

# Welcome to the Netherlands

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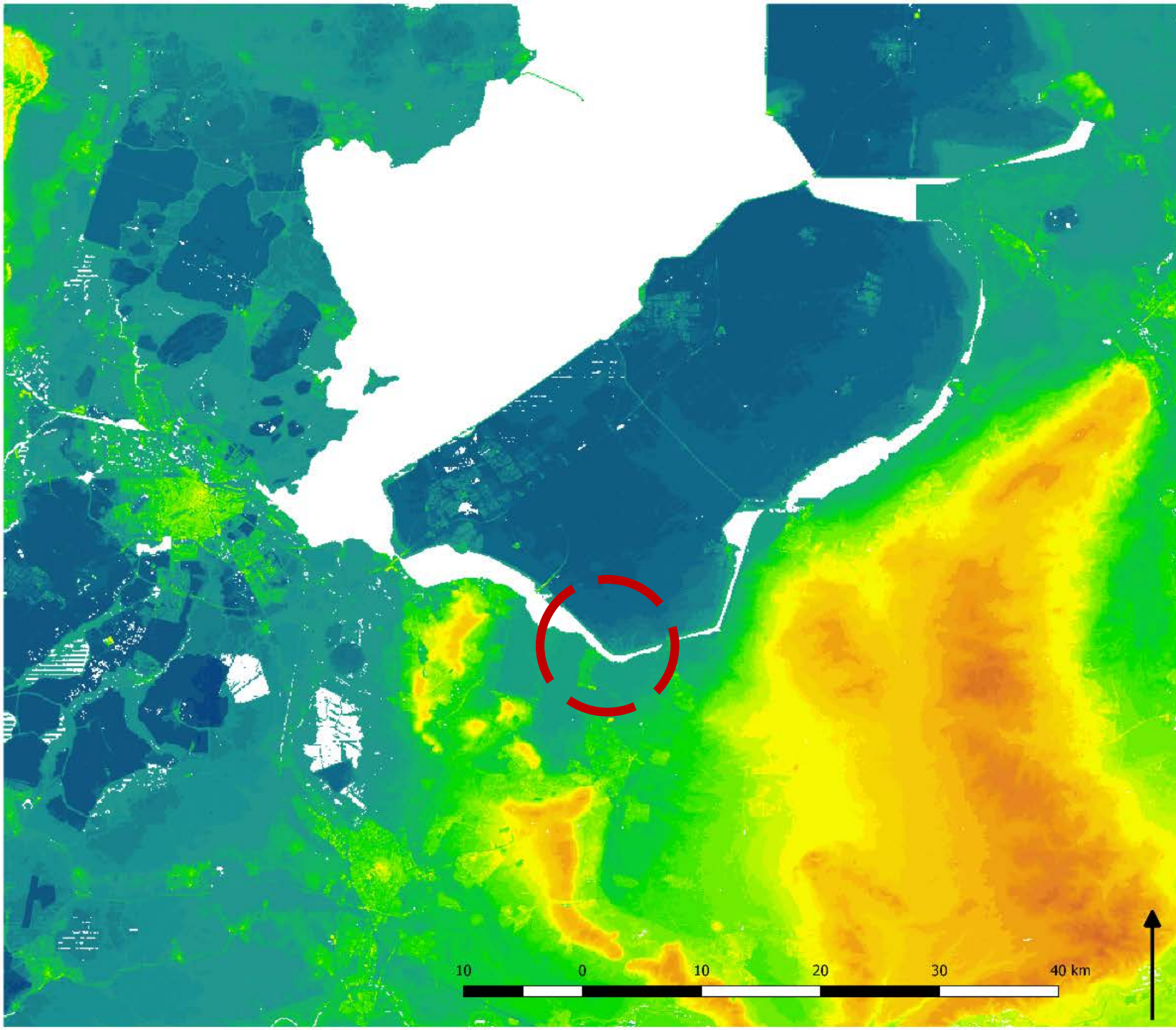
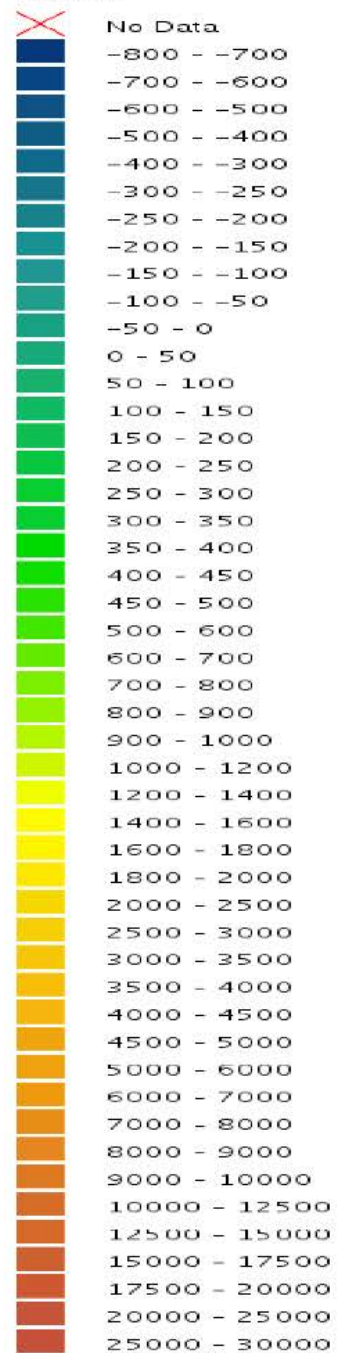






# Legend

Height (cm)





Rhine

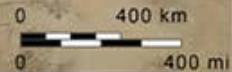
Meuse

North Sea

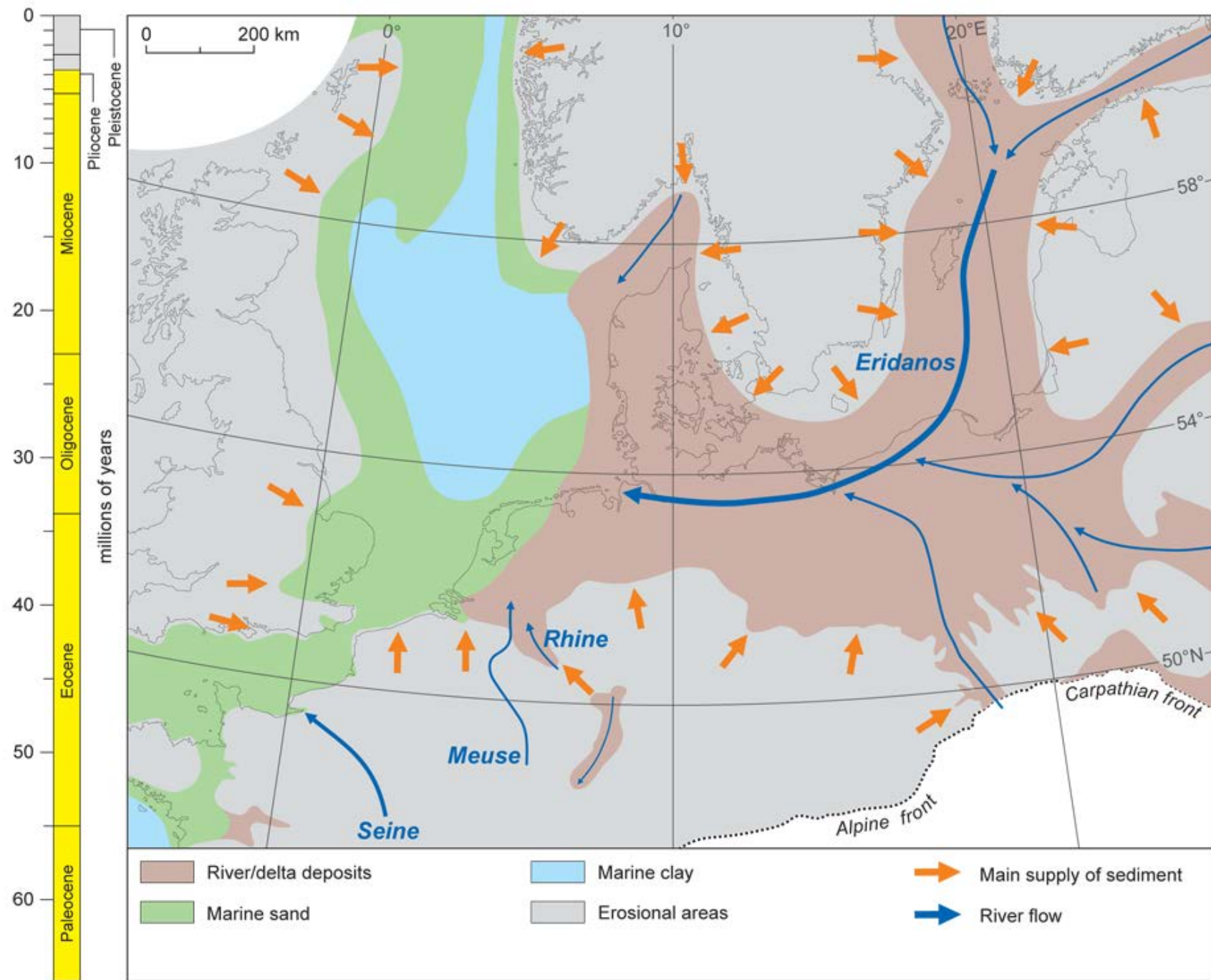


25 Ma

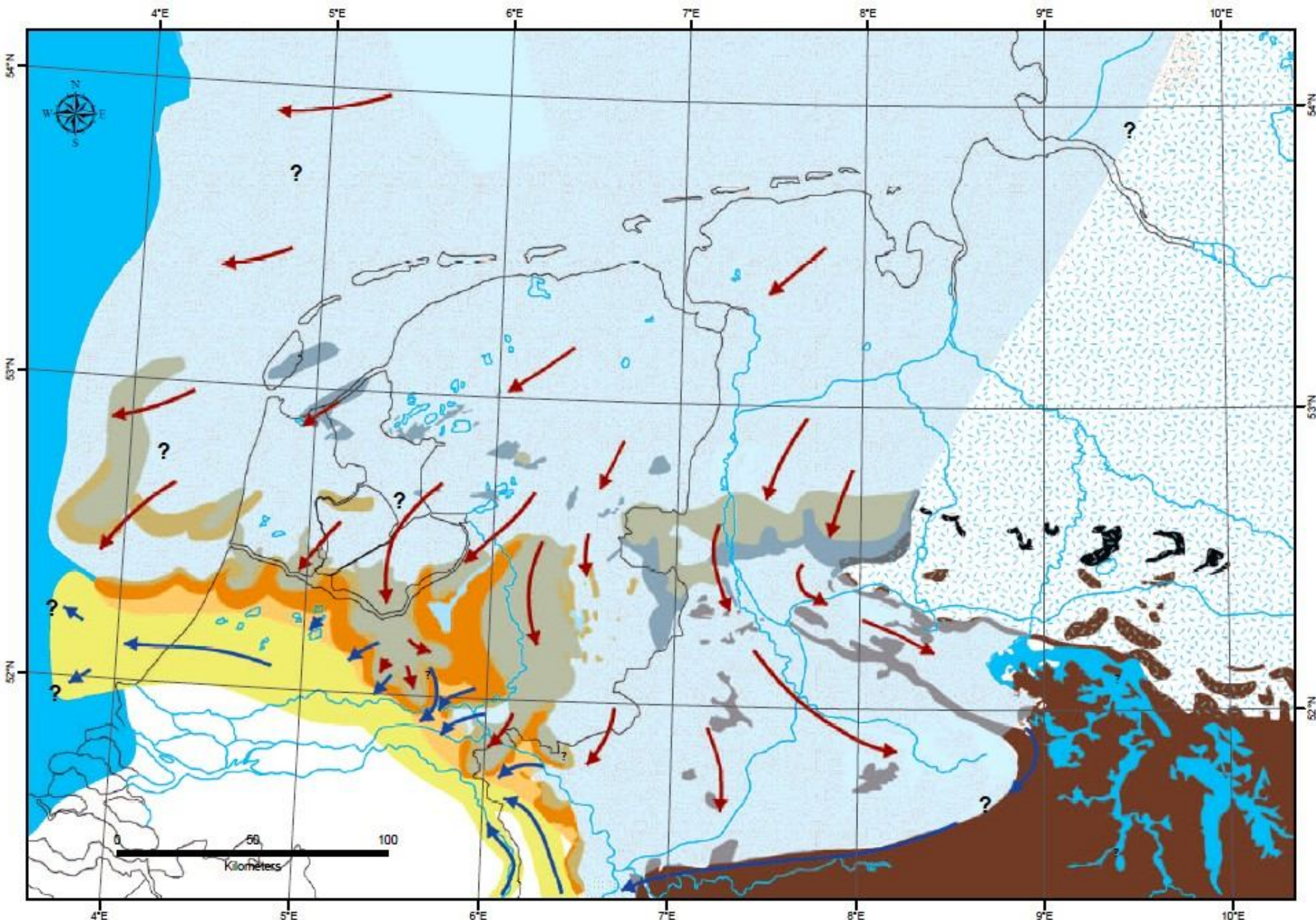
Oligocene ca. 25 Ma ©2012 Colorado Plateau Geosystems



# Early Pliocene (Zanclean)

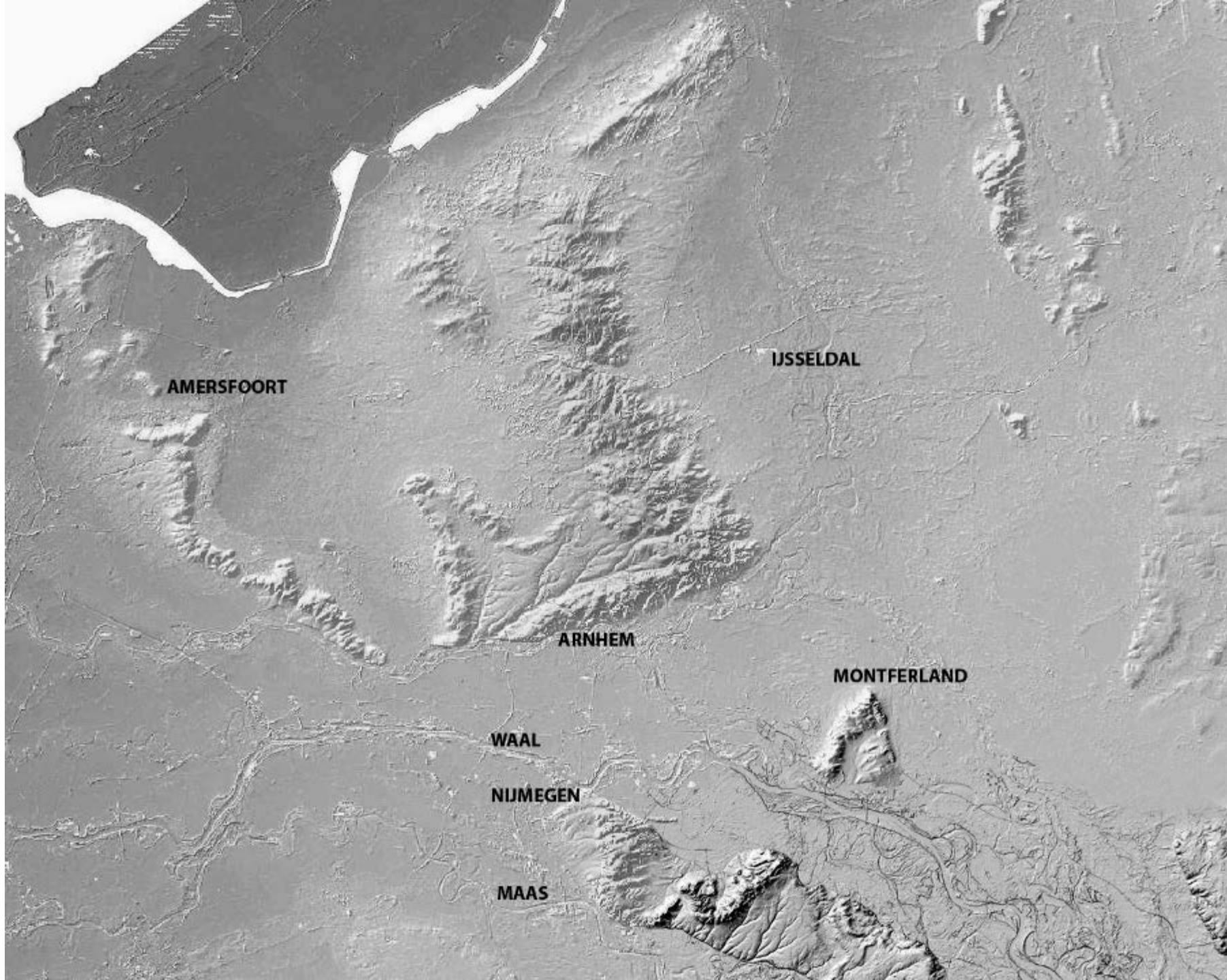


4 Ma



200 Ka





AMERSFOORT

IJSSELDAL

ARNHEM

MONTFERLAND

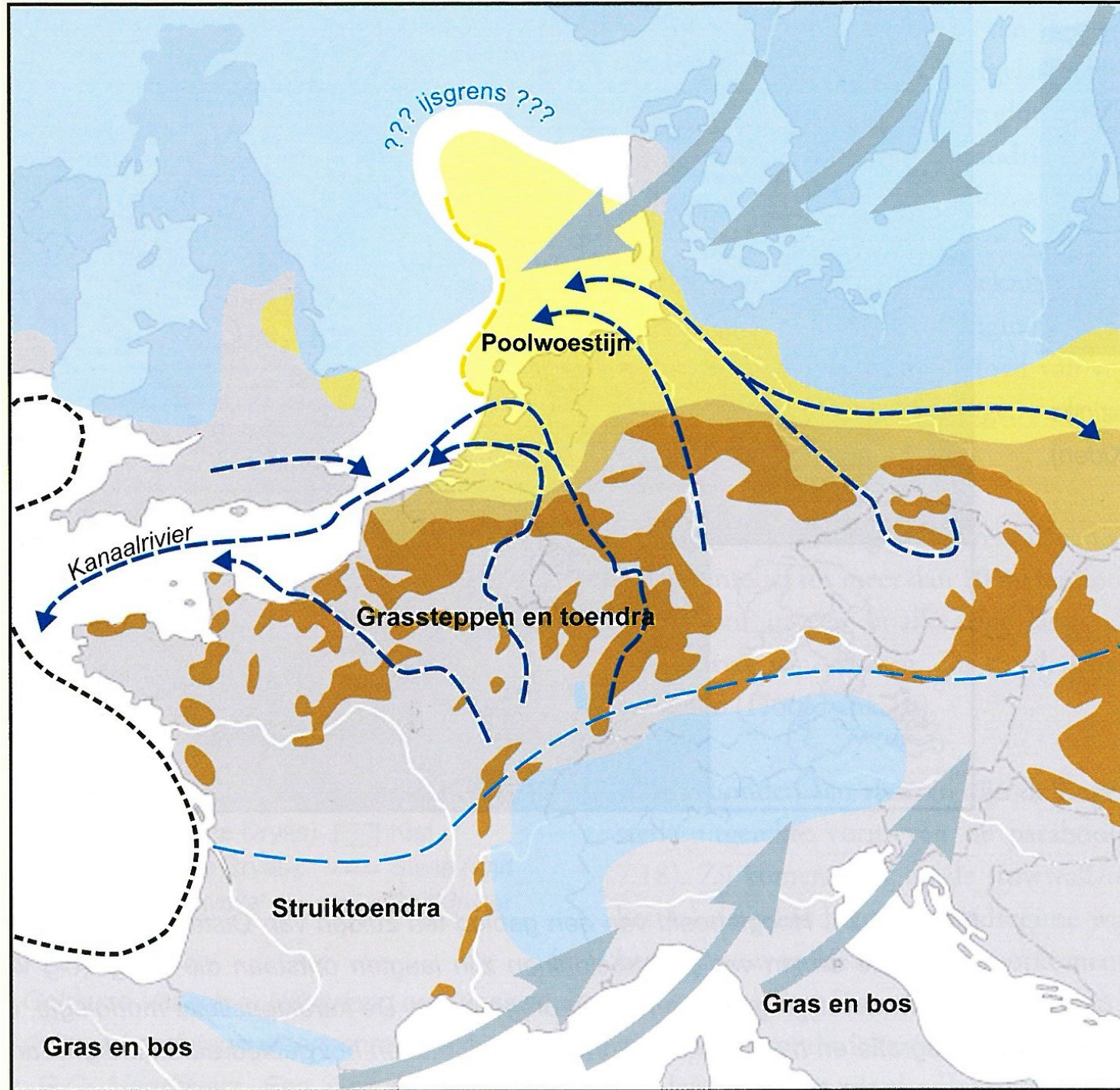
WAAL

NIJMEGEN

MAAS

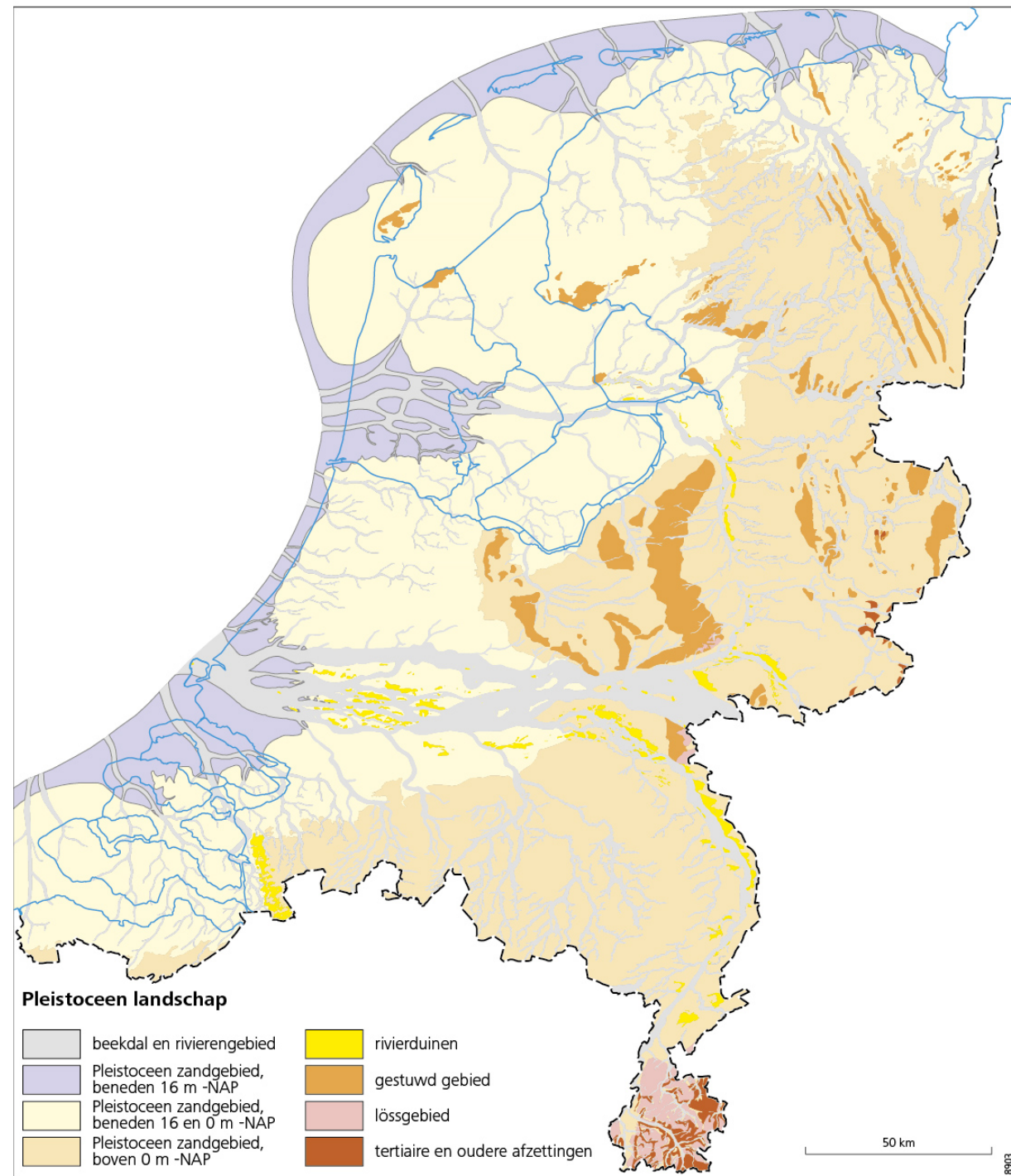


20 Ka



# 9000 BC

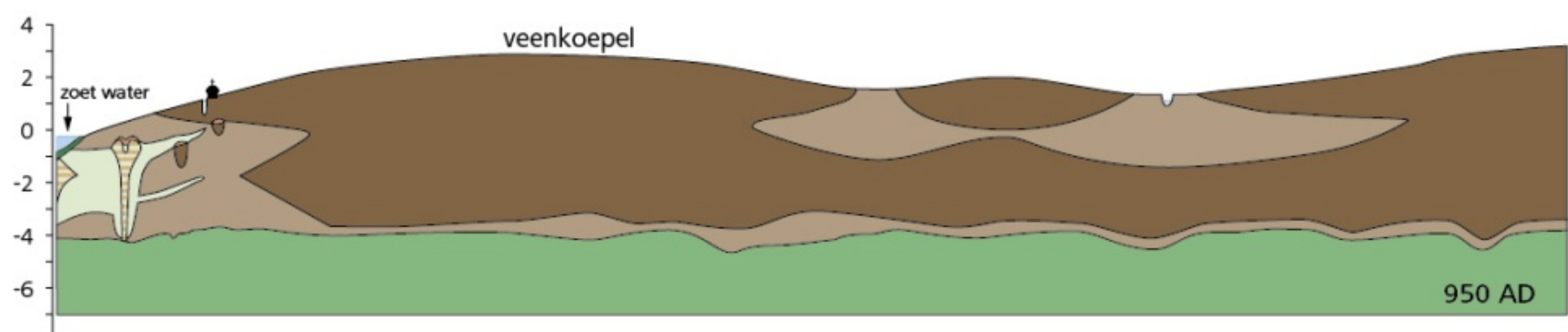
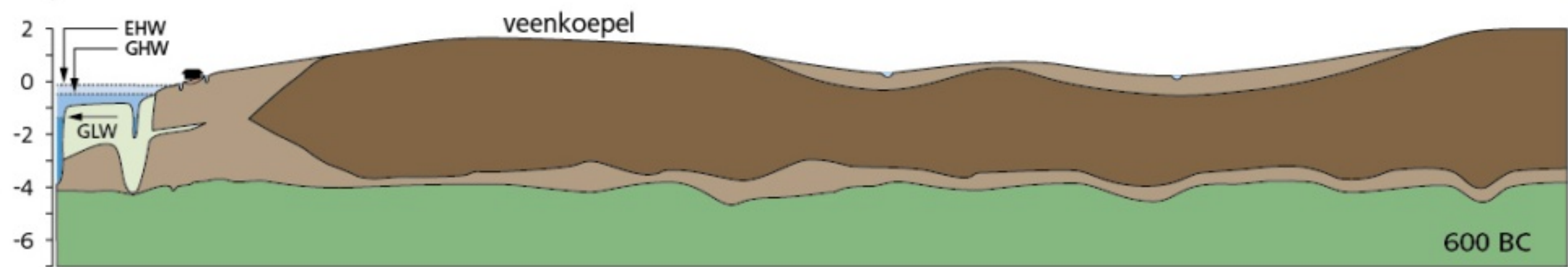
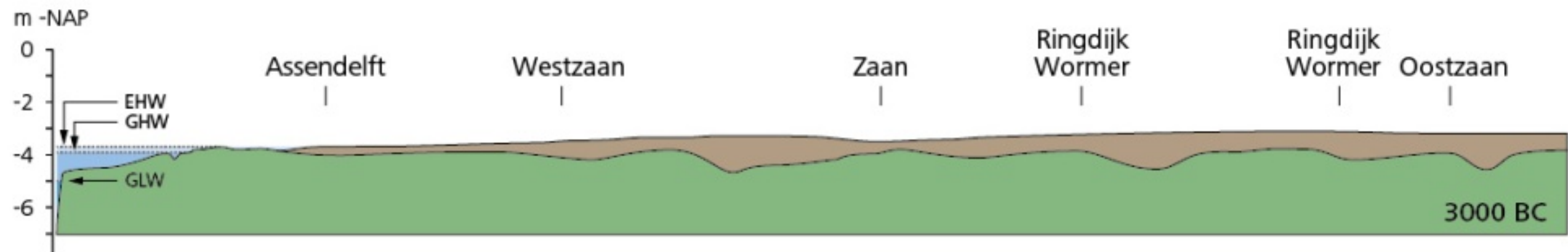
- North sea dry

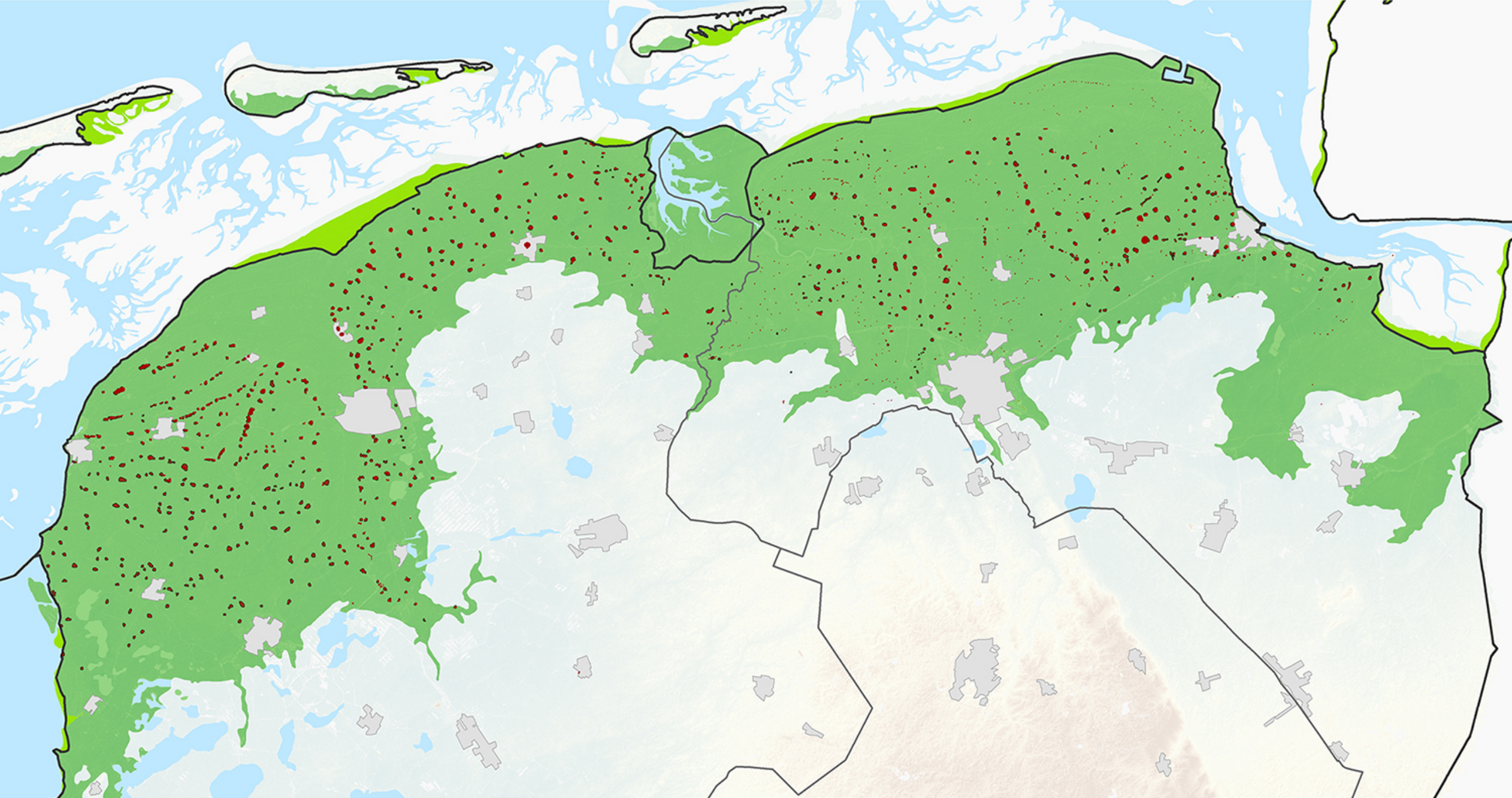


# 500 BC

- Growth of peat bogs







Terpen en wierden Klei aan de oppervlakte Kwelders Bebouwing

Bron: Vos, P. & S. de Vries 2013: 2e generatie palaeogeografische kaarten van Nederland (versie 2.0). Deltares, Utrecht.  
Op 28-04-2015 gedownload van [www.archeologiein nederland.nl](http://www.archeologiein nederland.nl), Bodemkaart van Nederland, AHN2. Bewerkt door J. Wiersma, 2016

# 100 AD

- Romans: impact on water system
- Deforestation -> higher discharge



## Holoceen landschap

### Kustduinen

- hoog duin
- duin en strandwallen
- laag duin

### Overstromde gebieden

- wadden en slikken
- rievlaktten en kwelders
- kwelderwallen

### Veengebieden

- veen

### Permanent onder water

- binnenwater
- buitenwater

## Pleistoceen landschap

- beekdal en rivierengebied
- Pleistoceen zandgebied, boven 0 m -NAP

- riverduinen
- gestuwd gebied
- lössgebied
- tertiaire en oudere afzettingen

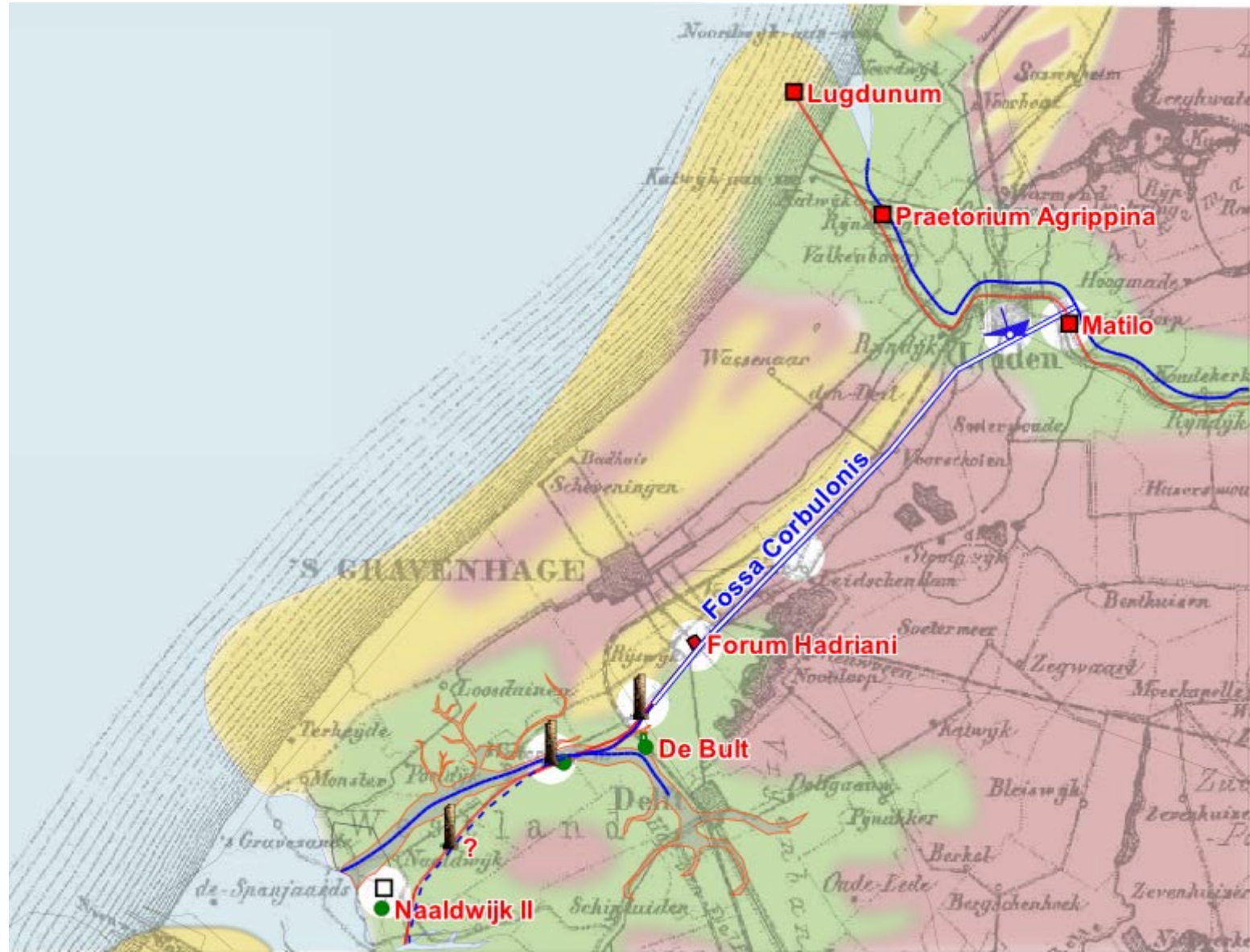
- waterlopen
- plaatsen

50 km



# 50 AD

- Roman general Corbulo: canal Fossa Corbulonis



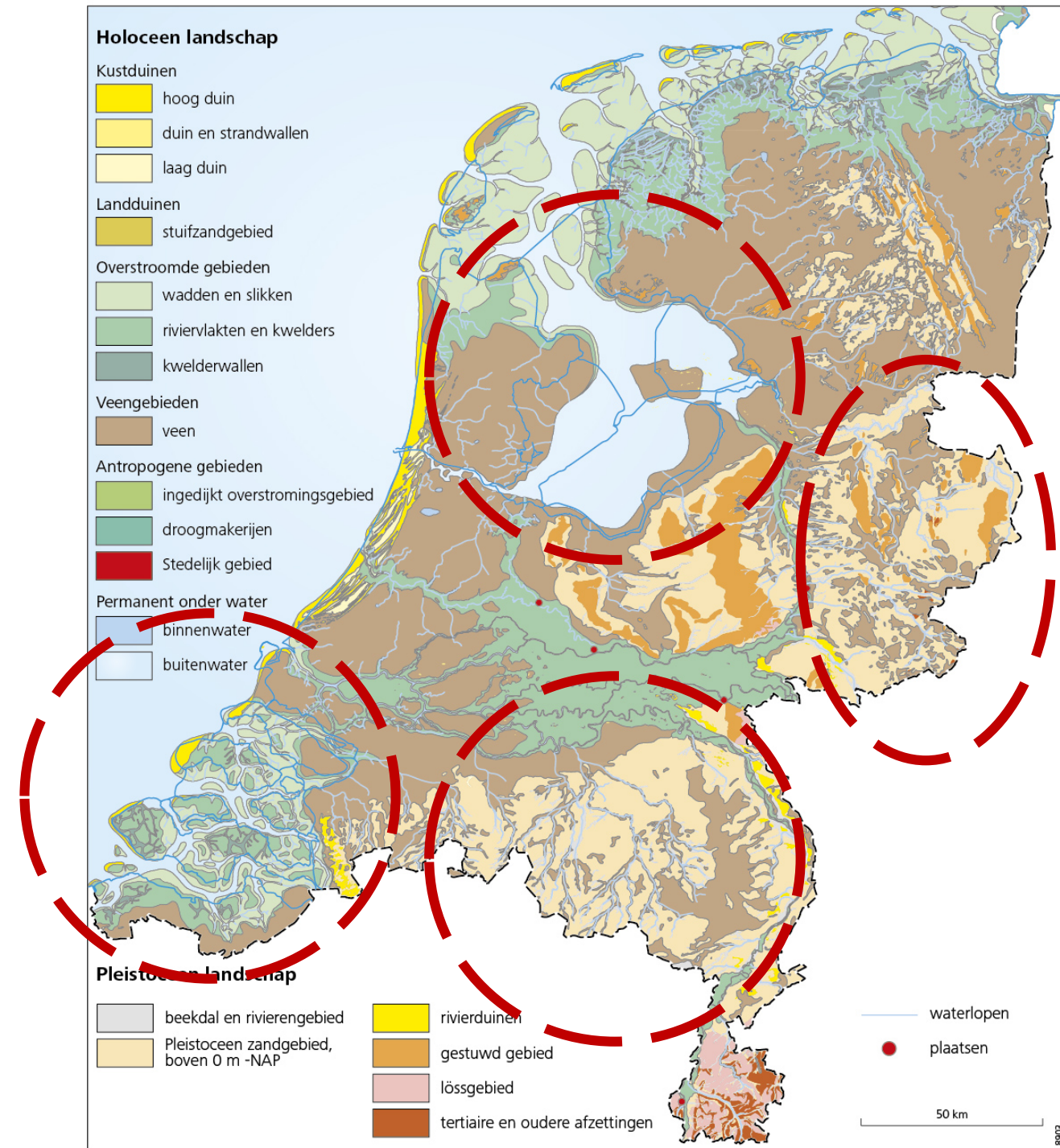
# 800 AD

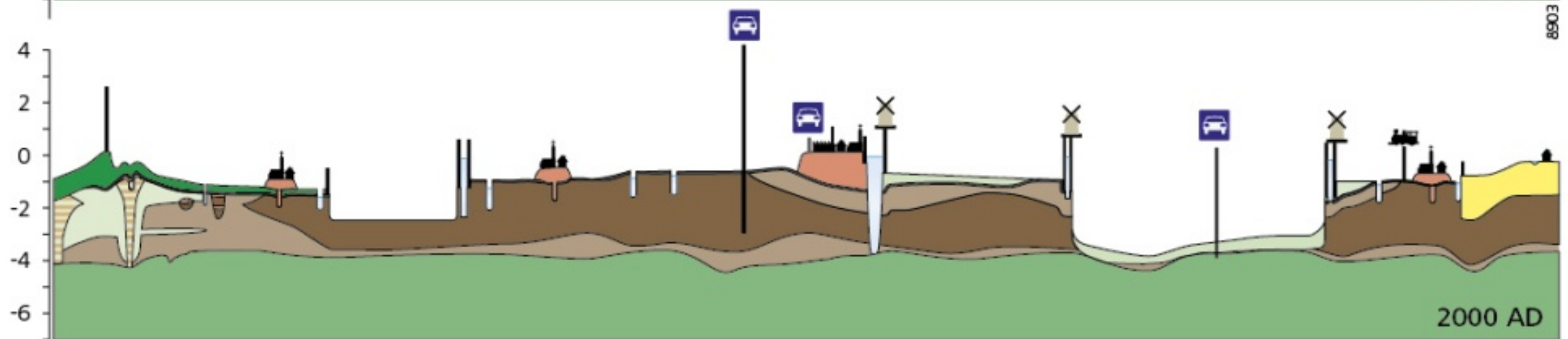
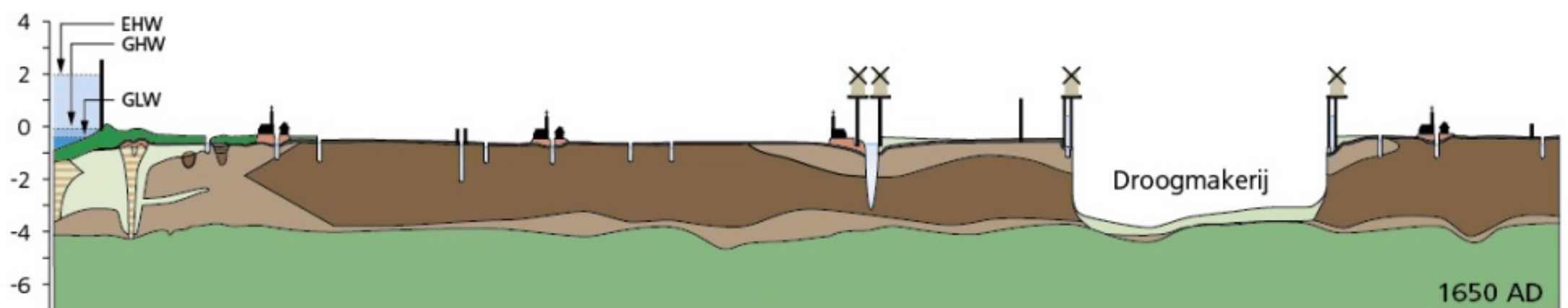
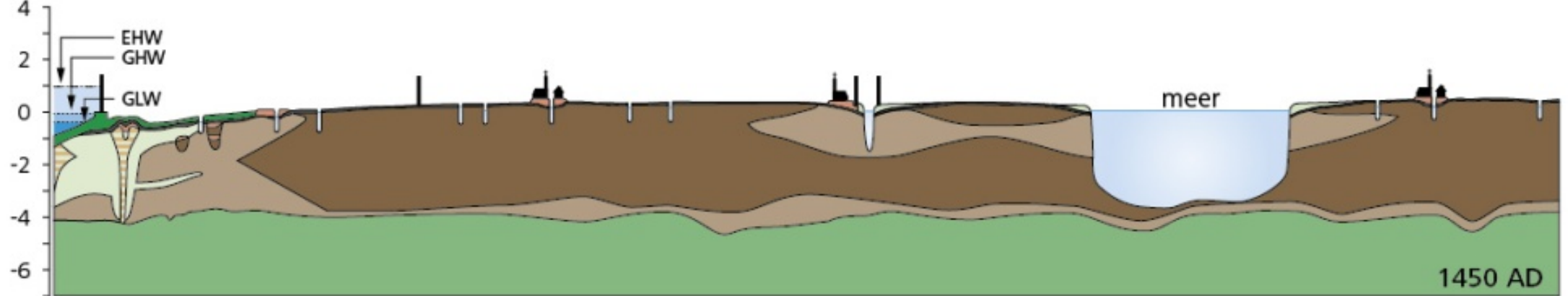
- Lake Almere open
- Loss of peat area Zeeland
- Digging of peat: gradual process
- Fertilizing sandy soils with cattle



No. 1752. L.A.V.  
Hilgers A. S. Nij. Hoop-Koppel.

Groets uit Hoop-Koppel.





5 km

8903

# 1255 first Water authority: Hoomheemraadschap van Rijnland



# 1500 AD

- Large peat lakes: ‘water wolf’
- Soil compaction in low areas: mills
- 1600 AD: Beemster polder: land reclamation: fertile soil and good investment





# 1850 AD

- River management: embankments
- Water authorities: 3500 (now 22)



# Flood 1916

- Zuiderzee works 1918
- Afsluitdijk finished in 1932
- Polders in 1930; 1942; 1957 & 1967



A56 Voltooiing van de Afsluitdijk, 1932





# Flood 1953

- Delta works committee (20 days later)

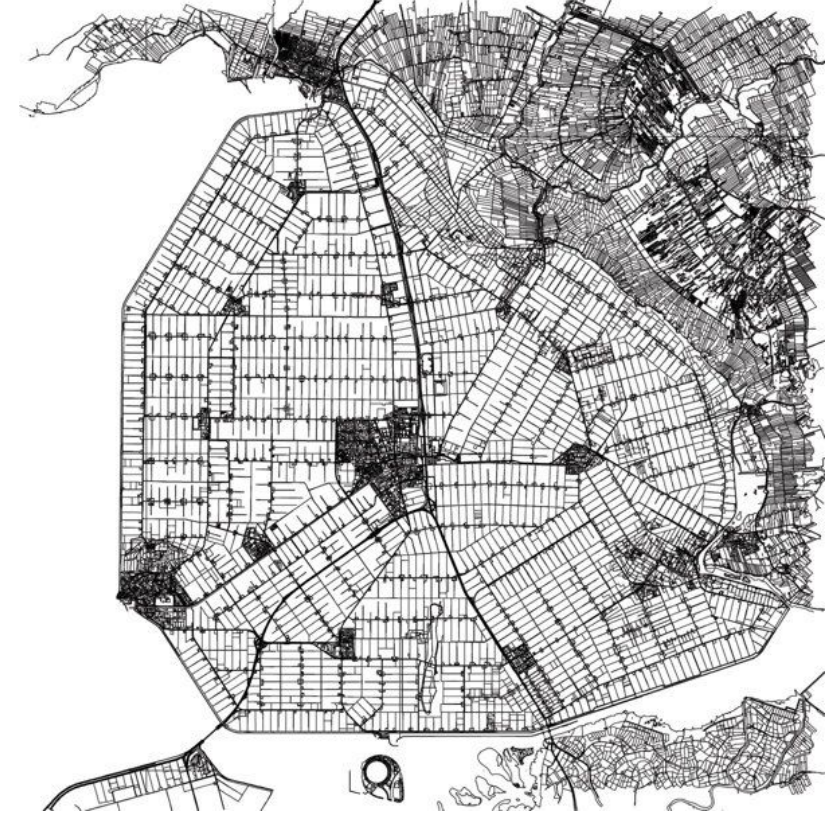






# Engineering culture

- Believe in 'makability'
- Agricultural engineering (*woeste gronden*)
- Nature engineering
- Social engineering (Joop den Uyl)





Charlotte Dematons

# NEDERLAND



LEMNISCAAT







## Holocene

- Dune sand
- Beach sand
- Subatlantic intertidal deposits
- Atlantic intertidal deposits
- Peat
- Peat bogs
- Rhine river deposits
- Holocene eolian sand
- Holocene brook deposits

## Pleistocene

- Coversand and löss
- Till and glaciofluvial deposits
- Ice-pushed ridges
- Local deposits
- Late-Pleistocene Meuse river deposits
- Mid-Pleistocene river deposits
- Early Pleistocene river deposits
- Older than Quaternary