

# Late Weichselian fluvial evolution of the Niers-Rhine: a multiple dating strategy



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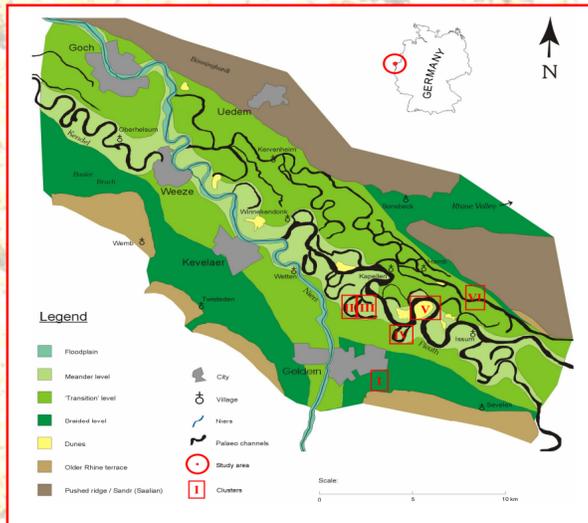
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## Aim & approach

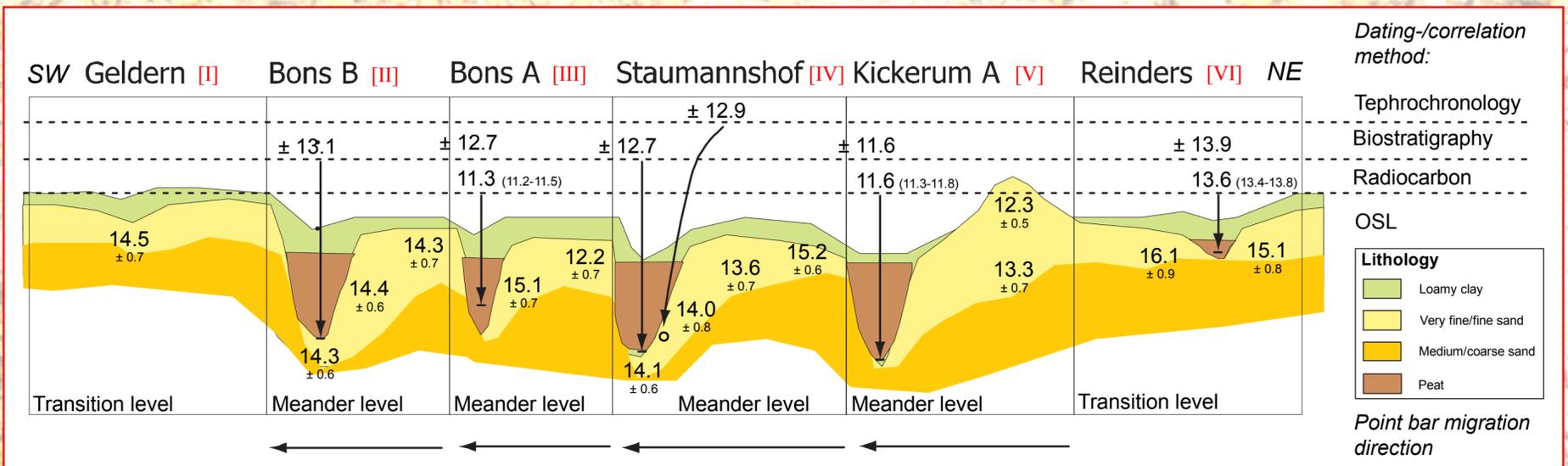
The aim of this research is to reconstruct the fluvial development of the Niers-Rhine (Germany) during the Late Weichselian (ca. 16-12 ka BP) in order to better understand fluvial response to climate change. Very well-preserved point bar series and meander cut-offs are directly found at the present-day surface. This makes it an excellent research location to test different dating methods and to compare results.



Niers-Rhine valley research locations.

## Multiple dating strategy

We used a combination of dating methods to investigate their applicability and to obtain insight in the chronology of the site. Point bar deposits and clastic channel infills were optically dated. Organic channel infills were biostratigraphically analysed and correlated with radiocarbon-dated sequences in the direct vicinity. Presence of Laacher See Tephra (12.9 ka) provides additional chronologic control.

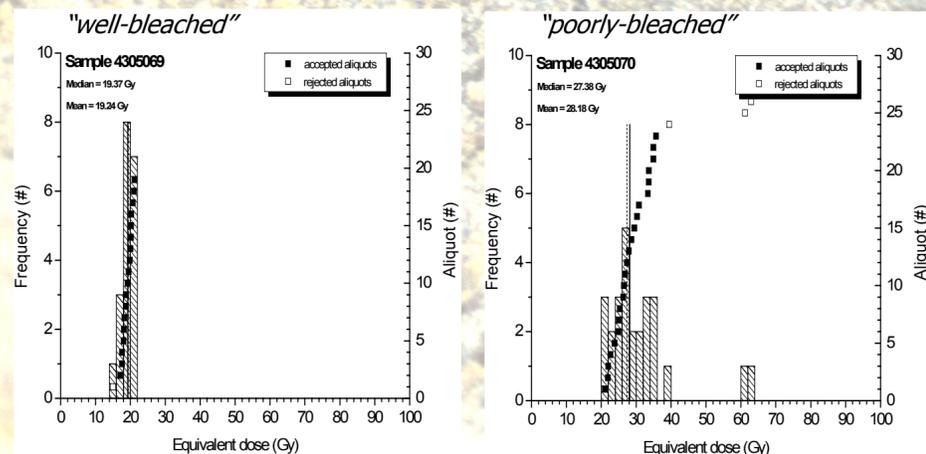


Schematic cross-section of Niers-Rhine valley. Radiocarbon ages are cal ka BP with 2σ range limits (INTCAL04).

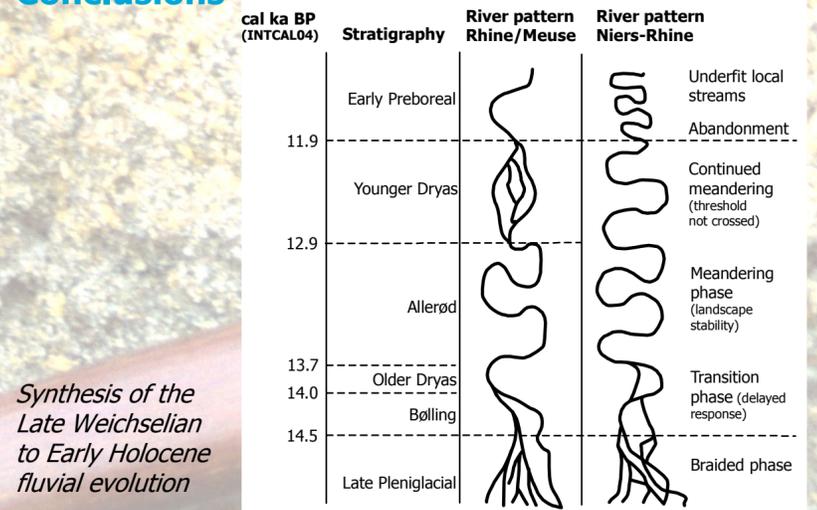
## Optical dating

A Single-Aliquot-Regenerative-dose (SAR) procedure is applied to sand-sized quartz. The use of the post-IR blue OSL signal was necessary to eliminate contributions from contaminating feldspar grains, even after the second HF treatment of the sediment.

To avoid bias in results due to the presence of grains for which the quartz OSL signal was not completely reset upon deposition, single-aliquot equivalent doses, separated more than 2 SD from the sample mean, were iteratively removed from the distribution. This led to the removal of one or more data points for 90% of the samples.



## Conclusions



Synthesis of the Late Weichselian to Early Holocene fluvial evolution

OSL ages of point bar sediments are in general agreement with radiocarbon and biostratigraphical results from channel infills.

The multiple dating strategy has shown that OSL can be a powerful tool in dating sandy fluvial systems, although single-grain dating may be necessary to improve the ages of heterogeneously bleached sediments.

Correlation methods can provide valuable additional time-control.



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