

WARMING-INDUCED GLACIER RETREAT COULD CREATE NOVEL ECOSYSTEMS

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Climate change caused by human activity under a high-emissions scenario may halve the area covered by glaciers outside the Antarctic and Greenland ice sheets by the end of the century, as per a study published in *Nature*. This will have marked ecological and societal cascading consequences, as novel ecosystems develop to fill emerging new habitats. However, there has been no complete spatial analysis carried out to quantify or anticipate the important changeover.

“Under a high-emissions scenario (in which global greenhouse gas emissions triple by 2075), about half of 2020 glacier area could be lost by 2100,” the authors write. “However, this could be curbed by a low-emissions scenario (in which net zero is achieved by 2050), which would reduce this loss to approximately 22%.”

As per the modelling exercise undertaken by Jean-Baptiste Bosson from the Conservatory of Natural Areas of Haute-Savoie, Annecy, France and others, the loss of glacier area will range from 22% to 51%, depending on the climate scenario. It would mean that by 2100, the decline of all glaciers outside the Antarctic and Greenland ice sheets may produce “new terrestrial, marine and freshwater ecosystems over an area ranging from the size of Nepal (1,49,000 sq. km) to that of Finland (3,39,000 sq. km)”.

In the deglaciated areas, the new ecosystems will be characterised by “extreme to mild ecological conditions” encompassing terrestrial, freshwater and even marine habitats. While such drastic changes might favour primary productivity, it may also lead to increased numbers of non-native species and those that can thrive under certain conditions such as cold-adapted species and generalist species.

“Such vast emergence on a relatively short timescale will add to the complexity of glacial dynamics and will increase the challenge of glacier conservation,” notes an accompanying News & Views piece in the journal. Ironically, less than half of glacial areas are located in protected areas.

In response to the possible scenarios, the authors “emphasise the need to urgently and simultaneously enhance climate-change mitigation and the in-situ protection of these ecosystems to secure their existence, functioning and values”. This is the first ever attempt towards getting a full understanding of the ecosystem shift associated with global deglaciation.

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