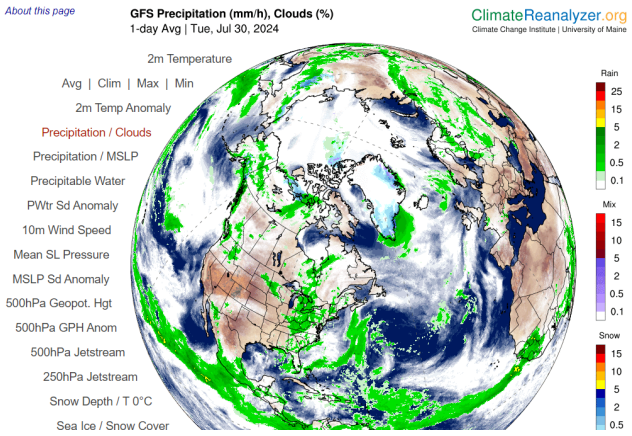
How is there a Heatwave in Antarctica - It's Winter!

Last time we saw a few “Dashboards” which can put you in touch with how things are going. 0ne of them was:

CLIMATE REANALYZER Today's Weather Maps



A few minutes after our meeting, I saw this article:

[Antarctic temperatures soar 50 degrees above norm in long-lasting heat wave - The Washington Post]

ENVIRONMENT

Antarctic temperatures soar 50 degrees above norm in long-lasting heat wave

This historic warm spell in East Antarctica is an ominous example of the temperature spikes this polar climate c experience more of in a warming world.

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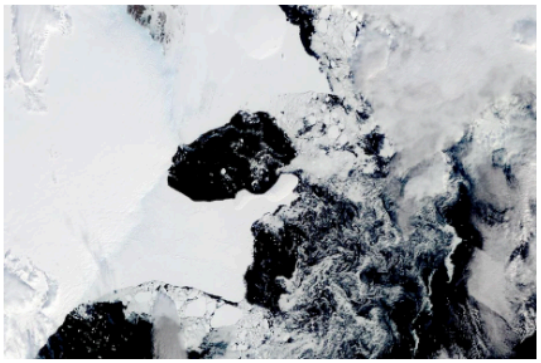
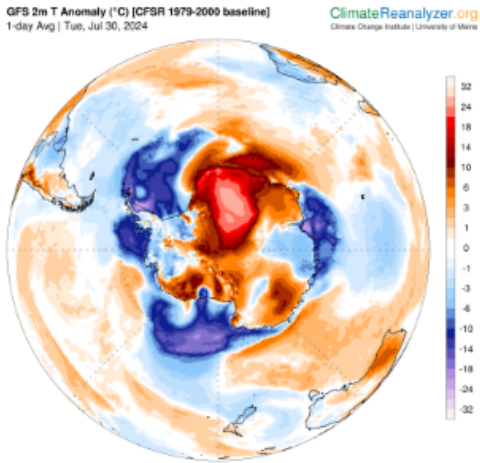


The Conger/Glenzer ice shelf before the collapse of an area the size of New York City in East Antarctica in 2022. (Christopher A. Shuman/UMBC/NASA/AP)

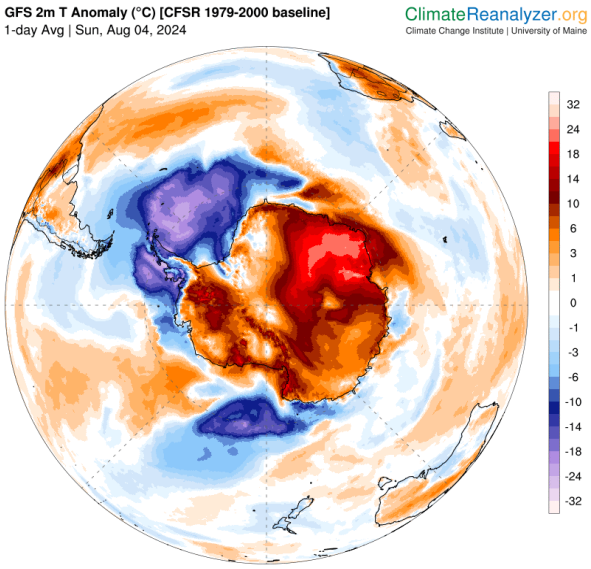
The Post used the Climate Reanalyzer we had just learned about (32C is about 50F)



Temperature difference from normal over Antarctica on Tuesday. (University of Maine Climate Reanalyzer)

maclankford@gmail.com

So, I pulled it up myself and found that 2 days later, it was as they said: up to 32 C or 50 F warmer than normal in Antarctica.



I'll use some quotes from the Post below:

The heat wave comes in the middle of the Antarctic winter, so temperatures are still hovering around minus-4 (minus-20 Celsius). Still, the Antarctic temperature anomaly is the largest on the globe, according to weather models.

It's too early to determine all of its causes, but scientists say it may be at least partially linked to processes occurring 20 miles (30 kilometers) above the surface in the stratosphere.

The stratosphere contains a strong band of cold air and low pressure spinning around each pole, known as the polar vortex. The vortex is typically strong and stable during winter in the southern hemisphere, said Amy Butler, an atmospheric scientist at the National Oceanic and Atmospheric Administration. But this year, she said, it's been jostled by atmospheric waves, weakening the vortex and causing high-altitude temperatures to soar; this is known as a sudden stratospheric warming event.

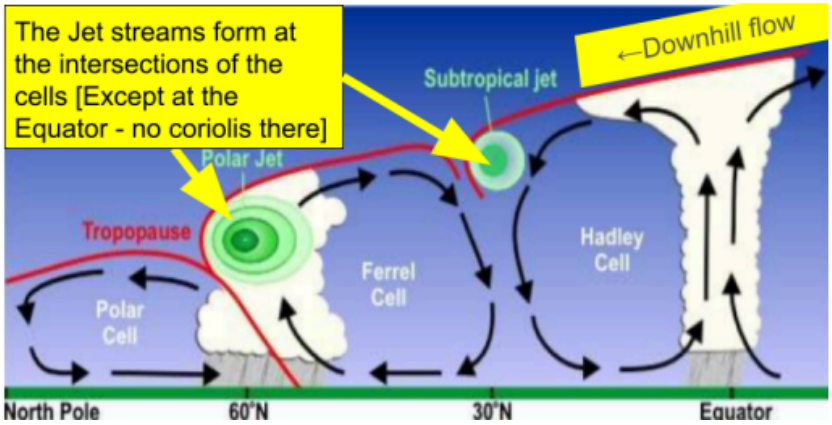
"The main reason it is notable is because it is usually a relatively quiet time of year for the Southern Hemisphere polar vortex," Butler said. This event has led to some record temperatures high in the stratosphere.

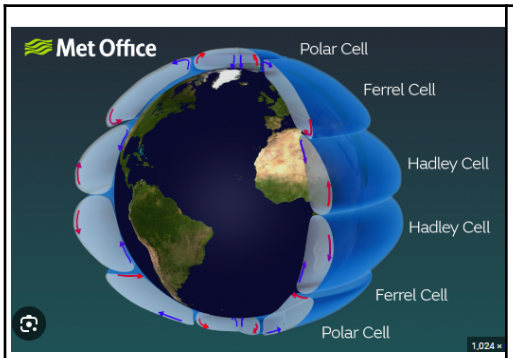
3	How is there a Heatwave in Antarctica - It's Winter!	CSSG-2.36

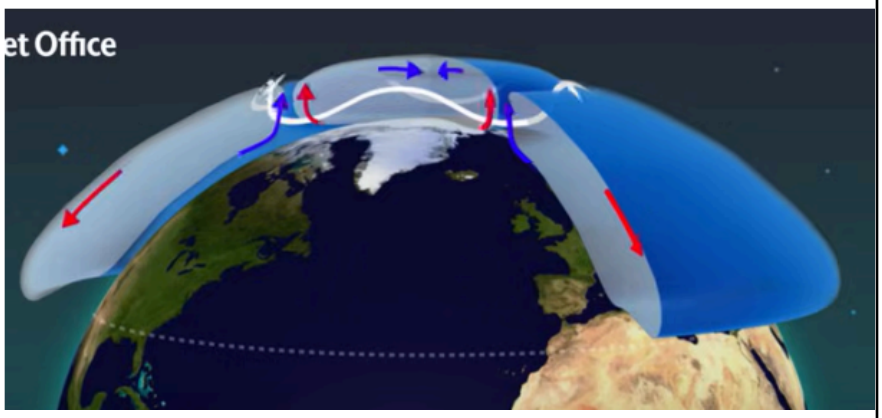
Let's see if we can sort this out with things we have learned

1. **The whole planet is getting warmer, and in the Southern Hemisphere, the warmth of the ocean dominates. The temperature difference between the equator and the poles is greatest in Antarctica during its winter (now). In normal times, this would drive a very strong jet stream around the continent during its winter.**

   Here it is in the NH, see CSSG-2.32 The Jet Streams. Notice in this NH winter, the pole is coldest, shrinking the Troposphere, increasing the downhill flow from the equator, strengthening the jet streams.







Let's look at the North (since it's the same as the South). The warm air rising at 60 deg S is sucked towards the pole at the top of the troposphere, creating a downdraft of warmth at the pole, this is a high pressure and can persist for a while, a heat wave.

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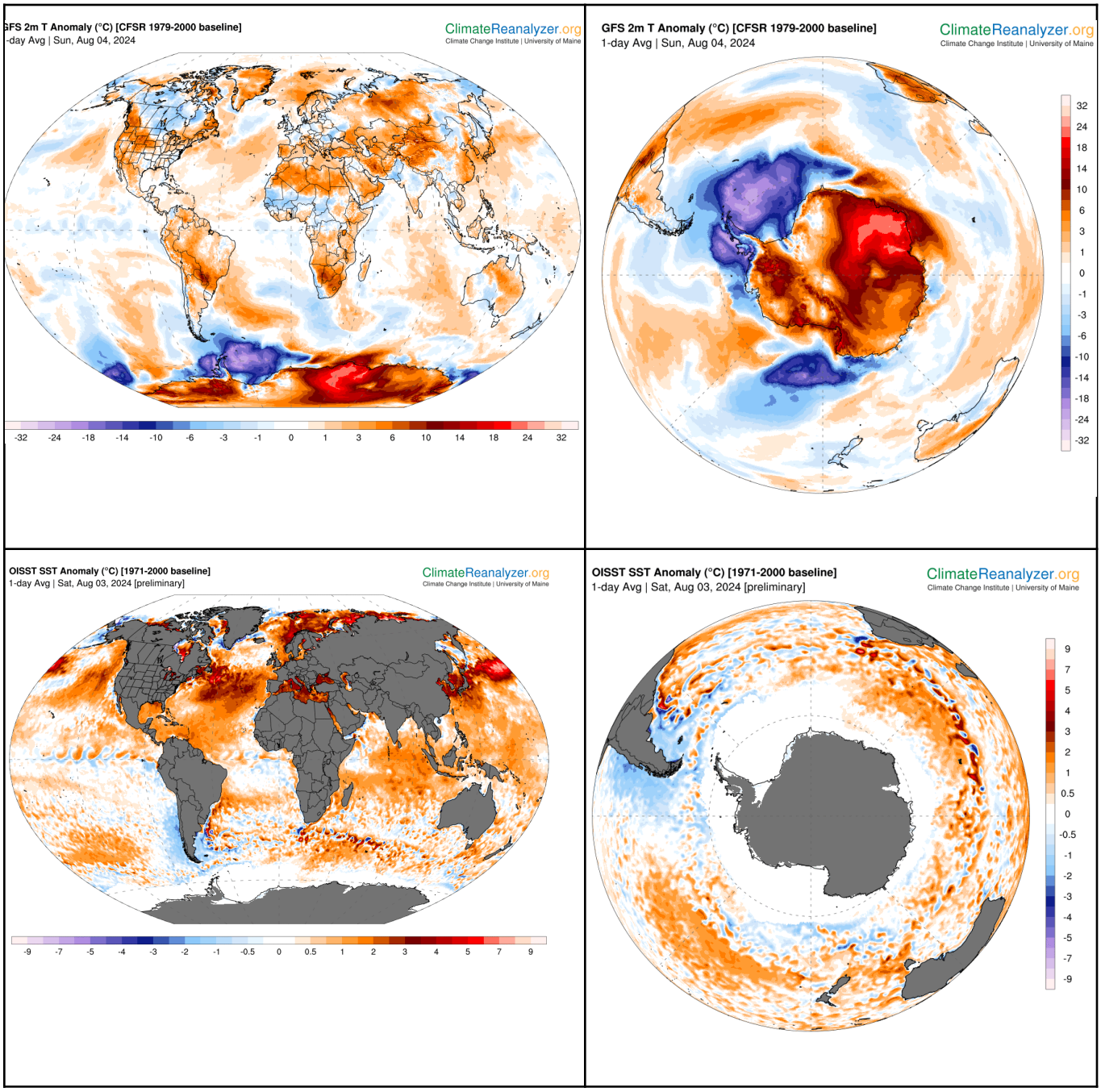
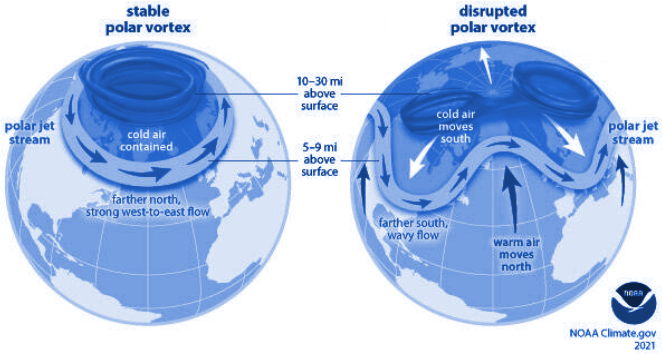
It is winter now in the SH, but note the <u>warm air</u> and <u>warm water</u> around the South Pole and Antarctica. And the dark colors in Antarctica are unmatched anywhere else on the globe - it's the strongest heatwave!



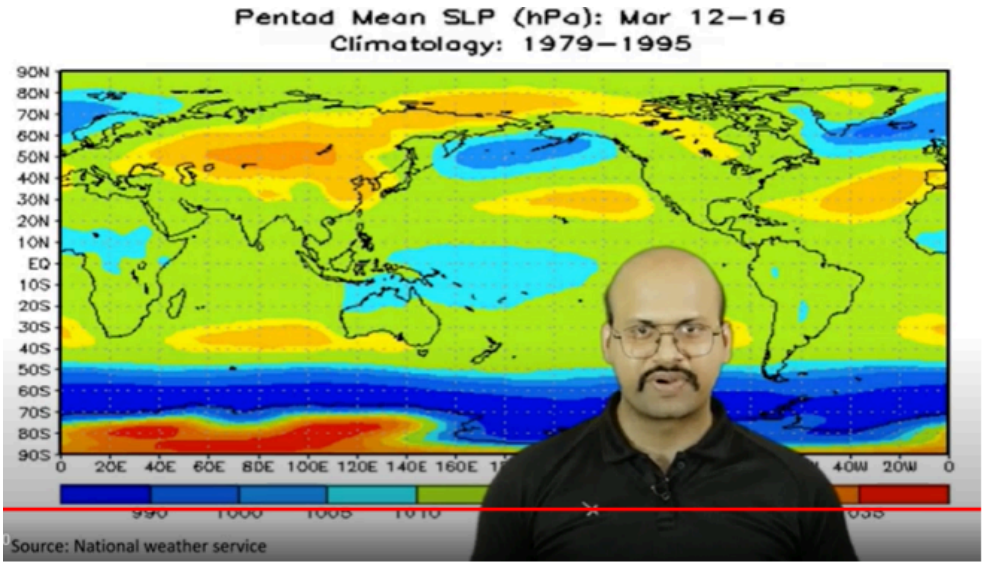
2. The southern ocean itself is warming, and this weakens the polar jet stream, letting it get wavy (like we see in the NH). (This will result in warm and cold surges in Antarctica, as seen above.) Also, in CSSG-2.14 we expanded this picture to include the Polar Vortex much higher up, in the Stratosphere. The Post article indicated that the wavy jet streams have caused disruption and heating way up there.

From CSSG-2.14: If the Northern-going winds are weaker, the stability is tripped up.



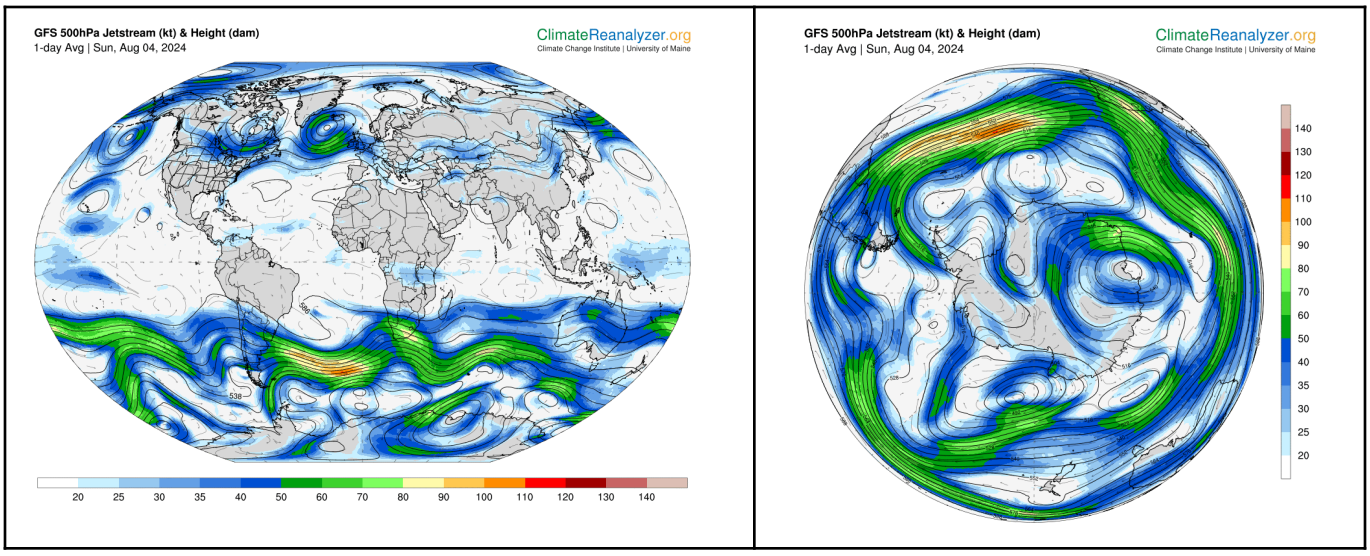
When the Arctic polar vortex is especially strong and stable (left globe), it encourages the polar jet stream, down in the troposphere, to shift northward. The coldest polar air stays in the Arctic. When the vortex weakens, shifts, or splits (right globe), the polar jet stream often becomes extremely wavy, allowing warm air to flood into the Arctic and polar air to sink down into the mid-latitudes. NOAA

Remember from CSSG-2.32 the strange guy showing us the low pressure (blue band at bottom) where the southern polar jet stream is formed, and how strong and uniform it normally is. This is getting wavy as shown above.

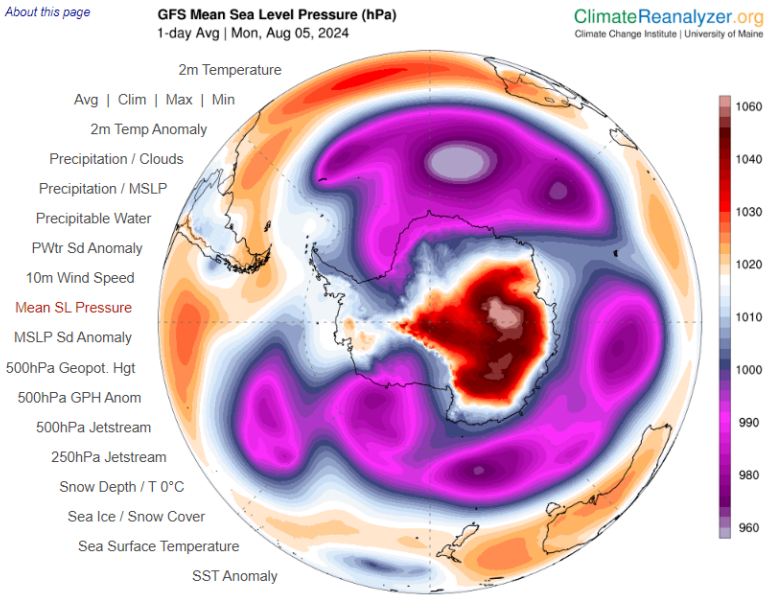


Why do I have nightmares with this guy in them?

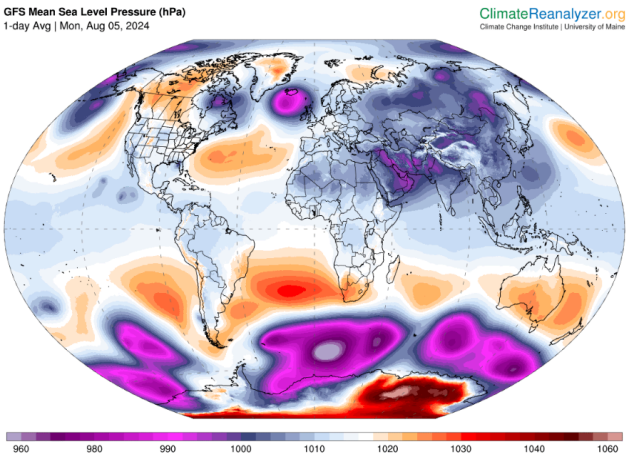
This leaves us with wavy jet streams and warmth over the pole and high pressure keeping the warmth in place. These are from last Sunday.



Here's the sea level pressure on Monday around the region. Note the low pressure around the edge of the cell around 60 deg S and the high pressure on the continent where the flow is coming back down with the warm air:



And another view:



Note that the effect is far weaker in the North - it's summer here and the downhill slide is far weaker, both because the pole is warmer and because La Nina is cooler at the equator.

The Heatwave makes more sense now, I hope!

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Approximate "Cheat Sheet":

1 meter → 3 feet **1 degree Celsius (°C)** → 2 degree Fahrenheit (°F)
ppm = parts per million **CO_2** = Carbon Dioxide
1 tonne = 1000 kilograms = 2205 pounds **1 gigatonne (1 Gt)** = 1 billion tonnes
1 trillion tonnes (1Tt) = 1000 gigatons

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Bronze Age technology could aid switch to clean energy

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TECH

Ranchers trial new diet for cattle, and it's transforming food production: 'They're going after a really big problem'

Even the federal government is all-in on the solution.

by Katie Dupere / August 11, 2024

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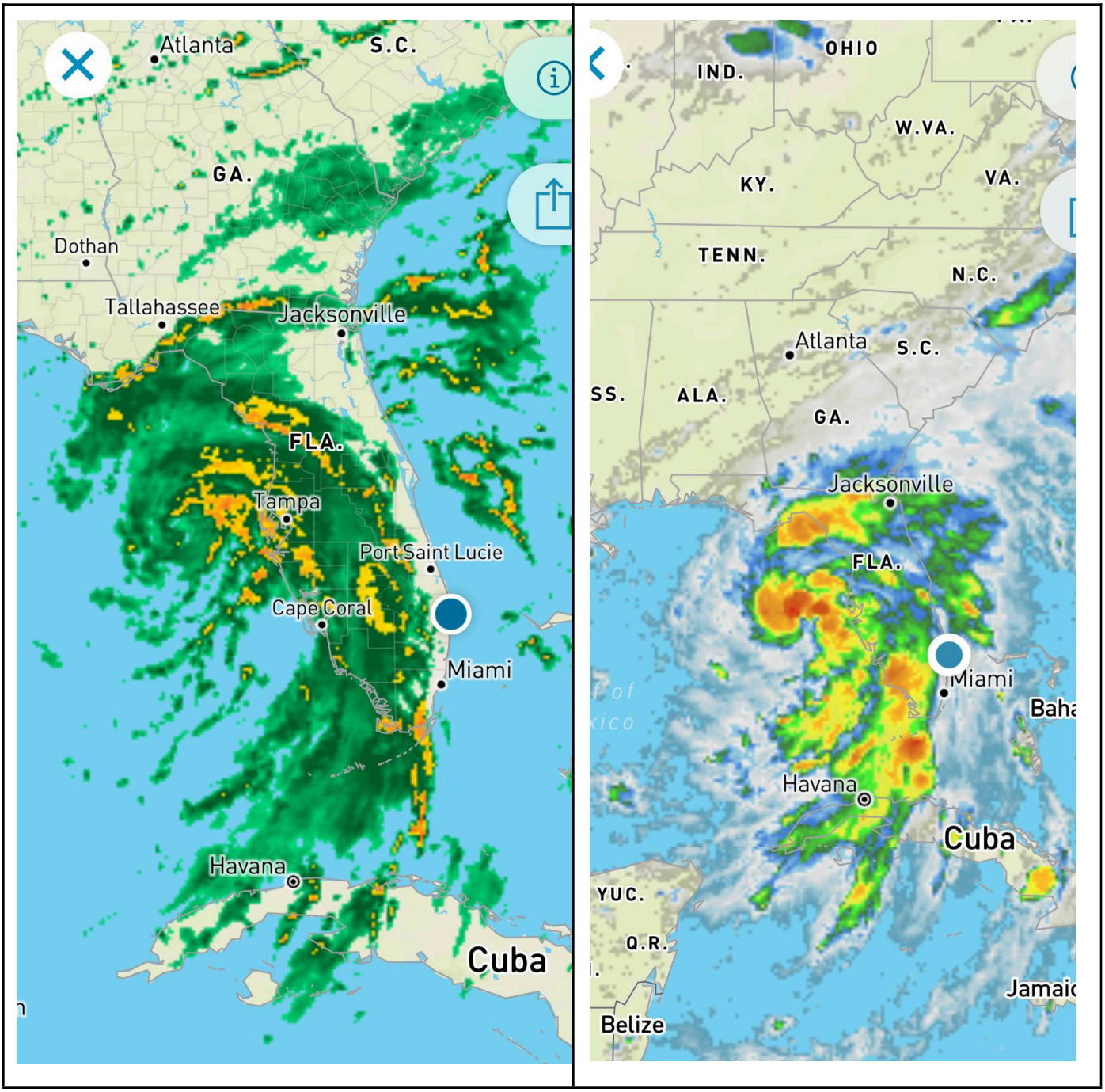
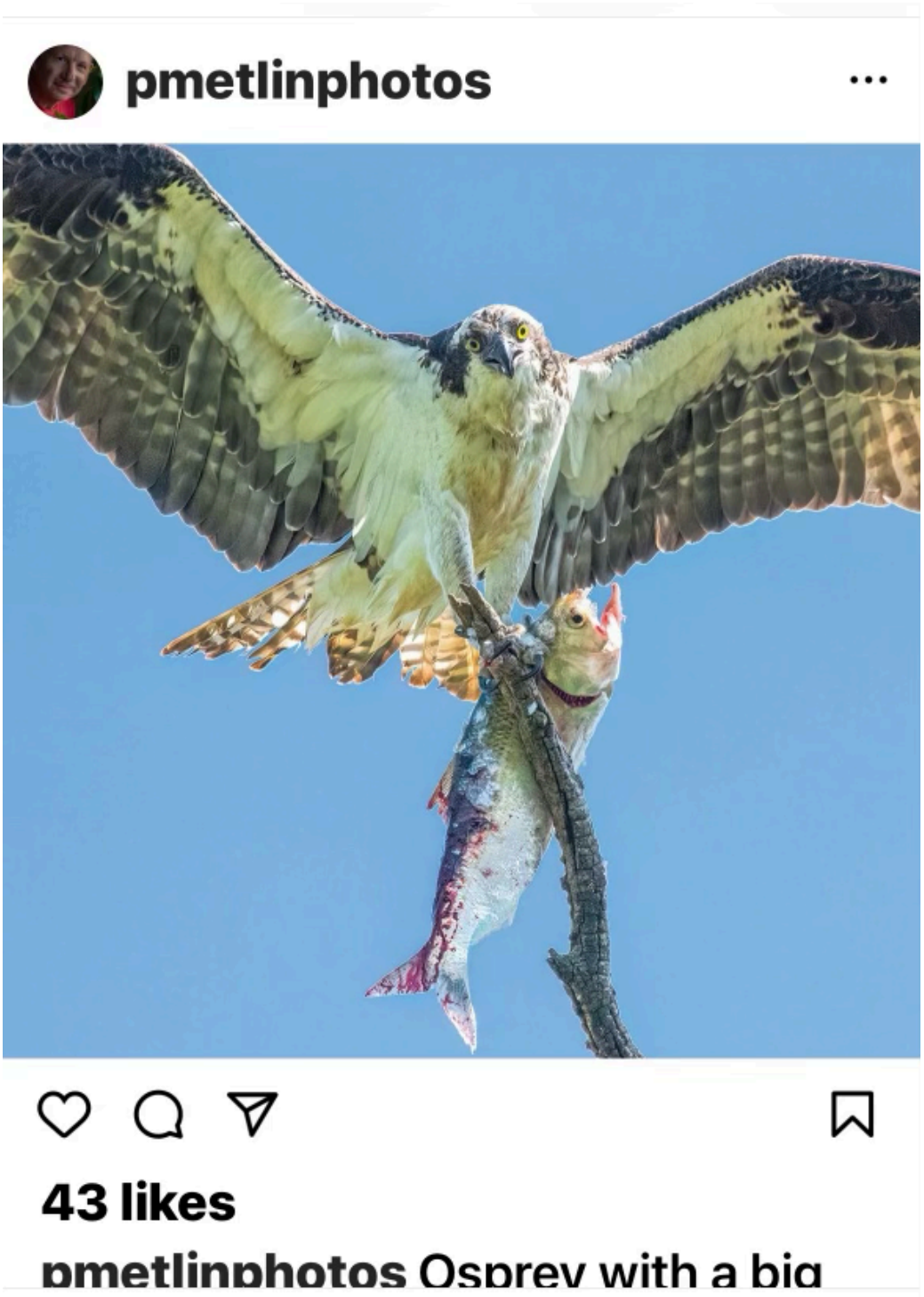


Morning in Paradise

Nature is complicated….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