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## **The Historical Geography of the German North-Sea Coast: a Changing Landscape**

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# The Historical Geography of the German North-Sea Coast: a Changing Landscape

By DIRK MEIER

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## 1. The Natural Landscape and the First Settlements in the Clay Districts from Prehistoric Time until 1000 AD

One of the earliest geographic descriptions of the German North Sea coast is from the Roman Pliny the Elder (23/24-79 AD). In his *Historiae Naturae* (XI, 2pp., 405 pp) he wrote: *There, twice in each period of a day and a night the ocean with its vast tide sweeps in a flood over measureless expanse, covering up nature's age-long controversy and the region is disputed as to whether it belongs to the land or the sea. There, a miserable race occupies elevated patches of ground or platforms built up by hand above the level of the highest tide experienced, living in huts erected on the sites chosen, and resembling sailors in ships when the water covers the surrounding land, but shipwrecked people when the tide has withdrawn, and round their huts they catch the fish fleeing with the receding tide. It does not fall to them to keep herds and live on milk like the neighbouring tribes, nor even to fight with wild animals, as all woodland growth is banished far away. They twine ropers of sedge and rushes from the marshes for the purpose of setting nets to catch the fish and they scoop mud in their hands and dry it by the wind more than by sunshine, and with earth as fuel warm their food and so their bodies, frozen by the North-Wind. Their only drink is supplied by strong rainwater in tanks in the forecourts of their homes. And these are the races that if they are nowadays vanquished by the Roman nation say that they are subjected to slavery. That is indeed the case: fortune often spares men as a punishment.*

Probably Pliny has visited the North Sea region after a storm flood during a campaign of the Roman fleet against the Germanic tribe of the Chauci (Fig. 1), which had been documented by other Roman historians (MEIER, 2006) During this time a natural landscape of salt marshes and large peat bog areas dominated the environment.

### 1.1 Late Bronze Age, Pre Roman and Roman Period

Around 7500 years BP during the rise of the Holocene sea level after the last Ice Age the North-Sea extended to the edge of the Saale-Glacial moraine landscape of Lower Saxony and Schleswig-Holstein (Northwest-Germany) (STREIF, 2004; EHLERS, 1988). Around this time the evolution of the present-day coastal landscape started when the sea level reached a position of about 23–25 m below its present elevation. From about 7500 BP onwards, temporary



Fig. 1: Salt marshes, peats and coastline along the North Sea coast with Roman fleet expeditions and Germanic settlements. Fig. Dirk Meier

reversals are indicated by regressive overlap of peat layers on clastic tidal flat and brackish sediments. Ideal conditions for the formation of widespread peat layers along the coast between the Ems and Elbe estuary apparently prevailed between 4800 and 4200 BP and between 3300 and 2300 BP. At some locations peat layers date between 2000 and 1600 BP. Within a phase of a generally rising sea level the peat layers indicated a temporary decrease of water levels (STREIF, 2004).

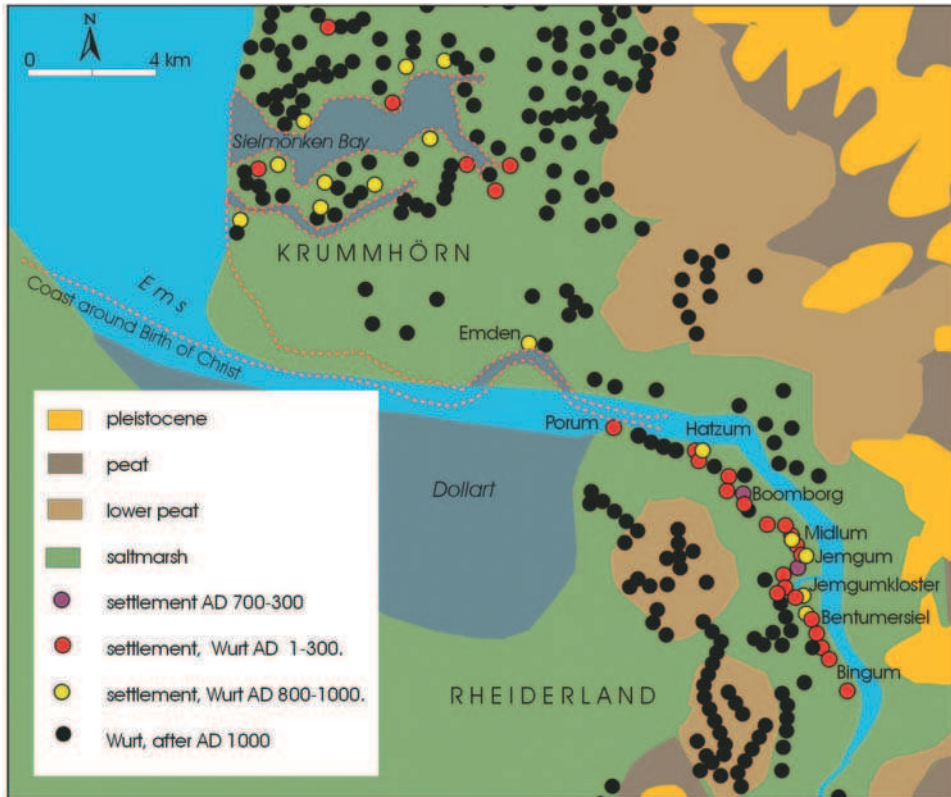


Fig. 2: Estuary of the Ems with settlements and Wurten. Fig. Dirk Meier

First marshes developed along the rivers, since Pre-Roman time along the North-Sea coast. The oldest settlements are known from the Weser and Ems river marshes, established during a period of water level regression (BEHRE, 2004). On the river bank of the Lower Weser a long-aisled stable house was erected in the 10/9<sup>th</sup> century BC. Botanical investigations have shown that arable farming was practised and that the settlement was situated in the upper part of a *Weichholzau*, dominated by *Alnus*. In the beginning of the Pre-Roman Iron Age between 700 and 660 BC, early settlers cleared also the uppermost part of the riverbank forests along the river Ems. Early ground level-single storey settlements (*Flachsiedlungen*) of this time are known from Boomborg-Hatzum (Fig. 2) and other places (HAARNAGEL, 1969). The main base of the economy of these settlements was stock-farming. Around 300 BC, settlement locations along the Ems were abandoned during a period of higher water levels and subsequently covered with sediments (MEIER, 2006).

The most active phase of this new transgression with the sedimentation of clastic deposits lasted in northern Germany for only two and half centuries, i.e. 400–150 BC (Fig. 3). Since 100 BC, salt marshes have developed on the surface of these deposits in the northern Netherlands as well as in Lower Saxony and the southern part of the North-Sea coast of Schleswig-Holstein between the estuaries of the rivers Elbe and Eider (BEHRE, 2004). These layers of soil deposited during a time of receding sea levels around the Birth of Christ.

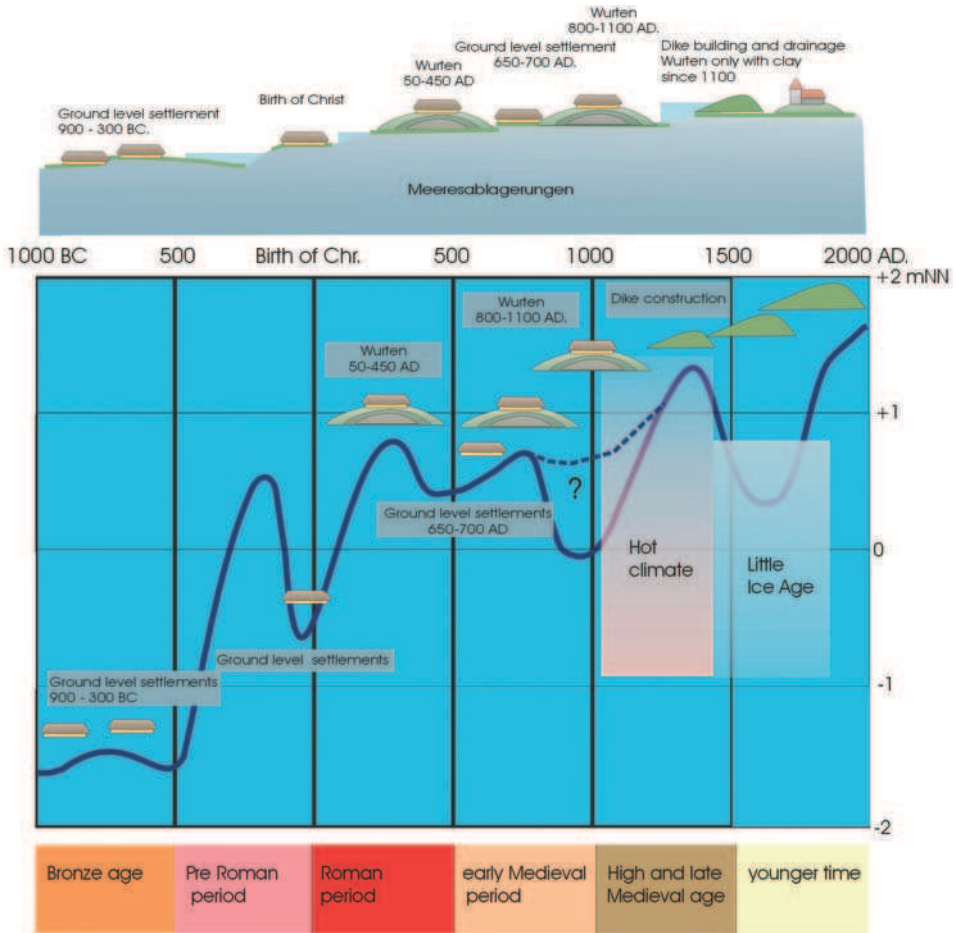


Fig. 3: Connection between Sea level, ground level settlements and Wurten as a model.  
 Fig. Dirk Meier

Another important consequence of this regression is the start of the formation of the East-Frisian barrier islands.

During this time, the salt marshes of Lower Saxony and those in the southern part of Schleswig-Holstein were inhabited. To the west, in the northern Netherlands, the settlement history is rather different because the clay districts of the provinces of Friesland and Groningen date back to approximately 600 BC. During the time of receding water levels around the Birth of Christ, ground level settlements were founded on high banks along the estuaries of the Ems, the Weser and Elbe in North-West Germany as well as in the clay district along the North-Sea coast. Examples are the Krummhörn around the Bay of Sielmönken north of the Ems estuary, Wangerland North of Wilhelmshaven, Butjadingen between the Jadebusen and Weser as well as the Land Wursten in Lower Saxony (MEIER, 2006). Most of these settlements were founded on high silted banks near the coast or river banks because large parts of the inland, e.g. the so-called Sietland, was covered with peat.

The inhabitants of these settlements protected themselves by constructing their houses on artificial earth mounds, called *Terpen*, *Wierden*, *Wurten* or *Warften*. These mounds had to be raised continuously due to rising sea levels or storm surges. The larger mounds (*Wurten*) with their numerous cultural layers, erected to protect people against storm surges, can in turn sometimes be used as fossil tide-gauges today. Some of these were 'village mounds', extended to protect entire communities e.g. Feddersen-Wiede in the Land Wursten/Lower Saxony (HAARNAGEL, 1979), Süderbusenwurd in Dithmarschen/Schleswig-Holstein (MEIER, 2004, 2005) or Tofting in Eiderstedt/Schleswig-Holstein (BANTELMANN, 1955).

The large excavation of the Federsen Wierde in Land Wursten north of the Weser estuary has helped to form our perception of a marsh settlement in the Roman period (Fig. 1). The development started with a little group of stable houses which were erected on a high beach ridge. Earth mounds were erected and raised starting in the 1<sup>st</sup> century AD. From the 2<sup>nd</sup> to the 4<sup>th</sup> century AD, a larger village mound existed before the settlement was finally abandoned during the 5<sup>th</sup> century AD (HAARNAGEL, 1969).

The salt marshes of Dithmarschen (Schleswig-Holstein), which have grown westward from the moraines and beach ridges of the older coastline since 500 BC, have been settled since the early 1<sup>st</sup> century AD. The earliest settlements were placed on lines with a southern-north orientation. Between 1998 and 2002, extensive excavations in Süderbusenwurd south-west of Meldorf have pointed out the existence of 'Wurten' with stable houses on a higher bank of a tidal channel around 50 AD. Consequently, they were raised after 150 AD (Fig. 1). The elevated settlement was abandoned at the end of the 3<sup>rd</sup> century AD. In the northern salt marshes of Dithmarschen small settlements are arranged on two lines west of the Pleistocene hinterland (MEIER, 2004, 2005).

Larger mounds (*Wurten*) existed also along the Eider estuary (Fig. 1). The best known example is Tofting near Tönning in Eiderstedt, which was founded in the 1<sup>st</sup> century AD on a high silted-up river bank northward of the Eider. The settlement consisting of a group of stable houses was raised with dung and clay in the following centuries, before it was abandoned during the 6<sup>th</sup> century AD (BANTELMANN, 1955).

North of Eiderstedt the present North-Frisian Wadden-Sea was a peat bog landscape east of a barrier coast of beach ridges and old moraines of the present islands of Amrum, Föhr and Sylt. Therefore, settlements of the Roman period are only known from the moraines (BANTELMANN, 1967; MEIER, 2006; MÜLLER-WILLE et al., 1988).

The economy of these mound-settlements was based on stock-farming with cattle grazing in the salt marshes around the settlements. Small-scale agriculture based on plants such as horse beans (*Vicia faba*), barley (*Hordeum vulgare*), oats (*Avena sativa*), Emmer (*Triticum dicoccon*) and flax (*Linum usitatissimum*) were only possible on higher banks during the summer months.

The first phase of the colonization of the clay district ended in most areas late in the 5/6<sup>th</sup> century AD. This may not have been the result of more frequent storm surges but also the consequence of the Migration period. There is no doubt that groups of Angles and Saxons migrated to England, but the question is how large these groups were. Too little is known about the settlement pattern in the time between 400 and 600 AD in North-Western Germany. In other clay districts such as Westergo in Frisia the colonization continued into and during the Migration period. This may also apply to East-Frisia, as recent excavations indicate (BÄRENFÄNGER, 2005). In Westeraccum, colonization started with a ground level settlement around the Birth of Christ. In the following centuries, the 'Wurt' was raised and continued to be a settlement during the 6 and 7<sup>th</sup> century AD (Fig. 4).

### 1.2 Early Medieval Time

Favourable natural conditions permitted the renewed colonization of the salt marshes in the North-West German clay district starting in the 6/7<sup>th</sup> century AD. During this time, new salt marshes had developed (Fig. 4). At some areas, the coastline shifted westward, in other areas large bays were generated by floods inside the old marshland, such as the Lay Bay,



Fig. 4: Salt marshes, peats and coastline of early Medieval time. Fig. Dirk Meier

the Harle Bay and the Crildum Bay in Lower Saxony. Along the shorelines of these bays 'Wurt' settlements were founded on higher banks. The renewed colonization by Frisian settlers in Lower Saxony, starting in the 7<sup>th</sup> century AD, began with ground level settlements during a time of a decreasing sea levels. The start of this phase was dated dendrochronologically at Upleward in the Krummhörn to be around AD 670 (BÄRENFÄNGER, 2005). Similarly, in Oldorf on a peninsula of the Crildum Bay in the Wangerland north of Wilhelmshaven, the start could be timed at AD 630 (BEHRE, 2004; SCHMID, 1994). In the course of the 8<sup>th</sup> century other salt marshes – such as the Krummhörn between the Ems estuary and the Lay Bay, Butjadingen and Land Wursten were settled again. Also the river banks along the Elbe were densely populated (MEIER, 2006).

The resettlement of the old salt marshes of Dithmarschen between the Elbe and the Eider by rural people started at the end of the 7<sup>th</sup> century AD. At this time, this area belonged to three North Elbian Saxonian tribes, which are described by Adam von Bremen in the history of the church of Hamburg (II, 17) with the words: *Transalbianorum Saxonum populi sunt tres. Primi ad occenaneum sunt Tedmarsgoi, et eorum ecclesia mater in Melindorp [Meldorf].* Charlemagne conquered these Saxonian tribes in AD 798. During this time, the salt marshes of Dithmarschen were one of the regions of clay districts in Schleswig-Holstein with the highest population. In southern Dithmarschen the settlements of this period occur in the same area as the settlements of Roman times (MEIER, 2004; MEIER, 2006). In the northern part between the present Bay of Meldorf and the Eider estuary the early Medieval 'Wurten' were established west of the region of the old Roman settlements, because bogs had spread over the inner part of the salt marshes after AD 400. The best example of a 'Wurt' of the early Medieval time with many habitation layers is Wellinghusen near Wöhrden (MEIER, 2001a). Here, a ground settlement was established at the end of the 7<sup>th</sup> century AD. Since the beginning of the 9<sup>th</sup> century the new stable houses were erected on single 'Wurten' (Fig. 4 and 5). Later, a large village mound evolved and was raised several times to an elevation of +6,2 m NN until the 14<sup>th</sup> century AD. The 10<sup>th</sup> century saw the beginning of an increase in



Fig. 5: Excavation of the village Wurt Wellinghusen, Dithmarschen. Fig. Dirk Meier



colonization and resulted in the establishment of new ‘Wurten’ such as Hassenbüttel or Wesselburen (MEIER, 2001a, 2006).

The colonization of the salt marshes north of the river Eider, which occurred during the 8<sup>th</sup> century AD, is connected with a Frisian immigration (Fig. 4). On the higher river banks large mounds were built in Elisenhof near Tönning (BANTELMAANN, 1975) and Welt (MEIER, 1997). Botanical investigations show that extremely halophytic conditions existed around these settlements. In Elisenhof a group of stable houses, surrounded by fences, were built as ground level settlements and later on raised with dung and clay. As during the Roman period, livestock was the economic basis of these settlements. Also the beach ridges of Eiderstedt were populated at that time.

Unfavourable environmental conditions due to the extensive peat bogs and swampy areas along the many parts of the North-Frisian coast prevented colonization before AD 1000 (HOFFMANN, 1988). Only the Pleistocene areas and flooded salt marshes in the western part of the tidal flats around the present island of Pellworm and Hallig Hooge were inhabited. These findings indicate that in early Medieval times salt marshes, located inland of the sand ridges, existed in the western part of the present North-Frisian Tidal flats. Excavations during the “Norderhever-Project” have discovered a ground level settlement of the 9/10<sup>th</sup> century AD, which was flooded in the late Middle Ages (MÜLLER-WILLE et al., 1988). By then, the sea level had risen so much that people could no longer live in houses built on top of the marsh land in North Frisia. Beach ridges in the West had been eroded and destroyed by waves and currents and, consequently, salt marshes were flooded too often during storm surges. Thus, mounds (Wurten) had to be built to protect against the rising waters. A number of settlements and burial mounds are also recorded on the Pleistocene deposits of the islands of Amrum, Föhr and Sylt.

## 2. The Cultural Landscape: Dike Building and Drainage from 1100 to 1634

Since the high Medieval Age, the entire area of the sea and river marshes were intensively cultivated and more densely populated than ever before. In the 11<sup>th</sup> and 12<sup>th</sup> century the building of dikes and drainage of land began. Initially, the dikes were not high enough to protect low-lying land against higher storm surges. More salt marshes – such as those in the northern part of Eiderstedt in Schleswig-Holstein – were colonized, and the landward swampy areas were drained. The local people generally took the initiative for the construction of dikes. Economic associations of high social standing and organised as cooperatives were established on larger ‘Wurten’ in the clay districts from East- to North-Frisia. Moreover, big chiefs (“Häuptlinge”) in East-Frisia and “Regenten” in Dithmarschen constituted and maintained complete independence from outside nobles and landlords until the late Middle Age, in Dithmarschen until 1559. The wealth of the leading families was based on the systematic drainage and colonization of the inland marshes and bogs. This started the transition from a natural landscape to the present cultivated landscape (MEIER, 2006).

The earliest dikes were built around the arable fields and meadows to keep out the occasional spring and summer floods. Examples of these local ring dikes, which are not very well preserved, are known from the northern part of Butjadingen near Sillens between the Jadebusen and the Weser estuary and Land Wursten in Lower Saxony (BEHRE, 2004). In the 13<sup>th</sup> century, these ring dikes were connected and raised. During this time the first sea dikes were erected along the coast in Land Wursten.



Fig. 6: East Frisia with Dollart and Jadebusen. Map of Blaeu in the *Theatrum Orbis Terrarum* (1645).  
Wikimedia

A consequence of diking was the water level increase during storm surges due to the reduction of the flood plains. Especially storms from the North-West forced water into the German Bight and the estuaries, and breaches of the dikes were common. Therefore, the dikes were built higher after the 13/14<sup>th</sup> century. Since the late Medieval time, heavy storm surges eroded and destroyed the higher banks near the coast. Salt water penetrated the low lying swampy areas and covered the peat with sediments. Due to extensive draining and subsequent compaction of the soil the surface had sunk. Several catastrophic storm floods eroded vast areas and created new large bays such as the Dollart in the Ems estuary and the Jadebusen between Wilhelmshaven and Butjadingen caused terrible losses of land, people and cattle (MEIER, 2006). In 1509 the Dollart reached its maximum extension which was close to six times its present size (Fig. 6). The reclamation of the lost land started after the middle of the 16<sup>th</sup> century. In the western part of East-Frisia the smaller bays of Sielmönken were embanked during the late Medieval times. The waters of the bay were cut off when, to the North, the Lay Bay developed in the 12/13<sup>th</sup> century and extended far to the South (BEHRE, 2004).

The largest of these catastrophes took place in the Jade area. The first Marcellus flood in 1219, the Lucia flood in 1287 and the second Marcellus flood in 1362 destroyed the dikes on the higher banks and salt water eroded the peat of the hinterland. The Jadebusen was formed and partly embanked in the following centuries (BEHRE, 2004; MEIER, 2006).

The sea dikes along the Dithmarschen between the Elbe and the Eider were built by

cooperatives which had been organised in parishes. These cooperatives – in Dithmarschen called “Geschlechter” – decided about the location, design, construction and maintenance of dikes, drainage systems and sluices. In the newly drained areas the farms of the cooperative settlements were built on little single ‘Wurten’ against flooding from inland waters. These Wurten were arranged in the landscape like beads on a string. Their narrow strips of fields penetrated farther and farther into the peat marsh. Moreover, in the salt marshes of Dithmarschen new village ‘Wurten’ such as Büsum, Schülpe or Lütjenbüttel were established. These mounds were mostly constructed with clay (MEIER, 2001a; MEIER, 2003).

On the low marshes of northern Eiderstedt numerous tidal channels separated island-like patches with mounds of clay. Even today these mounds still determine the appearance of the landscape in Westerhever, around Osterhever and Poppenbüll (MEIER, 2001b). Because salt water often inundated the low marshes, many of the mounds were suddenly raised in one construction effort. Excavations in Hundorf have documented an artificial mound of the 12<sup>th</sup> century with a height of +3 m NN, which was raised to +4 m NN in the 14<sup>th</sup> century (MEIER, 2001a).

The cooperatives, which settled on these ‘Warften’, also built dikes around their cultivated land and within single house ‘Warften’ were constructed (Fig. 7). The historical sources give no clear information about the social structure of the society, the dike building and marsh colonization during the high medieval time. Therefore, this process can only be assessed by an analysis of field forms, settlement patterns and the names of churches mentioned in historical documents. Inside the ring dikes irregular field strips were common. The best remaining example of this medieval landscape is the polder of St. Johannis. The surrounding

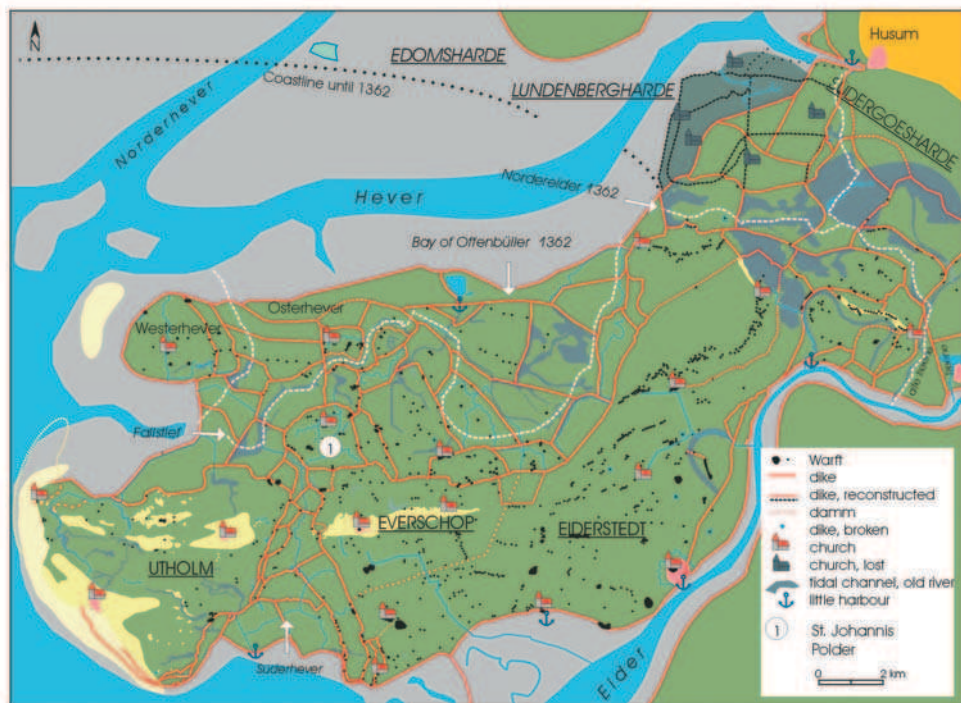


Fig. 7: Eiderstedt with Warften and dikes. Fig. Dirk Meier

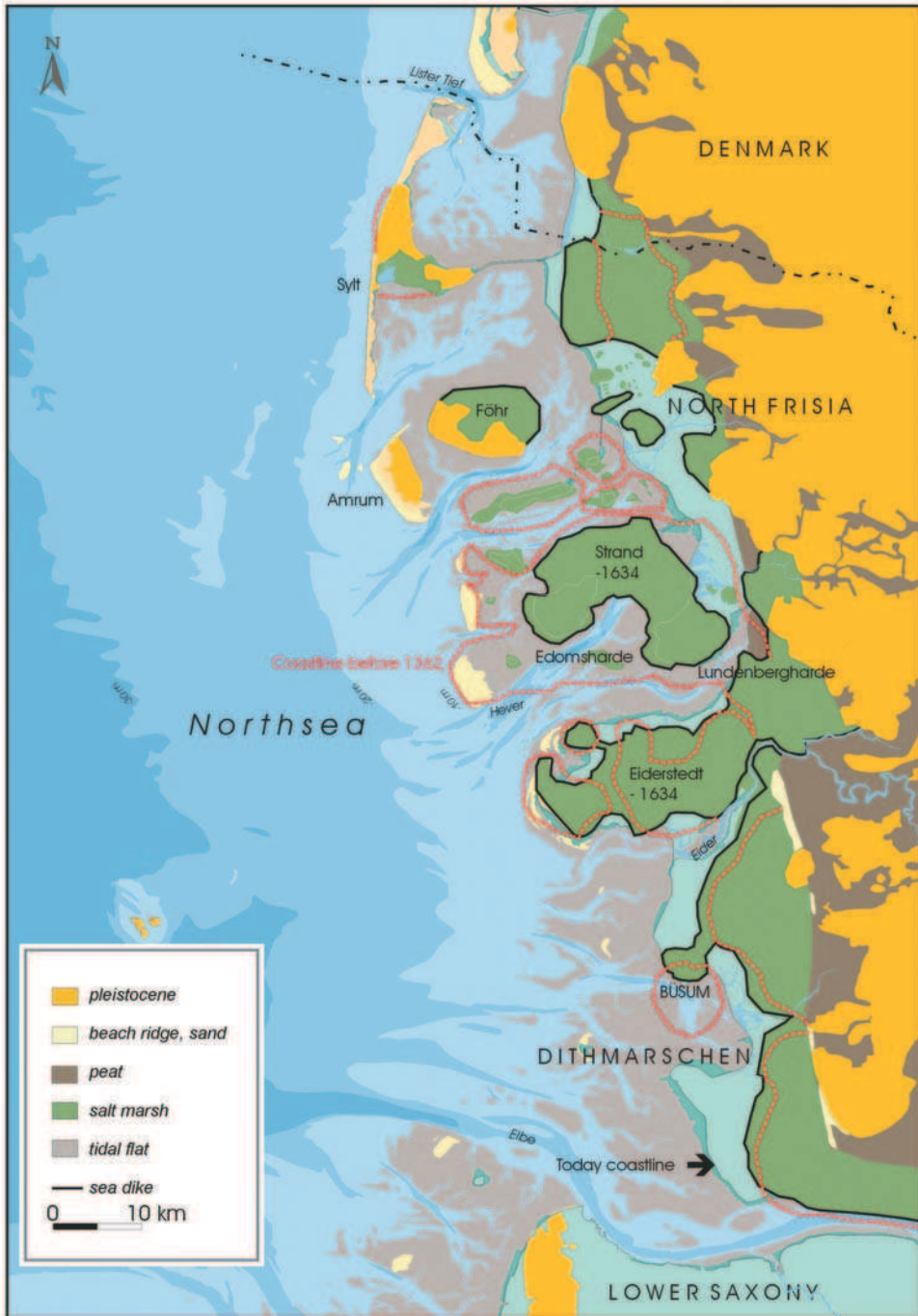


Fig. 8: Coastline of the North Sea coast of Schleswig-Holstein before 1634 with older coastline before 1362. Fig. Dirk Meier

low summer dike, constructed with an inside and outside trench, reached a height of +1.5 m NN in the 12<sup>th</sup> century and was raised further in the late Middle Ages (MEIER, 2001). Inside the polder we find the church and some single 'Warften'. To the West and Northwest, this ring dike of the St. Johannis polder borders on the wide Fallstief, which was not dammed off until the mid-15<sup>th</sup> century (MEIER, 2001b). With the construction of higher dikes starting in the late Medieval time, the floodplain was reduced. The more recent dikes built by order of (feudal) authorities are characterized by greater height and straight lines and no longer follow natural landscape structures.

According to numerous archaeological investigations, the outer salt marshes of North-Friesland were not colonized until the early Middle Ages. Several archaeological sites around Hallig Hooge, as well as the island of Pellworm delimit an area of earliest Frisian habitation in the 8<sup>th</sup> and 9<sup>th</sup> century. Similarly, in the north-part of Eiderstedt the oldest 'Warften' date back to the 12<sup>th</sup> century. After building dikes, the low-lying marshes were also colonized between the 12<sup>th</sup> and 14<sup>th</sup> century (MÜLLER-WILLE et al., 1988).

Since the late Middle Ages North-Friesland (Uthlande) suffered great losses of land (Fig. 8). During the catastrophic storm surges of 1362 and 1634, a large part of the Uthlande between Eiderstedt in the South and the island of Sylt in the North was completely lost. The so-called Edomsharde with the famous port of Rungholt was totally destroyed. The salt marsh areas below Mean High Water (MHW), which had been occupied and cultivated by man since the 9<sup>th</sup> and 12<sup>th</sup> century, became a permanent part of the tidal flats. Cultural remains dating back to the 12<sup>th</sup> to 14<sup>th</sup> century AD have been unearthed around the younger Hallig Südfall. The reasons for the catastrophes are the geological development as well as the activity of the inhabitants draining and mining salt. Thus, in particular, the exploitation of the coastal area by its inhabitants has to be blamed for the disaster (HOFFMANN, 1988; MEIER, 2006).

However, the coastal population could not know that the geological subsidence of the land, which depended on the relief of the glacial surface and the type and thickness of the overlying marine deposits, had not yet come to an end. Large tidal channels and gullies such as the Norderhever cut into the salt marsh area. These tidal creeks followed old glacial melt water valleys of the pre-Holocene landscape.

But also the settlers themselves contributed to the subsidence of the coastal marshland by the construction of dikes, systematic drainage of the area and, in particular, by peat cutting for the production of salt. Remnants of peat cutting activities can be observed in the vicinity of the Hallig Langeness and at other locations of the inner part of the North-Frisian tidal flats (MEIER, 2006). In Medieval times the settlers in this area sustained themselves on the basis of agriculture and salt production. The raw material for salt production was the peat of the upper organic deposits. It was cut systematically over large areas. The earliest report of salt production is from SAXO GRAMMATICUS (1180). Around the time of AD 1230, taxes had to be paid for salt production.

The second disastrous storm surge of 1634 also turned extended areas of coastal marshland into tidal flats. The large island of Strand was divided into the islands of Pellworm and Nordstrand as well as a group of smaller islands (*Halligen*). Subsequent attempts of reclamation of these areas were unsuccessful. They are still part of the cultural heritage and signs of the changing geography, landscape and settlement history.

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