

## ADVANCED REVIEW

# Historic narratives, myths and human behavior in times of climate change: A review from northern Europe's coastlands

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## Abstract

Decision-making about climate change is not only shaped by rational considerations, but also influenced by how communities define themselves, by historic or fictional narratives and collective memories. We add a historical perspective to this discussion and ask how regional collective identities and knowledge shape the perception of climate change. We look at coastal communities in northern Europe, which have lived with the threat from the sea for generations. “Deus mare, Frisia litora fecit.”—God created the sea, the Frisians created the coast, a famous quote in Eastern Frisia, shows how important the landscape and the battle against the sea are for a collective identity. We argue that these perceptions can influence the adaptive capacity to climate change positively, if values and collective identities of people are taken into account, or negatively, if people see their values and collective identities not taken into consideration or even threatened.

This article is categorized under:

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## KEYWORDS

adaptive capacity, climate change, identity, myth, narratives, perception

## 1 | INTRODUCTION

The purpose of this article is to provide a review of historically grown collective regional identities in the context of climate change adaptation, thereby contributing to our contemporary thinking about climate change adaptation and how people's understanding of climate is embedded in longer-term narratives and collective identities. Our aim is to demonstrate how important it is to take these identities into consideration when addressing climate change adaptation and identifying barriers and enablers to adaptation. Therefore, the focus here lies on the collective identities of certain groups and communities – which are based on factors like a shared history, common values, language, social connections and traditions – rather than on people's individual identity that of course also plays a role in climate change adaptation.

Yet, intangible and nonmaterial aspects of climate change such as values, perceptions or identities have received little attention in climate change adaptation research and if so, predominantly by geographers (Adger et al., 2009, 2011, 2013;

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Herrick, 2018; Hulme, 2008). For example, Adger et al. (2011, p. 2) argue that “climate change policy underemphasizes, or more often ignores completely, the symbolic and psychological aspects of settlements, places, and risks to them,” even though these places highlight the “emotional, symbolic, spiritual, and widely perceived intrinsic values of the environment.” The authors conclude that identity and sense of place are central to community resilience, public health and the general well-being (Adger et al., 2011, p. 20).

According to Adger et al. (2013), one reason why emotional and psychological aspects are underrepresented in current climate change research, is related to the fact that researching these aspects tends to apply a qualitative approach, which does not fit well with the predominantly quantitative research of the dominating climate science. Hulme (2008, p. 5) takes a similar view, stating that the narratives constructed around climate change are rooted within the natural sciences, and expectations are often that they improve “predictions” and help to frame a problem-solution policy, which claims both global reach and universal authority.

The existing literature on nontangible aspects of climate change puts an emphasis on the strong link between places and identities (Adger et al., 2013; Herrick, 2018; Marino, 2015): A place is not merely a compilation of physical factors or set of geographic coordinates, but rather a cultural construct.” (Herrick, 2018, p. 84) Adger et al. (2013, p. 113) conclude that “continuity of place can be an important component in maintaining or reinforcing identity.”

“Within the field of disaster studies, increasing attention is being paid to cultural factors. Worldviews, values, norms, attitudes and customs shape the capacity of communities to cope with shocks, while disasters in turn may shape culture.” (van Bavel et al., 2020, p. 100) Kempe (2006) writes about what he calls “culture of disaster” at the North Sea in Northern Germany and the Low Countries: “Cultural strategies of coping with natural hazards and preparing for future catastrophes necessarily require that experiences of such catastrophes enter the memoria of a social community. When remembered, memorialised and compared, experiences of disasters may inspire the invention of social practices and techniques in dealing with catastrophes” (Kempe, 2006, p. 328).

This strong connection between places and identities is also the underlying assumption for this review. Adding a historical perspective to existing discussions about climate change, places and identity can help us understand why and how these self-perceptions and collective identities have developed and what this means for climate change adaptation. Historical research, for instance, provides a vital perspective on human reaction to extreme weather events as for example Hardwick & Stephens (2019, p. 2) demonstrate in their study on Christian responses to extreme weather events from early modernity to present, which linked the origin of catastrophic events to a lack of religion and moral behavior: “The persistence of such moralistic explanations and ideas about divine retribution suggests that fruitful connections and comparisons can be drawn between past and present responses to extreme weathers and climates.” Wolf and Moser (2011) argue in a similar way by saying that believing in a higher spiritual being plays an important role in determining whether people believe that human action can influence the climate or the weather. And “if climatic change is interpreted as God teaching people a lesson or punishing sinners, public acceptance of climate policy may be undermined” (Wolf & Moser, 2011, p. 560). Ljungqvist et al. (2020) also identify this “divine punishment” as a main theme, especially in medieval and early modern Europe (see Section 3.1).

In the context of nation-building processes historic research has determined how an alleged joint history created a collective (national) identity (Flacke, 1998; Münkler, 2009). This review looks at the same phenomenon in a regional context and asks the question, how existing historic narratives influence people's perception of urgent environmental problems. Drawing from historic and current examples, we will argue that regional identities can influence the adaptive capacity, especially when adaptation measures contradict existing narratives and self-perceptions. On a more positive note, reverting to existing tales, stories and local historic knowledge also allows a better understanding of mental barriers against adaptation measures and might give researchers new resources to communicate necessary actions to regional communities and decision-makers. This review therefore not only looks at “real” historic events that had a great impact on coastal narratives, like devastating historic floods, but also at stories and legends as a second source that reflect an oral tradition often predating written sources. These stories are an indicator for how people have defined themselves and their lives, their identities in reference to nature and landscape sometimes for centuries. Those rather modern sources often contain traces of a far older oral history of storytelling (Rieken, 2005, pp. 35–36). This is for example reflected in the German word “*Sage*” (legend), which derives from “*sagen*” (to tell). While authors in the 19th century collected these legends and wrote them down, in the original meaning of the word they are short tales passed down orally. For Rieken “*Sagen*” are stories, which have been kept in the collective memory and contain information about questions of mentality. They do not tell about what actually happened, but about what people believe has happened. This also gives an insight into how they define themselves and reaffirm their identity (Rieken, 2005, p. 95). Above that oral traditions and regional stories have actually proven helpful to researchers and archeologists: based on

folklore archeologists in Northern Frisia were for instance able to find remains of old churches or farms that had drowned during flood events (Duerr, 2005, p. 50).

According to Fløttum and Gjerstad (2017) narratives define problems, indicate causes and possible solutions as well as moral responsibilities. In contrast to other argumentative or descriptive structures, narratives feature a storyline that can be realized in various forms, reaching from the aforementioned (fairy) tales to novels or reportages.

Understanding the self-perception of people living in these coastal landscapes and its origin, is an important factor to apprehend the reaction to current problems. Methodologically we approach the issue by reviewing and analyzing academic literature, historic sources and existing narratives, as represented in poetry, fairy tales and legends, local oral traditions or music. Hence, this is not an exhaustive or systematic review but is also based on the authors' involvement in climate change adaptation projects in the North Sea region and their previous publications in the field. However, by presenting key findings from academic literature and by reviewing historic sources as well as narratives, we aim to provide a unique perspective on the issue. This takes into consideration that many older myths and legends—originating as far back as prehistoric times—have found their way into today's popular culture and that way still influence people's thinking and understanding of places and cultural heritage (Holzhausen, 2019). This review therefore focuses on narratives about historic extreme weather events, as they are the ones most comparable to the expected long-term climatic changes that today manifest themselves in similar extreme weather events such as storms and flooding.

We will proceed as follows: first, we will briefly introduce and define the concepts regional identity and discuss the issue of perception of climate change. Then we will look at historic and fictional extreme weather events and their impact on regional identities mainly at the German North Sea coast, referring to a number of myths, narratives and stories about great floods, sunken cities and their influence on people's perception of natural disasters. This will be complemented by themes that emerged in recent research projects on climate change adaption in north-western Germany, themes that seem to reinforce the historical tales and regional identities shaped over centuries. While the connection between historic narratives and identities has been identified especially by historians, the literature on the effects of narratives and regional identities on the adaptive capacity to climate change is still lacking. In a case study, Karrasch et al. (2017) for example have discussed how landscape aesthetic values and cultural services, among them community identification were seen as essential for stakeholders in planning processes. This is the only case study so far that explicitly addresses cultural values in that region. Considering that the link between historical narratives and identities and contemporary climate change adaptation practices suffers from a paucity of case studies, we nonetheless want to introduce ideas and discuss how this knowledge can be used with regard to climate change adaptation by tapping into these regional identities, myths and narratives, also referring to examples beyond the North Sea context.

## 2 | CLIMATE CHANGE—GLOBAL PHENOMENON, REGIONAL ADAPTATION

Climate change is a global phenomenon, but the projected impacts differ from country to country, region to region or even from city to city, and depend on their vulnerability. Assessing the vulnerability of a given location involves assessing the adaptive capacity next to exposure and sensitivity. Adaptive capacity is defined by the Intergovernmental Panel on Climate Change (IPCC) as “the adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities (IPCC, 2014, p. 1758)”. Coastal zones are considered to be significantly vulnerable to climate change impacts (Grecksch, 2013; O'Donnell et al., 2019; van der Voorn et al., 2012). Sea level rise, floods, and/or changes in the water cycles pose severe challenges to cities and communities in coastal zones.

Even though coastal communities have lived with the threat from the sea for generations, climate change will most likely prove to be a new and different challenge, as measures people have relied on for centuries might not be as effective in future. At the same time—to give an example—coastal communities at the German North Sea coast have built their collective identity around the idea of a successful battle against the sea, around dyke-building, land-reclamation and withstanding wind and weather, which in their entirety have according to this narrative shaped a certain steadfast and strong type of people (Holzhausen, 2019). The predominant adaptation measure is to “hold the line,” that is, adapting the height of the dyke (Garrelts et al., 2013, p. 21). More innovative and creative solutions like opening the dyke to reconnect land and habitats on either side of the dyke, for example by perforating low summer dykes thereby converting pastures into salt marshes (Reise, 2005), are considered as nonfeasible by locals (Reise, 2015). Challenging these existing adaptation measures means challenging an existing identity and self-perception.

The question therefore is how these identities influence the adaptive capacity to climate change, especially when adaptation measures contradict existing narratives and self-perceptions. This research question is made more complex through a lack of definitions: the idea of a collective memory as basis for identities for instance has been widely discussed among historians, since Pierre Nora's "Lieux de Memoires" (Nora, 1984) or similar works like that of François and Schulze (2009) in Germany, but still "historians barely agree on what they mean by 'collective memory'" (Fulbrook, 2014, p. 68). The same problem arises with the definition of "region" or "regional," which needs to be contrasted against "local" storytelling and myth.

## 2.1 | The tower of babel: Defining regional identities

There is no commonly agreed definition of "region." The European Union is a good example for this problem: Glen (2008, p. 61) differentiates between three main types of regionalism within the European Union: regionalism as administrative decentralization, regionalism as federalism, and regionalism as nationalism. Often EU regions cross national borders and do not overlap with the member states' administrative levels and what they define as "regional" government or administration. The term "region" has no clear definition when used in common parlance either, making "region" or "regional" an arbitrary and flexible term in political and public discussions. This can cause problems when for example reviewing newspaper articles about climate change adaptation in a "regional" context.

The definition becomes even more complicated when looking at aspects of historically grown identities: people often identify with "their" region, which must not coincide with political-administrative boundaries. What can hold a region together and form a regional identity are for example a shared language or dialect, a shared or common history, narratives, myths or a sense of distinctiveness and/or the shared loyalties of their people (cf. Glen, 2008, p. 62). To give a short example: during the 19th century when the modern nation state as we know it today was formed, historic myth creating and artificial unifying history played an important role. In Germany it was Frederic I, the red bearded king, that would awaken when Germany was reborn and in France historic figures like Jeanne d'Arc became unifying symbols for the left as well as the far right. Interestingly enough the same phenomenon can be found on a smaller, regional scale. In the marchlands at the river Weser between Oldenburg, Bremen and the North Sea coast people for example rediscovered the Stedinger peasant's revolt of the 13th century and not only turned the Stedinger into a political myth—as spearheads of the 1848 revolution, early church reformers and nationalist figureheads—but also into a tale to define a regional identity. The Stedinger had not only fought against the oppression of the episcopal see in Bremen but also against nature. As colonists they had built the dyke, drained the marchlands, erected farms and villages, cultivated the land and protected the dyke—if necessary with their own bodies, as a common motive in the Stedinger literature tells. More importantly: they not only formed the landscape, but landscape and nature formed them. As battle-hardened warriors they fought the sea as much as foreign intruders, they valued nothing more than their freedom—just as the neighboring Frisians did. From that writers and artists in the 19th and early 20th century concluded that this special strength in character could also be found in their modern descendants. A historic tale was used to strengthen an identity deeply rooted in a region and its specific features: the landscape and the dyke, the language (a Low German dialect), art and culture (Holzhausen, 2019).

The so created identity is also closely connected to regional or local knowledge, because often enough people in coastal regions have—proudly—lived with the predominant natural conditions for generations. Storm floods here are part of the collective memory and people often have a sense for which weather conditions are real threats and which are just a "mild breeze."

Engels (2019) differentiates between forms of knowing and sensemaking. With regard to climate change she describes that the vast body of academic literature is only one form of knowing. Other forms include the knowledge generated by think tanks and NGOs. Moreover, other types of sensemaking such as political values and ideologies influence the view on climate change (research) as well (Engels, 2019). We propose that a regional identity is another type of sensemaking. Regional identities have produced and will produce knowledge—scientific knowledge, through universities and research based in a region, and nonscientific knowledge such as local knowledge about climate, weather and flood protection. The latter may also contain narratives and stories, which together can form an identity. Local knowledge can also be a corrective for the abstract formalized knowledge produced by mainstream science (Engels, 2019), with positive and negative consequences. Either it is contrary to academic knowledge or it is beneficial and enriches climate change knowledge. It is however important to enable greater representation and participation of indigenous people and their knowledge (Shawoo & Thornton, 2019) and to put local knowledge into context with regard to local

power relations and the interaction with government strategies, while also addressing structural constraints to the use of local knowledge across scales (Naess, 2013).

We argue that varying regional identities influence perceptions about climate change and especially the regional adaptive capacity. “If the identity aspect of any piece of information can overturn any other aspect of the information, we need to understand climate change knowledge in multiple non-scientific ways” (Engels, 2019, p. 3).

## 2.2 | Climate change perceptions and historic narratives

Perceptions can limit or encourage adaptation and “the perceptions of risks, knowledge and experience are important factors at the individual and societal level in determining whether and how adaptation takes place.” (Adger et al., 2009, p. 346). Most literature that discusses or reviews the perception of climate change focuses on individual perceptions or personal experiences (Grothmann et al., 2013; Grothmann & Patt, 2005; Hügel & Davies, 2020; Reser et al., 2014; Reser & Bradley, 2020; Tvinnereim et al., 2020; Wang & Zhou, 2020; Weber, 1997, 2016; Wolf & Moser, 2011). Perceptions of climate change risks and/or chances have been shown as important determinants of adaptation in various empirical studies (Grothmann et al., 2013; Grothmann & Patt, 2005; Hügel & Davies, 2020; Weber, 1997). Adger et al. (2009) discuss that even if people are provided with information on how to adapt, if those people do not believe that adaptation is necessary, no adaptation action will follow. Corner et al. (2014) and O'Brien and Wolf (2010) discuss personal values in relation to climate change. The latter conclude that “what is considered legitimate and successful adaptation depends on what people perceive to be worth preserving and achieving, including their culture and identity.” (O'Brien & Wolf, 2010, p. 233).

Some studies and reviews focus not just on the individual but on certain groups (young vs. old; rural vs. urban) or “publics” (Cook & Overpeck, 2019). Haluza-DeLay (2014) examines the engagements of various religious groups and traditions with human-induced climate change because among social institutions, religions are often presumed to be one of the most important avenues for values, motivations, morals, and worldviews. Wang and Zhou (2020) split their review in a macro and a micro analysis of climate change perceptions in China and the micro-analysis focuses on particular regions or specific populations (e.g., government officials, college students, farmers). They cite a study which focused on Tibetan villagers who view climate change as moral and spiritual issue (Byg & Salick, 2009). Hence, “research such as this reminded us that the importance to treat climate change not only as a physical phenomenon, but also social, cultural, and even moral and spiritual. Despite of the global nature of climate change, people's perceptions and responses must be understood in the local contexts.” (Wang & Zhou, 2020, p. 12) Wolf & Moser (2011, p. 549) mention (but do not refer to any concrete publications) that “some studies also focus on, or allow insights into, the ways regional populations differ from national averages, allowing for more tailored outreach campaigns.”

Hence, what becomes clear from the current research is the focus on individual perceptions and personal experiences and less on collective regional identities. Our review therefore tries to fill this gap, because how people perceive for example flooding, storm surges and protective measures, often described as presumed collective historic experiences, is an important aspect. In regions around the North Sea coast, the Baltic Sea or the Atlantic coast these stories about battling the stormy sea are a core narrative, including legends about cities or whole kingdoms lost in the struggle. Some of these stories, like the Celtic legends of Ker-Ys and Lyonesse (Markale, 2008, p. 79), have a mythical origin without any archeological or historic evidence, others, also long believed to be only legends, are actually rooted in history. Two well-known examples are the city of Dunwich in Suffolk, which repeatedly suffered storm damage and related land losses but at its height was a “port of considerable size” with reputedly 80 ships (Bankoff, 2013, p. 20), and Rungholt at the North Frisian coast, the latter long believed to be a myth: divided by more than 270 sea miles, both were destroyed in one single extreme weather event: the Grote Mandrenke/Grote Manndränke of 1362, roughly translated as “the great drowning of men” and also called the St. Marcellus's Flood (Duerr, 2005, pp. 113–114; Moss, 2011), “reportedly one of the single worst disasters of the thirteenth and fourteenth centuries” (Bankoff, 2013, p. 8). It “was said to have remodelled the entire Wadden Sea coastline (...) The death toll of 100,000, however, given in later chronicles is certainly an exaggeration.” (Bankoff, 2013, p. 8).

Climatic factors were important: the warming in northern Europe during the Medieval Warm Period was “+1.05°C, with respect to the 1951–1980 mean” (Esper et al., 2012, p. 862), leading to a period of prosperity in the Rungholt area. But with the beginning of the Little Ice Age the weather began to change (Rieken (2005, pp. 75, 170). Trouet et al. (2012) explain the climate science behind it. In his book about Rungholt, Duerr writes that the warm period in that region already ended in the second half of the 13th century (Duerr, 2005, p. 108): wetter and cooler summers



impacted the harvest and lead to famines and epidemics not only in the North Sea region, the first larger famine hit Northern Germany in 1308 (Duerr, 2005, p. 170). The thus weakened and decimated population was no longer able to guarantee the upkeep of the dyke as they had done before (Rieken, 2005, pp. 75, 170). Another factor that will probably have impacted the upkeep of the dyke was the Plague that according to various sources made coastal protection unaffordable in many regions (Duerr, 2005, p. 112). The combination of these factors with an above-normal seasonal flood finally led to the catastrophic events of 1362 when large previously reclaimed coastal areas were flooded and irretrievably lost to the sea. This example shows the impact of extreme weather events on people and landscape and could also be used for climate change communication, especially in combination with well-known narratives and stories.

Until today the stories about sunken cities and the devastating effect of flood surges echo in literature and art. In 1882 Detlev von Liliencron published the poem “Trutz, blanke Hans” in which he wrote about the mythical Rungholt (von Liliencron, 1964; translation J.H.): “Today my boat floated over Rungholt deep below/ the city drowned six hundred years ago/ And still the waves are wilful and abound/ As when under their rage the marches drowned.” Here the rich people of Rungholt become cocky and boisterous and in a drunken state they rush to the dyke and shout at the sea: “We defy you, Blanker Hans, lake in the North!/ And as they raised their fist in anger so raw/ Deep down in the mud the kraken stretched a claw.” According to the old Rungholt legend, its citizens did far worse: they asked a priest to give the last sacraments to a dying man, who turned out to be an intoxicated pig (Duerr, 2005, p. 114). Another story tells about the defilement of the altar bread (Duerr, 2005, p. 118). So it might not come as a surprise that Rungholt was also called the Frisian Sodom and that people later believed the Rungholt Watt was indeed cursed (Duerr, 2005, p. 122).

In von Liliencron's poem the punishment is swift; the storm flood, the Blanke Hans in its personification, is described as a beast resting on the ocean floor. But as it awakens and suddenly moves, the kraken creates the waves that will drown the city: “One scream and the town is erased from the ground/ and hundreds of thousands of people drowned.”

Even in recent years the poem has inspired artists to create their own works based on von Liliencron's verses. In 2015 the German band Santiano used slightly altered verses as lyrics for the song “Rungholt” and therefore—like German singer-songwriter Achim Reichel already did in 1978—transferred the old story into a new medium. Reichel immortalized another legend in one of his songs: in 2002 he set music to the poem Vineta by Wilhelm Müller (1825). The legend has it that the city Vineta, situated at the Baltic Sea, sank in a flood surge because of the abasement of morality. Its citizens had been too proud and extravagant and ignored all warning signs: For 3 months, 3 weeks and 3 days the city appeared as a ghostly light above the sea, later a mermaid appeared at the city's doorstep also issuing a warning. In their vanity the citizens ignored these premonitions and the city was swallowed by the sea. According to the legend the city reappears every 100 years on Easter Sunday and if the sea is very quiet one can still hear the church bells ringing beneath the sea.

When it comes to Vineta there is a whole list of publications—from poems to prose, from songs to opera, television and even movies. In 1860 for instance composer Johannes Brahms, set his music to Müller's “Vineta” (Müller, 1825; translation J.H.): “From the bottom of the sea below/ The evening bells ring soft and hollow/ They give us a wondrous account/ Of the beautiful, old marvellous town.”

In a larger context, the stories about sunken cities and the threats from the sea are a constant in German literature and art of the 19th and 20th century. In 1825–1826 the German poet Heinrich Heine (1797–1856) published “*Das Seegespent*” (The sea monster) in his poetry collection's “*Buch der Lieder*” (Book of Songs) first cycle about the North Sea (Heine, 1827, 1861): “But I still leaned o'er the side of the vessel,/ Gazing with sad-dreaming glances/ Down at the water, clear as a mirror,/ Looking yet deeper and deeper,—/ Till, deep in the sea's abysses,/ At first like dim wavering vapours,/ Then slowly,—slowly,—deeper in colour,/ Domes of churches and towers seems rising,/ And then, as clear as day, a city grand, (...).” Here the unknowing traveler peeking down from the boat to the bottom of the sea discovers a sunken city, young girls strolling beneath linden trees, old ladies walking to church—and a lost lover, hiding beneath the waves for 500 years.

In April 1888, German author Theodor Storm published his novella “*Der Schimmelreiter*” (The Rider on the White Horse) (Storm, 2005) for which he is maybe best known today. It tells the story of “*Deichgraf*” (dykemaster) Hauke Haien who has new ideas on how to build dykes that will give better protection against storm surges. During a fatal storm surge that destroys the dyke he was responsible for, he sees his wife and daughter drown. Grieving, he rides his white horse into the sea screaming: “Lord, take me, spare the others!”

No matter where those tales are actually situated and what their origin is, the stories have common features: on certain days the sunken city—like Vineta or Rungholt (Duerr, 2005, p. 7)—can for instance still be seen on the horizon,

a warning to the living. And when the sea is very quiet—so a common motive often adopted in literature, art and music—the church bells can be heard ringing beneath the sea. During the late 19th century locals in the area of what was then considered the potential site of Rungholt actually made excavations in the Wadden Sea, hoping to find the city's legendary bell that according to legend is still buried underneath mud and sand (Duerr, 2005, p. 135; Rieken, 2005, p. 193). In short: the tragedies of the past have become a warning for the future.

Remains of lost cities and markers in the landscape indeed often play an important role in the development of narratives and stories: traces of former settlements in the ground of the Wadden Sea kept the narrative in the collective memory that the sea often swallows the land and those living on it, as pottery and every day tools conserved in the mud of the Wadden Sea and found during low tide did clearly prove (Rieken, 2005, p. 188), (Duerr, 2005, p. 46). “All along the shores of the North Sea, the remnants of once thriving farms and villages or the memory of drowned landscapes still haunt their descendants who inhabit this region today” (Bankoff, 2013, p. 9). Because memories of floods and storms, people and culture are still intertwined today, Kempe (2006, p. 331) comes to the conclusion that water is indeed the “decisive key to understand the social life of communities on the North Sea Coast.”

Another example can be found in Wales: in May 2019 storm Hannah revealed the remains of a 4500 years old prehistoric forest. “The forest has become associated with a 17th Century myth of a sunken civilization known as ‘Cantre'r Gwaelod’, or the ‘Sunken Hundred’. (...) It is believed the area was a once-fertile land and township protected by floodgates” (BBC News, 2019), extending “some 20 miles west of the current shoreline into what is now Cardigan Bay.” (BBC News, 2019).

Visual reminders are important for the continuity and forming of narratives. Along the North Sea coast but also along rivers, we find flood markers or high-water marks, signs on houses indicating the date and the level or height of often several past floods (Figure 1). Depending on the age of the house the markers can go back to the Middle Ages or early modern times. For locals, flood markers are a constant reminder of the danger of the sea, but also people's resistance against these natural forces: the houses are still standing after all, the damage has been repaired. “These markings of the storm-tide levels (...) mark the transition between the memory of things and cultural memory. They represent not only useful information about the movement of the sea level but, at the same time, they represent a piece of memory of past floods” (Kempe, 2006, p. 337). They are a reminder that the event might happen again, or as Kempe (2006, p. 339) puts it: “As a normative message the postulate ‘Mind the next flood!’ is a part of a moral memory that tries to connect the past with the present”. According to Pfister (2011, pp. 8–9): “rather than being purely communicative, high water marks can be read as visual expressions of institutional risk memory (...)”. The impact this has on local narratives and perceptions of floods, the collective memory and identity is an interesting topic for further studies (McEwen et al., 2016).



FIGURE 1 Stormflood marker Hallig, Germany

### 3 | WHAT MYTHS, NARRATIVES AND STORIES TELL US ABOUT CLIMATE CHANGE

Historic and mythical narratives as “warning” stories often contain elements that are still important today. Looking for example at Rungholt, a factor for the devastating effect of the storm flood was that for centuries the population in this area extracted salt peat, which lowered the ground. “Land that had been previously protected from the sea by raised peat bogs formed over the millennia was by 1500 close to the mean water level of the North Sea.” (Bankoff, 2013, p. 9) According to Duerr (2005) salt peat mining became possible in the Rungholt region in the Middle Ages when areas with peat soil were flooded. Salt peat was not only used as fuel for fire, but the ashes were also washed to extract salt, which was a lucrative business (Rieken, 2005, p. 66) but also “highly destructive of peat banks” (Bankoff, 2013, p. 9). Peat mining was one of the factors for the devastating effect of the Grote Mandränke, because the water encountered less natural resistance before hitting inhabited land (Duerr, 2005, p. 172). The second factor for the lowering of the ground was that the city had been built on a moraine valley, a leftover from the Saale Ice Age (approx. 300,000–130,000 BC), which was filled with a sediment layer of up to 16 metres. The sediment level over time slowly dropped in a natural process (Rieken, 2005, p. 176).

The problem that the inhabited land lies below sea level but behind the seemingly protective dyke still exists today, for example at the German North Sea coast, where the land behind the dyke has subsided due to drainage, peat extraction and farming (Reise, 2015, pp. 15–17). Today, the region is therefore threatened by a similar scenario as has proved fatal for Rungholt. Among the consequences are first of all the need for more electricity to pump the water back over the dyke into the sea twice a day. Second, there is an increased danger of inland flooding or, the worst-case scenario, a storm flood combined with inland flooding (Grecksch, 2013).

Historic flood events and the corresponding collective memory can play an important role in early warning systems and make people aware of these risks. The devastating Hamburg flood of 1962 is a good example for this: according to McEwen et al. (2016) and Mauch (2012), here the “disaster memory became a veritable duty” to engage with a “memory landscape” of speeches, memorials, high water marks, signs, newspaper articles, photographs and films. However, the 1962 flood itself proved to be an example of low risk awareness. The citizens of Hamburg felt safe behind their dykes and nature was not seen as a danger—Naturvergessenheit (forgetting about nature) could be a defining feature of the city and its citizens back then (Heßler & Kehrt, 2014). Yet forgetting about nature corresponded with relying on technology—a paradigm that was questioned afterwards. Therefore, nature was no longer the only danger, but technology to control nature was not deemed safe either (Heßler & Kehrt, 2014, p. 24). Moreover, the storm flood was also interpreted using metaphors from the Second World War, that in 1962 were still present in the living memory, to the extent of comparing the flood to the devastating air raids in July and August 1943 (Heßler & Kehrt, 2014, p. 31). Hence, remembrance as part of the local or regional memory culture also provides a perspective for future, climate change related events, as coping mechanisms or warning systems.

As Box 1 shows collective memory plays a vital role for early warning systems in other parts of the world as well: Narratives about natural disasters and how to behave when certain natural phenomenon occur can actually help to save lives.

In the two following subchapters we will show how stories, identities and local knowledge can be used to gain a better understanding of people and their connection to landscape and nature. It is important to recognize that the close connection people have to the landscape, might also lead to a rejection of new measures—because they go against their cultural values, ideas and identities connected with landscapes, which mostly have been shaped by humans but are perceived to be the natural order of things.

#### 3.1 | Collective memories, identities and responses to climatic events and climate change

In narratives and stories dyke-building is often connected with morality and good behavior. Every landowner at the German North Sea Coast during the Middle Ages for example was tasked with the upkeep of the dyke as were landowners in other North Sea countries (Esser, 2016; Kempe, 2006; Soens, 2018; Soens et al., 2019). Not to do so, was not only a crime but also a moral failure, as it not only threatened the landowner and his family but also his neighbors. Above that during the Middle Ages storm floods were also connected with the idea of punishment. In all three Frisian regions tales exist that a blasphemer and sinner defiles the holy sacrament and in his wrath God sends a flood to



### BOX 1 Narratives and local knowledge play a key role in disaster warning

Beyond the North Sea context, Hiwasaki et al. (2014) describe how coastal and small island communities have long histories of observing changes to the environment. A key observation the authors made was the ability of local people to closely observe and monitor changes in their environment. This includes observing clouds, winds, sun and the stars and proved to be highly effective in predicting hydro-meteorological hazards: “In both Rapu-Rapu, Philippines and Aceh, Indonesia, it was documented that a foul odor emanating from the sea signified the coming of a storm or typhoon” (Hiwasaki et al., 2014, p. 18). Balay-As et al. (2018) analyze early warning systems among indigenous people in the northern Philippines with regard to typhoons and discuss the pros and cons of linking up indigenous with scientific knowledge. The indigenous knowledge used for the early warning system is based on sources such as reading the signs conveyed by heavenly bodies, movement of insects, changes in the behavior of animals, generated from lived experience, human-nature relationships in general, cultural history and conveyed through the practice of indigenous daily life, including story-telling (Balay-As et al., 2018, p. 21). According to Bankoff (2009, p. 265) “for Filipinos, hazard and disasters are simply accepted aspects of daily life,” such a “frequent life experience” that one can speak of a “normalisation of threat.” Such “cultures of disaster” embody coping practices—physically by “relocation of settlements, and in patterns of migration” and mentally by developing “strategies for dealing with the emotional and psychological requirements of living with uncertainty” (Bankoff, 2009, p. 266). Adaptation, for example crop diversification and coping practices “are based on the assumption that what has happened in the past is likely to happen again to a familiar pattern. People’s earlier actions, therefore, constitute a reasonable framework for guidance during repeated events” (Bankoff, 2009, p. 268).

Becker (2008) highlight the role of stories and refer to Native American oral histories, which have been integrated into earthquake and tsunami hazard education. McAdoo et al. (2006) describe how oral histories recounting a 1907 tsunami saved thousands of lives during the 2004 and 2005 tsunami events in Indonesia’s Aceh province: the oral tradition advised people to run to the hills after significant shaking of approximately 1 min. All those who survived the 2004/2005 tsunami were aware of this historic event and the necessary action.

destroy the land (Rieken, 2005, p. 206). Hardwick & Stephens (2019, p. 4; emphasis in the original) also look at the phenomenon of warnings to sinful communities in a Christian context: “God sent such ‘wonders’ to warn sinful communities of approaching disasters and to commend people to pious and penitential lives.”

The flood did not only pose a mortal danger but could also mean losing the chance of an eternal life “if the body was not found and buried in consecrated ground.” (Allemeyer, 2007, p. 99) Fischer describes the outer dyke land in Early Modern Times as “stigmatised space, where the gallows often stood and dishonourable burials took place” (Fischer, 2007, p. 6).

Indeed, in the context of religion and myth in the original meaning of the word—as a tale about the gods—the rise of the sea level is often associated with the end of the world, with death and rebirth, with human failure and punishment by the god(s): the old testament tells about the great flood God sends down to earth, because God’s creation has become immoral and God resets the world by saving only a few people deemed worthy enough. Only Noah and his family heed the warnings and thus survive the great flood, save a pair of each animal and start anew once the water has subsided. “Actual storm floods were called ‘particular-deluges’, to recall the biblical deluge as a world-wide inundation meant to punish mankind for its sin and moral depravity. The reference to Noah’s flood makes it possible to extend the flood memory back into the distant biblical past” (Kempe, 2006, p. 349). Allemeyer determines different sources for the fear of the flood. “The oldest, but nevertheless still valid interpretation was provided by biblical myth of the ‘Flood’ and the abolition of the safe border between land and sea, as a measure of divine punishment” (Allemeyer, 2007, p. 99). The sea here was a reminder of said biblical flood, further enhanced by the belief that was still common in the Middle Ages “that the end of the world would start with the rising of the sea” (Allemeyer, 2007). In the same vein, Rohr (2007, p. 89) states that the report of a great flood appears in many cultures as part of the creation myth and serves as the archetypical flood that washes away the sins of the world. “Hence, the characteristic aspect of punishment is apparent in many such cases.”

The stories about storms and floods as punishment for sins can be found in other cultural contexts as well, like the Sumarian Gilgamesh epic, which tells a similar story about how the gods once became angry with mankind and sent a flood for their utter destruction. Warned by god Ea Utnapishtim builds a boat for himself, his family and the seed of all living things. Just as in the biblical story rainfall floods the world and as the flood subsides, the boat lands on a mountain and a rainbow is sent as promise for the future (George, 2003).

The Norse legends also put a great flood at the center of their tale about the end of the world: after the mighty Fimbulwinter and earthquakes, which will free the Fenris wolf, the waters of the ocean will rise and surge unto land. The venom of Jörmungandr, the sea snake born to the giantess Angrboða and Loki, will poison all life in the ocean and the sea birds in the sky. That is the beginning of the end as the gods of Asgard are slain in battle. The world is engulfed in flames and the ocean swallows the ashes. Only the great tree Yggdrasil will be untouched and in its roots a man and a woman are hidden whose descendants will repopulate the earth. Ragnarok therefore is not only a story about death and destruction, but also one of rebirth, all centering around events that are not simply mythical stories, but also a description of natural disasters, which at some point must have affected the original storytellers: earthquakes, forest fires and devastating flood events (Lindow, 2002, pp. 254–258).

Many of these stories might actually have their origin in actual flood events that happened before people recorded them in written sources but instead have been passed on in mythical stories that slowly became disconnected from the actual event. Gräslund and Price (2012) for example argue that the origin of the Ragnarök stories lies in the dark summer of AD 536, showing that the climatic downturn not only widely disturbed settlements in Scandinavia but also influenced poetry and sculpture. The exact date of composition of the Norse mythological poetry “has been long debated,” according to the authors the first poems were put into order around the first millennium AD, but “it is equally clear that they are merely the result of centuries of addition and reworking, and that they contain numerous elements that go back to at least the fifth century” (Gräslund & Price, 2012, p. 437). And here the authors make a connection between historic extreme weather events and Ragnarök, because the legends describe very “specific weather conditions, including their appearance, duration and precise effects” (Gräslund & Price, 2012). The authors' conclusions indicate how a shift in narratives and the origin of stories might be found in actual historic events: “Whatever its cause(s), the abnormally long dust veil of AD 536–537, with its blood-red sunset, ice-cold summers, chilly winters and serious famine must have been experienced as a frightening foretaste of the world's ending. But when this did not happen and the sun actually returned, perhaps the terrifying memory was instead woven into an imagined image of a coming destruction, the Ragnarök, which long thereafter held a sway over the Northern people as their own version of Apocalypse” (Gräslund & Price, 2012). For Gräslund & Price (2012, p. 440) the origin of the narrative becomes a consistent image when looking not only at myth but connect them with natural history, archaeology and Late Antiquity sources, but without dated written sources it is of course difficult to once and for all prove when and how these stories were born.

Overall, these stories of destruction and the end of the world often might actually be stories people told to make sense of the natural disasters occurring in (pre-) historic times and/ or in societies who were not relying on written communication but with a strong oral tradition. This again shows the importance of narratives. Joseph Campbell (2020b) has discussed this repeatedly and says the flood motif appears in all cyclic mythologies about the end of time. The connection between a flood and humanity's sin according to Campbell (2020a) originates in Mesopotamia around 2500 BC: “The idea now is that God sends the deluge in punishment for man's sins,” while in other contexts, the flood had an “automatic, impersonal coming and going,” a kind of mathematical cycle, now “You have the punishment of someone who is guilty.” He continues: the old cycle of “flood and return, is a great magnificent, wondrous affair, the blooming of a cosmic being of which we are but morsels. The Near Eastern model, which comes down to us in the story of Noah, throws man into a personal relationship to a deity who has free will” (Campbell, 2020a, p. 65). The before discussed Ragnarök falls into the same category as Campbell discusses for the Near Eastern Model: even though the Gods do interfere in human affairs, at the end of the world humans are mere bystanders suffering the consequences of an eternal struggle between all-powerful deities. It is less a story of punishment than of a cycle of death and rebirth.

All these stories show—and this is why we discuss them in a review about regional identities—the power of flood narratives and how deeply they are embedded into our narrative DNA. Stories about floods resonate so strongly because they have been part of oral traditions, myth and legends for thousands of years even though the narrative focus might have shifted according to new religions, belief systems and philosophies emerging over time.

Deeply embodied in a regional identity, stories with religious origin or connected to religious beliefs can until today influence people's perception of new adaptation measures. Wolf and Moser (2011) have shown that a belief in a higher

spiritual being plays an important role in determining whether people believe that human action can influence the climate or weather. Particularly, if climatic change is interpreted as God teaching people a lesson or punishing sinners, as many of the stories in this review have shown, public acceptance of climate policy may be undermined. Looking again at the North Sea Coast, since Christianisation, narratives about impeding natural disasters were combined with the belief that one had to lead a life, which is agreeable to God to avoid punishment. Thus, the fight against the sea and fulfilling one's duty to protect the dyke became a synonym for a godly life, which in return can also mean that other measures and approaches can be seen as unnecessary as long as the traditional duties are fulfilled.

Religious beliefs and technological advances can often clash, as Allemeyer (2007, p. 103) shows for the 16th and 17th century: "The development of waterworks could be seen as 'a sign of men's expanding confidence in their ability to protect themselves against natural events with the help of technical means.'" And that happened at a time when storm floods were still widely seen as a punishment for sinful behaviour. Indeed, a fatalistic worldview in which God's punishment was inevitable, could also have an effect on how people approached dyke building and upkeep—not as a godly duty but as a waste of money and effort, as it could not withstand God's wrath and punishment anyway. Allemeyer here quotes an example from 1715 in which villagers gave God's punishment as an explanation why they did not upkeep the dyke even though they knew that a weak dyke would probably break during a storm flood (Allemeyer, 2007, p. 103). Steinberg (2006, p. xxi) concludes that in modern times defining natural disasters as "acts of God," as is popular in the US, tends to "overemphasize the natural factors at play while diminishing the human, social and economic forces central to these phenomena." In other words, God is used as an excuse for human failure (Steinberg, 2006, p. xxiv). Even for the 18th century example above, Allemeyer has to admit that it "is possible that they only use the argument of divine punishment in order to free themselves of the duty to repair the dike. But it is also possible that they really were as dispirited as the dike reeve describes them" (Allemeyer, 2007, pp. 103–104).

Kempe mentions that indeed there was a paradox between the necessity to build a dyke for protection and the interpretation of floods as God's just intervention. "This paradox remained invisible, given the supposition that to neglect the building and maintenance of dikes would be a sin of omission and that the storm-tides which broke through through the neglected dikes would be divine punishment for this omission. In this way, the theological discourse on *memoria* was able to render the paradox of protection and punishment invisible" (Kempe, 2006, p. 349).

How important the idea of religious—or better: moral—behavior is for the safety of coastal communities can again be determined by looking at stories and narratives not only at the German North Sea Coast, but also other coastal regions: In many stories the great catastrophe is also the result of neglect, not only in people's religious duties, but also in the upkeep of the dyke. Best example is the before mentioned Welsh legend of Cantre'r Gwaelod, where a kingdom drowns, because the drunkard prince opens the sluices (Markale, 2008, p. 214). By implication this means: As long as the dyke holds and all floodgates are closed, the land is safe.

### 3.2 | Dyke building as proof for human evolution: From sufferer of storms to tamer of landscapes

Another important aspect when discussing narratives in the context of climate change is a historically grown perception that the evolution of mankind has been one of constant improvement and advances in all areas—from technology to art, from medicine to politics. This also concerns the taming of nature: "(...) humanity has triumphed over the dangers and uncertainties of the natural world, and this triumph will continue to unfold in the future. Anything else would seem to be going 'backwards', in a world where 'backwardness' is pitied or despised" (Power, 2019; emphasis in the original). Herein lies a problem: coastal realignment, e.g. moving the dyke further inland, to create a flood plain seems to contradict the perception of the dyke as main cultural and technological achievement, proving humanity's success story. From the very beginning dyke-building not only had a practical aspect, but was also connected with a civilizational approach: the taming of the wilderness, bringing culture and knowledge to an underdeveloped region. The dyke until today is not only a protective shield against the ocean, but a symbol for culture, knowledge and human advancement as well. The landscape at the German North Sea coast made it necessary for a wider colonization during the early Middle Ages to also reshape the landscape, which not only included erecting a dyke, but also building drainage channels in the moors and marches to gain arable land. So, even though the landscape in these regions is still heavily influenced by the tide as decisive natural phenomenon, the landscape as we know it is man-made. The reciprocal impact of nature and culture is its prominent feature (Rieken, 2005, p. 59). Since the Enlightenment and with technological advances the idea took hold that the "hostile nature" had to be kept out of the "well-organized" human space

(Jakubowski-Tiessen, 2009, p. 180). The dyke became the border between civilization and wilderness (Fischer, 2014, p. 87).

This has not always been the case, since the first settlers according to archeological findings had a more symbiotic way of living with and on the flooded land, i.e. Warften or Wurten instead of dyke building. These natural or artificial mounds offered protection from flooding, allowed to keep animals and go fishing, but farming the fields only became possible after building so-called summer dykes (Allemeyer, 2007, p. 96; Meier, 2008, p. 22). The history of the marshlands at the North Sea Coast is one of constant expansion. Around the year 1000 AD reduced tax rates and greater liberties were given as incentives to draw new settlers into the sparsely settled marshlands and make the land farmable by building proper, so-called winter dykes (Allemeyer, 2007, p. 96; Bazelmans et al., 2012, pp. 121–122; Holzhausen, 2019; Meier, 2008, p. 25; Soens, 2018; Soens et al., 2019). “The extension of fenland reclamation can be considered a third step in this process, marking a turning point in the relation between the inhabitants of the marshes and the sea, and a change from a more or less defensive to an expansive way of dealing with the environment” (Allemeyer, 2007, p. 98).

Soens (2018) describes this as a high-risk type of land use, which was promoted by a new type of economic system, the Early Modern merchant capitalism. Merchant capitalism drove land reclamation projects which in the case of the Wadden Sea area was a clear break with the traditional system of flood protection based on low sea walls and extensive stretches of salt marsh in front of the sea wall (Soens, 2018, p. 172).

Looking at narratives we here find another problem: there are barely any written sources pre-dating the time of systematic land reclamation and those describing the early settlers are again written by outsiders. Allemeyer mentions the Roman Gaius Plinius Secundus and his not very favorable account of the marshlands (Allemeyer, 2007, p. 98). Pliny the Elder “described the Greater and Lesser Chauci inhabiting the Lower Saxon coastal area as *misera gens* (wretched people) because of what he perceived as the extreme environmental conditions in which they lived” (Bazelmans et al., 2012, p. 116). Therefore, it might not come as a surprise that taming the nature, floods as godly punishment and—as described in this chapter—land reclamation as human’s greatest achievement dominate the written narrative.

Johann Wolfgang von Goethe (1748–1832), arguably Germany’s most well-known writer, dramatizes the constant struggle against nature in the second part of his seminal *Faust*, characterizing humanity’s fight to conquer nature also as the moment of greatest fulfillment. Faust here embodies the idea that taming the nature is humanity’s—and his own—biggest cultural achievement (von Goethe, 1999, 2003; Part II, Act V, Scene VI): “**Faust:** A swamp lies there below the hill,/ Infecting everything I’ve done/ My last and greatest act of will/ Succeeds when that foul pool is gone./ Let me make room for many a million,/ Not wholly secure, but free to work on./ Green fertile fields, where men and herds/ May gain swift comfort from the new-made earth.” (...) “He only earns his Freedom and Existence, Who’s forced to win them freshly every day.”

Faust, now an old and blind man and having built a castle on reclaimed land, is using dykes to drain the land and hold back the sea. He sees claiming the land from the sea as his vocation, a deed for posterity and to help the millions of poor, which can use the newly gained land for agriculture or pasture.

That building a dyke, its upkeep and land reclamation has always been a collective task, has also impacted the narrative that people in this area have proved a great resilience and steadfastness because of their collective struggle against nature. Steadfastness when facing the natural dangers of living in a flood-prone area needs a greater personal and collective strength than passive retreat (Holzhausen, 2019; Rieken, 2005, p. 261). Each landowner responsible for the upkeep of one part of the dyke fought their own battle against the water, resulting in a special form self-confidence and stubbornness that shaped the regional mentality (Fischer, 2014, p. 101).

Karrasch et al. (2017) conducted a study in an East-Frisian coastal municipality in north-western Germany using a collaborative landscape planning process to support decision-making. The process included the assessment of four scenarios with special focus on ecosystem services. The first, “trend” scenario is a projection of the current land management into the future, i.e. it is based on food production, recreation and tourism. The second scenario “water management,” focuses on water storage, leading to embanked open waters and reed stands within large polder areas. The third scenario “carbon sequestration” is similar to the previous scenario but the envisaged freshwater polders will mainly be covered by reed fens instead of open water due to lower water levels.

The stakeholders however opted for the fourth “actor-based” scenario, which includes polder areas and a widening and strengthening of the main drainage system to prevent flooding and increase water retention. At the same time, it was important to all stakeholders to maintain the landscape’s aesthetic values and that cultural services, among them “community identification,” were seen as essential (Karrasch et al., 2017, p. 8). Hence, although stakeholders were partially open to new ideas in coastal land management, the ideas reinforce existing patterns (draining the land) and



## BOX 2 A wider outlook beyond Europe and the Western hemisphere

While this paper has mainly focused on European myth and legends in the North Sea region it is overall necessary to lose this European perspective and take other indigenous tales into consideration as well. “Recovering the stories of people marginalised from the narrative helps people think about life in a different light. Many indigenous people, for example, have ideas about the past that situate humans within complex ecosystems” (Power, 2019). In Box 1 we already referred to examples from Southeast Asia and how indigenous people use early warning systems based on observation of clouds or the sea based and generated from lived experience and cultural history. However, this has to be the question of further research into the role of narratives and historic myth in the context of climate change adaptation. Ford et al. (2016, p. 349) underline this point in their critical assessment about the inclusion of indigenous knowledge and experience in IPCC assessment reports by emphasizing that “the coverage is general in scope and limited in length, there is little critical engagement with indigenous knowledge systems, and the historical and contextual complexities of indigenous experiences are largely overlooked.” More specifically they criticize that “traditional knowledge is documented in chapters in a technobureaucratic manner as a source of empirical observations by individuals about specific events or phenomena (...) rather than as a complex knowledge system grounded in generations of place-based observations and experiences.” And further: “Studies on how the knowledge, experiences, stories, values, ways of knowing and beliefs that underpin how climate change is perceived, understood and responded to are largely absent” (Ford et al., 2016, p. 350). Looking at the Philippines, Bankoff (2009, p. 279) concludes that “developed countries in the West may have as much to learn about disaster preparedness, management, and recovery from non-Western countries as the latter do from the former.”

involve the aesthetic value of the land, that is, a preservation of the status quo. Yet, the example also shows that changes are possible if key components of the regional identity are taken into account and respected. The explicit mentioning of the “aesthetic value” of the landscape is therefore noteworthy in the context of our argument, especially since the landscape is not in its natural state, but historically grown.

All the aesthetic aspects so greatly valued—the drained land and the man-made dyke—are a homage to human ingenuity, craftsmanship and engineering capabilities in their effort to tame nature. As some examples have shown, this struggle in many cases is linked to a regional collective identity in the North Sea coast region. So, if—like in this case—the aesthetic value of this cultural, man-made landscape is of such great importance to stakeholders as well, then it needs to be studied how much decision-making processes and climate change adaptation measures are actually influenced and shaped by said regional collective identity. This however requires further case studies as: “detailed empirical studies of climate-society interactions over the long term can provide a rich baseline to understand the role that climate plays in a particular location and contextualize adaptation options” (Adamson et al., 2018, p. 202) (Box 2).

## 4 | CONCLUSION

Climate change adaptation can and should use local knowledge to better understand risks, landscapes and traditions. But it can also use this knowledge and these identities to identify barriers or enablers, as well as to communicate measures in a way that gives people the feeling that their way of life and history is valued and taken into consideration. Imposing generic adaptation measures may prove counterproductive.

We have contributed to this discussion by looking at the issue from a historic perspective. We show that stories, myths and legends persist and are powerful, when for example acting as warning story. Concretely, the moral obligation of maintaining the dykes proves to be a powerful narrative along the coastline and across time. Second, dyke building can be understood as a proof of constant human improvement—technologically as well as intellectually. The work by Karrasch et al. (2017) is a prime example of how both narratives are still manifested in current discussions about the future of the North Sea landscape. Those factors need to be considered when discussing and implementing climate change measures. If not, then one risks rejections that seem unjustified or inexplicable on a rational level, though they are deeply rooted in historically grown narratives and have become an important part of people's self-perceptions and identities.

However, further research needs to be done to better understand mentalities and identities in a regional context and how this influences decision making processes in times of climate change and beyond. Further empirical case studies are therefore suggested. While this paper mainly focused on a European context, more precisely a certain region at the North Sea coast, it is necessary to look at a more global context, different cultures, histories and people. While climate change is a global phenomenon, the effects are clearly bound to regions and vary depending on for example landscapes and adaptive capacity. In a wider context our review also showed that the discussion about “indigenous” knowledge, which tends to focus on the Global South, should be extended to the Global North and benefit from its richness. Further research could show how people indigenous to coastal areas in the Global North are participating and valued in climate change debates, or if indeed local knowledge and identities face the same marginalization as has been shown for indigenous people in the Global South.

## CONFLICT OF INTEREST

The authors have declared no conflicts of interest for this article.

## AUTHOR CONTRIBUTIONS

**Jessica Holzhausen:** Conceptualization; formal analysis; investigation; methodology; project administration; resources; visualization; writing-original draft; writing-review & editing. **Kevin Grecksch:** Conceptualization; formal analysis; investigation; methodology; project administration; resources; visualization; writing-original draft; writing-review & editing.

## DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no new data were created or analyzed in this study. All sources and literature used in this review are available from university and public libraries or published under open access licences.

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