COORDINATES: 74°S, 108°W

TWITTER TIME

7:04 AM
Great visualization of my research region from NASA. It really gives as sense of the geography of the place and role of glaciers on the southernmost continent.

7:23 AM
Glaciers are rivers of ice that flow downhill so slowly.

7:27 AM
Glaciers that flow off land and float into the ocean are called ice shelves. But, these shelves are a little thicker than bookshelves, in some places hundreds of feet thick. No need for me to travel to Thwaites since satellites, remote sensors, and other scientists traveling into the field take all of measurements I use.

7:31 AM
My computer code is built using all of those measurements and what we know about Earth processes to model how the ice acts.

7:36 AM
There are so many measurements we need to understand how the glacier and ice sheet are changing, so many that I have no choice but to use a supercomputer to run my code. Otherwise, it would take two weeks for my laptop to do the same job.

10:14 AM
I love making books and sketching. I also like to craft chocolate and do tastings with friends and colleagues. I like traveling and love observing plants and geology a lot!

2:48 PM
Thwaites has retreated dramatically in the past 25 years. The main suspects appear to be both the warmer air and water temperatures. Things are getting warmer and with so much water, even a temperature change of a few degrees has a big impact.

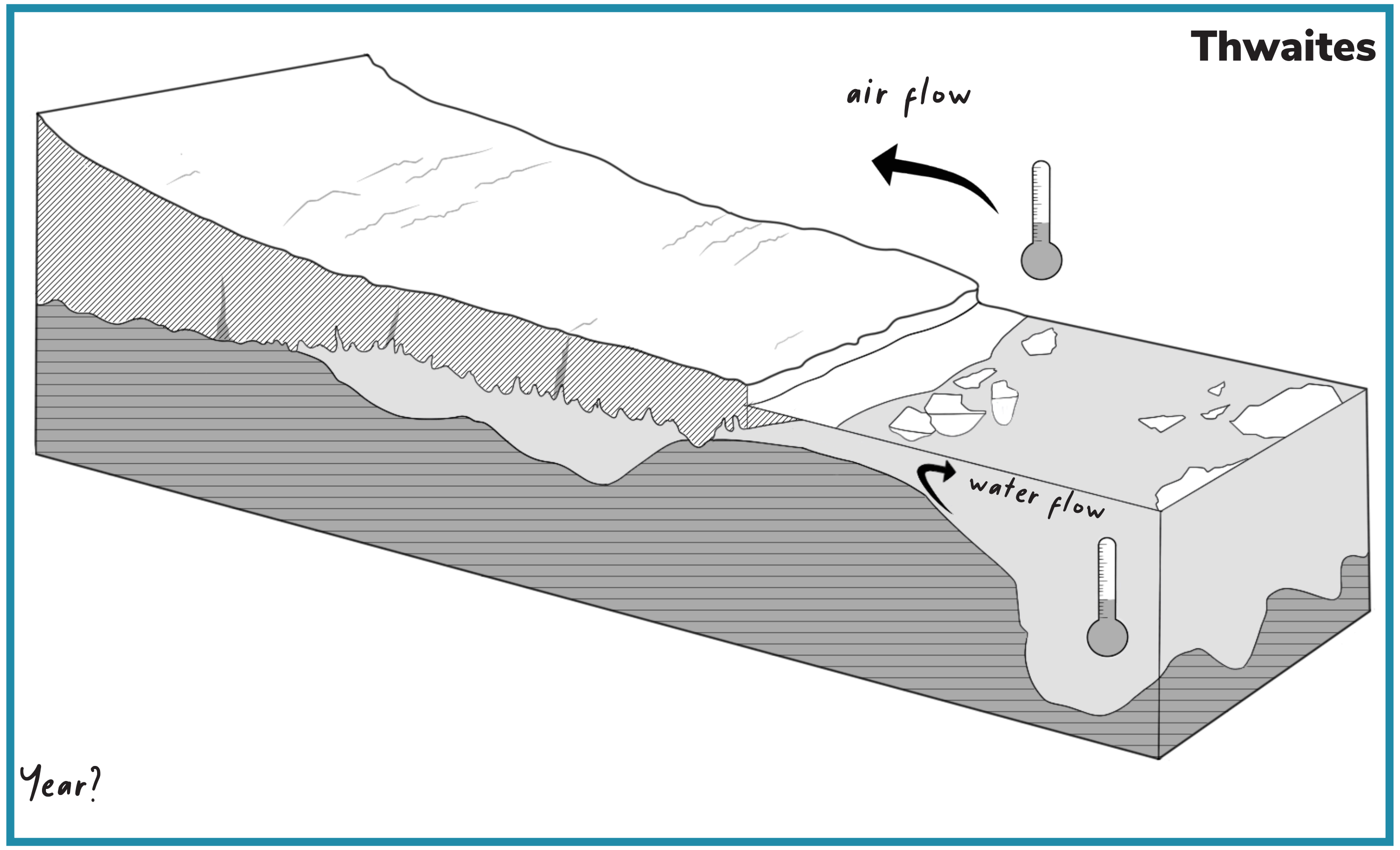
3:03 PM
We would have never known that it is easier for warm water to circulate well under the ice shelf if we didnt look there.

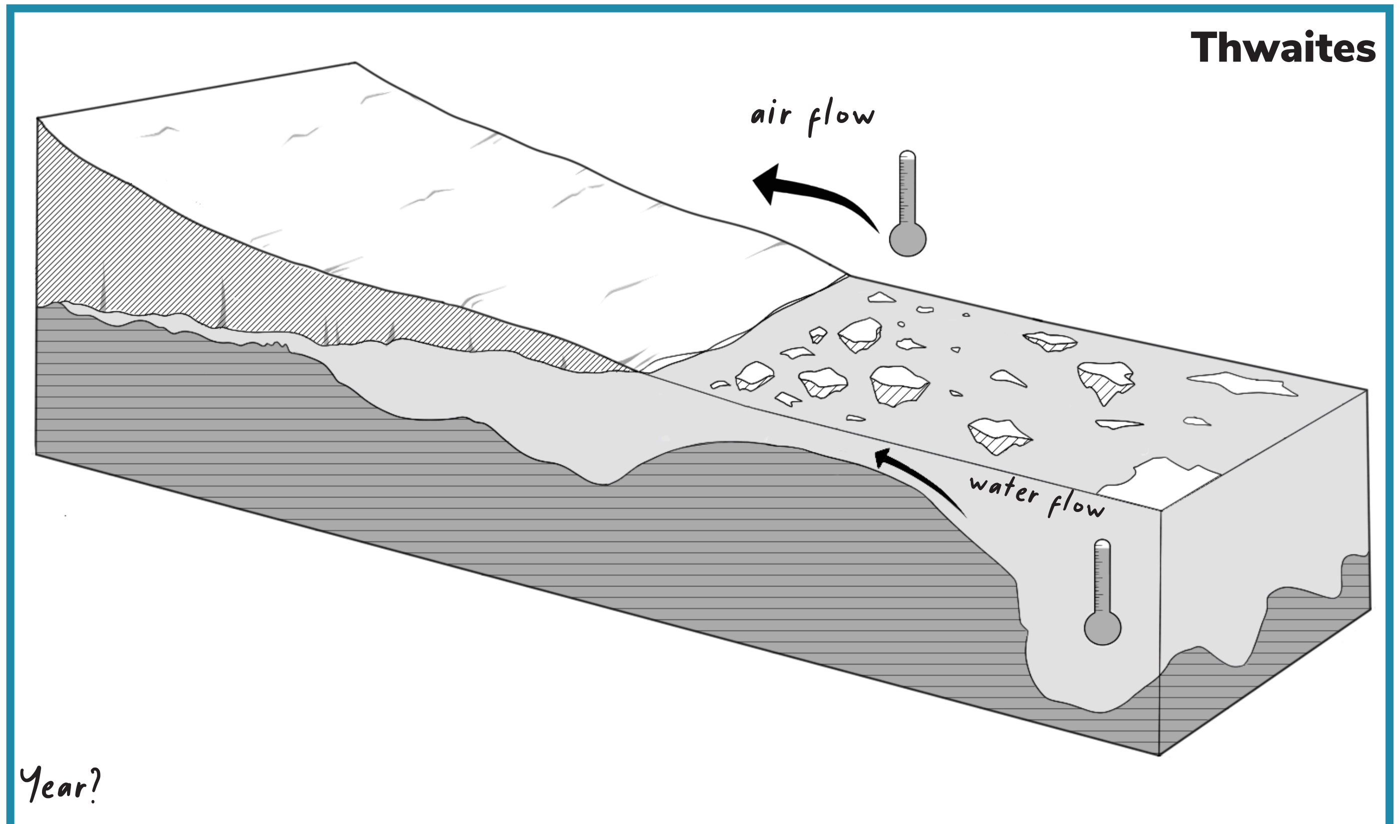
3:25 PM
Without the ice shelves holding back the glaciers, they can more easily flow into oceans and add water. This will raise sea levels and increase coastal flooding.

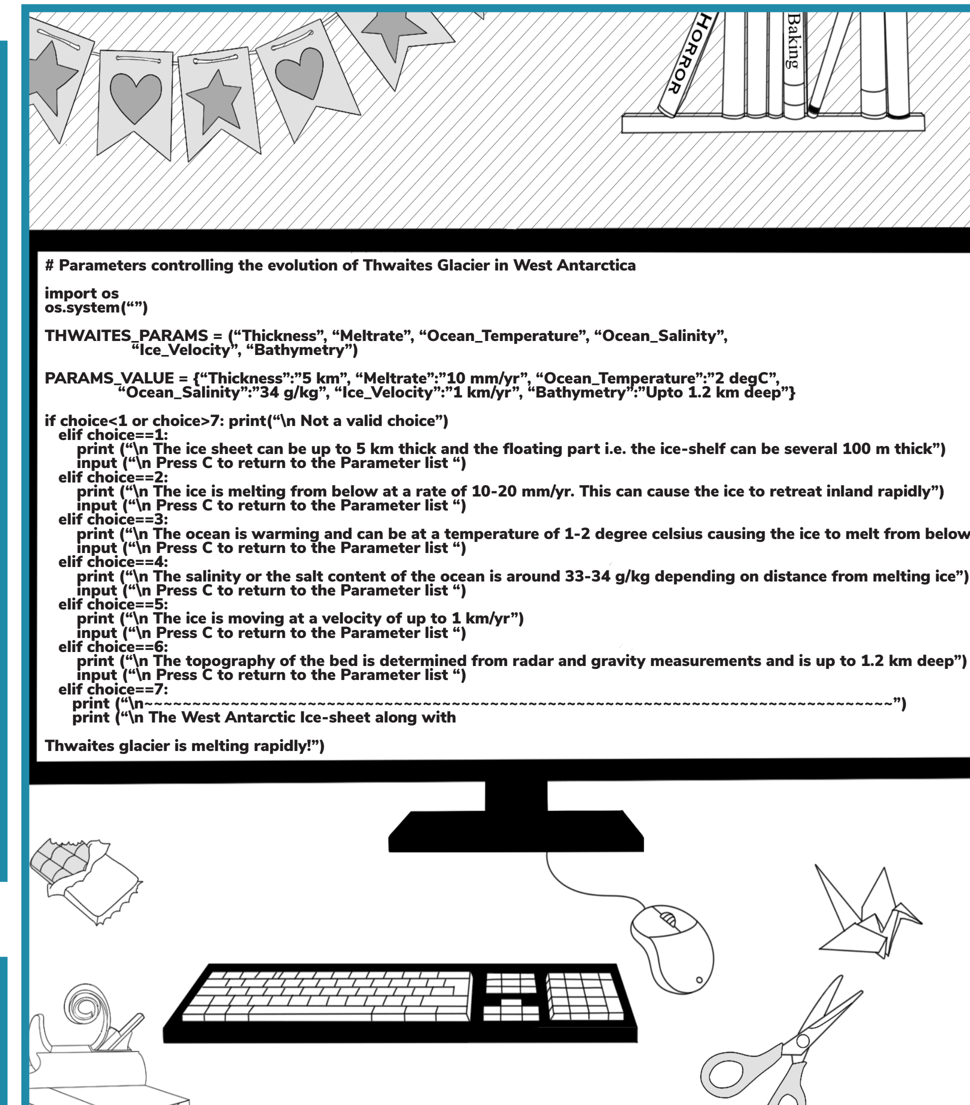
3:29 PM
I'm a fan of horror movies, but more coastal flooding, especially during high tides and big storms, is a real-life scary future for people living on the coasts.

4:46 PM
Had to change my password today...required every six months. So long myglacier+southerncontinent+tempH2Ofreezes.

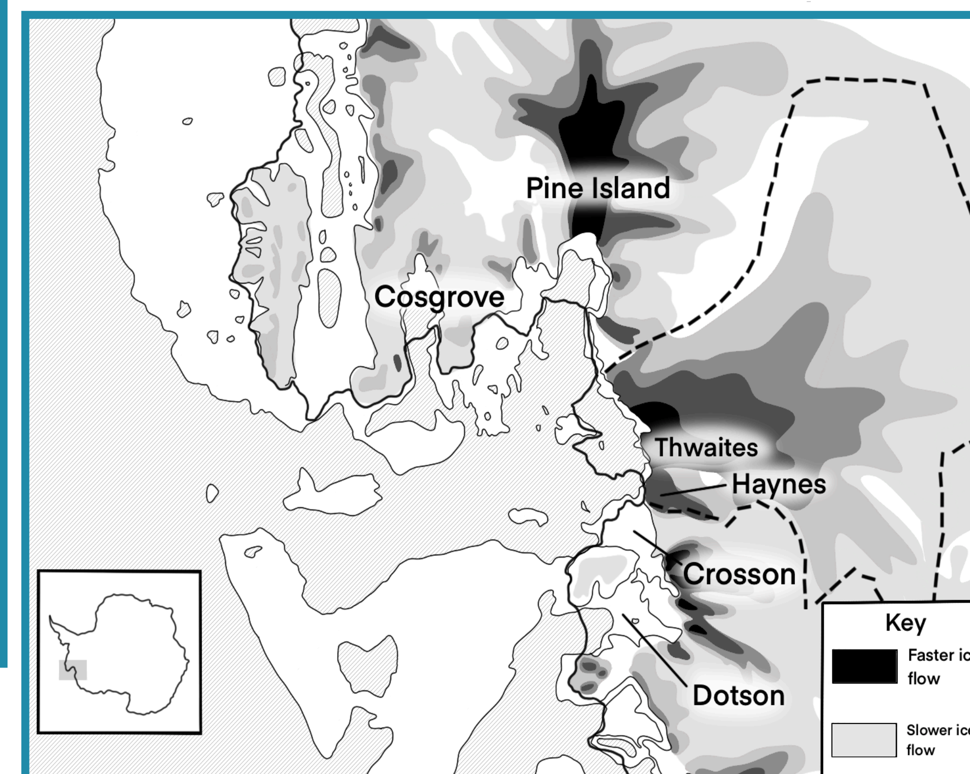
6:12 PM
What we learn about Antarctica might help us understand other icy places in the solar system. Go Europa!








```
# Parameters controlling the evolution of Thwaites Glacier in West Antarctica

import os
os.system("")

THWAITES_PARAMS = ("Thickness", "Meltrate", "Ocean_Temperature", "Ocean_Salinity",
          "Ice_Velocity", "Bathymetry")

PARAMS_VALUE = {"Thickness":"5 km", "Meltrate":"10 mm/yr", "Ocean_Temperature":"2 degC",
          "Ocean_Salinity":"34 g/kg", "Ice_Velocity":"1 km/yr", "Bathymetry":"Upto 1.2 km deep"}

if choice<1 or choice>7: print("\n Not a valid choice")
  elif choice==1:
     print ("\n The ice sheet can be up to 5 km thick and the floating part i.e. the ice-shelf can be several 100 m thick")
     input ("\n Press C to return to the Parameter list ")
  elif choice==2:
     print ("\n The ice is melting from below at a rate of 10-20 mm/yr. This can cause the ice to retreat inland rapidly")
     input ("\n Press C to return to the Parameter list ")
  elif choice==3:
     print ("\n The ocean is warming and can be at a temperature of 1-2 degree celsius causing the ice to melt from below")
     input ("\n Press C to return to the Parameter list ")
  elif choice==4:
     print ("\n The salinity or the salt content of the ocean is around 33-34 g/kg depending on distance from melting ice")
     input ("\n Press C to return to the Parameter list ")
  elif choice==5:
     print ("\n The ice is moving at a velocity of up to 1 km/yr")
     input ("\n Press C to return to the Parameter list ")
  elif choice==6:
     print ("\n The topography of the bed is determined from radar and gravity measurements and is up to 1.2 km deep")
     input ("\n Press C to return to the Parameter list ")
  elif choice==7:
    print ("\n~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~")
    print ("\n The West Antarctic Ice-sheet along with

Thwaites glacier is melting rapidly!")
```



Dealt Some Melt

Earth's air, oceans, and ice
are quite complex,
But how they interact together
could really perplex.

Thankfully, we know a lot
about each in isolation,
And can build computer
models to simplify the
complication.

Antarctic ice shelves are
shrinking most because of
warming oceans below,
With details of the air, oceans,
and ice determining how
quick they go.

Engagement Activity: It's Melting

Activity How-To Video

For this activity, we will be looking at features of the ocean floor, water, and ice sheet that impact how quickly the ice sheet melts. We will use a paint roller tray with water to represent the ocean and pieces of ice frozen on pie tins to represent the ice sheets. For this activity, we will be performing two experiments. The first will attempt to melt the ice as slowly as possible. The second will attempt to melt the ice as quickly as possible.

Materials:

- 1 paint roller tray
- 1 or 2 pie tins for freezing "ice sheets"
- Food coloring
- Small rock and pea gravel
- Several cups of cool water
- 1 or 2 cups of hot water
- 1 or 2 timers
- Kitchen or lab balance for measuring mass or mobile phone to take before/after photos

Prepare beforehand:

- Add water to 1 or 2 pie tins and place them in the freezer. The frozen ice should be about 1 cm thick and will act as our ice sheet.
- Prepare hot water just before boiling and mix in food coloring once it has reached the desired temperature. Have an adult help you with this.

Directions:

1. Using your rock and pea gravel, construct the terrain of the ocean floor in the lowest part of the paint tray and supporting the ice sheet so that it will not move.
2. After shaping your ocean floor, carefully remove the ice sheet from the pie tin and measure its mass with a kitchen balance or take its photo with a mobile phone.
1. Place the ice sheet at the top of the paint tray where it is most shallow.
2. Pour the cool water into the deepest part of the tray, until it touches the bottom of the ice sheet. Once the water has settled beneath the ice sheet, add enough water to almost cause the ice sheet to float.
3. Start your timer for 20 minutes when all of the water is added.
4. After 20 minutes, remove the ice sheet. Either measure its mass with the balance or take its photo with the phone again. Determine the percentage left by subtracting the mass at the end from the mass at the beginning and multiplying that number by 100.
5. REPEAT: If you would like to do both experiments, repeat the process again changing your setup.

Observations:

List three things you could change about the ocean floor, water, or ice sheet to affect how fast the ice melts.
1.
2.
3.

First Experiment – Slow Melt	**Second Experiment – Fast Melt**
Mass of ice before experiment:	Mass of ice before experiment:
Mass of ice after experiment:	Mass of ice after experiment:
Percentage left:	Percentage left:

Questions:

1. Which experiment had a larger percentage of the ice sheet left?
2. What was different about your two experiments? What do you think contributes to the ice sheet melting faster? How could you make each of these contributors bigger?
3. Based on the dyed hot water, what did you notice about how the hot and cold water arranged themselves when they came in contact?