

REVEALING HIDDEN LANDSCAPES OF TOFTING AND STOLTHUSEN TERPS: A GEOARCHAEOLOGICAL STUDY IN NORTH FRISIA

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Introduction



Figure 1: Location of the Tofting and Stolthusen terps, Eiderstedt peninsula (Source: ESRI Map Services).

The Wadden Sea region represents a dynamic landscape with challenging conditions for human habitation, which commenced as early as the Mesolithic period [1]. In this research project, we study the marsh landscape in the vicinity of the Tofting and Stolthusen terps on the Eiderstedt peninsula in North Frisia,

Germany, using a multi-method approach. We test existing hypotheses [2, 3] on the landscape evolution and explore different forms of land use in the area. Our aim is to gain a broader understanding of the spatial aspects of these terps as well as to reconstruct the landscape history of the surrounding area.

Methods



Figure 2: Tofting (top), Stolthusen (bottom). (Map data ©2015 Google).

We combined minimally invasive prospection techniques:

- LiDAR-derived Digital Terrain Model (DTM)
- Magnetometry – 6-probe Foerster fluxgate gradiometer system with 50 cm x-line spacing
- Electromagnetic Induction (EMI) applied as Frequency Domain Electromagnetics (FDEM) – Dualem-21HS, 9 kHz
- Sediment cores – Dutch auger, Vibracore drilling system

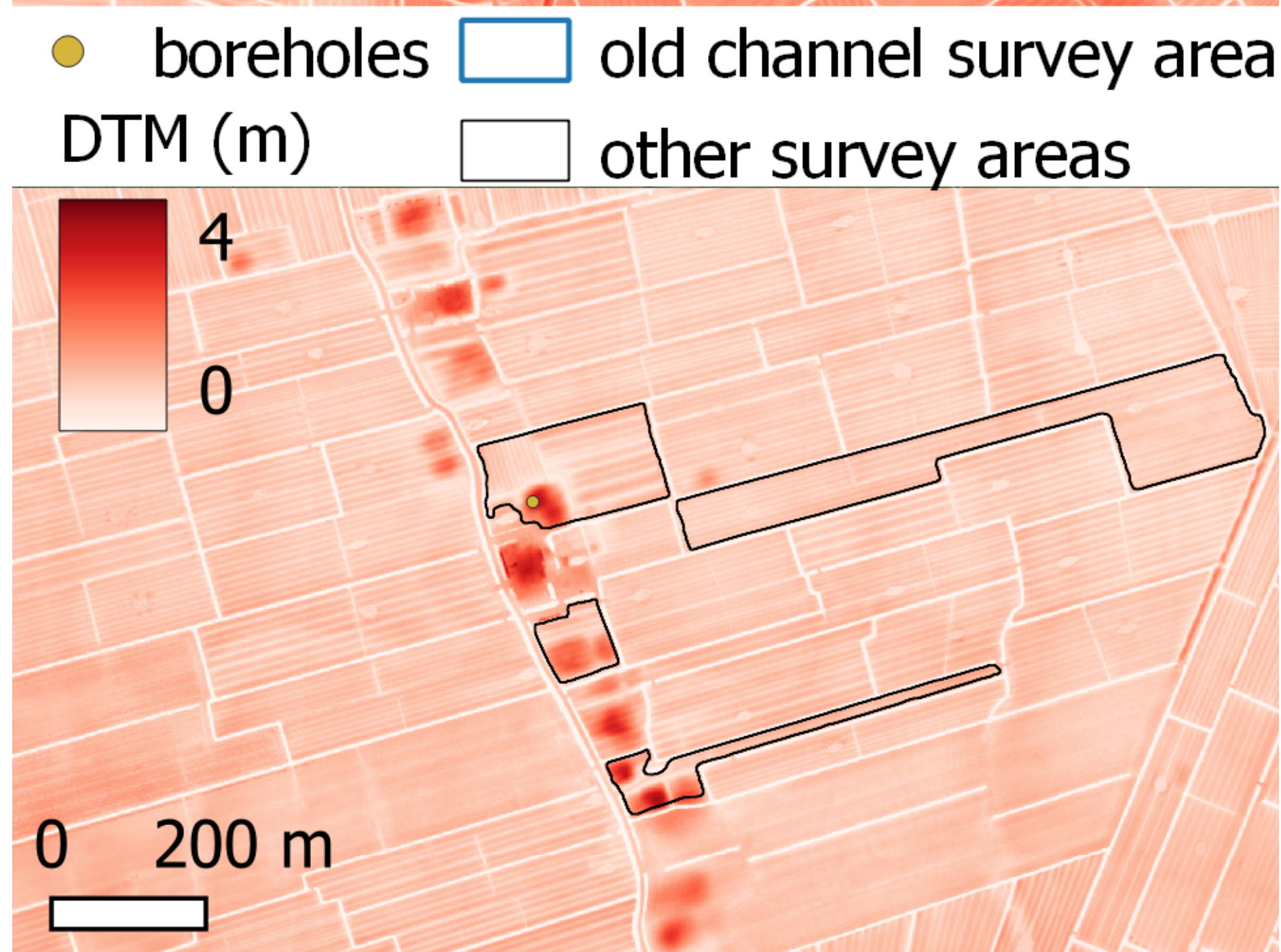


Figure 3: DTM with prospection & coring areas; Tofting (top); Stolthusen (bottom) with row of terps typically perpendicular to field ditches.

Results

The prospection and coring data show details of landscape evolution...

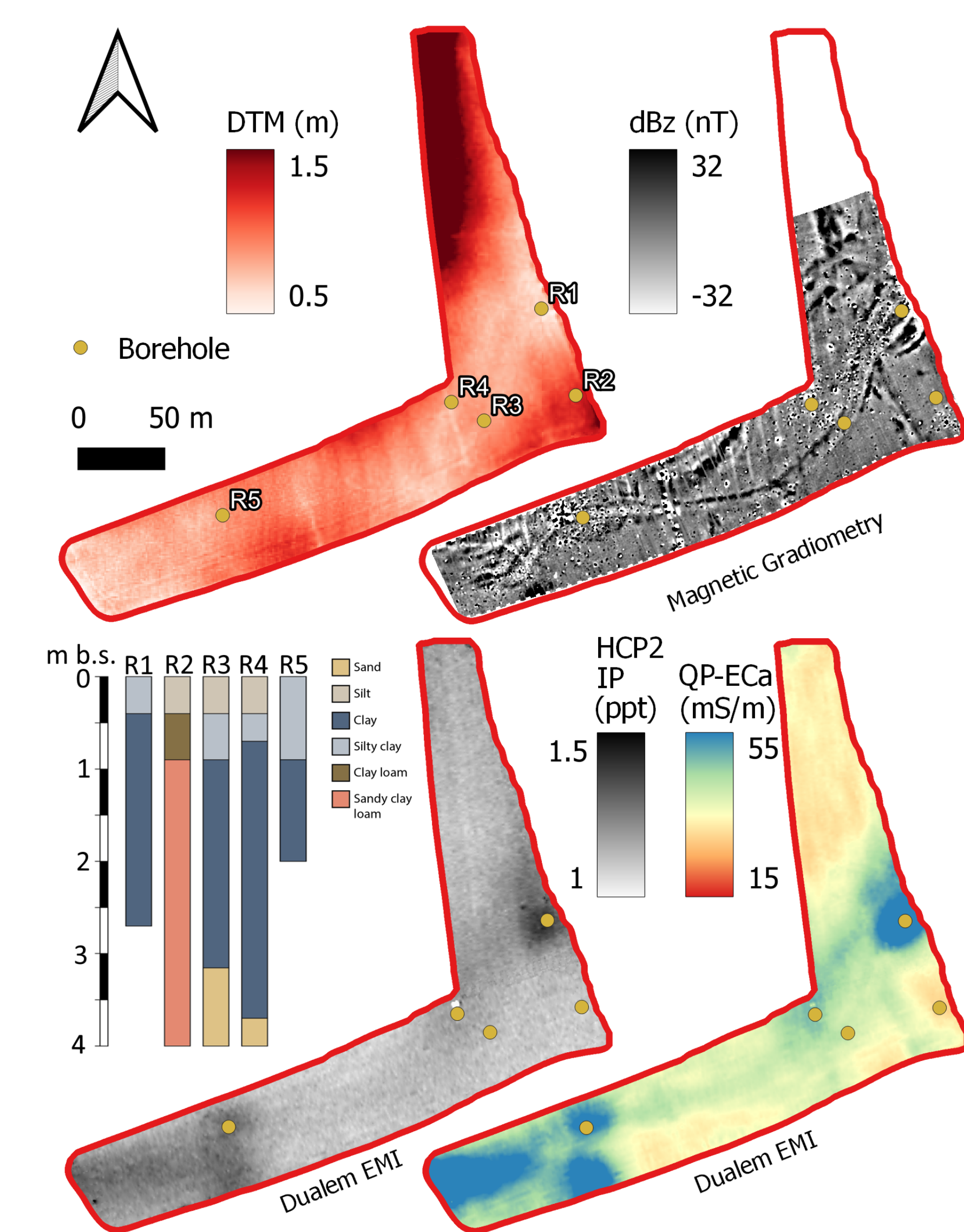


Figure 4: Relict channel Tofting + soil profiles. DTM & geophysical data show anomalies likely related to river access.

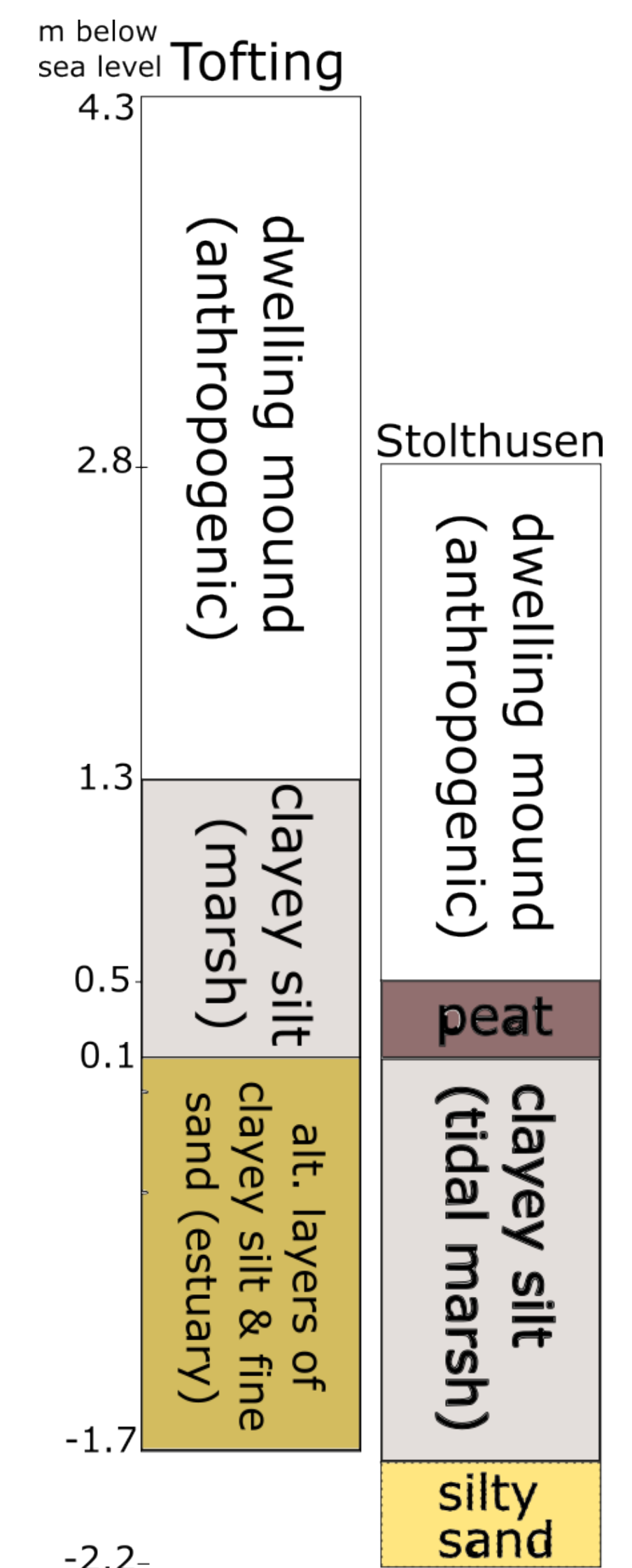


Figure 5: Vibracores from the top of Tofting & Stolthusen terps showing different settlement conditions.

...while the DTM reveals hidden features on a larger scale.

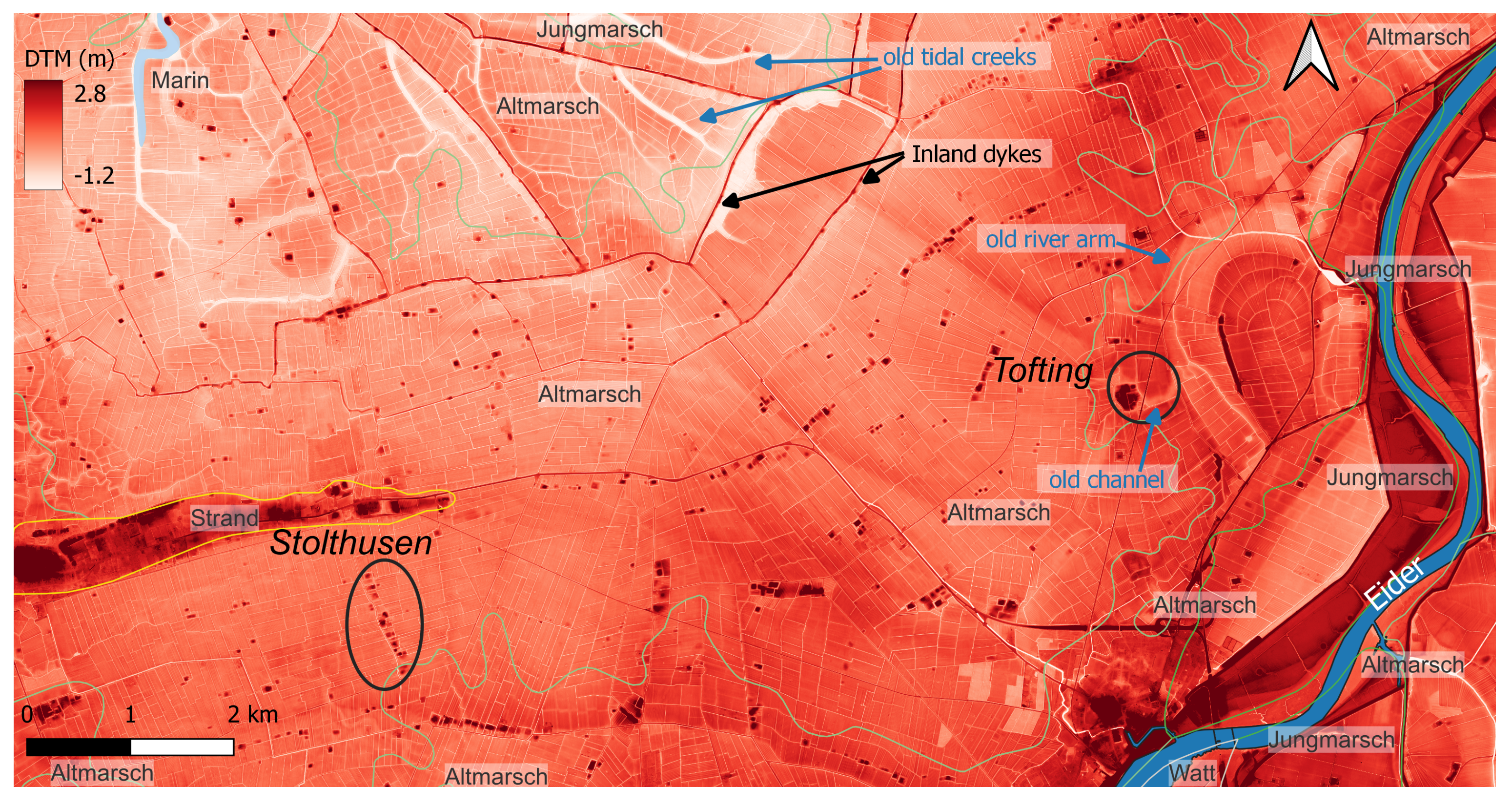


Figure 6: DTM with landscape types, relict landscape features & remnants of human land use. Tofting stands out as a large, solitary elevated area compared to other terps arranged in rows (e. g. Stolthusen).

Discussion & Conclusion

1. Tofting - More favourable, early river bank settlement with 'tidal' access to the Old Eider, which can be identified in multiple data sets - confirmation of long-standing hypotheses [2, 3]. Mottled clay layers in boreholes R1-R4 indicate tidal influence, anthropogenic traces and reed fragments in borehole R5. The presence of a dock during settlement is assumed.
2. Stolthusen - established later on less favourable peatland, land management resulted in noticeable subsidence due to drainage, which possibly explains the elevation difference.

The results of this study allow for the first large-scale spatial analysis of the surrounding landscape of the Tofting and Stolthusen terps, backing up and illustrating existing hypotheses and generating new insights into land-use history and landscape evolution. Our combined use of minimally invasive coring techniques with non-invasive geophysical prospection and remote sensing methods has proven highly successful in reconstructing the relict landscape and its changes over time.

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