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STRUCTURE AND KINEMATICS OF THE NORTHERN CALCAREOUS ALPS TO RHENODANUBIAN FLYSCH PLATE BOUNDARY EAST OF SALZBURG, AUSTRIA

Franz NEUBAUER[1] & Lisa NEUBAUER[2]

[1] Department of Geography, Geology and Mineralogy, University of Salzburg, Hellbrunner Str. 34, A-5020 Salzburg, Austria
[2] Institute of Earth Sciences, University of Graz, Heinrichstr. 26, A-8010 Graz, Austria

Introduction

A structural study of the boundary between Northern Calcareous Alps (NCA) and Rhenodanubian Flysch (RDF) has been carried in the Salzburg city to Mondsee area, Austria, in order to examine the following issues: (1) plate boundary kinematics during emplacement of the NCA nappe complex over RDF; (2) examination of the ISAM (Innsbruck-Salzburg-Amstetten) fault system, which was recently postulated (Egger, 1997); and (3) evaluation of structures resulting from shallowing of the dip angle beneath the NCA/RDF boundary (Neubauer et al., 2003), based on published and unpublished seismic sections. For comparison, many structural data are available from the NCA (Linzer et al., 1997; Peresson and Decker, 1997).

Results

Exposure within the Rhenodanubian Flysch Zone is limited (Fig. 1), particularly along the RDF/NCA boundary. The RDF/NCA boundary coincides with a shallowing of the base of Molasse basin, so that a splay of the floor thrust of the Alpine nappe edifice is responsible for wedging of the RDF in front of the NCA nappe complex (Fig. 2).

Thrusting and shortening was N-directed as map-scale folds, associated calcite-filled extensional veins and slickenside and striae within the RDF indicate. The NCA was subsequently affected by NE-directed shortening which resulted in formation of the Filbling-Schafberg fold zone which is subsequently overprinted by the dextral Wolfgangsee fault zone. Outcrop-scale structural data have been collected in ca. 50 stations. Representive examples of fault and slickenside data of five distinct palaeostress tensor groups are shown in Fig. 3. Overprint criteria are rare.

The ISAM fault has not been detected in detail, although some arguments indicate limited sinistral wrenching along the RDF/NCA boundary. Evidence include: the sinistral Kühberg fault, which affects Gosau Group successions (Fig. 1); steeply (ca. 60-80 degree) W-plunging, late stage folds in the Sam-Heuberg area, and limited subvertical E-trending strike-slip faults, which have been found close to the RDF/NCA boundary (Fig. 3). Missing offsets within the NW-trending Filbling-Schafberg fold zone, which reaches the northern boundary of NCA, exclude the presence of ISAM within the NCA of eastern sectors (Fig. 1).

Interpretation of large-scale structures reveals, in accordance with outcrop-scale structures, three major steps of contractional deformation, which are shown as model in Fig. 4:

1. Northward thrusting, RDF wedge formation and internal shortening;
2. NE-directed thrusting and shortening and formation of the Filbling-Schafberg fold zone;

Dextral offset of the RDF/NCA boundary along Mondsee fault indicate late-stage ESE-WNW contraction.

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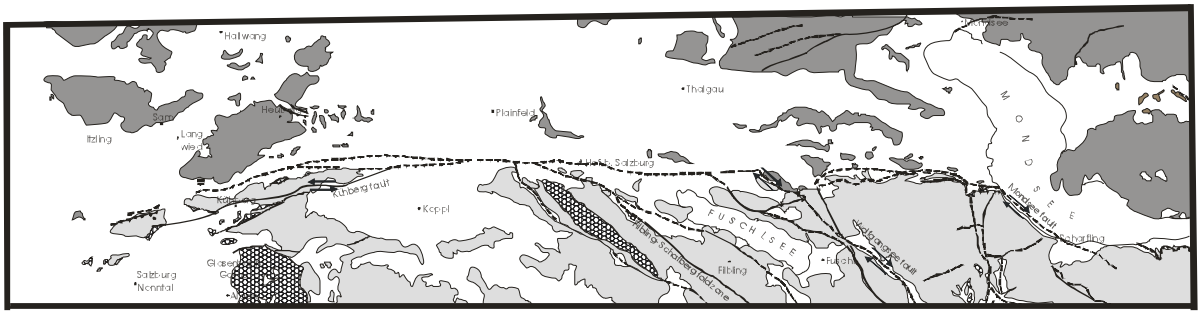

Fig. 1. Tectonic map of the boundary between Northern Calcareous Alps and Rhenodanubian Flysch between Salzburg city and Mondsee (based on maps of Prey, 1969, Egger, 2003, and Egger and van Husen, 1989).

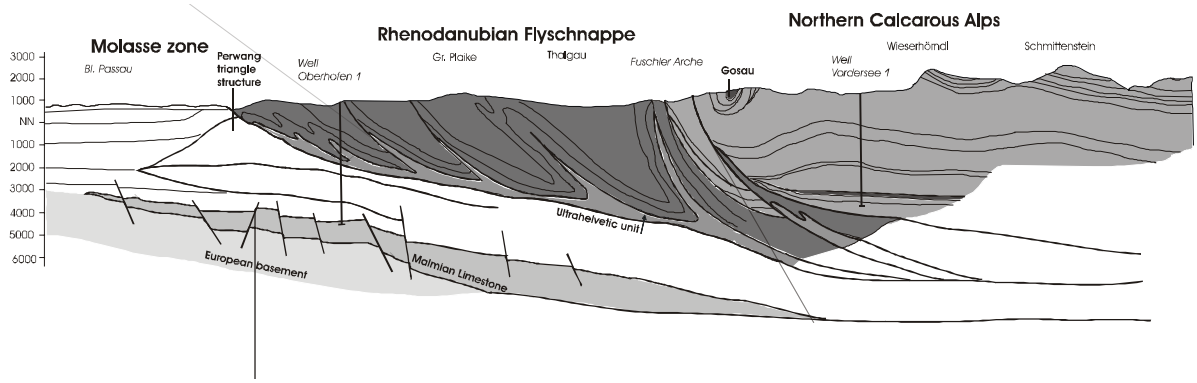

Fig. 2. N-S section from the Molasse zone to the Northern calcareous Alps. Compiled and modified after Hejl et al. (1988) and Geutebrück et al. (1982).

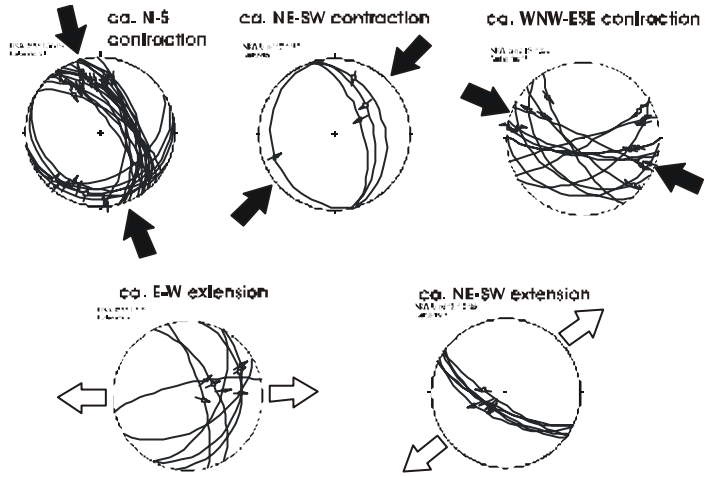

Fig. 3. Representative examples of faults and slickensides and their palaeostress assessment

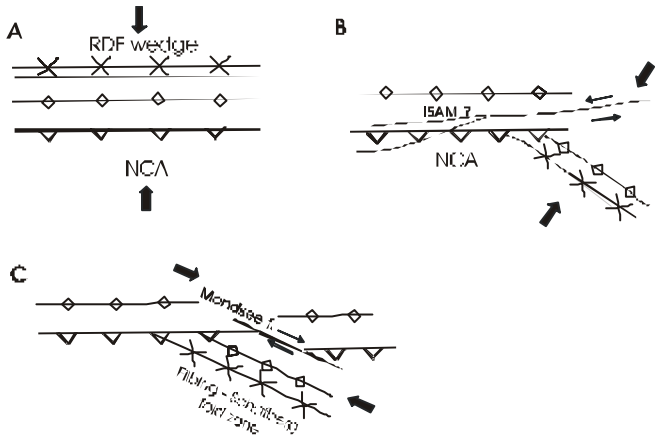

Fig. 4. Models for the three main stages of deformation along the RDF/NCA boundary.

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Autor(en)/Author(s): Neubauer Franz, Neubauer Lisa

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