Storytelling with data at NASA's Earth Information Center
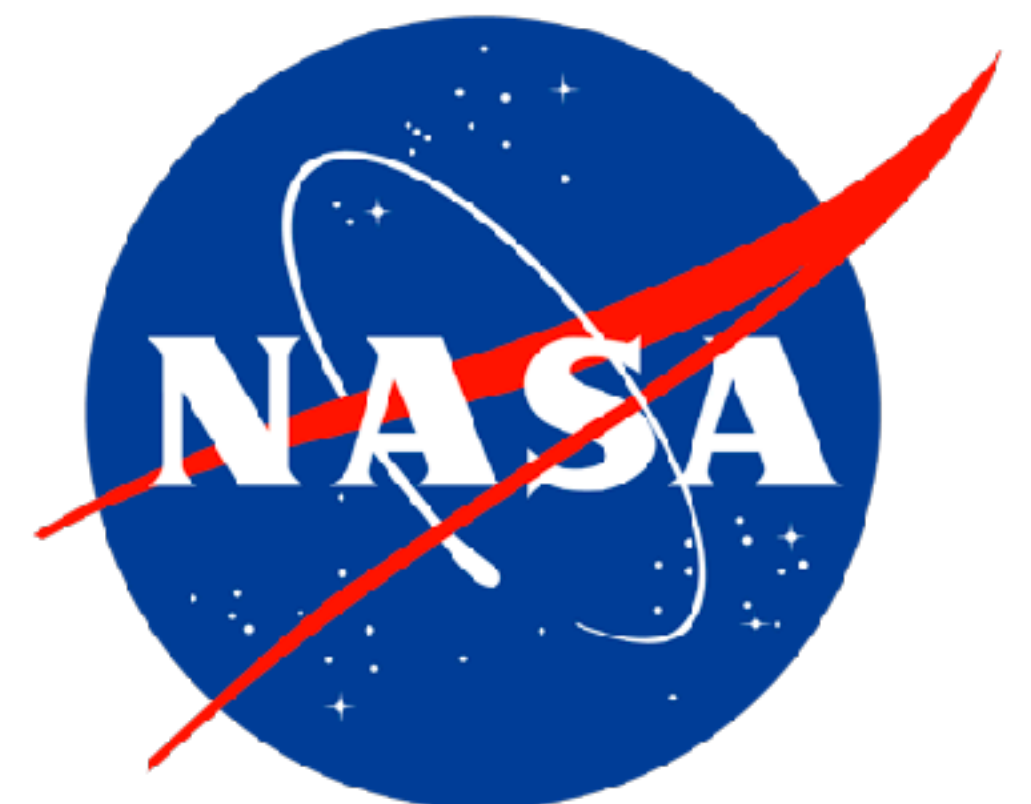
and how we use it to communicate the ways NASA's mission extends beyond space exploration to study the Earth.

Alex Gurvich, Ph.D.
www.alexbgurvi.ch
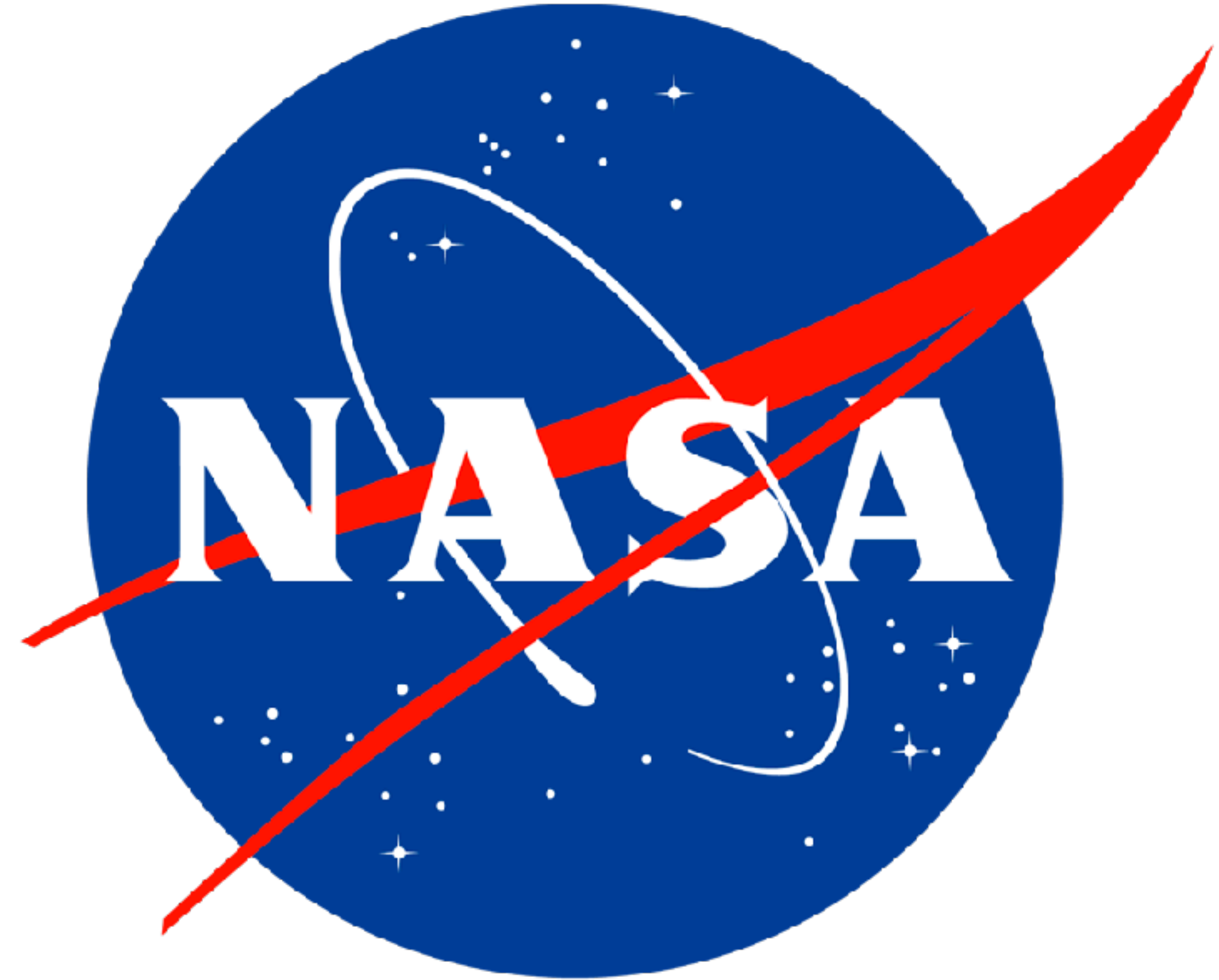Senior Graphics Designer and **Visualization Specialist**
at NASA Goddard Space Flight Center's Scientific Visualization Studio

Disclaimer: this presentation represents my perspective and opinions and **not the official position(s) of NASA**.

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Storytelling with data is a **focused and intentional** way to **communicate key features** in data.

www.storytellingwithdata.com

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Visualizations are rarely both exploratory *and* explanatory.

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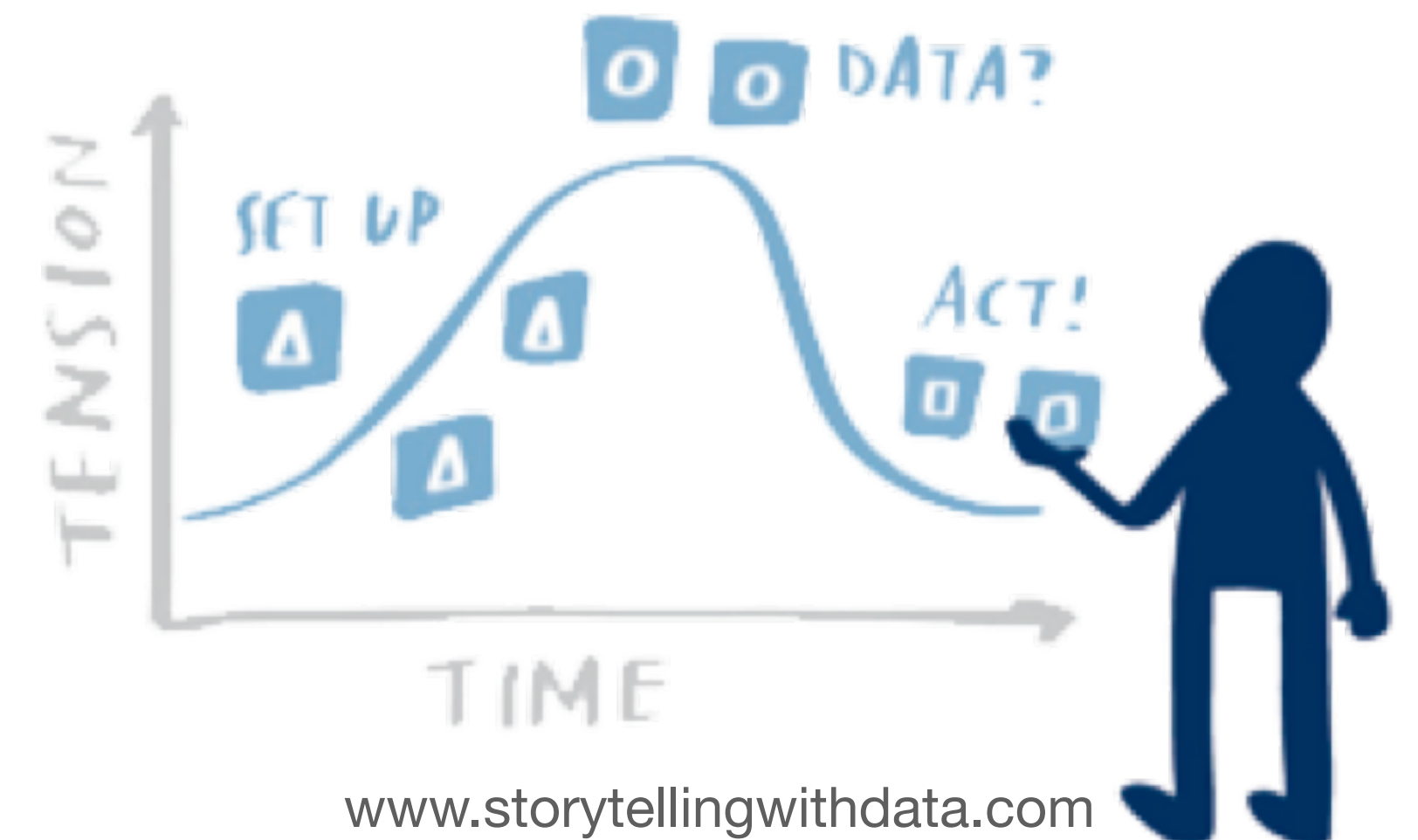
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Time spent doesn't automatically equal impact

- The **amount of time spent** on data processing and analysis often dwarfs the amount of time spent **preparing the data for presentation**. However, all anyone else sees is the final plot; we do **ourselves and our audience a disservice** to not spend additional time optimizing the presentation.

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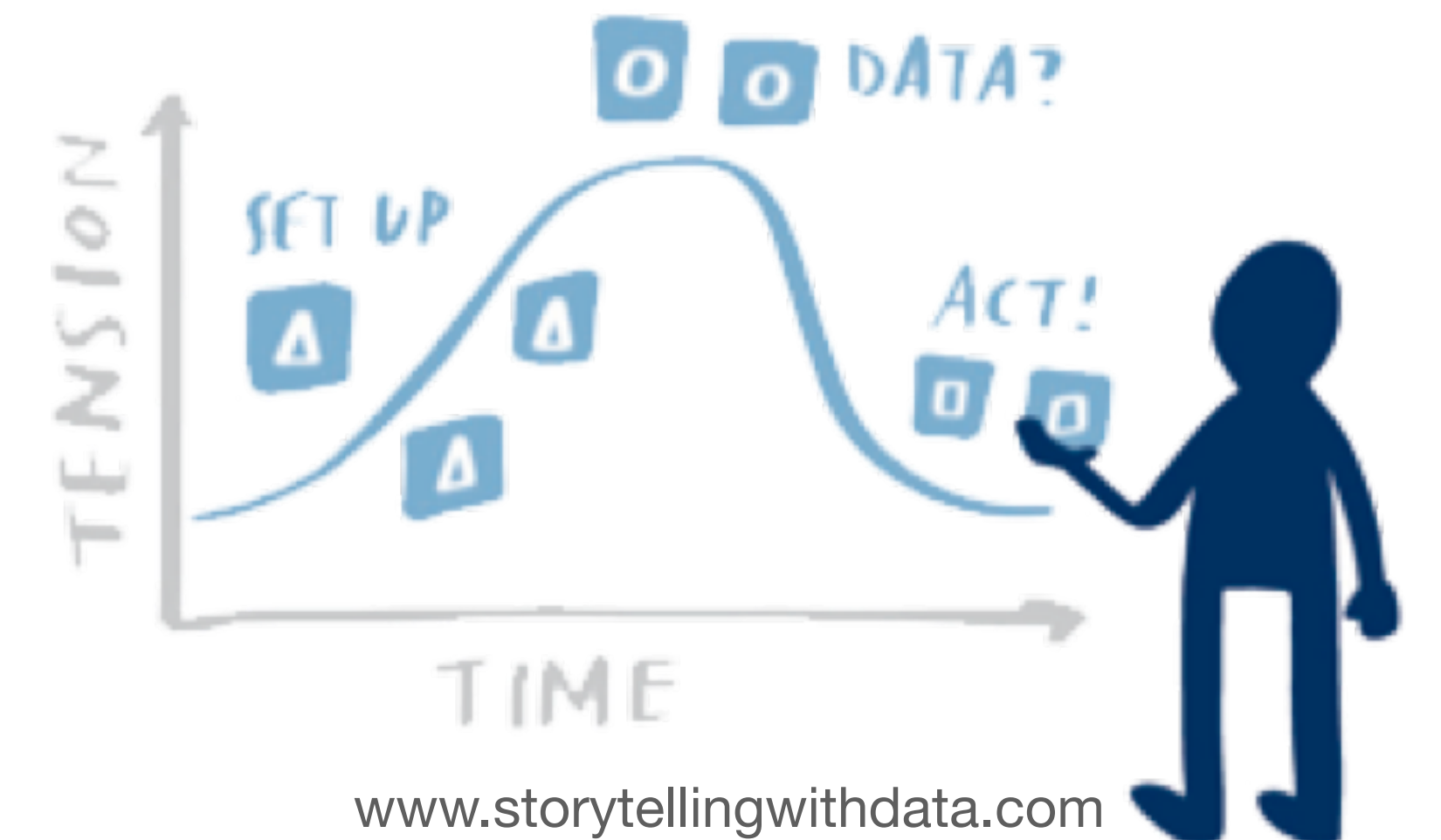## Visualizations are rarely both exploratory *and* explanatory.

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Data has no value on its own

- Data science empowers decision makers to **make more informed decisions**. Our role as data scientists is to **act as interpreters** by efficiently and clearly **communicating the story** hidden inside data.
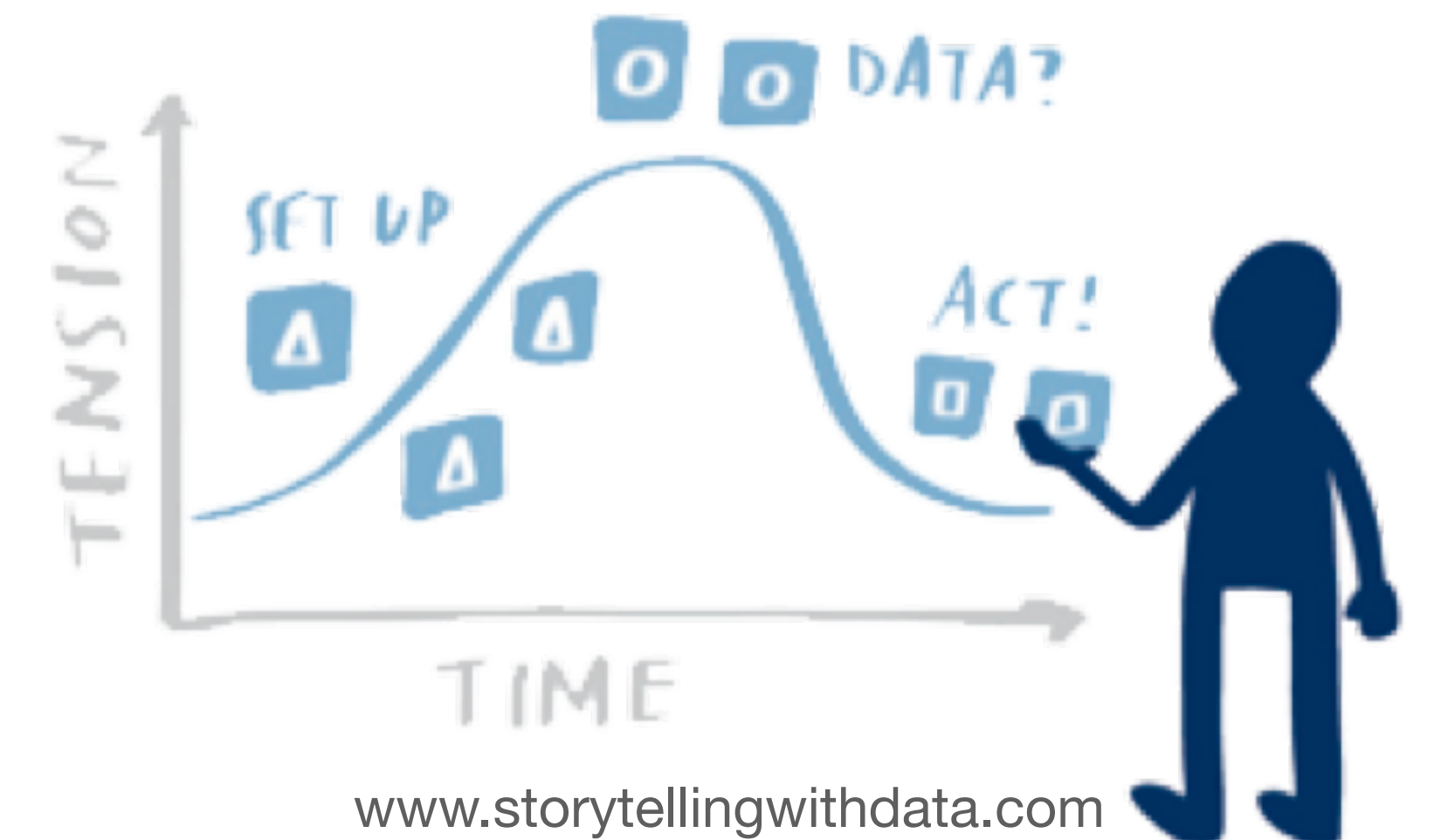
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The mission of NASA's **Earth Information Center** is to put the vast quantities of available Earth data **directly into the hands of decision makers**.

The EIC has two components:

1. a **physical exhibit** showcasing how NASA's Earth observing fleet of satellites **collects actionable data** at NASA HQ.

2. a **website** highlighting the **impact of NASA data across nine focus areas:** agriculture, air quality, biodiversity, disasters, energy, greenhouse gases, sea level rise, water resources, and wildfires. go.nasa.gov/EIC

Where does storytelling come in?

Including elements of storytelling in our dashboards, beauty pieces, and narrated videos helps us **convey the impact** of NASA Earth science data in a memorable and compelling way.
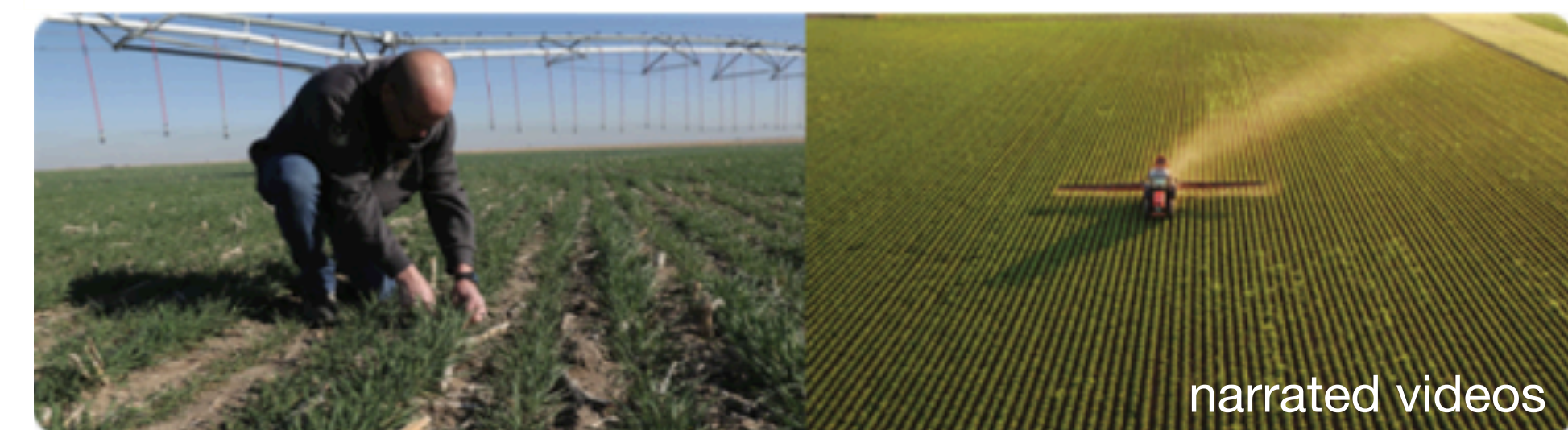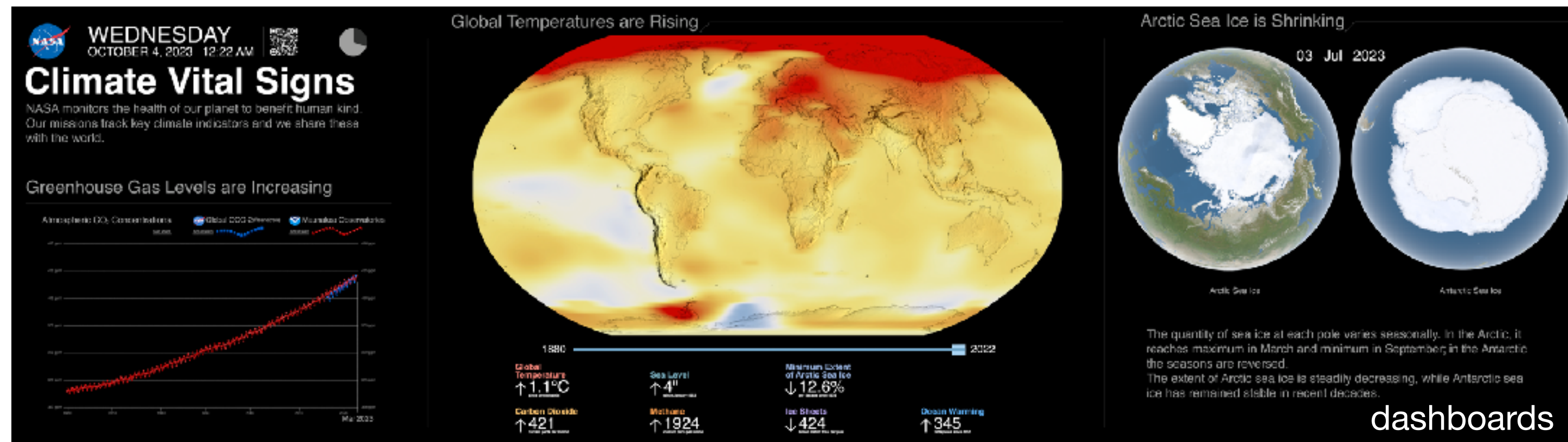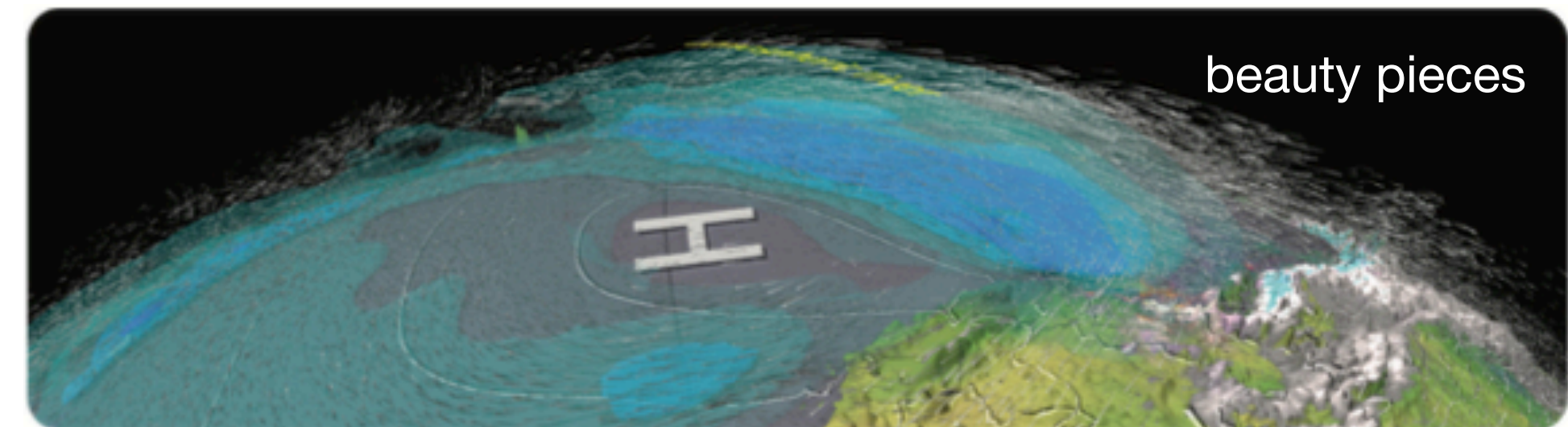
beauty pieces

dashboards

narrated videos

Unfocused visualization can make readers **confused** as they **attempt to figure out** what's being plotted.

Why doesn't this visualization work?

CERES measurements of planetary heat uptake
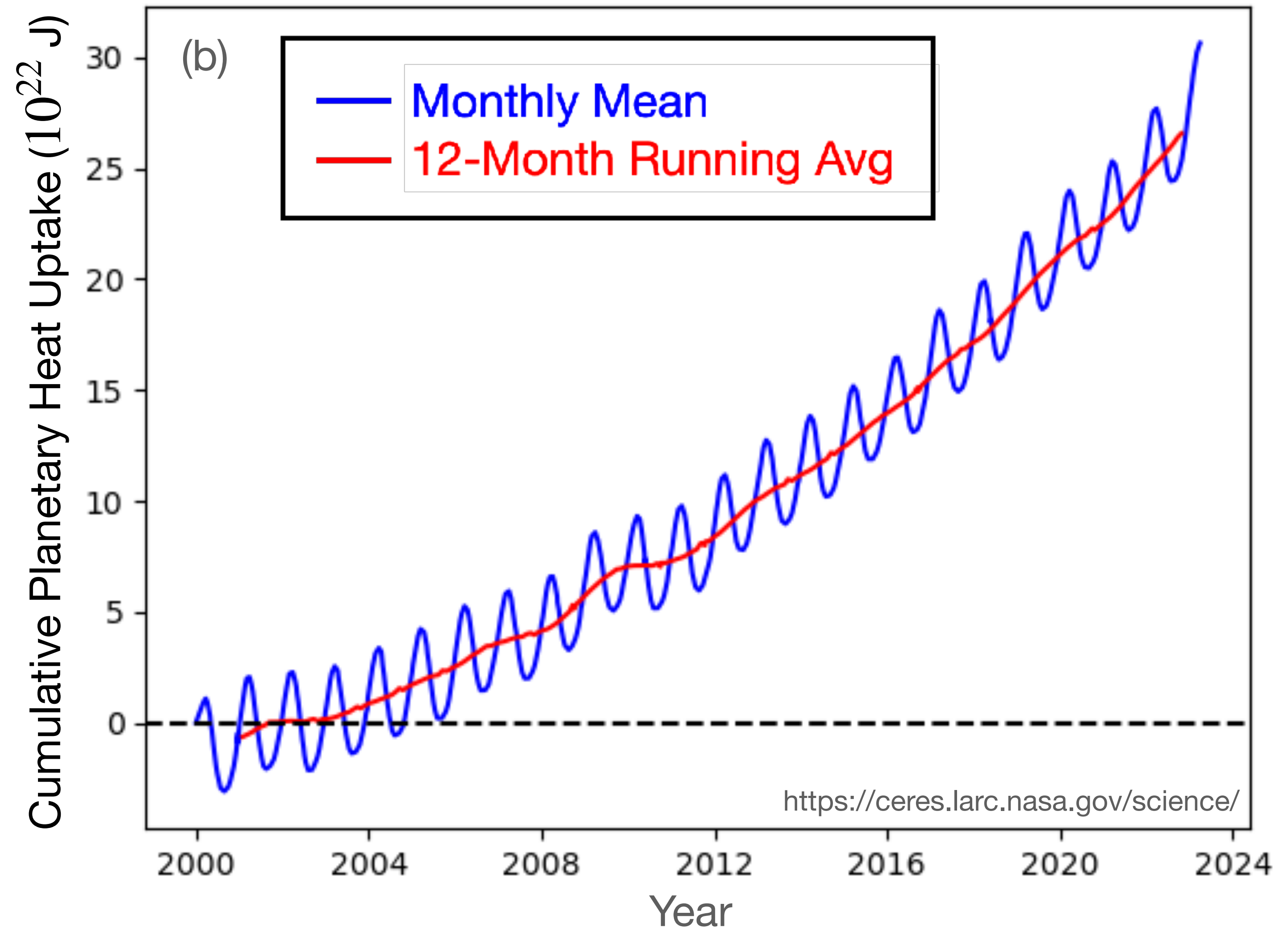
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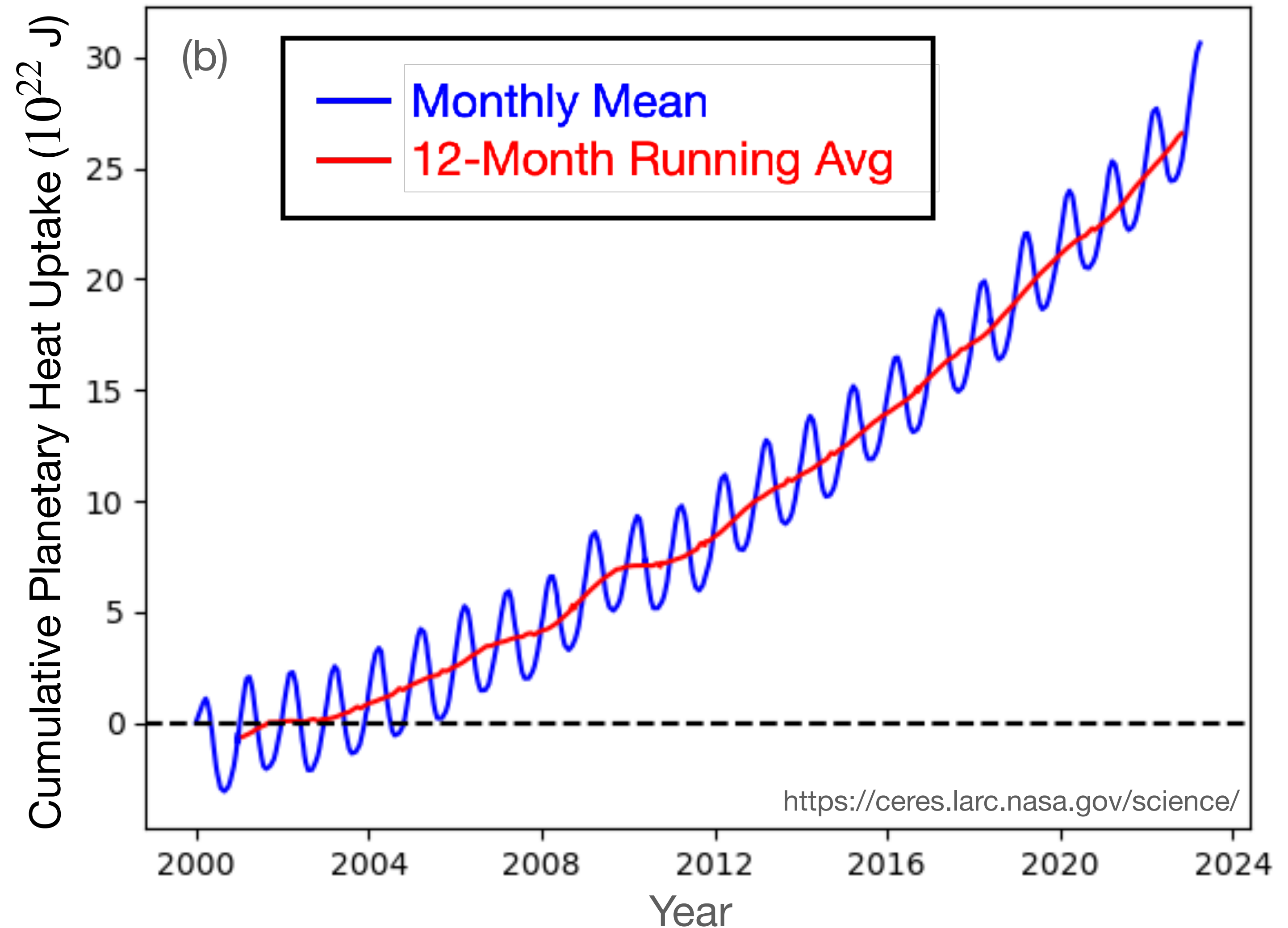
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CERES measurements of planetary heat uptake

Cumulative Planetary Heat Uptake (10^{22} J)

Legend: Monthly Mean, 12-Month Running Avg

(b)
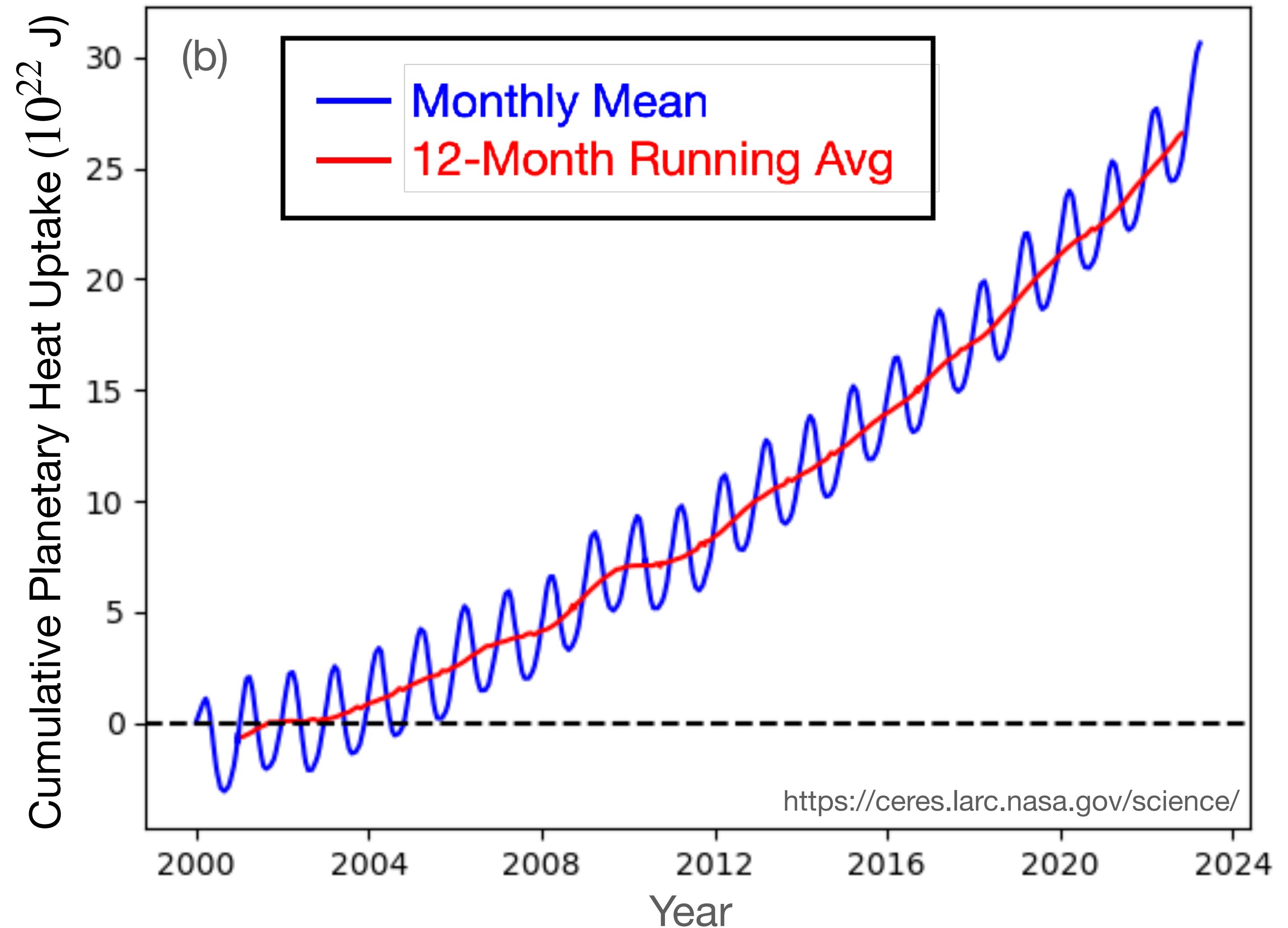
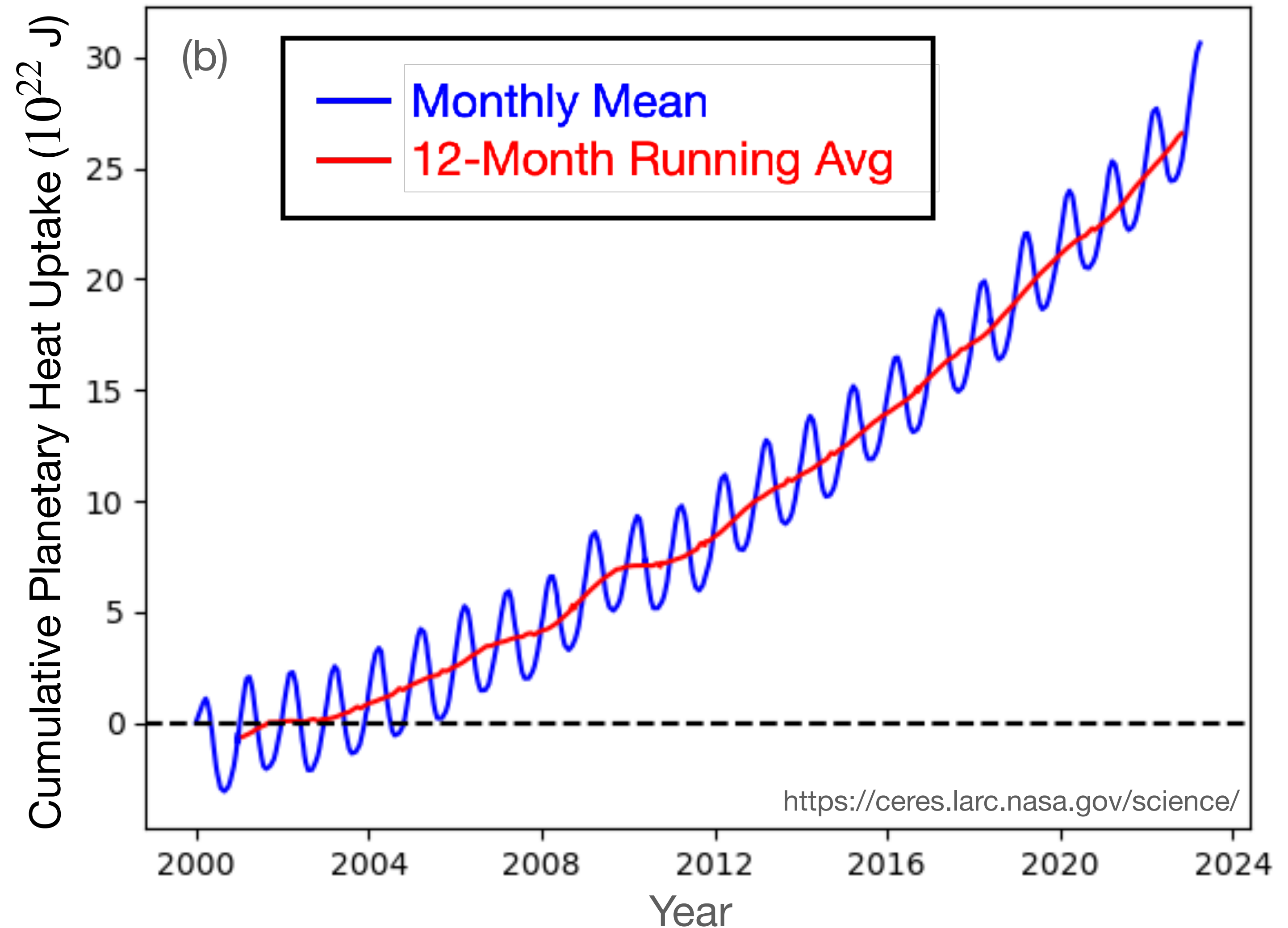https://ceres.larc.nasa.gov/science/

Year

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- If the reader is doing work to understand the plot **that's brain power not focusing on the takeaway** you want them to have.

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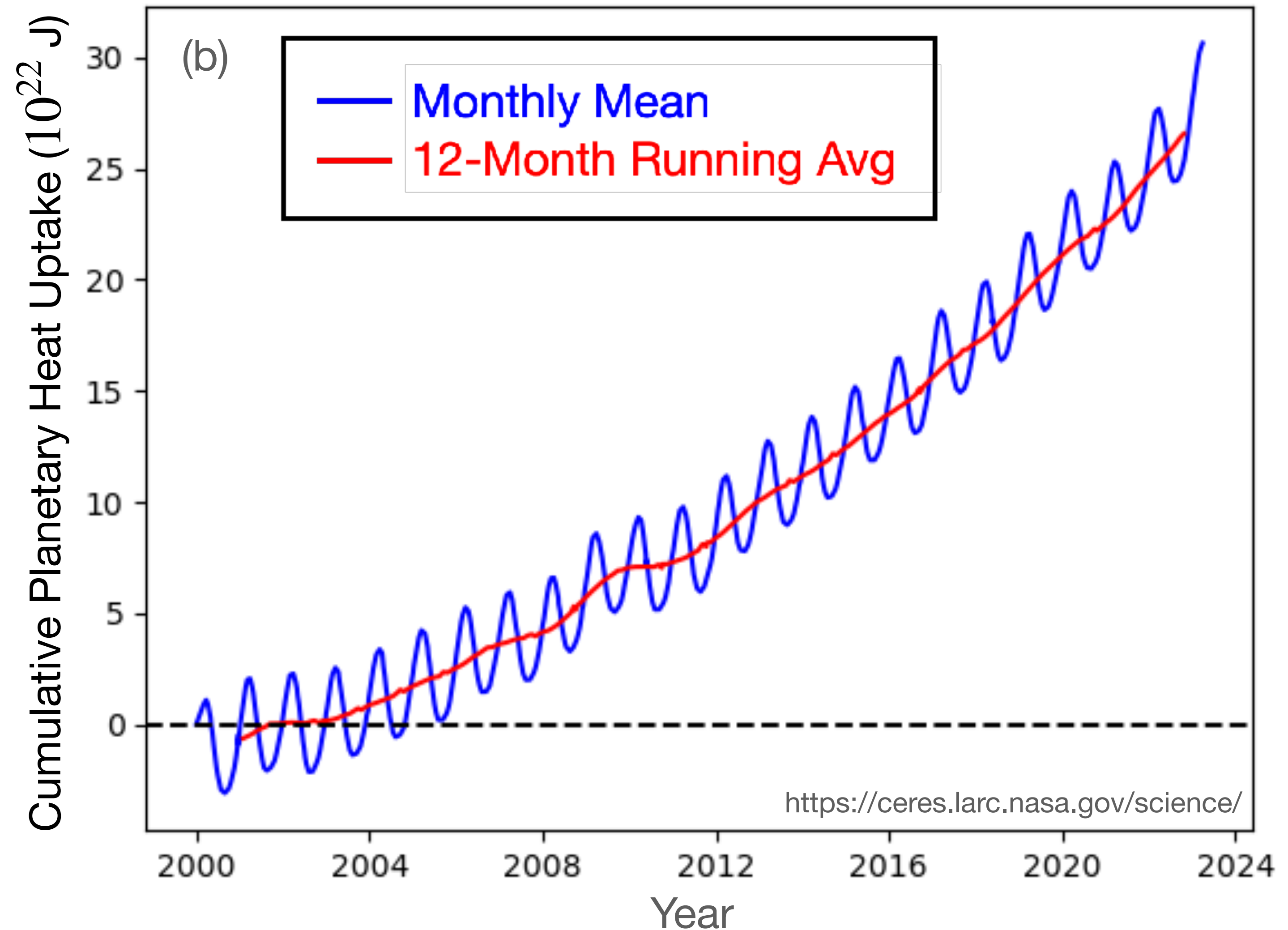
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Goal: "NASA satellite data reveals the Earth's energy budget is becoming increasingly out of balance."

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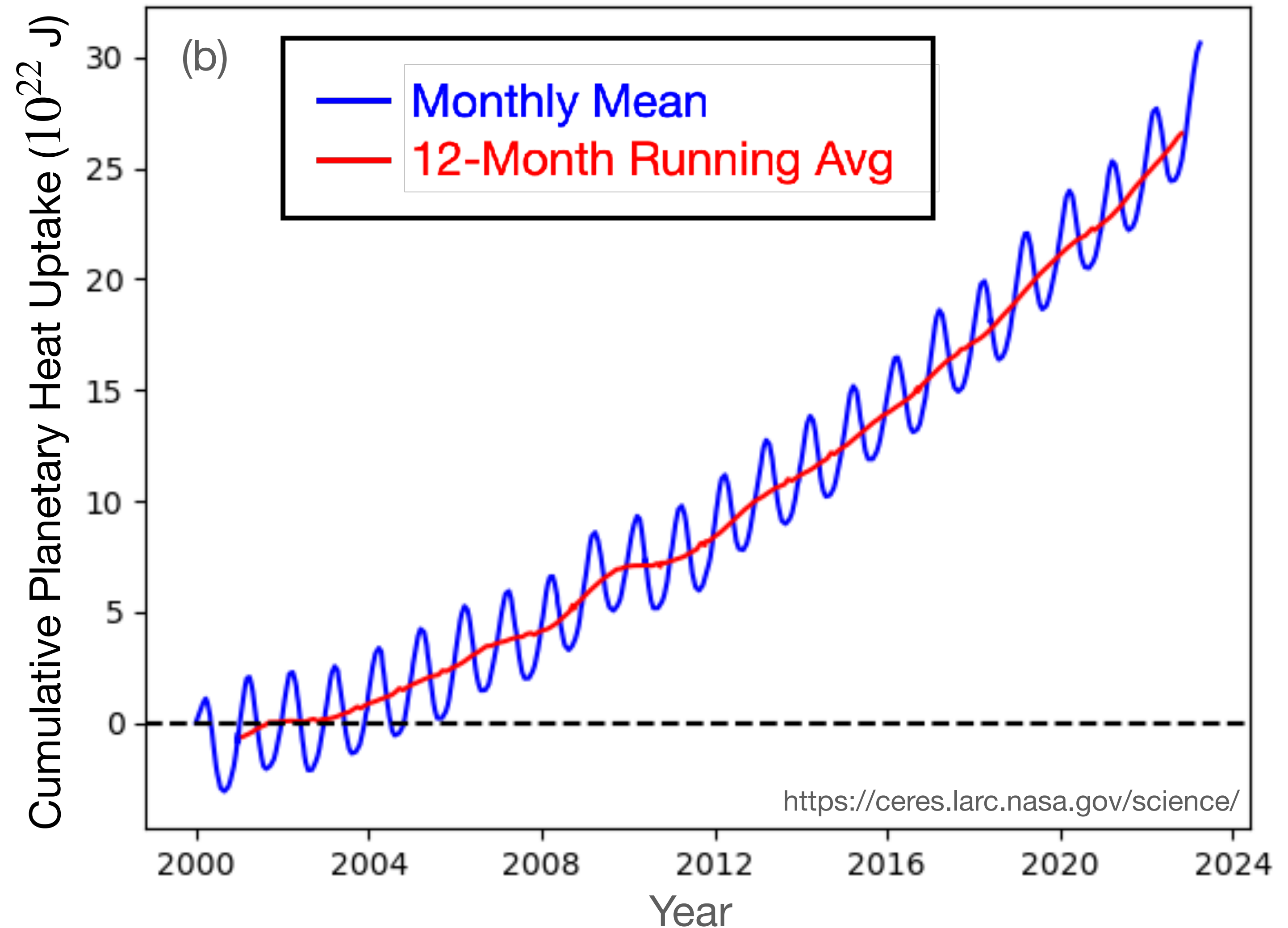CERES measurements of planetary heat uptake

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Excess energy since the year 2000 (in units of extra days worth of sunlight)

monthly average

12 month running average

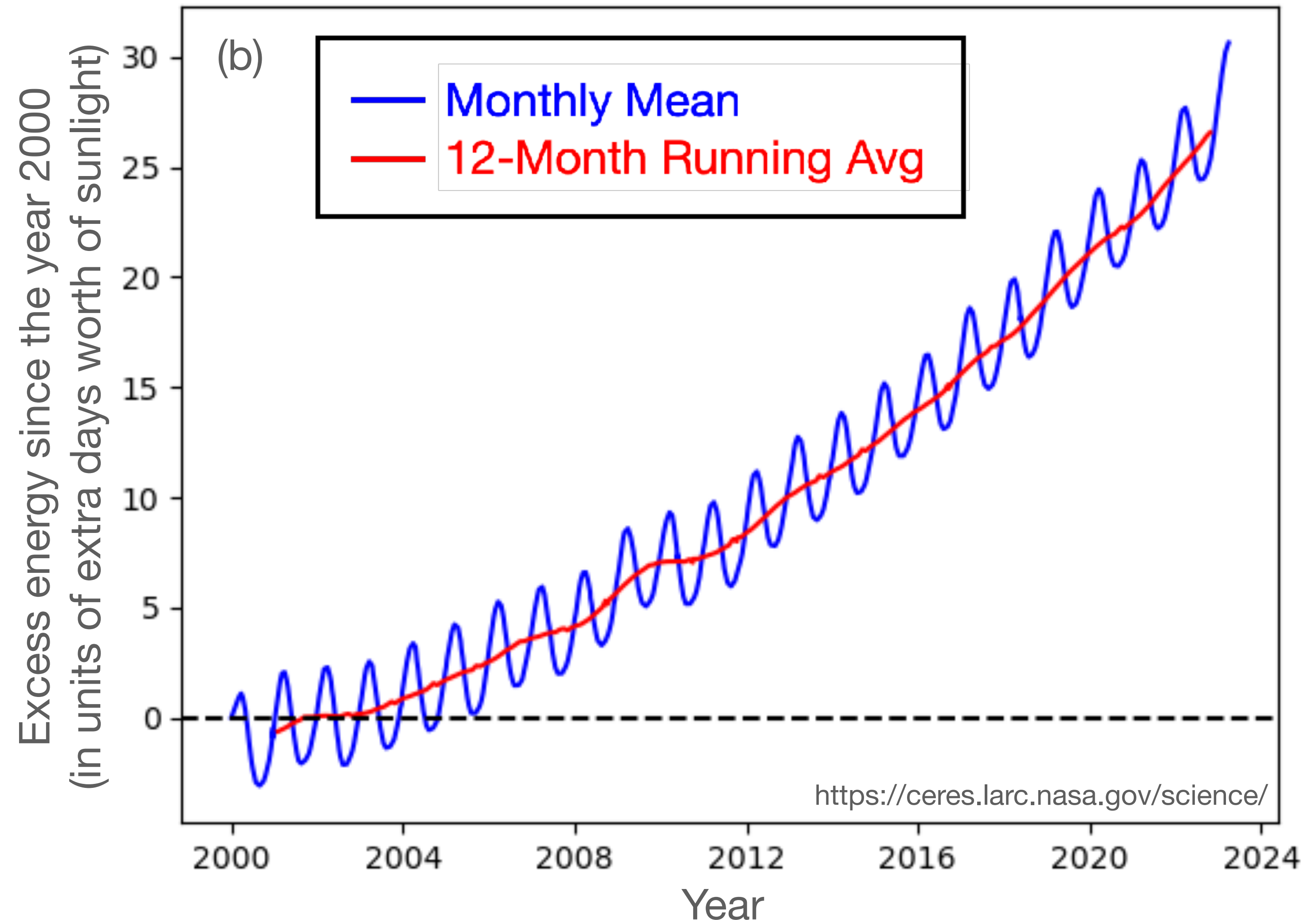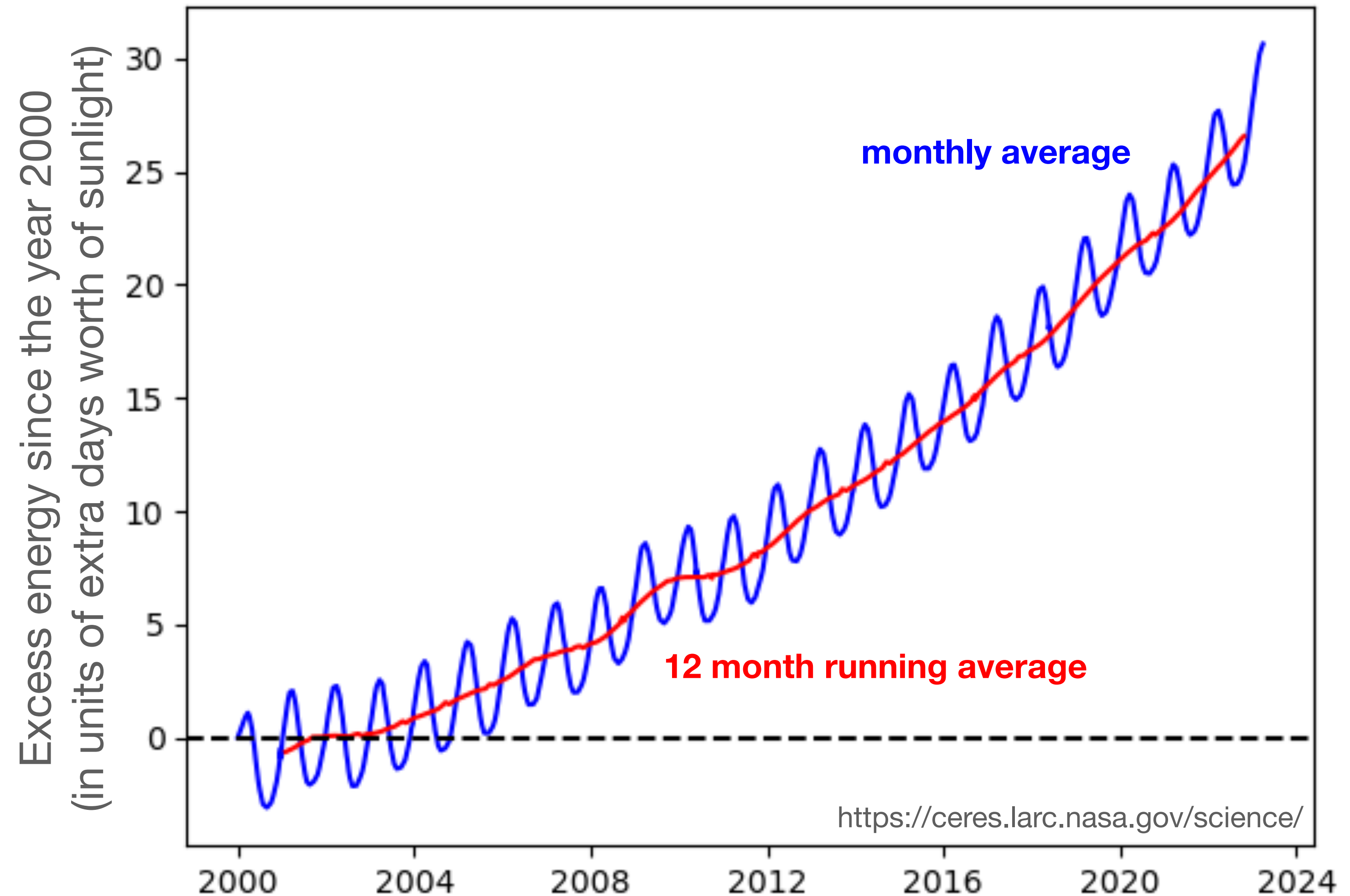https://ceres.larc.nasa.gov/science/

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- Other stylistic choices can help **reduce visual noise**, e.g. replace axis spines with left-justified titles.

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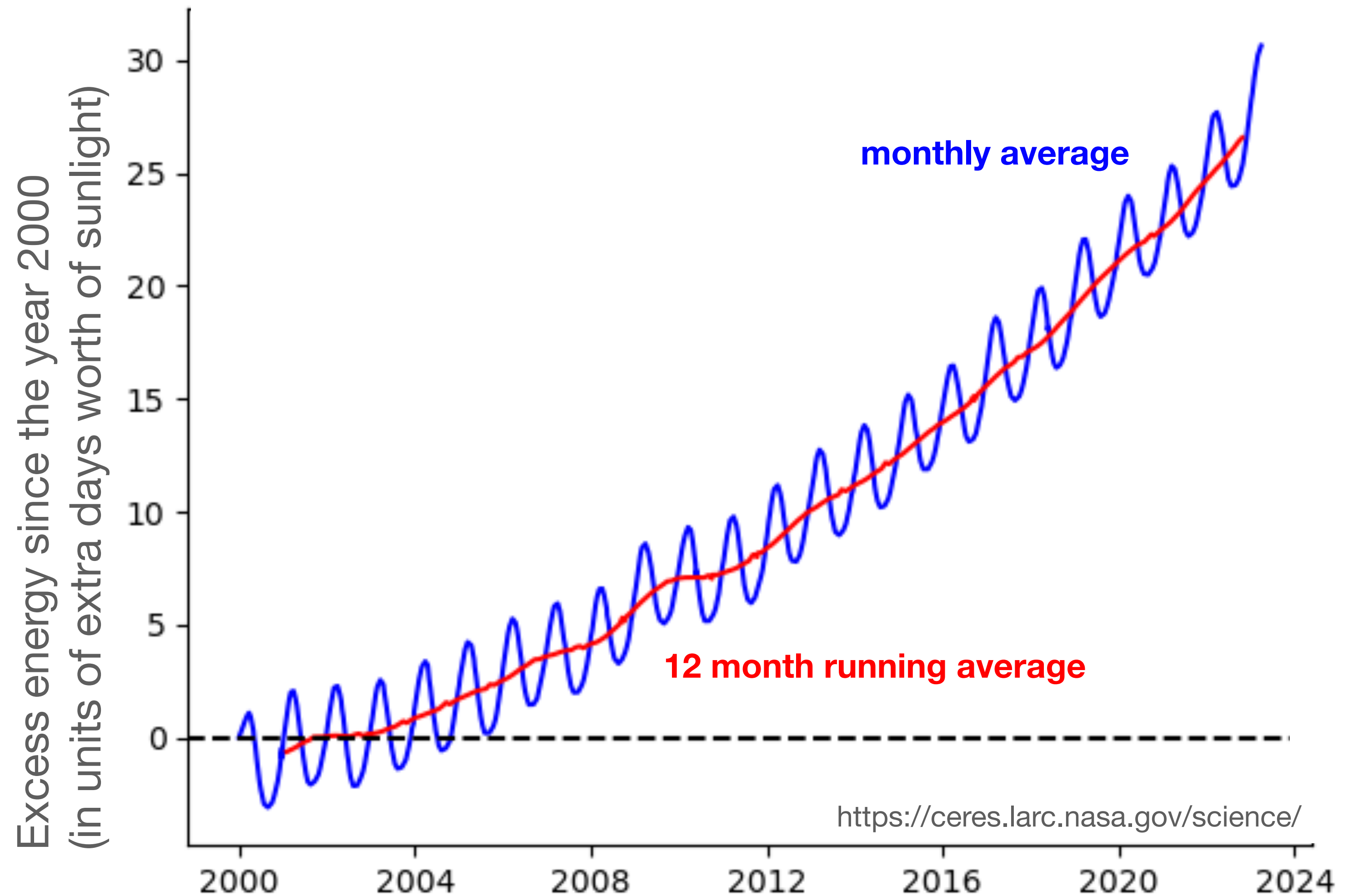
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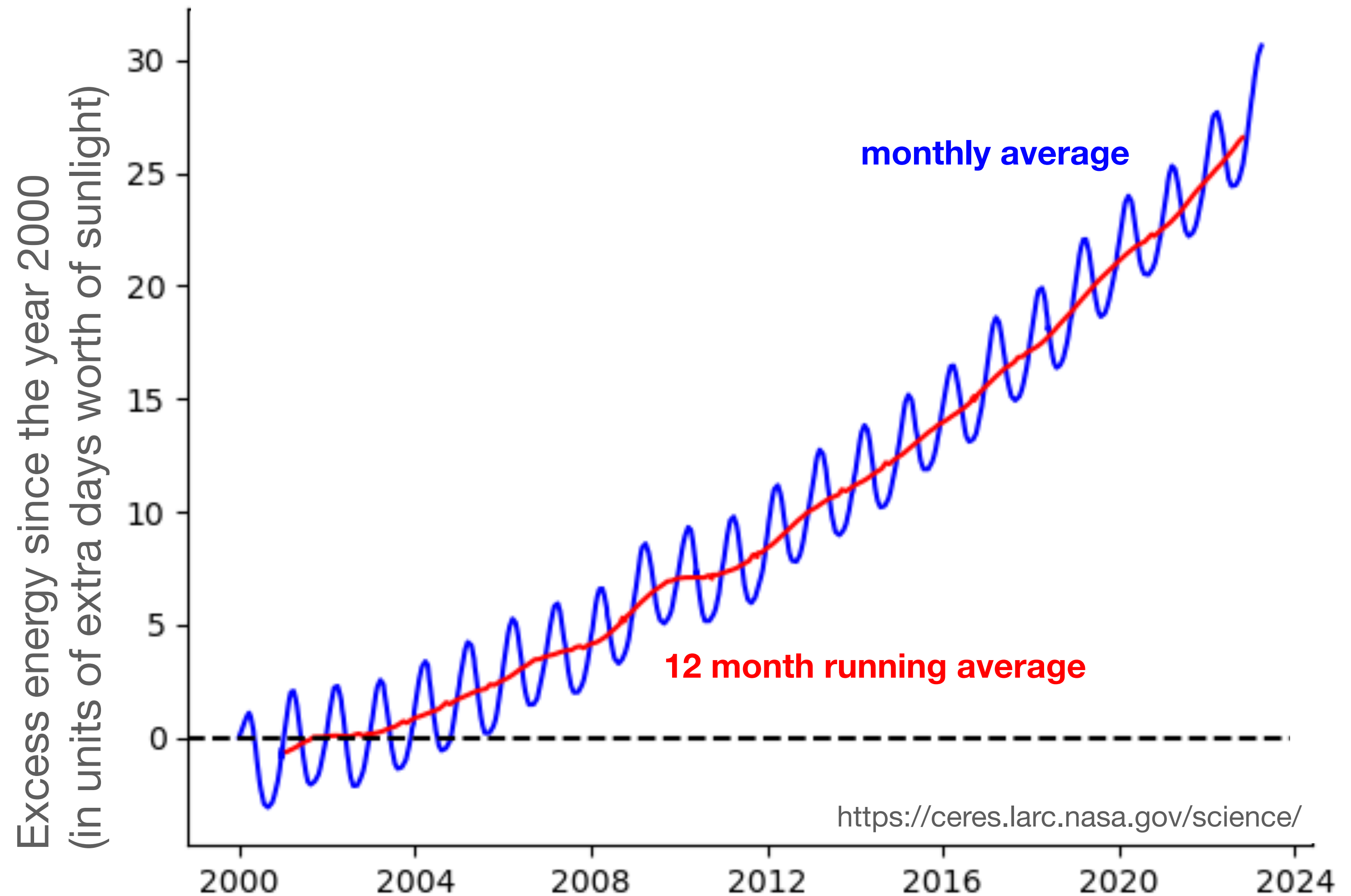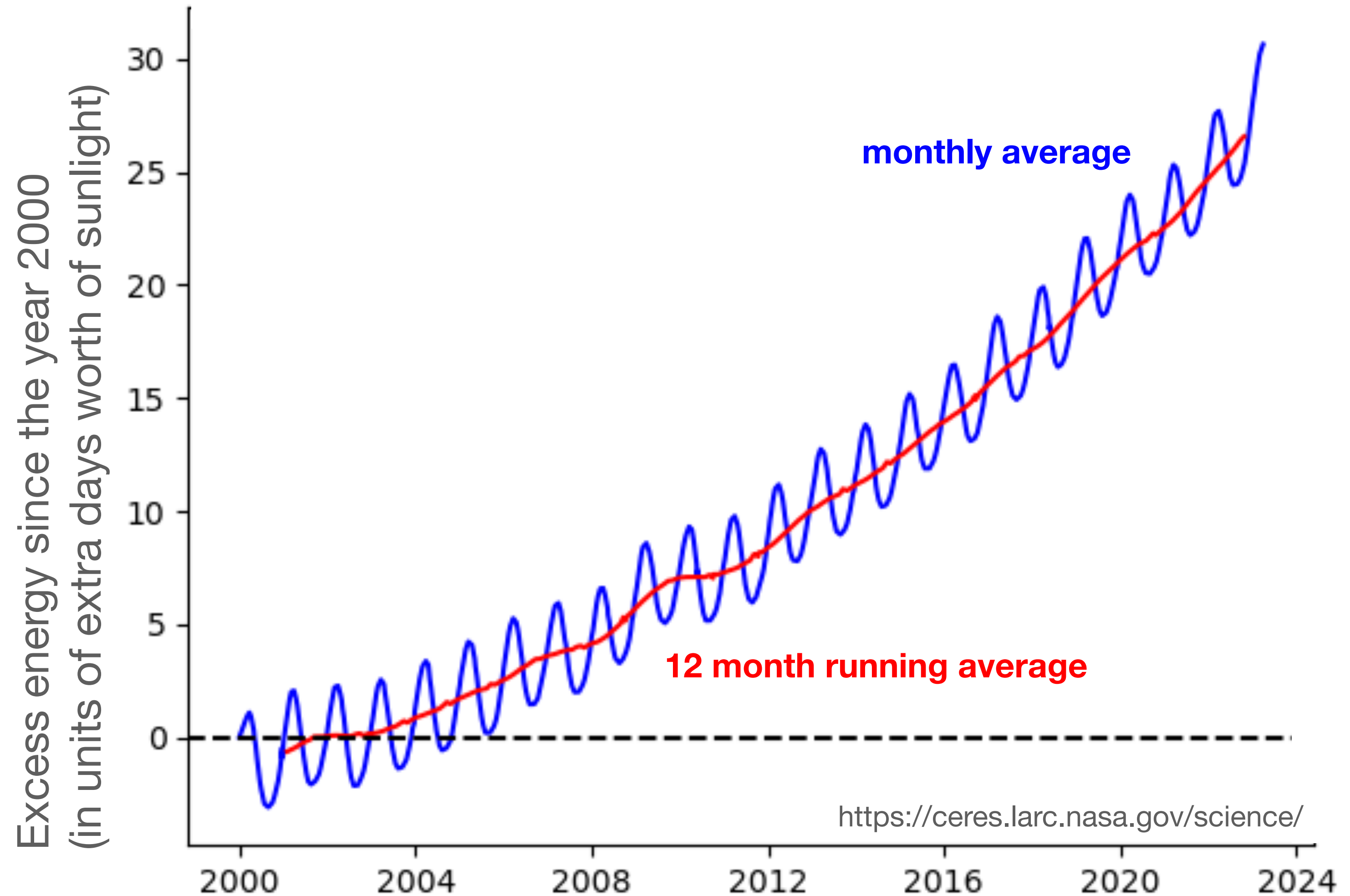
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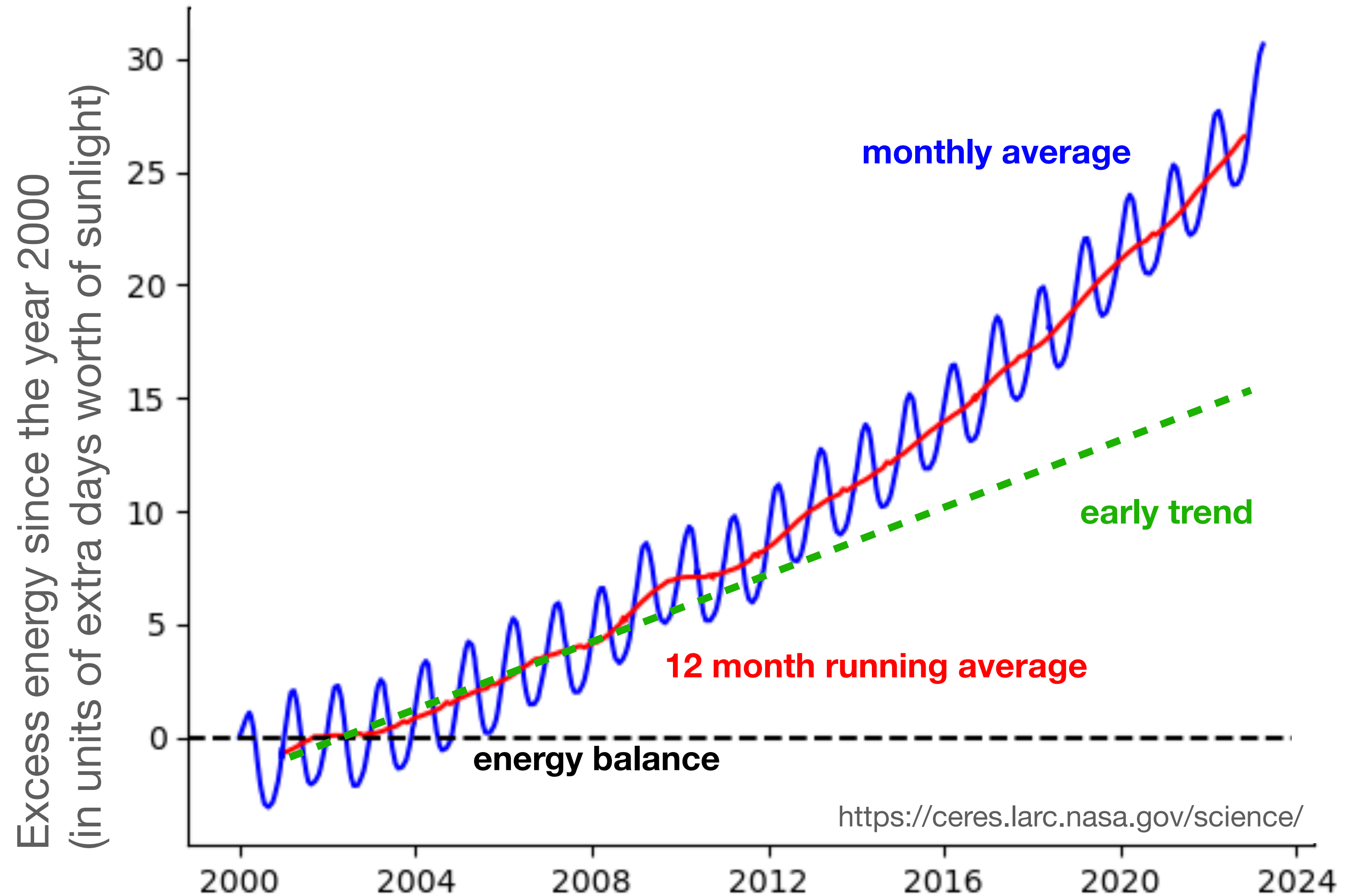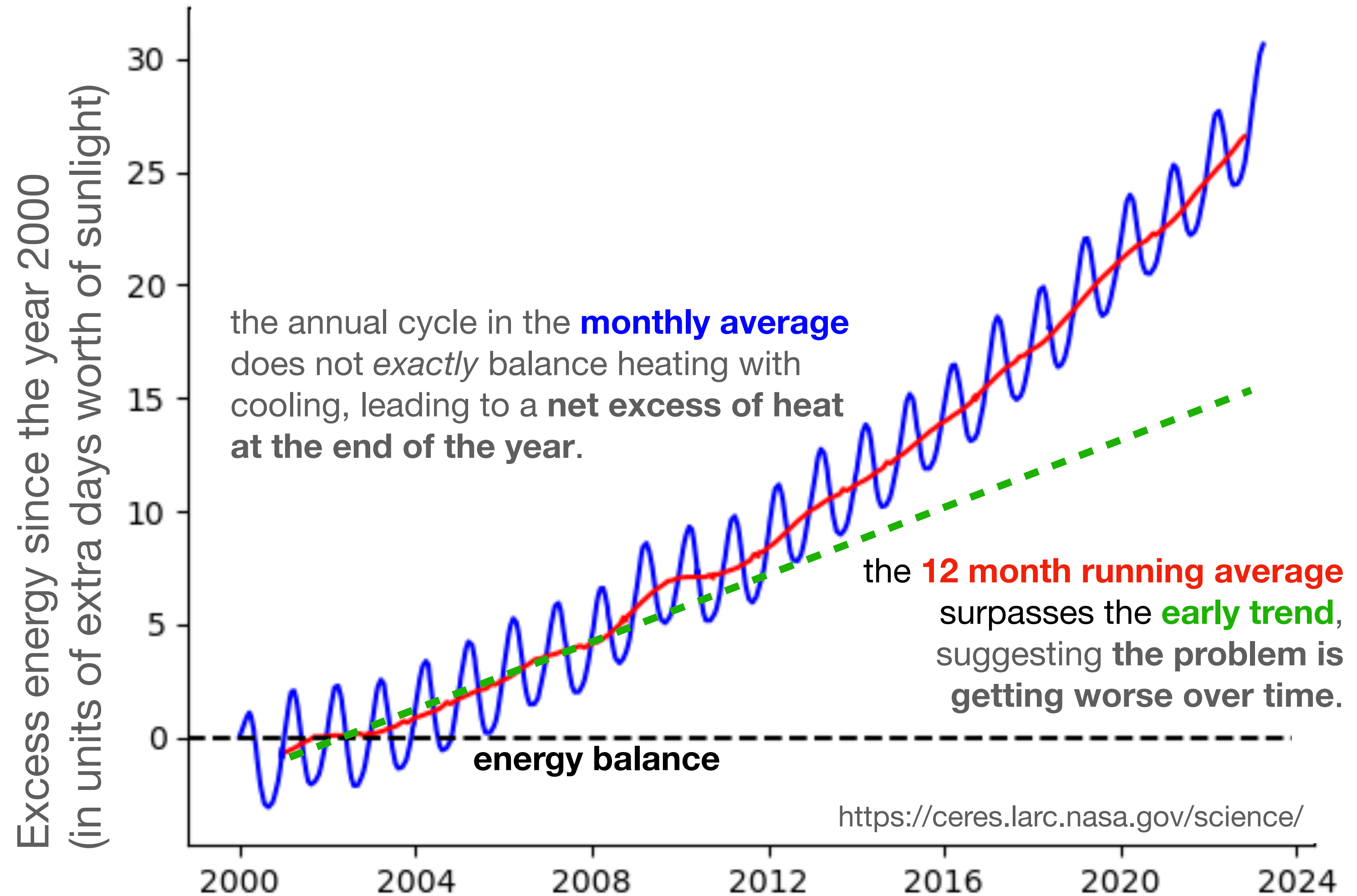
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- Use descriptive text to **highlight key features** and **guide the eye** through the graph.

NASA satellite data reveals the Earth's energy budget is becoming increasingly out of balance.

Excess energy since the year 2000 (in units of extra days worth of sunlight)

the annual cycle in the **monthly average** does not *exactly* balance heating with cooling, leading to a **net excess of heat at the end of the year**.

the **12 month running average** surpasses the **early trend**, suggesting **the problem is getting worse over time**.

energy balance

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