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## From classic to modern stratigraphy in the European context – an Alpine perspective (a contribution to the DATESTRA project)

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### Abstract

Marine Isotope stratigraphy (MIS) shows that numerous glaciations (> 50) had a significant impact on a global scale, but it is a well-known challenge that these glaciations are only represented in a highly fragmented terrestrial records. This calls for an undisputable way of correlating terrestrial sediment records like the fourfold Alpine terrace staircases of fluvial meltwater terraces with the marine stratigraphy. Morphostratigraphical correlations, especially of meltwater terraces, by counting backwards using isolated continental erosional remains in a world of multiple sedimentation events during the Quaternary induced by bundles of cold spells, may likely be misleading.

In addition, it was demonstrated in Middle Pleistocene palynological maar sequences in Central France, that the pollen successions of different interglacials may resemble each other very closely. For Early Pleistocene pollen sequences this issue is also well known and documented. The close resemblance of the sedimentological and petrographical characteristics of the fragmented glacial and glaciofluvial sedimentary records on a regional scale, makes over-regional or global correlations highly challenging. However, during the last decades, numerical dating techniques have evolved as an important tool for the correlation of such records on a continental or even global scale. As the boundaries of dating techniques, and their resolution has been constantly pushed forward on a methodological level, an increasing number of data is available for time slices beyond the penultimate glacial cycle. For example, staircases of cover gravels in northern Switzerland were likely deposited during multiple glaciations, as revealed by numerical dating. First results from the Vienna basin area also indicate the preservation of deposits originating from multiple glacial cycles reaching back to the Early Quaternary. Furthermore, results based on numerical dating techniques may often contradict existing stratigraphical models. However, a thorough interpretation of numerical dating results against the background of sedimentological, petrographical, and geomorphological evidence is inevitable. Additionally, existing numerical data may have to be re-evaluated because of methodological progress during the recent past.

For the DATESTRA project it is recommended to focus on a thoughtful evaluation of numerical age data, to create a new backbone of European Quaternary stratigraphy. This attempt should be undertaken without the confining heritage of classical local and regional concepts of Quaternary stratigraphy.