



## **Decades of snow-avalanche activity documented by tree rings on three colluvial cones in Northern Iceland**

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Tree rings were used in Northern Iceland to infer snow avalanche activity (lateral extent, runout distance, frequency and return period) in three U-shaped valleys of Northern Iceland, within the Suður-Þingeyjarsýsla, east of the town of Akureyri: Dalsmynni, Ljósavatnsskarð and Fnjóskadalur. From summer 2006 to summer 2010, a total of 121 trees were sampled (either one cross section per trees, either two cores per tree – 39 trees on the cone investigated in Fnjóskadalur; 27 in Dalsmynni; 55 in Ljósavatnsskarð). The analysis of the series of annual increment rings reveals the stress the trees suffer from during the dormant season and the growth disturbances the trees develop during the following growing season to cope with winter damage. The dendrochronologic approach enables the extraction of the chronology of snow avalanches back to the 50s in Dalsmynni, back to the 30s in Ljósavatnsskarð, and back to the 20's in Fnjóskadalur. Results emphasize the great impact of snow avalanche winters 1974 and 1995, which were dreadful over the island and resulted in severe losses of lives. In addition, several other winters, undocumented in the written archives, are highlighted in tree rings, offering an opportunity to derive the snow-avalanche return period at each site.