

Geology of the Groningen Field

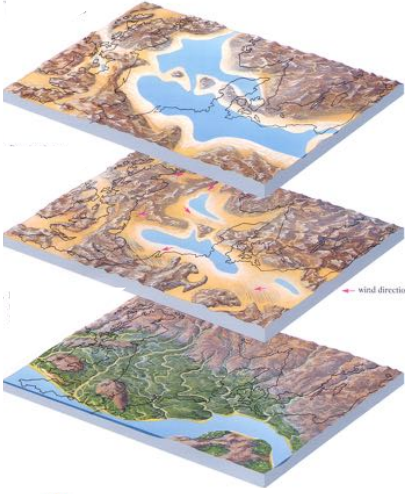
Rien Herber
Delft, 1st February 2018

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Groningen Gas Field

Three Geological Success Factors

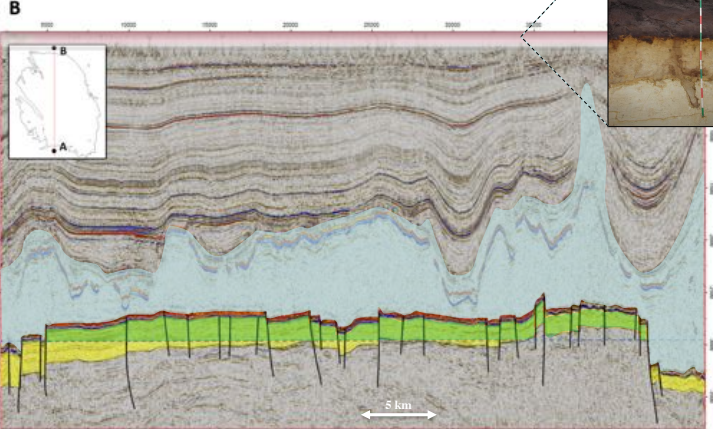
- SEAL**
250 mln years BP
Permian
Zechstein Sea
- RESERVOIR**
270 mln years BP
Early Permian
Desert
- SOURCE**
300 mln years BP
Late Carboniferous
Tropical Forest



Modified after Kroonenberg, 2008

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Groningen Seismic Cross Section



Modified after: De Jager & Visser, 2017

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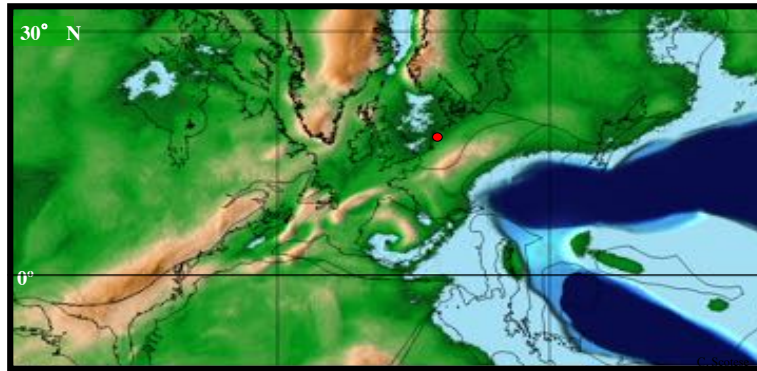
The Reservoir



Source: SPB Atlas, 2011

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Mid Permian – 240 MY

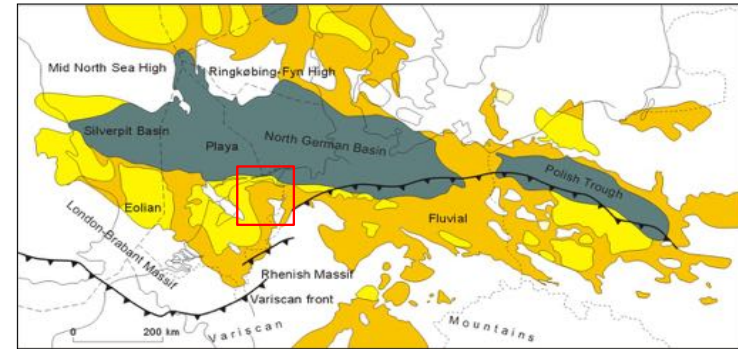


In a landlocked position at some 15° to 20° North, the Netherlands was exposed to a hot and dry climate

Source: Scotese, 2003



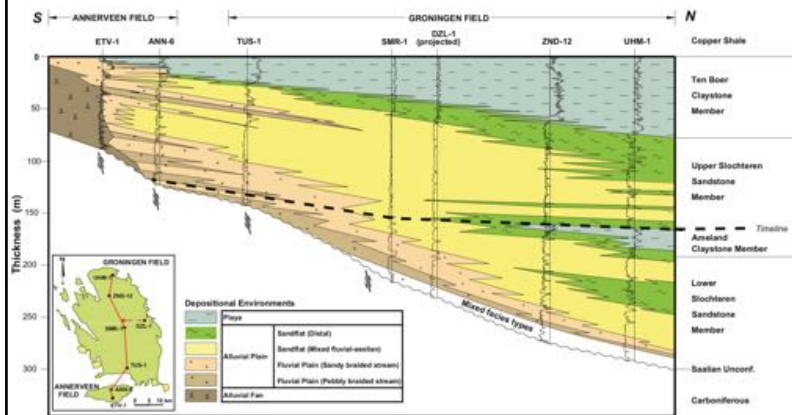
Southern Permian Basin Rotliegend Paleogeography



Source: Geluk, 2007



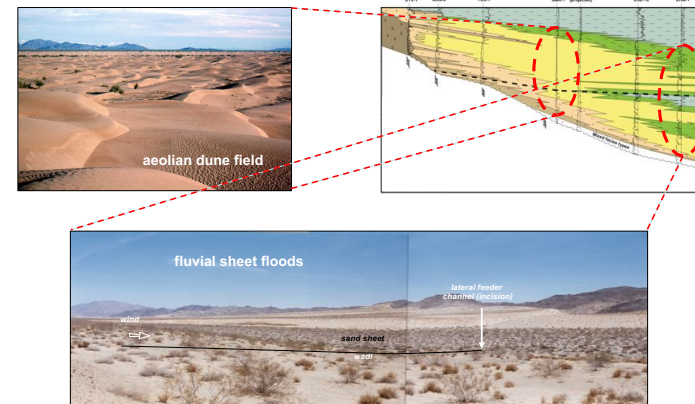
Rotliegend in Groningen – Depositional Environments

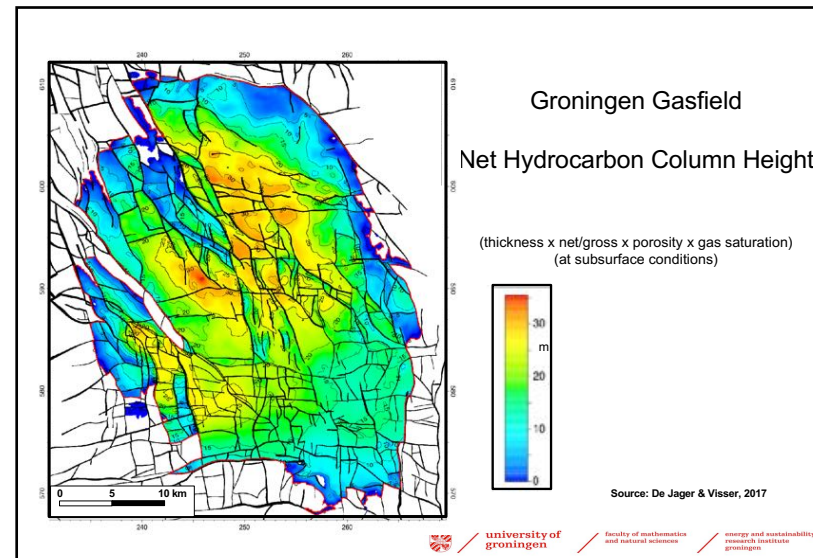
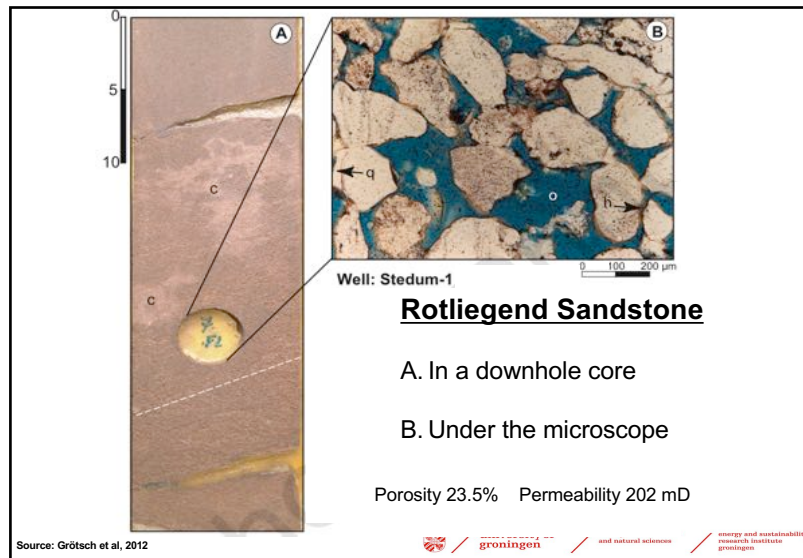
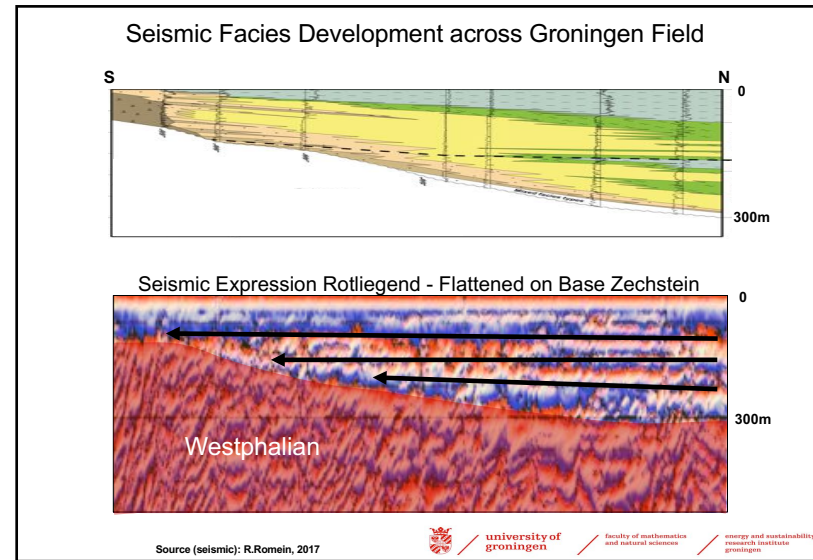
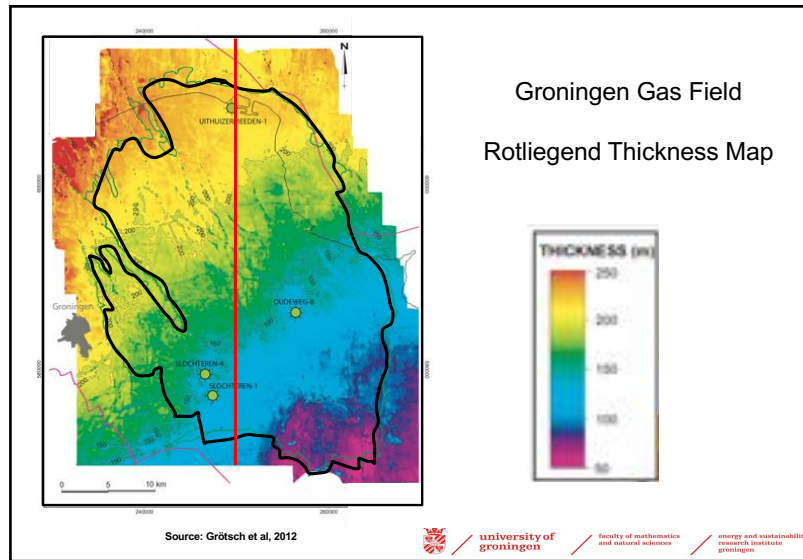


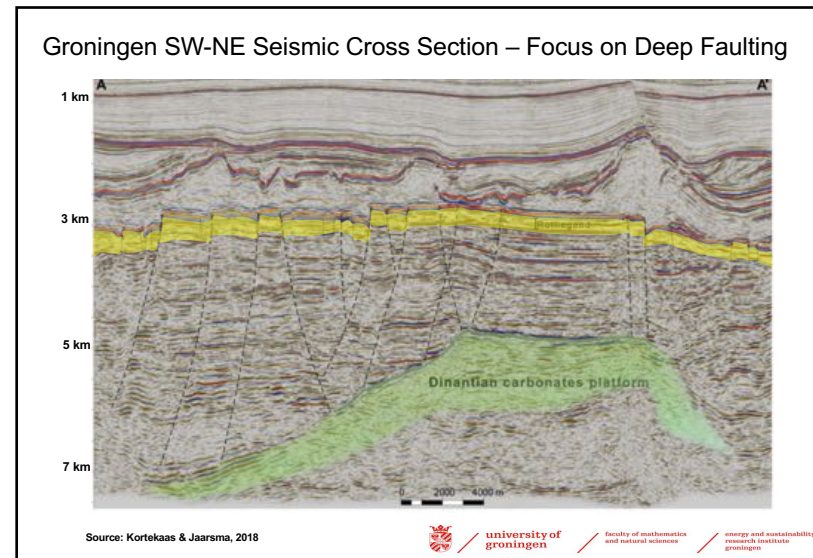
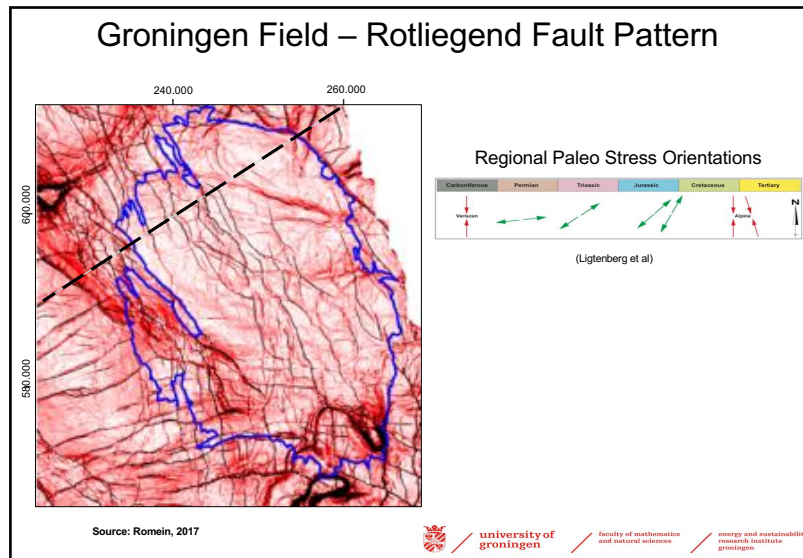
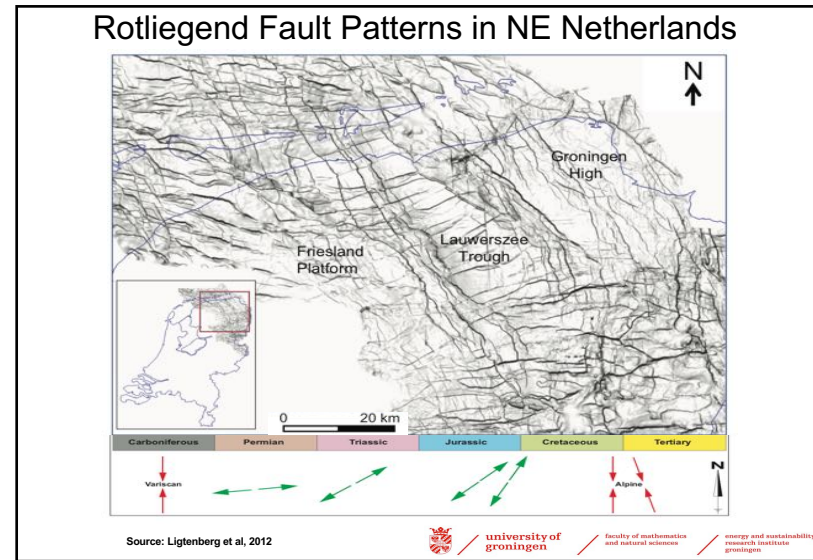
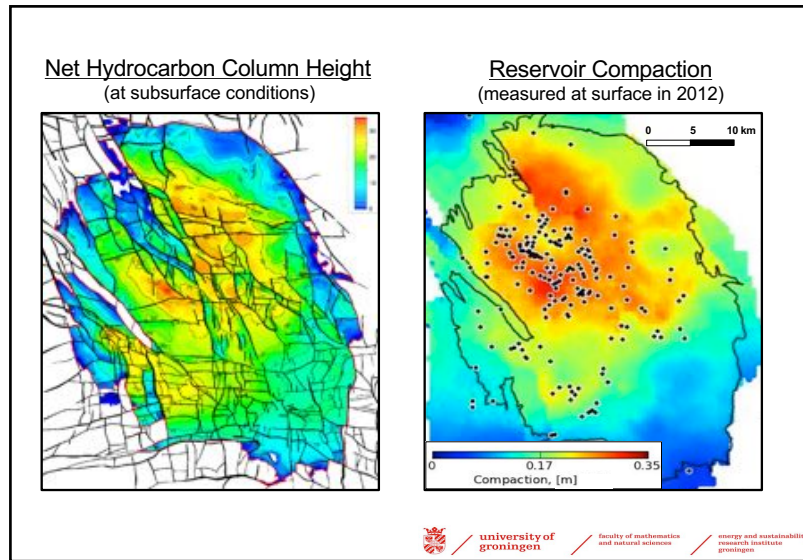
Source: Grötsch et al, 2012

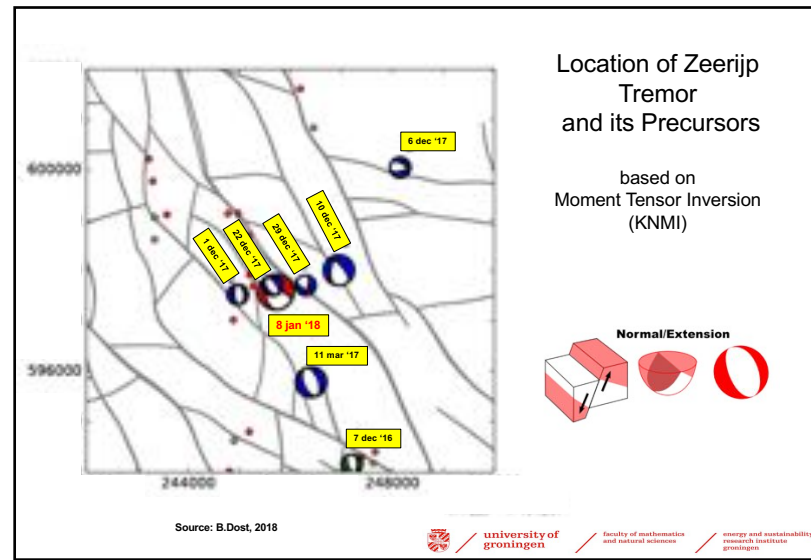
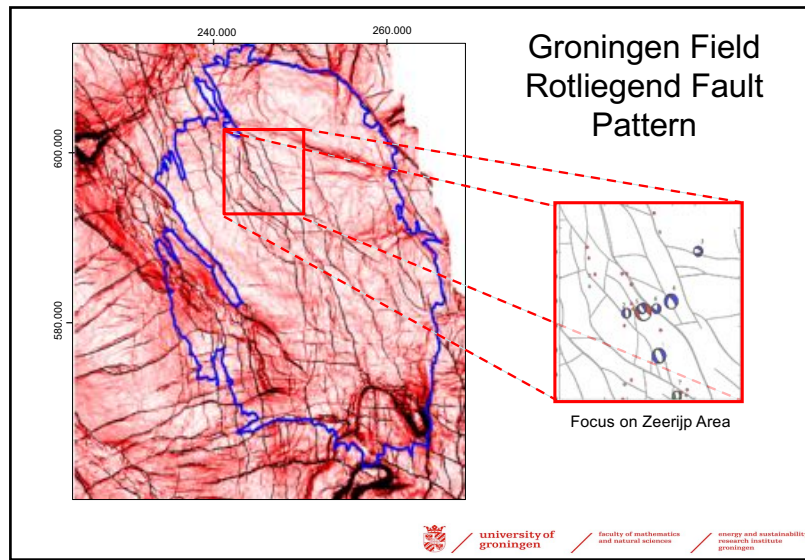
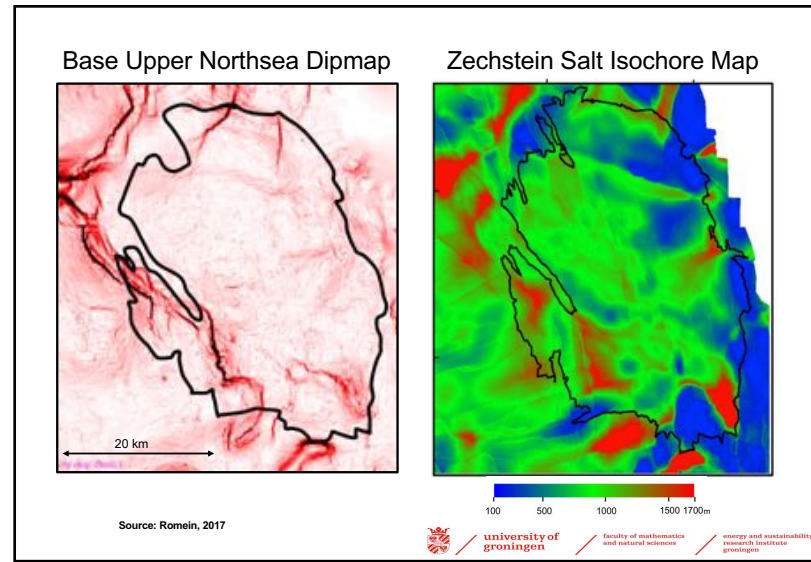
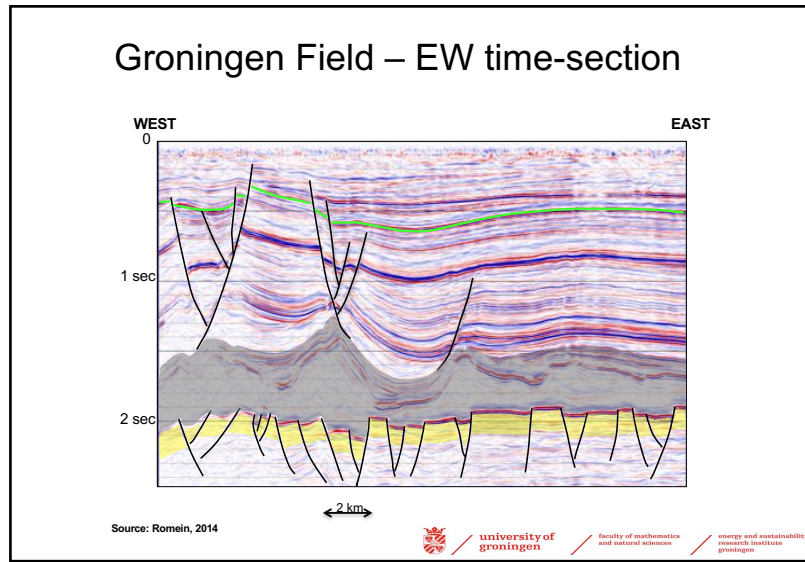


Rotliegend – Environments of Deposition







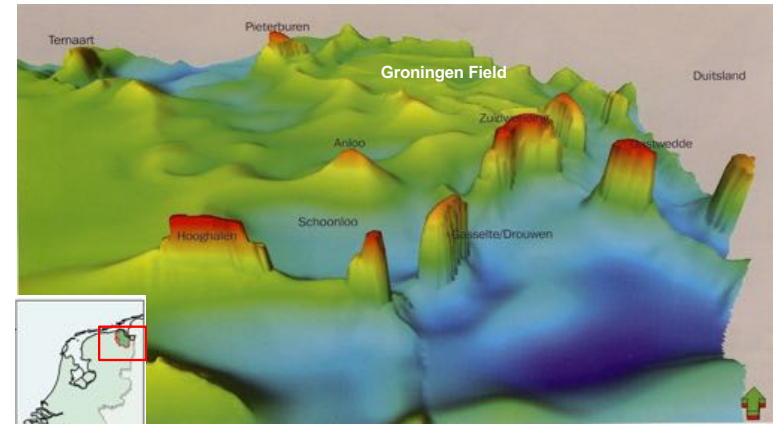


The Salt



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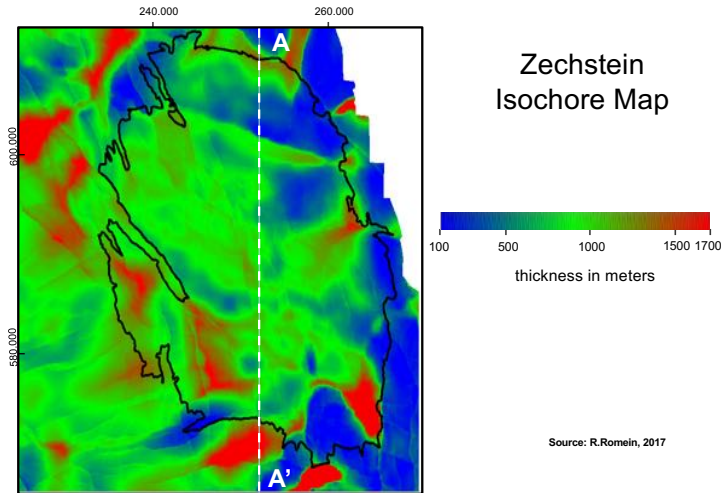
Top Zechstein Salt NE Netherlands



Source: Meijles, 2010

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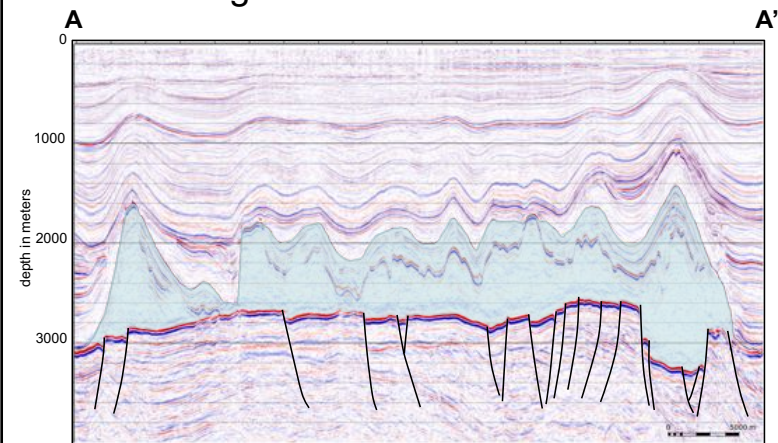
Zechstein Isochore Map



Source: R.Romein, 2017

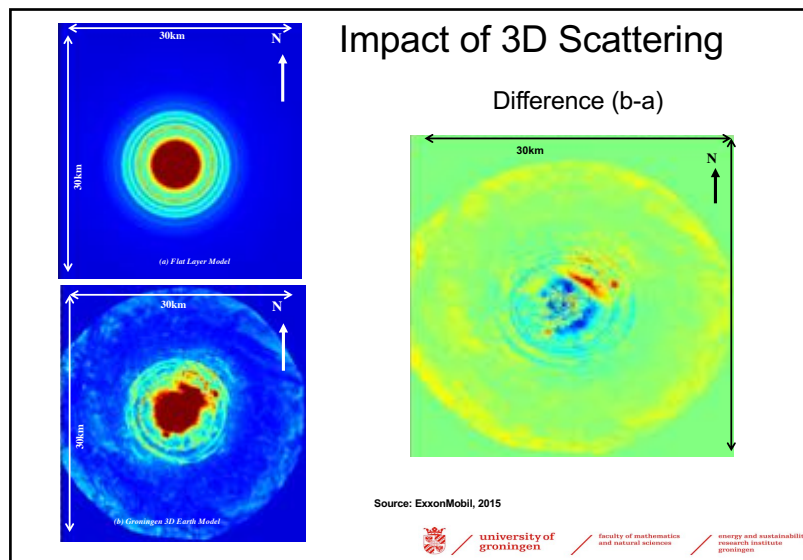
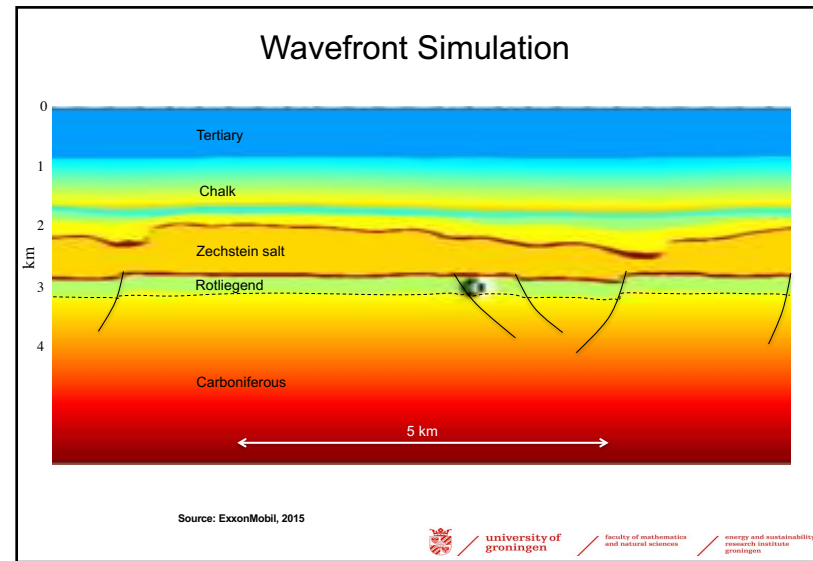
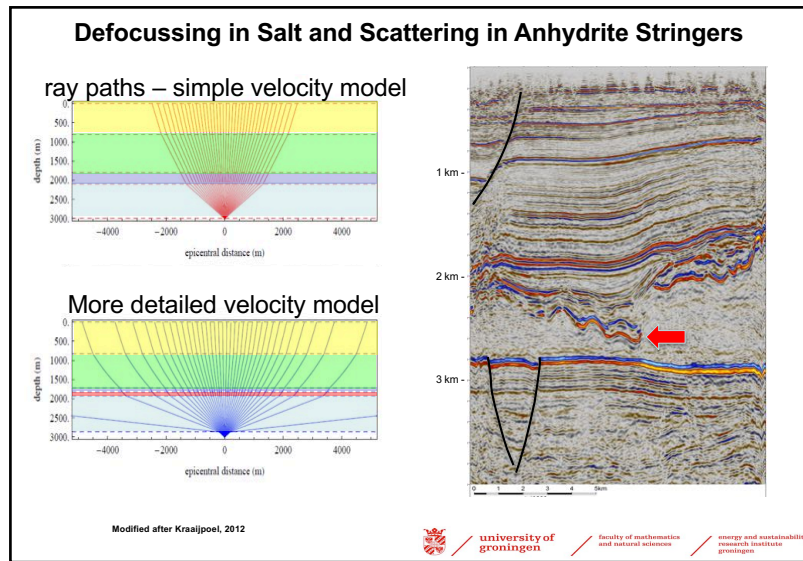
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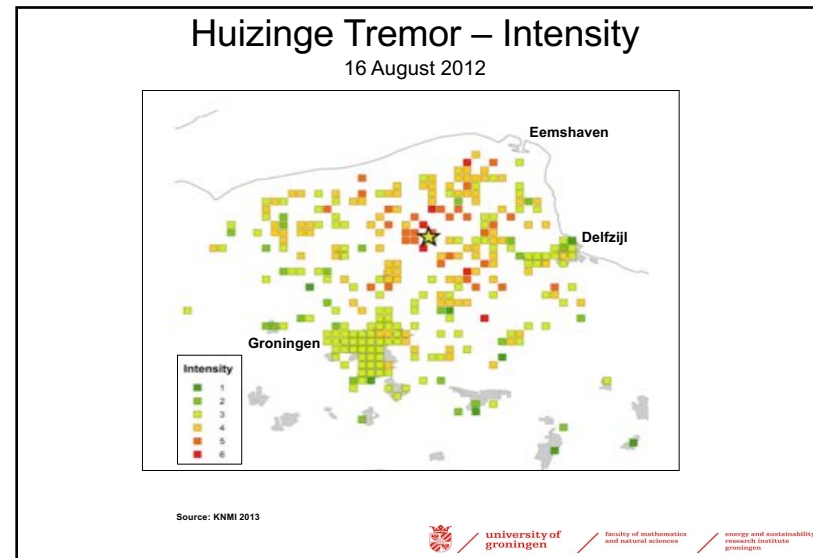
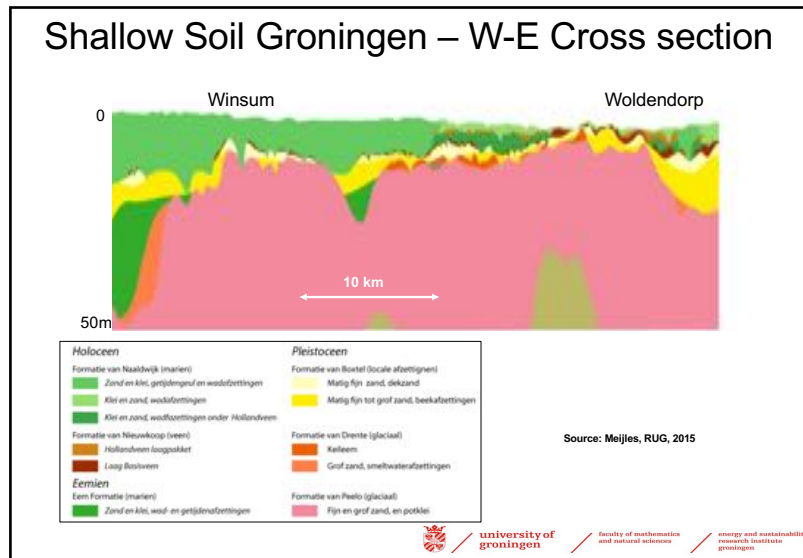
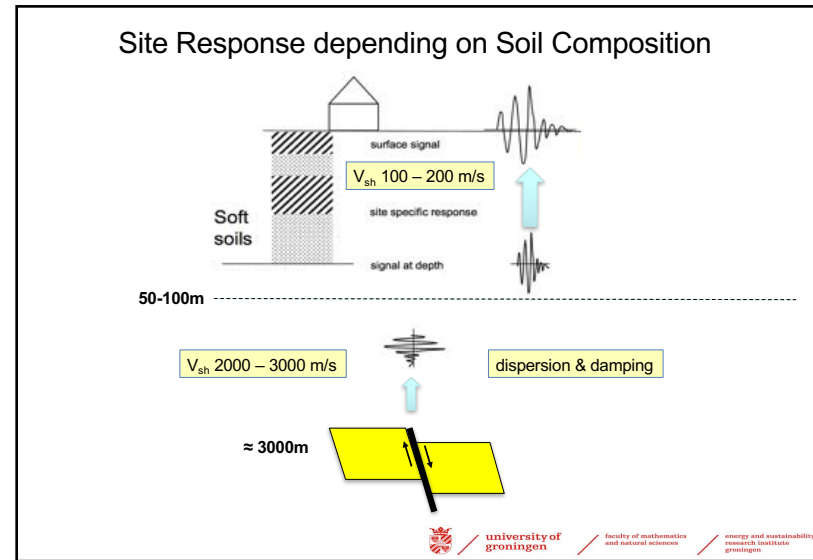
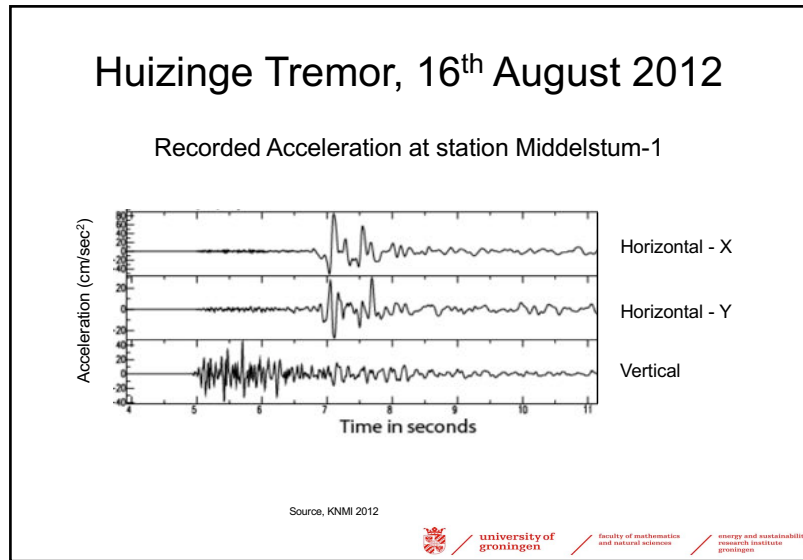
Groningen Gasfield – NS Transect

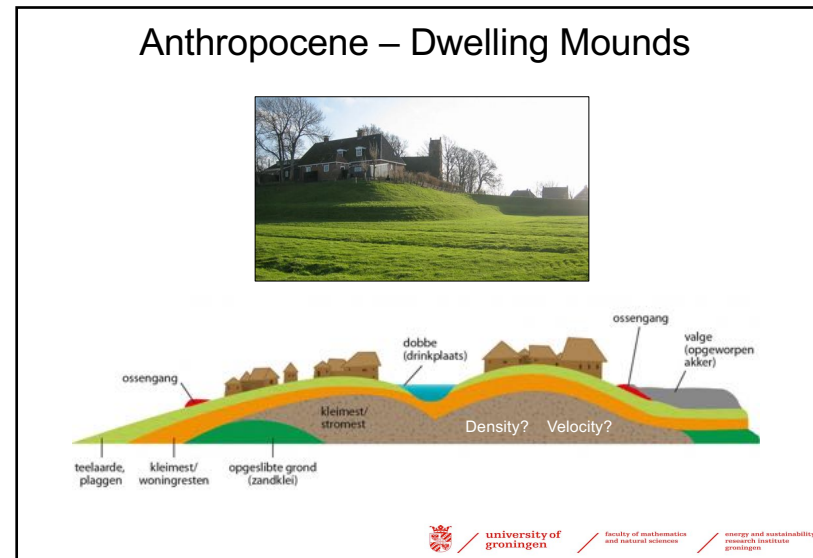
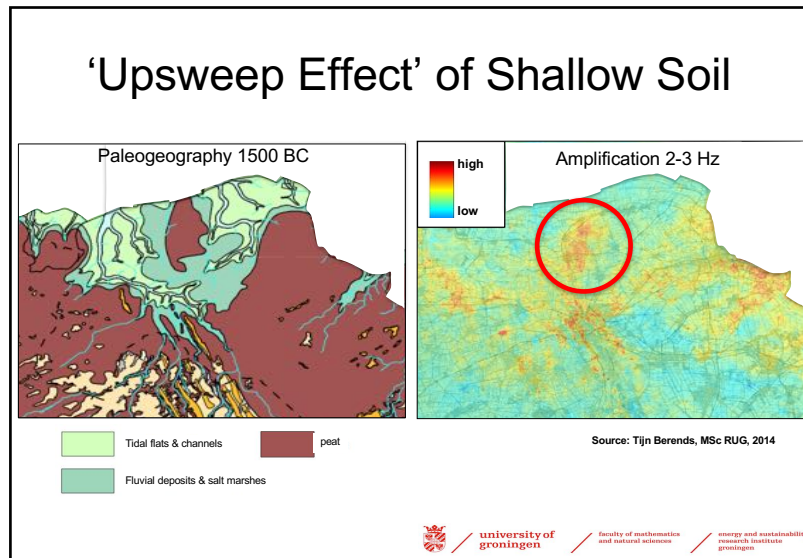
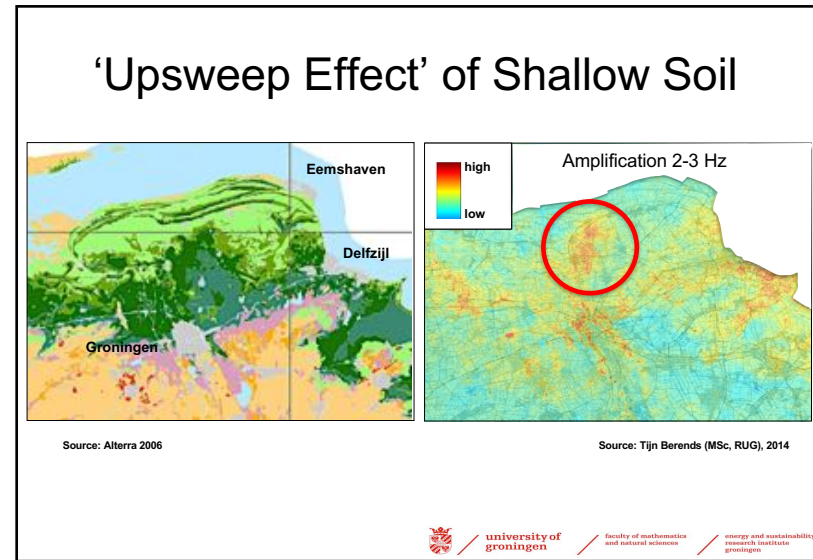
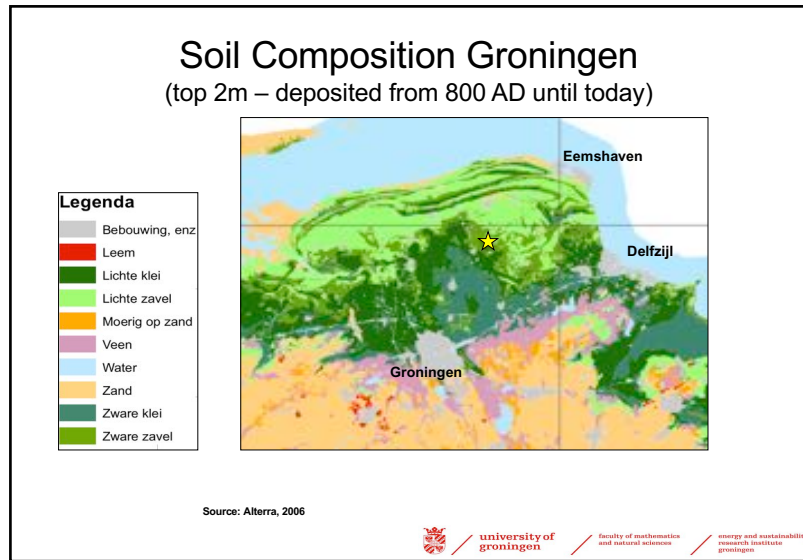


Source: R.Romein, 2017

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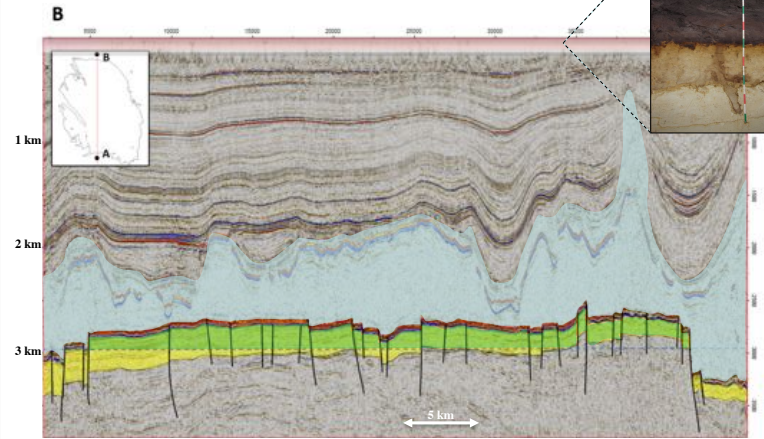


Locations of Dwelling Mounds in Groningen and Friesland (from 600 AD onward)



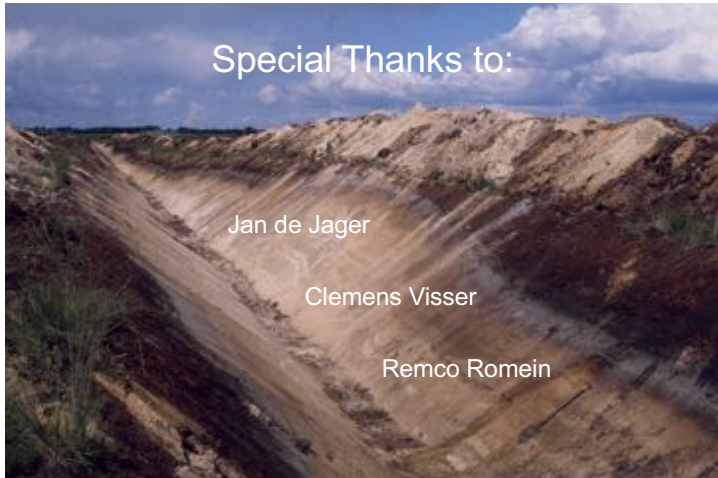
Source: Landschapsbeheer Friesland & Groningen

Groningen Seismic Cross Section



Modified after: De Jager & Visser, 2017

Special Thanks to:



Jan de Jager

Clemens Visser

Remco Romein

