## Accepted Manuscript

Disentangling the impacts of exogenous disturbances on forest stands to assess multi-centennial tree-ring reconstructions of avalanche activity in the upper Goms Valley (Canton of Valais, Switzerland)

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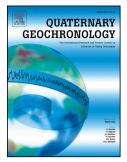
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## ACCEPTED MANUSCRIPT

1	Disentangling the impacts of exogenous disturbances on forest stands to assess multi-
2	centennial tree-ring reconstructions of avalanche activity in the upper Goms Valley
3	(Canton of Valais, Switzerland)
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17	Abstract
18	The purpose of dendrogeomorphic analyses is to amplify the signal related to the geomorphic process under
19	investigation, and to minimize the noise induced by other signals in the tree-ring series. Yet, to date, no study
20	accounts specifically for interferences induced by climate conditions or exogenous disturbances and which can,
21	potentially, affect the quality of tree-ring based process reconstructions. In this paper, we develop a specific
22	procedure allowing evaluation of the quality of reconstructions in five avalanche paths at Oberwald (Swiss Alps).
23	The study is based on possible interferences between snow avalanches, climatic conditions and ecological signals
24	in the tree-ring series. Analysis of past events was based on tree-ring series from 564 heavily affected, multi-
25	centennial European larch trees (Larix decidua Mill.) growing near or next to the avalanche paths. A total of 2,389
26	growth disturbances, such as scars, tangential rows of traumatic resin ducts, compression wood as well as abrupt
27	growth suppressions or releases, were identified in the samples, indicating 43 destructive snow avalanches since
28	AD 1780. At the same time, 31 potential events, which were detected with the conventional Shroder index value,
29	were rejected from the final reconstruction due to potentially strong interferences between the different signals.
30	This high rejection rate underlines the necessity to systematically-and carefully-discriminate ecological and
31	climatic noise from avalanche-related disturbances. This discrimination is even more so crucial as a significant

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