



Record Temperatures A Comparison of Two Centuries (1916-1920, 2015-2019)

Deborah Hunton – Bellevue University



Background

- There are many scientific studies regarding global warming, most looking at annual mean temperatures
- Many people question whether it is true or not
- A recent discussion concerned whether all of the record low temperatures disproved climate change



Question

Would an evaluation of maximum and minimum temperatures show more extremes in the 21st century than experienced in the 20th century?



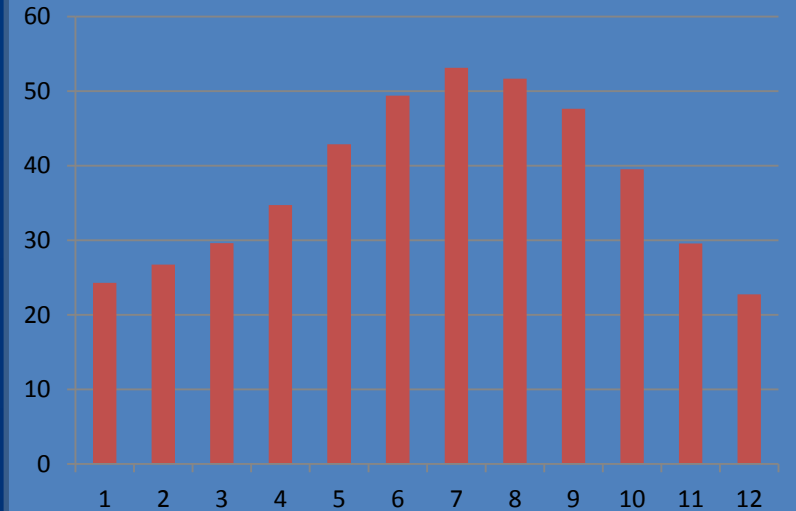
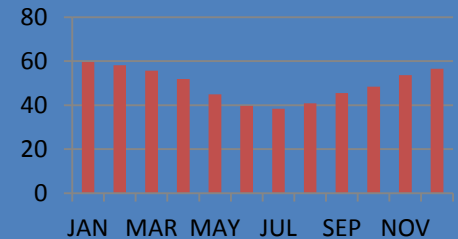
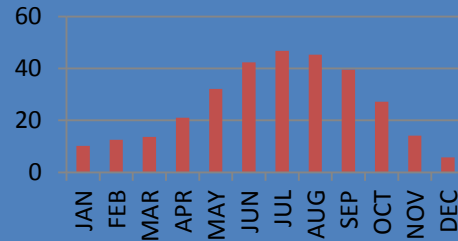
Data Preparation Process

- Select weather stations around the world, gather weather observations
Combine to find highest recorded daily high temperature, and lowest daily low temperature, for each month
- As a note, the annual data files for each year contains 10-40 million lines of data

Initial EDA Process

- Plot data: Mean **high** temperature

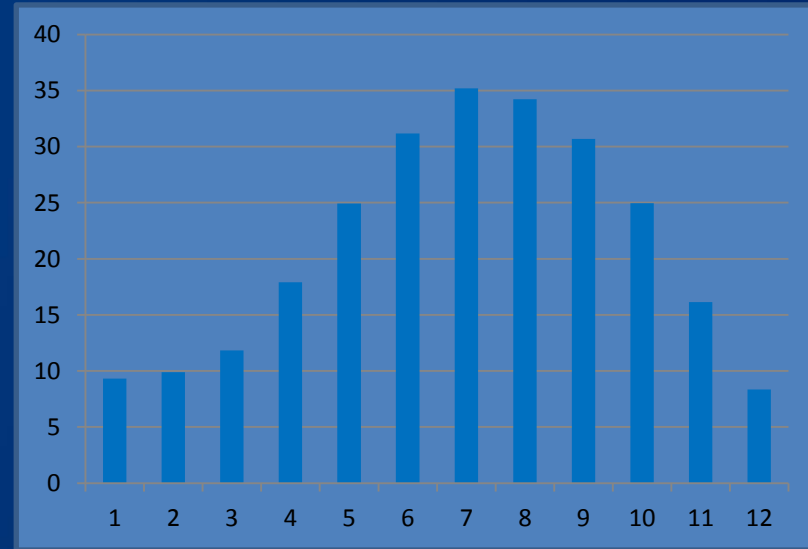
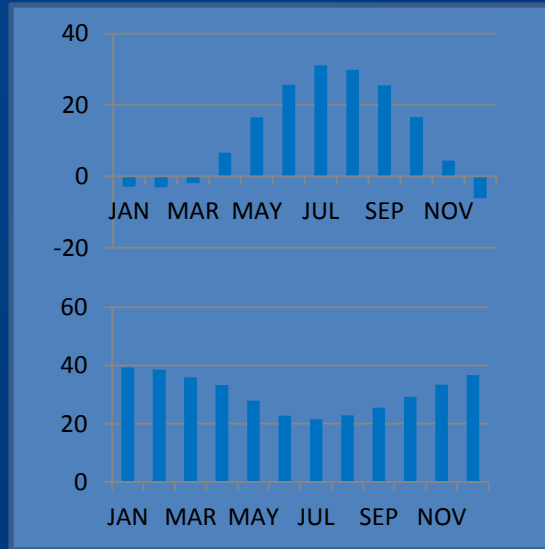
(NOTE: two on left are northern and southern hemispheres separately. Plot on right is all with coldest month [July in south] as the 1st month)



Initial EDA Process

- Plot data: Mean **low** temperature

(NOTE: two on left are northern and southern hemispheres separately. Plot on right is all with coldest month [July in south] as the 1st month)



Initial EDA Process

- Plot all record setting temperatures at all included stations

LOW	BAA	CA	DR	NOUS	PA	SUS
JAN	1920	1916	1916	2018	2018	1916
FEB	1916	1920	1916	1916	1920	2018
MAR	1916	1920	1916	1920	2018	2015
APR	1920	1920	1916	1916	2018	1920
MAY	1916	2018	1916	1916	2015	1916
JUN	1916	2018	1916	1920	1920	1920
JUL	1916	2015	1916	1920	2015	1920
AUG	1920	2015	2015	1916	2018	1916
SEP	1916	1920	1916	1920	2015	1916
OCT	1920	2018	1916	1920	2015	1916
NOV	1916	1916	1916	1920	2018	2015
DEC	1916	1920	1916	1920	2015	1916

- 1900's: 72.22%
- 2000's: 27.78%

HIGH	BAA	CA	DR	NOUS	PA	SUS
JAN	1916	2015	1916	1920	2015	2018
FEB	2018	1916	2018	2018	2015	2015
MAR	1920	1916	2018	2015	1920	2018
APR	2018	1916	2018	2015	1916	2018
MAY	2015	2015	2018	1916	2018	2018
JUN	2015	1916	2015	2015	2015	2015
JUL	2015	1916	2015	2015	2018	2015
AUG	2015	2018	1916	2015	2015	2018
SEP	2018	1916	2018	2018	2015	2018
OCT	1916	1916	2018	2015	2015	2015
NOV	1916	2018	2015	2015	2015	2018
DEC	1916	2018	2015	2018	2015	2015

- 1900's: 25.00%
- 2000's: 75.00%