

## HYDROCLIMATE

### Declining Arctic river icings

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PETER MATHER/NATIONAL GEOGRAPHIC/GETTY IMAGES

River icings — accumulations of ice formed when water flows onto a frozen surface and freezes — are one of the dominant forms of ice that influence the flow and morphology of Arctic rivers. The response of these features to climate change remains poorly documented, however.

Tamlin Pavelsky from the University of North Carolina and Jay Zarnetske from Michigan State University (both USA) use daily satellite imagery over the period 2000–2015 to identify 147 large river icings in Arctic Alaska and Canada. Of the 122 icings that fully melt each summer, 70 were found to be disappearing much earlier in the summer. Of the 25 that usually persist through the entire summer, 14 had significantly smaller minimum extents. None were getting larger or disappearing later.

These rapid documented declines suggest that Arctic hydroclimatic systems are also changing rapidly. River icing meltwater is especially important to Arctic rivers during summer low-flow periods and if the trend of rapid decline continues it may lead to alterations in river flow and morphology that will impact the ecosystems they support. *AB*

## GLACIOLOGY

### Greenland's ice loss

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Mass loss from the Greenland ice sheet is a major source of global sea-level rise. Approximately half of Greenland's present-day contribution comes from dynamical ice loss — enhanced discharge from calving glaciers — but future changes in these processes remain poorly constrained.

Daniele Peano from Ca' Foscari University and the Euro-Mediterranean Centre on Climate Change, Italy, and co-authors investigate the evolution of ice dynamics at five of the fastest-flowing regions in Greenland: the Petermann, Kangerdlugssuaq, Helheim, and Jakobshavn glaciers, and the North-East Greenland Ice Stream. They use a hybrid ice-sheet model forced with output from seven CMIP5 models.

At all locations except the Kangerdlugssuaq glacier, the authors report a projected ice-flux reduction up to 2100, that is, a decrease in the volume of ice reaching the coast. These changes are attributed to a climate-related shift toward negative surface mass balance, wherein greater summertime melt compared to wintertime snow accumulation reduces glacial thickness, decreasing the ice available for calving. In most fast-flowing regions dynamical

ice loss becomes decreasingly important, emphasising the need to reduce meltwater uncertainties for improved sea-level rise projections. *GS*

## COMMUNICATION

### Real-world interventions

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Regular public discussion is essential for civic engagement because it increases awareness of the need for change and facilitates cooperation and collective action. Yet few regularly talk about climate change, with one barrier being a perceived lack of knowledge. Thus, effective communication about climate change could prompt greater discussion of the issue and mobilize action.

Nathan Geiger and colleagues from Penn State University, USA, and New Knowledge Organization leveraged a training program in which presenters at informal science learning centres, such as zoos and aquariums, were taught evidence-based techniques for communicating climate change, including how to use empirically tested analogies to explain causal chains, and increase the salience of community action. Respondents in a national survey who attended a participating institution reported engaging in more discussions about climate change compared to those who attended similar, non-participating institutions. This effect was driven by higher perceived ability to discuss climate change, and greater perception that discussions about climate change could have positive impacts. These results suggest that knowledge-based interventions applied in the real world can be effective in promoting discussion about climate change. *JR*

Written by Alastair Brown, Michele Graffeo, Jenn Richler and Graham Simpkins.

## ENVIRONMENTAL PSYCHOLOGY

### Conflicting climate attitudes

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The successful implementation of climate policies is influenced by the public support that they can gather. A variety of beliefs and attitudes shape citizens' preferences on this topic.

Ekaterina Rhodes from the Simon Fraser University, Canada, and co-authors show that concerns for the protection of the environment and concern for the consequences of climate change are somehow distinct concepts. The authors compare two groups of Canadian citizens who show a moderate support for climate policies in general, but with important distinctions.

One group of citizens are quite concerned with the environment in general but less concerned about climate change, and they are willing to support regulatory-type policies (such as emissions limits) but clearly oppose market-based solutions like carbon taxes. Another group is more concerned specifically with climate change but less with environment and they would support carbon taxes. These distinct perceptions of climate change and environmental issues can be highly relevant for the successful implementation of carbon tax policies, given that 70% of the citizens in the latter group but only 2% of the former group show some support for them. *MG*