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!
Observed change in regional temperature

Comparable to difference between early 20\textsuperscript{th} 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.