# Mesolithic Landscape and Vegetation Development in the Present Day IJssel Valley, The Netherlands

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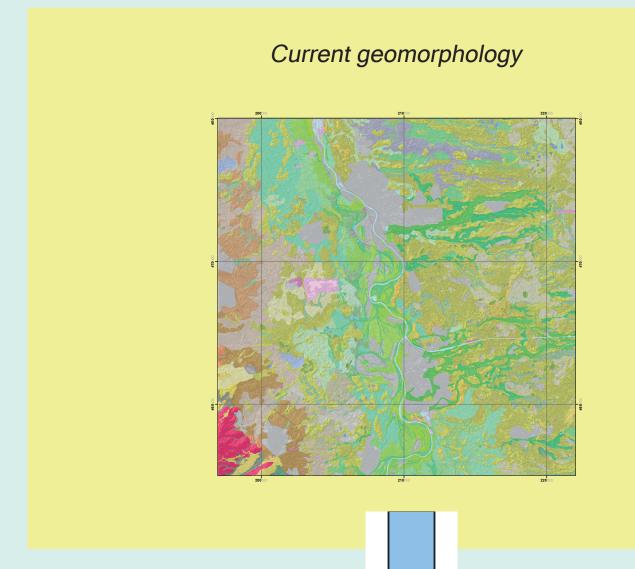
### Introduction

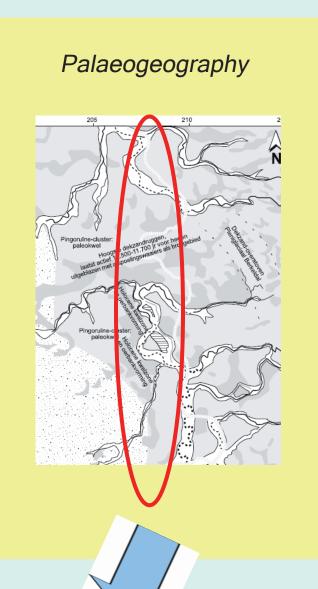
During the Mesolithic (10-6 <sup>14</sup>C ka BP) hunter-gatherers lived in the region of Deventer-Zutphen. Major palaeoenvironmental development occurred, involving groundwater level drop and vegetation succession. The question is whether these changes affected behavior and living conditions of the Mesolithic people. This poster offers a palaeo-hydrological and palaeo-vegetational reconstruction. Several scenarios are outlined for the palaeo-hydrological development of the region. In most of the reconstructed scenarios, succession caused the vegetation to become very dense during the Mesolithic, causing the groundwater level to drop. These factors have implications for the configuration of food resources and

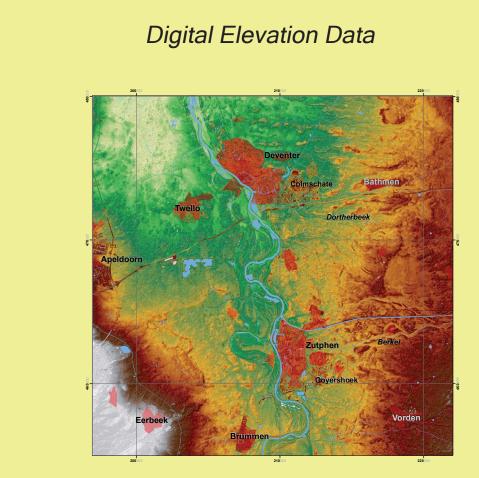
accessibility of the area. It is possible that the amount of easily accessible resources decreased and the landscape became more challenging to cross for Mesolithic hunter-gatherers. The preferred scenario, together with the other scenarios, will serve as input for a behavioural model that can improve understandings of the relationship between humans and the palaeolandscape.

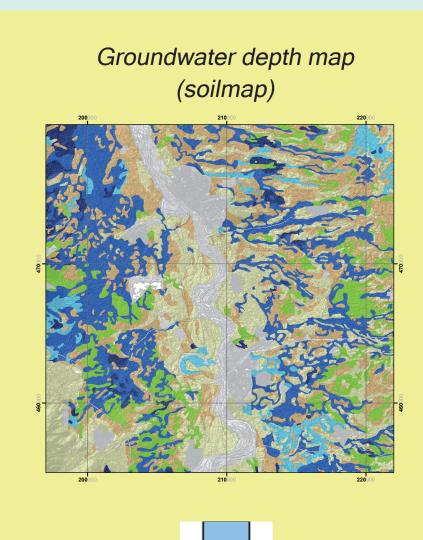


#### Input datasets

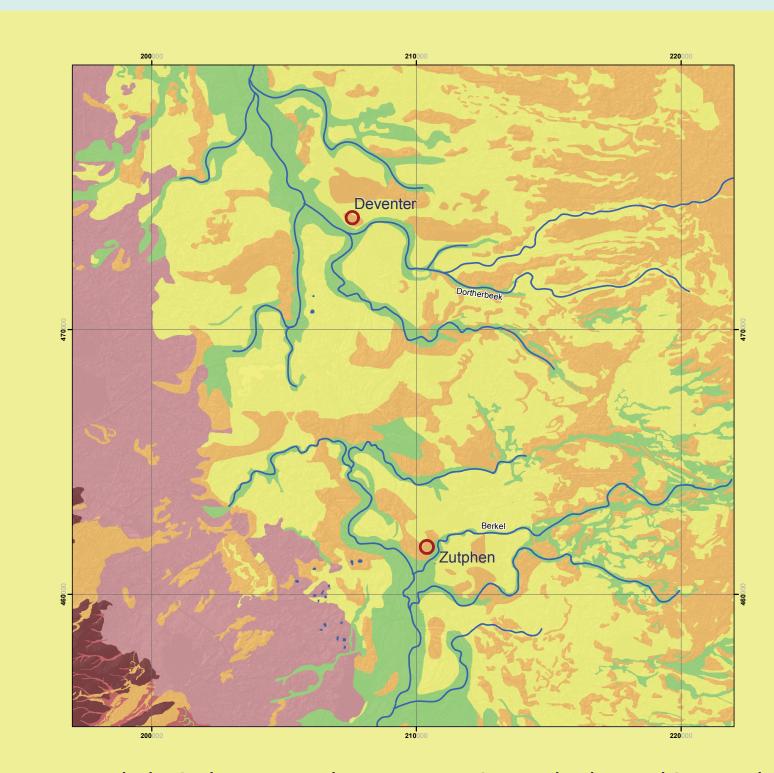




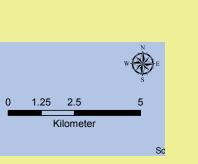




## Reconstructing geomorphology

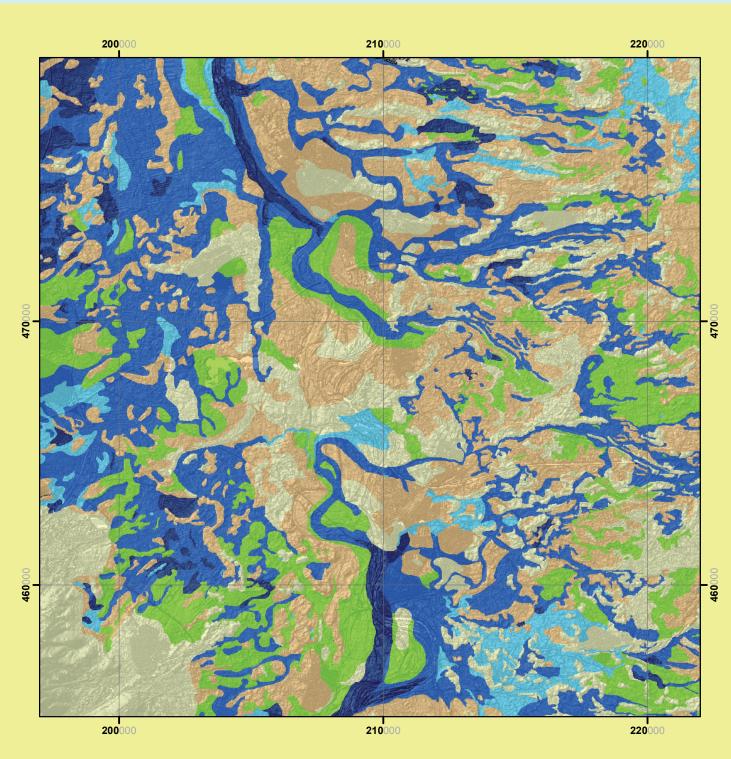






From the geomorphological map, a paleoreconstruction and a laser altimetry data set a palaeo geomorphological reconstruction was made that served as input for the hydrological reconstruction. It was assumed that the current geomorphology is comparable with the Mesolithic geomorphology, except for the middle part of the region that has been reworked by the river IJssel since the Middle ages (red circle in paleo geographical map). In this palaeo geomorphological reconstruction a distinction was made between higher and lower areas that has implications for hydrology, vegetation and land use strategies.

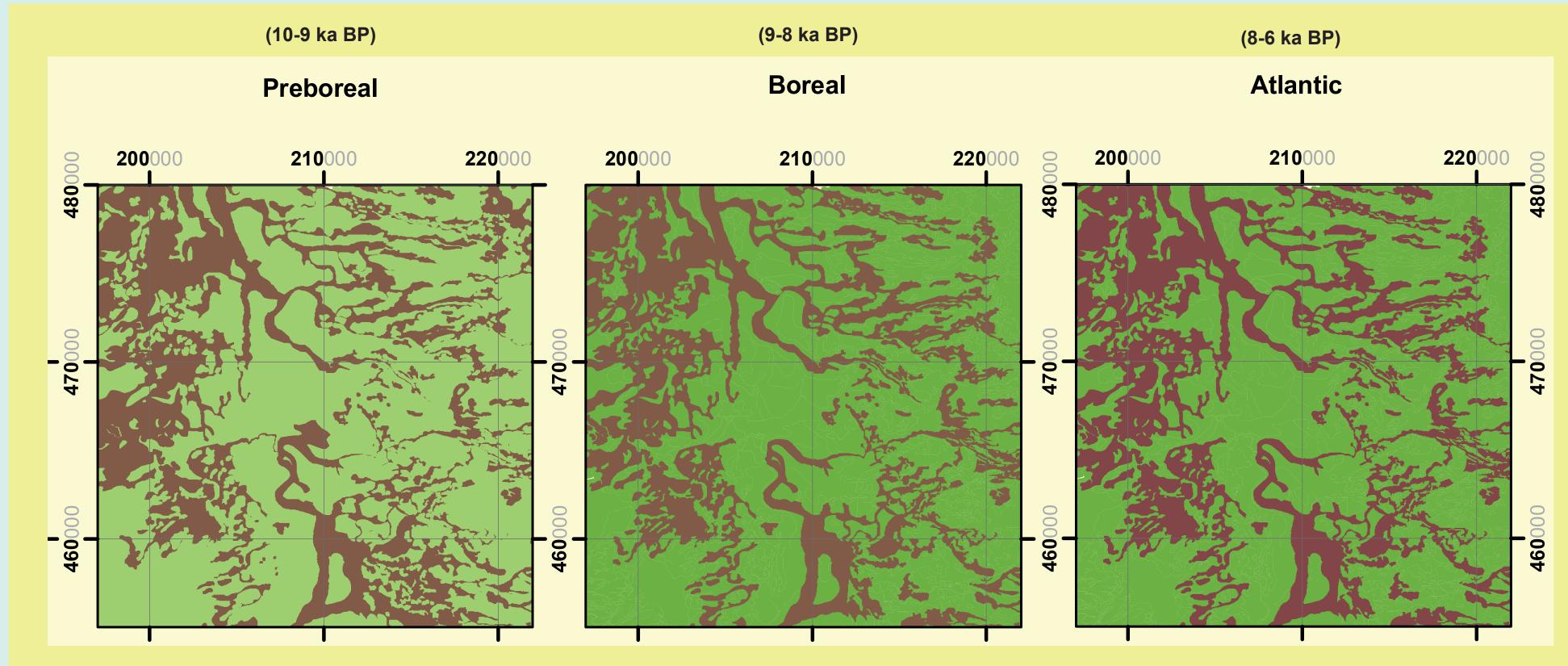
## Reconstructing hydrology

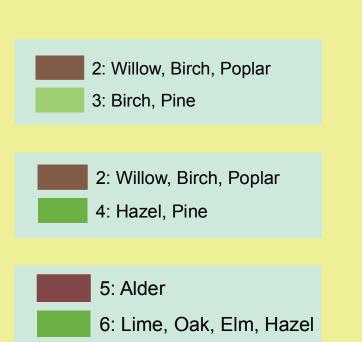




The palaeo geomorphological map and hydrological classes from the soilmap were used to reconstruct five relative groundwater classes ranging from very dry (7) to very wet (2). For the central part of the area additional assumptions had to be made based on the geomorphological reconstruction. The ice pushed ridge in the southwestern part of the area and several cover sand ridges are dry, brook valleys were reconstructed wet. From this map several paleohydrological maps with two classes (only wet and dry) were constructed.

## Reconstructing vegetation assemblages





From compiled pollen diagrams for the Netherlands a diagram was made with wet and dry vegetation assemblages (below). The vegetation assemblages per time slices were subsequently projected on the palaeo-hydrological maps. This yields maps per time slice with a dry and a wet vegetation assemblage. During the Mesolithic the vegetation probably became somewhat denser causing more evaporation and a drier landscape. For the vegetation development in time both a wet and a dry scenario are plotted on this poster indicating a bandwidth of uncertainty for the reconstruction.

|            | Before 10 ka | 10-9 ka        | 9-8 ka         | 8-7 ka     | 7-6 ka     |
|------------|--------------|----------------|----------------|------------|------------|
| Vegetation | Herbs        | Birch, Pine    | Hazel, Pine    | Lime, Oak, | Lime, Oak, |
| (dry)      |              |                |                | Elm, Hazel | Elm, Hazel |
| Vegetation | Herbs        | Willow, Birch, | Willow, Birch, | Alder      | Alder      |
| (wet)      |              | Poplar         | Poplar         |            |            |

#### Conclusions and outlook

- In order to reconstruct the vegetation assemblages in time slices of 1000 year, succession (deduced from literature and pollen studies) were successfully combined with reconstructed groundwater maps.
- The wet/dry distribution as limiting factor for vegetation assemblage involves many uncertainties and assumptions. The dry sub-scenario of the wet Atlantic scenario is the preferred scenario, although other scenarios cannot really be ruled out with the currently available data.
  During the Mesolithic the vegetation probably became denser and therefore darker on the ground. The dry areas were easy to cross, but finding food resources (game, fish, edible plants) became more difficult due to the dense canopy. This may have led to a decrease in population density in this area during the Boreal and especially during the Atlantic.
- The wet vegetation areas occurred as elongated barriers in the landscape. These regions were probably difficult to cross, especially in a N-S direction. Probably, when the landscape became wetter and the vegetation denser during the Atlantic, the region became even more unattractive to live in and more challenging to cross.
- Current research is focusing on the development of hunter-gatherer land use strategy models to investigate the implications of the hydrology and vegetation distribution on human behavioral decision-making and archaeological preservation (dissertation research of Marieka Brouwer).

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