

Climate Change

**WHAT IS IT?
WHERE IS IT GOING?
AND HOW DO WE KNOW?**

CHAPTER 4

City Heat

By Thomas C. Gibbons

TEMPERATURE MEASUREMENTS AT THOUSANDS OF STATIONS, ALL TAKEN WITHIN A FEW FEET OF THE SURFACE OF THE EARTH, SEEM TO SHOW AN ACCELERATING WARMING TREND.

BUT ARE THEY RELIABLE?

IS THERE SOME WAY TO CHECK THEM?

HAVE THERE BEEN ANY QUESTIONS ABOUT THEM?

GLOBAL WARMING QUESTIONS

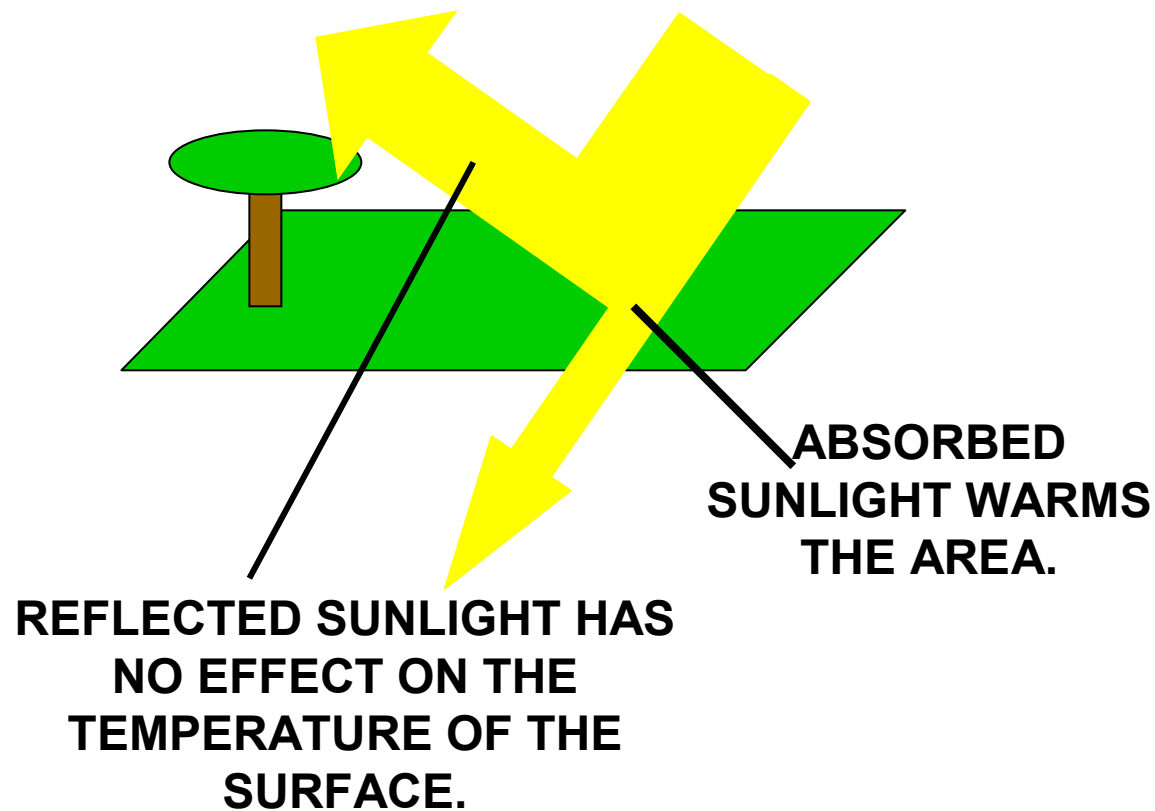
Skeptics have raised the following question:

It is well known that cities and towns are warmer than the surrounding countryside. This is called the “Urban Heat Island Effect”.

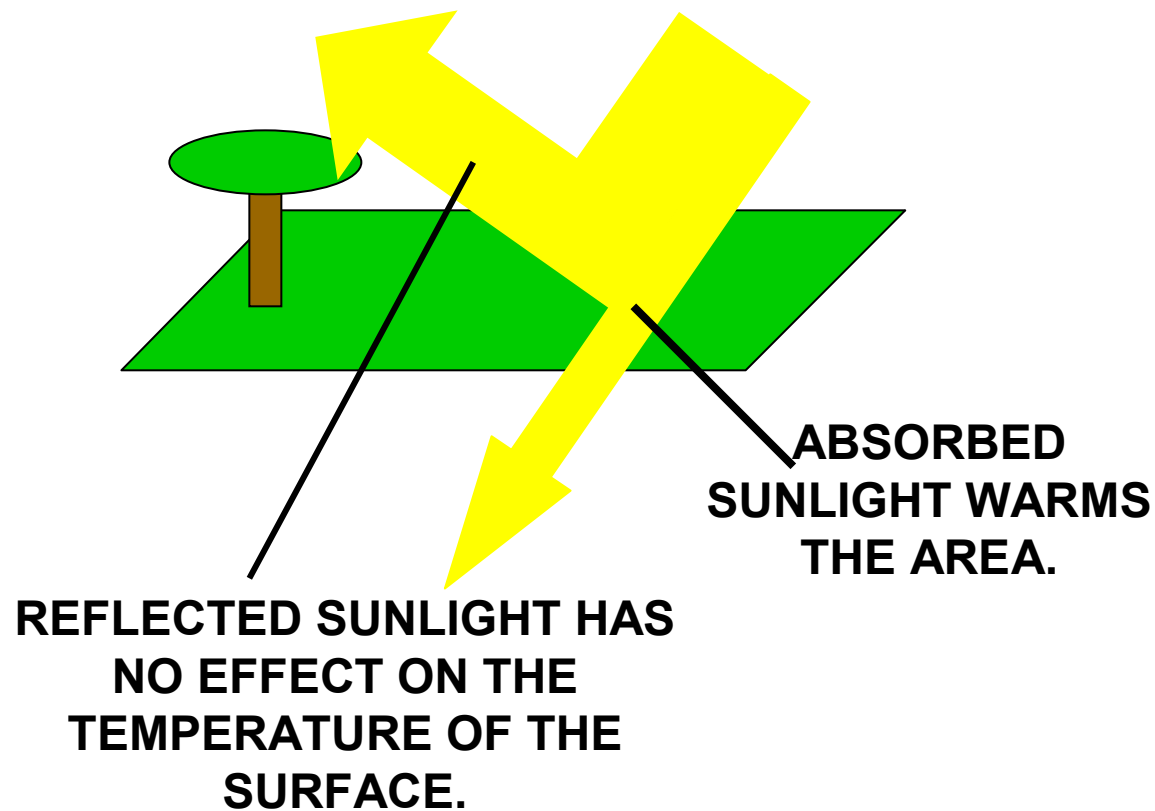
Also, over the years, the majority of those thousands of weather stations used in the temperature record have been in cities and towns.

Therefore, according to the skeptics, the warm urban areas might be responsible for the observed temperature increase.

In the first place, the Urban Heat Island Effect is real and well-known in cities – especially large ones. Many urban planners worry about heat waves in the summer, which make the cities very uncomfortable. It is also understood by climate scientists.



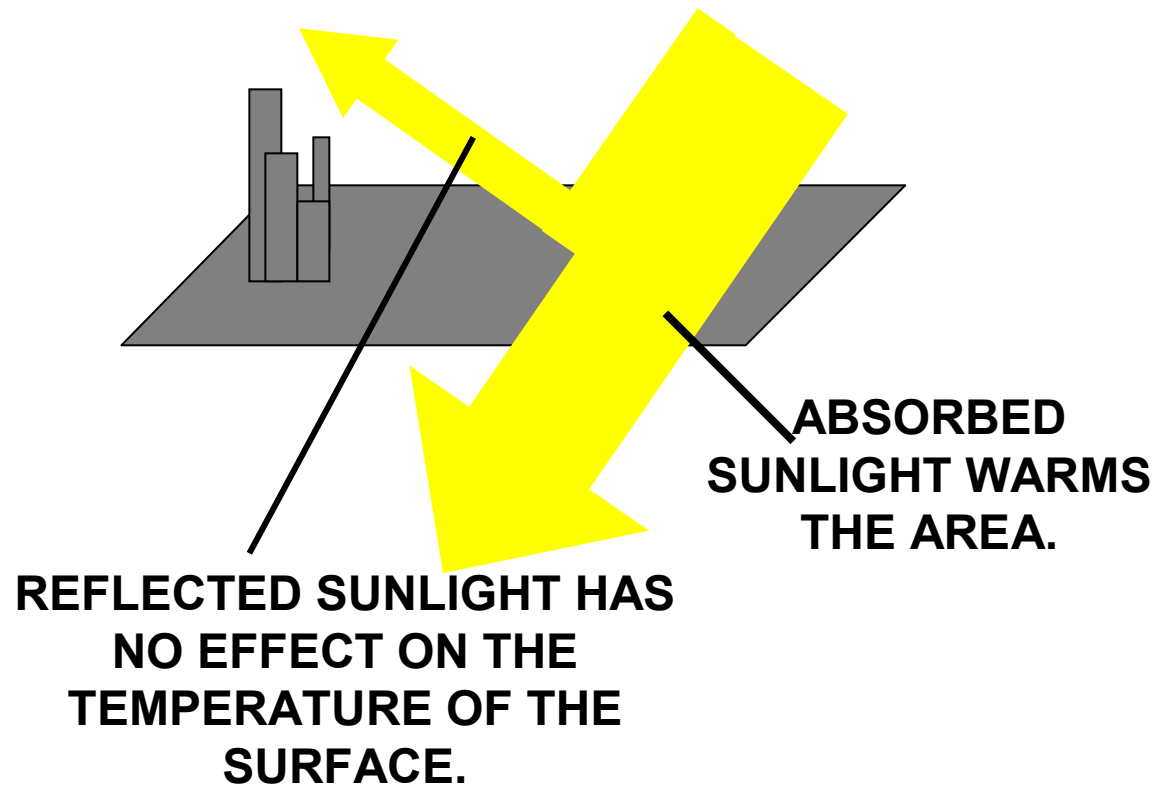
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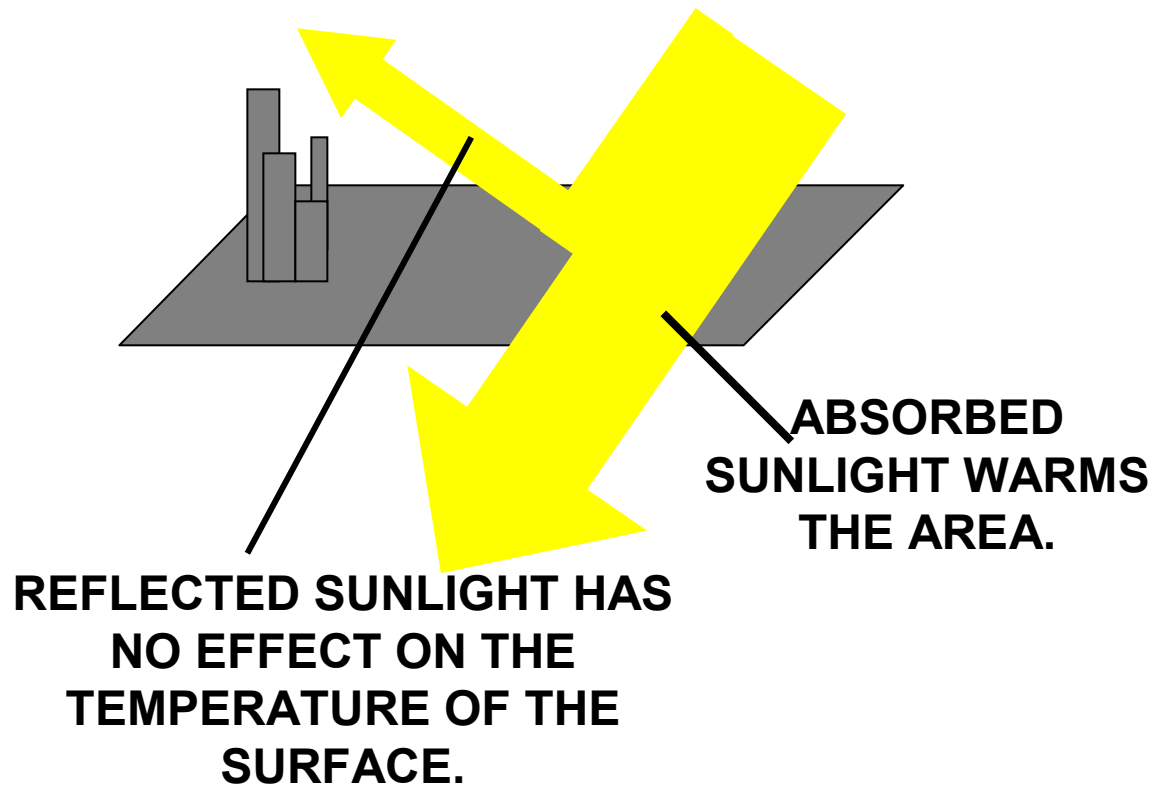
It happens for a combination of several reasons, but one important one is that green areas full of vegetation tend to reflect a lot of sunlight.

Plants also evaporate moisture, which cool them. Humans do this, too.

IF YOU REPLACE THE GREEN AREA WITH A CITY, THINGS CHANGE.



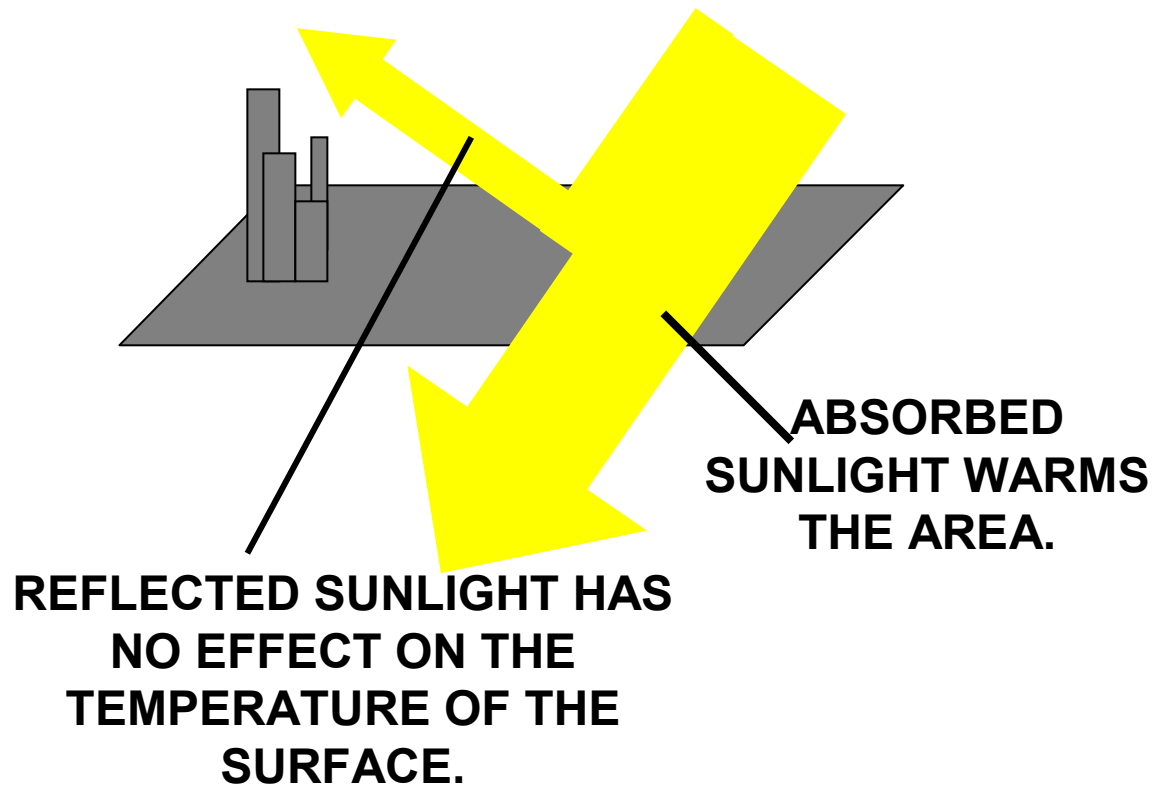
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Urban building materials tend to reflect less and absorb more. Therefore they get hotter.

Also, they don't evaporate moisture very well, so they don't have this cooling mechanism

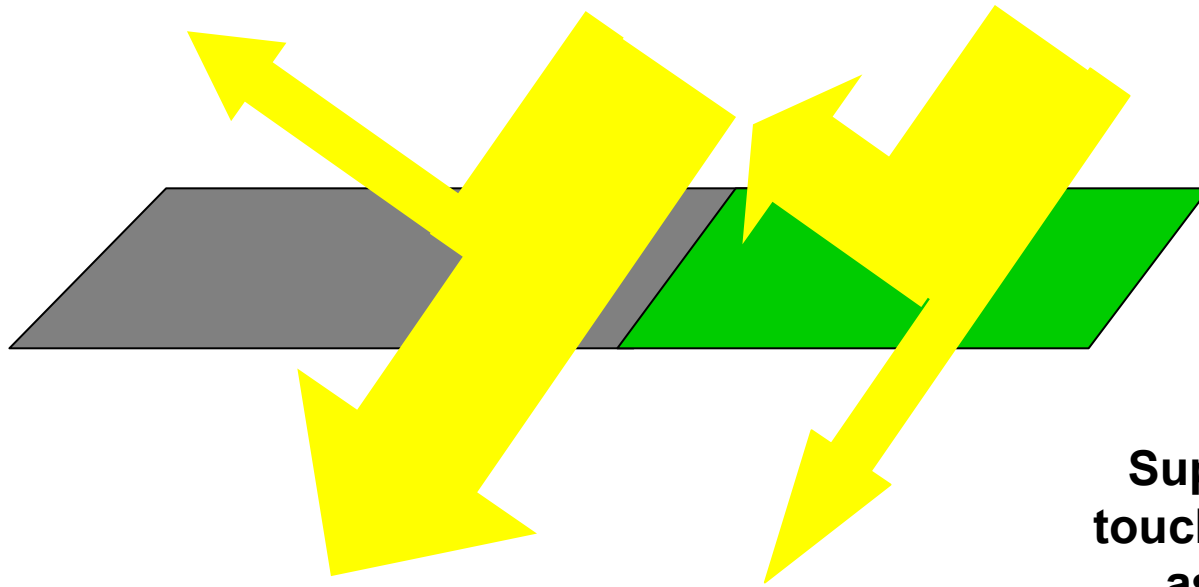
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This is why there is a tendency to build some new buildings with vegetation on the roof



IF YOU REPLACE THE GREEN AREA WITH A CITY, THINGS CHANGE.



Suppose you were to touch a green area such as grass and then (carefully) touch a conventional roof on a hot summer day.

Which do you think is more likely to burn you?

**BUT THE FACT THAT THE CITIES ARE WARMER DOES NOT
NECESSARILY MEAN THAT THEIR TEMPERATURE
INCREASES ARE SIGNIFICANTLY MORE THAN THOSE OF
RURAL AREAS.**

**ONE PLACE COULD INCREASE FROM 65 TO 66 AND
ANOTHER FROM 45 TO 47, FOR EXAMPLE.**

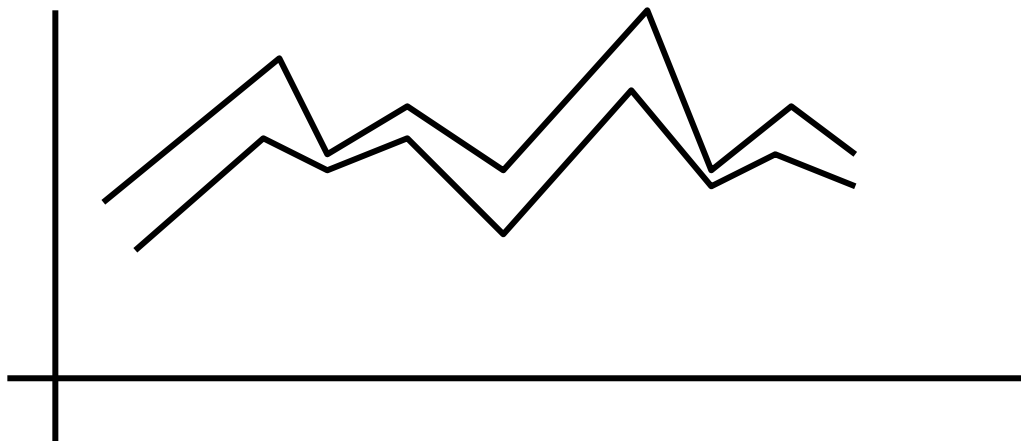
**IT IS UP TO THE SCIENTISTS TO CHECK THIS IN DETAIL AND
FIND OUT WHAT, EXACTLY, IS HAPPENING.**

AND THIS HAS BEEN DONE.

HERE IS A LINK TO AN ABSTRACT OF A 1998 PAPER BY THOMAS PETERSEN AND CO-WORKERS:

<http://www.agu.org/pubs/abs/gl/1998GL900322/1998GL900322.html>

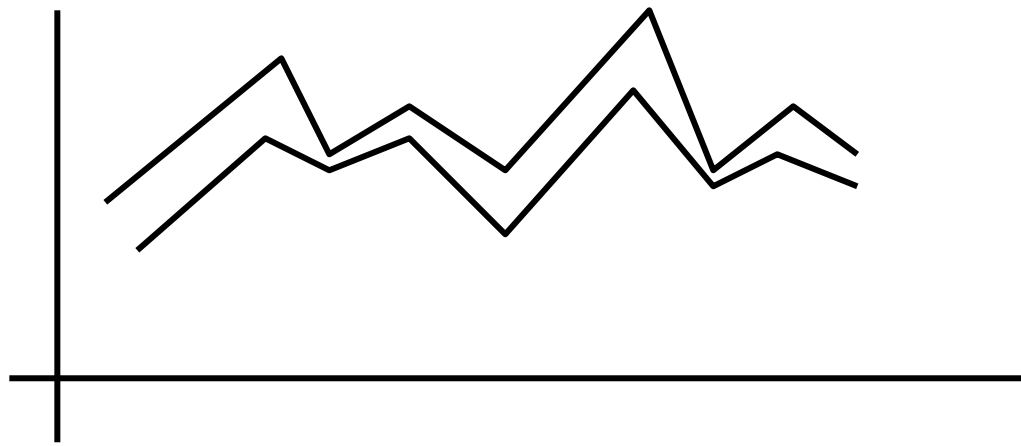
THEY EXAMINED THE GAUGES USED FOR THE TEMPERATURE RECORD – ALL 7280 OF THEM – AND FOUND 2290 THAT THEY COULD CLASSIFY AS RURAL. THEN THEY FOUND THAT THE “UPS AND DOWNS” OF THE RURAL STATIONS WERE NEARLY IDENTICAL WITH THE BEHAVIOR OF ALL STATIONS – URBAN AND RURAL – TOGETHER (AS SUGGESTED IN THIS SIMULATED GRAPH BELOW).



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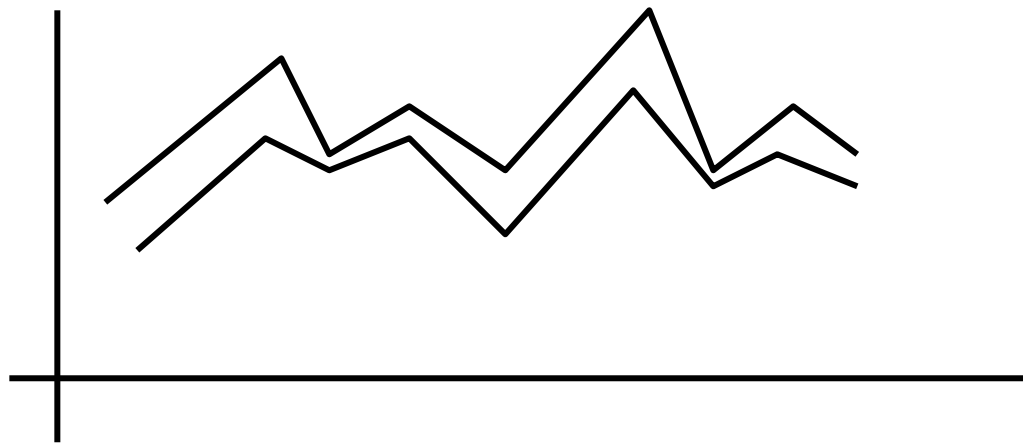
THEY ALSO FOUND THAT THE RURAL STATIONS SHOWED A WARMING TREND OF 0.70° CELSIUS PER CENTURY (1.26° FAHRENHEIT). ALL GUAGES – URBAN AS WELL AS RURAL – SHOWED A WARMING TREND OF 0.65° CELSIUS (1.17° FAHRENHEIT).



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THEY STATED, IN CONCLUSION, “Therefore, the well-known global temperature time series from in situ stations is not significantly impacted by urban warming”.



THE PETERSON PAPER SEEMS VERY DEFINITIVE ON THIS SUBJECT; HOWEVER THERE ARE OTHERS WITH THE SAME CONCLUSION.

FOR EXAMPLE, THE PAPER MENTIONED IN CHAPTER 2 ON THE GLOBAL TEMPERATURE:

http://pubs.giss.nasa.gov/docs/1999/1999_Hansen_etal.pdf

HAS A LONG DISCUSSION OF THIS, CONCLUDING THAT URBAN EFFECTS ARE VERY SMALL ON THE GLOBAL TEMPERATURE. IT ALSO MAKES REFERENCE TO SEVERAL OTHER SIMILAR PAPERS. SO CHECK THIS LINK FOR MORE DETAIL.

This article discusses the whole urban heat island question relative to global warming:

<http://www.realclimate.org/index.php?p=43>

This is a NASA article on the urban heat island (on effects on cities but doesn't address global climate.)

<http://eobglossary.gsfc.nasa.gov/Study/GreenRoof/index.html>

There is a similar focus in this one:

<http://asusmart.com/urbanclimate.php>

SUMMARY: THE SKEPTICS, IN CALLING ATTENTION TO THE URBAN HEAT ISLAND, CAME UP WITH SOMETHING THAT DEFINITELY NEEDED TO BE CHECKED TO SEE IF IT WAS RESPONSIBLE FOR THE RESULT THAT TEMPERATURE IS INCREASING.

IT HAS BEEN CHECKED IN DETAIL AND HAS BEEN FOUND TO NOT BE THE REASON THAT WE ARE SEEING INCREASING GLOBAL TEMPERATURES.

IN THE NEXT SHOW, AND IN OTHER LATER SHOWS, WE WILL HAVE A LOOK AT SOME OTHER POINTS RAISED BY SKEPTICS.

FOR EXAMPLE, THERE HAS BEEN QUITE BIT OF CONTROVERSY ABOUT MEASUREMENTS OF ATMOSPHERIC TEMPERATURE MADE BY EARTH SATELLITES.

REFERENCES

ALL OF THE REFERENCES IN THE SLIDES IN THIS CHAPTER ARE ALREADY IN THE FORM OF WEB ADDRESSES. YOU SHOULD BE ABLE TO EITHER CLICK ON THEM OR PASTE THEM INTO YOUR BROWSER.



**CONTINUE ON AND RETURN TO
THE GLOBAL WARMING MENU**

**THEN LOOK AT
CHAPTER 5
“The
Satellite Story”**