

Tectonics and Neotectonics in the Prealpes and Molasse Basin of Western Switzerland. Part 1 structural geology

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In an ongoing study we examine the tectonic and neotectonic structures of the Molasse Basin and the Prealpes of the Canton Fribourg and adjacent areas in western Switzerland. Extensive field work allows us to determine the type and spread of structures, as well as the style and grade of deformation observed in the outcrops. First results are presented in two posters; poster 1 illustrates the structural geology and poster 2 concerning paleostress.

Due to late Tertiary alpine tectonics the region investigated is structurally subdivided from NW to SE into:

- 1) the SW edge of the Jura mountains with the fault related folds of the Haute Chaîne.
- 2) the Plateau Molasse, which is affected only by very flat ample folds and extends throughout most of the study area,
- 3) the Subalpine Molasse which resembles a narrow bend of inclined, folded and imbricated rocks at the former front of the alpine fold-and-thrust-belt, and
- 4) the Prealpes Klippen, a stack of sedimentary nappes, detached from their (Sub)Briançonnais homeland and transported on top of the Subalpine Molasse to the north and the Helvetic nappes to the south.

The most striking structures observed in the Plateau Molasse are steeply inclined faults arranged in a Riedel system. The tectonic regime is of nearly pure strike-slip nature, expressed in WNW-ESE striking right lateral and NNW-SSE striking left lateral shear zones that are governed by an overall NW-SE orientated sub-horizontal maximum compressive stress, and arrange in a conjugate manner. Structures in the Subalpine Molasse contain further moderately inclined fault planes striking NE-SW with a reverse or thrust motion, also compatible with NW-SE compression. In the Plateau Molasse some faults of the same strike than the mean fault population show opposite senses of shear, indicating a polyphase tectonic history.

Within the Prealpine nappe stack, the main focus was on the Gurnigel and Klippen Nappes. The former is a frontal outlier of the lowermost unit of the Nappe Supérieure, which was partly overthrust by the Prealpes Klippen in a later stage. Due to changes in the structural style the Prealpes Klippen are divided into two parts: the *Préalpes Médiannes Plastiques*, mainly governed by large-scale fault-related folds, and the *Préalpes Médiannes Rigides*, dominated by imbricated thrust slices dipping to the N/NW.

A continuation of the structures is given between the Molasse Basin and the Jura Mountains as fold axes strike parallel and steep transcurrent faults cutting the Jura extend into the Molasse. The Present Jura –Molasse Basin limit is an erosional limit. A regional scale cross section, compiled from published data of boreholes and seismic studies clearly indicates that the cover sequences are decoupled from the basement along the décollement tectonic in Triassic evaporites. While the tectonic uniformity of the Molasse Basin and the Jura Mountains is obvious from their structural continuity, its possible connections and interactions with the late Tertiary tectonic structures of the Prealpes Klippen is still under investigation.