

## **Glacial cover affects nutrient fluxes from rivers in Chilean Patagonia**

H. PRYER<sup>\*1,2</sup>, J. WADHAM<sup>1</sup>, J. HAWKINGS<sup>2,3</sup>,  
L. F. ROBINSON<sup>1</sup>, K. R. HENDRY<sup>1</sup>, M. MARSHALL<sup>2</sup>,  
C. YATES<sup>2</sup> & J. HATTON<sup>1</sup>

<sup>1</sup>Department of Earth Sciences, University of Bristol, UK  
(\*Correspondence: [helena.pryer@bristol.ac.uk](mailto:helena.pryer@bristol.ac.uk))

<sup>2</sup>Bristol Glaciology Centre, Department of Geographical Sciences, University of Bristol, UK

<sup>3</sup>Department of Earth, Ocean & Atmospheric Science, Florida State University, USA

Glaciers have recently been highlighted as important sources of bioavailable nutrients, delivering large fluxes of phosphorus, iron and silicon to downstream ecosystems. This affects our understanding of how glaciers may impact primary-productivity and influence the climate, both in the past and with current climate-change. However, there are still many unknowns. The controls on glacial nutrient-concentrations are not well-understood and it is unclear how fluxes will change with continued glacial-retreat. Currently, the majority of studies focus on nutrient export from the Greenland Ice Sheet and there are almost no published data about the geochemistry of glacial systems in South America, despite evidence for rapid glacial-retreat throughout this region.

We present geochemical data from over 30 river systems in Chilean Patagonia, investigating how glacial cover affects riverine nutrient fluxes. Patagonia represents a unique natural laboratory to understand progressive deglaciation, with a spectrum of glacial cover and minimal anthropogenic influence. We find that glacially-fed rivers deliver large fluxes of particulate and colloidal nutrients to the fjords, including labile amorphous silicon and iron. Yields of these elements are an order of magnitude higher from glaciated-catchments than non-glaciated catchments, showing that glacial-weathering is an important source of nutrients in this region. Using these data, we infer how current landscape changes in Patagonia, such as the retreat and disappearance of glaciers and the formation of new proglacial lakes, will affect riverine nutrient fluxes and impact the surrounding fjord ecosystem.