Dr. Kelly Brunt

Phone interview conducted on June 9th, 2017

Questions

1) I understand that the Larsen C rift differs from the rifts of Larsen A and B, because this one has been growing during a period of cooling relative to previous decades. Is this understanding correct, and is there anything you would add to clarify/expand?

There's that. The major difference. One of the striking features of disintegration of Larsen B was the melt pond features. Water is more dense than ice and it just kind of cut its way through on the ice shelf. The difference is we don't have this kind of activity on Larsen C. Not only is it that it's a little bit colder, but it's a completely different mechanism. The lack of the melt ponds on the surface - that's why folks in my community are leery to say that this is climate-related (due to warming ocean or warming air). With Larsen B it was a little bit clearer. Warm air fohn winds made their way over the spine of mountains on the left and the warm air came over and down and created the melt ponds. Very unique signature and very different from what's going on on Larsen C.

2) What is the mechanism with Larsen C exactly?

Well, iceberg calving is totally normal! Two things about this event are making it unique. 1) It's going to make a large iceberg. The other thing is, (like with front of Ross ice shelf), these massive rifts often get hung up on suture zones, areas where the ice doesn't look the same as other ice. The ice is flowing out toward the sea and sometimes it has to flow around an island underneath, a bump...and so it creates a scar. Those suture zones are made up of regular ice shelf ice (coming off of ice sheet, sourced from snow) and marine ice (ocean water can freeze to the bottom of the ice shelf. It's got ocean stuff, debris in it. And that can get worked up around islands). Rifts tend to get hung up on suture zones. But that's not happening here. This rift system is blasting through this suture zone. Part of that might be the leverage - this is a really big rift which provides a lot of leverage as the oceans and currents are working on it. The way that this rift is propagating through things that on other shelves have hung these rifts up.

3) Is the coming event illustrative of any larger trends that may be driven by climate change, or is this really a mechanism of ice shelf loss that climate change doesn't affect at all?

We know what the front of this ice shelf has looked like from satellite imagery going back to the dawn of - late '70s, early '80s . . . to a certain degree a little bit farther. Navy was taking photos in the '60s. We've got a pretty good sense of a 50-year average of where the front of ice shelf is, how large it is . . . and when you lose a chunk of ice this big, that takes it away from a 50-year average. We are changing the system. How will the glaciers upstream respond to that missing ice? Right now, we can't definitively pin it on warming water, a warming ocean.

4) What will you take away from this event and/or what specifically will you be watching for after this iceberg breaks off?

- We know from Larsen B that when a whole ice sheet disintegrates and you're left with these glaciers that feed it with no buttressing, there's a glacier called the Crane Glacier. After the Larsen B, they saw significant accelerations of the Crane. That has slowed down since. We know when the whole ice shelf is gone, we definitely see acceleration; with Larsen C we won't lose the whole shelf, but we'll lose a significant amount. Can we still observe that upstream acceleration when only part of the buttressing is gone?
- This is a little speculative at this point . . . recently the rift tip sort of made a turn toward the northeast. If you look straight up from that [looking at green-tinged image of LC], you see a little white part of ice. Bawden Ice Rise (island). It'll be interesting to see if the ice shelf still maintains a connection to Bawden, because Bawden could be a stabilizing factor for the ice shelf front.
    - Just an interesting note: Ice shelves can only form in bays etc. Protected areas. If you look all the way around the fringe of Antarctica, ice shelves have a happy average - they don't extend way far off the continental shelf. They stay in protected waters. And they usually are met by islands (stabilizing features on the front). Islands are often found at the front of these things acting as points of stabilization.
        - Ross has two
        - Getz has lots

5) Is there any other information we should be sure to include in our write-up of this event?

- This is a big and unique event, but in general, the calving of icebergs is a normal part of the process.
- Ice shelves are already floating, so this iceberg, when it breaks off, will not contribute directly to mean sea level. What we're worried about are the indirect effects on sea level (acceleration).