Urban Heat Island Effect

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Introduction

The urban heat island (UHI) effect is a phenomenon where urban areas become warmer than the surrounding rural areas. Temperatures around the world are increasing. If climate change is affecting the frequency or intensity of heat waves in urban areas, then there should be a way to mitigate it. Mitigation techniques are crucial in decreasing the global temperatures.

How has climate change affected the frequency or intensity of heat waves in urban areas?

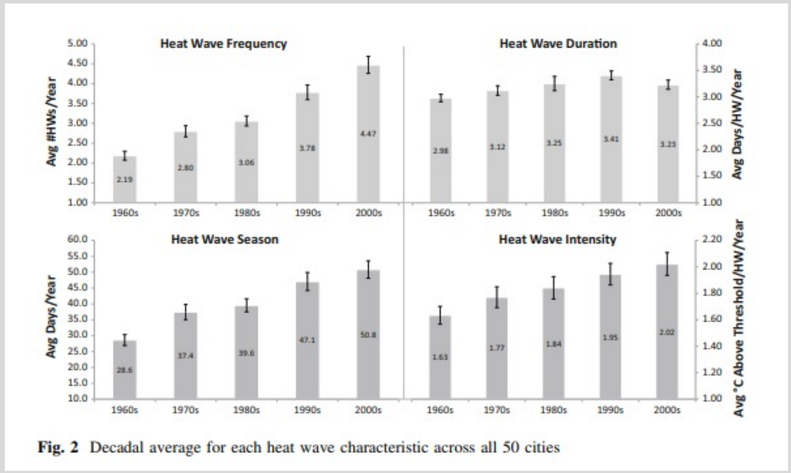
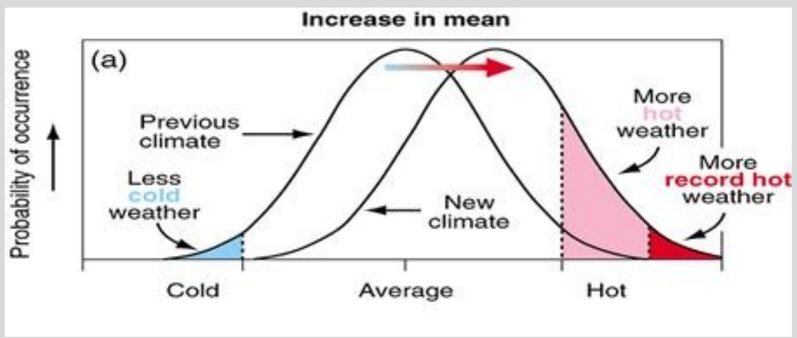


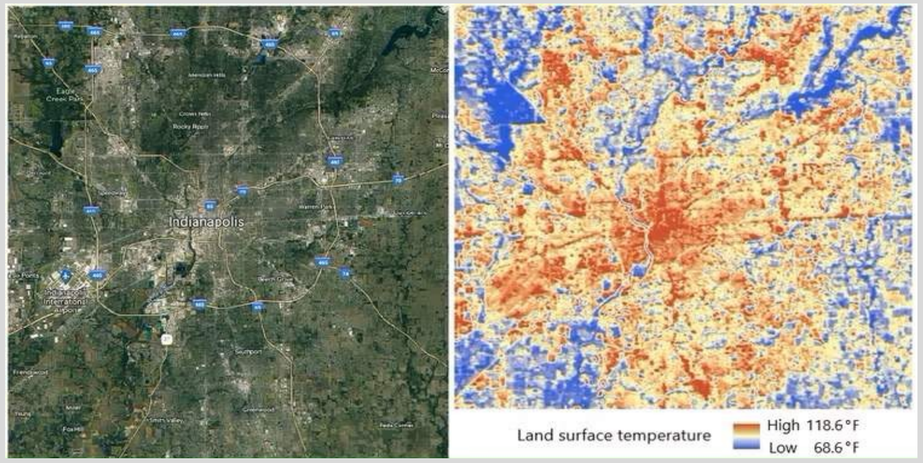
Fig. 2 Decadal average for each heat wave characteristic across all 50 cities

- In past years there has been an increase in heat wave frequency, season, and intensity in US cities which is likely to increase over time.
- Global climate models found in the southwest, southeast and Midwest US are likely to experience increases in heat waves and some cities are going to experience a 25% increase in heat wave frequency

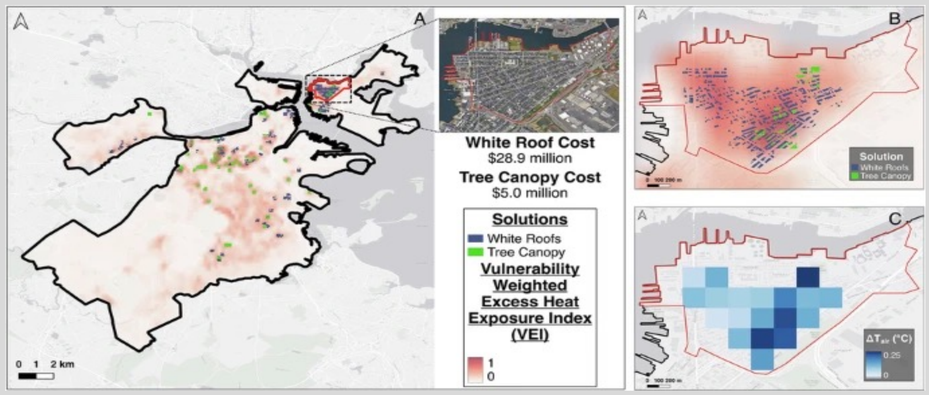


- This figure shows that the average global temperature is trending upwards, which shifts the bell curve to the right.
- Since the bell curve is moving to the right, the probability of distribution lies above extreme heat thresholds compared to before.
- This means the likelihood of heat waves will increase.

Urban areas are hotter than the surrounding rural areas due to increasing frequency and intensity of heat waves.



- This satellite image is an example of how much the temperature varies from city to vegetated areas in Indianapolis in 2019.
- Cities are extremely sensitive to heat- the patches between urban zones stay noticeably cooler on the heat map.



- This is a heat map comparing the urban heat island effect in east Boston with and without mitigation efforts.
- Tree canopy cover expansion programs and incorporating cool roofs is an expensive but necessary investment in order to reduce the heat caused by urban cities. The shade provided by trees alone can reduce heat by up to 2°C (Smith 2025).

CONCLUSION

- That the urban heat island (UHI) effect is increasing due to climate change.
- The figures show that the global temperature in cities is trending upwards.
- Urbanized cities experience high temperatures compared to rural areas. This is extremely apparent when you look at the pockets of rural land from the satellite view.
- Mitigation efforts have been made in some cities and include increasing tree canopy cover and upgrading roofs to have a higher albedo.

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