Does UHI amplify temperatures in Times Square?

Are summer max temps increasing?

* Compare distribution for first 30 years and create another fig to compare the latter 30 year period.
* Is summer in Times Square warmer th­­an Ardsley?

Box and whisker plot

Number of extreme heat days , date is changing overtime

Use 90th percentile , 95th percentile threshold & diff in medians

Calculate number of days above this threshold and the earliest of these days.

Does urbanization amplify warming trends

Earliest max temp, do analysis to see if diff in location make greater changes in the suburb.

Questions to Answer and Divide into 3 notebooks

1. Does the urban heat island amplify temperatures in urban Times Square more than it does in the suburban town Ardsley?
   1. Are the summer maximum temperatures increasing? Does urbanization seem to amplify warming trends?
   2. Are the number of extreme heat days changing overtime? Calculate the number of days above the 90th percentile and 95th percentile thresholds.
   3. Does the earliest date of extreme heat occur earlier overtime?

<https://wattsupwiththat.com/2018/12/20/the-science-of-the-urban-heat-island-effect-is-pathetic-and-misleading/>

Heat waves

<https://sci-hub.tw/10.1016/j.uclim.2017.09.001>

<https://reader.elsevier.com/reader/sd/pii/S2212095517300779?token=2EF365D656A612E621CAE0423993B17B438AA1902282536EEB67ED745308929283D8886B286A8DA2ECBF0A445FB6F3C8>

<https://sci-hub.tw/10.1007/s11069-014-1563-z>

<http://www.urbanclimate.gatech.edu/pubs/Habeeb_2015.pdf>

<https://sci-hub.tw/10.1016/j.compenvurbsys.2015.08.002>

On the impact of urban heat island and global warming on the power demand and electricity consumption of buildings—A review

<https://reader.elsevier.com/reader/sd/pii/S0378778814007907?token=6555DA0E64AD0F5E90298AF8882A59112B2E5BEC0713E67F96B986BFF490FB75AE8662DCBC0DE1D86DB7ABB0312F680B>

The urban heat island effect and city contiguity

<https://reader.elsevier.com/reader/sd/pii/S0198971515300089?token=B492262011CDE9C7FBD978165D648F94D1087006DE3CBFC7CD35F6EB91E9606676261D31E1EE7773464FF92BCDB25DC1>

argue importancy why care about extreme heat, urbanization, every graph should have a question

Rationale:

Urbanization has left a toll on many communities of people around the world. These urban areas are subject to the effects of the Urban Heat Island phenomenon. As the effects of climate change cause an increase in temperatures, the urban heat island only worsens. In past research, there have been identified changes in temperature changes in areas like New Zealand and Australia, but there has been very little done on temperature changes in North America (Perkins).

In order for people to understand the effects of the urban heat island, tracking temperatures in further research is needed. Many areas that feel the harsh effects and damage done are large cities. Urban areas experience the increasing effects of global warming, and unbearable heat in summer months. These cities are affected by the urban heat island phenomenon, which says that urban areas have higher temperatures than less industrialized areas. The urban heat island is the idea that due to anthropogenic heat release from urban activity, low surface albedo, and better retention of heat by buildings (edit the last part) there is an increase in temperatures (Rizwan). Other studies have found that areas with a higher concentration of people in an area could have a higher relative temperatures than their surrounding rural areas (Chapman). These urban areas may see particularly different changes in temperature, precipitation, evapotranspiration, cloudiness, wind speed, and other variables as a result of anthropogenic (human caused) release of greenhouse gases. It was also found that higher temperatures were found in more dense areas.

These may all cause effects on sea-level rise in coastal areas, extreme natural disasters, health from unsuitable temperatures, water availability, and food security (Hunt). In North America, populations are most heavily affected by El Nino, which can cause an increase in aridity in lands. There has been a long history of detrimental drought effects on different nations. In the 1930s US, the Dust Bowl occurred as a result of overgrazing and led to increased erosion and dust soils (Dai). Certain areas are going through a megadrought, which is an extreme drought that persists or around 20-40 years. Central America and the Midwest are currently going through a megadrought and this is only expected to come with harsh effects to food security and soil moisture (Cook).

Introduction:

Since the start of industrialization, there has been an increase in temperatures worldwide. Urban areas are susceptible to greater increase in temperatures in comparison to temperatures of less urbanized areas. This is due to the urban heat island phenomenon. In past research, there have been identified changes in temperature changes in areas like New Zealand and Australia, but there has been relatively less research done on temperature changes in North America (Perkins). As temperatures are ever changing, there is a need for constant updates in warming trends in urban areas.

The urban heat island is the idea that due to anthropogenic heat release from urban activity, low surface albedo, and better retention of heat by urban buildings, there is an increase in temperatures (Rizwan). Not only is this a problem currently, but this issue is expected to increase. This can cause many problems, especially for urban populations, which are more susceptible to heat waves due to the urban heat island. The urban heat island is a health hazard that caused (# of deaths during given year). Heat related mortality is a danger that should be tracked.

Past studies have looked into measuring the trends of heat waves, but have excluded New York as a part of their study (Habeeb).

This research aims to look at temperature differenced between Times Square, an urbanized area of Manhattan and Ardsley, a suburban area in Westchester County, NY. In order to understand the effect of the Urban Heat Island, this research comrelative to a less urbanized area, of New York, this research plots temperatures over a 67 year period, from 1950 to 2018 and tracks these temperatures to see if there is a significant increase in these temperatures. This research is aimed to answer if urbanization amplifies warming trends in Times Square more than it does in Ardsley. Additional questions may include, “Are the number of days above the 90th percentile increasing?”, “Are they increasing at a faster rate in Times Square than they are in Ardsley?”, and “