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The Heidelberg Basin Drilling Project
– Characteristics of an outstanding archive of Quaternary sediments –

SCIENTIFIC DRILLING HEIDELBERG BASIN

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SCIENTIFIC DRILLING HEIDELBERG BASIN

Aim

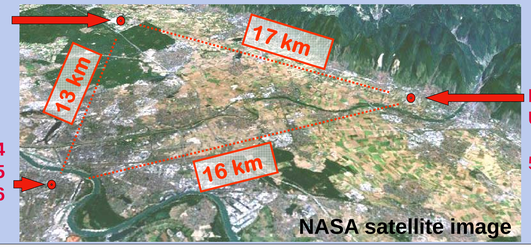
The Heidelberg Basin hosts one of the thickest and most complete successions of Plio-/ Pleistocene sediments in continental Mid-Europe, as revealed by new cored boreholes at three different locations. The main goal of this drilling project is to establish a reference profile for Quaternary stratigraphy for the region north of the Alps. In this context special emphasize is on the definition of Base Quaternary as revealed by different datasets. During the last decades a petrographical marker has been used to identify 'Base Quaternary' in the context of Quaternary research in the Upper Rhine Graben, e.g. the first deposition of alpine sediments imaged by a significant change in the heavy mineral spectrum – since Late Pliocene / Early Pleistocene, the River Rhine has acted as the only drainage system that connected the Alps with the North Sea. First data from the new boreholes suggests that this definition must be re-evaluated.

Location

Viernheim, 350 m

Details: Poster A72

Ludwigshafen P34
Ludwigshafen P35
Ludwigshafen P36
each 300 m



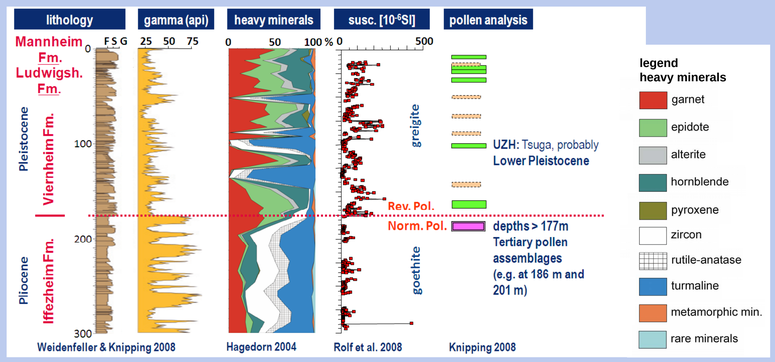
Heidelberg UniNord
500 m

Preliminary Conclusions

- The Quaternary sediment succession in the Heidelberg Basin is complete with respect to climate stratigraphy. This is a unique situation in western Europe.
- Lithostratigraphic changes do not correlate with biostratigraphy. Hence, sedimentation is controlled by tectonics and climate.
- The transition Pliocene / Pleistocene is imaged in all boreholes differently. The use of the heavy mineral signal as single proxy must be questioned.
- The lithostratigraphic terms used for this poster were established on the new cored boreholes. They can replace the actual, but regionally varying nomenclature, that is still in use for the Quaternary of the northern Upper Rhine Graben.

- To derive a well-founded reference profile of Quaternary additional data is necessary!

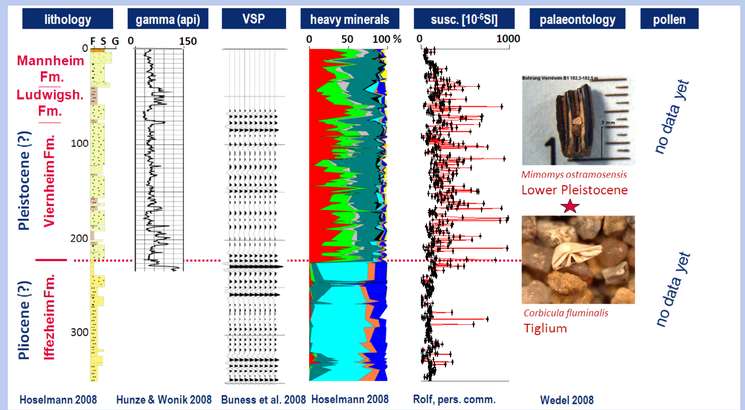
Ludwigshafen P34



'Base Quaternary'
interpreted at 177 m depth
- provenance boundary indicated by the heavy mineral spectrum
- pollen assemblages
- change in magnetomineralogy
- normal vs. inverse remanent magnetization (Gauss - Matuyama boundary?)
- significant change in susceptibility (decrease > 177 m)

Classical Definition of 'Base Quaternary' in the Upper Rhine Graben
- main proxy: heavy minerals -

Viernheim

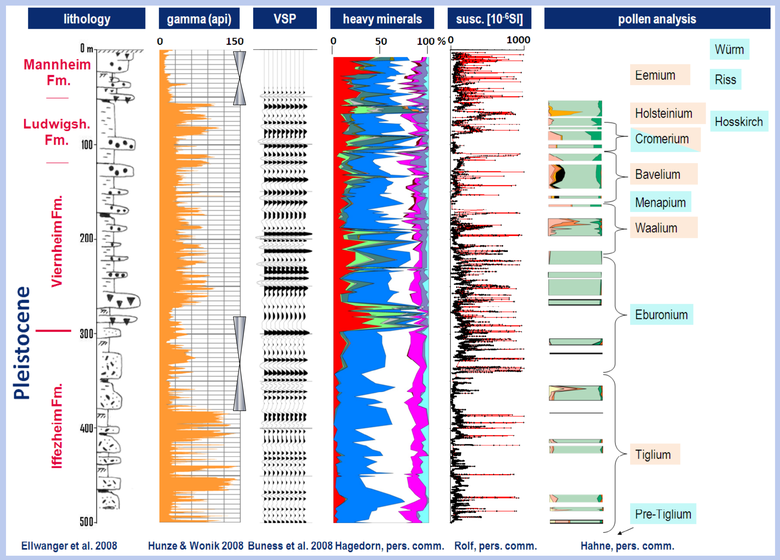


legend heavy minerals
garnet, epidote, alterite, hornblende, pyroxene, zircon, TiO2-group, turmaline, staurolite, other heavy minerals

'Base Quaternary'
interpreted at 225 m depth, similarities to Ludwigshafen P34
- provenance boundary indicated by the heavy mineral spectrum
- change in susceptibility (decrease for Pliocene sediments)

- neither bio- nor magnetostratigraphic data yet

Heidelberg UniNord



fines, organic / clay / silt
sand
gravel
coarse debris
diamicton

data affected by casing

garnet, epidote, alterite, hornblende, pyroxene, metamorphic, turmaline, zircon, rutile, anatase, apatite, rare min.

Tertiary elements, warm loving trees (dry soils), warm loving trees (wet soils), Abies, Tsuga, Conifers, Herbs, Ericales

'Base Quaternary'
not reached, most probably at depths greater 500 m
- pollen assemblage

Provenance Boundary
found at 299 m depth
- heavy mineral spectrum
- change in susceptibility?

Classical Definition of 'Base Quaternary' in the Upper Rhine Graben seems to fail

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