



Evaluating the controls on glacier behaviour on the Kamchatka Peninsula, Russia

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Glaciers have been unequivocally linked to changes in global climatic conditions, with an unprecedented and climatically-driven decline in glacier coverage witnessed over recent decades. Despite this relationship, variation in glacier response suggests that other (non-climatic) controls are involved in governing glacier behaviour. This variation presents a challenge when assessing how best to model and predict future glacier behaviour.

This study looks at the non-climatic controls on glacial behaviour on the Kamchatka Peninsula, and assesses associated impacts on glacier vulnerability to changes in climate. A detailed multi-annual study was undertaken using Landsat 7 and 8 images to monitor the inter-annual variability of Kamchatka's glaciers, with topographic information obtained from the 30m SRTM DEM. Glaciers were mapped manually, with 676 present in the year 2000, representing an area of 664.79 ± 65.25 km². Analysis revealed an overall decline in the glacial coverage of ~ 30.04 % over the 2000–2014 period. However, there is considerable spatial variability in glacier behaviour across the Peninsula, suggesting corresponding variability in the controls on glacier extent.

Here the role of glacier hypsometry, aspect, surface slope and areal extent, basin geometry and distance from the coast are examined to evaluate the role each has played in either enhancing or suppressing glacier vulnerability to the changing climate.