

What is the Federal Office of Energy doing in the Swiss Molasse Basin?

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(relative to the reference point at Laufenburg) at the rate of about 0.3 mm/a in the Black Forest (Höllental). Between Neustadt and Waldshut there are relative tendencies towards subsidence, with velocities up to 0.3 mm/a. The area Donaueschingen – Tuttlingen – Stockach is characterised by subsidence, with velocities of more than 0.5 mm/a.

Levelling measurements along the Hauenstein Tunnel in the years 1986 and 1988: These measurements indicated uplift velocities of up to 1.5 mm/a in the vicinity of the main overthrust of the Folded Jura. Such high values are otherwise only known from the Alps. Since these high values could not be explained satisfactorily, a new measuring campaign was carried out in 1990. It consisted of (1) repetition of the high-precision levelling measurement and a linear measurement (zero-measurement) in the Tunnel and (2) a new high-precision levelling measurement over the Hauenstein Pass.

To date, results are available only for the high-precision levelling measurement in the Tunnel. The high uplift rates measured in the 86/88 campaign were not confirmed to the extent expected by the 1990 campaign.

GPS network for Northern Switzerland: A GPS (Global Positioning System) network consisting of 25 reference points has been established in the region of the Southern Black Forest, the Folded Jura and the Molasse Basin, in order to study kinematics in more detail. An initial double conducted measurement campaign in autumn 1988 covered the whole network. Distances of 10 km are measured with a precision of 1 to 3 mm. It is planned to carry out follow-up campaigns every four years.

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What is the Federal Office of Energy doing in the Swiss Molasse Basin?

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In the Swiss Molasse Basin, the Federal Office of Energy is looking after the interests of the country in three different fields. It is controlling the work of the Nagra, the cooperative for radioactive waste disposal, it is financially but modestly helping Swisspetrol in its exploration for gas and oil, and it is financially supporting the use of geothermal heat. Perhaps more importantly, it is trying to make sure that information obtained in any one of these programmes is made available to the others.

In all these cases, the motivation behind the activity of the Office of Energy is independent from its geographical location. Chance, or rather geology, has decided of this concentration of activities in the Molasse Basin.

In the case of Nagra, the Molasse is a potential host for radioactive wastes where permeability is particularly low. On the contrary, the hopes of Swisspetrol rest on zones of high permeability and high porosity. The same can be said of exploration for geothermal waters.

The motivation for controlling operations by Nagra results from an obligation made to the Federal Government in a national vote in 1959. Help to Swisspetrol is justified by the desire to decrease our dependence on imported oil and gas, whereas the support for geothermy reflects the need to substitute non-polluting energy sources to hydrocarbons. It happens that the Swiss Molasse Basin is particularly favorable to all three types of activities described above, but when Nagra, Swisspetrol or the geothermicians operate outside of the Molasse Basin, the Federal Office of Energy follows them there too. In short, we go where our customers go!

The northern margin of the Molasse Basin in SW Germany ¹⁾

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Geometry and facies distribution of the northern part of the SW German Molasse Basin reflect changes in tectonic subsidence, sediment supply and sea level (Fig. 3).

The Oligocene "Untere Süßwassermolasse" is mainly represented by flood plain deposits with some lacustrine carbonates in the central part, whereas alluvial fans of the "Ältere Juranagelfluh" are shed along its northern margin.

During the early Miocene, marine highstand deposits of the "Obere Meeresmolasse" encroach on the Swabian Alb. Its coastal deposits are represented by shelly beach rocks (e.g. "Randener Grobkalk") which grade southward into more basinal intertidal and subtidal sand- and siltstones.

A major drop of the sea level causes the incision of the "Graupensandrinne" which in turn is filled with the estuarine "Grimmelfinger Schichten" and the brackish to lacustrine "Kirchberger Schichten".

¹⁾ Abstract to Poster