Science Communication

How to cultivate the art of storytelling (for scientists)

Sophia E. Hayes, Washington University

TEDx 2019

"Science the heck out of climate change"

Start your story “in the middle”

- craft that great hook

Every graph tells a story

TEDx 2019

“Science the heck out of climate change”

Tool #1: Start your story in the middle…

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Not
Chronologically (what came first, second, third, etc.)

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Goals
Keep the audience interested
Hold their attention
Make them *care* to hear more

Start your story in the middle…

This takes practice!

Find a partner to listen to you
--what's a major finding?
--what was a breakthrough moment in the research
--can you highlight something you (or your group members) overcame

Graduate students are amazing scientists …

I'm going to tell you about a grad student who ran an experiment that I would've wholeheartedly counseled against … one that was misguided, naïve, and frankly expensive to run.

And she showed me that sometimes "old" problems need a new set of eyes…

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The "Missing" Bicarbonate in CO_2 Chemisorption Reactions on Solid Amine Sorbents

Chia-Hsin Chen,[†] Daphna Shimon,[†] Jason J. Lee,[§] Frederic Mentink-Vigier,[‡] Ivan Hung,[‡] Carsten Sievers,[§] Christopher W. Jones,[§] and Sophia E. Hayes*[,†]

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Supporting Information

ABSTRACT: We have identified a hydrated bicarbonate formed by chemisorption of $^{13}CO_2$ on both dimethylaminopropylsilane (DMAPS) and aminopropylsilane (APS) pendant molecules grafted on SBA-15 mesoporous silica. The most commonly used sequence in solid-state NMR, ^{13}C CPMAS, failed to detect bicarbonate in these solid amine sorbent samples; here, we have employed a Bloch decay ("pulse-acquire") sequence (with ^{1}H decoupling) to detect such species. The water that is present contributes to the dynamic motion of the bicarbonate product, thwarting CPMAS but

formed on amines grafted on mesoporous silica SBA-15 have been observed by IR and solid-state NMR (SSNMR) numerous times.[4−11]

The formation of bicarbonate in CO_2 chemisorption reactions on solid amines has been debated in the past.[7,12−15] Solid-state NMR is used extensively to characterize chemisorption products because it can determine structures of these noncrystalline systems and can be employed in a manner that leads to quantification of products, as well as the consumption of reactants, and can detect side products that are formed as well.[16−19] In NMR in particular, the bicarbonate ^{13}C chemical shift appears at a range of values, depending on

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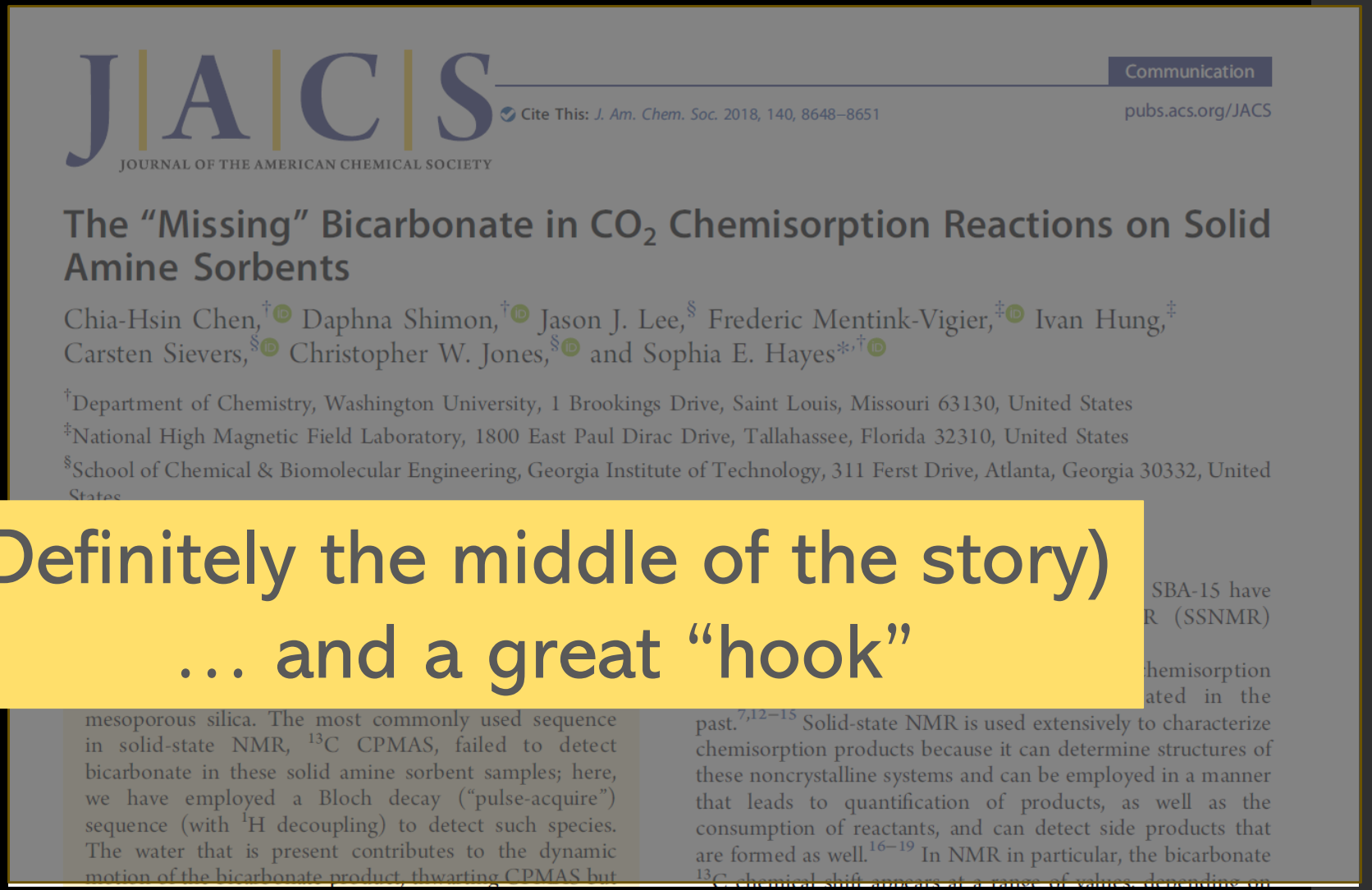

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(Definitely the middle of the story)
… and a great "hook"

Tool #2: Every graph tells a story

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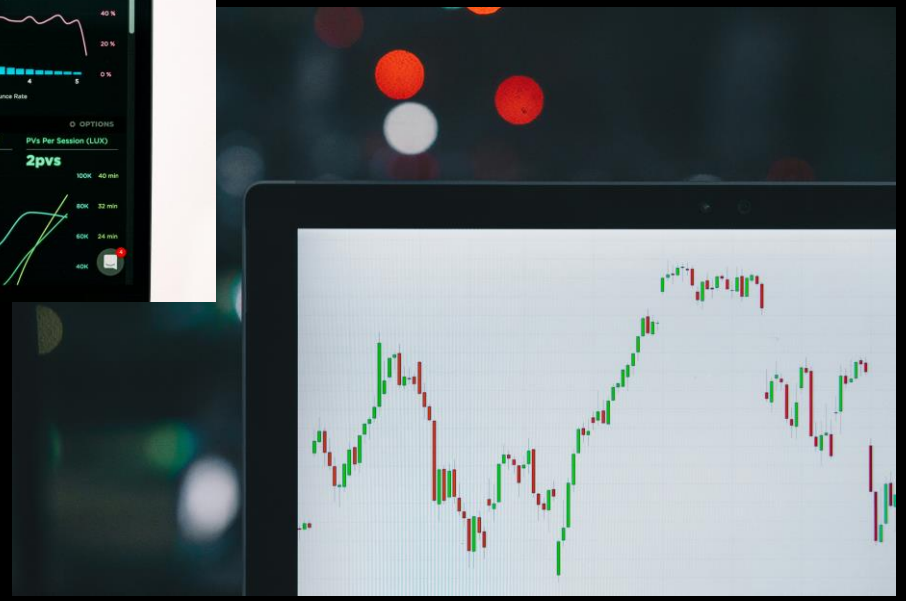

Tool #2: Every graph tells a story

(we have an algorithm for that)

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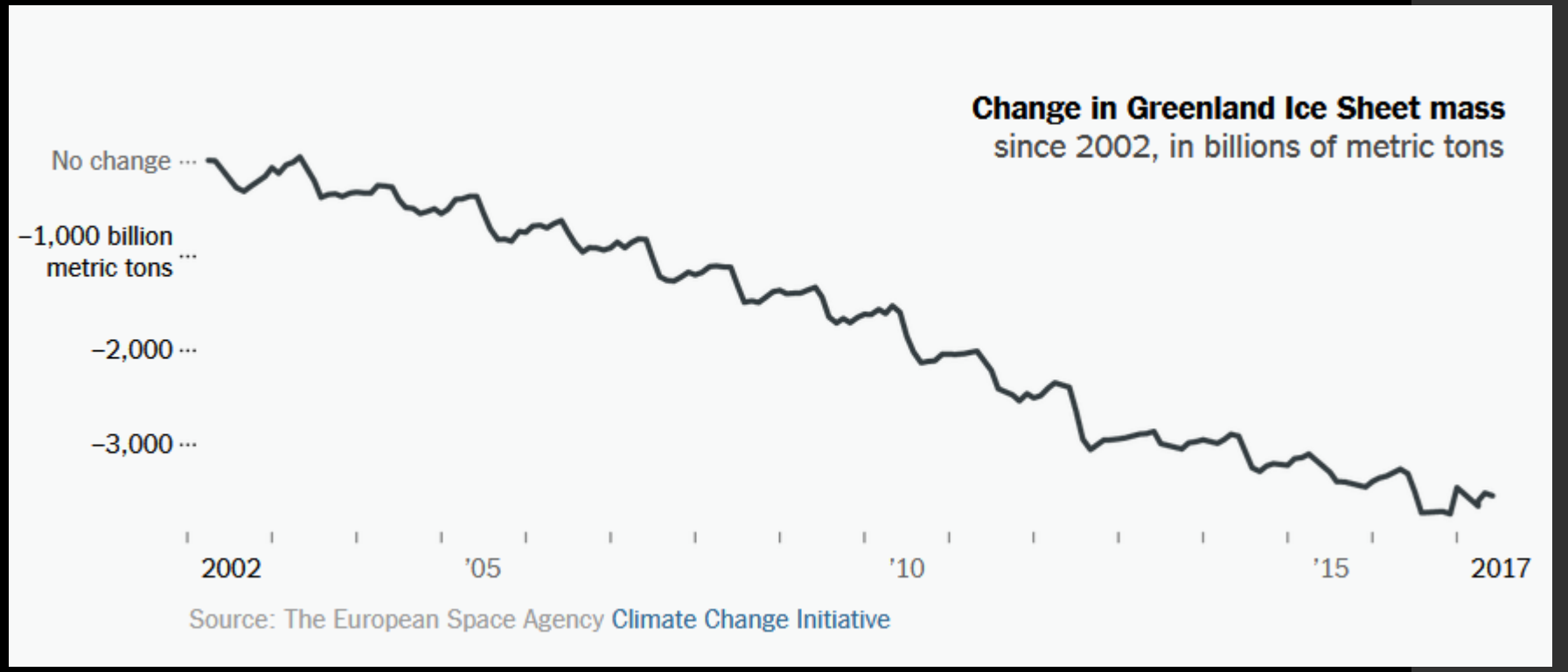
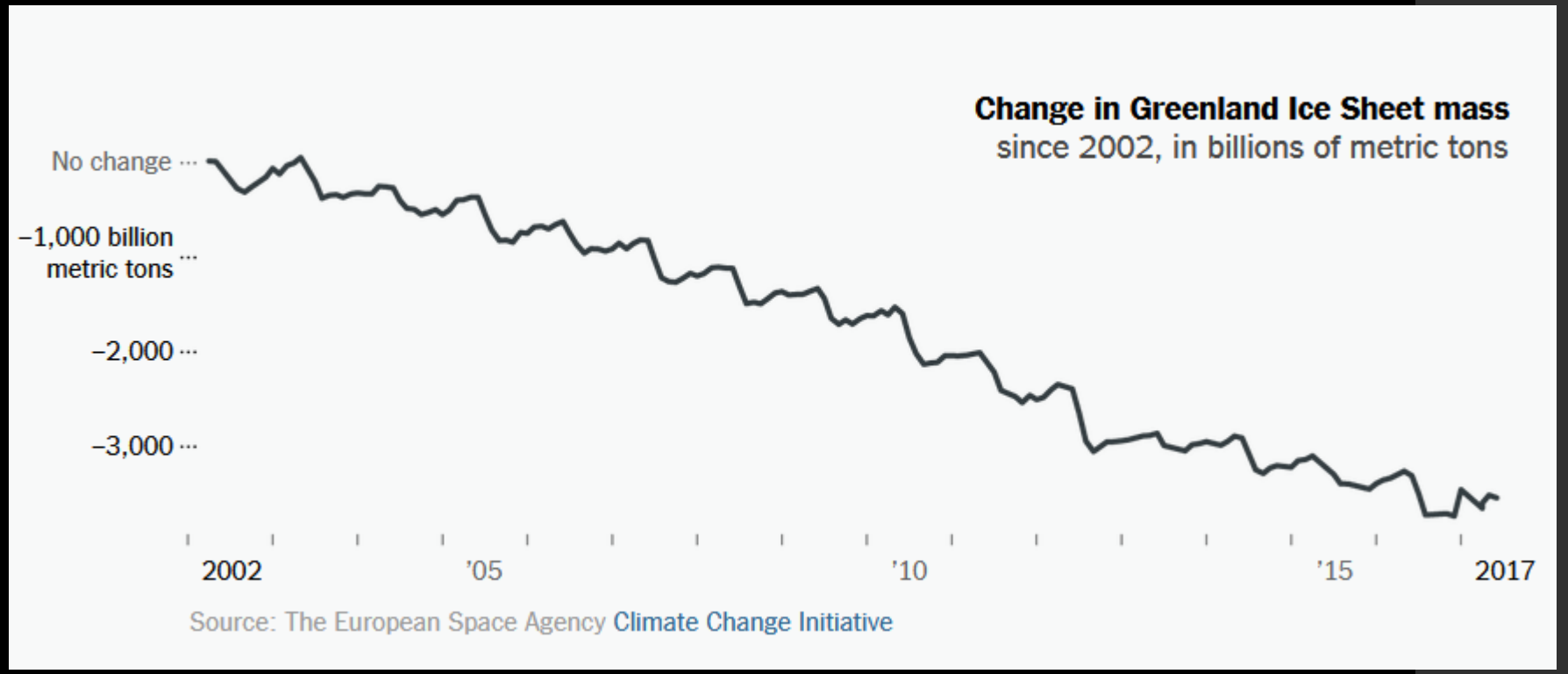
(we have an algorithm for that)

1. *Here are data from/of ____*
2. *The x-axis is ____*
3. *The y-axis is ____*
4. *What this tells us is _____*

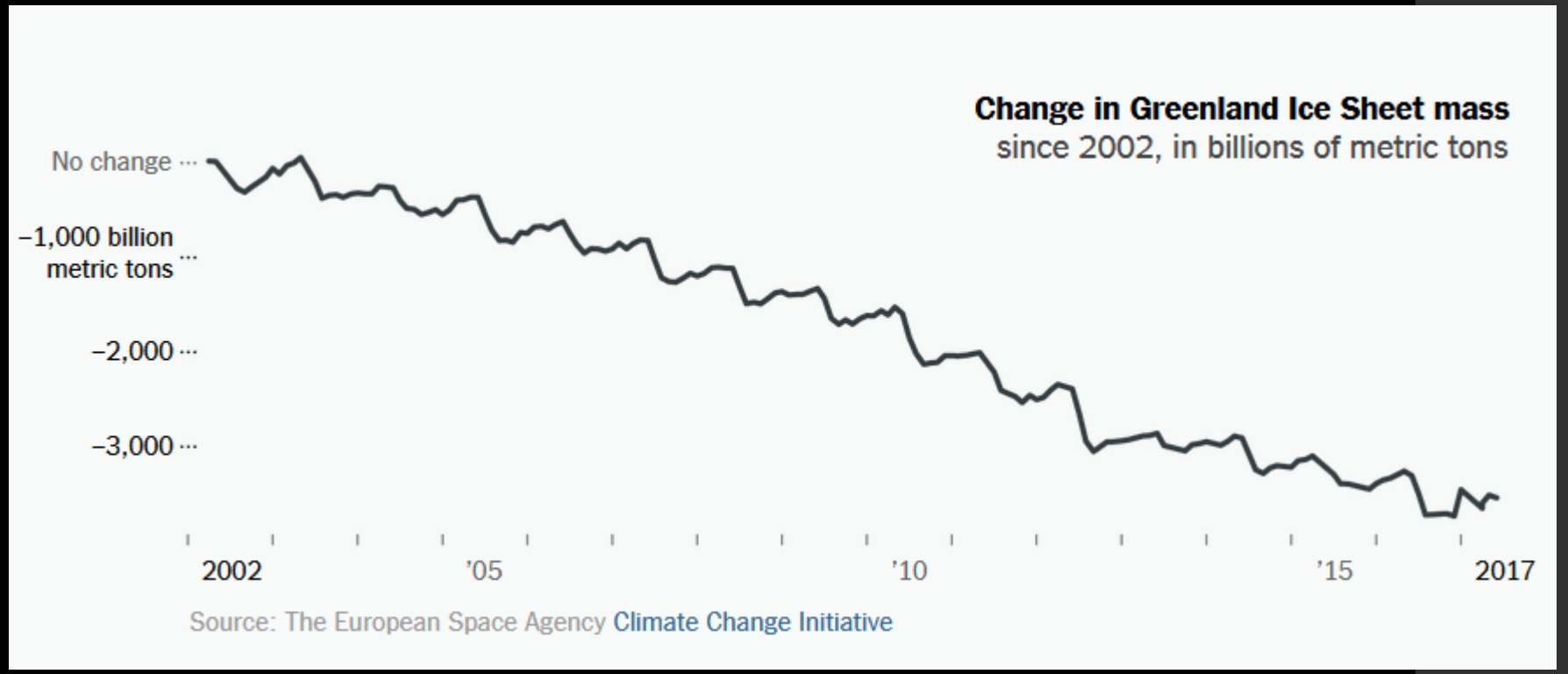


Source: New York Times



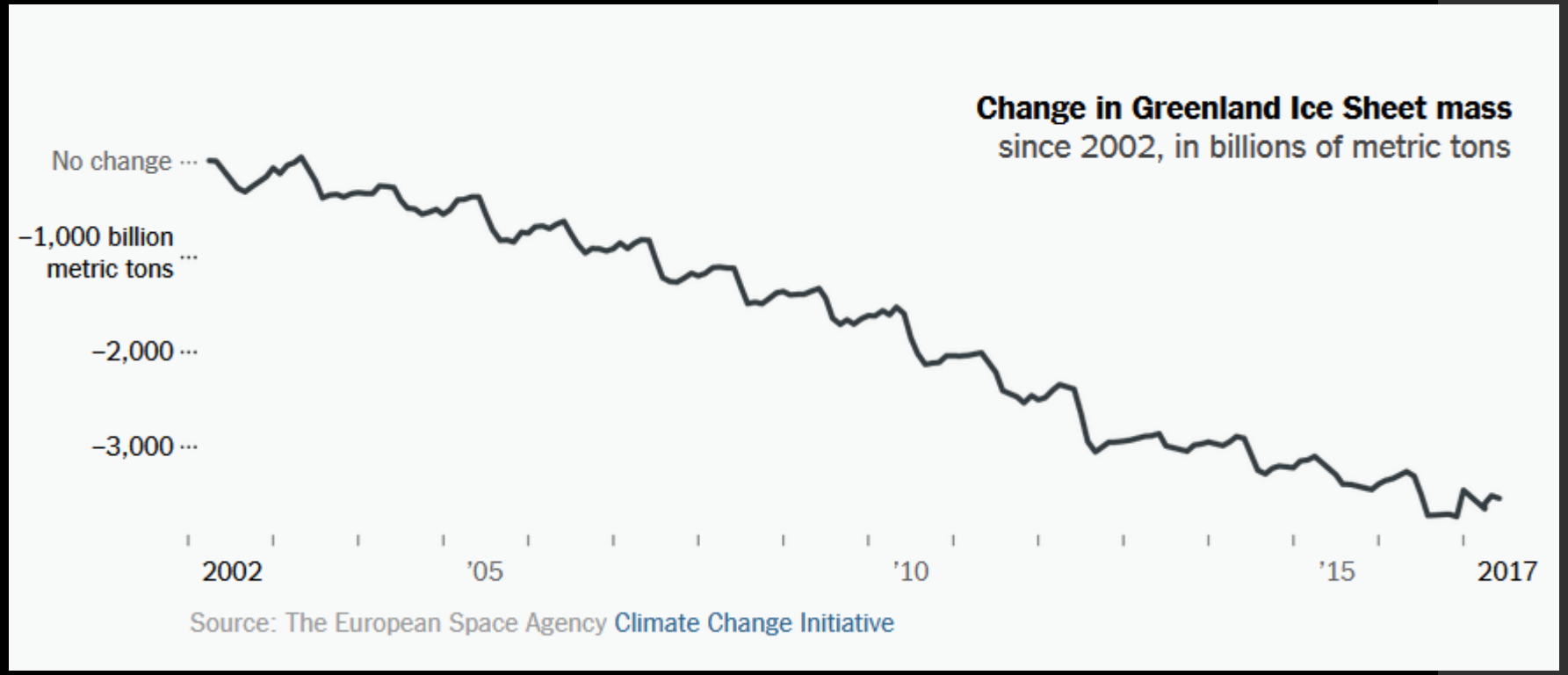
1. “Here is a graph of the loss of mass of the Greenland ice sheet over time.” (title)

Source: New York Times



1. "Here is a graph of the loss of mass of the Greenland ice sheet over time." (title)
2. "Along the x-axis is time in years shown from 2002 to 2017. (axes description)
3. The y-axis has a negative scale in billions of metric tons of ice. These numbers are negative because they start from 0 (in 2002) and decrease with time." (axes again)

Source: New York Times



4. "The Greenland ice sheet has been losing mass between 2002 and 2017. There are ripples in the plot, reflecting the seasonal loss of ice in summer and gain in winter, but those aren't our focus. What's important here? Note, the ice sheet decreases slowly at first (2002 – 2005), but there is more mass loss (we'd say 'the rate of mass loss increases') from about 2005 – 2012. It appears to be a little less steep between 2012-2017 – so maybe this process is slowing down – but we'd need more data to be certain."

Source: New York Times

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