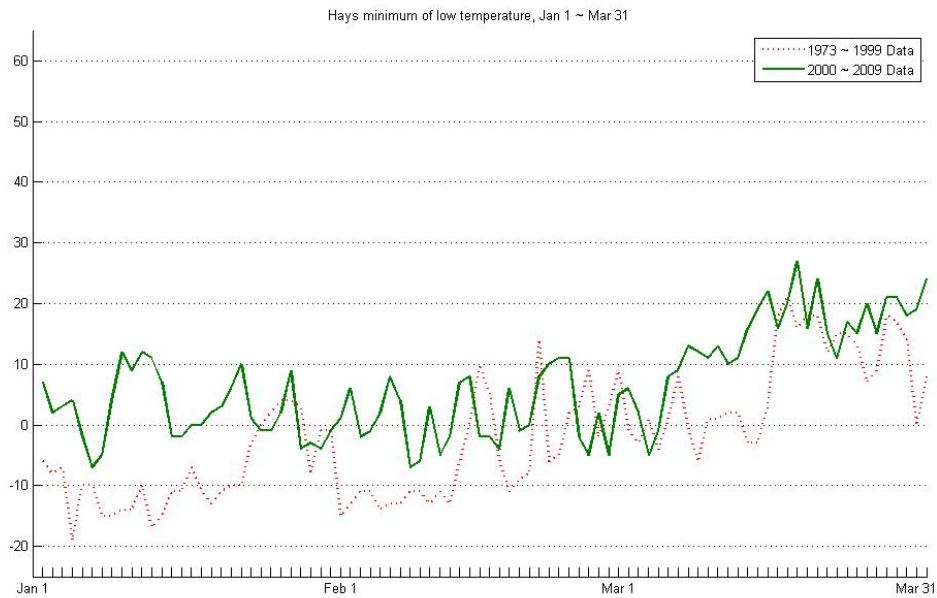


Figure 9: Original Data: Hays daily low temperature between Jan. 1 and March 31

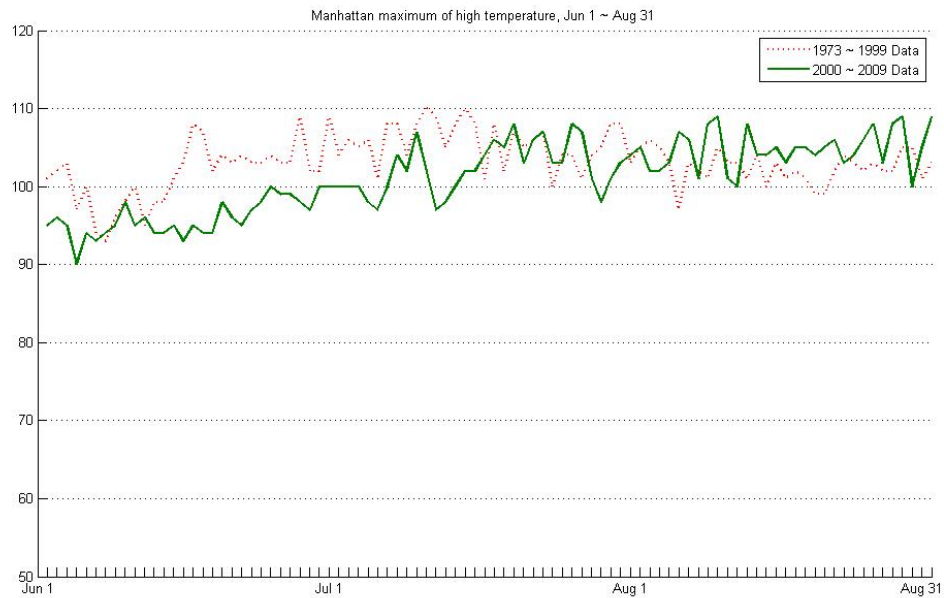


Figure 10: Original Data: Manhattan daily high temperature between June 1 and Aug. 31

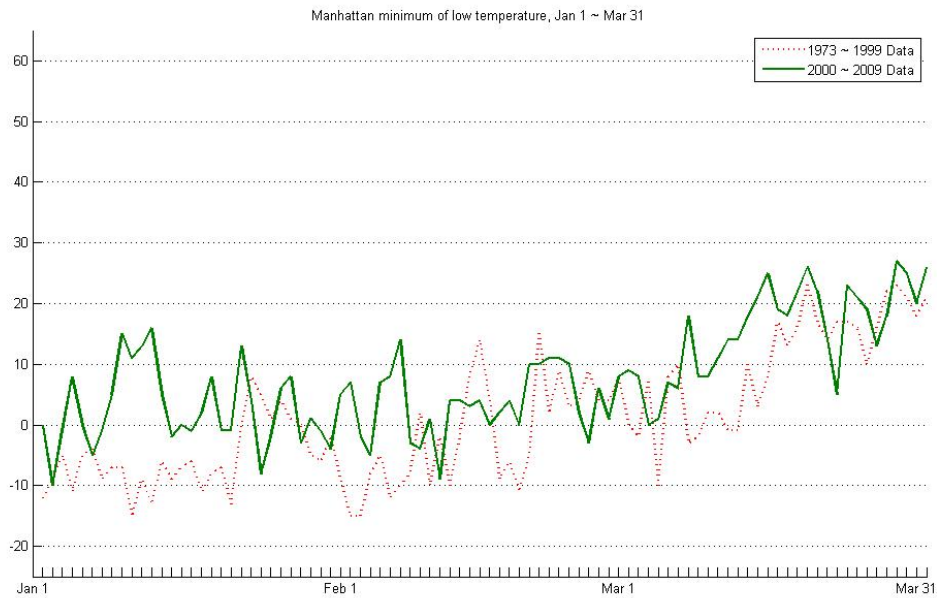


Figure 11: Original Data: Mahattan daily low temperature between Jan. 1 and March 31

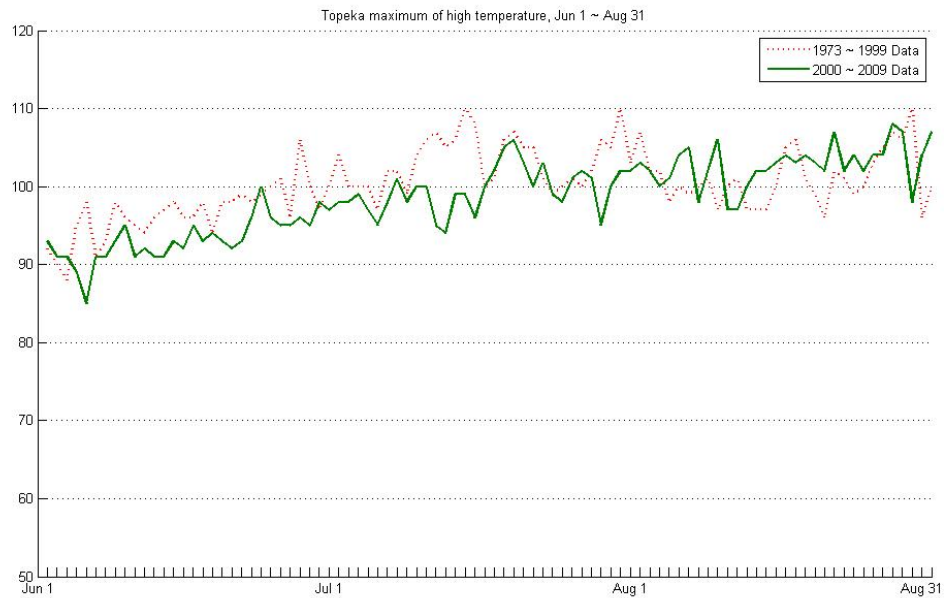


Figure 12: Original Data: Topeka daily high temperature between June. 1 and Aug. 31

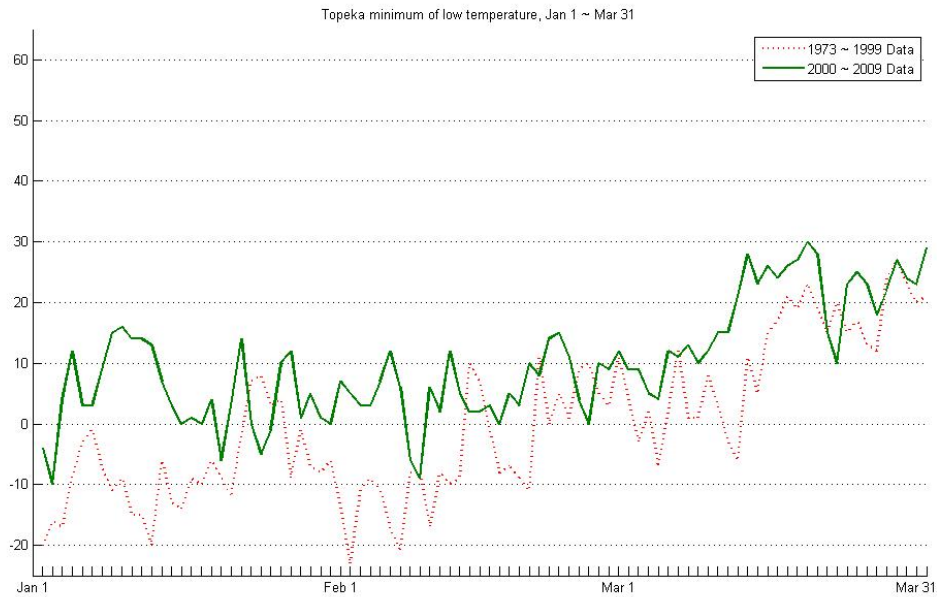


Figure 13: Original Data: Topeka daily low temperature between Jan. 1 and March 31

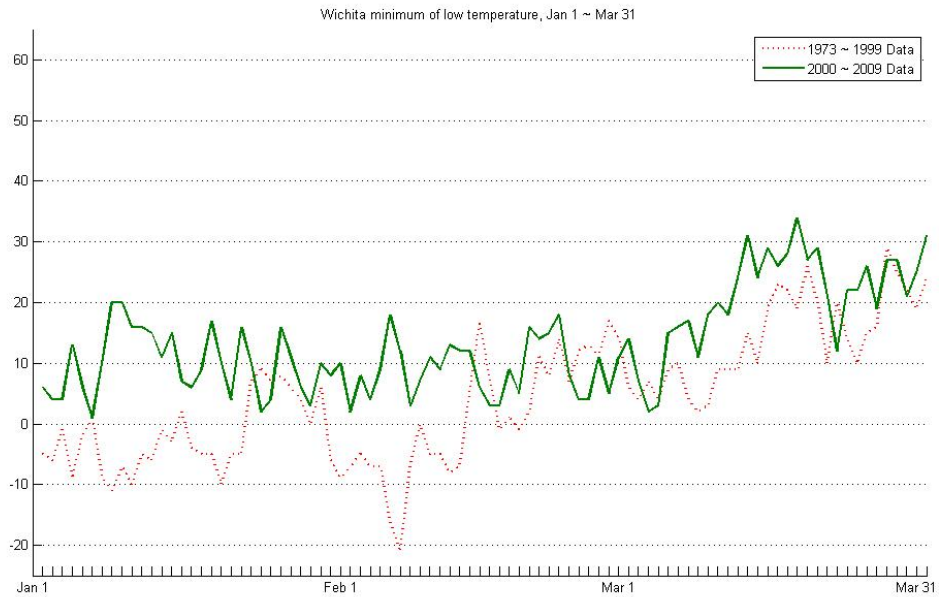


Figure 14: Original Data: Wichita daily low temperature between Jan. 1 and March 31

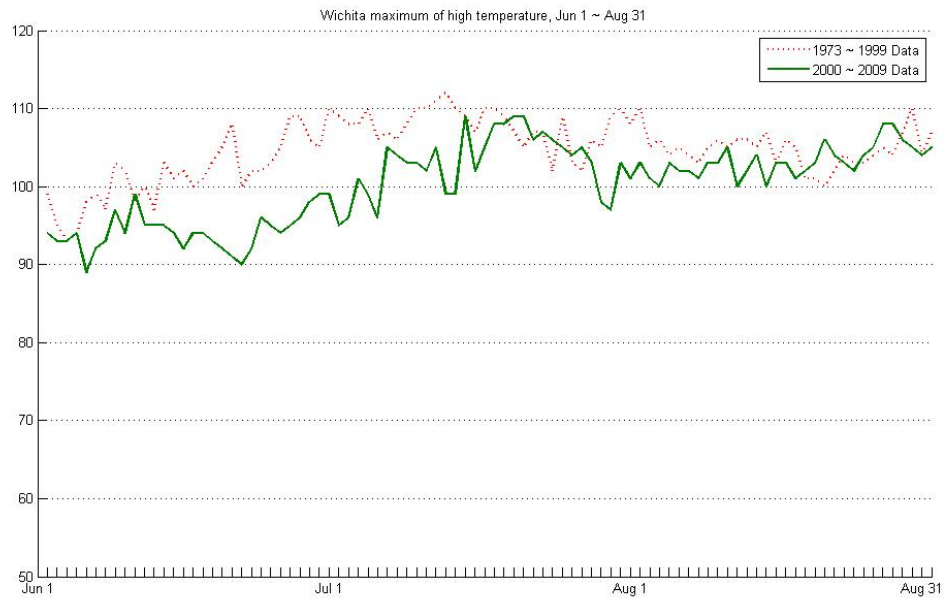


Figure 15: Original Data: Wichita daily high temperature between June 1 and Aug. 31