

A new global rock glacier inventory for water resources research

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There is overwhelming evidence that anthropogenic climate change is causing glaciers, globally, to recede at an alarming rate. This is troubling for communities living in arid and semi-arid mountain environments who rely on seasonal meltwater from glaciers to support them during dry months. Rock glaciers are potentially more resistant to climate changes, due to the insulating effects of debris, both within and covering the interstitial ice. However, two main obstacles exist in understanding the potential contribution of rock glaciers to water supply:

1. Few rock glacier inventories exist, limiting knowledge of their extent and distribution, at a global scale
2. Due to the debris cover, expensive coring remains one of the only methods to estimate ice content, so not many have been performed and estimations have high uncertainty.

Here we take a global view of existing rock glacier literature and synthesise this data into a new inventory. Included are those which have been instrumentally studied and have good estimates of ice content, with their methods analysed to assess accuracy. We also review the topographic setting and show the development of a methodology to estimate ice content using Differential Synthetic Aperture Radar techniques. This is novel in the field and would allow more extensive ice content estimations to be made, informing the future of rock glaciers and their natural and human impacts.