Drowned by the Grote Mandränke in 1362 AD – new geoarchaeological research on the late medieval trading centre Rungholt (North Frisia)

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1| Introduction

Research approach: Transect through the Wadden Sea

(Correlation of storm surge impact between coastline and hinterland)
2 | The trading settlement Rungholt

Traces of cultivated medieval marshland in the Wadden Sea around Hallig Südfall

(Photos by Busch 1936, 1940, Vött 2013, Hadler 2013)
3 | Working in the Wadden Sea

Direct Push (DP) Applications

EC Electrical Conductivity Logging
HPT Hydraulic Profiling Tool
CPT Cone Penetration Testing

Application of geomorphological and geophysical methods in the Wadden Sea
(Fieldwork northeast of Hallig Südfall, Photos by Vött 2013, Hadler 2013, 2016, Willershäuser 2016)

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Overview of fieldwork locations in the surroundings of Hallig Südfall

(Locations of cores and ERT transects)
4| Results: Magnetic prospection

Geomagnetic prospection in the tidal flats west of Hallig Südfall

(Preliminary results of geomagnetic prospections carried out by the Working Group of Applied Geophysics, CAU Kiel)
4 | Results: ERT measurements

ERT measurements in the tidal flats northeast of Hallig Südfall

*(ERT transects run perpendicular to cultural remain, e.g. drainage ditches)*

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4 | Results: Coring

Sedimentary infill of a sluice-type structure northeast of Hallig Südfall

(Pushcore RUN 2A was drilled in the central part of the sluice)

Stratigraphical sequence preserved below Hallig Südfall

(Vibracore RUN 7A was drilled on a recent salt marsh in the northwestern part of the Hallig)
Sedimentological and geochemical analysis of push core RUN 2A

(geochemical proxies allow to separate between marshland formation and storm surge deposits)
Microfossil analysis of push core RUN 2A
(Foraminifera were identified according to Murray, 1971, 2006, Sen Gupta, 1999, Lehmann, 2000, Scott et al., 2001)
5 | Dating approach

14C-dating of marshland and storm surge deposits
(Calibration of radiocarbon ages by Calib 7.0)
6 | Long-distance effects

Storm surges induced landward formation of new marshland
(Vibracore MIL 5 is located about 25 km east of Hallig Südfall)
7 | Conclusion

- Detection of medieval marshland, cultural remains and storm surge deposits by multimethodological approach
- Destruction of marshland and infill of cultural remains associated with the 1362 AD storm surge
- First sedimentary evidence of the 1st Grote Mandrenke for the Wadden Sea of North Frisia
- Formation of new marshland close to Geest fringe after impact of medieval storm surges

The Wadden Sea is an excellent geo-archive for reconstructing man-environment-interactions.
Thank you for your attention!
Evidence for maritime trading activity at Rungholt

(Historical map after Mejer/Danckwerth, 1652; location of sluices, Moorish jug and historic document after Henningsen, 2002)
Present day coastal landscape is a result of man-environment-interaction and hydrological extreme events.
3 | Ergebnisse: ERT-Messungen

Stratigraphische Abfolge einer verfüllten Grabenstruktur nordöstlich der Hallig Südfall
(Lage der Bohrung RUN 2A: xxx)
4 | Results: ERT measurements

ERT measurements in the recent salt marshes on Hallig Südfall

(ERT transects run parallel to recent drainage ditches with exposed shell debris layers)