Submitted Abstract

ID IMC22-FSAbstr- 702

First Author First Name / Last Name	Suzette G.a. (1,2) Flantua
Submitting Author First Name / Last Name	Suzette G.a. Flantua
Correspondence	s.g.a.flantua@gmail.com
Co-Authors >> E-Mails will be not listed	Seguinot, Julien (1,2); Hooghiemstra, Henry (3)
Organisations	1: Department of Biological Sciences, University of Bergen, N-5020, Bergen, Norway 2: Bjerknes Centre for Climate Research, University of Bergen, N-5020 Bergen, Norway 3: Institute for Biodiversity and Ecosystem Dynamics, Department of Ecosystem and Landscape Dynamics, University of Amsterdam, Science Park 904, 1098 XH Amsterdam, The Netherlands
Country	Norway
Region	Western Europe

Title	The Role Of Long Paleoecological Records In Revealing The Biogeographical History Of Mountain Ecosystems.
Keywords	Alpine Ecosystems, Flickering Connectivity System, Fossil Pollen Records, Glacier Reconstructions, Quaternary
Type	List Of Focus Session
Focus Session ID	29

Abstract

Our understanding of past climate change at Quaternary timescales has mainly been fueled by records from deep seafloor sediments. However, large ancient lakes in mountainous regions are increasingly recognized as continental archives of long-term climatic and environmental changes. Long fossil pollen records derived from such lakes can provide unique insights into the high degree of climate-change-driven dynamics in vegetation distribution, floral composition, and ecological characteristics as experienced by mountain ecosystems. For instance, thanks to the long history of paleoecological research in the Northern Andes, a suite of long fossil pollen records (the longest covering the last 2.2 million years) has helped reveal the dynamic past of the high elevation Andean alpine grasslands (páramos). Rapid global changes in temperature drove major shifts in the elevation of the páramo ecosystem. During warm interglacials, the complex topography of the Andes created a plethora of small mountaintop-bound páramo islands, while during cold glacial periods, páramo elevations dropped and the ecosystem covered much of the Andean slopes above 2000 m, causing previously isolated islands to merge into larger páramo complexes. Using a 1 million years-long pollen record we modelled elevational fluctuations to reveal the complex connecting and disconnecting dynamic history of páramos. Our findings show that temporal patterns of connectedness of páramo varied greatly among the different mountain ranges of the Northern Andes, producing individual ‘mountain fingerprints’, with mountain-range-specific implications for evolutionary trees. Here we highlight the important, but neglected role of the history of spatial and temporal connectivity of alpine ecosystems, coined as the ‘flickering connectivity system’, as a driver of ecological change and mountain biodiversity. Our models have provided unprecedented insights into the dynamic past of tropical mountain ecosystems, but much remain to be studied if such connectivity dynamics existed for other mountains around the world as well. Future studies will need to assess the role of paleoclimate, topography and glaciers in driving the biogeographical history of high elevation ecosystems.