

Processes Underlying Climate and Climate change

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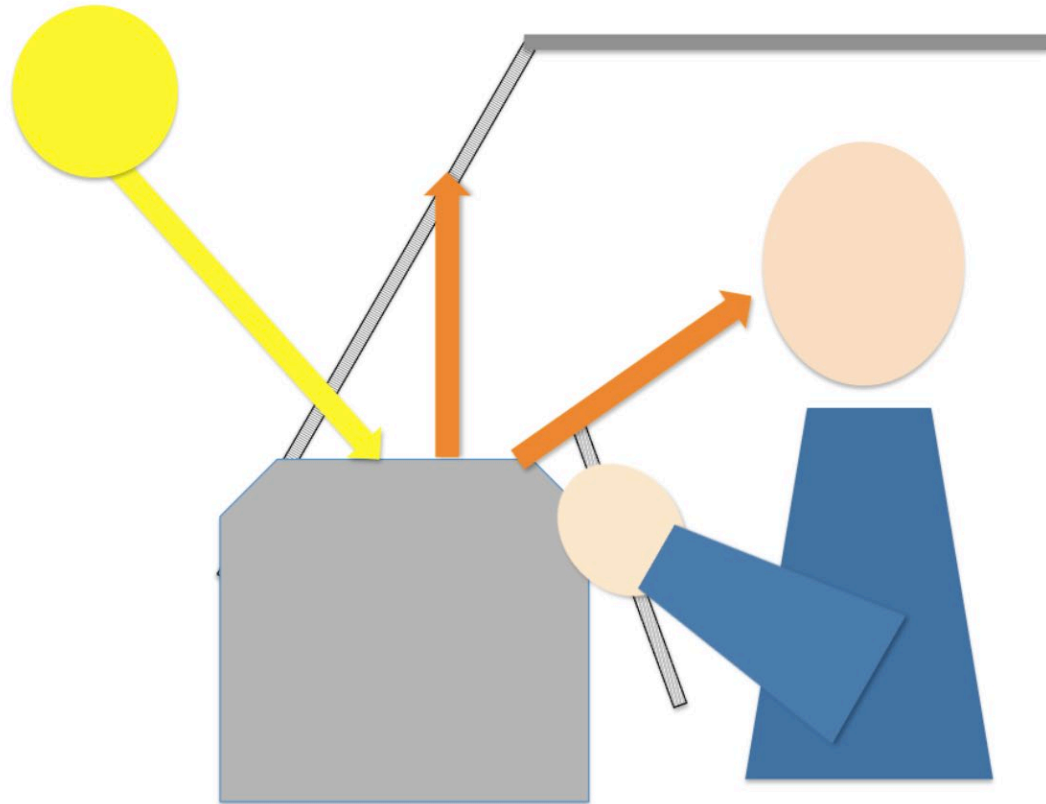


The Kernel of Climate

Climate depends on a balance of energy coming in and the resistance to it exiting the Earth-atmosphere system.

-Incoming amount varies by latitude and season.

-Resistance to outgoing longwave radiation depends on greenhouse gases.

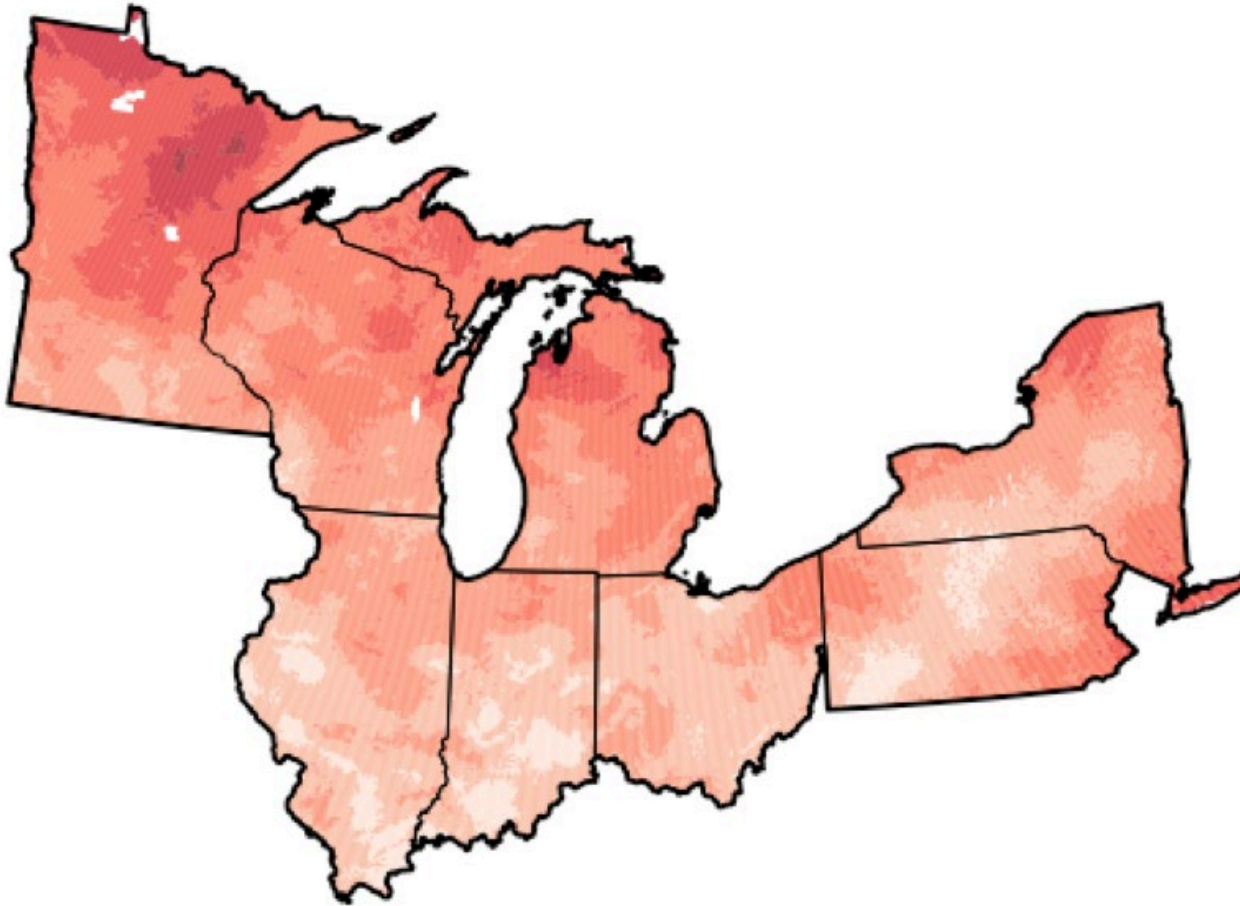


Closed car analogy

Similar to a literal greenhouse

We are trending toward this!

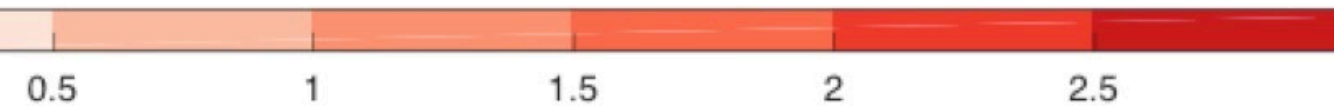
Annual Temperature Difference: nClimDiv
(1986 - 2016) - (1901 - 1960)



Observed change in regional temperature

Comparable to difference
between early 20th century and
last ice age.

Source: NOAA/NCEI

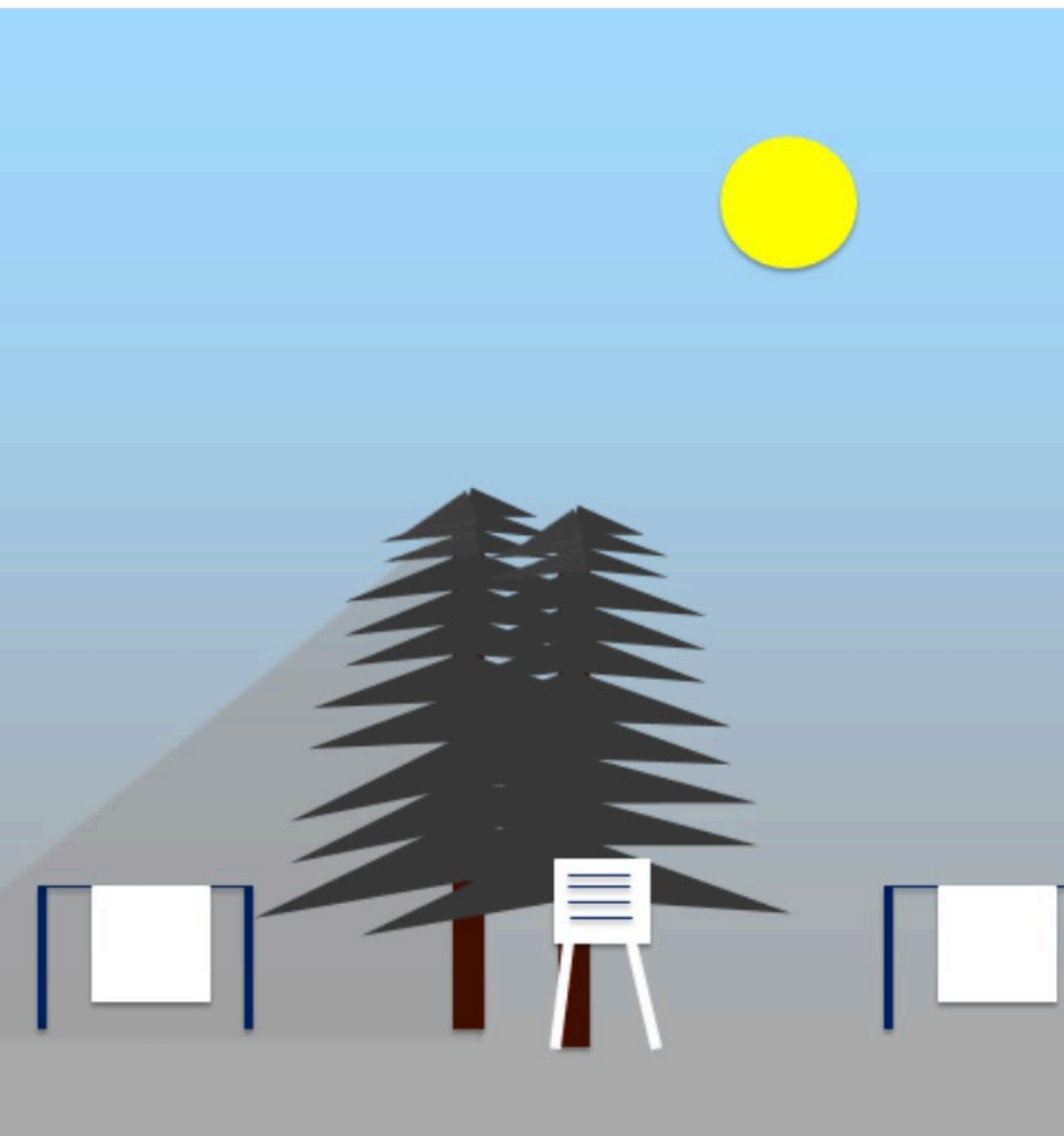


All the months are above average

If you compare the monthly global average air temperature for individual months to that same month averaged over the period 1901-2000, and most recent month that was not above average was February 1986.

425 consecutive months!

The odds of this happening by chance are 1 in $2^{424} \sim 10^{120}$



Evapotranspiration—the clothesline analogy

“The problem with the idea that air temperature causes ET is that it is not entirely false.” —Dr. Chris Milly

This idea needs to be used with care.