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Autor: Klingele, E.E.
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Gravimetry and Aeromagnetics in the Swiss Molasse Basin

By E. E. KLINGELE
Institute of Geodesy, ETH-Hönggerberg, CH-8093 Zürich

For the last twenty years the Institute of Geophysics of the University of Lausanne (IGPL) and the Swiss Geophysical Commission have been involved in the systematic gravity mapping of Switzerland. Almost 80% of the Molasse Basin is now covered with a density of stations ranging between 1 to 3 stations/km^2. The data of the western part of the Molasse Basin have already been published by the IGPL in the form of a gravimetric Atlas. From these data it was possible to identify the presence of a major structural feature situated in the crystalline basement. This feature is interpreted as a system of offset vertical faults situated at depth between 2.5 and 6 km.

Between 1979 and 1981 the Swiss Geophysical Commission conducted an aeromagnetic survey of Switzerland at two different flights levels (5000 m and 1680 m). The lower one covered the Molasse Basin and the Jura Mountains. With the data of this survey, it was possible to produce a map to the depth to magnetic basement. Some parts of the flight lines have also been quantitatively interpreted and the presence of more than one magnetic horizon have been identified.

The crystalline basement of Northern Switzerland

By M. MAZUREK, J. MEYER and T. PETERS
Mineralog.-Petrogr. Institut, Universität Bern, Baltzerstr. 1, CH-3012 Bern

1. General

The crystalline basement of Northern Switzerland is hidden beneath a sedimentary cover of variable thickness, generally on the order of several hundreds of meters. Therefore, our knowledge of the basement is based on a) deep crystalline boreholes, b) analogies to the Black Forest where the basement crops out, and c) remote sensing, mainly reflexion seismic data (Fig. 1).

2. Lithology

The basement consists of Pre-Hercynian gneisses and Hercynian batholiths and dykes to about equal amounts.

The **Pre-Hercynian gneiss series** comprises a Proterozoic metasedimentary sequence that was highly metamorphosed and partially migmatized prior to Hercynian magmatism. Metapelitic sillimanite – cordierite – biotite gneisses and migmatites are interlayered