Scientists in the United States, Japan, and Britain have all confirmed that 2015 was the warmest year in average world temperature in the historical record. This breaks the previous record temperatures of 2014.

You wouldn't really expect a record that has been around for many years to be broken two years in a row, unless something was changing. Obviously, it can happen just by chance. But it's not very likely, if weather is just fluctuating randomly. It's obviously a lot more likely if there's an upward trend over time.

Climate scientist Michael Mann has provided some more quantitative evidence to this effect. According to the *NY Times*:

"*Michael E. Mann, a climate scientist at Pennsylvania State University, calculated that if the global climate were not warming, the odds of setting two back-to-back record years would be remote, about one chance in every 1,500 pairs of years. Given the reality that the planet is warming, the odds become far higher, about one chance in 10, according to Dr. Mann's calculations*."

This is very powerful evidence that climate change is happening — just as you'd be very likely to think someone was cheating at poker if their hands were tending to get better all night, then they had four kings, and then the next hand they had four aces. We can make this more precise by doing a little complication, inspired by Bayesian statistical analysis. Rather than just using Bayes formula, which doesn't explain much, I'll try to unpack the reasoning. Hopefully this won't seem too much like the story problems everyone hated as a child. For those who just can't stand thinking about numbers, here's the conclusion: Even if you thought the reality of climate change was a 50-50 coin toss before these two record-breaking years, you should now figure that the reality of climate change is much closer to a sure thing bet.

Let's be conservative and suppose there was only a fifty percent chance that the world was warming before we got this new evidence. The IPCC thinks the odds are well past 90%, so most scientists would think I'm being too generous to climate skeptics here. If we considered 3000 hypothetical planets that had exactly the same evidence of warming, in other words, 1500 hundred of them would actually be warming and the others would not. Of the 1500 hundred with no real warning, one world would have just broken its temperature record. Of the other 1500 worlds, according to Mann's calculations, 150 would have two years in a row of record-breaking temperatures. I want to be conservative again and assume that actually the real number is 15, so he's off by an order of magnitude. (You can also think of this as accounting for the odds that there's a mistake in the global

temperature assessments). Altogether, of the 3000 planets we originally considered, we expect to find 16 cases in which the heat record was beaten two years in a row, and of those, fifteen were cases where the planet was experiencing climate change.

In other words, given that a climate has had two record breakers in a row, we can now readjust the odds that the planet is having climate change from 50:50 (the odds before we had this new data) to 15:1. Or to put it another way, the odds are now 94% instead of 50%. Of course, if we used Mann's numbers, the result would be even stronger.

Of course, climate change still isn't a certainty. It's possible that it's all just a coincidence or a conspiracy, just as it's possible that if I played Stephen Curry a thousand games of one-on-one, I might beat him once. He'd have to be struck by lightning during the game, however, for that to happen.