Deliverable 1.1

Initial mapping of narratives of change

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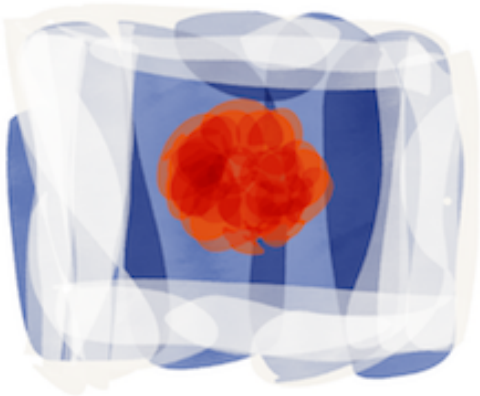

European Research Area for Climate Services

The CoCliServ project benefits from funding obtained through the ERA4CS Joint Call on Researching and Advancing Climate Services Development.

CoCliServ is funded by the following national funding agencies: Agence Nationale de la Recherche (**ANR**), France; Service public fédéral de programmation politique scientifique (**BELSPO**), Belgium; Deutsches Zentrum für Luft- und Raumfahrt EV (**DLR**), Germany; Nederlandse organisatie voor wetenschappelijk onderzoek (**NWO**), the Netherlands; Norges forskningsrad (**RCN**), Norway.

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Executive summary/summary

General Overview

CoCliServ explores new ways to transform climate science information into locally meaningful knowledge for action. CoCliServ shifts the focus on narratives of change in order to facilitate decision-making, to identify information needs and to better address local communities' concerns, aspirations and goals. The goal is to jointly empower local communities, stakeholders, knowledge-brokers and scientists to develop and to co-construct new forms of place-based climate services for action.

In CoCliServ, narratives play a central role as a localisation device. Narratives add value and meaning to scientific data about climate and turn 'matters of fact' into 'matters of concern'. Based on the mapping, analysis and interpretation of narratives of change, CoCliServ develops vision-based scenarios, deploying an incremental and community-led strategy. Exemplary collaborative relationships between climate science and local communities will be established in five representative case -studies: in Bergen in Norway; along the Jade Bay in Northern Germany; in Dordrecht in Netherlands; in St. Pierre /Kerourien (Brest) and in the Golf du Morbihan in France.

General purpose and framework

In this report, we present the results of D1.1, the initial mapping of narratives of change in the five field-sites of CoCliServ. This is the first of a three-step process to identify and to analyse narratives of change as the basis for the production of place-based climate services for action.

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As a general definition, we understand narratives as accounts of events or processes with temporal or causal coherence. Narratives evolve over time, they are dynamic, dialogic and often contested, and they provide a set of values and meanings. Narratives exist in written, oral or non-verbal forms such as maps, visualizations, or other media representations. In D1.1, we focus on meta-narratives understood as widely shared representations of specific land- or cityscapes. In this first step, we use narratives that are produced **by** the field (municipalities, science, tourist information, museums etc.) and those that are produced **in** the field (interviews with key actors, conversations, protocols of events etc.).

In the context of this deliverable, mapping means to identify, to document and to analyse dominant narratives that address the characteristic of a region, a land- or a cityscape, with a special focus on the role of weather and climate. Mapping means more than geographically locating narratives on a map; instead, mapping means identifying and presenting narratives in a social context and in the framework of the research. In a preliminary analysis, first classification schemes and typologies of place-based and actor-specific narratives are identified.

Objectives

D1.1 provides the basis for the production of incremental and community led place-based and actor-centred climate services. This initial mapping will serve as a backdrop for a more detailed analysis and chronology of weather related and place-based narratives in D1.2.

Work conducted and methods

D 1.1 follows an inter- and transdisciplinary approach, engaging in qualitative research and using a variety of research designs. Research was conducted in five highly diverse field sites, with critical discourse analysis as a common methodology and following a common set of guiding questions.

Discourse analysis as the method of choice offers various forms of analysis and interpretation, but it differs from grounded theory in the conscious choices made by the researchers. Each researcher or research team designed their research along place-specific constellations in which climate change is addressed. Thus, the researcher or research team becomes part of the field by making specific choices; information and data do not stand for themselves, but they are analysed and interpreted in the context of specific discourse constellations. Thus, situating CoCliServ in the respective field sites was the first step of the initial mapping of narratives:

- In Bergen, CoCliServ situates itself in a municipal climate adaptation context and engages additionally in citizen science projects;
- In Dordrecht, CocliServ is also joining municipal climate adaptation projects, addressing the needs of citizens and questions of social inequality;
- in the Jade Bay area, specific discourse constellations are identified in the field of coastal climate adaptation, land use and energy transition;
- in the Golf du Morbihan, CoCliServ works together with non-governmental organizations with a strong focus on raising climate awareness,
- and in St. Pierre / Kerourien, CoCliServ uses climate change as a medium that connects past, present and future of social minorities in a collaborative effort with local groups artists.

In D1.1, the primary task for all research projects was to establish a first introduction into the field. Following task 1.1, the following tasks were concluded:

- mapping general narrative representations of the cities or landscapes, including official documents, leaflets, science- and media reports;

- identifying weather or climate related practices and forms of governance;
- documenting iconic images and metaphors that characterize the respective field site;
- conducting first helicopter interviews with key actors.

The following table gives a sketchy overview of the activities related to the initial mapping of narratives and the field sites.

Table 1. CoCliServ overview

Field Site	Field work	Iconic Images & Metaphors	Climate governance	Main Institutions & key actors	Narratives of climate change
Bergen	Text analysis; participant observation; site observation	'Europe's rainiest city'; a city among 7 mountains; a water city; a people who live by the seasons	Local government climate change mitigation & adaptation	Bergen and Hordaland municipalities; Hordaland governor; NVE; Uni of Bergen; Uni Climate; NGOs; consultants	"we are facing the challenge of dealing with even more water – both from the sea and from the sky"
Jade Bay	Participant observation; semi-structured interviews; protocols	Bight between the estuaries of the rivers Weser and Ems; Land reclamation / loss; Friesian vs the sea; storm flood; wind parks.	Coastal protection / adaptation; energy transition;	Dike & Sluice organization; Municipalities; NGOs; farmers; climate services	More rainfall; change of seasons; number and intensity of storm floods; changes inland use
Dordrecht	Open and semi-structured interviews, site visits	St. Elisabeth's Flood, Dordrecht as an 'island', river crossroads	Climate adaptation, flood risk governance	Dutch Delta Program, municipality, safety region, water board, province, housing agencies, residents	River flood risk, flooding from intense rainfall, housing challenge

Table 1. CoCliServ overview (continued)

St. Pierre / Kerourien	Coding of Local edited sources; external edited sources; existing interviews and focus groups; complementary and semi-structured interviews and focus groups.	WWII; housing; social inequality; energy and mobility; well being.	National, regional and local level of governance, starting from the "Climate Plan: Energy&Territory 2014-2019"	Le théâtre du Grain; Le Maquis; Centre Social Couleur Quartier; Mairie de Quartier de Saint-Pierre; Association Don Bosco; Brest Métropole Habitat; Confédération syndicale des familles; Association syndicale familiale; Jardins partagés de la Fontaine Margot; Les Lapinoux; Centre social de Kerourien; Groupe scolaire Jean de La Fontaine.	Daily life and world-view representation; personal trajectories and experiences; the potential connection between expectations and climatic conditions; the political choices; and the dialogue between those political choices and the residents' dynamics.
Golf du Morbihan	Text analysis; life story; site observation	South of Britany; People who live facing the Gulf of Morbihan- the "little sea"; Secondary housing and tourism; Traditional activities adaptation	Coastal protection; energy transition	Intercommunality Golfe du Morbihan - Vannes agglomération ; Regional Natural Park of Gulf of Morbihan; NGOs as Clima'action Bretagne Sud; Farmers (breeders, fishermen, oyster farmers, etc.)	To adapt gradually to CC and population dynamics, and to learn to live with the risk To adapt to maintain economic activities in the territory Given the risks, the choice to re-think the territory

Main findings

The initial mapping of narratives provides an insight into the five field-sites as weather worlds, each one with its own climate and weather history. Even in this very early state of the project it is possible dissecting some typical narrative elements that constitute specific forms of climate governance. In one way or the other, a typology of meta-narratives emerges; narratives that build a kind of grammar of place-specific climate discourses. Agency comes in through the combination of elements, their respective historic and place-specific content, and last but not least through the changes in weather like storms, floods, or seasonal anomalies that differ from the expectations.

The most convenient introduction into the field is **maps**; they serve as a kind of 'natural' introduction to the field sites. But maps are far from objective; they are already narrative representations of regions, for example implying that a region is geographically peripheral, or that a coastal area is, in the context of climate change, threatened by sea level rise. Historical maps show the evolution of places, suggesting logical continuity instead of contingency; even graphical maps may contain the basic elements of each story, a beginning, a middle and an end.

Maps are crucial parts of **geo-political narratives** that help constituting a marked region, an area with a name, with natural or historical confines, and an identity. All of these European land- and cityscapes have a geological, a socio-economic and a political history, documented in scholarly and popular accounts; a geo-political history that is taught in public schools, informs the educated tourist and provides the basis for research projects, spatial planning and current adaptation or resilience strategies. On a second look, these geo-political narratives are closely related to the emergence of the respective nation-states. Historical accounts have a beginning, a middle and an end, they bring continuity into the geological and political chaos, and they have a tendency to harmonize

the natural and the political. In tourist information, iconic geological or architectonic elements are isolated and sold on a highly competitive global market

This is where **narratives of identity** come in, based on geography, historic events, or mythical accounts of the origin of a populace. Numerous accounts of regional histories give an insight into the dynamics of the field sites, into local perceptions and, most importantly, the constructions of place. Like geo-political narratives, narratives of identity are contested and under permanent negotiation; they are part of daily conversation and practices and a stake in conflicts about power and politics. Closely related are **narratives of heritage** as displayed in museums, monuments or landmarks.

Science-based narratives are historically understood as an antidot to patriotic feelings and exaggerations in many geo-political accounts. In all field-sites, scientific reports define the climate situation in terms of adaptation, resilience or vulnerability. Climate services provide statistical information about sea level rise and scenarios for future pathways. The report of the Intergovernmental Panel on Climate Change (IPCC) serves as a meta-narrative that guides scientific studies and information. The statistical nature of scientific narratives makes science-based narratives compatible with techno-based governance strategies and spatial planning; in conflicts about water management or climate adaptation, science sometimes is used to replace politics, to present decisions as without alternative or as an argument to silence other voices.

Climate change narratives are also mostly based on science, but they often contain moral or ethical elements. They have a relatively fixed narrative structure, with the beginning in the industrial revolution, the present time as the middle and apocalypse or salvation in the end. This narrative structure is highly flexible and serves both technocratic solutions and appeals to a change in quality of life. Climate change discourse is a form of governance that connects the global

with the individual. The first mapping of narratives in the field sites confirm the assumption that climate discourse is omnipresent; the discussion is no longer if climate change is a fact or not; instead, the debate seems to be about the best ways how to adapt to climate change.

Local narratives about weather and climate are omnipresent in the five field-sites; in one way or another, weather and climate serve as a medium to initiate visions about the future. Weather is talked about every day. It is an object of observation and comparison; it serves as a medium to initiate communication or to transport feelings, and it is closely related to routinized practises. Climate serves in the local context to stabilise the relationship between weather and culture; local festivities in the course of a year are closely linked to seasonal weather expectations; the rhythm of rural life and the management of cities and landscape are 'weathered', their management is 'seasoned' and 'climatized'. Changes in weather patterns are commented upon in daily talk and in the news and are discussed both in the context of climate change and of personal or generational experience.

Narratives of disaster and catastrophe are part of the narratives about the past, the present and the future. All of the field sites in this project are traumatized by war, migration, and extreme weather events like flooding, storms or excessive rainfalls. Natural catastrophes like storm floods are part of the cultural heritage of coastal regions; the domestication of the forces of nature, the 'conquest of nature' (Blackbourn 2006) is part and parcel of the modern narrative. In narratives of disaster, apocalyptical metaphors are omnipresent; **religious narratives** come to the forefront and give meaning to the death of thousands, for example in the historical storm floods in the Jade Bay or Dordrecht. Concerned climate scientists tend to frame their narratives as modern 'writings on the wall'; in science-based climate discourse, the apocalypse will come as an extreme weather event.

Biographical interviews with key actors in the field provide **life stories** and **personal narratives** of institutional or professional activities. Life stories give an insight into generational forms of land use, in structures of ownership and political affiliations. Biographical interviews with administrators or politicians connect the history of institutions with the network of people and things that constitute their field of expertise. And, of course, life stories are an entry into the local 'weather world', into the network between people, weather and infrastructures which are necessary for the implementation of place-based climate services. Life stories are accounts of the senses of place and of belonging.

This rough **typology of narratives** – which for sure is not complete – is the result of the initial mapping of narratives; elements of all of these types are found in each of the field-sites. The focus on narratives gives an insight into the construction of these places and landscapes and their weather- and climate related infrastructures. These local weather-worlds are articulated in specific situations. The beauty of 'our city'; the uniqueness of 'our coast' is evoked on public events or whenever something is at stake. In political discussions it becomes evident that each narrative has a counter narrative or a slightly different version; the elements of these narrative structures can be used in different contexts, for different purposes and to make a difference. It comes as no surprise that one and the same person can believe in God's punishment and supports the need for improving the infrastructures, as was the case after the storm floods of the 18th century; the same is true today when people fight for alternative pathways as trajectories into the future. The mapping of narratives and their further interpretation are a first step on the way to coproduce place-based climate services for action.

Goal/Purpose of the document

The purpose of this document is

- To give a general outline of D1.1 as part of Work Package 1, Narratives of change;
- To critically discuss the role of narratives in the production of place-based climate services for action;
- To document the results of the initial mapping of the five case-studies;
- To inform the consortium and the respective site organizers from scenario building, climate services, metadata, citizen science and knowledge assessment,
- and to give an outlook on the next steps in WP1.

Relationship to the Description of Work (DOW)

Deliverable 1.1 is defined as 'Reports on the initial mapping of narratives of each site.' It appears in the DOW as the result of Task 1.1, which states:

'Initial mapping of narratives of each site: first overview; desktop research, including official documents, leaflets and media reports; identification of weather- and climate- related storylines; identification of weather- and climate-related practices and forms of governance, metaphors and iconic images that characterise the specific weather-world; introduction to the field and first 'helicopter interviews' with local representatives' (DOW, CocliServ).

1. Introduction

This part is contributed by Werner Krauß.

1.1. The challenges of mapping narratives of change

"We dream in narrative, day-dream in narrative, remember, anticipate, hope, despair, believe, doubt, plan, revise, criticize, construct, gossip, learn, hate, and love by narrative. In order really to live, we make up stories about ourselves and others, about the personal as well as the social past and future. "(Hardy 1968:5). And every day, we make up stories about the weather, the season and read about climate change. When it comes to flooding, draught or extreme weather, we have to "tell ourselves stories in order to live" (Didion 2006).

But sometimes, some stories are more dominant than others and tend to annihilate or delegitimize other narratives. This is the case when it comes to climate change. For a long time, it was almost exclusively climate science that made facts about the global rise of temperature or sea level meaningful. But the success of climate-science is also closely entwined with the capacity of storytelling; it takes a good story with a beginning, a middle and an end in order to present the results of statistics, calculations, empirical data and models. Until to the present day, this statement is considered as blasphemy in parts of science and especially in the climate debate. It is an often-repeated argument that climate change is not just another story; instead, climate scientists insist that it is a fact. For a long time, the climate debate was restricted to a fight between science and skeptics, between truth and fake-truth and last but not least, to a war between science and the humanities. There was a lot of collateral damage from this "war on climate", as Jerry Ravetz (in Krauss et al., 2012). Once called it. President Trump and the debate about 'fake-news' and the advent of a 'post-truth era' did not help much, quite the contrary. The anthropologist Tim Ingold

addresses in a statement about art and research the double-bind caused by this circular debate and suggests a different understanding of 'truth':

"Research is the pursuit of truth, through practices of curiosity and care. Truth does not mean fact rather than fantasy, but the unison of experience and imagination in a world to which we are alive and that is alive to us. Amidst panic that we have entered a 'post-truth' era, however, truth itself risks being devalued even by those who spring to its defense. It is reduced to an objectification that only further exacerbates our sense of separation from the things that concern us. In this climate, the meaning of research has been corrupted beyond recognition. It has become an industry of knowledge production, dedicated not to truth but to novelty and impact. How can art restore research to its proper vocation?"(Ingold 2018).

The challenge of mapping narratives of change is to make facts about climate change locally meaningful and to reconnect climate information and everyday experience in the real world; for this purpose, CoCliServ also experiments with art and other forms of collaboration. Instead of playing out facts against fiction, WP1 maps meaningful stories that address and make sense of changes in climate, the seasons, the weather, or the environment. It does so in accordance with the recent IPCC, where the documentation of facts about climate change is complemented by a chapter about their implications for adaptation and mitigation.

In the chapter 'Foundations for decision making' (Jones et al., 2014), the IPCC highlights the central role of narratives for climate communication and the co-production of climate services. According to the IPCC, narratives provide a social and environmental context for modelled futures; they help to bridge the route between scientific and local forms of knowledge, and they frame in a fundamental way the attitude towards risk, uncertainty and the possibilities of resilience. Narratives are understood as tools for communication, and they are

often used to translate scientific definitions into everyday language. For example, it makes a difference whether climate change is presented as an apocalyptic scenario or as a change of environment people have to adapt to. Discourse analysis is one way of dealing with this kind of difference, as the writer Amitav Ghosh (2016) shows in his analysis of the two most influential meta-narratives about climate change.

Amitav Ghosh discusses climate change and the language of risk and catastrophe in contrasting the IPCC report and the recent encyclical of Pope Francis, Laudato Si. He treats these iconic texts as different types of narrative, both based on the same scientific datasets. Ghosh highlights the difference between the juridical language of the IPCC, where every sentence is cleared by lawyers, and the ethical, social and moral language of the Pope. About the story telling of the IPCC he writes that

"the diction of the Agreement is borrowed directly from the free-trade agreements of the neo-liberal era, with its references to 'accelerating, encouraging and enabling innovation' and many of the terms on which it relies, such as *stakeholder*, *good practices*, *insurance solutions*, *public and private participation*, *technology development*, *decision-making* and so on." (Ghosh 2016, 155)

About the encyclical, he writes that "in place of the obscurity and technical jargon of the official IPCC discourse on climate change, the encyclical explicitly acknowledges the influence of the saint who is the pope's 'guide and inspiration': 'Francis (of Assisi) helps us to see that an integral ecology calls for openness to categories which transcend the language of mathematics and biology and take us to the heart of what it is to be human." (Ghosh 2016, 153)

The difference is not facts versus fiction or science versus theology; instead, Ghosh compares the texts as narratives, which are both, based on the same data

sets but are subject to different interpretations. According to Ghosh, the IPCC advocates a technological solution for the climate problem, symbolized in the 2-degree target. The Pope advocates a holistic perspective and suggests compassion as an attitude that addresses the human condition in a changing environment.

With his interpretative discourse analysis, Ghosh shows that there is more to narratives than simply adding them to the scientific agenda in order to better implement adaptation or mitigation measures. Instead, based on the same set of science-based facts, the narratives imply different worldviews, different understandings of adaptation and consequently, different understanding of climate politics.

The challenge for CoCliServ is to replace the familiar position of the distanced researcher with the 'unison of experience and imagination' through novel forms of cooperation with art, of collaboration with NGOs, activists or other local actors. Of course, there are limits defined through the dynamics of an academic project with restricted time and capacity, but the focus on narratives, entwined with politics and power, helps providing novel forms of place-based climate services.

1.2. Mapping narratives: theoretical background and methods

Bruno Latour (2016) time and again insists that the separation of nature and culture is one of the pitfalls of modernity. Global '*Klimapolitik*' followed for a long time this modern scheme; climate science provided the facts about nature, and politics had to follow, with social science seen as facilitators between climate and politics (von Storch and Krauß, 2013). With the advent of the Anthropocene as a new concept, this narrative based on the separation of nature and culture becomes more and more porous. The meta-narrative of science-leading-climate politics is slowly replaced by a plurality of narratives, as seen above in the

comparison between the IPCC and the Pope's encyclical. Mike Hulme (2015:1) consequently argues for a 'cultural appraisal' of climate change:

'Rather than framing climate as an interconnected global physical system or as a statistical artifact of weather measurements, climate should be understood equally as an idea that takes shape in cultures and can therefore be changed *by* cultures. Climate has a cultural history, which is interwoven with its physical history. It is a history which forms the substrate out of which today's beliefs, claims and disputes about climate change emerge.'

A cultural appraisal of climate and its changes is more than only adding social sciences and humanities to climate research; it fundamentally changes the concept of climate change and, as a consequence, the nature of climate politics. Climate is more than the statistics of average weather or a system of interconnected spheres and global thresholds. According to Hulme, climate is first and foremost an idea that helps to stabilize the relationships between cultures and weather, with climate change as the latest step in the cultural evolution of this idea. His approach fundamentally differs from the conception of global climate politics framed by planetary boundaries and aiming at stabilizing climate at 2-or fewer degrees above preindustrial levels; his cultural appraisal suggests an alternative to the regime of experts and the fantastic narratives about the magic of big data and technological solutions (Krauß 2016).

In CoCliServ, we map narratives related to climate change in five different coastal land- and city-scopes in North Western Europe. In doing so, we can rely on a long tradition in narratology in literary studies, but also in disciplines like anthropology, political science or in applied social sciences. Mapping narratives means in a first step identifying dominant narratives that represent a landscape or a city.

Like nations, coastal landscapes or cities are 'imagined communities' (Anderson 2006), with foundational myths and meta-narratives that bring a sequential and causal order into the chaos of geo-physical, meteorological, and socio-political history; a history, which is according to the philosopher Walter Benjamin a series of disasters and catastrophes. At least, this seems to be true for Europe and the case studies in CoCliServ; all of the field sites have common histories of war and migration as well as of catastrophic natural disasters like flooding. These memories including references to climate and weather are archived in meta-narratives like official representations and create a collective identity. But these narratives are far from being objective facts; they are under permanent construction and have to be performed in public and private conversation; a conversation that never comes to an end and of which we as scientists are an integral part of.

But what does it mean to belong to a place; to be an inhabitant of a specific landscape or city and to possess what is called local or indigenous knowledge which is different from those who do not live there? In "Senses of place", Steven Feld and Keith Basso (1996) critically discuss the inherent colonial attitude of identifying specific people with places and a bounded culture; a narrative that turns 'them' into the exemplary 'other' of the cosmopolitan scientist or citizen. Today, when globalization and belonging become politically charged counterpoints in populists' arguments, it is well worth reflecting again the meaning of place as a site of contestation:

"Thus, ethnography's stories of place and places are increasingly about contestation. And this makes them consistent with a larger narrative in which previously absent 'others' are now portrayed as fully present, no longer a presumed and distant 'them' removed from a vague and tacit 'us'. These stories are placed and in motion on a world map whose once black-lined borders and

boundaries are increasingly smudged by vagueness, erased by chaos, or clouded by uncertainty." (Feld and Basso 1996, 5)

Feld and Basso wrote this before climate change became one of the privileged topics to address the relation between the North and the South, between 'us' and 'them' in the global and national peripheries; and indeed, there are many examples where climate science and the export of global climate models tend to annihilate local forms or perception and senses of place (Mahony and Hulme, 2016). But there are also increasingly counter examples, where in conflicts about climate adaptation different perceptions, land uses and forms of knowledge are successfully negotiated, as Bremer and Funtwicz (2015) show in an example from New Zealand about the role of narratives in negotiating a conflicted coastal area.

Thus, localising climate change is a two-or-more-way interaction between science, local communities, stakeholders, NGOs and other local and non-local actors; in these encounters the meaning of global and local and the implicit power constellations have to be re-negotiated, and the meaning of climate change has to be transformed and translated into a locally meaningful one. Place-based climate services must be rooted in these intersecting histories in order to be meaningful and effective; abstracts concepts of scientific climate have to be replaced by narratives that connect private and public realms (Arendt 1958), and they have to be linked to 'ordinary life' and 'ordinary affects' (Stewart, 2007). Concepts like 'structures of feeling' (Williams, 1973), 'senses of place' (Feld and Basso, 1996) or the 'politics of storytelling' (Jackson, 2002) address the role of sensory and affective dimension of life that is hardly addressed in climate discourse. People do not live in abstract climate; they live in weather-world that structure the seasons and the rhythm of life, shape everyday practices, serves as archives for individual and collective memory and are woven into the dreams of the future (Ingold 2010).

Tim Ingold's conception of people inhabiting a 'weather-world' adds another dimension to the instrumental aspects of narratives of change as a tool to deploy more effective climate services. According to Ingold (2008), the concept of weather-world is fundamentally different from the distanced view of the scientific observer. He explains this in a graphic way, illustrating the difference between the 'exhabitant' and the 'inhabitant':

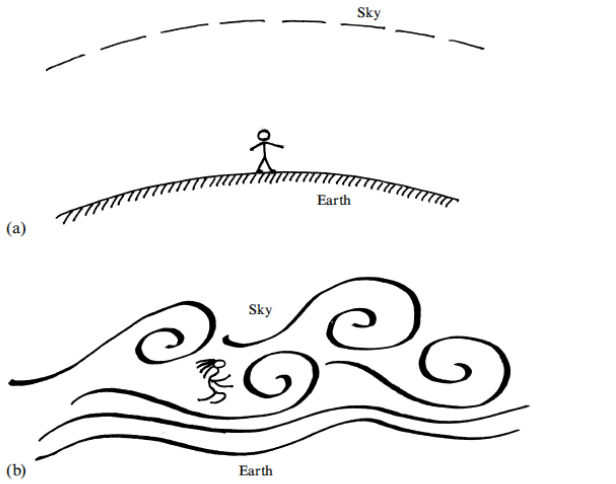


Figure 3. (a) The exhabitant of the earth and (b) the inhabitant of the weather world.

Figure 1. Earth & Sky (Ingold 2008, 1804)

At this point, place-based climate services are more than an advanced instrument to order the relation between weather, climate and people; from the perspective of Ingold's 'inhabitant', climate services are a step towards consciously producing, weaving and performing the world we inhabit or, to put it in other terms, of 'worlding'. This is where ideally art comes in or research contributes to the art of living.

In order to identify and to dissect these narrations, the researchers or research teams follow the traces of people, of things, of metaphors, of stories and of conflicts (Marcus 1998). They are to be found in everyday conversations, in life stories, in eyewitness reports, legends and the news, as well as in analog and digital archives, documents, plans, leaflets, tourist information and blogs. Narratives are not simply out there, stories are not told without a reason.

Instead, it takes a situation, a purpose, an opportunity to tell a story. Mapping narratives does not only mean to document a text and to isolate it from its context where it was produced and came into being. It is one thing to catch a butterfly, pin it on a needle and put it under the microscope, and it is another one to follow a butterfly on its drunken journey. Narratives are like butterflies; once you follow them, they bring places into being, fill them with life and make them real. Narratives change their meaning in every situation where they are told; they are told for a reason. Meta-narratives provide elements that can be deployed in certain situations to strengthen an argument, to change the direction of politics or of a discussion, to make someone to fall in love, to exclude some people or to win others as followers. Some narratives disappear, others are stored in the archives and come suddenly to the surface; nobody remembered the battle of the Amselfeld in the 14th century before it was reactivated as a myth of origin in the Balkan wars. The initial mapping of narratives in D1.1 identifies some of these meta-narratives that define the representation of the respective field-sites and situates them roughly in the context of practices and discourses surrounding the issue of climate change. Mapping fills statistical numbers about weather and climate with life; storm flooding, extreme weather, seasonal changes and even climate change have a long social and natural history in the respective field sites.

Mapping narratives goes hand in hand with their analysis and interpretation. In some cases, like in Kerourien, grounded theory (Strauss and Corbin1997) served well to get familiar with the place and the set of narratives that represent it. In other cases, research was from the beginning focused on the intersection of meta-narratives and the weather / climate context. Discourse analysis is here the method of choice; introduced by Hajer (1997), it is well established in the field of interdisciplinary environmental research. Discourse analysis serves both to dissect a singular story or a set of stories under the microscope and to critically

interpret their role in the political, economic and social life. In this and the following deliverables of WP1, we use critical discourse analysis as introduced by Hajer (2006) and others in the field of interdisciplinary environmental research. Interviews, representations or reports are coded and analyzed with the respective software along main categories such as plot, framing, context and visions; we embed single narratives in a chronology of narratives; we look for their actual role in the climate debate, and finally we discuss their potential for the co-production of place-based climate services. In an interpretative mode, discourse analysis also strongly reflects the role of the respective researchers and of science in general; the researchers have to make decisions which paths to follow, with whom to cooperate, and finally they have to construct their own narratives (Dracklé 2015).

The initial mapping of narratives remains necessarily sketchy and incomplete. They are always part of a conservation, they are performed for specific purposes, and like chameleons they adapt to new circumstances. It is a big mistake to state that 'people think' or 'people believe' or tell this or that story; the question is when narratives get a grip on a situation or in a conflict. Why do specific narratives get hold of the listener, when do they become instruments of power and conviction? This is what the researcher has to find out, in direct contact, in conversation, with his or her intellectual and sensory compassion. In the end, the researcher has to tell a story, too, in exchange and collaboration with his interviewees. Both share a common problem: how to deal effectively with the challenges of a changing climate in specific places, and how to find pathways into the future.

2. Case Study : Bergen / Norway

This part is contributed by Scott Bremer.

2.1. The Bergen case study

Bergen is a harbour city in the fjords of Western Norway. King Olav Kyrre founded the city in 1070, and its name Bergen means 'the green meadow among the mountains'. The historic centre is on the flat land wrapped around the sheltered 'Vågen' harbour, and surrounded by seven low mountains. The harbour itself comes off a fjord – 'Byfjorden' – which is sheltered from the North Sea by a chain of islands including the islands of Sotra and Askøy. Today Bergen is the administrative centre of Hordaland County, and comprises eight boroughs extending over an area of 465 square kilometres, with a population in 2016 of 278,121 inhabitants (Statistics Norway, 2016). CoCliServ study focuses on the historic centre of Bergen and the immediately surrounding suburbs that fall within the Bergenhus borough. Bergenhus contains most of the historic sites of the city and is the most densely urbanised, with shops, offices, apartments and houses (see Fig 3 and Fig 4).

Figure 2. Map of Norway (google maps)

Bergen has historically been an administrative and trading centre. Once founded, it became the capital and central administration for Norway until the late 13th Century when King Håkon V moved these functions to Oslo, though Bergen has remained an administrative centre for the west of Norway. Bergen has always had a strong focus on trade through the harbour, historically tied to the trade of fish and dried cod in particular, which the city was granted a monopoly to trade in the 13th Century. By the mid-14th Century, a commercial and defensive confederation of German merchant guilds – the Hanseatic League – established a 'kontor' in Bryggen, alongside Vågen harbour. Bergen became one of the four most important Hanseatic trading centres up until the mid-18th Century when the Germans left the kontor to Norwegians. Over this time, Bergen was the centre of trade in Norway, which also saw it become the largest city in Norway up until the 1830s when it was overtaken by Oslo. It has always been a highly international city, with influences to its culture and language coming through trade ties to England, the Netherlands, Germany and France.

Figure 2. Bergen municipality borders with urban areas shaded (The case study focuses on Bergenshus borough; the large grey area in the centre of the figure (Statistics Norway)

Bergen today portrays itself along four key themes. First, it remains the busiest port in Norway in freight and passengers, and the city a hub for marine industries including aquaculture and fisheries, shipping, the off-shore petroleum industry, and sub-sea technologies. Second, Bergen has become an important

centre for higher education and research, with the Bergen School of Meteorology established at the Geophysical Institute in 1917, the Norwegian School of Economics founded in 1936, and the University of Bergen founded in 1946. To this has been added numerous institutions, from the Architecture School, to the University Hospital at Haukeland, and various trade colleges. Third, Bergen was designated a European City of Culture in 2000. The old Hanseatic quarter at Bryggen is included on UNESCO's World Heritage List, and Bergen designated a World Heritage City. The Bergen Philharmonic Orchestra is the oldest in Europe of its kind, and the city also houses Norway's oldest permanent theatre, 'Den Nationale Scene'. Contemporary music, art and film also thrive in Bergen, through institutions like the Grieg Music Academy and Bergen Kunstskole and the USF Cultural Centre, museums like KODE, and festivals like the Bergen International Festival. Fourth, Bergen is a tourism destination that appeals both to its cultural heritage and its 'exceptional' proximity to natural landscapes, as the 'gateway' to the UNESCO-listed fjords of western Norway; named as one of the world's 'most unspoilt tourist destinations'. Much is also made of the walkable mountains that ring the city, and access to ski stations. The port of Bergen welcomes more than 150,000 cruise ship passengers each year.

Figure 3. Bergen centre (Bergen centre as represented in visitor guides and tourism information. The limits of this map roughly match the limits of Bergenhus borough (orangesmile.com))

This general introduction to the Bergen study site is derived from sources that tell public narratives of the city to outsiders, through online and published material in English (see reference list), including: the 'Wikipedia' page, 'Visit Norway' website and booklets, 'Fjord Norway' website and booklets, 'Visit Bergen' website and booklets, and Bergen municipality's own informational booklet 'The City is Bergen'. These are the most likely sources from which an outsider, especially from outside Norway, will come to know the city. They are the first links in English internet search engines, and made available to visitors at the tourist information centre, municipality, or organised events like conferences. There is a common cadre of public narratives that emerge across all of these sources, which share some common characteristics:

- *voice*: the narrator as an unknown local informing an outsider, particularly as it is written in English
- *historical plot*: around key historic events, from Bergen's founding, to opening the Hanseatic kontor, or becoming European city of culture
- *identity and place-making themes*: like 'trade', 'culture' and 'nature'
- *narrative devices*: key words or phrases, like 'the gateway to the fjords'
- *motive or moral*: to depict the city as vibrant and enticing, and in its extreme to 'brand' Bergen. There are few negative portrayals of the city.

2.2. Analysing climate and weather in public narratives of Bergen

The objective of this analysis is to distil the way that weather, seasons and climate are used in *public narratives* about Bergen, and by extension, contribute to the identity or sense-of-place in Bergen. Here public narratives are seen as 'institutional or social formations' (Somers & Gibson 1994); shared stories that are simultaneously shaped by, and shaping of, the stories of individuals. Public narratives are formed from the aggregated stories of individuals, but individuals often tell their own stories according to public narratives, or couched in public narratives. In this way, public narratives are co-produced across the private and public sphere. Private narratives of individuals can also become public narratives

where they are told in the public sphere, and have an impact on the ways others understand their place in the world. This study is not complete, but it does provide an initial mapping of some of the main public narratives shaping how local people relate to the climate, and as place-making devices in Bergen.

This study uncovers narratives that relate to weather and climate in public spheres of Bergen. To be included, sources had to be publicly accessible in spaces such that large and diverse groups of people can regularly come into contact with them. This excluded highly specialised or obscure sources, in academic literature or scientific models for example. Otherwise, this study incorporated a wide diversity of sources across different media, from written texts, to paintings, sculptures or other physical place-making devices like local advertising. Analysis thus goes beyond textual analysis alone to include ethnographic approaches to place-based observation. Public narratives about weather and climate where collected in the following spheres:

Table 2. Sources analysed for public narratives in Bergen

Information about Bergen for outsiders	*Bergen municipality policy*	*Bergens Tidene local newspaper*	*Observations in the city and at key sites: museums*	*Locally histories, in local bookshops*
• Wikipedia • Visit Norway • Visit Bergen • Fjord Norway • The City is Bergen	• Water and the life of the city • Cities of the future	• Meze-Hausken, 2007 Seasons in the sun. Int. J. of Biometeorology 52(1): 17-31	• Permanent collection at KODE • Sculpture in Bergen • City observation	• Berntzen, 2016 • Cole & Brosset, 2012 • Dahl & Bagge, 2015 • Rafto & Rafto 2017

2.2.1. Information about Bergen for outsiders

The Wikipedia page on Bergen includes reference to the climate up front in the introduction, and has a section on climate in Section 3. In the introduction the page emphasises the **mild and sheltered climate of Bergen** for its latitude, warmed by the Gulf Stream and protected by the mountains that encircle it;

"Compared to areas behind the mountains on the Scandinavian peninsula, Bergen is much wetter and has a narrower temperature range with cool summers and mild winters" (Wikipedia, 2018). The climate section **emphasises the 'plentiful rain' that Bergen receives**, with average annual precipitation of 2250 mm that it credits to orographic lifting of moist Atlantic air by Bergen's mountains. A table of average monthly climate data, in temperature and precipitation, notes an average of 195 rainy days each year. It notes that, "The high precipitation is often used in the marketing of the city" (Wikipedia, 2018).

However, there is almost nothing about weather and climate in the Visit Norway or Visit Bergen material. The Fjord Norway Travel Guide publication does introduce weather and seasons, especially to describe the people of Bergen and western Norway. It presents them, in branding Bergen as an enticing travel destination, as **'resilient and hospitable' people, who 'play live and work among the forces of nature', and live by the seasons**:

"They live in tiny island communities at the ocean's edge, in mountain villages, fjord villages and cosmopolitan towns and cities. Each and every one of them lives close to nature. In Fjord Norway there are big differences between the seasons. The long winter in which a thick layer of snow covers the mountains. A bubbling spring. A summer full of contrasts. And autumn, when nature puts on its most colourful display. These changes in the weather, in the seasons and in the landscape make the local people impulsive and good at identifying opportunities. With the forces of nature ever present, it's only natural that the people of the region are active and like to spend their leisure time in the great outdoors." (Fjord Norway 2017, pg 25).

Bergen municipality's 'The City is Bergen' publication has a section characterising Bergen as 'A City of Weather', beginning by noting that Bergen's mountains make it 'susceptible to rain', but that the local people are 'more than accustomed to this fact', and also enjoy 'vivacious and vital' summer days. Like Fjord Norway, it emphasises Bergen peoples' love of the outdoors in spite of the rain; a

'population of hillwalkers', 'an active bunch'. A curving blue text, like waves, writes "**Bergen is a city with a dramatic landscape, and due to heavy rainfall, the Spring is especially colourful and beautiful here**" (Bergen Kommune 2018, pg. 8-9). In the body text it notes that blossoming Bergen has a climate for rhododendrons and roses. It also notes the **challenges of living with the rainfall, which have built up high-level expertise in water and sewage management**, noting "The water works in Bergen are the oldest in Norway, and Bergen has a total of 1900 km of water and sewage pipes" (Bergen Kommune 2018, pg. 9).

2.2.2. Bergen municipality policy

The municipality's vision statement, 'Water and the life of the city', emphasises how Bergen is characterised by water, opening with the sentence: **"Historically, the whole existence of the 'Shipping city of Bergen' has been based on water"** (Bergen Kommune 2010, pg. 1). **Bergen is depicted as the 'Rain City', both as the city's 'trademark' and as a possible 'contribution to city life.'** The vision goes on to say, "The challenge is to focus on the many experiences and great pleasure that the water can provide and on the need to exploit the water to add important qualities to necessary urban densification and the development of new urban districts. The use of elements of water in urban spaces and venues shall contribute new knowledge and diversity to urban life for all age groups" (Bergen Kommune 2010, pg. 2). On page 4, the vision discusses the 'Master Plan for Wastewater and Water Environments', which has a focus on surface water and waterways. It stresses that rainwater is, "an important resource that should enhance the city rather than harm it, and that not only do open systems enrich the environment, but they are also more robust and reliable". On page 5 it introduces the 'Management Plan for Bergen's Watercourses', emphasising Bergen's 'wet, wild and beautiful' character; **"Bergen has more affinity with water than most other cities. Reflecting water surfaces and murmuring**

streams, whether natural or man-made, lend character to the city and the quality of urban spaces".

One on-going issue in Bergen, often related to the local climate, is air quality in the city. The municipality's 'Cities of the Future' report lays out an action plan for better air in Bergen, which it attributes to "the weather in the winter months, road traffic, and more wood-fired heating following on higher electricity prices" (Bergen Kommune, 2008, pg. 9). In the colder winter months, when there are several days without precipitation, air pollution can be trapped in the bowl of mountains around Bergen by a layer of cold air. Though not weather itself, air pollution is often discussed in the context of the local climate; caused by the cold weather, and linked to it as a characteristic of the cold winter air.

2.2.3. Bergens Tidene: a local newspaper

Local newspapers are an important media for conveying, and creating, public narratives. Elisabeth Meze-Hausken (2007) reviewed the coverage and contextualisation of weather and climate as front-page news stories in Bergen's local daily paper, *Bergens Tidene*, from 1994 – 2003. The paper discussed Bergen as 'Europe's rainiest city'. Bergens Tidene is an independent, non-tabloid newspaper with a dominant status in the regional market of western Norway. **Meze-Hausken's study uncovered 809 front-page articles with either direct or tangential treatment of weather and/or climate over this 10 year period, on average occurring every four or five days and giving an indication of the importance of climate in Bergen**. The majority of articles focused on climate in Bergen and its hinterland, but some (68) looked at global climate change or foreign extreme weather disasters. Most articles appear in the winter months – when reports of fill the news" – and July – with "joy about sun or disappointment because of rainfall" over summer holidays (Meze-Hausken 2007, pg. 9).

Meze-Hausken identified categories under which front-page stories fall, which also give insights into public narratives circulating in Bergen:

(i) *seasonal issues* receive the most coverage, with winter and autumn receive almost twice the attention of summer and spring. In the cold months articles focus on clear winter days, or report on "avalanches, winter storms and accidents due to snow chaos or icy roads", while warmer months bring "joy about sun or disappointment because of rainfall" over summer holidays (Meze-Hausken 2007, pg. 9). Other seasonal themes related to "outdoor activities according to seasons, or hopes for weather conditions expected for a season (White Christmas)" (ibid, pg 10), exceptional seasons with drought or late harvests, and the long-term impact of weather on economic activities, like farming or rising energy prices.

(ii) *impacts of weather extremes* receive the second most attention, reporting mainly on avalanches, floods, and storms. Drought, fires, thunderstorms and heatwaves – both locally and abroad – also receive attention

(iii) *'bad weather'* is third most discussed, "in its simplest form equated with rainfall [...] even if rainfall is a very common event" (ibid, pg. 10). These articles discuss impacts of rainfall like flooding and mudslides, but also complaints about unpleasant living conditions and weather-based depression among people, particularly when rainfall hampers summer holiday plans. In contrast, "Many stories about happy people doing sports during heavy showers give the impression that the challenge to live in this hard climate is met with pleasure" (Ibid, pg 10).

(iv) *'poetic elements'* also come through in a fourth category of articles, which articulate the emotions and affections people have for weather and seasons; "a photo series of melancholic autumn atmosphere, wedding plans in spring, or motorcyclists preparing their Harleys for the first summer trip" (Ibid, pg 10).

Finally, Meze-Hausken sought to quantify what constitutes 'good' and 'bad' weather for Bergen residents, by season; i.e. when Bergens Tidene wrote about a good day, what did this correspond to in parameters like temperature and rainfall? **For a winter's day to be good, sunshine hours are most important, and crisp cool temperatures. A good summer's day depends most on temperature; even a grey day can be considered a good day where the temperatures are mild enough to wear summer clothing. In spring, it is expectations of escaping the cold winter months that drive perception of good weather**; "in general, days with some sunshine/moderate temperature following a bad weather period are described as wonderful in respect to the weather" (Ibid, pg 23). Bad weather is usually associated with rainfall, even if rainfall is common in Bergen. Seeing rainfall as 'bad' can be because of an extreme rainfall event, a long unbroken period of rainfall, or rainfall during an important event. Meze-Hausken concludes:

*"**People in Bergen have a highly ambivalent relationship to their weather and climate. On the one hand, the amount of rainfall creates pride** – being the wettest city in a month is at least as important as being the wettest on average throughout the year. Feature stories on more unorthodox topics like umbrella culture, rain clothes fashion, rain festival or celebration of the annual umbrella day strengthen the self-confidence and may act as a distraction and comfort while anticipating the next sunny day. However, using this rainy image as a peg in marketing campaigns [...] is strongly opposed by the region's tourist council."* (Ibid, pg. 24).

2.2.4. Observations in the city and at key sites: museums

Public narratives do not have to be recorded in text. They can take other forms in public spaces, from signage to sculptures, or art in museums. As an image or object they can trigger, or invoke, narratives.

A number of weather and climate related place-making devices or cues can be observed around the city, attached to some of the cities defining institutions. All appeal to the 'Rain City' identity attached to Bergen, discussed under municipality policy.

Figure 4. Local 'Hansa Beer' brewery: 'Brewed in the rain'

Figure 5. Bergen Philharmonic Orchestra

Figure 6. Sculpture that channels rainwater 1

Figure 7. Sculpture that channels rainwater 2

Figure 8. Aksdal rainwear shop

Figure 9. Modern clothing shop called 'Rain'

Figure 10. 'Coffee. Good in the rain', in local café

Figure 11. Postcard sold at tourist info centre

There are a number of museums dotted around Bergen centre, with the KODE art museum prominently wrapped around the southern side of the Smålungeren Pond in the centre of town. This has a permanent exhibition titled 'Bergen and the World', which includes a number of historical paintings – especially from romantic painters in the 19th Century – telling the story of Bergen in this period. A visit to KODE on 1 Feb 2018 identified 14 paintings on display that explicitly depict Bergen, and which can be analysed for how they portray the local weather and climate.

Most paintings were realist and painted in the Romantic Movement, mainly by J. C. Dahl. Most of the paintings (10) represent Bergen in dry weather, with only four making reference to rain or storms; Dahls 'Coast near Bergen' and 'En route to Bergen by sea' both show stormy grey skies, and his painting 'Bergens Harbour' seems to show the city after rain (Fig 11). Only Krohg's painting 'Bergen City Square and Buekorps' seem to explicitly show people struggling in the rain.

There are some key themes that link all of the paintings though, and give a sense of place. Most show the surrounding mountains as an imposing backdrop to the city, and feature some water; either in the harbour, fjord or lakes. Moreover, reference seems to always be made to the weather by including clouds – the sky is never totally clear in these pictures – which particularly gather around the mountains.

Figure 12. J.C. Dahl's 'Bergen's harbour', painted in 1834

2.2.5. Locally histories, in local bookshops

A fifth medium for conveying public narratives is through published books of local histories, which can be found in the 'local history' section of bookshops in Bergen, and in the public library. To this point, the study has focused on books available in bookshops, which are general in their scope; i.e. not focussed on one event, like occupation in WWII. It will be extended to include the large collection of books at the library. Of the books selected, some tell the history of Bergen in the third person, as a seemingly objective account. Others are biographical, telling the life story of one or more Bergen residents.

Dahl and Bagge's (2015) book 'En Guide til Bergen, Anno 1765' (A guide to Bergen in year 1765) describes what the city would have been like in that year, written like a guidebook for a tourist in that era. One of the first sections is on weather and transport. It starts with a quote from Baron Holberg - "If it is not raining in other places, it will be raining in Bergen". Holberg and others understood already then that Bergen's rainfall was caused by the high mountains that circle the city, which could see rainclouds settle over the city for weeks or months, giving the rain the name 'Bergen's dug.' It goes on to note that Bergen did have milder winters than other Norwegian towns, but that the city could still suffer cold winters, and describes accounts in the 1600s, when people could walk across the sea-ice to Askøy Island. The Guide goes on to discuss the consequences of Bergen's damp climate, with one key impact being the transformation of the road network to mud, making it unusable for most carriages. Another consequence is to the dress of Bergen people, with simple, sturdy shoes and rain-clothes socially acceptable at all levels of society; women wore wool or silk rainhoods over their heads, and men used umbrellas or rainhats. A third consequence is to health, with Holberg arguing that the damp weather encouraged illness.

Notwithstanding this wet weather, the Guide describes Bergen's people as often outdoors, with warm summer weather seeing young people swimming in the fjord, or people taking boat trips on a Sunday; though boat trips could turn dangerous if people sailed beyond Kvarven, where the winds can pick up suddenly. In winter, the young people would skate, ski or use sleds. Ice-skating was popular on lakes and in parks around the town. Otherwise, it was popular to stroll and exercise in the parks, gardens and countryside in Bergen's hinterland.

In an attempt to access Bergen life stories in the public sphere, the study included two biographical books. These books gave rich and personal detail about the recent history of Bergen, and how particular people took meaning

from the weather, but also show how seldom weather or climate feature in the telling of life stories. The book by Rafto & Rafto (2017) follows the life of a 100-year-old woman who grew up in Bergen in the 20th Century. Most of this woman's weather-related stories centred on the winter's snows; "When there was snow we made snow-caves. Then we would get a light from home to light up the cave, and sit there and shiver and freeze. And we would shiver even more when we started telling ghost stories! Then it was good to return inside and have a warm cup of cocoa" (Ibid, pg 15). Or, "In winter they would spray water on the field if it was cold enough for a couple of days in a row, and we could go and ice skate." (Ibid, pg 24). And "In winter we would ski and rent a sledge in Nygardsparken. From Jahnebakken and down into the park was a painfully steep slope. Those that managed to ski down there were very good at skiing." (Ibid, pg 23). She also talked about swimming in the summer, "Sydnes sea pool. We went there and swam from when it was opened early in spring until it was closed late in autumn." (Ibid pg 22).

The other biographical book, Dette gjorde vi: Barn I Bergen på 1950- og 1960-tallet (Thats what we did: Children in Bergen in the 1950s and 1960s) by Gro Berntzen (2016), followed the lives of 16 Bergen personalities, often active in the cultural milieu. Here again, climate was largely absent from most peoples' stories, with just five people discussing weather or seasons. The story of Arne Birger Lindtner Næss was interesting for his account of adventures in local Scout troops, including trips to make snow-holes on Gullfjell; "Once we were hit with terrible rain in the night. I woke up with the snow falling on my sleeping bag, and when I looked up to see the sky I got rain on my face. Everything got wet and we packed up in a hurry. Down at the train station and guesthouse at Gullbotn we were allowed into the fire room. It was nice and hot and we could dry our clothes before we took the bus home" (Ibid, pg 20). Also, "It rained terribly at the Scout camp in 1960. Then 9000 scouts were gathered at Brunlanes in stave tents, and

the rain dripped into the tents where we sat and ate Sunda on slices of bread (Ibid, pg 20).

Dag Arnesens story is interesting because he came from a family of umbrella craftsmen; "Dag grew up in a small house where the family ran a small shop on the ground floor. It was called Frekvent, and there stood his mother and sold toys and various other things, mainly umbrellas. His grandfather was a trained umbrella maker from Germany and ran an umbrella workshop in the basement" (Ibid pg 28). Dag was also active in the buekorps, troops of marching bands for young men that are very popular and specific to Bergen. '"It could be wet and cold many times, but when I was the drumming major and went first, I liked the attention it gave me.' As drum major he was lead drummer and also had to repair all the drums [...] In rainy weather the leather became slack, but now they use water resistant plastic" (Ibid, pg. 35).

2.3. Analysing references to climate change in public narratives of Bergen

To what extent has the threat of global climate change coloured the way Bergen's people discuss the climate in Bergen, and the cities future? In this section we analyse reference to climate change in narratives, and make a broad distinction between: (i) public institutional spheres and networks of 'experts' who are engaged climate mitigation and adaptation governance in Bergen; and (ii) other spheres open to a more general public, not necessarily possessing expertise or responsibility to govern for climate change in the city.

2.3.1. Climate change narratives inside Bergen climate governance networks

There is a well-established network of actors and institutions that are leading work on climate adaptation and mitigation in Bergen; work that dates back at least 10 years. This network includes scientific institutions in the Bergen Climate Hub (The Geophysical Institute and the Centre for Climate and Energy

Transformations at the University, Uni Research Climate and the Nansen centre), local government at the municipality and county level, and the Norwegian Water Resources and Energy Directorate for instance.

Within the scientific network, there are important moves to even further Bergen's status as a global centre for climate research. At the University of Bergen, 'Climate and Energy Transitions' is one of three priority areas, and there are efforts to establish the Bergen Climate Hub (BACH) across all climate research institutions in Bergen. Ironically, a presentation at BACH last year discussed the 'Bergen Paradox', noting that considering the huge climate research expertise assembled in Bergen, there has relatively little climate science focussed on Bergen itself (Paasche et al 2017). Notwithstanding this, there have been numerous climate-related studies in Bergen, across many different disciplines including climate services, and including predictions of the future climate. A presentation at a 'Klimathon' in Bergen, 8-9 January 2018, by Erik Kolstad at Uni Research Climate summarised the scientific climate predictions specific to Bergen. He noted predictions for wetter weather along the northwest of Norway, with implications for the city's surface water management. He also noted a shifting in the timing of the seasons and the weather contained in each season, would affect activities like farming; "Now that spring comes earlier, it will also rain, and as a result it will be difficult to use heavy machinery on the fields".

We see that this science is influencing how local government is planning for the city, evident in the policy and action emerging at the municipality and county level. A Regional Climate Panel has been established, and all municipalities in Hordaland invited to participate. The municipality has a whole network of relevant policy instruments and vision statements, including (i) Water and the life of the city'; (ii) Cities of the Future; (iii) Bergen Smart City Energy Efficiency; and (iv) 'Green Strategy; Climate and Energy Action Plan for Bergen. Perhaps most telling is the second line in the 'Water and the life of the city' vision which notes,

"The 'Rain City' is our trademark and climate change means that we are facing the challenge of dealing with even more water – both from the sea and from the sky". A presentation by a municipality representative at the BTO, Bergen 13 June 2017, summarised their predicted impacts of combined increased rainfall and sea-level rise:

"The city has a long tradition is surface water management. The city has managed this rather well so far, but existing water systems are about to reach the limits of their capacity and many systems will have problems in the future due to climate change: (i) increasing amount of precipitation (especially in autumn and winter); (ii) increasing intensity of the rainfall (summer rain); (iii) problems with flooding (Nesttun watercourse, Damsgård and more). We also face sea level rise, which will (i) increase overflow from the sewer systems; and (ii) Bryggen will be flooded more often".

The municipality policy documents often refer to specific recent and disastrous flooding or landslide events to illustrate the need for policy measures. For instance, the 'Water and the life of the city' document writes, "Extreme levels of precipitation result in flooding and landslides. Following the landslide disaster at Hatlestad Terrace, the City of Bergen has put a lot of effort into mapping all areas with a risk of landslides, to prevent any future recurrence of this kind of accident". The presentation last year appealed to a major flood on 15 November 2013, which was described as a 50-year event in 3-4 hours.

Both city and county government commit to integrating more science into climate governance. The Bergen municipality presentation in 2017 asserted the city, "seeks and contributes to increased knowledge to adapt to changes", and listed at least five international research projects that it has taken part in. The Hordaland county 'Klimapllan' has as its vision and objective; "Adaptation to climate change must be based on the precautionary principle, still more precise basic data, and the knowledge of local people" (Hordaland, 2014).

2.3.2. Climate change narratives in the broader public sphere

To what extent have themes around global climate change infiltrated into wider public narratives about weather and climate in Bergen? Actually, there are indications that climate change is being connected up with, or built into, the ways that people in Bergen talk about the weather, and the future climate in the city.

Returning to the material reviewed in Table 1, we see that the Wikipedia page about Bergen does include two paragraphs about the impacts of future climate change: "In recent years, precipitation and winds have increased in the city. In late 2005, heavy rains caused floods and several landslides, the worst of which killed three people on 14 September. Some indications are that, due to climate change, storms causing landslides and floods will become more severe in the area and in the surrounding counties [...] [There were] over 480 landslides in Hordaland county from the spring of 2006 to the summer of 2007. Most of the slides hit roads, without causing damage to cars, buildings, or people, until October 2007 when a large dislodged rock killed a motorist" (Wikipedia 2018). The other concern voiced on the website is for rising sea-levels, which could endanger the Bryggen site, and train transport. It notes that Stiftelsen Bryggen has suggested installing a seawall in Vågen harbour that can be raised or lower according to the tides.

Climate change also appears quite regularly in the local newspapers. Meze-Hausken (2007), in her review, identified 66 front-page stories referencing climate change, and asserts it is an important issue in Bergen for two reasons: "First, the University of Bergen intensively conducts geophysical research on climate change. This results in occasional newspaper headlines about research highlights and interviews with scientists. Second, several numerical models – including the Bergen Climate Model [...] – project an increase in rainfall for western Norway in the order of 10 to 20%, especially during the autumn and winter, and an increase of 15 days of rain per year by the end of this century

[...]The possibility of being confronted with even greater amounts of precipitation captures journalists' attention. Local rainfall records or other weather extremes, not uncommon for western Norway, are then related to a first fingerprint for anthropogenic climate change (Ibid, p. 13). To this we can add a third reference to climate change in newspapers, linked to local government climate initiatives. The free local newspaper, 'Bergeneren' (the Bergener') in March 2018, had a two-page spread on the transformation of Bergen to a 'Climate-friendly city' - 'Med bompenger til klimavennlig by' – principally through raised road tolls and public transport.

Another way of seeing climate change grow in the public consciousness is through recording the public events that discuss climate, and the organisations that are emerging in the city. To the former, we see long-established organisations and institutions holding events that discuss climate. Two very recent events are illustrative. In February, the Philharmonic Orchestra gave a free concert, coupled with talks from local scientists about climate change, to raise climate awareness. That same month, the Bergen Litteraturhuset (The Bergen Literature House), which supports authors and cultural communities in Bergen, had an event titled 'Verden i Bergen' (The World in Bergen), which covered many topics, but included an interview with well-known American climate scientist and activist James Hansen. This shows how climate consciousness is infiltrating these cultural institutions. Other new non-governmental organisations are emerging with a climate change focus, which also traverse all levels of society, from 'Besteforeldrenes kimaaksjon' (Grandparents for climate action) to the 'Concerned Students of Bergen'. Publicity for these groups and events appear in the streets and cafes of Bergen, and further trigger thinking about climate change.

The school is yet another public sphere bringing climate into the understanding of Bergen's weather. Climate change is entering the curriculum, and there are

increasing numbers of seminars or workshops with school students in Bergen about climate change, including those led by University researchers (Fløttum, Dahl & Rivenes 2016).

2.4. An initial typology of climate narratives in Bergen

From this initial mapping, a rough typology of climate-related narratives emerge in Bergen. Importantly, this typology is dependent on the way the mapping was conducted in Bergen, and determined by several choices made, including a focus on: (i) narratives in physical artefacts like texts, presentation slides, paintings or other physical cues around the city; (ii) narrative sources that are prominent in public spheres, easy for residents and visitors to come across (i.e. no strictly scientific texts); and (iii) a distinction between public spheres that are 'within' the existing institutions and network of actors formally working with climate governance in Bergen, and other spheres 'outside' of this formal network. We see different types of story that depict the climate in Bergen, based on their structure and especially the meaning or moral they impart (in no order):

- *Promotional narratives*: written to attract visitors, but also new business and industry, and mainly seen in publications by tourism organisations. They omit reference to rain and focus on the vibrant diversity of seasons in Bergen, and how close the city and its people live according to these natural rhythms.
- *Identity narratives*: distil the identity or 'trademark' of Bergen city as a place. They are prominent in publications by Bergen Kommune, like 'The City is Bergen' or 'Water and the life of the city', but also seen in physical artefacts around town like sculptures, shop names, posters and slogans, and in some newspaper articles. Here rain and water are central place-making motifs. Bergen is the city under the rain and beautified by water; puddles mirroring grey skies, and rushing waterfalls, gutters and streams. Bergensers are the people who proudly live under the rain, resilient folk who persevere through rough conditions and make the most out of life, leading outdoor lifestyles in spite of the rain.
- *Romantic narratives*: emphasise the dramatic beauty and mystique of the natural landscape around Bergen and its people's unique link to nature, as seen in historic paintings as well as some newspaper articles. Prominent in these narratives are the mountains and fjords surrounding Bergen, their

change over the seasons, and poetic stories of people going into nature, for spring weddings, or summer motorbike trips for example.

- *Life stories*: are prominent in biographical books found in local bookstores, and in the newspaper. They tell the life stories of prominent people in Bergen, and these stories are at times told around weather episodes, like particular storms, or more often weather norms; typical things these people would do in certain seasons, or certain weather.
- *Accounts of today's weather and extreme events*: are most often seen in the newspaper. They report on the actual weather phenomena people are facing now, and how it has impacted on the community; from extreme weather events like storms, to commentaries on 'good' or 'bad' weather the city faces, or how the weather framed a recent social event.
- *Narratives of Bergen in a global climate*: focus on projected changes to Bergen's climate related to global climate change, encapsulated in Bergen kommune's assertion that Bergen will need to deal "with even more water – from the sea and from the sky". This narrative finds mention in most spheres from scientific presentations, to the local newspaper, or on Wikipedia for instance. It is often linked to recent floods and landslides in the city in the past five years. It captures the attention of a city that already deals with a lot of rain and water.
- *Narratives of Bergen's response to global climate change*: are split between Bergen's own proud traditions in water management, its history of research on meteorology, to its current place as a globally important node of climate science. These narratives mainly emerge in climate governance spheres, but also in certain other public narratives, including on Wikipedia. They are perhaps most prominent in local government policy narratives.

Importantly, these narrative types are not mutually exclusive. Very often a narrative will weave together two or more of these story lines. For instance, the Kommune's 'Water and the life of the city' document starts from Bergen as the 'rain city' – the identity narrative – then connects this with the narrative of Bergen facing climate change, and finishes by showing the engineered and scientific response.

3. Case Study : Jade Bay, Germany (Werner Krauß)

This part is contributed by Werner Krauß.

3.1. General background

The Jade Bay (Jadebusen) area is situated between the river Ems and the river Weser, with the characteristic shape of the North Sea bight and the surrounding landscape with its marshlands, moors and moraines. The Jade Bay has two districts, Wesermarsch in the East (the Butjadingen marshlands, between Weser delta and Jade Bay) and Friesland in the West, with its main towns Wilhelmshaven, Jever and Varel.

Figure 13. Map of the Jade Bay area (Wikipedia commons)

The Jade bight resembles a giant bathtub, surrounded by dikes and with a neck to the North Sea, which serves as entry and exit of tidal waters. The bathtub is filled twice a day with water; with each tide, 450million m^3 water from the sea floods an area of 164 km^2, while during low tide, only 44 km^2 are covered with water. Since the end of the 19th century, a dike line of 55km almost fully circles the Bay and ensures the maintenance of the deep-water trenches, the so-called

inner and outer Jade (named after the river Jade). Water remains the crucial threat and challenge in this area: from the seaside, storm floods threaten the land, and on the land, highly complex drainage systems keep the water from rainfalls out of this low-lying landscape and pump it into the sea.

Dairy farming with its meadows and pastures dominates the current agrarian structure; structural change led to intensification, specialization (pigs, poultry) and subsequent ecological problems. Tourism is another heavyweight economic factor in this region, and the seaside of the Jade Bay is part of the National Park Wadden Sea and a UNESCO World Heritage Site. Furthermore, this region is one of the hot spots of the German energy transition, with abundant wind parks, biogas production, and the subsequent changes in land use, ownership and conflicts with nature conservation. Wilhelmshaven hosts the Weser-Jade Port, Germany's only deep-water port. Its skyline with two coal-fired power plants marks a stark visual impression at the horizon; in summer, tourists and coastal dwellers appreciate sitting on camping chairs and commenting the skyline, the tides, the mud flats, the weather, the imponderability of life and soccer results. A good place for telling stories, old and new.

3.2. Geo-political narratives

The geo-political history of the Jade Bay is well documented. The educated reader and tourist will find two notable books in every bookshop in the region: one covers extensively the geological and social history of the Jade Bay landscape (Behre 2012); the other, a comprehensive reader edited by the Oldenburgische Landesverband (OLV 2015), presents the geography and the history of the institutions, with a strong focus on the activities that today shape the professional and everyday life of this area. Wikipedia (2018) provides a summary of the main geologic and historic events. Furthermore, the historian David Blackbourn (2006) narrates the history of the Jade Bay as a 'conquest of

nature' and an outstanding example for the role of water drainage and dam building in the making of Germany.

Each of these exemplary publications (there are a few more) shifts the focus on a different aspect of this region. Like other coastal North Sea landscapes, this is a constructed landscape in the strict sense of the term: The Jade Bay is the result of the interaction between human and non-human forces, between the land and the sea. This historic interaction also serves as the basis of regional identity, dubbed as 'Frisian'. In the course of history, this interaction served as a myth of origin, as proof of racial superiority, as a self-conscious regional identity in the mosaic of German identities, as a marker of local products or an icon for the tourism industry.

The visual representation of the area in form of maps plays a central role in the various representations of this area. Here an example from Blackbourn's book that in one form or another is seen at iconic places along the Jade Bay, at heritage sites or in books about the history of the Jade Bay:

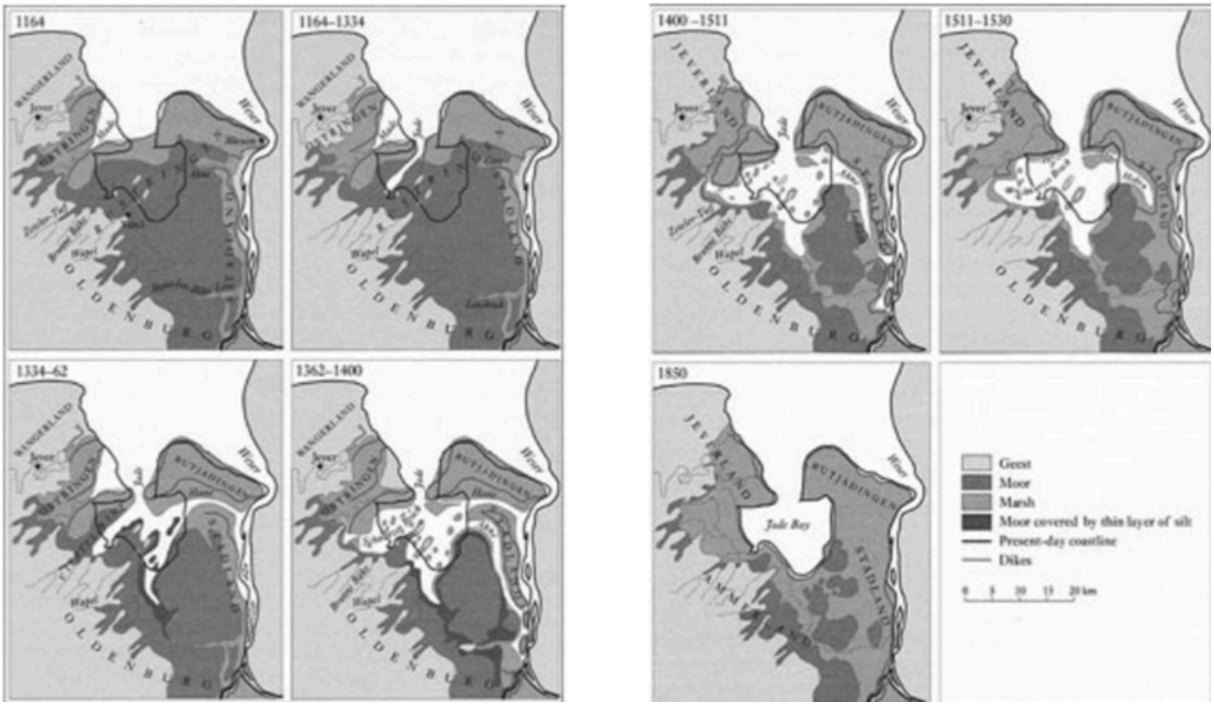


Figure 14. The formation of the Jade Bay (Blackbourn 2006, 126 f.)

This series of pictures (there are other versions, too) makes a long story short. Each of the tables represents the effects of storm floods and dam building since the middle ages. The *Julianenflut* in 1164 opened the neck to the sea, followed by disastrous floods in the subsequent centuries, like the *Marcellusflut* (1219), the *Große Mandränke* (1362), the *Allerheiligenflut* (All saints flood) of 1570 with 9000-10000 deaths, the *Weihnachtsflut* (Christmas flood of 1717) and many more.

Behre's account (2012) of the origin of the Jade Bay landscape starts with the rise of sea level 5000 years ago and describes in detail the historic interplay of dramatic floods, sedimentation, and settlement, from early colonization and chiefdoms to the emergence of counties like Oldenburg and finally the nation-state. The history of dike building and water drainage, of ports and infrastructures are the core of his account and end in today's modern coastal protection, with only few remnants of 'nature' preserved in the National Park. In one way or the other, elements of this detailed geo-political account serve as the foundation for the construction of regional identity, dubbed as Frisian and based on the myth of the eternal struggle of the Frisian against the sea.

In his book 'The conquest of nature. Water, landscape and the making of modern Germany', the historian David Blackbourn (2006) shifts focus on the geo-social history of the Jade Bay as a prominent example for the role of drainage and dam building in the making of modern Germany. Coastal protection and drainage systems are an inseparable part of the social organization and societal order, like in many other dike societies; the making of this landscape and the conquest of nature are closely linked to power and property. Blackbourn puts the emergence of a powerful elite of marsh farmers into the context of disastrous land loss, subsequent dam building and coastal politics. The colonization of the land, the emergence of chiefdoms, counties and modern nation building is not a teleological story; Blackbourn challenges the conquest of nature as a tale of the heroic Friesian who fights the sea and the '*Blanke Hans*' (the wind), of man versus

nature. The origin of disastrous storm floods may be natural, he writes, but the dike also potentially endangers neighboring areas, where the water comes in with double force. Disasters are manmade, at least partially. In any case, dikes also symbolize the power of the investor, the duke or the nation state; they provide identity and easily help turning weather or climate into destiny in the tales of theologians, politicians, scientists or environmentalists. Blackbourn raises awareness for the fact that each intervention into the landscape is a challenge for the social and symbolic order of society; narratives of change are an integral part of the history of an amphibious society.

In another shift of focus, the edited reader about the Jade Bay (OLV2015) takes the river Jade (close to Varel, see figure 14) as the starting point, which is only 22 km long – even though the deep waterways in the Jade Bay are called inner- and outer Jade, they are separated from the original river; the river Jade did not originate the Jade Bay. Nonetheless, the river Jade is exemplary for today's land use and the role of drainage for this landscape; the *Wapeler Siel (sluice)*, where the Jade enters the Jade Bay, is one of the central pumping stations and outlets of water from the land into the sea for an area of 195 km^2. The chapters in the book show in lively detail the industrious life in this area and present some of the main socio-economic and cultural activities. Frisian identity is here based on innovation, water management and development, with a strong foundation in research and nature conservation, organised in administrations, *Vereine* (associations) and private foundations.

There are also counter-narratives. While all authors make use of the geological features that characterize this landscape, they differ in interpretation. Did the sea historically really 'eat' the land, or did it help creating land through sedimentation? Is misled human intervention the cause of disaster and not the sea (Umweltstation Iffens, n.d.)? And is coastal protection a necessity or, especially in times of climate change, a fallacy (Reise 2015)? These questions

emerged with the age of ecology and, more recently, of climate change; the heroic tale of the Frisian against the *Blanke Hans* and the sea is slowly undermined and, at least by a few, considered as part of the problem.

3.3. Science-based narratives, coastal management and climate governance

Coastal management has a long tradition in Germany. From the eighties onwards, ecosystem studies shaped the perception and the management of the coastline, with the denomination of the Wadden Sea as a National Park and a UNESCO world heritage site as one of the results. In the new millennium, climate change scenarios slowly replaced the dominance of ecosystem studies; from the past decade onwards, the area between Bremen, Oldenburg and the Jade Bay is subject to a series of programs that study the effects of climate change for the management of this region. Scenarios based on downscaled climate projections for this area help to anticipate the possible consequences for agriculture, economy, coastal protection and nature conservation, some of them in close cooperation with the respective stakeholders. Climate adaptation and mitigation are the key terms for science-based climate politics.[1] Climate services provide scenarios for the region (Meinke et al., 2009; Meinke et al., 2014; Jacob et al. 2014; Quante and Colijn, 2016); projects funded on various levels from EU to the federal state of Lower Saxony studied the management of climate change and its potential regional effects (Beese and Aspelmeier 2014), developed an integrative roadmap (NordWest 2050, 2014) for 'regions of the future', or researched the effects of climate change on coastal protection (Grabemann et al,., 2005) and the water management (NLWKN, 2017).

Research in ecology and now climate change increasingly shapes the perception of coastal landscapes and creates new forms of science-based coastal politics;

[1] Thanks to my colleague Birgit Gerkensmaier for providing information about the studies.

the IPCC and regional climate studies inform Germany's coastal protection politics and the traditional dike and sluice organizations. The districts of Wesermarsch and Friesland each have '*Klimaschutzbeauftragte*' (coordinators for climate protection measures), who try to reduce emissions on district level, to educate the population and to shape spatial planning accordingly. Agriculture and especially dairy production are subject to many regulations, many of them concerned with the effects on the environment including climate, and the production of renewable energies is in full flight. Climate change is part of the discussions about the quality of life; NGOs point to the cognitive dissonance in the behavior of their fellow citizens or try to change the course of development. In short, climate change has already become a form of governance, supported by science, experts, public and private climate services and engaged citizens. Science-based narratives turn climate change into a technological problem, with only few nods to the politics and the cultural implications of climate change.

3.4. Dike & sluice organization

The centrality of coastal protection and drainage makes the dike & sluice organization one of the key actors. The '*Oldenburgischer Deichband*', the dike association of Oldenburg, is divided in three sections; each of them responsible for the maintenance and conservation of a part of the dikes protecting the Oldenburg and Jade Bay region. The dike organization is a public corporation; each owner of land below 5 meters above sea level is an automatic member and has to pay fees according to the size of the land. Large landowners dominate the association, with the national state, who owns the most of the coastal area of Wilhelmshaven, as one them.

The dike and sluice organization is, by nature, a conservative organization with a long tradition that has to work closely together with the municipalities, the federal state, and the associations that are related to the subject. One of the

main narratives is the war against the sea, nowadays enforced by climate change and its potential effects of sea rise level and intensification of storm floods. Currently, climate adaptation measures are underway; the dikes are made climate proof. The organization holds regularly ritual dike inspections (*Deichschau*), where members of the organization and affiliated institutions walk at least parts of the dike lines and discuss problems of maintenance, conservation, land use and related issues. These inspections are also a demonstration of the familiarity and expertise with the landscape, with its materiality (quality of soil etc.), with questions of land use, ownership and the politics of the landscape. The members of the organization are all native to the region, and they do their job on an honorary basis; in their duty, they embody the Frisian ideal of protecting the land against the sea. The new generation of dikes are roll-over dikes, but they are still literally huge walls that separate the land from the sea. The narrative of the war against the sea entails the detailed knowledge about the political ecology of the landscape.

The discourse of coastal protection suggests an understanding of landscape as a practice and a political arena where decisions are made. In former times, *Landschaft* actually was a political organization; still today, there exists the '*Oldenburgische Landschaft*', the landscape of Oldenburg, as a cultural organization.

3.5. Storm flood memory as cultural heritage

All along the coastline, monuments and landmarks remind of past storm floods and the damage they had done. Metering rules show the height of the respective floods, and there is a count of death on the placards. Past storm floods are measured in relation to the current height of the dikes; the monuments are both warning and affirmation that current dikes are high enough. There are also monuments of some former engineers and heads of the dike organizations, with

placards informing about their achievements. Partly tourist attraction, partly local heritage, these monuments are part of the regional narrative of the war against the sea.

The *Academy of Dangast*, a local organization which promotes cultural activities in the region, organized an exhibition about the Christmas flood of 1717, where approximately 9000 people had died (Peters 2017; see figure 16). It was one of the first well-documented floods, and the exhibition gave a detailed report of the events in carefully prepared presentation boards, based on scholarly research.

The opening was exactly 300 years after the disastrous storm flood, and it was attended by representatives of the municipality, the church, the dike & sluice organization and other honorable persons. The ceremony was characterized by two main discourses, a religious and an engineering one. The priest opened the ceremony with a discussion of the question what God wanted to tell us with this disaster on Christmas eve. He discussed this theological question in detail, from the former idea of a punishing God to today's God of compassion. In the end, he did not hesitate to remind the audience that climate change affords a change in daily habits and life.

This religious discourse was followed by the head of the dike and sluice organization, who told the story of his own experience with flood alarm as a young boy in 1954. From here, he praised the evolution of dike building, with the new dikes which do not serve simply as a wall but may be rolled over by the waves without breaking. In the worst case, individual polders will be flooded; the conservation of the second, older dike line will prevent from greater damage.

In between, chronicles from the 1717 were read, reminding the audience of the horror of the cold death which storm flood brings. After the ceremony, the priest led the audience to a monument, where he blessed the so-called flood bell; a piece of art that reminded of the sunken villages in the Jade Bay. The legend says

that the church bells from the bottom of the Jade Bay still ring when a storm flood comes in.

Figure 15. Akademie Dangast, flyer : '300 years Christmas Flood: the disastrous storm flood came in Christmas night (Peters 20017)'.

3.6. Nature conservation

The implementation of the National Park Wadden Sea and its subsequent declaration as an UNESCO world heritage officially ended land reclamation at Germany's North Sea coastline. Ever since, from the foot of the dike seawards, protected salt meadows mark the habitat of migratory birds. National Park administrators consistently monitor the ecology of the Jade Bay. The National Park entertains various houses along the Jade Bay, providing information for the public. The director of the Dangast house clearly confirms that climate change already left its traces in the Jade Bay; temperature and sea level are rising; new species arrive and older ones disappear; patterns of bird migration change as does the arrival of the seasons. But climate change is didactically difficult to teach; mostly, in seminars and workshops, ecology prevails over climate change. Climate change is mostly invisible and untouchable, while ecology is close at

hand; narratives about climate change cannot compete with those of ecology, whose subjects are visible and touchable.

There is also a long story about the tensions between coastal protection and nature conversation. In 1996, the dike in *Cäciliengroden* had to be repaired; the dike organization extended the foot of the dike into the saltmarshes. As a consequence, a nature organization sued them, because the salt marshes are protected from human intervention by the National Park. The dike organization reacted in organizing a demonstration, which was attended by 10.000 people carrying torches around the Jade Bay. The slogans said that coastal protection needs to have priority over nature conservation. The conflict was finally resolved 'among men' and in a 'Frisian way', during a stormy night; the opponents met and negotiated in the barracks with lots of *Schnaps*, as the often-repeated legend goes. It seems to be obvious that here met two different forms of managing the coast, too; the dike organization had to follow the rules of the National Park, but nature conservationists had to submit to the myth of Frisian identity, which is based on the war against the sea.

3.7. Land use

In interviews, farmers tell that after the War, mixed agriculture existed besides today's almost exclusive dairy production. The life histories of farmers are also stories about the quality of soil – marshlands with rich soils or the poor soils of the Geest (mainland) – and, correspondingly, about social hierarchies. Today, so-called conventional farming is characterized by EU subsidy policies and a constant intensification of production; poultry and pig mass production has a long and contested tradition; the Oldenburg region is one of the hubs in Germany for mass production of meat. Pressure of smaller farmers intensified once more with the end of the milk quota in 2015, which forced even more farmers to give up. On the other hand, there is a constant rise in biological

farming and the marketing of so-called whole food. The narratives of conventional farmers are predominantly market-based, and they complain about the bureaucracy involved with subsidies and the pressure of the market. The narratives of biological farmers are about the quality of food and the well-being of the animals. Both meet in the love of land and work; in many cases, farms are still in the hand of families, and farmers on both sides think in generational terms. A further differentiation among the farmers came with biogas and wind energy; both accelerated the competition for land.

Figure 16. Land use below sea-level in Wangerland, district of Friesland. (photo by Werner Krauß)

3.8. Wind energy

Wind turbines are a highly visible structural element of the Jade Bay landscape. During my field stay, a regional branch of the non-governmental organization BUND organized a discussion about the future of wind energy, with a representative of a regional renewable energy provider as the main speaker. The discussion was characterized by competing narratives about energy, politics, land use and ownership; market arguments were complemented with those about senses of place and belonging – in the Jade Bay area and in the world.

With statistical numbers, the representative of the power provider presented the enormous success of wind energy and its potential as the main energy provider in Germany; on the other hand, she criticized the new governmental energy policies which put an end to wind energy as citizens' energy. New application laws privilege big investors and corporations over locally organized wind parks, who cannot compete in the competitive market where the provider of the cheapest price for energy wins the license.

But there are more conflict lines: local protesters complained about the omnipresence of wind parks and the resulting effects like noise, disco effects at night, bird kill and loss of property value. Others complained about irregularities in the procedure of licensing on the municipal level; suspicion of corruption was expressed by some, loss of property value close to the wind parks by others. There was general agreement that there is a price to pay for the energy transition and that the landscape is more or less saturated with wind parks; arguments like bird kill were countered with much higher numbers from road kill. All in all, the well-attended meeting gave an insight into the inherent tensions created by the energy transition. The tensions already created through the intensification of agricultural production – with biogas as one of the main competitors for land -, are rising with the omnipresence of wind energy. While the energy transition sails under the flag of climate change, its origins are rooted in diverse discourses about energy autonomy, resistance against nuclear power or a cleaner environment; nowadays, climate politics deeply affect and change existing power structures. Wind energy is big business, with positive and negative connotations, even for those who support climate mitigation; one of the main challenges is the question of property, where communal or civic wind parks loose increasingly ground against professional developers.

3.9. Fieldwork in the weather world

My access to narratives of change is based on anthropological fieldwork, participant observation in everyday and public life, complemented by conducting biographical and semi-structured narrative interviews. Over the course of the past four months, I lived for several weeks on a farm, where my hosts entertain a whole-food '*Bioland*' shop. They leased their land to a gardener, who produces biologically licensed vegetables and fruit. Following a snowball system, I interviewed key actors who are considered influential in terms of climate governance and / or the representation of the landscape of the Jade Bay. I also participated in various public events and tried to make myself familiar with the complex politics of this amphibious landscape and its complicated forms of organization. I conducted 12 recorded interviews, wrote protocols of seven conversations and public events, and I kept a field diary throughout four months and will do so throughout the summer.

Most importantly, I share as much as possible life in the 'weather-world' of this region. I sustained a winter in which the sun disappeared in October behind grey skies and did not shed a light until late February (with a few exceptions). An already unusual rainy summer, as my informants told me, was followed by an extremely wet winter; the fields and meadows were drowned in water and became inaccessible, farmers could not get rid of the manure any more.

Everybody complained about the rain, and many of my informants blamed climate change for it. As a farmer explained to me: only freezing temperatures provide clear and sunny skies in the winter, while rising temperatures and rainfall keep the skies full of clouds. Old weather proverbs are no longer valid, he said. No one remembered such a wet winter. Extreme and stormy weather, with intensive rainfall and strong winds, becomes more frequent, as one of the heads of the dike organization explained to me.

Figure 17. Fieldwork in the rain (photo by Werner Krauß)

It was only a few days in February, when ice covered parts of the waterways and the wet pastures; informants told me, that in former times, skating was possible in every winter for several weeks; nowadays, this is hardly possible.

The marshlands were under water; the world seemed to drown in endless rain, and feet of humans and animals deeply sank into the black earth of the fields – Tim Ingold came to mind, who argues, that we do not stand on the earth and under the sky, but that we are entangled in the weather world.

In regional newspapers like the *NordWestZeitung* or the *Friesländer Bote*, changes in weather and, of course, this year's winter storms were extensively covered – some of them made national news. One of the storms broke large pieces out of the dunes of the island of Wangerooge; a tanker ship stranded before the island, and during high water, one tourist who slept in his car close to the sea was surprised by storm flooding and drowned. Maintenance and climate adaptation work at the dikes along the Jade Bay are critically covered, and climate change lingers through many of these stories. These local issues are far from isolated or peripheral; when I drive from university in Bremen into the 'field', the same issues are discussed at length in radio features, be it the future of intensive agricultural production, the new legislation for wind energy, or the warnings of

climate scientists and climate services that soon the coasts will be flooded unless we reach the 1,5 degree target. There is no outside to the weather-world; instead, there is an ongoing conversation, to which we from CoCliServ contribute our findings and comments. Coproduction of narratives for place-based climate services means that we inhabitants of the weather-world share forces to face the challenges imposed by changing weather conditions.

4. Case study : Dordrecht, Netherlands

This part is contributed by Benedikt Marschütz and Arjan Wardekker.

4.1. Situation in space and time

4.1.1. Location

The city of Dordrecht, on the Isle of Dordrecht (99 km^2), is a city in the west of the Netherlands, in the Rhine-Meuse-Scheldt delta. It is part of the Randstad Metropolitan Area, the conurbation that includes the major Dutch cities such as Amsterdam, Rotterdam, The Hague and Utrecht. The Isle is enclosed by rivers and is at a fluvial crossroads, with river channels connecting it to Rotterdam and to the Southwestern Delta. The city (119,000 inhabitants) originated as a river exchange point and trading port city. The surrounding land contains agricultural and nature areas. Most areas are about 1.5 m below sea level and are protected by dikes. The Isle also contains unembanked areas, such as the historic harbour, which floods occasionally. Key climate related challenges include heavy precipitation events, drought and soil subsidence, flooding from the rivers, flooding from the nearby sea, and impacts from water management actions on the latter two issues both upstream and downstream. The Municipality of Dordrecht is actively working on climate change adaptation.

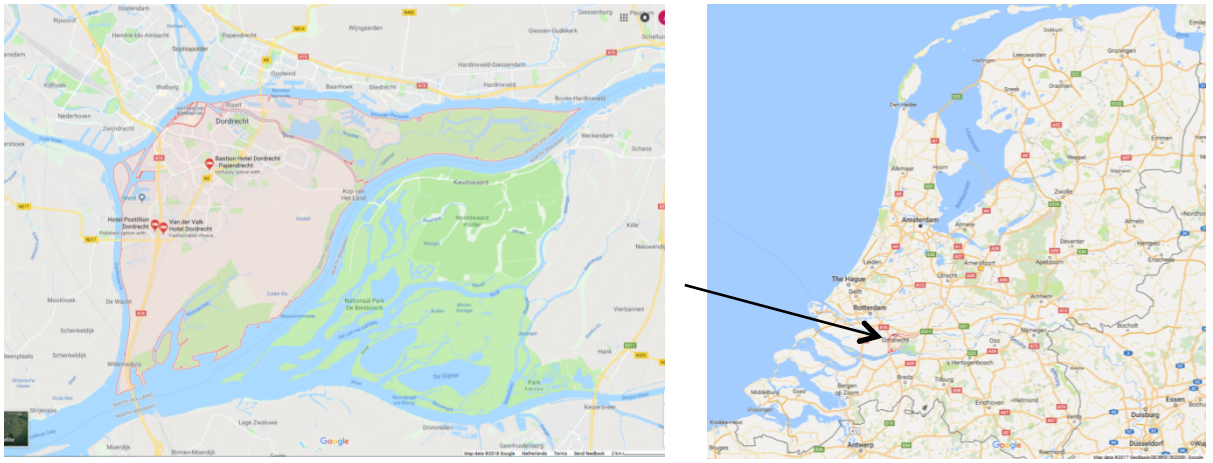


Figure 19. Dordrecht: (a) Isle of Dordrecht, (b) satellite photo of Dordrecht, (c) location in the Netherlands

4.1.2. Historical development of Dordrecht

Dordrecht is located in the Rhine-Meuse-Scheldt delta, one of the large European deltas. It is built on former peat swampland, and the soil consists mainly of peat and riverine clay, and to a lesser extent sand (Gemeente Dordrecht, 2013). The presence of peat leads to ground compaction and consequently soil subsidence. The riverine clay, which is water impenetrable, reduces the uptake of water into the soil, and consequently results in challenges with discharging rainwater.

The area of the current Netherlands lies in the delta region of three of Europe's main rivers, the Rhine, the Meuse, and the Scheldt respectively, which let the

sediment brought by them, gradually gather in this region since the last ice-age 11,000 years ago (Gemeente Dordrecht, 2013; Jak & Kok, 2000). In front of this background started land to accumulate from around 5500 BC with large peat areas starting to develop initially, until around 100 AD the area becomes more stable (Herrebout, de Vries, Hochstenbach, & Smits, 2015). Accounts on the vanishing of the Roman Empire from that area around 300-600 AD let the landscape become yet again more wild after some Roman settlements gradually vanished, until the population experienced such growth around 1000 AD that agricultural lands start to form and people became technically so advanced so as to cultivate this wet area (Gemeente Dordrecht, 2013; Herrebout et al., 2015). Peat landscapes dominated the landscape for the most historical parts until quite recently, some 1,000 years respectively, the landscape became more human-dominated, as seen below in Figure 20.

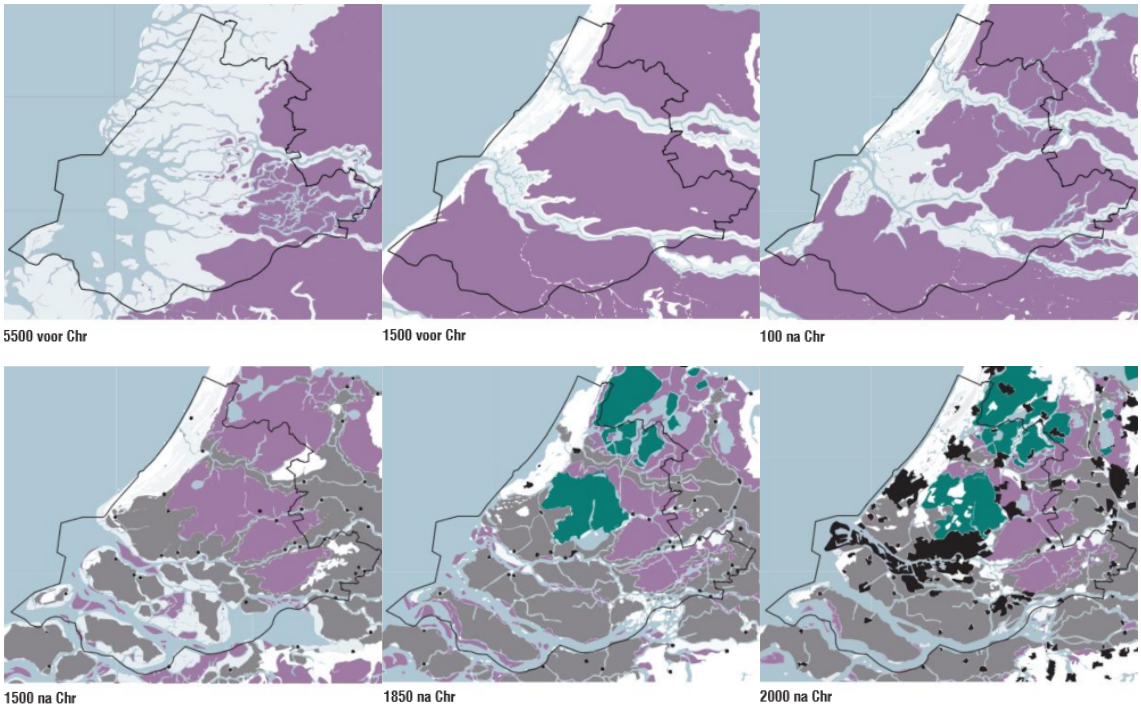
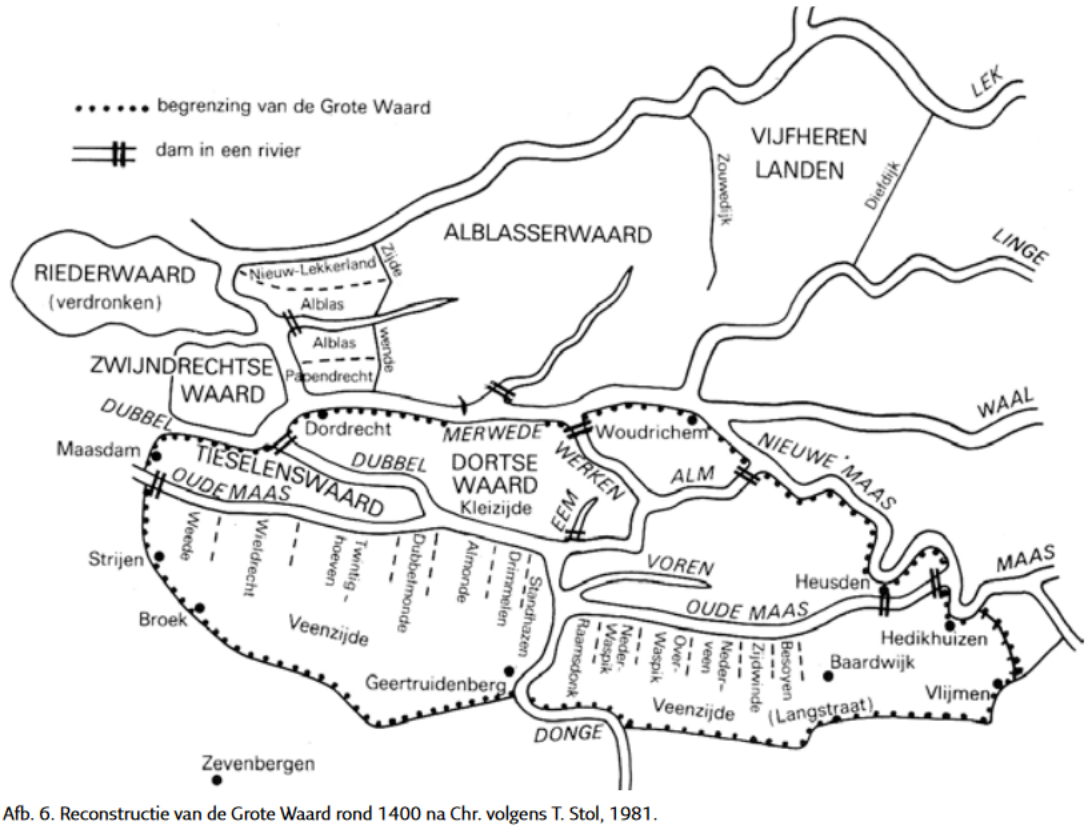


Figure 18. Physical development of the Netherlands (Herrebout et al, 2015)

The city is built on former peat swampland and originated as a river exchange point and trading port city. The location that is today known as Dordrecht has as such a very long history too, and is among the oldest cities in the Netherlands,

with settlements dating back to the beginning of the 12th century, between 1120 and 1122 respectively, and city-rights dating back to the year 1220 (Baarda, n.d.; Monumentenzorg Dordrecht, n.d.). Firstly, the city was mentioned in 1120 and started as a small settlement along the river Thure, and was called Thuredriht (Hoevenberg, 2018; IsGeschiedenis, n.d.; van Eijnsbergen, 2018). Due to its strategic location of being surrounded just by a few rivers did Dordrecht receive in addition to city-rights also “stapelrecht” in 1299, meaning that all wares that pass by the city need to be offered for sale in the city (Hoevenberg, 2018; Monumentenzorg Dordrecht, n.d.). Dordrecht developed around that river, with the current Voorstraat being the oldest street of the city and forming the centre of it respectively (Citizen 1, 2018). Whereas not much is known about the time prior to the big flood, the St. Elisabeth flood in 1421 AD respectively, historians and archaeologists tried to reconstruct the landscape prior to it. This landscape, which was called the Groote Waard, was as far as it is known shaped by many smaller creeks and rivers, as can be seen below in Figure 21, and some dikes were starting to form in order to make the land suitable for agriculture (Hos & Dorst, 2010). They refer further to a lessening chance of floods in the area as from approx. 1270 AD all rivers in the Groote Waard were controlled and the land drained, which resulted in a lowering of the surface of the land inside the diked areas but at the same time increased the risk in case of a potential breach as they were improperly constructed (Hos & Dorst, 2010; Nienhuis, 2008).



Afb. 6. Reconstructie van de Grote Waard rond 1400 na Chr. volgens T. Stol, 1981.

Figure 19. Reconstruction Grote Waard, approx. 1400 AD (Hos & Dorst, 2010)

It is suggested that this regulation of the landscape and its adjacent lowering of the surface increased the pressure on the dikes to such level that the risk of a breach due to a flood increased tremendously as well as the location that is generally prone to flooding from both rivers and the sea. At the same time, political turmoil, a disorganized polder-board and a suggested lack of maintenance increased the chance for a devastating breach even further (Hoevenberg, 2018; Nienhuis, 2008). Whereas widespread flooding has been reported from 1287, 1288, 1374, 1376, 1394 and 1396, the famous St. Elisabeth flood in 1421 AD changed the whole region substantially, which was followed by another St. Elisabeth flood in 1424 AD (Hos & Dorst, 2010; Nienhuis, 2008). One fatal occasion in the night of 18-19 November 1421, which basically was a combination of a storm flood approaching from the sea and causing a dike

breach, and the rivers Maas and Waal bursting through the northern dams, which resulted tens of villages disappearing from the landscape. Thus, both landscape and Dordrecht as such change tremendously due to the flood, and even destroyed the oldest house in the city, the "Huis te Merwede" from around 1300 respectively (de Nood & Baarda, 2004). While Dordrecht's inhabitants claimed a lot of land from the water previously, this flood reclaimed large parts of the area for water and changed the city's character and location towards that of an island surrounded by waters, which it is until today (see more in de Nood & Baarda, 2004). The character of the flood has been one that is until today posing severe challenges and potentially threats to the city, a combination of high tides from the sea and large discharge levels on the rivers.

After the flood, water flooded the whole region and basically created a vast open area of water as can be seen in the maps below (figures 22-24).

Figure 20. Dordrecht in the 16th century after the flood (Gemeente Dordrecht, n.d)

A series of old maps show the landscape in the years after the flood, which has the commonality of being shaped by water until around 1600.

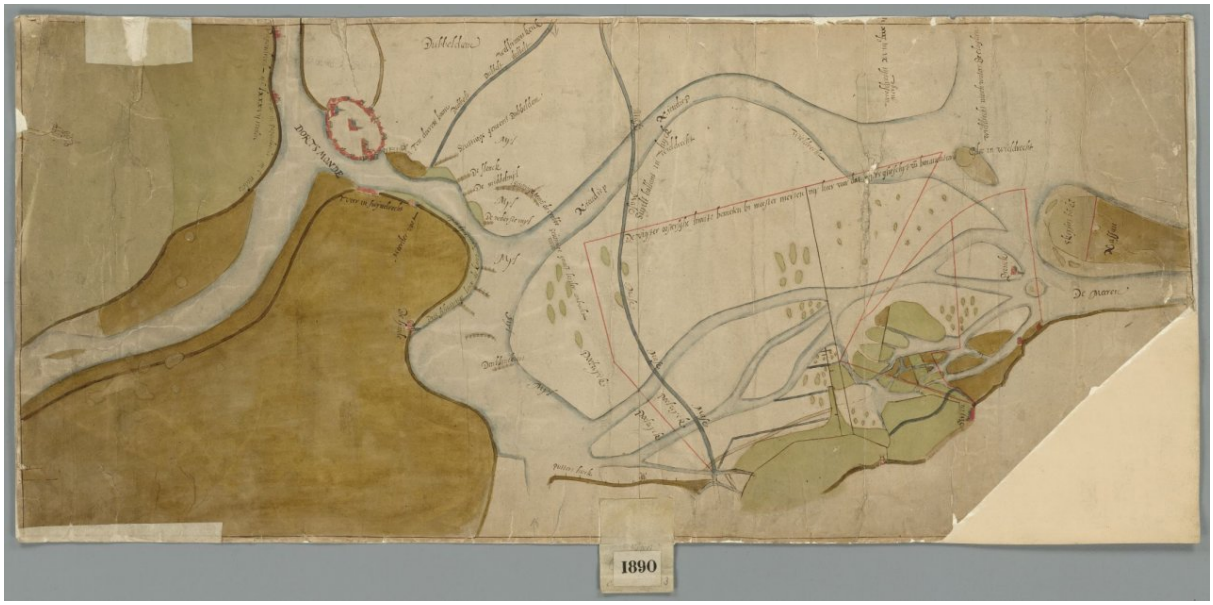


Figure 21. Dordrecht prior to 1537 (Schilder, 1890)

Figure 22. Dordrecht prior to 1560 (Kaartcollectie Binneland Hingman, n.d.)

With receding water levels in the area, people started to yet again to build polders, with the first one dating back to 1603 respectively (Hoevenberg, 2018). From that date onwards, the city develops significantly in size until the latest polder forms in 1926 around the Biesbosch on the island of Dordrecht as can be seen below in Figure 25 (Monumentenzorg Dordrecht, n.d.). Whereas several even severe floods happened until people started to build the first polders in Dordrecht, much less is known about them, potentially also due to their less severe effect on the already destroyed landscape around Dordrecht (Nienhuis, 2008). Nienhuis (2008) refers to the big Allerheiligen Flood in 1570, which affected large parts of the North Sea due to a big storm approaching by sea, followed by several floods from rivers affecting basically the whole Delta region including Dordrecht, accounts on Dordrecht are not known in detail though.

Figure 23. Development of the polders in Dordrecht (Unknown, n.d.)

A more detailed map of the development of polders in Dordrecht is available.

Despite all the new dikes, after the St. Elisabeth's Flood (1421 AD), the city is completely surrounded by rivers and continues to be an 'island on a river crossroad'.

4.1.3 Recent events in relation to weather and water

The already mentioned St. Elisabeth flood in 1421 had by far the most severe impact on the island, many more floods occurred in the centuries to come.

Interviews on the historical embeddedness revealed together with flood-stones in the city of Dordrecht more recent historical floods in 1901, 1906, 1916, 1928, 1936, 1953, and 1954 as can be seen below in Figure 26 (Hoevenberg, 2018; Marschuetz, 2018c).

Figure 24. Flood stone in Dordrecht (Marschuetz, 2018c.)

4.2. Representations of climate change: Local climate adaptation

Recently, the municipality concluded that during flood events, there will be too little time to evacuate its citizens, and that urban flood risk management will need to be rethought, through concepts such as urban flood resilience and vertical evacuation. The municipality aims to actively collaborate with citizens on climate adaptation and water management.

Their work is backed by the National Water Plan that states the need for adapting to climate change, specifically in relation to water (Rijksoverheid, 2009). In the following, the province of south Holland equally states the need to adapt to a changing climate and its effects, with this province being particularly at risks as large parts of South Holland are situated below sea-level (Provincie Zuid-Holland, 2009).

The municipality in particularly has been developing the concept of multi-layer safety that basically brings the above mentioned flood resilience to a new level and incorporating primary defense, sustainable urban planning to limit effects of flooding as well as making the city and the island more self-reliable as only 15 % of the population can be evacuated (Hoss, Jonkman, & Maaskant, 2013; Kelder, Gersonius, & Hulsebosch, 2013; van Herk et al., 2011).

Several locations have been mentioned as being interesting for such strategy to implement as well as adaptation pilots, a further analysis is being conducted based on local risks respectively (e.g. in Blom, 2013), which include e.g. Stadswerven area, Dubbeldam area, Binnenstad area, Wielwijkpark area, Stadspolder area and the living lab “water in the public space” that looks more broadly across the city. Figure 27 shows several adaptation projects.

a

b

c

d

Figure 257. Four adaptation projects (Four adaptation projects (a) Plan Tij, high class water robust neighbourhood; (b) Dordtwijkzone, a green ribbon running through the city; (c) Land van Valk, neighbourhood with soil subsidence (right: compare door frames: left house subsided) where citizens actively manage their groundwater tables; (d) Nieuwe Dordtse Biesbosch, nature area on south side of the Isle. (photos: Arjan Wardekker))

4.3. Context and methods of the CoCliServ case study

The Municipality of Dordrecht is a core partner of the Dutch CoCliServ team. The research is dovetailed with the ongoing development of adaptation plans in the municipality. Specifically, CoCliServ is teamed up with the Dordrecht Living Lab on Spatial Adaptation[2] (supported through the Dutch Delta Program) in which several adaptation pilot areas are currently being developed (see figure 28).The Living Lab runs until 2020 (as does CoCliServ) and aims to inventory concrete opportunities for blue-green infrastructure and spatial adaptations in the city, as well as to partially execute these interventions. The results will also contribute to the city's overall adaptation strategy and be connected to other ongoing efforts in Dordrecht, such as the INTERREG projects BEGIN[3] and SCORE[4], and nationally with the City Deal Climate Adaptation[5] and the National Knowledge Program Water & Climate.

Figure 26. Design table, Atelier X (Design table for one of the Dordrecht pilot areas during the Living Lab Spatial Adaptation 'AtelierX' session in January 2018. (photo credit: Arjan Wardekker))

For the narrative mapping, we conducted visits to sites of climate adaptation projects, conducted visits to local musea and water-related historical sites, and collaborated on two events. We inventoried relevant documents and conducted several sets of interviews. A first set of five helicopter (open-ended) interviews was held to scope the field site, including the challenges, opportunities and

[2] https://ruimtelijkeadaptatie.nl/actueel/actueel/nieuws/2017/start-living-lab/
[3] http://northsearegion.eu/begin/
[4] http://northsearegion.eu/score/
[5] http://www.citydealklimaatadaptatie.nl/steden/dordrecht/

potentially relevant actors. A second set of (open-ended) interviews was held to explore the historical context of the area. A third set of 9 (semi-structured) narrative interviews, to date confirmed and in the process of conducting them, is being held with locally relevant organisations. These will form the main basis of the analysis of 'public narratives'.

Further into the project, we will also conduct a fourth set of (semi-structured) narrative interviews with individuals. We will select two concrete adaptation case study areas within Dordrecht, a decision is yet pending. These will from the main basis of the analysis of 'individual narratives'.

The analysis of the narratives will take place by means of a discourse/framing analysis, using content analysis. The interviews will be transcribed and coded, and analysed along several main categories of inquiry (e.g. plot, content & framing, context, visions). The material from the helicopter interviews, historical interviews (at least to a large extent), policy documents, and site visits will be used in particular to situate the narratives in their temporal/historical, spatial, social, and governance/regulatory context.

4.4. Public narratives of change

Whereas this is at a very early stage, following some short accounts on Dordrecht. Interestingly to note is that the so far interviewed people from Dordrecht are very proud of their city and mention that quite implicitly as e.g. seen in the following lines taken from several interviews:

(excerpt from an interview on the history of Dordrecht)

"[...] this was all water. so every time the river moved sand to a higher level so suddenly we had more land. so we didn't ... push the water away but we , this is all naturally built land brought from sea is sand. and we were smart of course, when it was here we quickly put a dike around it [...] yea. so now we have land. you can see in the picture of Dordrecht .... you can see all rings of dikes and every time a little bit

further, so we grow on to this city. well because you can see water here. surrounded by water. and when the city was building and building they were very rich and were also very smart the city [...]" (van Eijnsbergen, 2018)

Another excerpt from an interview on the history of Dordrecht.

"[...] that area is also very sensitive to flooding. And over there, the Bomkade, also very sensitive for floodings. And yeah, over here basically not sensitive for floodings. I don' t know what year it was but they basically reconstructed everything here to accommodate for high water (he is pointing towards the street Voorstraat). [...] and also if you walk through this street you will see all of these little iron pieces along the wall, that's where they put in the floodplanks, and just to keep water from going through. But, if water does come to high, the houses itself, this is still outside the dikes (he points towards the house and facing the water). and the front door is inside the dikes [...]" (Citizen 1, 2018)

An interesting note on the last interview here was that off-the record at the very end of the meeting, the initial interest in weather and water related issues over history in Dordrecht was fading once the conversation moved towards climate change and adaptation to it. This citizen voiced then his change in attitude and that he is not really sure what to believe in terms of climate change and that this citizen is doubting the severity of climate change and human effects on the climate system. This change in attitude is interesting to note since the citizen was initially very keen to talk about the history, and when we first met also heard already that I am particularly interested in weather, water, the history of Dordrecht, etc., which sparked and to talk to with me about.

Finally, one further excerpt from an interview aiding in eliciting the public narrative, embedded with an organization respectively:

"[...] Ah, the floods of the 90s what we said, we have a strong picture in some of our presentations of a guy, he lives in Dordrecht, he lives in the Buitendijks, ..., and the

water on the river is very high, and he lives in the buitendijks, and he is an artist, his working space is under water and they have a picture of him, from the water, and you see him on the other side of the room, of the window, and he takes the sunlevel down to, while the water is at that level (laughing, and showing that it is very high and that he'd be flooded as he shows the water being higher than the floor, somehow mid-level in the room). "maybe this protects you", but it doesn't of course. but that's a very strong picture on wow, water can come that high. And those, his building is built for it so it's not completely dangerous. […] " (Neefjes, 2018)

See figure 29 for word clouds resulting from interviews with members of key organisations:

Figure 29. Illustrative wordclouds of the first narrative interviews in Dordrecht (Based on transcripts from: (a) municipality, (b) province, (c) safety region, (d) WWF.)

4.5. Conclusion: Mapping early narratives

Several different types of narratives can be observed in the early interview results and public documents. Specifically, we observe:

- *Historical narratives* of Dordrecht and water & floods. The formation of the city and historical struggles with water and weather.
- *Vulnerability narratives*; Experiences with rain and floods in city, vulnerable neighbourhoods, locational perspectives (Dordrecht is especially vulnerable because of location at crossroads of rivers, close to the sea, etc).
- *Adaptation experiences and lessons*; there's much going on already on adaptation, and perhaps some lessons might already be learned regarding climate adaptation and climate services.
- *Future perspectives*; expected threats and how to counter those (preventing future floods), desires for the future, development challenges (e.g. 15.000 houses will need to be built in the coming years). What to keep for the future, and what should change in what way? Future goals, how to achieve those, what problems are expected in that?
- *Governance narratives* of how different authorities collaborate, divisions of responsibilities, and how to enhance citizen involvement in climate adaptation. Also includes risk governance issues: nobody has experienced evacuating 100.000 people in Dordrecht, so how should we prepare for that?
- *Identity narratives* of Dordrecht as "working class city" and sayings such as "hoe dichterbij Dordt hoe rotter het wordt" ('the closer to Dordt, the more rotten it gets'). Also (implicit) pride in living with water ('island' and 'river crossroads' metaphors).
- *Socio-economic narratives* and pressure in the city. This includes citizen perspectives, but also economic and budgetary risks for adaptation in Dordrecht (for adaptation and future proofing, you need money – if you don't have that, you can't do it).

5. Case study : Golf du Morbihan, France

This part is contributed by Charlotte Da Cunha.

5.1. Background

5.1.1. Geographical setting

Located within the southern fringe of Brittany (at 47° 36' North, 2° 48' West), the Gulf is an attractive location for many aspects: geography and geology, history (and prehistory), environment and biodiversity, economy and tourism, and climate. These characteristics, in part antagonistic, justified the creation in 2014 of the Gulf of Morbihan Regional National Park (PNR) for a better protection of the natural environment while permitting a quality development of the economy and tourism.

The name "Gulf of Morbihan" is derived from two characteristics and one fallacy. It is a gulf, about 25 km in diameter (surrounded by a coastal trail of more than 400 km length, due to the numerous caps and bays), severals tens of Islands, from 6 km length to few hundred meters, and with a narrow entrance to the Atlantic ocean (about 1 km wide). Morbihan, the name of the administrative department, means "little sea" in Breton language. This little sea does not refer to the modern Gulf, but to the coastal sea which borders it to the west, limited by the "Pointe de Quiberon" to the North West, the Belle Isle, Houat and Hoedic islands to the west and the "La Vilaine" river estuary to the South, a vast valley about 20 m deep, inundated after the end of the last deglaciation about 10 to 5 kyr ago.

The Gulf itself was a small estuary joining two little rivers, which has been progressively inundated over these last 2000 years (cf Fig 30). The submersion derives from a large scale tilt of the Southwest Britanny and is associated continental shelf, along the fault following the western boundary of the 550

million years old Hercynian western mountains (submersion speed of about 1 mm/year confirmed by 14C dating of submerged oak roots and megalithitic menhirs of about 5000-7000 yrs BP, and gallo-roman houses and roads (Office National de la Chasse et de la Faune Sauvage 2011).

Figure 27. Map of the landscape unit of the Gulf of Morbihan (DREAL, DDTM et al. 2011)

5.1.2. History

The area was a major civilization center during the megalithic period, with thousands of cairns and menhirs, richly sculptured walls and precious jadeite jewels in the burial cairns (cf Fig 31). It was the center for an international trade of sacred jadeite axles (Musée de Préhistoire de Carnac 2015), draft stones imported from northern Italy and Portugal, polished locally, and travelling again across all western Europe.

The first historical reference for the area is in Julius Caesar's "Gallic war" with his reference to his difficult marine victory against the Veneti ships in 56 BC and destruction of the Veneti power over southern Brittany. This was the start of a rich gallo-roman development with multiple remains over the countries and in cities as Vannes. The area stayed a major Brittany center throughout the centuries, siege of the Brittany parliament before moving to Rennes and Nantes in 1554, after the reunion of Brittany to France The Morbihan economy has

always been narrowly related to maritime trade. It is in the Harbor of Auray that Benjamin Franklin disembarked from the ship who brought him from America in 1776 to ask for support in the independence war.

Figure 28. Pearls and pendants (Pearls and pendants in "callais" from the Tumulus Saint-Michel (Carnac), around 4500 BC J.-C. Picture O. Caijo ©Collections du Musée de Vannes/Fonds SPM (Musée de Préhistoire de Carnac 2015))

5.1.3. Natural environment

The Gulf of Morbihan, relatively isolated from the post war industrial and urban development, is protected since the 1970's along the Gulf itself from building outside existing villages (a protection which extended progressively after 1986 to the whole sea-side : la "Loi Littoral"). This preserved a quality landscape highly appreciated by visitors.

The Gulf of Morbihan last submersion liberated large tidal flats, very attractive for bird wintering (duck, terns and various waders and other shorebirds), making a major wintering zone for at least 8 species, in particular the spoonbill. More than 200 km² are protected as Special Conservation Zone Natural 2000 (cf Fig 32). The bird population (about 70 000) has decreased by about 30% in the last decades, pollution and disturbance by visitors and motor boats being probably among strong factors.

Climatically, the Gulf of Morbihan is within the general zone of conflicting influence between the mid-latitude Atlantic Ocean system and its ocean atmosphere interactions (with seasonal and interannual oscillations of the dry Açores tropical anticyclone system, and, at its North, the chain of temperate

depressions and associated rain and westerly winds) and, seasonally, the winter expansions of the continental polar anticyclone systems, with cold north-easterly winds and the summer expansion of the warm subtropical continental anticyclone (Office National de la Chasse et de la Faune Sauvage 2011). At local scale, the closed sea just south west of the alignment of low hills running from Pointe du Raz to the river Loire valley, residues of the old hercynian mountains isolates along the coast a micro "marine mediterranean" type climate with high insolation (more than 2000 hours annually) and moderate pluviosity (around 700 mm/year) mostly in winter. Local people are sensitive to climate change, with the winter rains more frequent, and summers dryer. Hay and wheat harvests are typically one month earlier nowadays that 50 years ago.

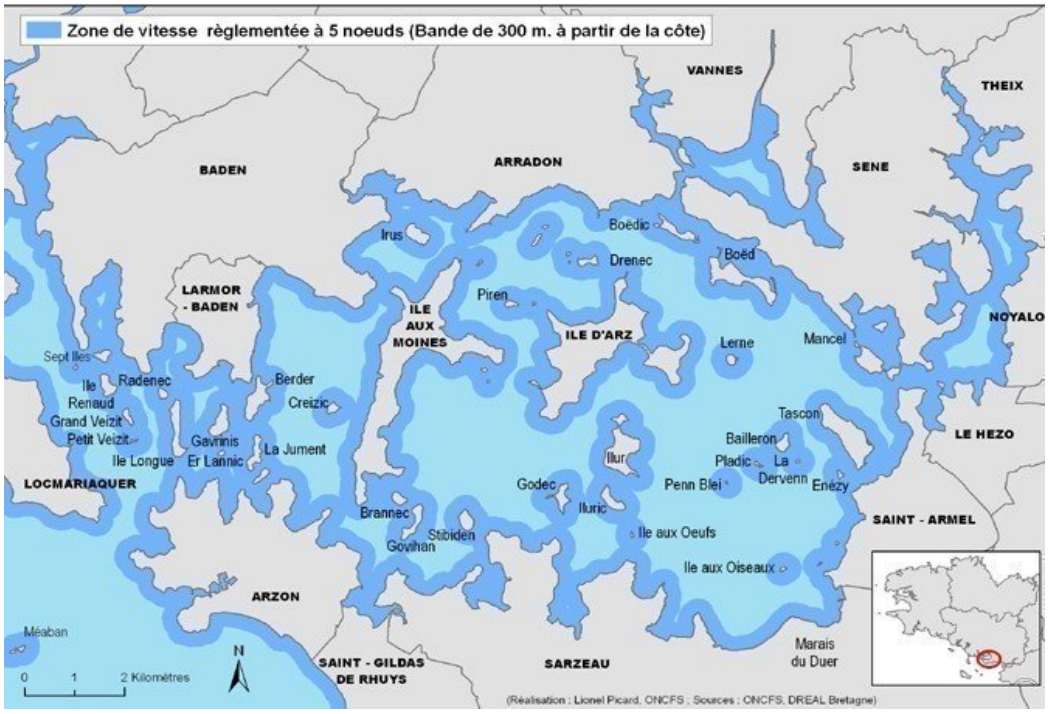


Figure 29. Map of the foreshore (Picture L. Picard ©ONCFC (Office National de la Chasse et de la Faune Sauvage 2011))

5.1.4. Modern economic and social setting

Tourism started with sea-side resorts along the Brittany coast in the XIX th. century and is still a major economic resource. Present development, still mostly along the coast, started in the years 1960-1980, with "secondary" housing from

Rennes, Nantes and Paris. Price for constructing land, by example, varies between less than 50€/m2 at 20 km from the coast to more than 800€/m2 in select coastal areas. The littoral versus inland contrast is one of the major social and economic characteristics around the Gulf of Morbihan. Yet, tourism and the associated economy makes local coastal towns thriving with business, in strong contrast to the small towns located inland, who suffer from decaying industry and agriculture. It has influence on social and professional life but also on political choices. The "Parc Naturel Regional" creation was in a large part justified by the necessity to attenuate at least in part that contrast.

Travelling around in winter week days, the number of closed houses is an immediate signature of this differentiation. By example, in Arzon (south western tip of the Presqu'ile de Rhuys which close the Gulf of Morbihan to the South), "permanent" population shift from less than 1500 during these winter weeks to more than 25 000 in the summer season, plus about 5000 overnight visitors in camping and other touristic housing. Summer visitors are mostly packing on the sand beaches or walking along the numerous natural trails. Sailing and motorboats drive also a strong attraction, with several large sailing harbors and ship builders. A large fraction of the permanent sea-side residents are seniors (the mean age for permanent residents in Arzon is 58 yr!), with a serious problem for young peoples to live locally and find work out of the holidays season.

Access to water (both for drinking and irrigation) becomes progressively more difficult, especially during the summer touristic season. Other uses that drinking becomes forbidden during these periods. Linked to that problem and to the warming of surface waters, coastal water quality deteriorate, with frequent development of toxic algae, when collection of shells for eating is forbidden, and sub-surface apparition of anoxic water, when divers observe local mass mortality of fiches and crabs.

5.2. Local population and perception of climatic change

Several successive events around 2008-2010 awakened the local population to climatic change and its consequences. The publicity given to the Peace Noble Price for IPCC. Several local persons, in particular Laurent Labeyrie, specialist from IPCC (who is our correspondent for the Gulf of Morbihan Cocliserv experimental field) and elected as vice mayor for the Environment and sustainable development in Arzon, seized the occasion to promote mobilization on Climate change consequences among the local actors. This action expended rapidly with the creation of the association Clim'actions Bretagne Sud, now strong of 130 active members, and several thousands of followers for the public activities. Simultaneously, the technical team preparing the project for Parc Naturel Regional, under the direction of Monique Cassé, former engineer in Agricultural sciences developed with a young geographer trained in climate changes, Juliette Herry, who put a strong emphasis on these problems, with significant support from the European project ClimSea. Clim'actions Bretagne Sud and Gulf of Morbihan PNR are our sub-contracted local actors.

The storm Xynthia (end of February 2010), was not a especially strong storm (winds in the 120 km/h range), but arrived just at the peak of a relatively strong high tide (102 coeff), with a direction and path maximizing an associated coastal storm surge of about 1,2m. The maximum impact was about 200 km south (Vendee and Charente-Maritime), but the 50 persons who died with the event, the pictures of destructed piers, boats throne on the beaches, and wide submerged areas has been an "electro-shock" for the whole Atlantic coast inhabitants. Polemics about who should have better acted to protect the population mobilized all persons in responsibility (in particular the state agencies in charge). Plans developed for better efficiency of the different actors and defense against submersion (Ministère de l'Environnement de l'Energie et de la Mer 2017), from the control of constructability to the assessment of risks.

A third element facilitated the sensibilities of the local population towards environment, quality of life and the future of their kids. The long-term action of environmental associations as Eau et Rivières de Bretagne and Bretagne Vivante, and the mobilization towards local production of organic agriculture. People from Brittany have a long tradition of unity struggle against major threads.

5.3. Methods and fieldtrip

The Gulf of Morbihan study site is rooted in the articulation of the CoCliServ consortium and the local teams, constituting a hybrid site-governance group that works to propose what could be integrated into the CoCliServ formal process and to validate the 'what if' proposed to be implemented in the sites for the narratives of change WP1 process.

The site objectives are to structure and design an initial mapping of narratives, for the Gulf of Morbihan, on climate change and related mitigation and adaptation strategies. From month 1 to 6, the site-governance group conducted three stages of research:

1. Get-togethers and dialogue about the existing information on the Gulf of Morbihan narratives (field data, reports, academic literature).
2. Fieldtrip from 19-23 February 2018 (geographical discover of the Gulf du Morbihan and life stories).
3. Restructuring information and production of an initial mapping of narratives.

5.4. Existing narratives on the future of the Gulf of Morbihan

The site-governance group develop a co-construction process, based, until the present, on local partners (Clim'action Bretagne Sud and Gulf of Morbihan Regional National Park (PNR)) the CoCliServ artistic group and the interdisciplinary researchers from CEARC and LSCE. We brought to a common pool a series of data from the local partners and a preliminary academic

literature review focused on the Gulf of Morbihan, in order to pre-established narratives lines.

Clim'action Bretagne Sud, an non-profit organization, is a think-thank to anticipate and act on climate change. They collaborate or produce various outputs about Gulf of Morbihan future and lead events about ecological transition, markedly:

1. *Life stories:* Singular collectives ("Singulier collectifs ») who have collected words and stories from residents about global warming (Brulavoine, Maisonneuve et al. 2016).
2. *Narratives of Gulf of Morbihan's response to global climate change:* Forum on hydroliennes and marine Energies in the Gulf of Morbihan (cf Fig 33 - exhibitions, conferences and questionnaires/free expression) (Clim'actions Bretagne sud 2017)

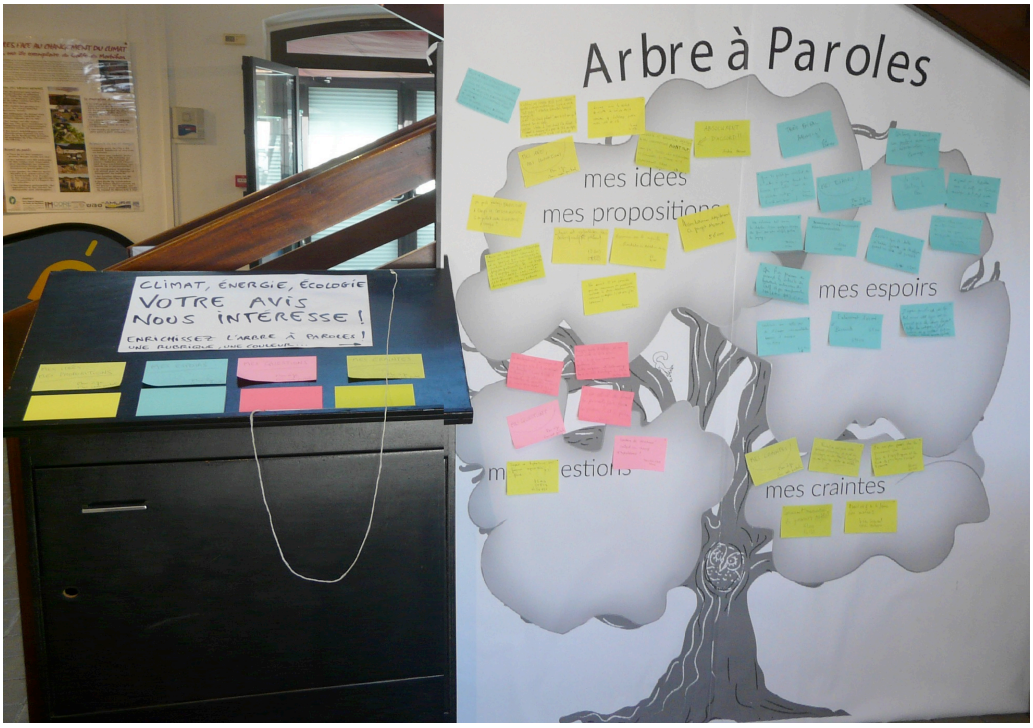


Figure 30. Questionnaires and free expession tree during forum on hydroliennes and marine Energies (Clim'actions Bretagne sud 2017)

The Gulf of Morbihan PNR is in the lead with actions for climate change impacts understanding actions and mitigation and adaptation strategies. Two main corpus highlight narratives of Gulf of Morbihan future.

- *Future perspectives*: three IMCORE scenarios (IMCORE project 2008-2011) were developed under several facets (land use planning, conflict management, environmental, social and economic impact, governance, etc.) and propose global adaptation measures (UBO and SIAGM 2011). In the continuity of the Cactus tool, the PNR initiated a work on the vulnerability to climatic change of three coastal municipalities, in particular the risk of submersion and the average rise in sea level (Miller 2017).
- *Governance narratives* of *how environment is changing and how actors live with it.* Seven filmed interviews with local actors, realized by the Regional Natural Park of Gulf of Morbihan (2015). The interviews started from a single question (Environment is changing, what's effects on….) which is declined on different characteristics of the Gulf: 1. rivers, 2. fauna and flora, 3. marine environments and oyster farming, 4. agriculture, 5. pleasure boating, 6. risks for coastal municipalities.

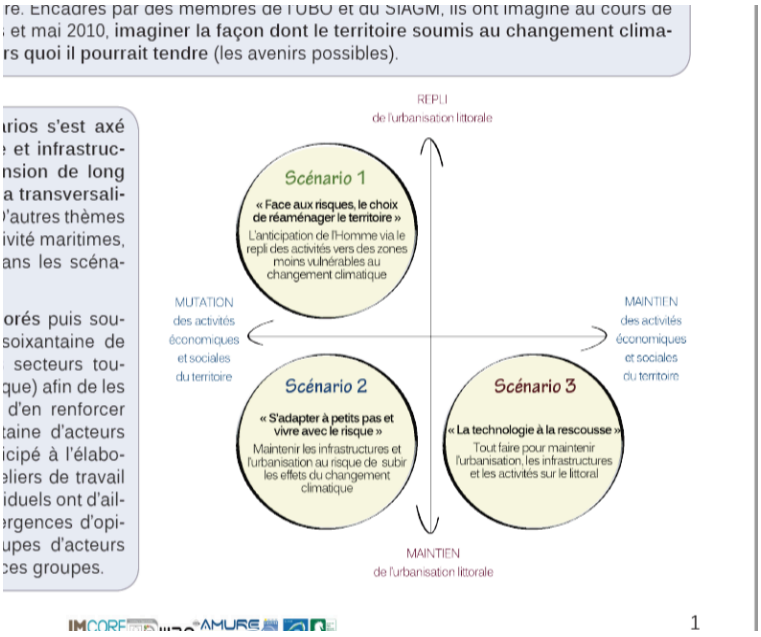


Figure 31. IMCORE project scenarisation proposal (UBO & SIaGM 2011)

Two more narratives can be highlight from the institutional website present in the Gulf of Morbihan:

- *Promotional narratives*: written to attract visitors, but also new business and industry, and mainly seen in publications by tourism organisations (Office de Tourisme du Golf du Morbihan /)
- *Romantic narratives*: emphasize the history of Morbihan during the megalithic period. The area was a major civilization center during the megalithic period, with thousands of cairns and menhirs, richly sculptured walls and precious jadeite jewels in the burial cairns. It was the center for an international trade of sacred jadeite axles, draft stones imported from northern Italy and Portugal, polished locally, and travelling again across all western Europe (Musée de Préhistoire de Carnac /).

5.5. CoCliServ new corpus

The purpose of the life stories and site exploration was to understand past, present and future changes in the Gulf of Morbihan. By doing so, we wanted to look at the characteristics of the geographical site, to determine whether pre-established narratives lines were still relevant, and to identify community priorities and gaps to be filled.

For this initial round of life stories, we made contact with actors from a range of major economic activities present in the Gulf. The starting question was so linked to their activities: I would like to talk about what it is for you to be oyster farmer / farmer / salt worker in the Gulf today? The prompt set forth the same question with reference to past and future. If it was not addressed directly by actors, we requested, from their point of view, if they have observed any changes in the past 20 years, if these changes are linked to climate change, and finally if they need information about these changes.

5.6. Initial mapping of narratives

We achieved an analyze, based on modified grounded theory, of the existing information on the future of the Gulf of Morbihan and new corpus to identify weather and climate-related storylines, practices and forms of governance. Three main narrative lines should be explored. This preliminary results have to be completed with another set of qualitative data (life stories/semi-structured questionnaire with economic actors and permanent and secondary residents, closed-end questionnaire, etc.) to confirm theses narratives lines and to understand the perceptions of citizen about climatic change, their impacts and the adaptation alternatives.

These narratives start from a trend that began in the Gulf of Morbihan 10 year ago. Between 2007 and 2014, the number of Morbihannais increased by 0.8% per year, at a rate three times higher than that of the nineties, mostly on the coast, attracting people with a high socio-economic profit, mainly from Bretagne and Île-de-France. A significant part of this population are secondary residents either within the Gulf (two residences in the Gulf of Morbihan, the main one being at Valves), either local, national or international.

These two cumulative demographic effects have led to an expansion of the number of people interested (in a sufficiently regular way due to interne and local tourism) by organic and local products, for direct sale (all types of products, including those from the sea). Morbihan suffer a decreasing of agricultural farms number, coupled with a very strong increase of organic farms, by effect of training and sharing of knowledge. This proves a strong capacity of adaptation of the economic actors. Nevertheless, the price of land (but also the creation of the PNR) are obstacles to the installation of new activities, especially agricultural ones.

5.6.1. To adapt gradually to CC and population dynamics, and to learn to live with the risk

This narrative is closely in line with the current situation and acknowledge the needs to the maintenance of infrastructure and urban areas on the coast, despite the risks of climate change. The increasing urbanization of already heavily populated risk areas, the aging of the population and the reduction of socio-economic diversity due to the increase in the price of land represent important issues for land use planning and risk management, that climate change is exacerbating. It becomes essential for this territory to reflect on its adaptation in a context where the withdrawal is difficult to envisage. This adaptation will be multifaceted but will go through heavy technical and technological means.

Table 3. Origin of information for narrative 'To adapt gradually to CC and population dynamics, and to lear to live with the risk'

Singular collectives	Forum on hydroliennes and marine Energies	IMCORE	filmed interviews	Fieldtrip
Perceptions of climate change, need for get back to nature and social link, need to be an actor, relocation, environmental education	Voluntary simplicity, local solutions (Local elected officials, concertation, enercoop ..)	Scenario 2 « to adapt gradually and live with the risk» Scenario 3 « Use of technology"	Perceptions of climate change, need to adapt gradually	Perceptions of climate change, relocation of oyster and agricultural sales activities, evolution of population profile (secondary resident, ageing populations)

5.6.2. To adapt to maintain economic activities in the territory

Climate change affects economic activities, particularly those that are emblematic of the Gulf: oyster farming, salt production and crop-livestock farming. The durability of these traditional activities is linked to climatic and meteorological hazards. Facing the water warming, how to handle the increase in mortality (new strain, inland controlled environment, oyster farming abandonment). In case of changing precipitation patterns, how to crystallize the salt or to dry hay. It will be necessary to adapt the activities, either by anthropic control of temperatures or precipitation, or by importing fodder.

Table 4. Origin of information for narrative 'To adapt to maintain economic activities in the territory'

Singular collectives	Forum on hydroliennes and marine Energies	IMCORE	filmed interviews	Fieldtrip
		Scenario 2 « to adapt gradually and live with the risk»	Perceptions of climate change, need to adapt gradually	Perceptions of climate change need to adapt to weather with changing conditions (linked to Climatic change?)

5.6.3. Given the risks, the choice to re-think the territory

Fueled by the negative psychological impact of storms, a transfer of populations and activities, through the withdrawal of activities to areas less vulnerable to climate change, is implemented in anticipation to secure goods and people.

Table 5. Origin of information for narrative 'Given the risk, the choice to re-think the territory'

Singular collectives	Forum on hydroliennes and marine Energies	IMCORE	filmed interviews	Fieldtrip
		Scenario 1 « Given the risks, the choice to re-think the territory »		

Moreover, we identify the best connections and transitions the needs for WP2, 3 and its representations as described in WP4. This part of the work his strongly completed by the desktop work that is being done for the WP3.

6. Case study : Kerourien, France

This part is contributed by Juan Baztan.

6.1. St. Pierre-Kerourien, a peri-urban context :

The first part of this chapter situates the St. Pierre-Kerourien case study in time and space as well as within the main discourses that shape the image and perceptions of the Kerourien peri-urban context.

As described in the CoCliServ DOW, the St. Pierre quarter in the urbanized area of Brest, France is mostly structured around post-war housing projects. The administrative district of Kerourien drew attention from the outset of the project. Figure 35 shows the landscape transformation from rural to peri-urban that has occurred in this area from the 1950s to the present day.

Figure 32. Landscape in the Kerourien area in 1950 and in 2018

During World War II, the city of Brest was one of the worst damaged areas on France's west coast. From 1940-1944, it was the target of 165 bombings and 480 alerts, which resulted in 965 dead and 740 seriously wounded. The Kerourian farming area was also greatly impacted (Figure 36).

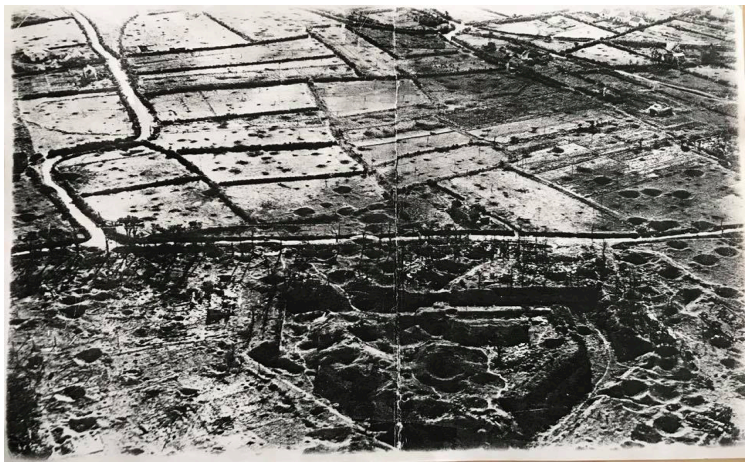


Figure 36. Kerourien and Keranroux during the period 1940-1944

The decision of Victor Le Gorgeu to begin Brest's reconstruction came on October 3rd, 1944. During the reconstruction, cabins were the main housing for workers who came from France and abroad (Figure 37).

The Kerourien reconstruction story begins January 8th, 1964. Albert Cortellari designed the site plan for the first HLM tower project in the western part of the city of Brest (Figure 38). The project included 500 apartments to be built on seven hectares of land the city purchased for 20 million francs using several expropriation procedures that are recorded in the municipal archives (Benoît Quinquis, personal communication April 2018). This project marked a clear turning point in the progressive transformation of Kerourien from a rural to a periurban area.

Figure 33 'Les baraques' housing for workers during the city's reconstruction and after it, too.

Figure 34 Kerourien housing project construction in the 1960s (Brest municipal archives, 2018)

According to the 2013 census, Kerourien has 1200 inhabitants. It is a priority area within St. Pierre, as indicated in city policy statements since 2014 (Figure 39).

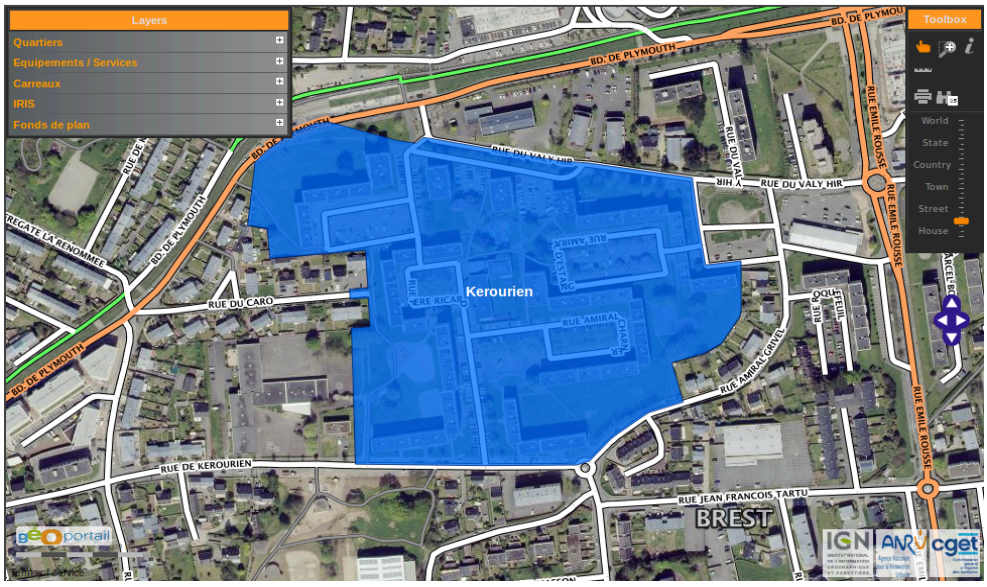


Figure 359. Satellite view with Kerourien area in the blue (Brest SIG, 2018)

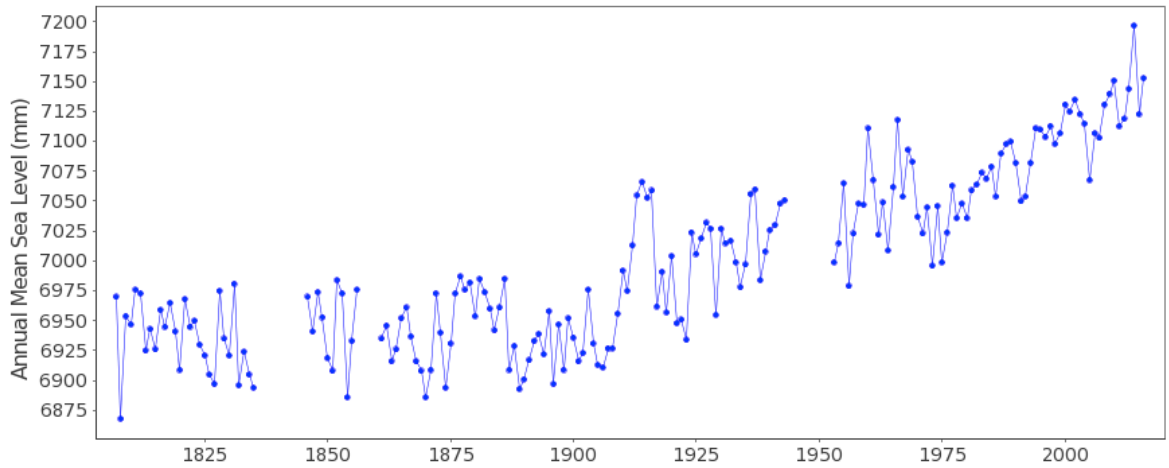
The most salient aspect of Kerourien is its diverse population. Rooted in a place with fragile economic conditions, residents face the challenge of unemployment. Thirty-two percent of residents between the ages of 15 - 64 are unemployed. For those between the ages of 15 - 24, the rate jumps to 46 %. Thirty-two percent of women are unemployed. Only 35 % of young adults ages 18 – 24 are enrolled in universities or other academic institutions.

6.2. Focus on representations of climate change in the area through science, municipalities, practices and activities

There are three primary types of climate change representations in the study area: representations from the natural sciences, representations from government, and representations embedded in Kerourien residents.

The natural sciences representations in the area have few anchor points, which will be detailed in WP3. For this initial step of the project, we have selected two examples. First, there are the measurements from the Tide Gauge Data, with data since 1679 and longitudinal data from the Permanent Service for Mean Sea Level (PSMSL) starting in 1807 (Table 6).

Table 6. Annual Sea Level from the Brest Tide Gauge



Annual Mean Sea Level from the Brest Tide Gauge, extracted from Database April 2, 2018 (*http://www.psmsl.org/data/obtaining/stations/1.php*)

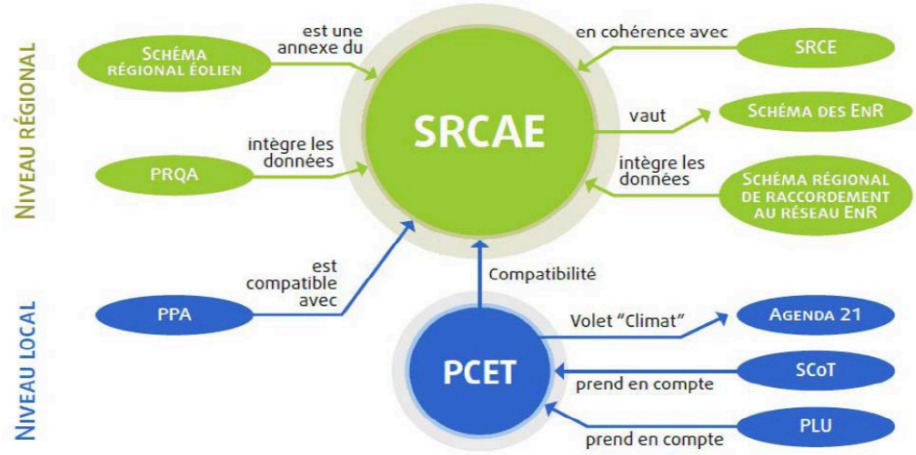
The second example is the Seasonal Sea Surface Temperature (SST), with the latest results from L'Hévéder's work in 2016, which shows:

Changes in the Western English Channel have been estimated for the previous decades from high-resolution satellite data. Coastal seas, well separated from offshore waters by intense frontal structures, show colder SST by 1–2 ◦ C in summer. A significant warming trend is observed in the autumn season. This

positive trend is stronger offshore, with an annual mean SST increase of 0.32 ◦ C decade −1 , but weaker in coastal waters (0.23 ◦ C decade −1), where strong vertical mixing induced by tides and winds acts to reduce surface warming. In the Iroise Sea the increase in annual mean SST in CMIP5 future scenarios simulations ranges from 0.5 ◦ C (RCP2.6) to 2.5 ◦ C (RCP8.5) by year 2100, with a seasonal modulation leading to a more intense warming in summer than that in winter. This increase in SST may strongly affect marine biology, particularly phytoplankton phenology, macro-algae biomass and benthic fauna, including exploited shellfish (L'Hévéder, 2016).

The government representations converge mainly at the regional level and are summarized in the "Climate Plan: Energy&Territory 2014-2019" from the Regional Council of Brittany. This document establishes a framework rooted in the IPCC's efforts and identifies energy, transport, agriculture, fisheries and infrastructure as the main sectors to focus on for improving sustainability through training, economics, planning, and environmental and international actions. The Climate+Air+Energy framework is articulated regionally and locally as described below (Table 7).

Table 7 Climate + Air + Energy regional framework (SCRAE)



(Source : SRCAE, Schéma 3 Hiérarchie normative autour du SRCAE)

The climate change representations embedded in Kerourien residents present the first challenge for CoCliServ WP1, since they are manifested implicitly and explicitly, rooted in residents' past, present, and anticipated-future life conditions. This opens the question: what can we learn from these embedded representations about the connections between knowledge and action?

6.3. Disciplinary background and fieldwork methods

The fieldwork in Kerourian is rooted in a simple question: How can we bridge residents' representations and actions with those proposed by climate science?

We draw from the Community-based Action Research paradigm as the underpinning for our epistemological approach. Action Research provides an array of approaches for bringing about changes in knowledge, policy, and practice within complex dynamics of power and participation (Petit, 2010). From Freire's 1974 work, which focused on the learning and transformation of the participants themselves as a core principle, to more mainstream social science efforts to enhance the quality and integrity of findings, the various Action Research approaches share the common idea that creating knowledge for change is essentially a social and political process (Bradbury and Reason, 2008). In Kerourien, we find it useful because Action Research raises vital questions about the relationship between power and knowledge along with the challenge to enable more adaptive, contingent, and power-sensitive ways of knowing and responding to complex problems, taking into account diverse perspectives and knowledges (Petit, 2010).

Keeping in mind the epistemological position described above, we developed an approach for combining multiple methods of inquiry to broaden our focus from simply collecting individual perceptions of climate change to being better able to approximate community residents' understanding, which is partly based on their

holistic perspective and learning through their lived experiences. The methods used include: (i) Interdisciplinary studies used to define current conditions, design research and analyse results; (ii) modified grounded theory used for semi-structured interviews, focus groups, and coding (Strauss and Corbin, 1997; McCreaddie and Payne, 2010; Charmaz, 2006); and (iii) participant observation conducted over 10 years in Kerourien by local partners, which allows us to draw from knowledge created over a longer time period and helps contextualize participants' words and ongoing processes. All the sources of knowledge are drawn upon during fieldwork periods and used for the deskwork that has been conducted since October 2017.

6.4. Narratives of change: Situated public and individual narratives that reflect /express / address climate change

6.4.1. CoCliServ dynamics in the St.Pierre-Kerourien study site for the initial mapping of narratives

The Kerourien study site is rooted in the articulation of the CoCliServ consortium and the local teams, which constitute a hybrid site-governance group that works to propose possibilities to be integrated into the CoCliServ formal process and to validate the 'what ifs' proposed for the Narratives of Change WP1 process. The four main kinds of agents involved in the collection of narratives include local participants and CoCliServ consortium members engaged in the process. This allows us to move from the DOW description to each site's implementation and for this, even if there is some flexibility, we wish to define as much as possible the core group that will be working throughout the whole process.

Local Coordination Team: Composed of the residents and stakeholders who are engaged -as individuals and/or structures- in the 50th anniversary celebration of Kerourien. The first meeting to validate the CoCliServ engagement was September 20th, 2017. CoCliServ were invited by "Le Maquis" and "Le théâtre du

Grain". We meet monthly in plenary meetings to: share updates from each component, propose new steps, and vote on the key points to validate collectively (Figure 40).

Figure 36. The local coordination team during the October 26th 2017 meeting at the 'centre social'

Meeting minutes are sent by one of the two structures driving the process locally: "Le théâtre du Grain" (TdG) or the "Centre Social Couleur Quartier" (SC). These minutes constitute part of the corpora.

Site-Governance Group: Five people from the local coordination team have been selected to speed up the process and be a force of proposition between the plenary meetings; they are: Aurelian (SC), Amandine (TdG), Lionel (TdG), Anissa (LM) and Juan (UVSQ).

Neighborhood Residents: The 1200 residents from Kerourien are ideally part of the process, they are being engaged progressively throughout the project.

Society as a Whole: One of the intentions is to create links and dynamics within the isolated and marginal Kerourien neighborhood that extend to society as a whole, so "you" are also part of the process.

Through the deskwork and discussions with the local coordination team, a multilayer stakeholder dynamic has appeared. Based on the focus group

discussions and the meetings, the stakeholders actively engaged in the process currently are:

Le théâtre du Grain, Le Maquis, Centre Social Couleur Quartier, Mairie de Quartier de Saint-Pierre, Association Don Bosco, Brest Métropole Habitat, Confédération syndicale des familles (CSF), Jardins partagés de la Fontaine Margot, Les Lapinoux, Groupe scolaire Jean de La Fontaine.

6.4.2. Corpora and the processes for the initial mapping of narratives

Since January 25th 2018, the basis and dynamics have been laid out for the next few months and are structured in 18 open working groups; these are: Collection of testimonies / archives; Artistic creation "The Beautiful Stories"; Programming for children, youth and adults; Scenography and decoration of the site; Exhibitions; Village of 50 years; Public hosting / Ticketing; Hiking, cycling, scooter; Canteen / Kitchen; Reports, video editing, projections; Pump room; Soccer tournament; General coordination; Communication and volunteer mobilization; Technical (management of the marquee, security, waste, dry toilets, etc ...); Administration and budget monitoring; Artistic creation workshops; Organization. Each working group has its own governance dynamic and all groups meet monthly in a plenary assembly to share, debate, vote and establish further steps. The group work and plenary dynamics have helped us identify the content for the four main sources that constitute the corpora. At this stage of CoCliServ we have established positive local trust conditions and collected the corpora documents from stakeholders, the more relevant of which are detailed below, classified by the main sources:

Local edited sources: Available paper and online documents from the agents engaged in the process such as administrations, NGOs, inhabitants and other local agents. Agents will bring to the common pool* what is important for them from the last 50 years and the present time. The most relevant are:

- *Contrat de Ville 2015-2020, Brest métropole, 2015,* ***Report*** *66pp*
- *Couleur quartier, 2003,* ***Book*** *160pp*
- *Des graines sur le béton, 2006, Véronique PONDAVEN,* ***Film****, 52'*
- *300 papers about Saint Pierre memories, in "l'écho de Saint Pierre",* ***Papers*** *310pp*
- *CSF, Climat: Agir, Magazine NOUS N°210 3ème trimestre 2015,* ***Journal***
- *Municipal archives,* ***Pictures***

External edited sources: Available publications on the area and identified local focus topics from local edited sources found through the publishers and editors the consortium has access to through academic sources. The most relevant are:

- *Plan Climat Energie Territoire 2014-2019, Conseil régional de Bretagne, 2014,* ***Report*** *114pp*
- *Représentations Sociales d'un quartier brestois : Kerourien, by Cristian Diaz Gobeaux, UBO,* ***Master Thesis****, 2017.*
- *Trois cents ans de mesures marégraphiques en France : outils, méthodes et tendances des composantes du niveau de la mer au port de Brest. Climatologie. Université de La Rochelle, Nicolas Pouvreau,* ***PhD,*** *2008.*

1st coding of existing interviews and focus groups: Previous interviews and focus groups were conducted in Kerourien prior to this project. The coding of these texts will illuminate elements to help identify the priorities of the communities and the gaps that need to be filled. We also have access to the analysis results from existing interviews and focus groups compiled both in the "couleur quartier" book (2003) and in the C. Diaz master thesis (2017), but not to the rough material. These two documents are very useful for forming an initial understanding of the place and encouraged us to conduct complementary interviews and focus groups.

Conducting complementary interviews and focus groups: Additional interviews and focus groups are being conducted based on modified grounded theory in order to have a wide-open window of narratives from residents and other key agents. The first set of 10 interviews were conducted by Lionel and Juan based around the following questions:

- *Where were you born?*
- *What path/road did you take before arriving at Kerourien?*
- *Can you tell the first time you came to Kerourien? What was your feeling?*
- *Tell us three events in Kerourien that have been important to you (personally).*
- *What is your feeling when you look at Kerourien today?*
- *Can you describe three dreams that you have for Kerourien for 2050 (in 30 years)?*
- *What would it take to make them come true?*
- *Do you have anything to add?*

The average length for interviews in this first complementary set is 67 minutes.

The public corpora is shared internally by the Local Coordination Team members through the Network-Attached-Storage http://93.7.24.2:57498/ from the Le théâtre du Grain with 250Gof dedicated space with “Text”, “Video”, “Picture” and “Others” folders.

After seven meetings, the Local Coordination Team has established their own governance and has agreed to focus on Kerourien’s 50th anniversary party, to be held the 16-21 October 2018. A full day planning event was launched January 25th 2018 to engage the public in this process, and another on January 28th 2018 to launch the artistic workshops associated with the celebration.

The red-thread of the narratives is “Les belles histoires de Kerourien” meaning “The beautiful stories of Kerourien”. This title is a powerful choice to encourage

and help bring a wind of change to the negative representations this place has had in the media and within the city's residents (Figure 41).

Figure 41. Flyer identifying the public to participate in 'The Beautiful Stories' process

6.4.3. Climatic challenges, main directions from the initial mapping of narratives

The initial mapping of narratives comes from the first analysis of the corpora, shedding light on the best connections and transitions between (i) the collection of the narratives and the identification of key agents, and (ii) the needs for WP1, WP2, WP3 and the representations as described in WP4.

The explicit expression of "climatic change" or expressions that are semantically linked to it are absent from the narratives of Kerourien residents and stakeholders. They are not used in daily-life narratives or in the recorded interviews. Only when we ask, "And what about CC…" then answers appear as, "Ah, yes, it is extremely important," and then they connect with IPCC mainstream discourses, with three exceptions in this initial mapping of narratives: (i) residents affected by building degradation and unhealthy life conditions; (ii) public servants who implement the national and regional CC framework downscaled from the IPCC; and (iii) scientists working on the topic mainly from natural sciences perspectives. CoCliServ can make a difference if we understand

and figure out a way to connect the local community's climate-based concerns with knowledge as a whole. The first mapping of available narratives showed two very specific points appearing from the interviews: the window blinds alteration (Figure 42) and the buildings' uninsulated north faces that cause health troubles such as "asthma, repetitive colds and insomnia," as reported in the interviews.

Figure 42. Window blinds alteration reported by the inhabitants

Who is responsible for this work that needs to be done in the near future? The city owning the buildings, or the residents who are leasing apartments within them? For community members with low incomes, a question of 28 euros -the price of the piece needed to fix the smallest windows- is a big deal, and the threat of being abandoned by public services increases their feeling of insecurity. Climatic change moves from there, showing five main narrative lines:

- the place where the climate takes on its daily life and world-view representation;
- how participants bring, through their personal trajectories and experiences, the climatic history that allows connections between regional and global questions;
- the potential connection between expectations and climatic conditions;
- the political choices regarding climatic questions; and
- the dialogue between those political choices and the residents' dynamics.

Figure 37. Poster for the Kerourien 50th anniversary in October 2018

This initial mapping of narratives will be enriched with the in-depth analysis of available sources, including the work on social representations of Kerourien by **Cristian Díaz-Gobeaux's (2017), that will be completed by Le Maquis,** Le théâtre du Grain and other stakeholders during the long-term fieldwork processes.

In these first CoCliServ steps, it appears clearly that we are in a place with high diversity and a fragile balance; this is demonstrated in formal and informal exchanges and is also reflected in the interviews and stakeholder dynamics, both within them as well as with the residents. Each resident and stakeholder is a precious multidimensional reference and CoCliServ is a chance to transform climate sciences into action-oriented place-based climate services to engage, enable and empower local communities (Vanderlinden, 2017).

In order to go beyond this initial narratives mapping, including a classification of the available narratives, the in-depth analysis will be completed as a part of the second step of this first work package.

7. Conclusions and outlook

The initial mapping of narratives of change was congruent with situating CoCliServ in the respective fields. Situating means also finding discourse constellations and debates that fit the purpose for CoCliServ. From the beginning, the field projects had different research designs: in some, like the case of Dordrecht, members of the municipality are members of the Consortium; in others, like the Jade Bay, research is designed more loosely and follows the actors and discussions in the field. But all of the projects focused on constellations that involve climate change with the goal to identify strongholds for the development of new forms of climate service. Thus, a project like CoCliServ from the beginning is an actor in the field; the scientific ideal of the distanced position of the neutral observer does not apply to this kind of engaged research.

The diversity of research designs and approaches to the field did not impede comparison; the common focus on narratives enabled the identification of common discursive threads. As a result, it was possible to distill a typology of narratives structuring the discourse and the debate about climate change. The respective types and the importance of geo-political narratives in the respective settings, their connections with narratives of identity or myths of origin help situating weather and climate related problems in the respective land- or cityscape, each of them with their own combination of those elements. Those narrative structures are not exclusively linked to climate change, quite to the contrary; former and current right wing 'blood and soil' ideologies use the same rhetoric repertoire. Once climate change is located in an 'animated' lifeworld, it finally becomes part of the political assemblies that manage, shape, inhabit and administer the respective land- and cityscapes. The questions of land use, of

property and civic participation are common threads; climate issues are closely related to questions of social equality and environmental justice.

This initial mapping provides access to the respective local field sites for the site organizers from scenario building, climate services, metadata, citizen science and knowledge assessment; first contacts and collaborations are already underway. The main challenge is the reflection of the own role in respect to the field sites. Filling statistical data with life and turning narratives into data means squaring the circle; a project like CoCliServ has to transcend the old dualism that still structure the academic work. One way out is the integration of citizen science and artists; projects, that are already underway. The other way out is the close cooperation with the respective partners in the field. The challenge is not to shy away from actively situating our research in discourse constellations that matter.

In the next step, these roughly sketched narratives will be transcribed, coded and analysed according to the disciplinary traditions, with discourse analysis as a common method. Furthermore, these narratives have to be interpreted in the context of other narratives and the weather-world where they originate from. These first steps will provide the basis for the collective of CocliServ to intensify interaction and collaboration.

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