Combining teaching and research: a BIP on geophysical and archaeological prospection of North Frisian medieval settlement patterns (Part 2)

# Houses everywhere?: Stolthusen's Medieval Terps under Geophysical Inspection

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## Introduction

The Terps (North-Frisia: "Warften") can be found near the Wadden Sea. Their construction in Northern Frisia, Germany, can be traced back at least to Roman times, continuing in the Middle Ages, up to the constructions of the modern dykes. They serve the purpose of safe retreat for people and livestock. Over time they were constructed using dirt, sediment, dung, and diverse rubbles [1, 2]. Stolthusen, situated on the Eiderstedt peninsula, is a site where a row of terps can still be observed. Deriving from the linear alignment they can be dated to the Middle Ages [1]. In contrast to medieval times, where people lived on salt production, herding, and agriculture [1], the site is used nowadays as a cow pasture. In the frame of a BIP Erasmus+ program, comprising students from Universities of Kiel, Bratislava, Vienna, and Ghent, a multitude of geophysical and archaeological methods were applied.


Figure 1: Location of the prospection site

## Methods

To explore three of Stolthusen's terps ("north", "middle", and "south") a combined approach of geophysical methods was used .

- Magnetometry using a 6-probe Foerster fluxgate gradiometer system with 50 cm x-line spacing
- Electromagnetic Induction (EMI) in multifrequency mode (FDEM) – Dualem-21HS, CMD Explorer
- Ground Penetration Radar (GPR) with the Sensors & Software Pulse EKKO 500 MHz antenna
- Electrical Resistivity Tomography (ERT) with Dipole-Dipole and Wenner Alpha arrays
- SH-Seismics (horizontal polarised shear waves)

The data of the geophysical methods were further compared to various drilling cores.


Figure 2: The Vibro-Core-Sample shows clayey silt, sometimes mixtured/alternating with organic matter in the first 2.35 m, artificial deposition, H. Hadler [3]

## Northern Terp

### Rising the Terp

According to the seismic data, the northern terp is built up mostly of clayey silt. The model further shows an underlying layer of silty sand (Fig: 3 E). This data is reflected mostly in the Vibro core (Fig: 2), which shows an admixture of peat material. Additionally, a drought gradient, decreasing in depth is visible. Further, a one-time construction of the terp is likely, because of its homogeneity. Both, the clay, as the main building material, and the mode of building, are characteristic for the Middle Ages [1].

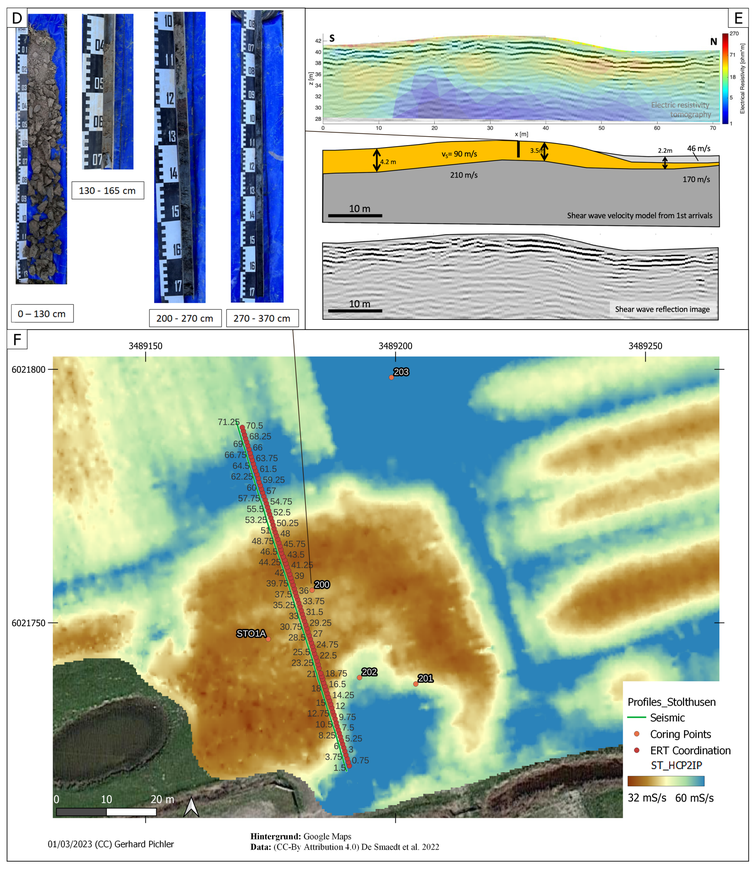


Figure 3: **[D]:** Borehole 200; **[E:]** top sediments (Vs=90m/s) dry/partially saturated silt (orange), lower sediment (Vs=210m/s) sandy silt (dark grey), north sediment ((Vs=46m/s) peat (light grey); **[F:]** View on north terp with EMI and Coring.

### Rubble Everywhere

The top of the terp has mostly low conductivity (Fig: 3 F). The magnetometry data from the top of the terp is highly dominated by strong thermoremanent magnetisation. This signal outlines the terp, contrasting sharply with the surrounding area. Compared to the corings taken from the top, this magnetisation can be correlated with brick debris, which may be remnants of previous houses (Fig: 4).

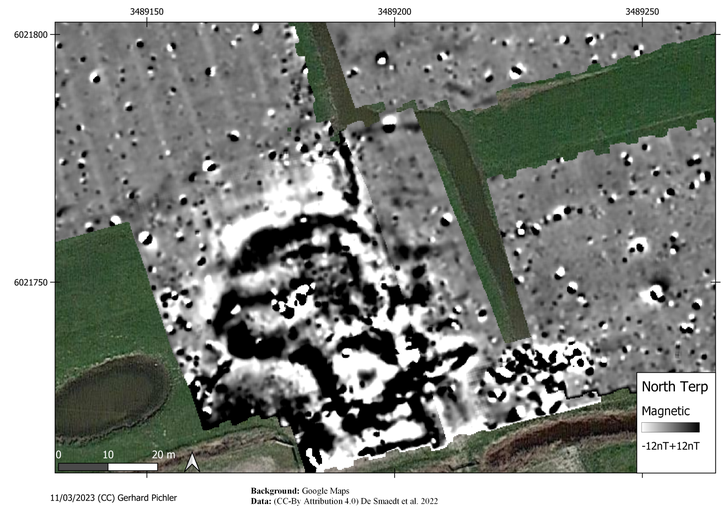


Figure 4: High magnetic respones on the North Terp, postholes in the north-east side

## Middle and Southern Terps

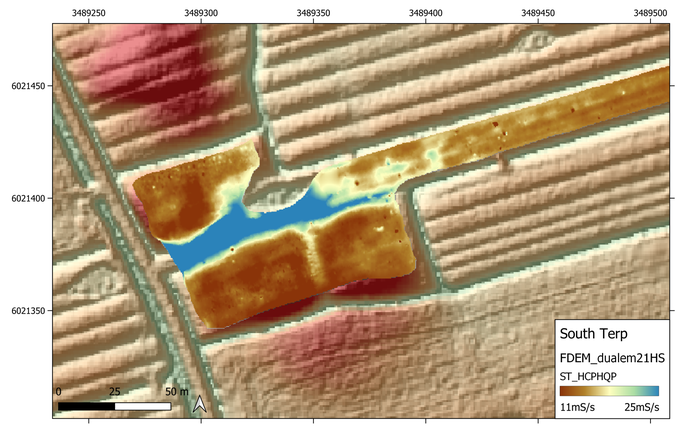


Figure 5: Higher conductivity zone splits the two south terps

The middle part consists of two distinctive terps, while the south section was originally one bigger terp (Fig: 6a). It got divided into two smaller ones, detectable by the EMI (Fig: 5). The strong positive signals from magnetometry on the south east part of the middle terp could be an indication of a structure (Fig: 6). Additionally, a formation of small ditches around each terp constitute the drainage ditches built during the construction of the terps [4]. Similar structures were detected on the island of Rungholt (Fig: 6 b-c). There they are more recognisable due to stronger erosion.

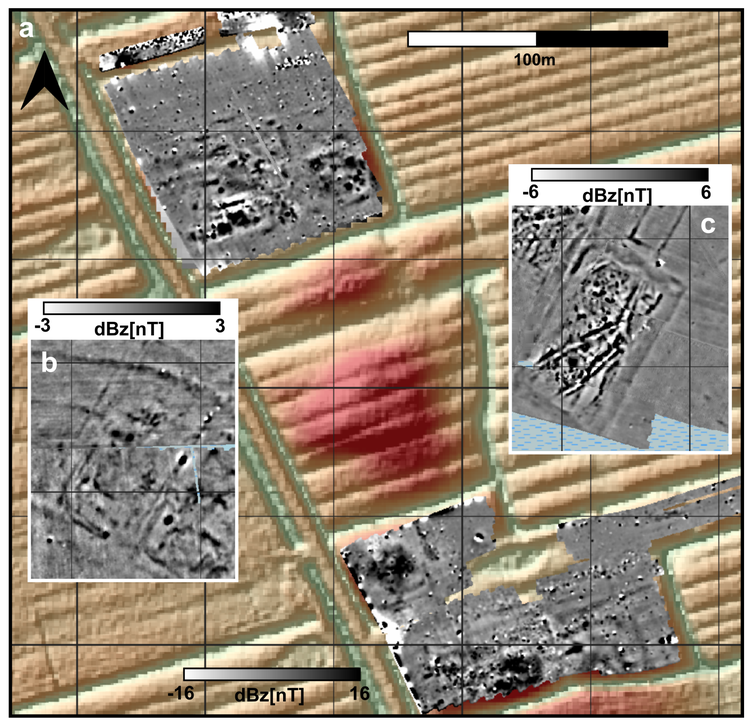


Figure 6: Magnetometry data, a: Stolthusen, b-c: Rungholt D. Wilken [5]

## Conclusions

The Stolthusen terps are a great example of medieval dwelling mounds constructed in uni-phase. They can be compared to other contemporary dwellings, like structures found on the island of Rungholt. In the middle and south sections, drainage ditches were build around each single terp. Some indication of parts of building were found, like postholes and rubble in the north, and positive magnetometry signals on the middle terp. Understanding the medieval settlement strategy can help future societies tackle inevitably approaching higher storm surges [4].

## References

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