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Foreword

Hosting the XVIII INQUA Congress in Bern, Switzerland, is a great event and an honour for the Quaternary scientific community in Europe. Since the foundation of DEUQUA (German Quaternary Association) in 1948, close links have existed with our neighbouring countries, with members especially, but not only, from Austria and Switzerland. As the central European high mountain range, the Alps are a research object in all three countries and are thus of shared interest. For several decades, DEUQUA has also had board members from both countries who have repeatedly organised DEUQUA meetings in their respective countries. Switzerland hosted DEUQUA in Zurich in 1982 and in Bern in 2000; Austria was the host in Vienna in 1978 and 2008, and in Gmunden in 1996. Therefore we are pleased to present a volume of E&G Quaternary Science Journal for the participants of the INQUA Congress, with papers highlighting some aspects of Quaternary research in Germany, Austria, and Switzerland.

Germany is the only country affected by both the Scandinavian and the Alpine glaciations. The long tradition in research on the Quaternary glaciations started in the second half of the 18th century. Prominent Swiss researchers promoted the idea of an Alpine glaciation in the 18th and 19th century and already developed the idea of polyglacialism. It proved much more difficult to convey the idea of a glaciation – and therefore the glacial transport of boulders from Scandinavia to northern Germany – and to achieve the general acceptance of this hypothesis, as a possible glaciation was not as evident as in the Alps, where the glaciers were advancing during the Little Ice Age.

It was Albrecht Penck – first working in Saxony, then continuing his outstanding work in the Alps and the northern Alpine foreland after he became a professor in Vienna – who gave impulses in stratigraphy that are still considered today. Penck is one of the "fathers" of polyglacialism in the areas affected by the Scandinavian inland ice, though he did not create the terms Elster, Saale and Weichsel. But for the Alpine foreland, he introduced the terms Günz, Mindel, Riss and Würm for the glaciations. Although much research has refined this concept, the names are still used in the context of German, Austrian and Swiss alpine stratigraphy.

For the warm phases, palynology brought insights into the changing vegetation and therefore into palaeoenvironmental conditions during interglacials and interstadials.

In northern Germany, morphostratigraphy, lithostratigraphy and sedimentology were important methods for studying the formerly glaciated areas and revealed with time a more and more detailed view of Quaternary development and the related glacial processes. Those methods are still used to reconstruct and characterize processes forming the old morainic area (cf. Winsemann et al., this volume). Geochronological studies dating minerogenic deposits also of Middle Pleistocene age will probably help in future to specify these processes over time. In general, physical and chemical dating methods have already revised the idea of the time frame of the Quaternary, and are still refining in detail our knowledge about age estimates of processes and events. Examples of dating results for the last glacial cycle and evaluations of the methods employed are given by Reuther et al. and Lüthgens & Böse (this volume). The ongoing development and refinement of these methods will surely provide more and more high-resolution tools for interpreting the past, including the processes involved.

Periglacial conditions widely affected the non-glaciated areas during the glacial cycles and transformed their topography to a certain extent. Periglacial relicts such as landforms and sediments are still part of our present-day landscape. Apart from the small glaciated mountain peaks of the Harz, the Bavarian Forest and the Black Forest, the non-glaciated areas experienced repeated transformation and sedimentation caused by various periglacial processes. Especially the widespread loess deposits and the palaeosoils within them became a valuable archive for climatic reconstructions (cf. Terhorst et al., this volume).

The river systems and their terraces are mainly linked to repeated climatic changes during the glacial cycles. The terraces are impressive landforms in the present-day landscape; they can often be associated with the changing fluvial conditions and are also linked with loess archives.

Polyglaciation was the basis of all subsequent ideas and studies about palaeoclimatic changes. Such studies are abundant and of extremely great interest for the recent discussion of global change as reconstructing the past helps us to develop and understand the models of the future. For these studies, the analysis of terrestrial archives is essential as they offer an insight into the local variety of climate embedded in the global climate fluctuations.

The first part of the volume is dedicated to the northern glaciations and a loess area in Austria.

Research results from the archives in the Alpine foreland are presented in the second half of the volume by the AGAQ (Arbeitsgruppe Alpenvorland-Quartär – Working group on the Quaternary of the Alpine Foreland). It has been in existence for about 20 years as an informal working group mainly of DEUQUA members working on stratigraphical correlations.

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