Younger Dryas river dunes, a buried Allerød peat layer and former lakes along the Brabantse Wal, southern Netherlands

Marjan E. Kloos[1], Wim Z. Hoek[1] & Cornelis Kasse[2]

[1] Department of Physical Geography, Faculty of Geosciences, Utrecht University
[2] Climate Change & Landscape Dynamics, Faculty of Earth & Life Sciences, VU University Amsterdam

Introduction

The Younger Dryas period is the last cold phase of the Weichselian glacial. Because of the vegetation decline and changes in river flood discharge many rivers in NW Europe changed their channel pattern from meandering to braiding and as a consequence sand was blown from the braid plain and accumulated as source-bordering dunes (river dunes) in adjacent areas.

Detailed coring in the area between Woensdrecht and Ossendrecht revealed a clear pattern in the top of the Pleistocene sandy deposits (figure 1). Two west-east cross-sections show the presence of potential river dunes from the former River Scheldt (figure 2). A heavily compacted peat layer buried by a 5m-thick sand layer was sampled for palynology and ^{14}C-dating (figure 3). Between the dunes and the escarpment calcareous lake deposits were found, which were fed by seepage.

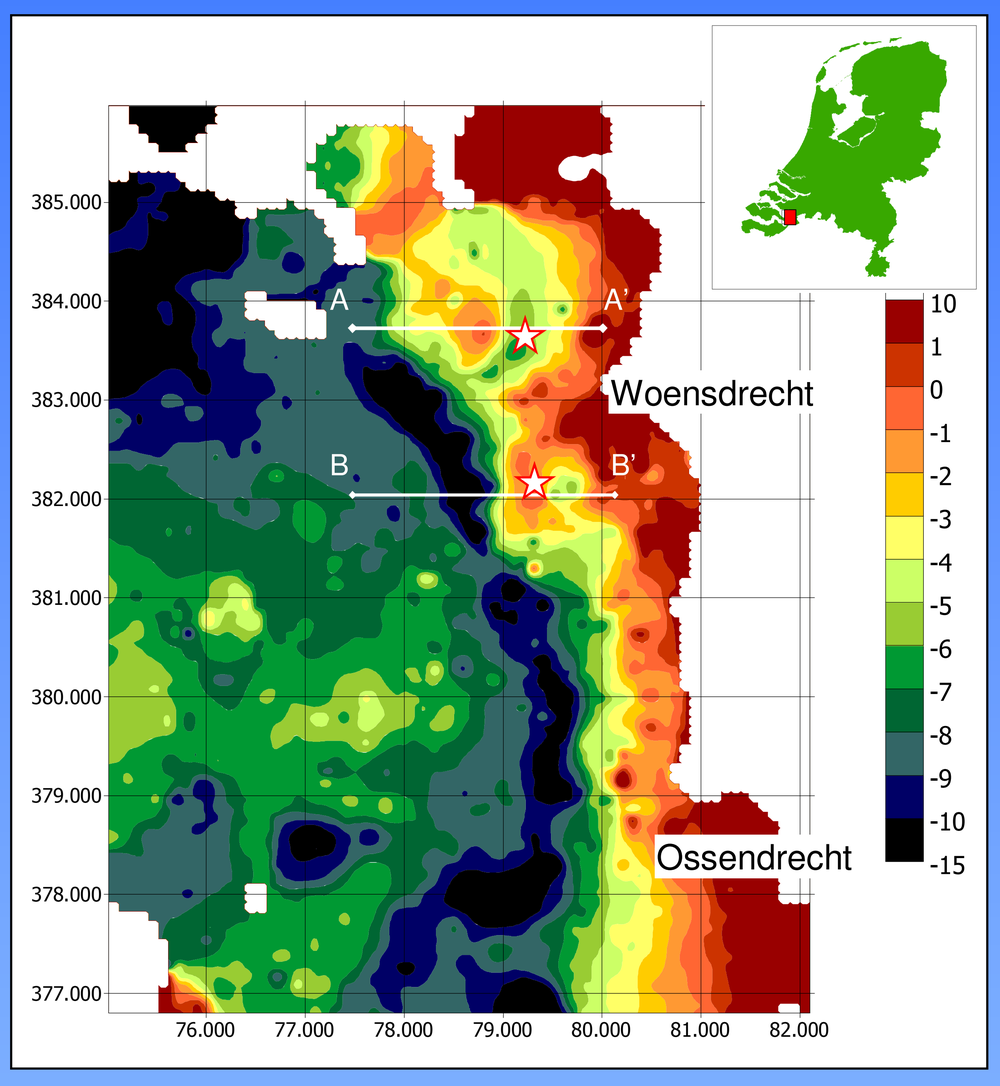

Figure 1: Top of the Pleistocene sand relative to NAP, with two cross-sections, and locations of ^{14}C dates.

Cross-sections

The top of the Pleistocene sand reveals a clear channel pattern and potential river dunes east of the channel near Woensdrecht (figure 1). Two cross sections over the potential river dunes were constructed showing the morphology of the Pleistocene surface (figure 2). In the cross-sections, river dunes, Holocene marine/estuarine peat and clay deposits, and lake deposits are indicated. A date form the base of the peat layer beneath the sand yields 11,940 ± 60 BP while the basal fill of the northern lake has been dated earlier by Kiden and Vos (1997) to 9610 ± 60 BP.
The investigated buried peat layer with an Allerød age, and the basal Preboreal lake date, therefore, frames the river dune deposits to the Younger Dryas.

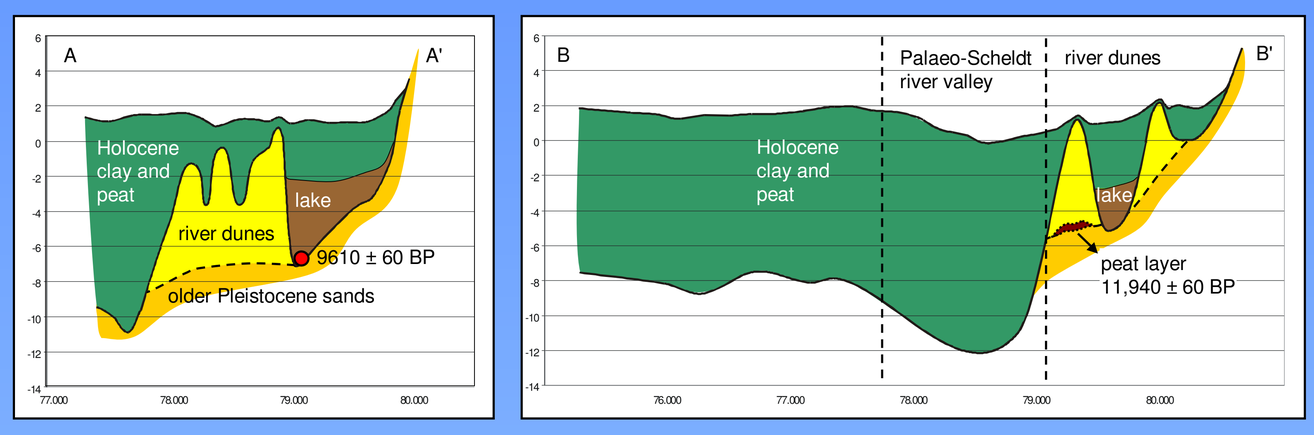

Figure 2: Cross-sections over the Palaeo-Scheldt valley, river dunes, lake basins, and locations of ^{14}C dates.

Pollen diagram

The palynological analysis of this peat shows a clear Lateglacial vegetation development characterised by high values of *Betula* and *Pinus* during the Allerød (zone 2a & 2b, figure 3). A ^{14}C AMS-date from the base of the peat yielded 11,940 ± 60 BP. For the top of the peat, which shows the onset of the Younger Dryas (zone 3) and the influx of aeolian sand, no terrestrial macrofossils for AMS-dating could be selected.

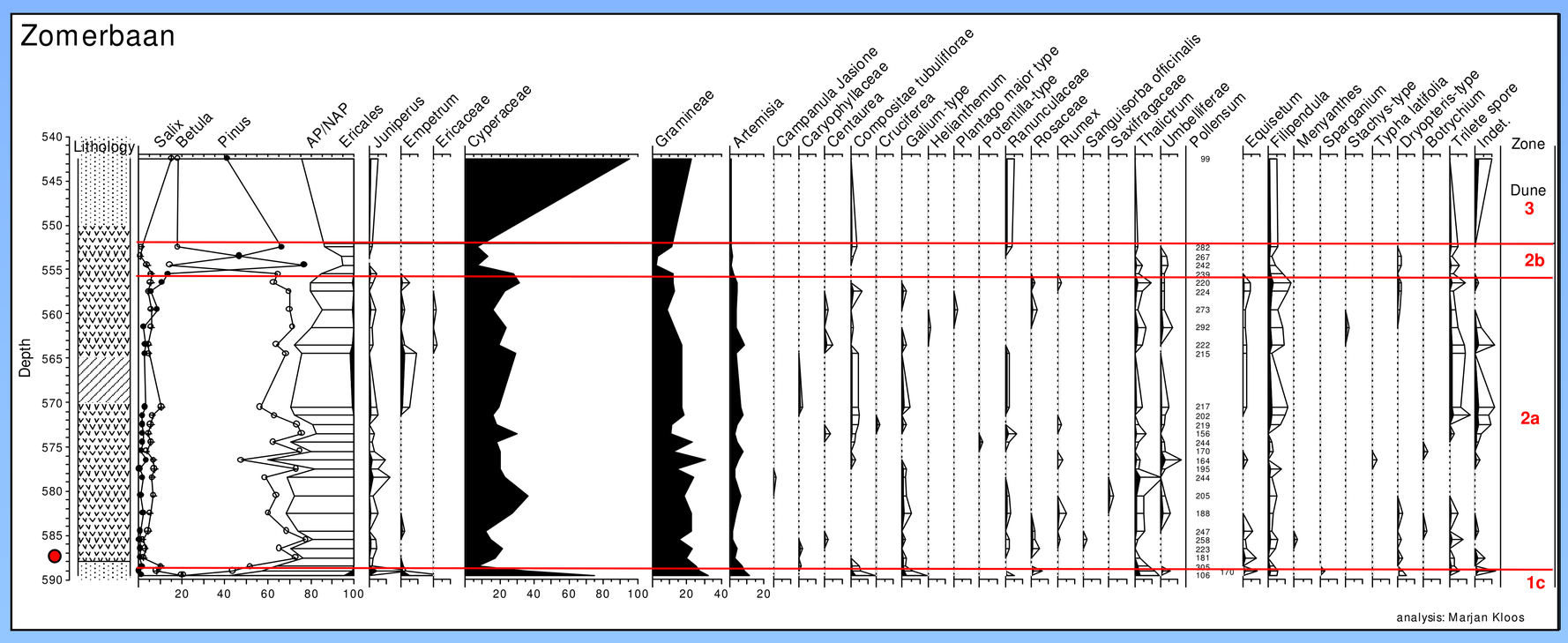

Figure 3: Pollen diagram of the peat layer beneath the sand dune showing the Lateglacial vegetation development near Woensdrecht and the position of the AMS date of 11,940 ± 60.

Conclusions

This study shows that from the onset of the Allerød, peat has been formed along the Palaeo-Scheldt, probably as a result of seepage from the Brabantse Wal.

The sand body covering the peat is most likely a river dune blown out from the river Scheldt and dune formation occurred during the Younger Dryas stadial.

In between these river dunes and the Brabantse Wal escarpment, groundwater-fed lakes formed, which were completely filled during the Holocene.