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A calving front of Petermann Glacier.

The Petermann Glacier connects the Greenland ice sheet to the Arctic Ocean and is named for German cartographer, August Heinrich Petermann. It consists of a 70km long and 15km wide 'ice tongue' whose thickness varies from 600 m to 60 m.

Recent research discovered an unknown mechanism, in how the glacier's ice interacted with the ocean and suggests that climate scientists may be vastly underestimating the magnitude of future sea-level rise from polar ice deterioration. It emerges that the Petermann Glacier's grounding line — where ice detaches from the land bed and begins floating in the ocean — shifts substantially during tidal cycles, allowing warm seawater to intrude and melt ice at an accelerated rate. The grounding line retreated nearly four kilo-meters — 2½ miles -- between 2016 and 2022, warm water carved a 670-foot-tall cavity in the underside of the glacier, and that abscess remained there for all of 2022.

The traditional view of grounding lines beneath ocean-reaching glaciers was that they did not migrate during tidal cycles, nor did they experience ice melt. But the new study over turns that idea and suggests that warm ocean water intrudes beneath the ice through pre-existing subglacial channels, with the highest melt rates occurring at the grounding zone.

Factoring in this, would mean that sea level rise from global warming would be thrice what is now expected of glaciers ending in the ocean, which includes most of northern Greenland and all of Antarctica.

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