

27 NOVEMBER TO 1 DECEMBER 2022 BARILOCHE - ARGENTINA

IAL IPA 2022



Lagos, Memorias del Territorio

Lakes, Memories of the Landscape

This work is licensed under a creative commons Attribution 4.0 International (CC BY 4.0) licence.

doi: [10.5281/zenodo.7305148](https://doi.org/10.5281/zenodo.7305148)

GLOF event in the Turbio river basin in June 2017 (North Patagonian Andean Range, NW Chubut, Argentina): triggers and impacts

Quesada, A.^{1,2*}, Colavitto, B.^{3,4}

¹ Universidad Nacional de Río Negro, Instituto de Recursos Naturales, Agroecología y Desarrollo Rural (IRNAD), Río Negro, Argentina

² Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Instituto de Recursos Naturales, Agroecología y Desarrollo Rural (IRNAD), Río Negro, Argentina

³ University of Geneva, Institute for Environmental Sciences, Climatic change impacts and risks in the Anthropocene, Switzerland

⁴ CONICET - Universidad de Buenos Aires. Instituto de Estudios Andinos "Don Pablo Groeber" (IDEAN). Buenos Aires, Argentina

*Corresponding author: aquesada@unrn.edu.ar

The Turbio river valley can be described as a paraglacial landscape with wide floodplains and glaciers relicts in its headwaters. High-energy events, frequent but not cyclic, have effects on the geomorphological and biological evolution of the basin. Our study focuses on a glacial lake outburst flood (GLOF) that occurred in June 2017 in one of the upper basin tributaries. Based on satellite images and local stakeholder's information, the outburst occurred between June 25th-26th. During those days, a rockslide from the southern slope of the valley reached the lake (42,28°S; 72,13°W), emptying it completely. The resulting high-energy flow eroded the lateral banks of the Turbio river valley and left a large debris corridor extending more than 7 km. The torrent flood overbanks the lower fluvial plain and reached the fan delta of Puelo lake. Wood debris accumulations (*Fitzroya cupressoides*) were found along the Lake. A rural house was destroyed and trouts (*Onchorynchus mykiss*) were found dead. A few days before the event, a 3-day cumulative rainfall >80 mm was detected, associated with a cut-off low structure developed over the southeastern Pacific. Subsequently, on June 25th, a Mw 4.9 earthquake occurred 12 km from the lake, with a depth <13 km. In this case, the rockslide induced by weather (rainfall) or seismic conditions, or both combined, may have been sufficient to trigger a GLOF. An example is the Valdivia mega-earthquake of May 1960, in which outburst flood and avulsion processes were reported in the same lower basin. We suggest that continuous monitoring of glacial lakes and related hazards in this region is important, despite being sparsely populated. In addition, we recognize that the low anthropization degree of the Turbio river provides an excellent opportunity to study GLOFs and their geomorphic effects in the north Patagonian Andes.

