



## **Progress and challenges in deciphering the glacial chronology of the Alpine Lateglacial of the Eastern Alps**

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For more than a hundred years efforts have been undertaken to decipher the Alpine Lateglacial (appr. 20 -12 ka), i.e. the period beginning with the withdrawal of the LGM glaciers from their tongue basins until the onset of the Holocene. Since the pioneering work of Penck & Brückner many modifications and improvements of the original subdivision into glacial stadials have been put forward. Especially the application of equilibrium line altitude depressions ( $\Delta$ ELAs) resulted in the definition of new glacial stadials since the 1960's. In addition, previously defined stadials were re-defined using morphological criteria as well as  $\Delta$ ELAs but without any reference to the original type localities. Finally, modern geochronology, especially surface exposure dating with cosmogenic nuclides, helped to establish a chronological framework and enabled correlation with high-resolution marine and ice-core records and elaborated paleoclimatic consideration. However, the results of comprehensive geological mapping in combination with surface exposure dating and radiocarbon dating indicate a bias in the commonly used subdivision of the Alpine Lateglacial. This seems to be, on the one hand, the result of a rigorous application of differences in  $\Delta$ ELA for chronological correlations, which led to the underestimation of regional differences within one climatic phase. On the other hand, only one type-locality has been dated so far. Moreover, as no "type-valley" exists where all moraines of the proposed glacial stadials are evident, we run into the danger of using a sub-division of the Alpine Lateglacial, which contains unjustified chronostratigraphic artefacts. In other words, based on recent work an overclassification may have been established. Beyond the well-known Younger Dryas glaciation only a floating or at least poorly referenced stratigraphy prior to the Bølling/Allerød interstadial (> 14.7 ka) is in use. Examples will be presented which show the current problems and how glacial stratigraphy could be improved by considering the whole Lateglacial landscape evolution including mass movements.