

Climate at a Glance: Urban Heat Islands

Bullet-Point Summary:

- **Urban heat islands**, which grow along with the size of cities, **create artificial warming** at many long-term temperature stations.
- On average, urban heat islands **increase** the global surface **temperature trend by almost 50 percent**.
- Almost 90 percent of U.S. temperature stations have been compromised by urbanization effects.
- **Almost half** of the **reported U.S. warming disappears** when reporting only uncorrupted stations.

Short Summary: The majority of U.S. temperature stations utilized for NOAA and NASA temperature records have been compromised by encroachment of artificial surfaces like concrete, asphalt, buildings, and air conditioner exhausts. This creates a substantial false warming trend that is responsible for almost half of reported U.S. warming. When only pristine temperature stations are used, warming trends are quite minimal. Figures 1 and 2, below, illustrates this.



Figure 1 - USHCN weather station used for climate data in a parking lot. University of Arizona Atmospheric Sciences Department, Tucson. The station had previously been in a grassy area but was moved as the campus grew.

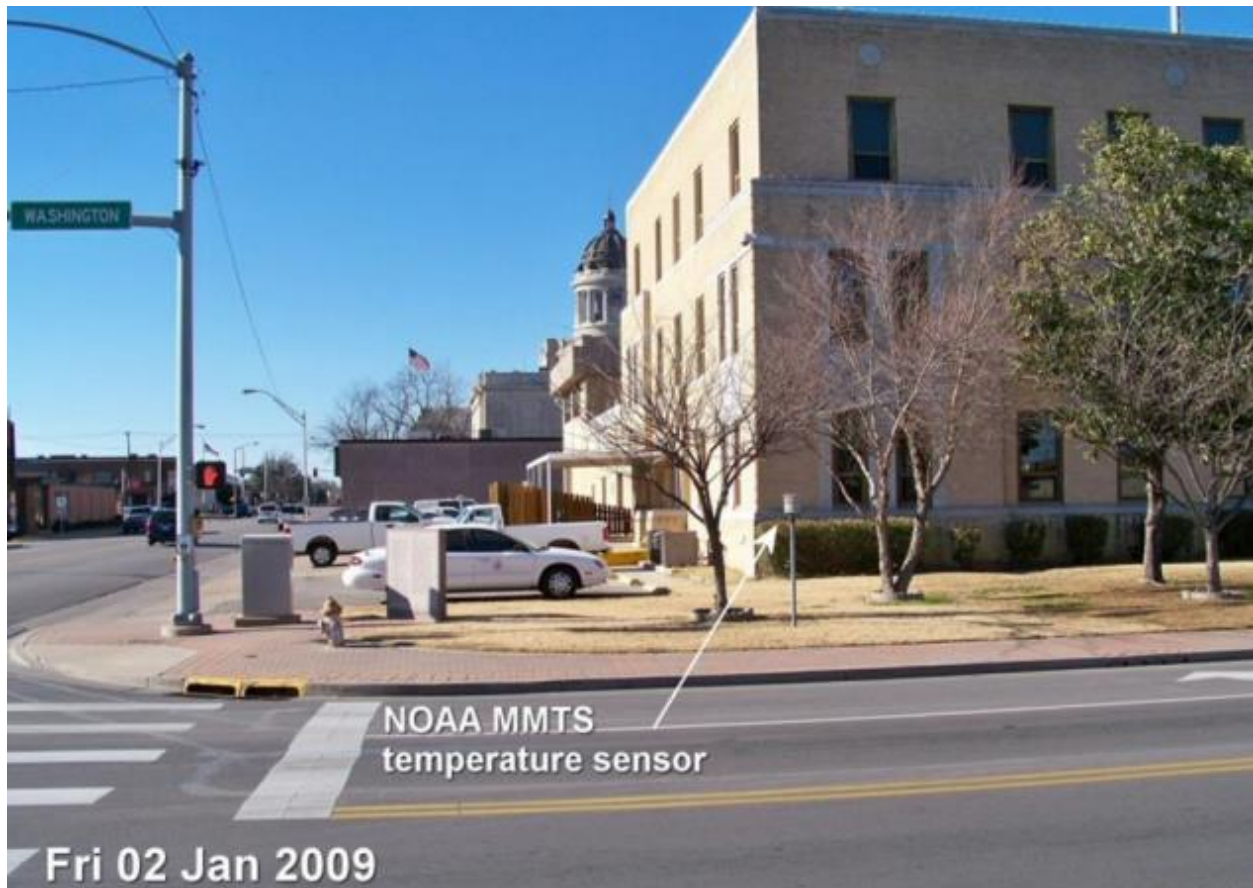


Figure 2 – NOAA temperature sensor (used for climate data) located on street corner in Ardmore, Oklahoma, corrupted by heating signatures of building, asphalt, and automobiles.

Figure 3, below, shows that temperature stations that have not been corrupted by urban heat island impacts report much less warming than temperature stations corrupted by urban heat island impacts. Yet, corrupted temperature stations are a majority of the stations used to report official U.S. temperature data.

Trend Comparisons

(All Unperturbed Stations vs. Official Record)

Raw, Class 1\2 (Compliant): **+0.204**

Raw, Class 3\4\5 (Non-Compliant): **+0.319**

All 1218 Official NOAA-Adjusted, Class 1-5 (All): **+0.324**

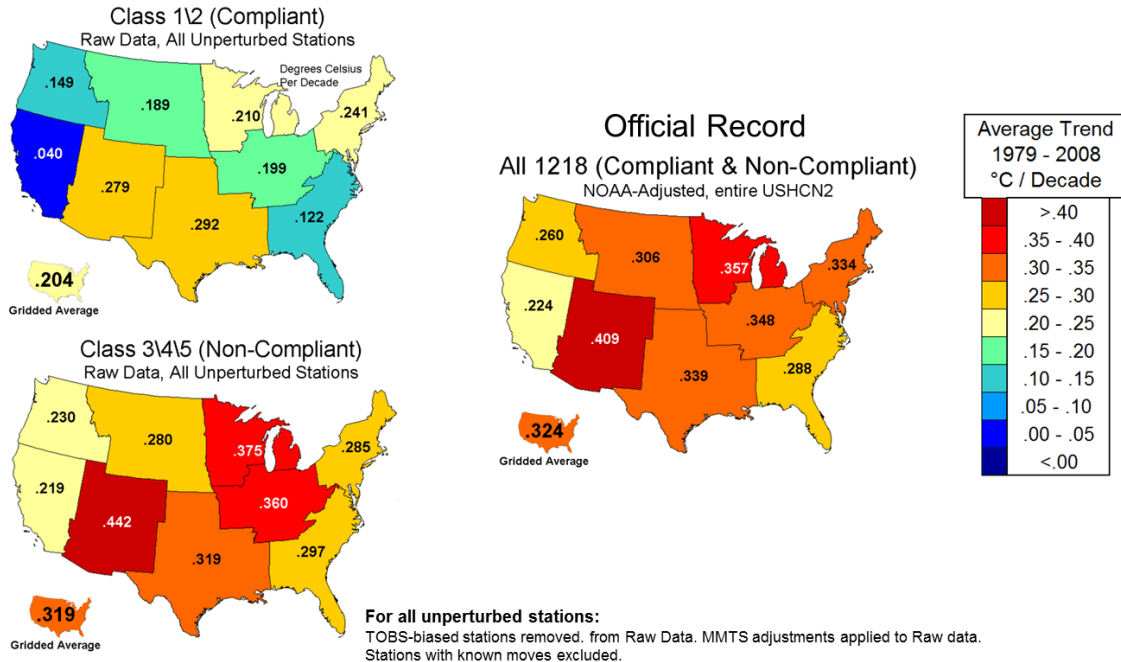


Figure 3 - Uncorrupted stations (Class 1&2) report much less warming than stations corrupted by urban heat island factors (Classes 3,4,&5).

There is strong evidence of this same sort of siting problem around the world at many other official weather stations, suggesting that the same upward bias manifests itself in the global temperature record. Because the U.S. temperature record is thought to be “the best in the world,” it follows that the global database is likely similarly compromised and unreliable.

Recommended Reading:

1. *New study of NOAA’s U.S. Climate Network shows a lower 30-year temperature trend when high quality temperature stations unperturbed by urbanization are considered*, American Geophysical Union, December 16, 2015, <https://fallmeeting.agu.org/2015/press-item/new-study-of-noaas-u-s-climate-network-shows-a-lower-30-year-temperature-trend-when-high-quality-temperature-stations-unperturbed-by-urbanization-are-considered/>
2. *Is the US Surface Temperature Record Reliable?*, [https://www.heartland.org/ template-assets/documents/publications/SurfaceStations.pdf](https://www.heartland.org/template-assets/documents/publications/SurfaceStations.pdf)
3. Ronald D. Leeper, John Kochendorfer, Timothy Henderson, and Michael A. Palecki, “Impacts of Small-Scale Urban Encroachment on Air Temperature Observations,”

Journal of the American Meteorological Society, June 12, 2019,
<https://journals.ametsoc.org/doi/10.1175/JAMC-D-19-0002.1>

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