EU-Projekt GeORG:
Geopotenziale des tieferen Untergrundes im Oberrheingraben /
Potentiel géologique profond du Fossé rhénan supérieur

Interreg IV
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Towards a harmonized lithostratigraphic nomenclature for the Cenozoic of the Upper Rhine Graben of Germany, France and Switzerland

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The Upper Rhine Graben (URG) is a Cenozoic rift and wrench basin about 300 km long and 35 to 50 km wide. Its Eocene to Early Miocene sedimentary fill is up to 4 km thick and mainly covered by Pliocene to Quaternary terrigeneous clastics. Since exploration of the URG geology started early in the 19th century, a wealth of stratigraphic information was published in numerous scientific articles and confidential reports.

Most Tertiary units traditionally were based on biostratigraphy and on correlation to the strata of the Mainz Basin. However, there is a lack of good index fossils over most of the graben fill and the original correlations with the Mainz Basin have proven to be inconsistent over the last 10 decades of deep drilling. Working for different oil companies and in different countries, not all researchers used the same characteristics to distinguish between the units. Additional complication arose from the redefinition of some regional chronostratigraphic stages referring to GSSP's – e.g., most of the URG "Lower Miocene" is now Late Oligocene in age (DSK 2011). All this led to confusion and uncertainties in correlation.

Since 2008, the Project Team of the EU Interreg-Project GeORG developed a revised lithostratigraphic nomenclature especially for the Tertiary sediments to provide a harmonized transnational database on the deep subsurface of the URG. This database is compiled in a 3D digital geological model shared by the geological surveys of Baden-Wuerttemberg (LGRB) and Rheinland-Pfalz (LGB) in Germany, the Geological Survey of France (BRGM), and representatives of the University of Basle/Switzerland (AUG). The model bases on data from more than 2000 boreholes and more than 5000 km of seismic lines to allow statements about deep subsurface geopotentials (Anders et al. 2012; www.geopotenziale.eu).

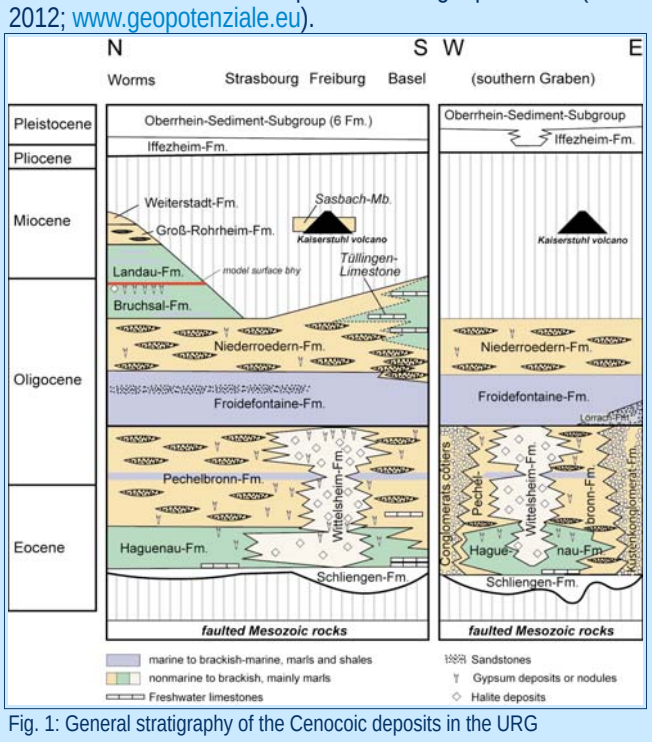


Fig. 1: General stratigraphy of the Cenocoic deposits in the URG

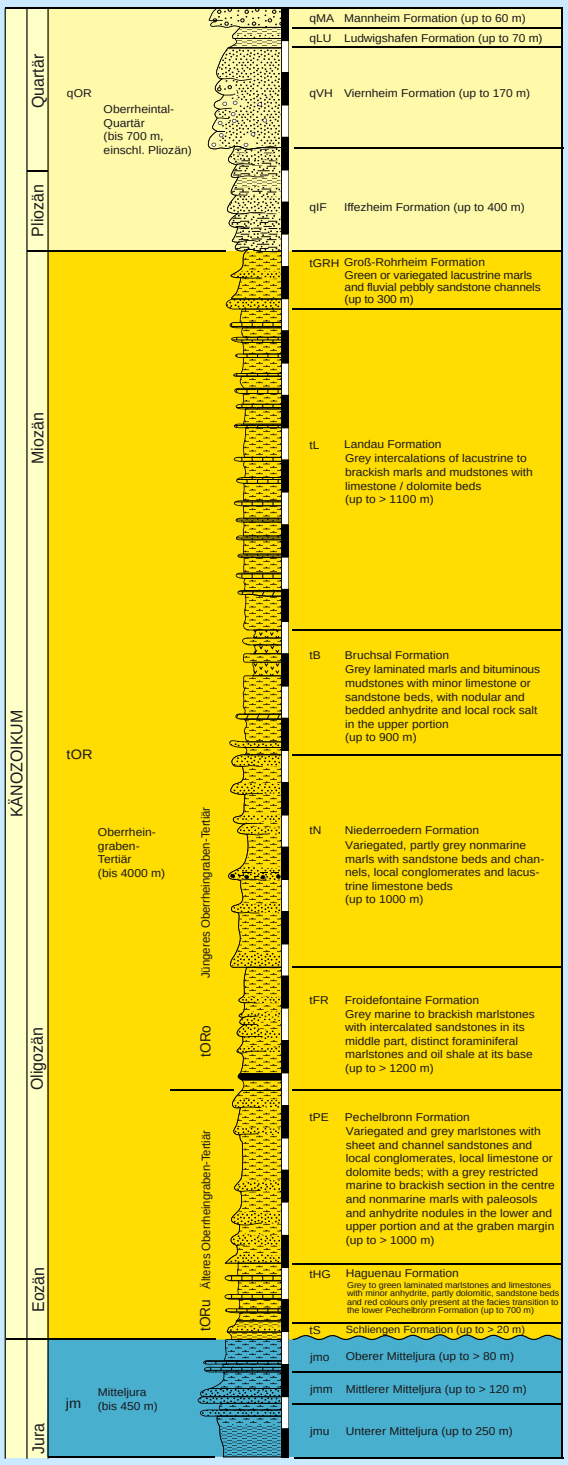


Fig. 2 Generalized standard section for the Central/Northern URG

The revised lithostratigraphic units of the basin facies group into an Eocene to earliest Oligocene syn-rift sequence (Schliengen, Wittelsheim, Haguenau, and Pechelbronn formations), and an Oligocene to Early Miocene wrench-rift sequence (Froidefontaine, Niederroedern, Bruchsal, Landau, and Groß-Rohrheim formations) covered by Pliocene to Quaternary unconsolidated deposits.

Formation boundaries were defined at major facies changes that can be seen in well logs, commonly referring to one of the differing definitions previously in use. Most traditional unit names, however, were either homonyms to differing and older formations (mainly of the Mainz Basin) or apply to only part of the Formations (e. g., the Lymnaea Marls in the Haguenau Formation). Thus we propose several new names for the lithostratigraphic units, some of them already suggested by Grimm (2005). To improve the consistency of the stratigraphic scheme with neighbouring regions (Paleozoic-Mesozoic terrains of Germany, France an Switzerland, Cenozoic Molasse Basin), the rank of the Eocene-to-Miocene Basin fill has been set at group level, whereas those units mappable in subsurface were defined as Formations.

LEGEND

- Sand and gravel (unconsolidated)
- Conglomerate
- Sandstone
- Interbedded sandstone-mudstone
- Mudstone
- Marl / Marlstone
- Limestone
- Dolomite
- Anhydrite / Gypsum
- Rock salt (halite, sylvinite)

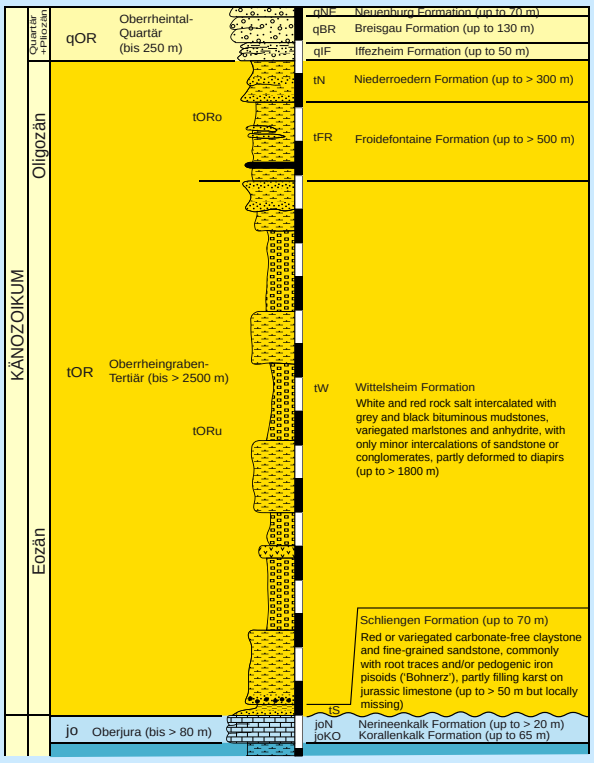
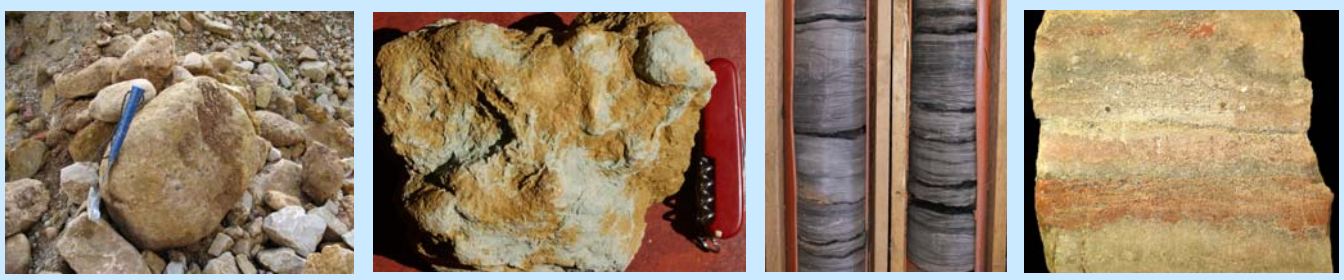


Fig. 3 Generalized standard section for the Southern URG



Marginal boulder conglomerates (Küstenkonglomerat Formation / Conglomerats côtiers).

Paleosols in nonmarine mudstones / sandstones (mainly Pechelbronn, Wittelsheim, Niederroedern, and Groß-Rohrheim Formations).

Laminated mudstones with intercalated sandstones / carbonates (nonmarine to brackish, partly marine: present in most formations).

Rock salt at depocenters (Wittelsheim und Bruchsal formations).

Fig. 4 Characteristic lithofacies types of the URG Paleogene

For the first time, the Cenozoic units of the URG are defined on a strictly lithostratigraphic basis, mainly using facies characteristics, geophysical logs and seismic properties. This has proved to be the only practical way to consistently use the majority of the data at hand, since for most of the deep drillings the documented palaeontologic information is insufficient for eco- or biostratigraphic interpretation.

References

Anders et al. (2012): Geopotentials of the Upper Rhine Graben - results of the GeORG project. – Talk, GeoHannover 2012.

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Der Oberrhein wächst zusammen, mit jedem Projekt
Dépasser les frontières : projet après projet

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