Visualization of temperature in Shanxi, China 2013 - 2017

BST5920 Final Presentation

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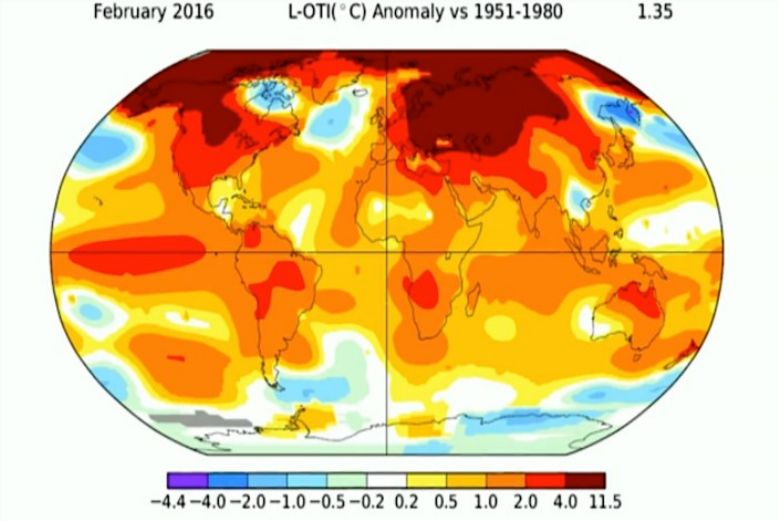
Background

Climate change has been a global public health issue that has wide impacts on the society:

- human health,
- agriculture,
- food security,
- water supply



Shanxi weather data

All the historical temperature data were scraped from 2345 Historical Weather, published by China Meteorological Administration.

- year 2013 to 2017
- 127 counties, 11 cities
- a wide range in latitude and complex and different types of landforms
  - distinct four seasons
  - different temperature patterns between north and south Shanxi
  - different temperature patterns between winter and summer
  - different temperature patterns between day and night

Shiny app

The link to the shiny app: https://miaocai.shinyapps.io/datavisproject/

Two major components:

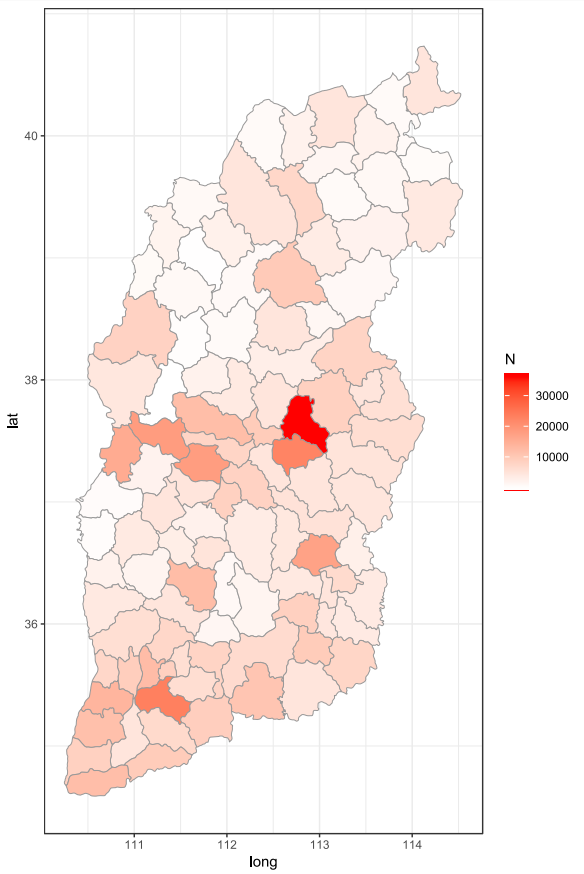
1. Temperature trends
2. Temperature variation trends

Temperature trends

It shows temperature trends on any selected periods between January 1, 2013 and November 28, 2017 in any of the 127 counties in Shanxi, China.

Choices:

- **City**: 11 cities
- **County**: 127 counties in total
- **Time range**: between January 1, 2013 and November 28, 2017
- **Temperature types**: Maximum, Average, Minumum



Example

Temperature trend in Datong County, Datong City, Shanxi China

Temperature variation

Sources:

- Horizontal variation (V_h): the sum of the absolute difference between the average temperature in two consecutive days in the past week.
- Vertical variation (V_v , a.k.a. diurnal range): the absolute difference between the maximum and minimum temperature during a day.

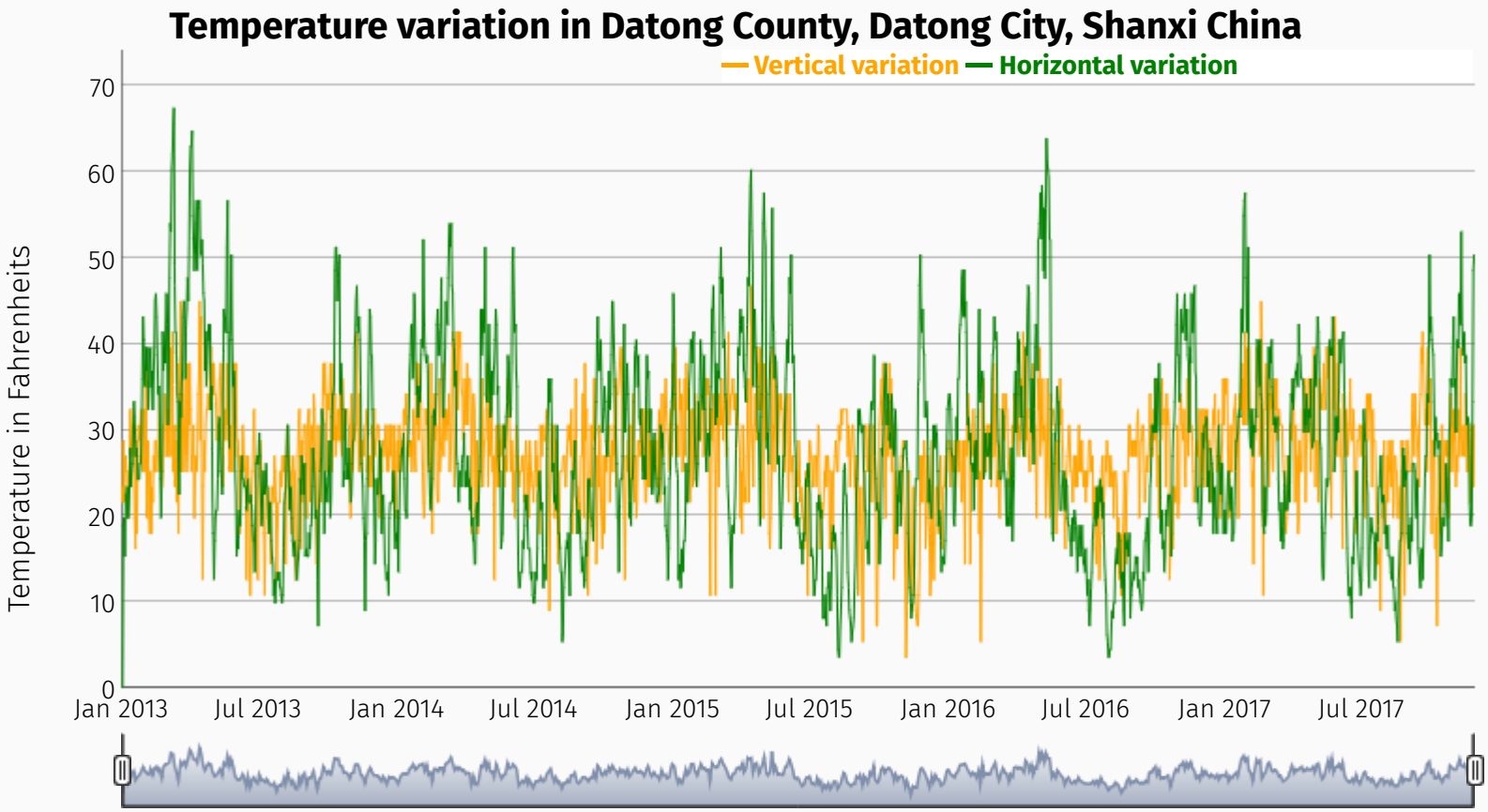
$$V_h = \sum_{i=\mathrm{d}-7}^{\mathrm{d}} \left| T_i - T_{i-1} \right|$$

Where d is today's date.

$$V_v = T_{max} - T_{min}$$

This decomposition allows for temperature variation within a day and temperature variation across multiple days.

Example


Temperature variation in Datong County, Datong City, Shanxi China
Vertical variation
Horizontal variation
Temperature in Fahrenheits
70
60
50
40
30
20
10
0
Jan 2013
Jul 2013
Jan 2014
Jul 2014
Jan 2015
Jul 2015
Jan 2016
Jul 2016
Jan 2017
Jul 2017

Q & A