



Geomorphologically effective floods from moraine-dammed lakes in the Cordillera Blanca, Peru

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Outburst floods originating in moraine-dammed lakes represent a significant geomorphological process as well as a specific type of threat for local communities in the Cordillera Blanca, Peru (8.5°-10° S; 77°-78° W). The main objective of this work is to provide a revised and comprehensive overview of geomorphologically effective floods in the area of interest, using various documentary data sources, verified by analysis of remotely sensed images (1948-2013) and enhanced by original field data. Verified events (n = 28; 4 not mentioned before) are analysed from the perspective of spatiotemporal distribution, pre-flood conditions, causes, mechanisms and geomorphological impacts as well as socioeconomical consequences, revealing certain patterns and similar features. GLOFs are further classified according to their magnitude: 5 extreme events, 8 major events and 15 minor events are distinguished, referring to the quantified geomorphological and socioeconomical impacts. Six events are reported to have caused fatalities and various degrees of material damage were reported for 10 out of 28 events. Selected moraine dams and flood deposits are dated using lichenometric dating. Special attention is given to moraine dam breaches - the most frequent type of water release with the most significant geomorphological consequences. Finally, a general schematic model of lake formation, growth and post-flood evolution reflecting initial topographical setting and glacier retreat is introduced.

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