



The potential of lateral moraines on alpine glacier forelands for reconstructing Holocene glacier chronologies - some examples

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There is universal agreement that mountain glaciers are important and sensitive indicators of past and present climate changes, and thus vital for palaeoclimatic inference. Reconstructing the Holocene glacier chronology in as many as possible mountain regions on both hemispheres and different climatic settings is, therefore, particularly important. Although multi-proxy approaches combining glacial and non-glacial evidence are necessary to deliver true high-resolution Holocene climate reconstructions, often those entirely base on the palaeoclimatic interpretation of the glacial record, i.e. existing moraines sequences. Before the full palaeoclimatic potential of Holocene moraines can, however, be utilized, all uncertainties related to moraine formation, relationship to glacier dynamics, and post-depositional modification need to be substantially reduced.

Here, we present some selected results of studies on lateral moraine morphology and formation from a few glacier forelands, mainly in the European Alps and the Southern Alps of New Zealand. Unlike terminal moraines at warm-based mountain glaciers, lateral moraines of the “alpine type” sensu Winkler & Hagedorn constitute dump moraines, i.e. they are predominately formed by dumping of supraglacial debris. This type of lateral moraines has since long been recognized as “summary of Holocene glacier advances”, i.e. they have been successively built during several Holocene glacier advances. Depending on the magnitude of the subsequent advances, different sub-types can be identified, each offering its specific potential for geochronological studies applying different numerical and relative-age dating techniques.

This potential is assessed in order give some suggestion on the selection of moraines sequences for future geochronological studies. Furthermore, the influence of post-depositional paraglacial modification on lateral moraine morphology and its impact on such studies is presented.