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Title: What is driving glacier and ice sheet mass loss? The role of climate variability and climate change

Abstract:

Mountain glaciers have been retreating for over a century, and they have experienced an exceptional and likely unprecedented period of ice loss in the last few decades. Extreme mass loss years – such as the 2022 summer in the European Alps – are increasingly common. The Greenland and Antarctic Ice Sheets are also experiencing accelerating mass loss, and together, mass loss from global glaciers, Greenland and Antarctica, are the largest term in the sea level budget, accounting for approximately two thirds of currently observed rise. Detection and attribution studies for glaciers and ice sheets are in their infancy, and although progress has recently been made, it is still not clear, particularly in Antarctica, to what extent this mass loss is a signature of multidecadal internal climate variability versus secular, anthropogenically forced change. I will draw on a decade of work on modern and paleo New Zealand glaciers (1,2) and the Antarctic Ice Sheet (3,4) to briefly discuss the role of Pacific and Southern Ocean climate variability, as well as anthropogenic global warming in driving the loss of land ice to the oceans.

References:

1. https://www.nature.com/articles/ncomms14202
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3. https://www.nature.com/articles/ncomms9910
4. https://www.nature.com/articles/s43017-022-00309-5