



Late Cenozoic mass transport deposits in the northern Dutch offshore:

Anatomy and implications revealed by HiRes seismic mapping

A.M. Marks <sup>(1)</sup> & H.G. Hoetz



Utrecht University

ebn

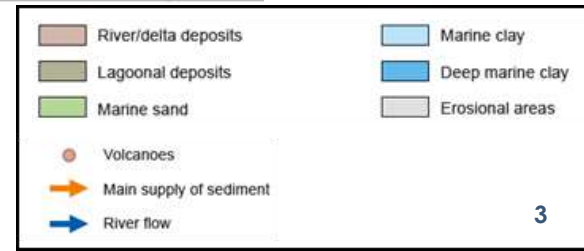
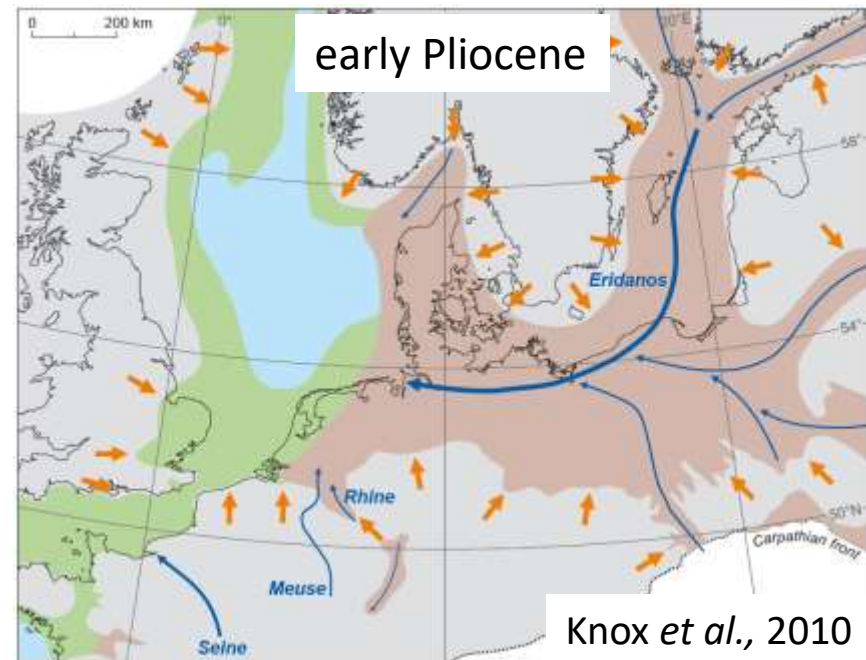
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# Conclusions

- 14 Mass Transport Deposits (MTD) identified and mapped in the NU
- Around ~10% of the northern Dutch offshore is covered by MTDs
- Internal structure analyzed:
  - Headwall domain: extensional stress regime
  - Toe domain: compressional stress regime
- No increased risk of drilling incidents within MTDs

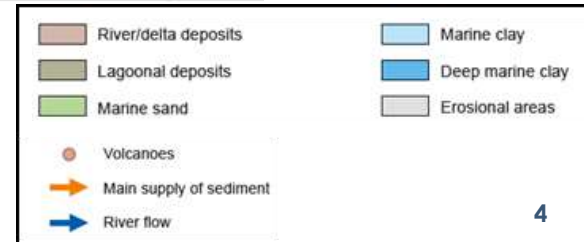
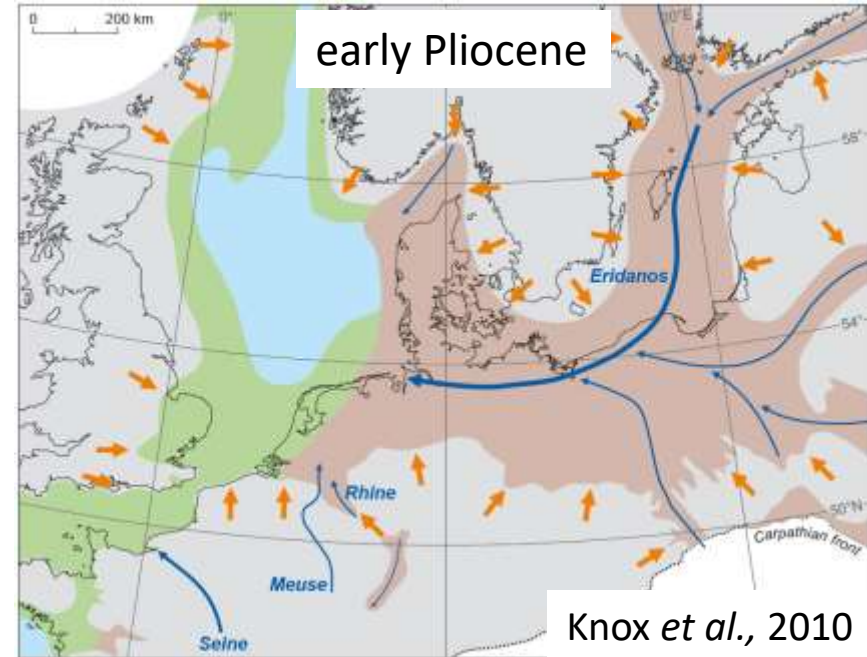
## The Eridanos System

- Creation of Baltic river system [Oligocene]
- System reaches North Sea [Pliocene]



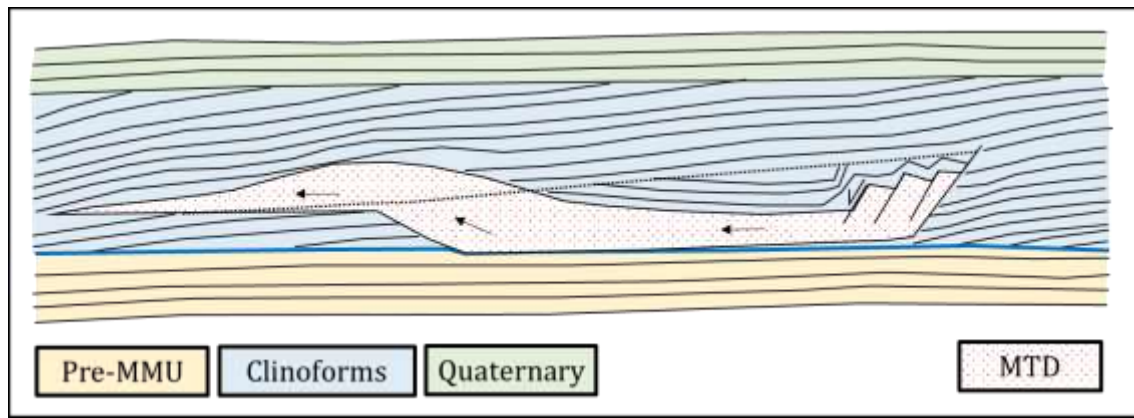
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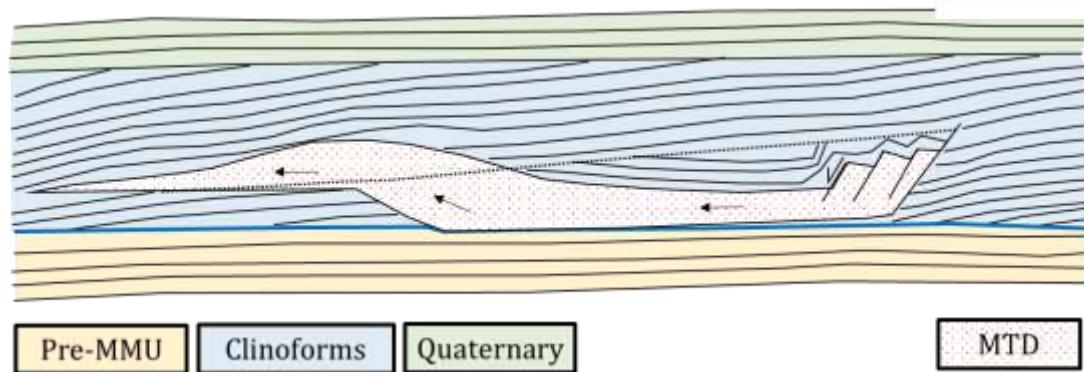
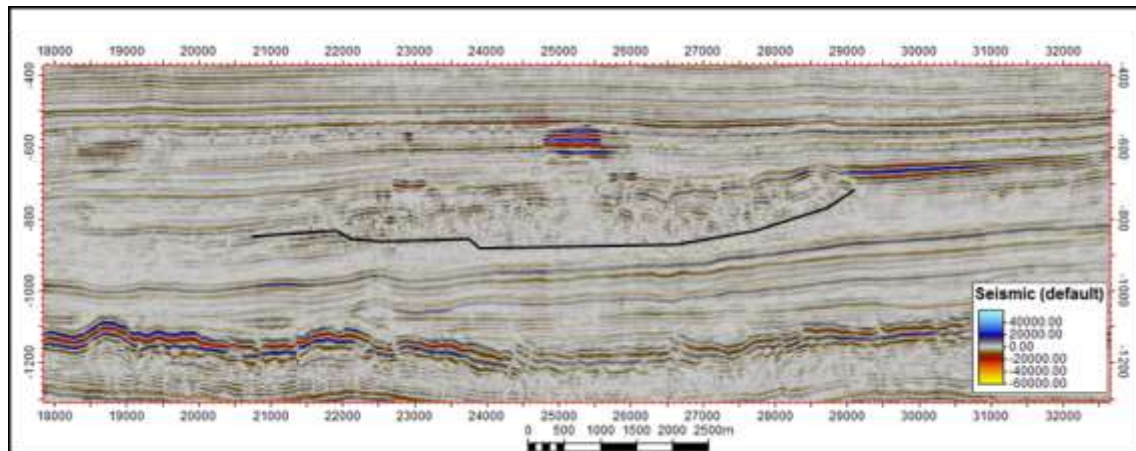
## Data & Methods

- **Seismic data**
  - Scanning of the datasets
    - Plain-stratified
    - MMU
    - Clino-stratified

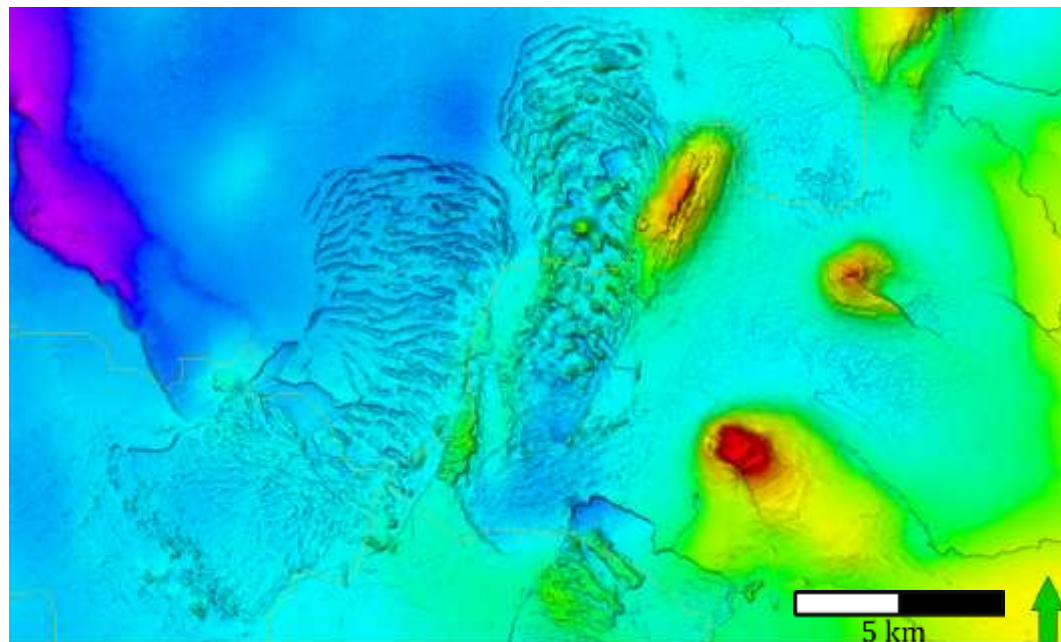
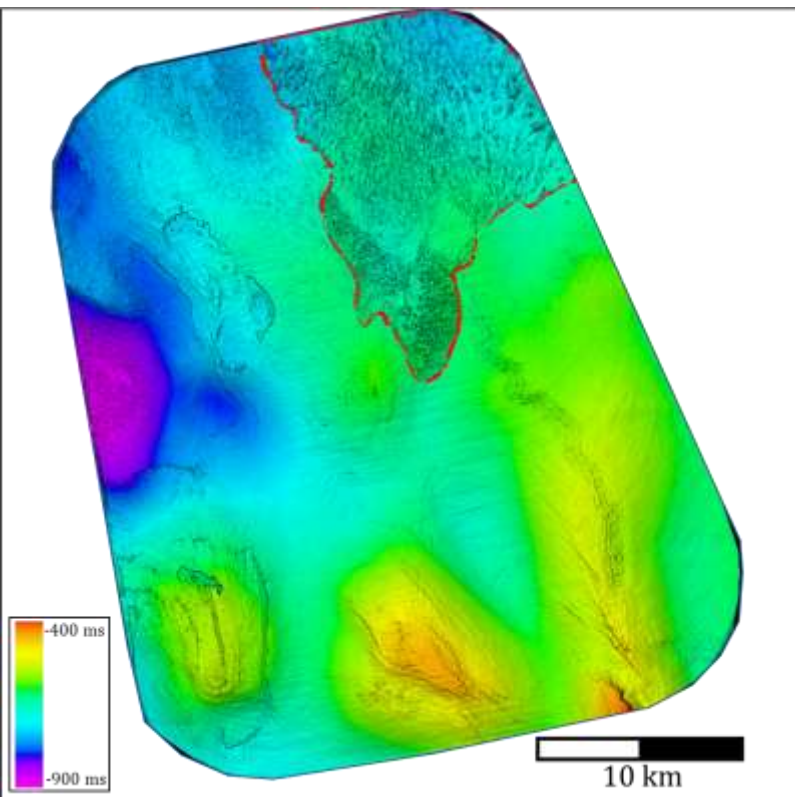


## Data & Methods

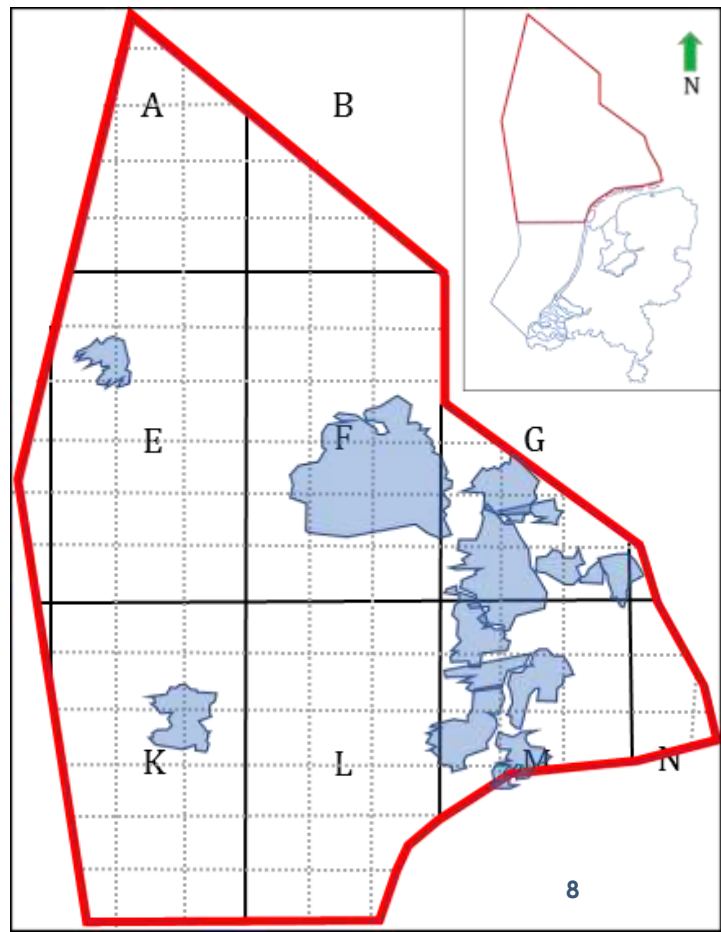
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## Mapview



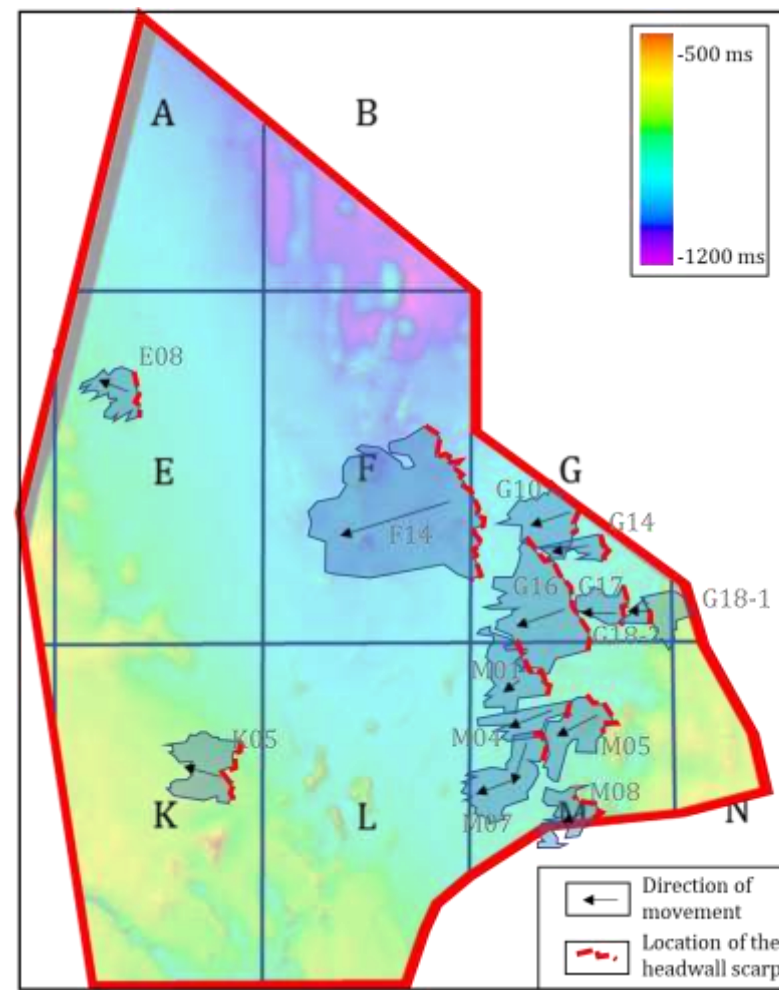
- 14 features
- Highest concentration in G & M blocks
- MTD vs MTC



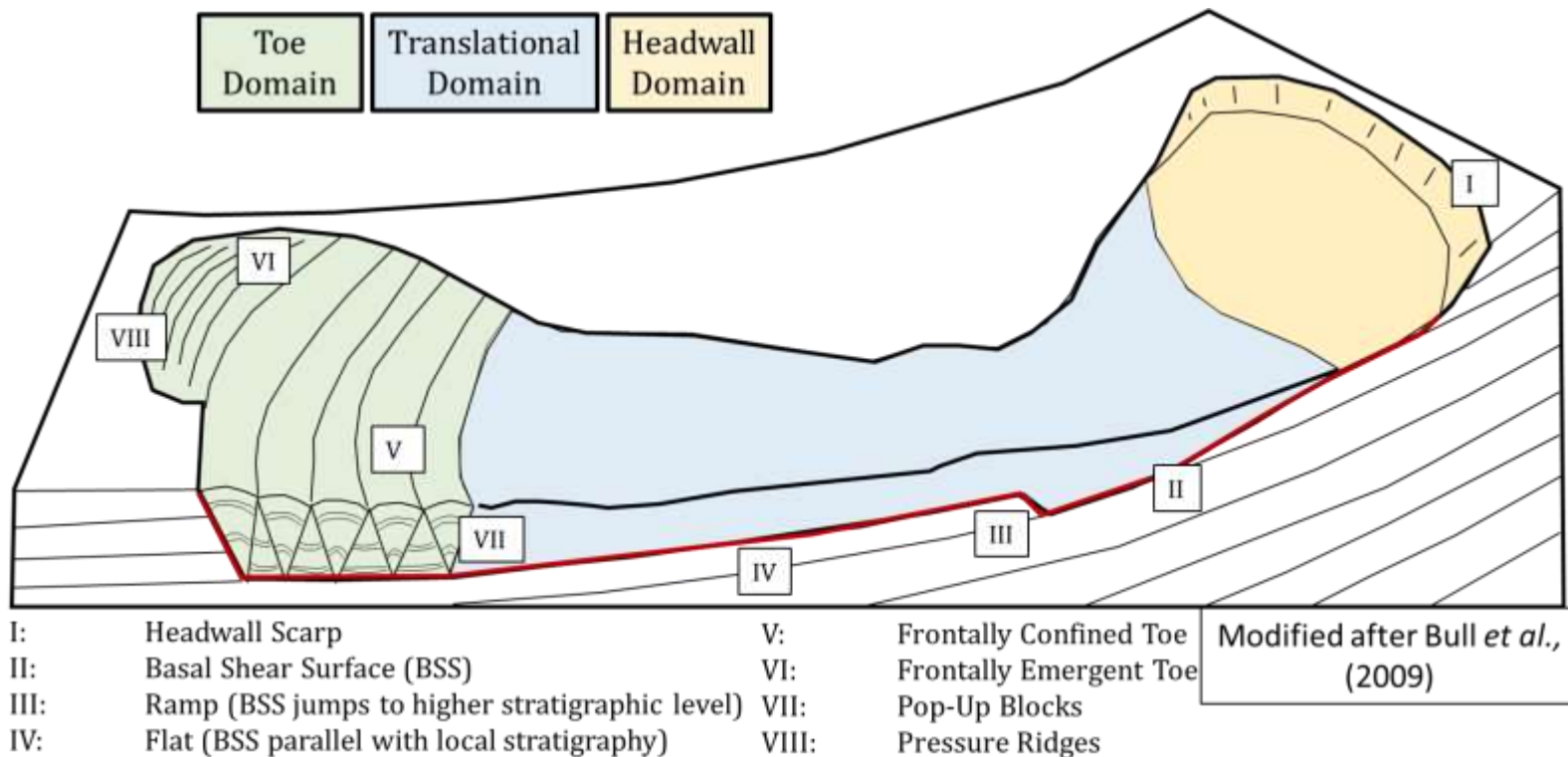


## Areal Distribution

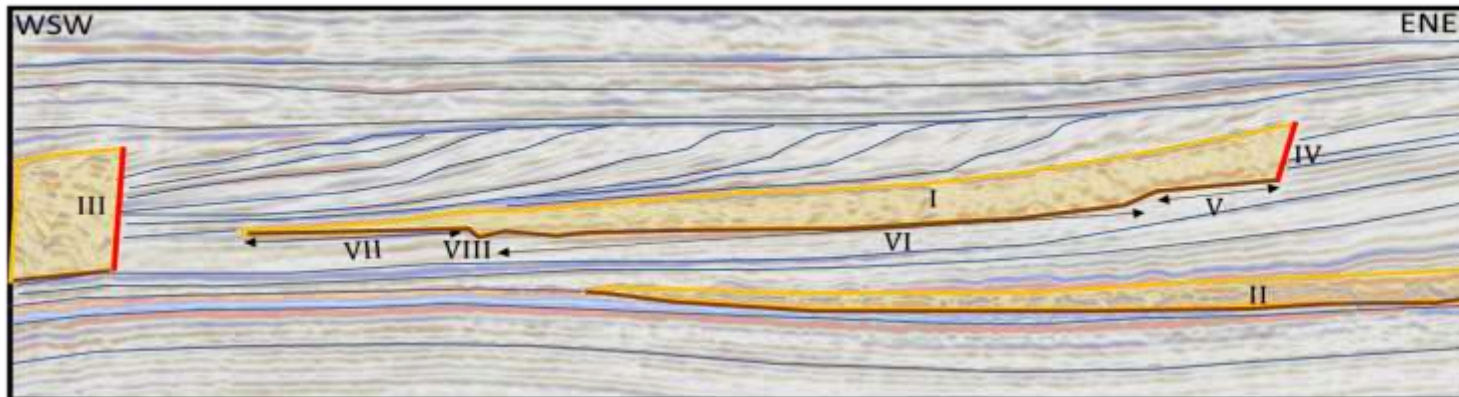
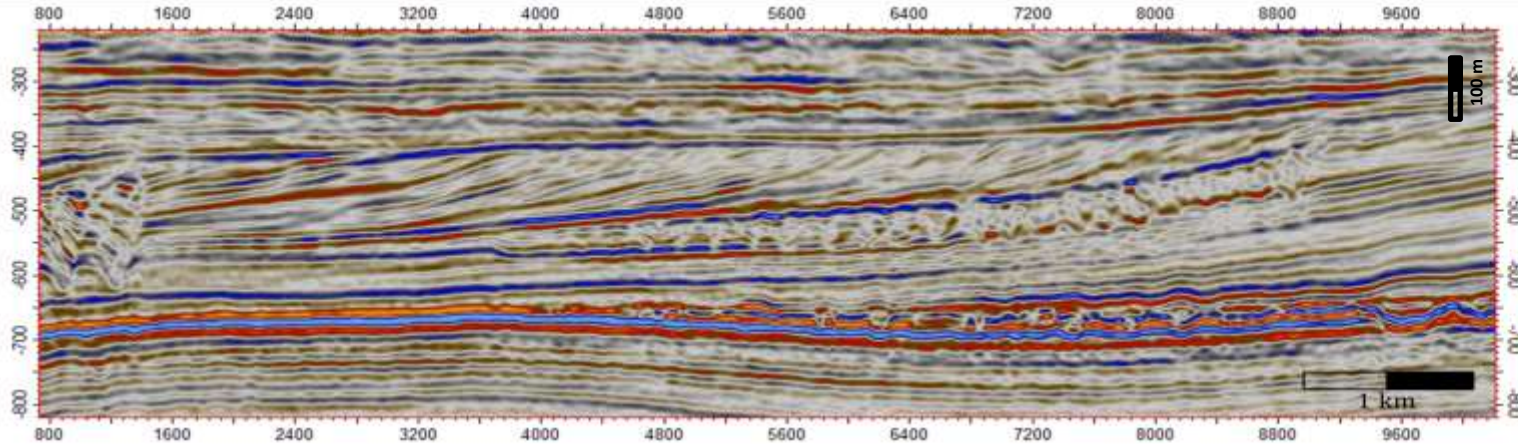
- Average area: 277 km<sup>2</sup>
- Average thickness: 140 m
- Average run-out distance 23 km
- Orientation: approximately westward
- Dip angles between 1°- 5°



## Internal architecture

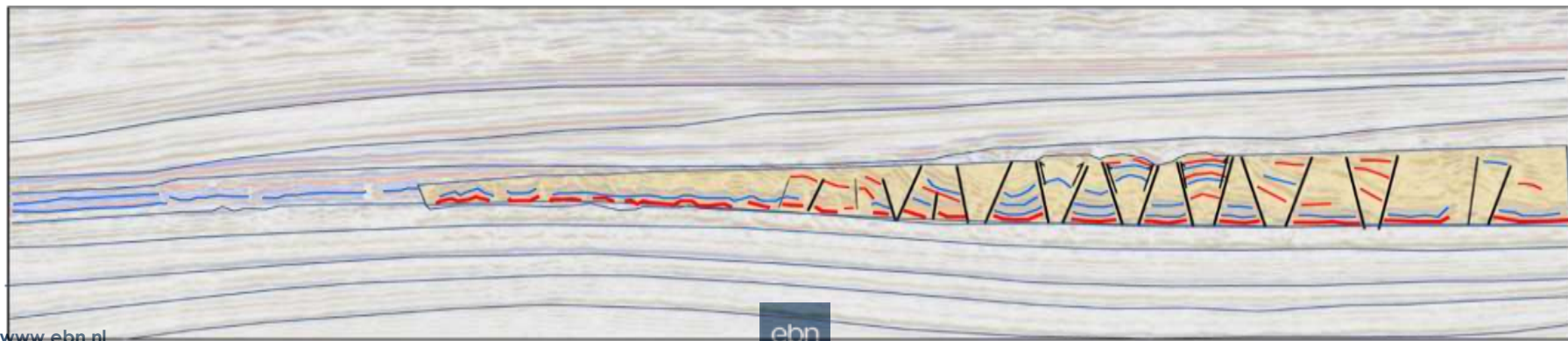
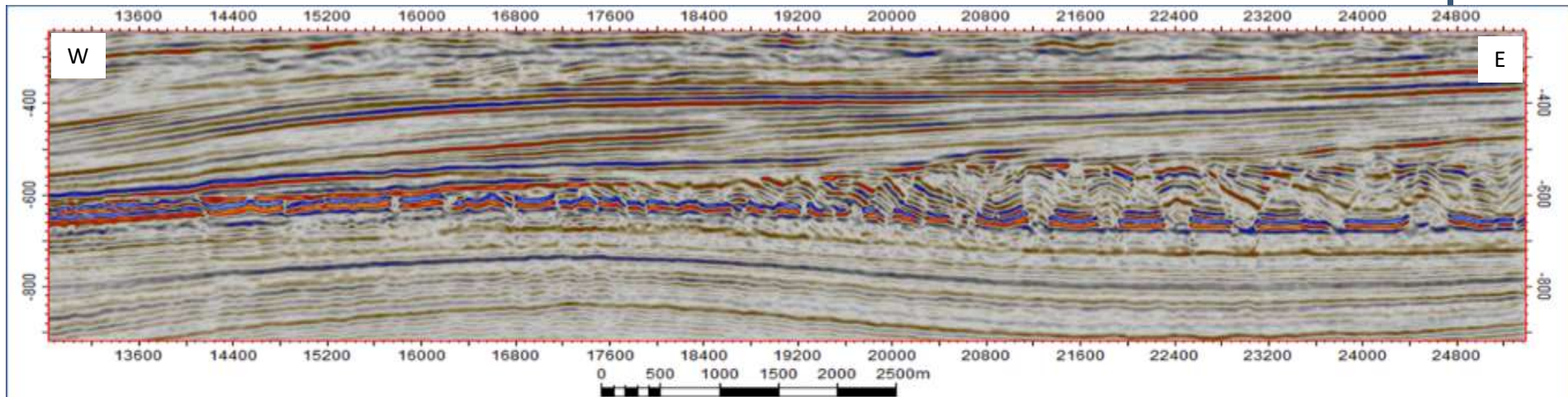


## Example 1

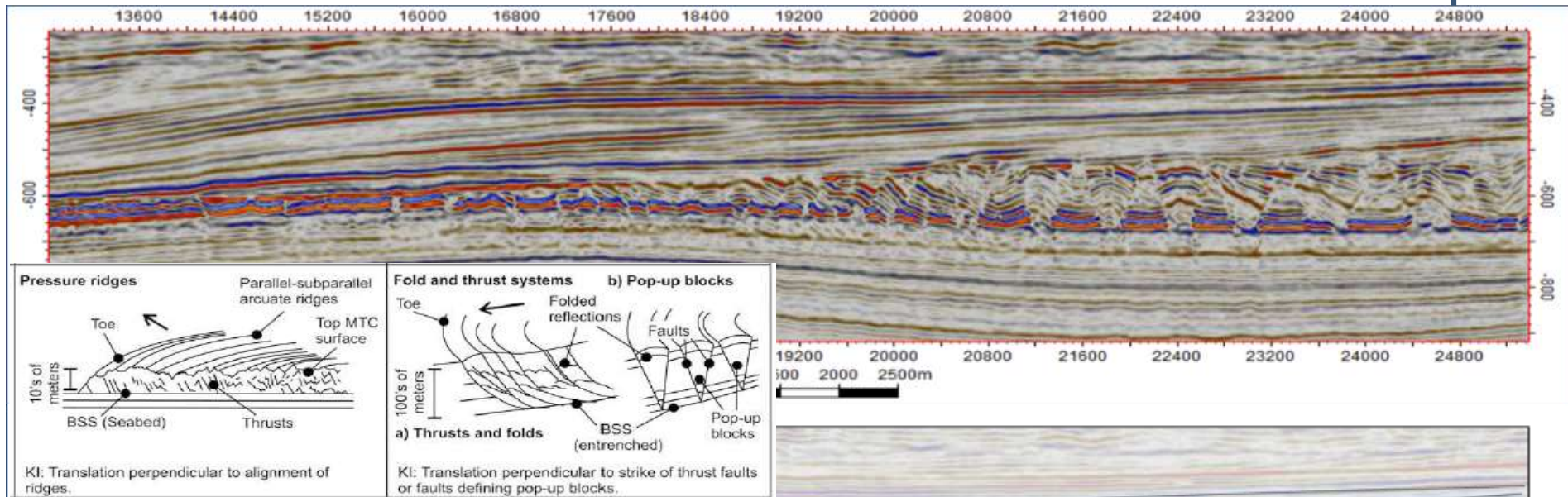


- I: MTD G18-2
- II: Toe domain MTD G18-1
- III: Headwall scarp MTC G17
- IV: Headwall scarp
- V: Headwall domain
- VI: Translational domain
- VII: Toe domain
- VIII: Toe of surface of rupture

## Example 2

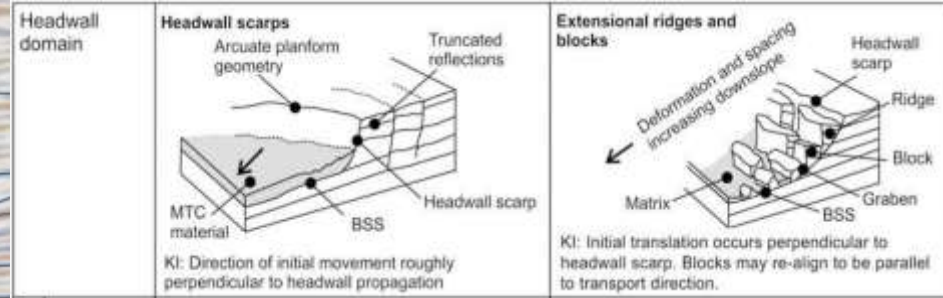
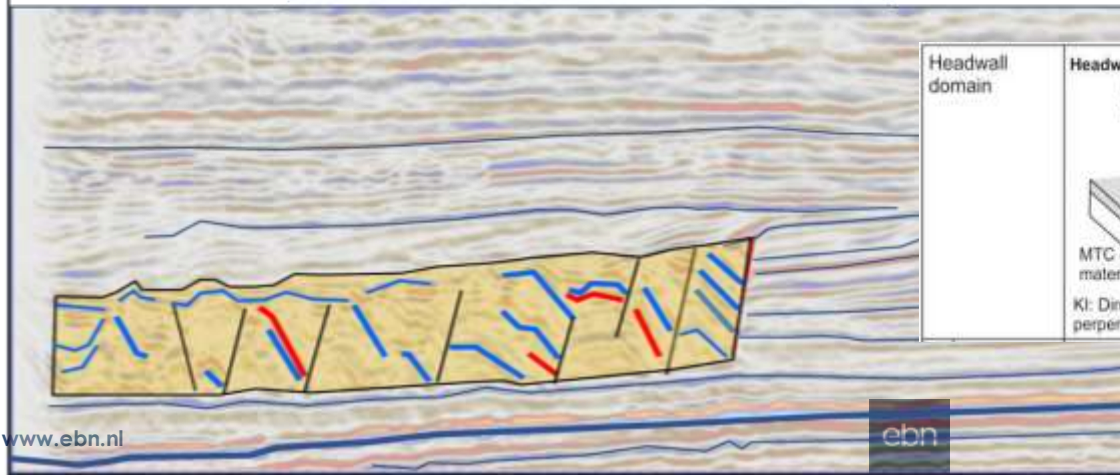
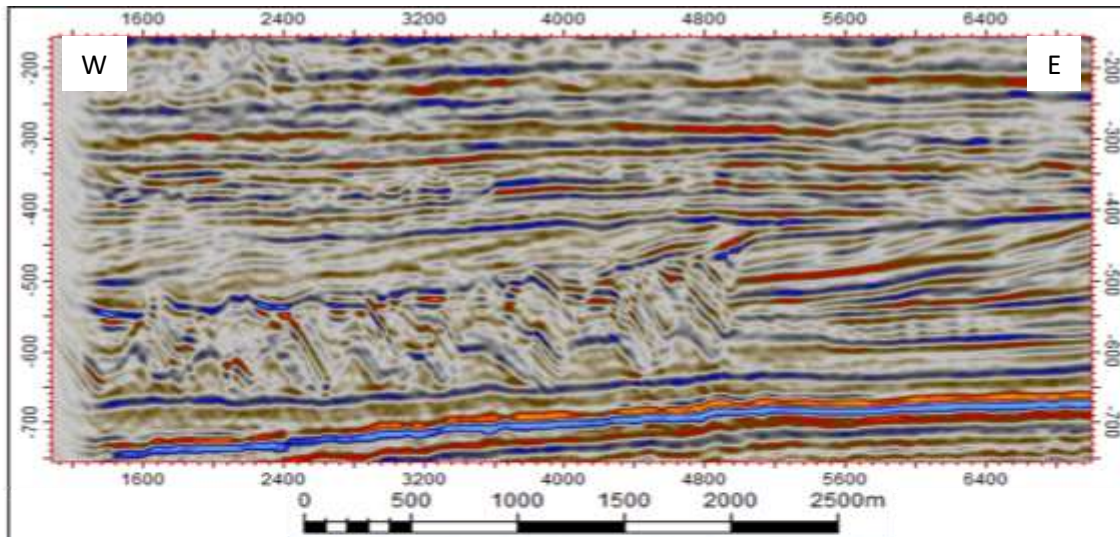


## Example 2



Bull *et al.*, 2009

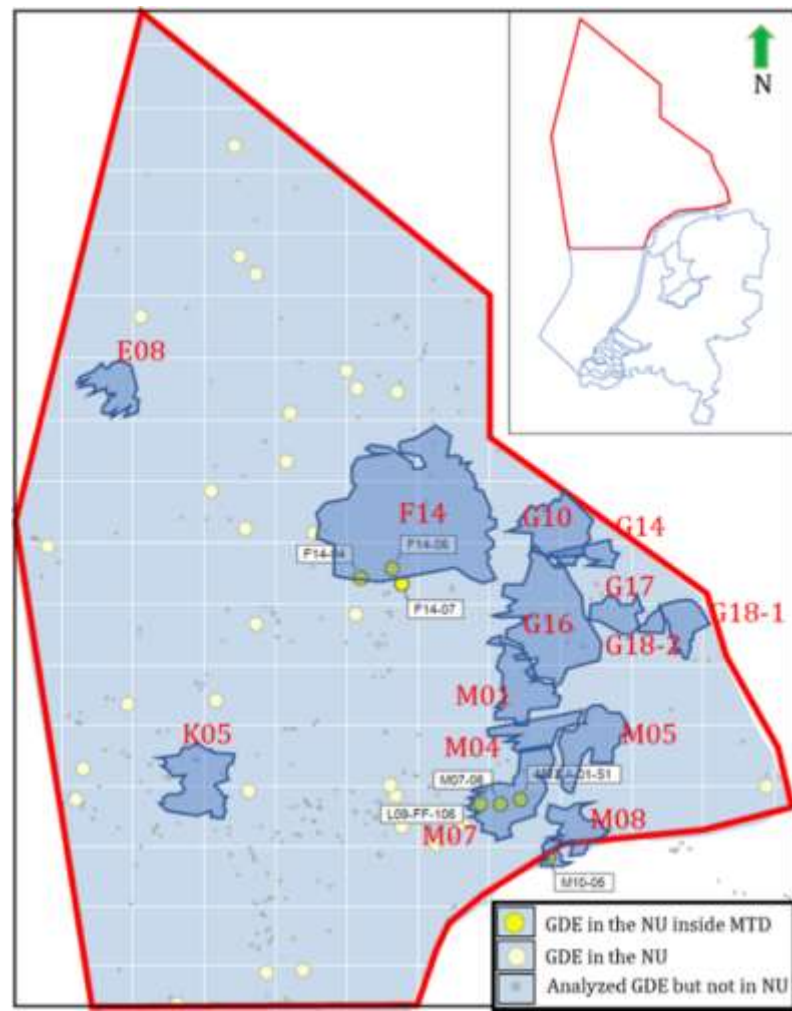
## Example 3

Bull *et al.*, 2009

## Do MTDs give rise to drilling problems? (e.g. hole instability)

- Geo Drilling Events: ~1000 events documented in EBN's database
- 10 events in study interval (NU)
  - No events coinciding with MTDs

→ MTDs do not form an additional drilling risk



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# Questions?

**Late Cenozoic mass transport deposits in the northern Dutch offshore:**

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Alex Marks <sup>1</sup> & Guido Hoetz <sup>2</sup>

(1) Currently employed at Fugro

(2) EBN

*Acknowledgement: ONE Dyas B.V.*

The logo for EBN, consisting of the lowercase letters 'ebn' in a white, sans-serif font, set against a dark blue rectangular background.