

Summary

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Summary

The region mapped is South of Fribourg (Switzerland). It lies in the molassic basin and adjoins the northern margin of the Prealps. The tertiary deposits of the region belong to three different units: The Molasse of the Plateau, the subalpine Molasse and the External Prealps (Subalpine Flysch partly and Wild Flysch). The Quaternary deposits are widespread.

Stratigraphy

The Molasse of the Plateau consists of sediments of the Miocene transgression (Upper Marine Molasse). Two sedimentary cycles are present. The first (*Burdigalian?*) includes an accumulation of more than 750 meters of sediments, which are made essentially of glauconiferous sandstones, except at the top of the series, where marly and shaly sandstones are more widespread. It has been possible, after studying the lithofacies and their horizontal and vertical variations, to set up a summary palaeogeography of the sedimentation areas. The second cycle (*Helvetian?*) is characterized by abundant conglomerates with intercalations of very fossiliferous marls and sandstones. Its thickness is about 430 meters. The Upper Marine Molasse contains a macro- (mainly Pelecypods and Gastropods) and a microfauna (mainly Foraminifera) denoting a shallow marine-brackish environment. No fauna specifies the age of Burdigalian or Helvetian: the subdivisions are therefore based only on lithogenetic units. The notable thickness of the shallow water deposits of the Upper Marine Molasse is to be explained by subsidence. The divergent currents, which involve the lateral and vertical variations of facies, are responsible for the rhythmic character of the molassic deposits.

The subalpine Molasse of Oligocene age, consists of the Lower fresh water Molasse (Chattian and perhaps Lower Aquitanian) and the Lower Marine Molasse (Rupelian). *The Chattian* is subdivided into the following units: Upper Chattian and Lower Chattian. The thickness of the Upper Chattian (perhaps with Lower Aquitanian) can be estimated at 1400 meters in the region of La Roche. The sediments are composed essentially of coloured marls, clays and sandstones, with thin local beds of limestone, accumulated in little, often incomplete "cyclothems". The environment of deposition was very calm (no erosional unconformities, no coarse sediments). The Lower Chattian is characterized by the appearance, beside coloured marls and sandstones, of numerous intercalations of coarse or conglomeratic sandstones, even of conglomerates. Its thickness is about 1000 meters. In comparison with the Upper Chattian, the conditions of sedimentation are much more turbulent (erosional unconformities, cross-bedded coarse deposits, conglomerates). Fossils are very scarce in the Chattian. In the Upper Chattian, some Molluscs (terrestrial Gastropods) are associated

with rare Vertebrate teeth. The coarse sandstones of the Lower Chattian contain a reworked fauna of Foraminifera. *The Rupelian* comprises two classic units: marls of the Lower Rupelian (about 100 meters in the region studied) and sandstones of the Upper Rupelian (30-50 meters). The sedimentation was generally calm in an area which represents the residue of the Flysch sea. The palaeontology is characterized by the presence of *Cyrena* in the sandstones whereas the marls always contain numerous Ostracods, among which the species *Cytheridea ventricosa* GOERLICH allows an accurate dating of the whole formation.

The External Prealps are not studied here, but it may be interesting to describe briefly the two different units which form the southern margin of my map: the subalpine Flysch (beds of Cucloz-Villarvolard) and the Wild Flysch. The subalpine Flysch is a very thick complex of grey shales and marls with thin, middle-sized or coarse grey or greenish sandstones containing volcanic elements. Unlike the Rupelian, the subalpine Flysch marls did not yield any Ostracods at all, but a microfauna of *Globigerina* and *Globorotalia*. The definitive dating of this formation is not yet established: it represents the Lattorfian (L. MORNOD) or the Paleocene (P. CORMINBŒUF). *The Wild Flysch*, dated from Maestrichtian to Priabonian, contains tectonic slices of older formations (for instance, triassic gypsum from Burgerwald).

The Quaternary comprises deposits attributed to the last glaciations : Riss and Würm. A very old system of valleys, the deepest known (Sarine and Gérine of the Preriss Period), is filled with a ground moraine and stratified clays and sands of the Riss glaciation (maximum and retreat of the Rhone glacier). To the Würm glaciation, we can attribute fluvial, morainic and fluvio-glacial deposits, which are in relation to the advance, the maximum and the retreat of the Rhone glacier.

Tectonics

The Molasse of the Plateau is gently folded. The following structures are present: a syncline (syncline of Fribourg) and two anticlines (Alterswil anticline and the "main anticline of the Plateau", plunging towards NE). The southern margin of the Plateau is overthrust by the subalpine Molasse, in which four tectonic wedges can be recognized. The subalpine Flysch forms another overthrust complex resting on the subalpine Molasse. The subalpine Flysch is overlain in turn by the Wild Flysch and the Gurnigel Sandstones of the External Prealps.