HUMBOLDT-UNIVERSITÄT ZU BERLIN

(Re)Thinking the Ocean

Bachelor´s Thesis
Submitted for the Degree of
Bachelor of Arts (B.A.)
in Art and Visual History

Humboldt-Universität zu Berlin
Faculty of Humanities and Social Sciences
Department of Art and Visual History

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Berlin, 19. April 2021

Declaration

I hereby declare that my thesis is the result of my own work and that I have marked all sources, including online sources, which have been cited without changes or in modified form, especially sources of texts, graphics, tables and pictures.

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Berlin, 19. April 2021

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I. INTRODUCTION

"The world ocean is changing, as its circulation, chemistry, and life undergo a major set of transformations."[1] We are intellectually aware of these changes, they are scientifically observed and yet we rarely experience them. Representations of the ocean as a mainly solitary place remain the same. This is the unspoiled view, the gaze across the vast open ocean from a terrestrial perspective. Contemporary artist Hiroshi Sugimoto (1948) explores this view of looking across the water in his near-abstract series of seascapes (1990). For him, a familiar feeling is evoked, a feeling of visiting his ancestors, who were able to cherish the same serene experience his camera captures today.[2] The same decade that Sugimoto began to work on this series of seascapes, oceanographer Sylvia Earle (1935) published her book *Sea change: A message from the Oceans* (1995). Earle abandons this traditional terrestrial perspective, *by the sea,* and offers a new oceanic viewpoint, *beneath the sea.* She reveals how the oceans are being slaughtered by the interests of industrial driven humans and calls on us to recognize the mutual dependencies of these two spheres.[3] The romantic and eternal feeling in Sugimoto's photographs gives way to an eerie sensation of uncertainty. As Earle suggests, when we break the surface of the ocean, we can break with the limitations of the past and open up our understanding of the sphere we inhabit.

In the interdisciplinary project *Oceans in Transformation* by Territorial Agency, the architects and urbanists Ann-Sofi Rönnskog and John Palmesino focus on the invisible and slow processes within the ocean that are igniting the degradation of the health of our aqueous planet.[4] To find new ways of thinking *from* and *with* the Ocean, the couple transforms open-source data sets into complex assemblages to visually communicate the profound and often hidden territorial transformations of earths contemporary state of being. They ascribe their work into the new geological epoch of the Anthropocene and ground it in the Gaia principle, the theory that places life as the regulator of the earth.[5] The following analysis into

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[1] Pietro Scammacca del Murgo / Daniela Zyman, (ed.): *UNFOLDINGS. A research dossier on the seven trajectories of Territorial Agency: Oceans in Transformation*, 2020, p. 2.
[2] Armin Zweitens, (ed.): *Hiroshi Sugimoto. Revolution*, Osterfildern 2012, p. 6-9.
[3] Sylvia Earle: *Sea Change: A Message of the Oceans*, New York 1995, p. 327.
[4] The ocean system, one of the most dynamic and sensitive parts of the planet, is put under growing stress by human activity. Science has identified the world ocean as a key element of climate change. - *Oceans in Transformation* was commissioned by TBA-Academy. The Exhibition curated by Daniela Zyman synthesizes the three-year intersectional research of Rönnskog and Palmesino. It was on display at the Church of St. Lorenzo in Venice 27. August - 29. November 2020 and, as restrictions allow, will extend with new perspectives until August 29, 2021. I will not discuss the exhibition further, as I was unable to visit in person.
[5] The Anthropocene is a proposed new epoch in the history of the earth which includes human actions in the geological timescale that is well discussed within many disciplines and the arts. Notable publications: Johannes Lunderhausen: "The Anthropocene Working Group and its (inter-)disciplinarity," in: *Sustainability: Science*

cartographic and artistic representations of the ocean explains how the sea has been abstracted and generalized as an empty, yet paradoxically limitless void and presented as a space for emotional reflection. It was thought of as anonymous, open for appropriation and glorification as colonial ideology led to its untamed exploitation. The ocean beneath the undulating surface was ignored and devoured simultaneously. This duality spawned the essential questions of our time, how can the Anthropocene ocean be visualized in its entirety? How can we disable its physical and metaphysical colonization and allow the ocean to articulate itself?

A variety of artists, exhibitions and publications approach contemporary questions like these from different angles. The exhibition *To See Without Being Seen, Contemporary Art and Drone Warfare* and works by *Marshmallow Laser Feast* visualize hidden and invisible processes and analyze the effects remote seeing machines can have on our understanding of the world.[6] The exhibition *Prospecting Ocean*, by Armin Linke, with the accompanying publication by Stefanie Hessler, shifts the focus to the ocean and provides a broad interdisciplinary overview of the state of urgency that the ocean is facing.[7] These works, like *Oceans in Transformation*, aim to trigger an empathic response and allow the viewer to understand and question our Earth system while opening a path for solutions through process.[8] TBA-21 Academy is an art organization and cultural ecosystem who fostered the work of Territorial Agency and Linke. They are leading the way to radically (re)think the ocean through interdisciplinary artistic research on an institutional level, by taking action towards policy making and advocacy.[9] Within the academic setting a variety of new programs like Planetary Health Science, Earth System Sciences or Global Change Geography are emerging as well. These are dedicated towards a novel integral study of the

Practice and Policy, vol. 14:1 (2018), p. 31-45. Heather Davis, and Etienne Turpin, (eds.): *Art in the Anthropocene: Encounters Among Aesthetics, Politics Environments and Epistemologies*, London 2015. - The Gaia theory was formulated by James Loverlock and Lynn Margulis in the 1970´s. James Loverlock: *Gaia: A new look at Life on Earth*, Oxford 1979.

[6] *To See Without Being Seen, Contemporary Art and Drone Warfare,* Mildred Lane Kemper Art Museum at the Sam Fox School of Design & Visual Arts at Washington University St. Louis, 29. January – 24. April 2016. – The London based collective *Marshmallow Laser Feast* places their work on the intersection of art and technology. Through the use of lidar and other innovative imaging devices they aim to visualize processes otherwise invisible for the human eye and make them accessible in virtual reality experiences.

[7] Stephanie Hessler: *Prospecting Ocean,* London / Cambridge, MA 2019. *Prospecting Ocean,* Institute of Marine Sciences of the National Research Council of Italy, 23. May – 30. September 2018.

[8] Hessler Stefanie (ed.): *Tidalectics. Imagining an oceanic worldview through art and science*, London / Cambridge, MA 2018, p. 8.

[9] TBA21 – Academy was established in 2011 as a new department within the Thyssen-Bornemisza Art Contemporary foundation (TBA21). TBA21: "About TBA21 – Academy," from: *TBA 21*, (n. d.), URL: https://www.tba21.org/#item--academy--1819, last accessed 10. April 2021.

ocean and the globe to tackle the challenge of "learn[ing] new ways to inhabit the Earth."[10] *Critical ocean studies* are gaining traction as our understanding of the ocean evolves inspiring interdisciplinary endeavors of the humanities and social sciences that validate and fuel this trend in the arts.[11] However, I believe an analysis of the stylistic devices that are transforming the over-coded seascape into an equitable *ocean-space* is still to be done.

In the following pages I will discuss how Territorial Agency radically shift our perception of a seascape by composing an integral, multidimensional, ocean-space. This novel *ocean-space-scape* adheres closest to the classic definition of science fiction by Darko Suvin, as the genre of cognitive estrangement, by imagining a world that is logically continuous with what we know about reality while introducing something new that defamiliarizes the present.[12] This interdisciplinary investigation is concerned with the critical examination and contextualization of the data painting *Continental Shelf* (2020, Figure 1), part of Territorial Agency´s project *Oceans in Transformation*.[13] The methods I apply are borrowed from a diverse mix of discourses including history, sociology, philosophy, feminism and postcolonial research. I place my research at the intersection of the natural, social, and human sciences following the approach of integrative geography.[14] I begin with a detailed iconographic description of the work and the project that will open up new theoretical concerns. Once the framework that the art was created in and exists in is delineated, I will explore the visual communication of the ocean and its social construction within cartographic history. From here I will bring our western, human point of view into the frame and discuss how the perspectives - by the Ocean, above the Ocean and beneath the

[10] Planetary health science focuses on the degradation of our planet and the impacts on human health. - Earth system sciences study the oceanic and terrestrial, to understand the complex interrelations that characterize the Earth as a whole. - Global change geography focuses on climate change and how to move towards a sustainable development of humans and the environment. – Quote: Bruno Latour: *Down to Earth: Politics in the Climatic Regime*, Cambridge, MA 2018.

[11] Elizabeth DeLoughrey: "Submarine Futures of the Anthropocene," in: *Comparative Literature* vol. 69:1 (2017), p. 32-44.

[12] Melody Jue: *Wild Blue Media. Thinking Through Seawater*, Durham / London 2020, p.7-8. (Darko Suvin: Metamorphoses of Science Fiction, Bern 2016, p. 15-27.) – The estrangement effect that I return to throughout the work is equivalent to the German *Verfremdungseffekt*, making something strange that is known or familiar. It is a theatrical technique to dispel the notion of reality and emphasize on its artificiality to create an *estranged* or detached, possibly rational reception. Gerhard P. Knapp: "Estrangement Effect [Verfremdungseffekt]," from: *The Literary Encyclopedia*, (18. December 2006), URL: https://www.litencyc.com/php/stopics.php?rec=true&UID=355, last accessed 14. April 2021.

[13] I am referring to the image as *Continental Shelf.* The official caption of the image: "*Territorial Agency: Oceans in Transformation*. Commissioned by TBA21–Academy. European continental shelves are among the most exploited ocean areas. Aggregate shipping activity and oil licenses. EMODnet data." Scammacca del Murgo / Zyman 2020, p. 30.

[14] Integrative Geography is also referred to as human-environment geography and focuses on the relation of individuals or societies to their environment.

Ocean – influence our comprehension of the ocean and scrutinize human values, beliefs and cultural understandings. Throughout the analysis I will dispel the stereotypes and conventions that have formed our visual representation of the ocean in cartography and the arts. The hybrid character of *Continental Shelf* will allow me to treat the image as a cartographic depiction as well as a true artistic work. My research in this paper will be led by the recurring conflict between scientific knowledge, human utilization of the ocean and our stagnant modes and concepts of representation.

II. PRELIMINARY CONTEXTUALIZATION AND ANALYSIS

When Rachel Carson asks: "Who has known the ocean?" it appears to be a trivial question.[15] Certainly, even the landlubbers in our globalized contemporary societies have a picture of the ocean in their mind. Advertisements, movies, books and holiday promotions all use similar images of the unspoiled ocean as a space for recreation, relaxation and enjoyment. However, I will show that these images are actually anchored within the tradition of the seventeenth century seascape and are conceptualized through a terrestrial lens. Western scientific efforts to *know* the ocean through technical analysis are advancing at an increasing speed and yet they leave out the premise of interrelation between knowing and being, "we do not obtain knowledge by standing outside of the world; we know because `we´ are the world."[16] At the same time, the ocean is the arena where geography, world history and global trade continue to unfold. The ocean contains an abundance of resources, but also a wavering surface, a marine habitat, a carbon sink, unbound connectivity and much more. In short, the ocean that builds the core of my analysis is an ambiguous, multilayered, multifaceted and multitemporal construct that I would like to define.

First, I need to make a delineation between *ocean space* and the hyphenated *ocean-space.*[17] The phrase *ocean space* is most commonly used in reference to it as a container of resources that needs to be regulated and is communicated in the context of policy making or marine governance. This territorialized ocean space is thought of as an extension of the terrestrial space.[18] The hyphenated *ocean-space* was defined by Philip Steinberg as an

[15] Hessler 2018, p. 157.
[16] Karen Barad: "Posthumanist Performativity: Toward an Understanding of How Matter Comes to Matter," in: *Signs: Journal of Women in Culture and Society,* vol. 28:3 (2003), p. 829.
[17] I follow Anne-Flore Laloë in defining the demarcations between *ocean space*, *ocean-space* and *ocean*: Anne-Flore Laloë: *The Geography of the Ocean: Knowing the ocean as a space*, London 2016, p. 1-4.
[18] Laloë 2016, p. 1- 4. - The Ocean has been perceived and used as a container that societies can fill and empty based on their needs, for example: chemical and conventional ammunition dumping, trawling, extensive fishing, petroleum extraction and mineral extraction.

integrative space that is "constructed by a variety of actors as they respond to and reproduce social processes, spatial patterns, and physical nature"[19] and "that intended to capture both the specificity of the world ocean and the fluidity between the study of landward and seaward domains, as both are socially and physically linked through linked dynamics."[20] I would add to this, that the ocean-space occurs in four dimensions and as Territorial Agency remarks, is a sensorium, "that records in its complex dynamics the transformations of the earth and inscribes its cycles into the patterns of life forms."[21] The ocean-space accounts for its own physical rights, its fluidity and movement are inseparable from it and allow for human engagement with it. Finally, the *ocean* is the culturally constructed space which focuses on the coastal zones and human interaction.[22]

Territorial Agency: *Continental Shelf*

Continental Shelf (Figure 1) is a multi-media *ocean-space-scape*[23] from an ariel perspective. This *data painting*[24] initially appears to be a view overlooking an otherworldly abstract landscape. The view does not correspond to our known image of the ocean. We feel alienated and disoriented. Our cartographic way of seeing has nothing to grasp. We do not see water. Instead, we see textures. Light grey fields are marked by a cliff that opens up towards the top corners of the image. The top right corner is filled with a field of scattered pinnacles in soft shades of grey. Hues of light blue in swaths of fluctuating intensity swerve and encircle dark areas of inky blackness. Sharply defined jittery tentacles encroach upon them as the light blue dilutes into a hazy surface towards the right side. Movement is created within the

[19] Philip E. Steinberg: *The Social Construction of the Ocean*, Cambridge 2001, p. 10-11, Footnote 2.
[20] Phillip E. Steinberg: "Navigating to multiple horizons: Toward a geography of ocean-space," in: *Professional Geographer*, vol. 51:3 (1999), p. 367-368.
[21] Scammacca del Murgo/ Zyman 2020, p. 8.
[22] Laloë 2016, p. 1- 4.
[23] Tim Ingold suggests, that when the land became the subject of art, the linguistically similar words scope (classical Greek *skopos*, target, and *skopein*, to look) and scape (Old English *sceppan* ot *skyppan*, to shape) were conflated and lead to the misconception of landscape as not something natural viewed from the distance but something altered by humans. Landscapes are constructed by the reach and limits of human sight, and the ability to shape them. With *ocean-space-scape* I would like to break with the traditional seascape, one that is anchored in the tradition of landscape painting and conceptualized as nature altered by humans. The ocean cannot be shaped to our visual liking, and hence the *ocean-space-scape* conceptually unites the elements of the ocean-space. Tim Ingold: *Being Alive: Essays on movement, knowledge and description*, London 2011. And: Hessler 2019, p. 129-132.
[24] I consider the *data painting* analogous to a traditional painting. A painting begins with an experience; a visual impression is made on the retina of the artist, which is transferred through the brain and the artist's motion to develop stroke by stroke on a canvas. In a data painting, real-life experiences leave an impression on an imager which transfers the light rays into data, that is reworked into a visual experience by the artist pixel by pixel with the recorded traces leaving marks like brushstrokes.

stillness. A layer of cobalt blue geometric forms, intersected by white lines, hovers in a seemingly random way across and above the dark ground. The grid is sprinkled with dots of varying intensity. The dark spaces alternate in intensity and texture. The surface of the lower dark area feels like clouds packed tightly together while the encircled shapes in the center and the largest area on the left half of the image could be mountain peaks obscured by thick fog.

The abstract shapes and patterns do however correspond with real areas, surfaces and places. There is land and ocean-space. Our tilted perspective is directed to the south-west across Europe. The southern tip of Norway and the Fjords reach into the image from the bottom left corner. From here we can move south across Denmark to the European mainland and all the way to the Iberian Peninsula. The remaining dark shapes above the center of the image are the United Kingdom and Ireland respectively. We can identify the North Sea basin, in the center of the image, as it is filled by the Atlantic Ocean coming in from the bottom right corner along the diagonal axis of the frame. The continental shelf is depicted as a smooth blurry edge along the right side, gaining intensity towards the western edge of Ireland. It continues as a steep cliff along the Bay of Biscay, down the Portuguese coast before reaching the Strait of Gibraltar, which lays just off the edge of the image. East of the coast of Spain we get a glimpse of the Mediterranean Sea and the distant coast of the shelf break of the African continent and its adjacent landmass.

Geologically, a continental shelf is defined as the submerged extension of the continental landmass. They are often relatively shallow and form the edge of the landmass that is still covered in continental crust.[25] The topography of a continental shelf is similar to that of the exposed portion of the terrestrial section. Most continental shelves gently slope down to between 100 and 200 meters where they end with an abrupt drop called the shelf break. This is defined with a light-dark contrast in the image that is especially clear in the Bay of Biscay in the top right corner of the image. The continental slope then steeply subsides and merges with the continental rise at a depth of 4,000 to 5,000 meters where it finally phases out into the abyssal plane. These deep ocean plains cover roughly 50 percent of the Earth´s surface and reach depths up to 6,000 meters below sea level. Volcanic mounds and hill groupings rise abruptly, giving the plain its unique appearance of *scattered*

[25] Continental Crust is the outermost layer of Earth´s lithosphere that makes up the planet´s continents and continental shelves. The continental crust forms nearly all of Earth´s land surface. The Editors of Encyclopaedia Britannica: "Continental crust," in: *Encyclopædia Britannica*, (30. June 2020), URL: https://www.britannica.com/science/continental-crust, last accessed 10. April 2021.

pinnacles. The continental shelves are constantly shaped and reworked by the high energy-forces of the surf that pass over them.[26] Carson vividly describes how an *underwater traveler* would experience the continental shelf:

"He would traverse miles of level prairie lands; he would ascend the sloping sides of hills; and he would skirt deep and ragged crevasses yawning suddenly at his feet. Through the gathering darkness, he would come at last to the edge of the continental shelf. The ceiling of the ocean would lie a hundred fathoms above him, and his feet would rest upon the brink of a slope that drops precipitously another mile, and then descends more gently into an inky void that is the abyss."[27]

In juridical terms, the continental shelf is treated in a simplified mode. It is considered to be a natural extension of land territory laying claims to the seabed, the shelves, the rises and the slope´s subsoil but excluding the overlying water column.[28] Territorial Agency give us an expression of this ocean, one that is technologically drained of its often-defining feature, the salient water. New bathymetrical modes of visualization, which I will discuss in more detail in chapter three, allow Territorial Agency to insert high-definition images of the continental rise, the abyssal plain and the regularly hidden seabed. Inverse to the generic concept of the deep sea as a dark and uninhabitable place, here it is displayed as the lightest area in the image, highlighting the space lying at the greatest depths. Also in contrast are the land areas above sea level, which are hued in the darkest shades. Striking is the fluorescent blue grid with its lightning like flashes that hover almost exclusively over the continental shelves, encroaching on the landmasses. These appear not to be a part of the physical space; they are neither the palpable ocean nor the land. This layer is an illustration of the marine technosphere, which is the combined "material output of the contemporary human enterprise," including mobile and fixed technological objects, that spans the Anthropocene ocean.[29] The lines I have described as *light blue and fluctuating* depict shipping activity; the *cobalt blue geometric forms* represent the oil licenses of the area; and the *intersecting white lines* mark the Exclusive Economic Zone (EEZ). I will take a moment to elaborate on each of the elements, beginning with the latter.

Adjoining boarders are drawn based on the regulations of the United Nations Convention on the Law of the Sea (UNCLOS).[30] The UNCLOS in its contemporary form

[26] The Editors of Encyclopaedia Britannica: "Continental shelf," in: *Encyclopædia Britannica*, (3. February 2012), URL: https://www.britannica.com/science/continental-shelf, last accessed 10. April 2021.
[27] Hessler 2018, p. 160.
[28] Scammacca del Murgo/ Zyman 2020, p. 31-33.
[29] Jan Zalasiewicz, et al.: "Scale and diversity of the physical technosphere: A geological perspective," in: *The Anthropocene review*, vol. 4:1 (2017), p. 9-17.
[30] The UNCLOS codifies the fundamental division of the ocean and its resources. It is signed by 168 nations and almost universally accepted. *United Nations Convention on the Law of the Sea*, 1833 U.N.T.S. 397, (10. December 1982), URL: https://www.un.org/depts/los/conventionagreements/ texts/unclos/unclos_e.pdf.

was established in 1982 to govern the ocean space per the objective, as stated in the preamble:

"[…] the desirability of establishing through this Convention, with due regard for the sovereignty of all States, a legal order for the seas and oceans which will facilitate international communication and will promote the peaceful uses of the seas and oceans, the equitable and efficient utilization of their resources, the conservation of their living resources, and the study, protection and preservation of the marine environment."[31]

Angular white lines are used to divide the ocean-space into EEZ´s, which reach as far as 200 nautical miles from the coastal baseline (low-water line along the coast). Within the EEZ, states enjoy sovereign rights for the exclusive exploration and exploitation of economic resources. Another white line traces the coastline closely and marks the territorial sea. This zone is defined as a sovereign territory, extending to the air space, seabed and subsoil but not further than twelve nautical miles from the coastal baseline of the respective coastal state. All waters and resources beyond the EEZ lie outside of national jurisdiction and are declared *Common heritage of mankind*.[32] This includes the exploration as well as the exploitation of its resources which it describes should be carried out to the benefit of mankind irrespective of the geographical location of the States.

The light blue lines, swaths and strokes that are clustered together and gain intensity at intersections represent aggregated data from shipping activity. The data used by Territorial Agency is derived from the European Marine Observation and Data Network (EMODnet).[33] Ship movement patterns were organized into vessel density maps to understand maritime traffic in European waters. Each vessel carrying an Automatic Identification System (AIS) was tracked by coastal monitors or satellites, depending on their proximity to land, and the signals were transferred to create points in a grid that overlays the monitored area.[34] Finally, these points are connected by lines that highlight the major routes of movement on the ocean. The fact that transport supersedes territorial sea boarders and is embraced as a global right becomes clearly visualized.

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[31] UNCLOS 1982, p.25.
[32] UNCLOS 1982, p. 27, 67-78.
[33] EMODnet is a marine data initiative, that provides open access European marine data across several disciplines. EMODnet has established a network of partner organizations who are contributing to the data collection and simultaneously provides a gateway to data archives in order to foster a development towards a *blue growth*. EMODnet: "Central Portal," from: *EMODnet*, (n.d.), https://www.emodnet.eu/en, last accessed 10. April 2021.
[34] AIS data is transferred into a grid to measure the time spent by a certain ship in a one square kilometer grid cell over a month time. All cargo-, fishing-, or passenger vessels need to be equipped with an AIS following regulation 19 of the International Convention for the Safety of Life at Sea. Luigi Falco et al.: "Vessel Density Map. Detailed Methods," from: *EMODnet Human Activities*, p. 2, (March 2019), URL: https://www.emodnet-humanactivities.eu/documents/Vessel%20density%20maps_method_v1.5.pdf, last accessed 10. April 2021.

Cobalt blue polygons signify offshore oil licenses, each of them representing an interest in the resources below them. Oil licenses are geographical areas at land or at sea, that are distributed by countries on a bidding or grant system to corporations. The corporation receives the right and obligation for petroleum exploration for a limited period of time. These scattered blue sprinkles, which are distributed in varying density across the image but are especially prevalent in the North Sea, represent the amalgamated data from active, abandoned and suspended boreholes. These locations had been the private data of the respective petroleum companies until EMODnet gathered this information, from a range of sources, to develop a publicly accessible digital map which is now used by industry representatives themselves.[35]

The grid and the splatters of light within *Continental Shelf* recall images of a modern city at night with restless motion and brightly flashing intersections. The technosphere has encroached on the ocean with towering spikes shooting into the air from the mega-ports. Each ship that moves across the surface leaves a mark on the screen. Dots, lines and strokes race across the picture plane like splatters of color that consume the ocean while ignoring its physicality. Regulatory policies do not account for the oceans dynamics, movement of molecules, wave patterns, evaporations or its totality yet shipping activity continues to increase. Presently, it accounts for three percent of global greenhouse gas emissions but is excluded from restrictions on emission in the Paris Agreement. Territorial Agency remark, that capitalist societies have laid claim to the sea and economically developed it to the extent that the European continental shelves have become one of the most exploited areas of the global ocean. [36]

Territorial Agency: Context within the Œuvre

I will now examine how the piece *Continental Shelf* fits into the context of Territorial Agency's broader body of work. *Continental Shelf* is a small building block in the *North Sea to Red Sea* trajectory in the latest project *Oceans in Transformation* by Territorial Agency. *Oceans in Transformation* is a continuation of the group's engagement with the Anthropocene and their quest to find new ways of communication that will enable a sustainable territorial transformation. One of their earlier but ongoing projects is the

[35] EMODnet: "Central Portal," from: *EMODnet*, (n.d.), https://www.emodnet.eu/en, last accessed 10. April 2021.
[36] Scammacca del Murgo / Zyman 2020, p. 30.

Anthropocene Observatory. Together with Armin Linke and Anselm Franke, the *Anthropocene Observatory* was founded in 2013 and produced by the *Haus der Kulturen der Welt* Berlin. Through different modes of representation, the group aims to illustrate the concepts behind the scenes of the Anthropocene and how it unfolds into reality.[37] In another the exhibition -project, *The Museum of Oil,* curated by Bruno Latour and produced by the *Zentrum für Kunst und Medien* Karlsruhe, Territorial Agency confronts the disputed use and production of crude oil. Beginning with the statement "We shall need to keep the oil in the ground" it seems as though Rönnskog and Palmesino have opened a Pandora's Box that leads to more complex and unimaginable questions. Oil is the core of our economy and our lives depend on it while its production is simultaneously destroying life on Earth. By packing the oil industry into a *Museum,* the project openly aims "to make it [the oil industry] a thing of the past."[38] While this project stays mainly within a terrestrial perspective, the question of the oceans was raised within the work and what began with looking at oil rigs evolved into the project *Oceans in Transformation*, a three-year endeavour with a wide scope. With the support of TBA21-Academy, Rönnskog and Palmesino explored new ways of cooperating with scientist, artists, research institutions, intergovernmental organizations, scholars, activists, policy makers and ocean advocacy groups.[39]

The goal was to rethink and redefine the ocean-space in order to protect the physical ocean. Rönnskog and Palmesino communicate the tangible and intangible transformations the world oceans are facing, which I will touch on throughout my work and compiled them along seven trajectories: Gulf Stream, Equatorial Pacific, North Sea to Red Sea, Humboldt Current, Indian Gyre, Coastal Asia and Mid Atlantic.[40] A trajectory is a set geographical area that structures the global ocean-space and at the same time is oriented along specific research itineraries.[41] Territorial Agency further defines them as "alternative ways of storying and mapping waters [that] can give voice to inclusive and evolving vocabularies of water places, thereby transforming collective ways of thinking."[42] Each trajectory explores

[37] Territorial Agency: "Anthropocene Observatory," from: *Territorial Agency – Anthropocene Observatory*, (n. d.), URL: https://www.territorialagency.com/anthropocene, last accessed 10. April 2021.
[38] Territorial Agency: "Museum of Oil," from: *Territorial Agency – Museum of Oil*, (n. d.), URL: https://www.territorialagency.com/museumofoil, last accessed 10. April 2021.
[39] Scammacca del Murgo / Zyman 2020, p. 2-12.
[40] Scammacca del Murgo/ Zyman 2020, p. 9. – The detected transformations are: Multiple Oceans; Sensible zone; Sea level rise; Atmosphere; Chlorophyll and algae bloom/Eutrophication and Dead Zones; Overfishing; Transport; Extractivism/Deep Sea Mining; Bathymetry/Continental Shelf; Coastal Urbanization/Ecosystems; The Knowledge of Land and Water: Indigenous Climate Justice
[41] Scammacca del Murgo / Zyman 2020, p. 2-12.
[42] Scammacca del Murgo / Zyman 2020, p. 46.

the intersection and co-existence of Earth science and human subsistence. It is not their intention to create new marine regions but instead point to the aquatic, geological, climatic, material, human, organic, and conceptual agencies, systems, histories and transformations that have evolved along and across them.[43] Each trajectory is displayed with a dynamic multi-media *hydro-political-economic deep-scape* (Figure 2).[44] The image slowly moves from the left to the right side of the screen. It allows the viewer to soak in the abundance of stories and information compiled in the work, which are always incomplete, partial and temporal. The renderings are in a cartographic manner showing the multilayered and multitemporal human interference in the scattered ocean. The use of text in the image is vital. The words written on the picture plain represent real things equal to images, unfolding narratives above and below the surface of the sea. The full trajectories are accompanied by a set of images and extensive supportive information from different disciplines.[45] Each image entangled in the trajectory offers insight into the state of the ocean and reveals humans' relations and appropriation with its physical being. Each image also aims to unravel the abstruse *hyperobject:* the ocean-space for the viewer, while at the same time indicating how situated, partial and incoherent our knowledge still is.[46] Although I am focusing this limited research around *Continental Shelf*, one specific work from the project, it is important to keep in mind what Trevor Paglen points out, "in the new era of *seeing machines* it becomes apparent, that the focus should not lie on the individual image but rather the culmination of them."[47]

[43] Scammacca del Murgo/ Zyman 2020, p. 2-12.
[44] The term was introduced by: Scammacca del Murgo/ Zyman 2020, p. 47. - The dynamic image can be accessed at: Territorial Agency et al.: "Trajectories," from: *Ocean Archive -Territorial Agency*, (n. d.), URL: https://www.ocean-archive.org/collection/49, last accessed 10. April 2021.
[45] The full project including all supporting research can be explored on: URL: https://www.ocean-archive.org/collection/49 - Further the bi-weekly seminar Ocean/Uni hosts discussions and lectures aiming to foster a new way of thinking with the oceans to complement and enhance land-based understanding of the Earth. URL: https://www.ocean-space.org/activities/ocean-university.
[46] Scammacca del Murgo/Zyman 2020, p. 2-3. – *Hyperobjects* are "things that are massively distributed in time and space relative to humans." The term was minted by philosopher Timothy Morton. Timothy Morton: *Hyperobjects: Philosophy and Ecology after the End of the World*, Minneapolis 2013, p. 1.
[47] Svea Bräunert, and Meredith Malone: *To See Without being Seen: Contemporary Art and Drone Warfare,* exh. cat. St. Louis, Mildred Lane Kemper Art Museum, 29. January – 24. April 2016, Chicago 2016, p. 51-57. - *Seeing machine* is defined by Trevor Paglen as an expansive definition of photography and encompasses the view of human used technology as well as the way automated machines *see* – these include iPhones, airport security backscatter-imaging devices, electro-optical reconnaissance satellites in low earth orbit, surveillance cameras, roving cameras and so on.

Artistic research and Data Art

Palmesino stated that: "Thousands of sensors constantly monitor the ocean above and beneath the waves […] Never before has the ocean been measured to this extent."[48] Data is being generated, collected, searched and shared constantly and the accumulation of this information brings with it new challenges. Besides logistical matters like storage, organization, accessibility and rights, the pivotal questions about use and deployment have become central. Territorial Agency, however, are not the only artists who have begun to discover the value of raw data as a medium for artistic expression. The challenge for all *data artists*[49] lies in the creative translation and reworking of the data into visual experiences that break down the boundaries between pure information and plain visual art. The data artist uses the abstract data to create a narrative that oscillates with the viewer and rethinks human perception by blurring the boundaries between the digital and physical through technological modes. This emerging artistic movement reflects the *datafication* of our world systems as they become increasingly governed by algorithms.[50]

Data art evolved from graphic representations like charts, pie charts, graphs and heat maps that were provided by the scientific disciplines themselves.[51] One of the pioneers in the field of complex and innovative expressions of data with a focus on visual value was the curator Kynaston McShine (1935-2018) who examined the impact of technology on art in the exhibition *Information* (1970) at the Museum of Modern Art in New York. Exhibiting the work of 130 international artists he predicted a new handling of art with information communicated through conceptual work. In the exhibition catalogue he was the first to define the genre of data art: "Increasingly artists use mail, telegrams, telex machines, etc., for transmission of works themselves — photographs, films, documents — or of information about their activity."[52] He also suggested, that painting might not have the ability to tackle the more contemporary issues, that conceptual art can.[53] As McShine predicted, artists today

[48] Scammacca del Murgo/ Zyman 2020, p. 8.
[49] "A data artist is a `specialist´ responsible for delivering fresh insights from data in order to help an organization to meet its communication goals. He/she creates graphs, charts, infographics, and other visual tools that help people to understand complex data." Giovanni Schiuma et al.: "Toward a Data-Driven World: Challenges and Opportunities in Arts and Humanities," in: Giovanni Schiuma, and Daniela Carlucci (eds.), *Big Data in the Arts and Humanities. Theory and Practice*, Bocca Raton, London and New York 2018, p. 22.
[50] Schiuma et al. 2018, p. 15-22.
[51] Schiuma et al. 2018, 2018, p. 19-24.
[52] Maxence Grugier: "The Digital Age of Data Art," in: *More Tech Crunch*, (9. May 2016), URL: https://techcrunch.com/2016/05/08/the-digital-age-of-data-art/, last accessed 10. April 2021.
[53] Robert Smith: "Kynaston McShine, Curator of Historic Art Exhibitions, Dies at 82," from: *The New York Times*, (12. January 2018), URL: https://www.nytimes.com/2018/01/12/ obituaries/kynaston-mcshine-museum-curator-dies-at-82.html, last accessed 10. April 2021.

use data to critically examine our society. Popular topics are the incomprehensibility of our current world system, global entanglement and connectivity, the politics of ecology and the responses of Earth to our human actions.

In the mixed media installation *Black Shoals Stock Market Planetarium* (2001/04) Lise Autogena and Joshua Portway created a night sky of a different dimension. Small constellations and creatures that evolved into clusters were projected inside an otherwise dark dome. The viewer gazed at small flickering and glowing lights that corresponded to the real time activities of the stock market. This computerization turned the financial market into an artificial night sky that was to be experienced by the audience through the visualization of data. Autogena and Portway found a way to illustrate the magnitude and randomness of the stock market by still reminding of its real-life effect for each individual.[54] Another example for data driven work is *Amsterdam SMS* (2007) by data artist Aaron Koblin. He transformed the data derived from the volume of text messages sent on New Year's Eve in Amsterdam into a dynamic visualization that evoked images of a cityscape. Koblin used real-life and community generated data to deliver new insight into communication patterns at special events and the distribution and movement of people throughout Amsterdam.[55]

Rönnskog and Palmesino also use the impact of real-life scientific data that reflects on often invisible processes. Their work exists in this genre of data art, where art and visual practice meets technology and Earth science with the aim to generate and communicate information. The *datafication* of the ocean-space leads to a new way of its visualization and allows for its greater optical investigation. *Oceans in Transformation* started out with the analysis of the scientific literature assembled by the recent (2019) United Nations Intergovernmental Panel on Climate Change (IPCC) *Special Report on Ocean and Cryosphere in a Changing Climate*. The project analyses approximately five percent of the publicly accessible open-access data referred to in the report. The remote sensing datasets, meaning data obtained from a distance, are gathered from satellites, airborne sensors, floating buoys, GPS, artificial intelligence and sonar scans. They are organized by institutions and researchers with the majority stored away and guarded respectively.[56] In *Oceans in Transformation* Territorial Agency bring the complex remote sensing datasets and climatic models of the intersections between sea, sky, and land together and assemble them

[54] T. J. Demos.: *Decolonizing Nature, Contemporary Art and the Politics of Ecology*, Berlin 2016, p. 101-106.
[55] ZKM, Center for Art and Media Karlsruhe: "Aaron Koblin, Amsterdam SMS," from: *ZKM*, (n. d.), URL: https://zkm.de/en/aaron-koblin, last accessed 10. April 2021.
[56] Scammacca del Murgo/ Zyman 2020, 8-12.

in the trajectories. The project aims to enable a new trust in science, through advocacy channelled towards protection and conservation, because this same data is also used to explore the ocean, control it and exploit it by applying the identical arsenal of research methods that come out of the Earth sciences themselves.[57] This dichotomy reveals the opportunity data offers to the visual arts, as it can be communicated efficiently to allow for a multipurpose response. Territorial Agency act as "magician[s] of communication"[58] between the many stakeholders of the oceanic realm. Data derived art seems especially purposeful in the context of conservation, as Territorial Agency notes "it [the ocean] is sensed and detected, navigated and observed, and made sensible to new polities and new forms of collaboration that are trying to compose a new common world for common action."[59] Rönnskog and Palmesino are exploring the ocean as an aesthetic device which in its unstable state calls for its own mode of representation and communication away from tradition, which as I will discuss in the following chapters, allow(ed) for and enable(ed) its exploitation and anthropogenic transformation.

III. CARTOGRAPHIC IMAGES

I would like to begin with a brief story. 61,280 Nike shoes found their way into the ocean on May 27, 1990, as the container ship *Hansa Carrier* encountered a storm and lost its load. The shoes began their unsupervised journey through the sea. Some of them washed on the shore of the West coast of the United States. Beachcombers collected them and sold them for a profit while oceanographers used the incident to gain insight into the variability of ocean currents by calibrating the shoes recovery site with the release site. The ocean was the provider of an incidental opportunity for these groups but for the Nike corporation, the ocean was different. Following the global labor asymmetry, Nike´s production sites were outsourced to low-wage areas and the ocean became a space in-between these regions that simply had to be crossed. For the shipping company carrying out the journey, the ocean represented an idealized flat transportation surface. Lastly, for the insurance company of the shipper, which assessed the risk of the journey, the ocean represented locations and events

[57] Jenny Rock et al.: "What is the ocean: A sea-change in our perceptions and values?" in: *Aquatic Conservation: Marine and Freshwater Ecosystem*s, no. 30, 2020, p. 532.
[58] Nicholas Sakelaris: "Markus Reymann: How Art Could Save The Oceans," from: *Dallas Innovates*, (29. April 2016), URL: https://dallasinnovates.com/markus-reymann-how-art-could-save-the-oceans/, last accessed 10. April 2021.
[59] Scammacca del Murgo / Zyman 2020, p. 8.

that needed to be evaluated. Each link of the chain transformed the ocean. Together, these groups constructed a societal system linked by the ocean.[60]

The hypothesis of the world ocean as a predictable friction free transportation surface, which the Nike corporation, the shipper and the insurer hoped for, developed through history, as global industry, colonialism and capitalism engrossed the ocean. In the following chapter I would like to consider the idea of the ocean as a social construct and examine how early cartography enabled this view. Maps transfer real spaces into complex visual devices that help humans align their inner mental world with the physical outside world. They are a tool that allows people to communicate about space.[61] Hitherto maps intend to evoke the sense that we can envision the world through them and objectively, which attributes them with "extraordinary authority,"[62] that Denis Cosgrove even refers to as "normalizing and ideological."[63] From the beginning, maps generated a form of universal graphic language that influenced the social life of humanity across the globe. Maps did not just shape and enable human understanding of our relation within the world but facilitated the development of human societies as they made domination over the inhabitants of certain regions possible.[64] Maps therefore pose a "sensitive indicator of the changing thought of man, and […] an excellent mirror of culture and civilisation."[65] The history of cartography gives information about the cultural processes and current human views reproduced by the cartographer. Further, they reveal the technical innovations and advancements of each time period. These include inventions like early telescopes and satellites in orbit which allow for the processing of space in the evolving mediums of representation. Lastly, maps are tools, that generate new contexts and histories through their use and circulation.[66]

Ninety percent of global goods, components, dry cargo, and solid fuel are moved across the global ocean. This was made possible by the standardized logistic unit of the cargo container and going further back, by the development of maritime waterways, which are analogous to terrestrial routes, connecting fixed points at a minimum distance based on the

[60] Steinberg 2001, p. 1-7, 206-210.
[61] J. B. Harley, and David Woodward, (ed.): *The History of Cartography. Cartography in Prehistoric, Ancient, and Medieval Europe and the Mediterranean*, vol. 1, Chicago 1987, p. 1 – 5.
[62] Harley / David Woodward 1987, p. 2.
[63] Claire Reddleman: *Cartographic Abstraction in Contemporary Art. Seeing with Maps*, New York and London 2018, p. 7.
[64] Hessler 2019, p. 67-68.
[65] Norman W. Thrower: *Maps and Man: An Examination of Cartography in Relation to Culture and Civilization*, Englewood Cliffs, New Jersey, 1972, p. 1.
[66] Reddleman 2018, p. 7.

hypothesis of the world ocean as a predictable friction free static transportation surface.[67] Therefore, it is worth asking, what are the visual elements within maps that contribute to this spatial and social construction of the ocean-space and do we still find the material space of nature within them? Jeremy Crampton has identified the attempt of a map to make "sense of the geographical world" it depicts as a defining feature of the genre.[68] Maps are respected within several discourses, serving as scientific reports, historical documents, research tools and objects of art.[69] Within this research I will treat the selected historic maps as *cartographic images* which will allow me to analyze them methodologically within the art historical discourse while focusing on an iconological visual analysis embedded in the field of visual studies. With the focus on the visual parameters, I will however not deepen the analysis into the circulation and use of the discussed maps. In the second section I will compare my findings with the work *Continental Shelf* .

Cartographic Abstraction

The ocean-space is both a complex physical body filled with life and a socio-economic realm. Most maps abstract and generalize the world ocean into a plain stagnant surface of blue color which exists outside our consciousness and thought.[70] I will now take a comparative look at the visual representation of the ocean-space through selected maps with a primary focus on the mercantile era up until today. Since ancient times, civilizations across the globe have utilized maps in one form or another. First known examples of visual representations with cartographic features were found in the form of cave paintings and carved on tusks or stones with the earliest examples dating back to 25,000 BC.[71] These are followed by an extensive production of maps by the ancient Babylonians, Greeks, Romans, Chinese and Indians that is too large a task for me to discuss in detail. An early example of a medieval world map, serving as my starting point, is the mappamundi, which displays not the travel of humans through space but rather through time. The mappamundi *"*reveal explicitly the layers of historical events, processes, and artifacts that have shaped the present

[67] Scammacca del Murgo / Zyman 2020, p. 28-30.
[68] Reddleman 2018, p. 4. - This approach was designated as a loose defining feature for mapmaking by Jeremy Crampton to bypass the unfolding and unfruitful discussion of finding a universal definition of *the map* which he argues cannot be defined.
[69] Gerald Crone: *Maps and Their Makers: An Introduction to the History of Cartography*, London, 1953, ix (note 13).
[70] Reddleman 2018, p. 1-7.
[71] Alexander Wolodtschenko, and Thomas Forner: "Prehistoric and Early Historic Maps in Europe: Conception of Cd-Atlas," in: *e-Perimetron*, vol. 2: 2 (2007), p. 114-116.

landscape, as well as the objects that now exist […] portray[ing] the location and distribution not only of objects and conditions but also of events and processes."[72] The maps distinctly separate the terrestrial space of land, society and state from the maritime space. It was believed that the time-lapses reproduced only unfolded on land. Being considered more of a *history book* than a *geographical map* this genre tapered off with the development of the Portolan chart and the rediscovery of Ptolemaic geography. The latter eventually led the way in the development of modern maps.[73]

One of the first nearly accurate maps of northern Europe, I am discussing in more detail, is the *Carta Marina* by the Swedish priest Olaus Magnus published in 1539 in Venice (Figure 3). [74] The woodcut displays a *view from nowhere*[75] of the Scandinavian region with typical cartographic elements – the inscriptions of latitude and longitude in the frame, a legend with emblems in the bottom right corner, compass roses and directional vectors. The Scandinavian peninsula takes up the map's right half and is surrounded by the Norwegian- and the North Sea. Curving around along the right edge of the map, Sweden and Finland enclose the Baltic Sea. Along the bottom edge lies the European mainland. The islands of Great Britain, Tile, Fare, Orcad and Iceland find themselves in the left half of the map. The elaboration and eye for detail, which allow for the immediate identification of the depicted area, are unique for the time period. The region, rarely captured before in a map, is astonishingly realistic in its shapes and asserts a sense of validity.[76] The *Carta Marina* is rendered making use of Ptolemaic geography. Ptolemy was the first to use longitudinal and latitudinal lines within his world map, which bases the territorial locations on celestial observations. Considering the challenge, to transfer a large area into the grid of longitudes and latitudes and at the same time account for the curvature of the globe, the precision of

[72] David Woodward: "Reality, symbolism, time, and space," in: *Medieval World Maps. Annals of the Association of American Geographers,* vol. 75:4 (1985), p. 519-20.
[73] Philip E. Steinberg: "Sovereignty, Territory, and the Mapping of Mobility: A View from the Outside," in: *Annals of the Association of American Geographers*, 99:3 (2009), p. 475-477.
[74] The full title of the map: *Carta marina et Descriptio septemtrionalium terrarum ac mirabilium rerum in eis contentarum, diligentissime elaborata Annon Domini 1539 Veneciis liberal itate Reverendissimi Domini Ieronimi Quirini* - "A Marine map and description of the Northern Countries and of their marvels, most carefully drawn up at Venice in the year 1539 through the generous assistance of the Most Honourable Lord and Patriarch Hieronymo Quirino." - The map consists of nine sheets and measures 170 x 125 cm in total, it is one of the largest examples of printed maps in the sixteenth century. Leena Miekkavaara: "Unknown Europe: The mapping of the Northern countries by Olaus Magnus in 1539," (22. May 2013), in: Belgeo 3-4 (2008), last accessed 10. April 2021, p. 4.
[75] "The view from nowhere is the familiar cartographic view from above all points of the mapped terrain simultaneously—non-perspectival, and highly abstract." Reddleman 2018, p.8.
[76] The first Ptolemaic world map that included the northern European area was created around 1482 in Ulm, Germany. Yet, the area is difficult to identify for a modern audience. - William B. Ginsberg: *Printed Maps of Scandinavia and the Arctic 1482–1601*, New York 2006, p. 6.

this early example becomes even more impressive. Anchored in the tradition of the medieval mappamundi and strikingly different from later maps, as I will discuss shortly, the entire surface is covered with inscriptions, graphic patterns, creatures and people. Let us now consider the relationship between the distinct representations of the land and the ocean.

Creatures were commonly found on maps and reflected the overall fascination with them in the time period. Comparing the creatures of the sea with the creatures of the land we do find correlations. However, it seems as if Magnus considers the world above the surface to be an imitation of the one below.[77] This prospect was already found within Greek mythology which saw *Oceanus* as the origin of all life and nature. Peruvian, Mexican, North American, Indian and Scandinavian mythologies also saw the ocean as the creator of the Earth and as the origin of all life. Elisabeth Borgese considers this a universal and timeless mindset.[78] The monsters, which Magnus describes in his *Historia* as "products of a whimsical, haphazard Nature, proof of the playfulness of the wind and the waves, and of Nature herself" can be divided into three categories.[79] First, the natural, depicting regional animals of the sea, like the walrus, whales or rays which existence were supported by evidence of local fishermen. Second, preternatural creatures, taken from classical texts on natural history. These aimed to build a bridge between the Norwegian Sea and the Mediterranean, hence the classical heritage that was important during the Renaissance. Thirdly, the supernatural monster, for example the sea-pig northwest of the mythological island of Tile, was taken from other contemporary imagery reflecting on the opposition of religious shifts. While there is no unified interpretation of these creatures, they do tie a historical, political and natural sphere to the geographical depiction of the region, already creating a pre-capitalist version of the ocean-space as defined by Steinberg.[80]

The sea full of creatures is depicted as a wild zone, an unruly, uncultivated place. The proportions between the creatures and the seaman and their ships are overwhelming, evoking a sense of danger and the untamableness of the ocean. However, the sea is also

[77] In the preface of *De piscibus monstrosis* he describes: "Within its swirling waters the vast Ocean […] brings forth to view its various offspring, striking us not in their hugeness and similarity to the constellations, so much as with their menacing shapes, so that there appears to be nothing hidden in the heavens, on earth, in earth's bowels or preserved in its depths. Inside this broad expanse of fluid Ocean, which admits the seed of life with fertile growth, as sublime Nature gives birth." – Erling Sandmo: "Dwellers of waves: sea monsters, classical history, and religion in Olaus Magnus´s Carta Marina," in: *Norsk Geografisk Tidsskrift – Norwegian Journal of Geography*, vol. 74:4 (2020), p. 240.
[78] Elisabeth Mann Borgese: "Reflections on the Ocean," in: UNESCO Courier, vol. 44(8), 1995.
[79] Sandmo 2020, p. 241. – The *Historia de Gentibus Septentrionalibus* ("Description of the Northern Peoples") is an extensive commentary volume complementing the Carta Marina. The work is split into 22 books, was written by Olaus Magnus himself and first published in Rome in 1555. Sandmo 2020, p. 237.
[80] Sandmo 2020, p. 246-247.

illustrated as a "[…] metaphor for adventure of the human quest for knowledge […]" anchored in Greek philosophy.[81] The whole oceanic area is covered in irregular horizontal lines with some turning and spiralling into eddies. We see water rising and waves crashing against the ship bows. Most creatures break the surface of the water while other creatures, like the Narwhal towards the western edge of the map are about to be flushed by water. Being submerged in the sea, they exemplify the three-dimensionality and depth of the ocean. In some instances, we get a glimpse of the underwater sphere. The snake depicted off the south-western coast of the Norwegian peninsula dips in and out of the water as we still see its movement. The whole chaotic spectacle stands somewhat opposed to the land which is portrayed as a less rough and more civilized place.[82] Quaint houses and churches are scattered across the surface, representing villages while diligently placed tree lines give structure. The territories are clearly marked through emblems and names. Compass roses and directional vectors, which were used by sailors to find the heading to navigate their ships from one coast to another, are only found over the oceanic space, stopping as soon as the land starts. Steinberg interprets this dichotomy as the sea providing a space of connection versus the land as a civilizable space of distinct places.[83] The ocean was perceived as a place that, other than land, could not be territorialized, hence failed to be possessed or controlled by any state authority.

The idea of specific places, that could be enclosed or any kind of materiality that could pose an obstacle within the ocean, contradicted the idea of the ocean as a space of connectivity and limitless movement.[84] The ocean, first portrayed and thought of as untamed, full of wonders and inscribed within mythology, gets replaced by grids and numbers in the early seventeenth century with the increase in seafaring. Nature is eradicated in an approach to emphasize the ocean´s navigability which was codified by the Dutch jurist and philosopher Hugo Grotius in his fundamental book *Mare Liberum* in 1609. Here he establishes the terms for the freedom of navigation as a global right.[85] In the *World Map from Teixeira* (1630 Fig. 5) rhumb lines gained intensity, spanning the entire map, including

[81] Rock et al. 2020, p. 532-539.
[82] This becomes more evident in the neatly arranged fields in: Lucas Janszoon Waghenaer: *Map of the English coast from the Isle of Wight to Dover*, in: *De Spieghel de Zeevaerdt*, 1584, James Ford Bell Library, University of Minnesota, Minneapolis.
[83] Steinberg 2001, p. 99-109. However, Steinberg points out, that many maps, including the *Carta Marina*, which displayed compass roses and rhumb lines were not useful for navigation. Steinberg 2009, p. 482-484. And: Miekkavaara 2008, p. 4.
[84] Steinberg 2009, p. 481 -483.
[85] Hessler 2018, p. 231-236. - I will discuss the book *Mare Liberum*, which was significant for the development of the law of the sea and fundamental for the UNCLOS, again in chapter IV.1.

the land sections. These again did not serve any navigational purpose, but rather emphasized the perception of the ocean as an easily traversable space and they were used as symbols, representing the navigability of the waters. In the second half of the seventeenth century the charting of commercial routes took shape. Rhumb lines were replaced by marked specific locations, connected with lines, which turned the ocean into a space of generic commerce routes, (1708, Figure 5) "a putatively placeless in-between space."[86] The graphic features of these lines represent friction-free travel similar to the lines of today´s transit system map.[87] Beneath the lines the ocean becomes simply the surface of blank parchment paper the map is printed on. It was now an empty arena that was freely and easily traversable and navigable.

The ocean-space completely became a counterpart to the terrestrial by the beginning of the eighteenth century. All of the remaining materiality that was slowly vanishing in the seventeenth century was eradicated and replaced by an "abstract, mathematical, and materially empty space of points that can be crossed at will," marked by the ecliptic line.[88] This cartographic representation of the ocean-space has remained and can be found in modern maps, like *Google Maps* (2021, Figure 6). Google maps, one of the most used map tools today, shows an ocean-space that is only identifiable through its blue indexicality, a unified flat plane. Zooming in close, darker blue broken lines that connect harbors appear and evoke the impression that travel along these lines is smooth and eventless. As technological navigation advanced, seafaring became more predictable and sea monsters as warning signs (*monstrum* is etymologically linked to the verb *monstrare,* meaning to show or to warn) on maps became decorative or obsolete.[89] The ocean evolved into a background, annihilated of its palpability, movement and its most significant dimension, the depth. It is a loss of not just the ominous mythical but also the natural. Additionally, the descriptions of travel across the ocean in the second half of the mercantilist era did not display nature in a significant way and the sea became interpreted as an unremarkable space.[90]

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[86] Steinberg 2009, p. 482. – For example, the route to the East Indies. In the eighteenth-century cartographers also started marking the routes of famous historic explorers such as Columbus or Magellan and introduced an historic dimension into the oceanic mobility frame.
[87] Steinberg 2009, p. 479-480.
[88] Steinberg 2009, p. 485. – The ecliptic (or zodiac) line, again hints at the navigability of the ocean without actually enabling navigation.
[89] Sandmo 2020, p. 240.
[90] Steinberg 2001, p. 99-109. – I believe this could possibly be linked to the extensive overexploitation of marine resources, foremost whales, in the seventeenth century which drove several species to near extinction, which have not recovered to date. Also, boats had to go further out on the sea to catch whales and therefore did not bring them back to land stations but rather processed them on board. Louwrens Hacquebord: "Three Centuries of Whaling and Walrus Hunting in Svalbard and its Impact on the Arctic Ecosystem," in: *Environment and History* 7, no. 2, May, 2001, p. 169- 185.

Mercantilist era maps transformed the ocean from a wild, terrifying place where societies interacted with nature to an empty friction free surface. This shift in representation of the ocean-space is, as Steinberg notes, the beginning of its spatial construction which dominates the following centuries of industrial capitalism. The ocean-space became a place of control, not over itself but over channeled routes of circulation which enabled the wealth of territorial nations.[91] Furthermore, revolutions in sea navigation within world history played a major role shaping todays societies and "the modernist mastery of nature."[92] People were able to trade, explore and colonize across the oceans. Maps created for and as a result of these expeditions were essential because, "to discern assets as exploitable, they needed to be charted, analyzed, and categorized."[93] This brief historical overview was intended to show how concepts of the ocean evolved and became the ocean-space that the participants of the Nike endeavor took for granted. Everyone had hoped for the friction free, eventless ocean because that was the concept developed through representation since the sixteenth century.

Cartographic Materialization

In the twentieth and twenty-first centuries the view of the ocean as a fundamentally external place outside of state-societies has become widely accepted. Modern maps rarely challenge this view or mark political divisions in the ocean such as sovereign territorial waters, EEZ´s or the high seas. This widening crevasse between the oceanic and the terrestrial realm permeates modern society where the ocean has become a space of Romanticism.[94] It can appear that only relatively few directly depend on the ocean for their everyday existence since most people have become far detached from it. This opposes the actual dependence of contemporary humanity on the ocean. The resources provided by the ocean-space are vital for our world system. Half of the oxygen we breath is produced by the ocean. We depend on fish catch, world cargo fleets, offshore petroleum, and raw materials for industrial, pharmaceutical and cosmetic uses. The economic value of oceanic resources is increasing with its assets valued at 24 trillion US Dollars, yet its value to our planet is incalculable.[95] Our abstract modern capitalist system has slowly transformed the socially and materially

[91] Steinberg 2001, p. 99-109.
[92] Trevor Paglen: "Experimental Geography: From Cultural Production to the Production of Space," in: Emily E Scott, and Kirsten J. Swenson, (ed.): *Critical Landscapes: Art Space, Politics*, Berkley 2015, p. 34.
[93] Ibid.
[94] Steinberg 2009, p. 480-488.
[95] Steinberg 2001, p. 8-11. – The Gross Marine Product (equivalent to the GDP) is at least 2,5 trillion US Dollar. Ove Hoegh-Guldberg, et al.: *Reviving the Ocean Economy: the case for action*, Geneva 2015, p. 7.

real ocean into a crowded place, but one out of sight and invisible for most of society. We have seen how maps played a pivotal role in this change as "[…] the flattening of the land into a map turned walking the land from a way of living into little more than a symbol. The peripeteia of one foot following another across the contours of the terrain became merely a line on the map."[96] Maps can be accused of the abstraction and "idealized annihilation"[97] of real space through extreme simplification, enabling the miscomprehension of the ocean-space as a void. I would argue this has accelerated within the age of Google maps because the advances in technology and novel imagery devices which would actually allow for a better and deeper understanding of the ocean-space have been opposed. The ocean remains reduced to a surface of limitless mobility, which fails to resemble the physical experience of moving across or through it.[98]

The brief historic overview in the previous section posited that the rising utilization of the oceans and the reductive cartographic illustrations of it developed in unison. This is the reason Territorial Agency utilize new modes of visualization within the cartographic practice to raise consciousness and enable a de-codification of the ocean-space. Indeed, no map should be entitled to the name of universal or *World* unless they account for the ocean at least equally to land.[99] In *Continental Shelf* (Figure 1), Rönnskog and Palmesino fill the void the ocean has become with the anthropogenic web humans have spun across its x- and y-axis. The elaboration of the ocean-space within *Continental Shelf* disrupts the representational dilemma between the natural and the cultural oceanic dimension in the traditional cartographic view. The cardinal points are reversed, demanding our mind to align anew in order to find orientation. Land and ocean trade roles, topographic and graphic elements are exclusively found within the oceanic area. The ocean is filled with materiality. It is displayed as a buzzing space full of flashing strokes and sizzling patches. While this representation of the ocean and north-western Europe only displays the transport and oil licensing of the area already it creates a space that appears overwhelmingly crowded. The abstract rendering of the shipping industry in colours, shapes and textures that is transferred onto the two-dimensional interface represents the materialistic and socially real capitalist endeavour of transporting roughly ninety percent of globally shipped materials in order to

[96] David Graham Burnett: *Masters of all they surveyed*, Chicago 2000, p. 171.
[97] Ibid.
[98] A similar argument could possibly be made for the earth´s materiality, that becomes more removed and annihilated through the rapid increase in aviation or for example the abstraction of space in subway maps.
[99] Ellen C. Semple: *Influences of Geographic Environment*, New York 1911, p. 294. – Semple raises the issue in relation to universal history. Yet I believe it is equally applicable in relation to maps themselves.

fuel supply chains and international trade demands. The commercial routes we encountered in seventeenth century maps have developed into massive maritime pathways which still continue to treat the physical nature of the ocean as a backdrop. Territorial Agency visualize the traces each vessel leaves as it interacts with the ocean.[100] Rönnskog and Palmesino present an ocean-space much closer to the early *Carta Marina* then the later examples, like the *World Map from Teixeira* (1630, Figure 4) or *Google Maps* (2021, Figure 6). The ocean-space is no longer shown as an empty void without obstacles and natural confrontations. The creatures, that were instrumentalized to tie a historical, political and natural sphere to the geographical depiction of the region are replaced by the contemporary technosphere that humans have created. Within this cartographic view of today´s ocean-space, it is the human who poses an obstacle to the free movement on its surface. The ocean has been built up and treated much like the terrestrial space by pushing its physical form into the background and therefore completely opening it up for exploitation. The cartographic depictions described above continue to enable the production of human-made infrastructure, oil platforms, windfarms, wind-pylons, buoys and the massive amounts of ships that are clustered on the ocean´s surface and increasingly on the seabed as well.

Continental Shelf combines the strengths from the different eras of cartography. The visual materialization of the *Carta Marina* is fused with the conceptual notion of the mappamundi. The annual time-lapse of aggregated shipping activity materializes sea routes and reflects an unfolding of events and narratives. The element of time was removed from maps in the middle ages in order to evoke a feeling of present tense, but here it is re-introduced to communicate the present.[101] This becomes even more evident when we consult the trajectory image (Figure 2). The information displayed illuminates the social, political and capitalist web human societies have spun. Like a history book, Rönnskog and Palmesino unravel the many narratives and experiences that engulf the ocean in four dimensions. The stories of sunken shipwrecks, the risks of dumped World War I and II munition deteriorating on the ocean floor or the capitalist chain of dredging or trawling are bound and imagined together.

We have seen how cartographers eradicated materiality and the elements that could communicate the sense of distinct location that we found in abundance in the *Carta Marina*.

[100] Impacts of shipping on the marine environment: oil pollution, air pollutants, and greenhouse gas emissions; the risk of bioinvasions through ballast water discharges; ship strikes with marine megafauna; and acoustic pollution. Scammacca del Murgo / Zyman 2020, p. 30.
[101] Steinberg 2009, p. 474-477.

Rönnskog and Palmesino reintroduce a new materiality to the ocean-space, not the expected natural form but instead by visualizing the traces of the system that consume it. Societies have utilized the ocean as a resource provider, first by binding and governing new remote areas to exploit resources and later as a resource container itself. Oceanic activity expands exponentially. For example, the first offshore commercial petroleum well was drilled in 1937. Presently, nearly a third of fossil fuels come from offshore drilling. Oil and gas extraction as well as the novel industry of deep-sea mining are rapidly becoming a mega-industry.[102] The roots of this extractive capitalism can be traced back to the 1500s and the rise of colonial imperialism as mineral resources were converted into commodities at a market value, within a market structure on a global scale.[103] The occurrence of natural resources in the ocean today is driving the territorialization and regulation of the sea:

"The main development of the law of the sea, […], drew on a geological basis, viewing the continental shelf as a submarine prolongation of the land territory of coastal states. The key argument here was that mineral (fossil) resources of that submarine area belong geologically to the same poll as those resources found on land that forms part of the same continental mass."[104]

This development continues to be excluded from maps and as already mentioned, only a very few modern *political* maps show the juridical divisions of the ocean space.[105] The oscillation of the territorial and the oceanic in terms of resources is in opposition to the key argument of the above citation and yet maps continue to emphasize their distinct segregation. The *Carta Marina* does not show any artificial boarder line, yet land and water are still similar in their representation, clearly separated and with the land bound to one mass. Teixeira presented a very simplified and clear outline of the land, highlighted by the writing on the landlocked boarder. Taking a look at Google maps (2021, Figure 6) we again see the clear difference between land and water, this time accentuated through the use of representative colours, blue for the ocean, and shades of green for the land with land boarders drawn in bold dark grey lines. The oceans, which do not display their ownership, are still entrenched in the traditional stylistic manner and are sharply separated from land while the national waters and the exclusive rights over exploitable resources within the seabed have become vital to and are connected with, state-systems and societies.[106]

[102] Scammacca del Murgo / Zyman 2020, p. 35-37. – Armin Linke undertakes a sustained visual analysis in the many facets of deep-sea mining and the uncertainties that come with it. Hessler 2019, 23-65.
[103] Scammacca del Murgo/ Zyman 2020, p. 35-37.
[104] Hessler 2018, p. 232-233.
[105] Steinberg 2009, p. 487-488.
[106] Scammacca del Murgo / Zyman 2020, p. 31-33.

Continental Shelf openly marks all territorial boarders extending into the sea through simple nondescript lines. The boarder between land and ocean is not marked. Territorial Agency does outline the actual national boarders which lie in the sea, yet these become overshadowed by the accumulation of shipping data which glowingly trace the landmasses. Beyond that, ownership is not just marked by territorial state lines within the ocean space but also through distinct oil licensing areas. However, if we were to remove all human traces from the image, we would be left with one single area and we would not be able to clearly identify land and sea or where water hits land. This ambiguous zone is marked through a "liminal line where the ground ends: so sharp on cartographic maps, so porous, indefinite, and expanded when perceived through the human body."[107] This aligns with feminist theories of Stacey Alaimo and Astrid Neinmanis. The body, like the ocean is not a closed container but porous and distributing material flows that connect to global elements.[108] We make a clear differentiation, a permanent line in maps and yet this does not exist in reality. Daily tidal movements, but also longer-term global sea level rise is making that especially clear. The cartographic image of an aerial view over Denmark and the northern edge of Germany (Figure 7) from *Oceans in Transformation* shows different scenarios of sea level rise from 1m, 5m to 9m based on varying carbon emissions.[109] The different hues of blue tell the story relative to different emission scenarios. The future of the coastal zones, which have experienced massive urban expansion over recent decades, are uncertain and at risk. The zone where the ocean and human architecture meets has been built up as stable and undynamic to align with modern societal needs. The solid line found in cartographic depictions has become internalized and taken as fact. Territorial Agency show large parts of Denmark, especially the western coast, but all the way inward to Germany with Hamburg lying just left of the middle axis of the image on the bottom edge, will be threatened. These vulnerable urban spaces will lead to massive shifts and movements as whole cities will disappear under water. Territoriality on the coasts and in the sea has been established as on land, yet the two spheres are different, oscillating and in flux. The water's movements cannot be contained. The artificiality and rigidity of these lines and swaths becomes obvious.

[107] Scammacca del Murgo / Zyman 2020, p. 141.
[108] Jue 2020, p. 19.
[109] As a guiding parameter, the 2° C limit for global warming imposed by the Paris Climate Agreement could lead to a sea level rise of approximately 5,5 meters by the end of this century. Scammacca del Murgo / Zyman 2020, p. 15-17.

Territorial Agencie´s work grapples with the question, if this distinction between a fixed land and a constantly moving ocean can be undone.[110]

Continental Shelf continues to disrupt the cartographic tradition by inverting the visual relation of land and sea and exposing the otherwise hidden, artificial-symbiotic, composition of the ocean-space. It materializes the ocean's dynamics as a space within society. This social and spatial construction of the ocean has taken shape within the mercantile era. Through maps, the ocean developed as a traversable and predictable surface and was turned into an idealized static background in order to emphasize speed and efficiency.[111] Territorial Agency used data to visualize this entire social construction with the ocean as a resource provider, a transport surface and as a *force-field*.[112]

IV. VIEWPOINTS

"For the first time in my life I saw the horizon as a curved line. It was accentuated by a thin seam of dark blue light – our atmosphere. Obviously, this was not the ocean of air I had been told so many times in my life. I was terrified by its fragile appearance."[113] This was how the astronaut Ulf Merbold felt after his visits to outer space. He described a radical shift in perspective, how seeing the planet Earth, in its entirety, was a deeply profound experience. When we compare Merbold's visual encounter from space to the previous analysis of cartographic visualizations of the ocean they both reveal how our conceptualization of the relationship between our-self and our environment change depending on our point of view.[114] New viewpoints have continued to change the way we see. These evolved from our basic perspective, the naked eye with our feet planted on earth, to the development of optical devices, like the telescope in the early seventeenth century.[115] Later that century the first balloon flights introduced the perspective of hovering at a distance above the ground and another hundred years after that the first aerial photographs began to make this view accessible to all. Finally, in 1946 the first orbital photograph to be taken during the U.S.

[110] John Palmesino, and Ann-Sofi Rönnskog: "When Above," (20. May 2020), from: *e-flux architecture,* URL: https://www.e-flux.com/architecture/oceans/331872/when-above/.
[111] Hessler 2018, p. 219-224.
[112] This aligns with what Steinberg has identified as the three perspectives of human-marine interactions. Steinberg 2001, p. 11.
[113] Piers Bizony (ed.): *NASA Space Shuttle. 40th Anniversary,* Beverly, MA 2021, p. 37.
[114] A viewpoint is defined as "a point of view on space, a particular position of the body and the gaze." Reddleman 2018, p. 7.
[115] Hessler 2019, p. 73.

launched V-2 flight shifted our conception even further. However, the last visual frontier is yet to be optically discovered. Sealed by a reflective surface, the oceanic milieu, down to the seabed, has yet to be given conspicuity through progressing imaging methods.[116]

In the previous chapter I discussed the cartographic elements of *Continental Shelf* and how the work can be interpreted as a radical break from generic maps. Within this chapter I will focus on the physicality of the four-dimensional ocean-space we experience in *Continental Shelf* and how technologies evolved enabling new viewpoints that rendered possible the assemblage of the multiple visual layers. I would like to follow the structure proposed by Shin Yamashiro in her analysis of oceanic literature. She divides the literature into three topographical orientations, by the sea, on [above] the sea and beneath the sea.[117] I will connect these viewpoints with the history of seeing and the technological advances in seeing machines, again taking a longue dureé view.[118] The analysis will be guided by the words of marine biologist Rachel Carson: "Who has known the ocean? Neither you nor I, with our earth-bound senses, […]" She goes on: "To sense this world of waters known to the creatures of the sea we must shed our human perceptions of length and breadth and time and place and enter vicariously into a universe of all-pervading water."[119]

By the Ocean / Horizontality

By the Ocean, describes the locality where humans are in their native conditions, with their feet on the ground and their bodies exposed to the gravitational conditions of being on dry land. It is where humans can experience the ocean "[…]in its changing aspects, its great rhythms, its movement, its infinite and constant reflections, its smell"[120] and let their gaze travel across the surface to meet the distant horizon, the demarcation line between the ocean

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[116] Ongoing projects like *Seabed 2030* aim to confront this issue and produce a definitive map of the world ocean floor. In February 2018, the General Bathymetric Chart of the Oceans (GEBCO) began a collaboration with the Nippon Foundation of Japan with the aim to "bring together all available bathymetric data to produce the definitive map of the world ocean floor by 2030 and make it available to all." The product will be "the most authoritative publicly-available bathymetry of the world´s oceans." Oceans in Transformation takes most of its bathymetric information from the GEBCO. Scammacca del Murgo / Zyman 2020, p. 31-33. – Seabed2030: "About the Seabed 2030 Project," from: *Seabed 2030*, (n.d.), URL: https://seabed2030.org/about-us, last accessed 10. April 2020. – The project Google Oceans tries to offer an all-around view similarly to Google Streets. Further see Footnote 162.

[117] Shin Yamashiro: *American Sea Literature. Seascapes, Beach Narratives and Underwater Explorations,* New York 2014, p. 5. – Yamashiro refers to literature *on the sea*, in the sense of literature which is *about* the sea. I will however stay within the geographical perspective and replace *on* the sea, with *above the sea*, meaning the viewpoint from above the surface of the water.

[118] I will apply a longue durée view as it was defined by Fernand Braudel, to recognize the roots of the viewpoints, which inform depictions of the ocean today.

[119] Hessler 2018, p. 157-162.

[120] Barbara Wright: "The Sea and Seeing," in: *European Review,* vol. 8:1 (2000), p. 101 (p. 105, Footnote 17).

and the air. Since the seventeenth century this outward view, *by the Ocean,* has become a popular subject for many artists. Seascapes, as landscapes, enabled and illustrated the reflection and quarrel of visual engagement with particular historical theories and concepts.[121] Since the Renaissance, the idea of nature, as a functioning and coherent system subject to constant change, yet maintained in integrity, became predominant and the premise for the development of the genre of landscape painting.[122] The military and mercantile power of the Dutch Republic enabled rapid technical advances in naval architecture and allowed for the ocean to be seized as an independent pictorial genre. One of the pioneers forming the genre was Hendrik Cornelisz Vroom.[123] In *the Return to Amsterdam of the Second Expedition to the East Indies* (1599, Figure 80), we see a panoramic view from the coast looking across the surface of the calm vitreous sea dotted with ships of different sizes and ending in the distant horizon line. The detailed depiction of the ships builds the core of the image, emphasizing the prevailing idea that the ocean was conquered by the advances in the naval power of man. The sea became an allegory for Empire, merely the stage for heroic sea battles, great expeditions and national parades displaying the strong identity of the Dutch as a seafaring nation.[124]

Willem van de Velde (II.) (1633-1707) offers a similar scenario in *Dutch Ships in a Calm Sea* (1665, Figure 9). The grandeur of the vessels distributed far into the distance bring the focus out to the horizon. The physicality of the water, a weltering surface of stylized smoothened waves, is again menial. What appears to be dolphin fins peeking out of the water in the foreground, feel awkwardly placed and forced rather than natural and playful. These descriptive and topographic modes conceptually align with the abstracted and generalized display of the ocean we saw in mercantile era maps. Both paintings present the ocean as a link for the territorialization of distant land, hence an arena for the exertion and battle of state power.[125] Grotius first introduced and formalized the concept of the freedom of the sea,

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[121] Ronald Rees: "Constable, Turner, and Views of Nature in the Nineteenth Century," in: *The Geographical Review,* vol. 72:3 (1982), p. 253-269.
[122] Barbara Eschenburg: *Naturbilder. Weltbilder. Landschaftsmalerei und Naturphilosophie von Jan van Eyck bis Paul Klee*, Berlin 2019, p. 9, 215-216.
[123] Other Dutch artists forming the genre are Jan Porcellis (1585-1632), or Jan van Goyen (1596-1656) who as well as van de Velde incorporated common every-day scenes into their seascapes. - French and British naval paintings were ordered form Dutch painters in the seventeenth century as there was no tradition yet within their own countries. Martin Faass et al.: *Seestücke. Von Casper David Friedrich bis Emil Nolde,* exh. cat., Hamburg, Hamburger Kunsthalle, 24. June – 11. September 2005, München 2005, p. 9-15.
[124] Flags in the painting played a pivotal role and represented the territorialization of land fought in the ocean, not the territorialization of the sea itself. More on this: David Onnekink: "The Language of the Sea: Flags and Identities in Early Modern Dutch Marine Painting," in: *Early Modern Low Countries*,4:1 (2020), p. 1-34.
[125] Sekula, Allan: *Fish Story*, Düsseldorf 1995, p. 43-44. - Steinberg 2009, p. 98-109.

as a key principle in the treaties *Mare liberum,* that I briefly mentioned above, as a way to secure the right for free international trade for his country.[126]

"The air belongs to this class of things for two reasons. First it is not suspectable of occupation; and second it´s common use is destined for all men. For the same reason the sea is common to all, because it is so limitless that it cannot become a possession of anyone, and because it is adapted for the use of all, whether we consider it from the point of view of navigation or of fisheries."[127]

Within this excerpt two main ideas are presented based on Grotius equalization of water and air. One, as discussed in the previous chapter, the ocean as a place that failed to be thought of as possessable in order to enable free movement across it to all and two, the imagination of the ocean as an infinite resource and space which, I propose, finds it representation in the horizon line. The later will be the focus of the following analysis.

The horizon line is conceptualized as the "interception of sight with the surface of the planet."[128] It provides the viewer with a sense of orientation, yet it is always in flux, it transforms and moves with us. The horizon above water allowed seafarers to determine their location within their surroundings, their map and their intended route. This process was refined by the use of instruments and eventually with the invention of an artificial horizon.[129] The use of the horizon was not just a key element in navigation but became a significant element in the construction of the linear perspective "both in geopolitical territorial expansion and in art."[130] We were provided with linear perspective in the fifteenth century which as Lepenies argues "marked the beginning of a decisive cultural shift with lasting consequences that changed our thinking, our behavior and our approach to the physical world." He refers to this turning point in history as the *Anthroposeen,* that is the psychological prerequisite for humans to develop into a dominating force on the planet, positioning themselves above nature, which in turn leads to the Anthropocene.[131]

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[126] The Portuguese and Spanish had claimed exclusive rights over eastern trading routes in the Treaty of Tordesillas (1594). Grotius contradicted the treaty, arguing the sea could not be possessed, to secure the Dutch "the right which belongs to the Dutch to take part in the East Indian Trade" foremost favoring the Dutch East India Company. Although other treaties like *Mare Clausum* (1635) by John Selden again argued for the territorialization of sea, Grotius draft would largely prevail to finally build the foundation of the UNCLOS (1982). Hessler, 2019 p. 133. - Steinberg 2009, p. 88- 98.

[127] Hugo Grotius, Hugo: *The Freedom of the Seas, or the Right Which Belongs to the Dutch to take Part in the East Indian Trade (1608),* New York 1916, p. 28.

[128] Palmesino / Rönnskog 2020.

[129] Bräunert / Malone 2016, p. 72.

[130] Hessler 2019, p. 80.

[131] Philipp Lepenies: The Anthroposeen: "The Invention of Linear Perspective as a Decisive Moment in the Emergence of a Geological Age of Mankind," in: European Review, vol. 26:4 (2018), p. 584-586. There is no consent within the sciences about the beginning or catalyst for the Anthropocene. Theories vary between the later eighteenth century when first chemical circulations changed to the middle of the twentieth century and the testing of the first atomic bomb.

The physical limit created by the horizon line acted as a symbol for the imagined infinity that lay beyond it. The painted space we see in Vroom or van de Velde´s seascape was materially restricted by the cropping of the canvas on the sides and by the horizon within the painting, but these were limits that alluded to the space behind them. Everything within our sight, on the viewers *side* of the horizon, could be made visible. The horizon line represented the demarcation between the one who is included and the one who is excluded, what can be owned and what is beyond human reach and the known and the unknown ocean-space that laid beyond it. A space believed to stretch on endlessly while it moved forever into the distance.[132] This further enabled the imagined narrative of spatial infinity, which in turn enabled the idea of the ocean as an inexhaustible container of resources as it was formalized by Grotius and reinforced by the constant flow of goods coming in from the horizon.[133]

Svetlana Alpers identifies the continuities between contemporaneous artistic and cartographic practices in early Dutch landscapes as the *mapping impulse*. My analysis thus far, I believe, shows how this applies for the Dutch seascape as well. The abstraction of the surface in maps and seascapes enabled the financial and territorial interests in the land that laid beyond them.[134] "Like the mappers, [Dutch painters] made additive works […] like a map, a surface on which is laid out an assemblage of the world."[135] The foundation of the seascape laid out by the Dutch was adapted by many artists throughout the following centuries. Romantics like Joseph Mallord William Turner (1775-1851) in England or Casper David Friedrich (1774-1840) in Germany incorporated a sustained analysis of the sea in their work.[136] In the dynamic composition *Snow Storm* (1842), Turner embraced the advances of the industrial revolution, the study of modern machinery and the sublime. Seafaring subjects were surrendered to the perfect and heightened place of the sublime, the open ended rough

[132] Rönnskog / Palmesino 2020.
[133] Hessler 2019, p. 133-134. - Colonial imperialism since the fifteenth century enabled the development of natural resources (sugar cane, silver, timber, rubber, and petroleum) into globally tradable commodities, which built a seemingly unlimited constant flow of goods, people and capital to come ashore from the open ocean. Scammacca del Murgo/ Zyman, 2020, p. 35-36 and Hessler 2019, p. 80-82. – Also, Grotius codified the inexhaustibility of the ocean as followed: "It is manifest that if many hunt on the land or fish in a river, the forest will soon be without game and the river without fishes, which is not so in the sea." Freedom of fishing is still today codified in article 87 of the UNCLOS, bound to regulations but on the groundwork of Grotius. Grotius 1916, p. 57. - The concept of infinitude also refers to the ocean space itself as a vast arena for all to engage in unlimited trade and navigation based on the idea "They could not forbid navigation, whereby the sea loses nothing." Reminding on Footnote 100, this is factually false.
[134] Svetlana Alpers: *The Art of Describing: Dutch Art in the Seventeenth Century*, Chicago 1983, p.119-168.
[135] Alpers 1983, p.122.
[136] Other early artists staying within the tradition of the Dutch seascape are Peter Monamy (1670-1749), Samual Scott (1702-1772) and Johan Christian Dahl (1788-1857).

and deep ocean, which evoked obsessive fears in Turner´s viewers.[137] The blurring of the horizon fuses and confuses the elements, water and sky, by obscuring their boundaries. The boundless elicits infinity which fuels the sublime as Edmund Burke (1729-1797) writes, "infinity has a tendency to fill the mind with that sort of delightful horror, which is the most genuine effect, and truest test of the sublime."[138] Another example of the adaption of the sublime as something beyond human reach can be found in Friedrich´s seascape *The Monk by the Sea* (1808-1810). The viewer is guided across the serene surface of the ocean to the poetically charged horizon that vanishes in the haze and becomes one with the foreground allowing the viewer to get lost in yearning and arousing an emotional reaction. The gaze across the sea becomes transcendent, a metaphor for the individual's relation to the infinite, the eternal.[139]

The romantic and metaphysical infinity of Turner and Friedrich internalized, transformed and abstracted the materialistic infinity of the seventeenth century Dutch seascape. This culmination finds it´s articulation in the realization of the horizon as the interface between the sky and the ocean, the known and the unknown and plays a fundamental role in the conceptualization of the ocean-space. Here I would like to connect with contemporary artistic positions on the sea. Gerhard Richter´s (1932) photographically painted serene seascapes of water, sky and horizon are still anchored in this conception of the sublime, corresponding with Burke and standing in proximity to Friedrich´s romanticism.[140] Richter´s *Seascape (Cloudy)* (1969) depicts his yearning and the attempt to grasp the chaos within nature and explore perfection. He often fuses the sky and the sea from different photographs to show the "beautiful or nostalgic, with a Romantic or classical suggestion of lost Paradises," yet, I believe, unconsciously reinforcing a juxtaposition of man and nature shaped by (visual) human domination.[141] Hiroshi Sugimoto carries on these

[137] Rees 1982, p. 253-269. - The sublime formed as a counterpart to the evolving perception of control and overview over nature. Hessler 2019, p. 80-82. - Burke further sees depth to be the extension causing the greatest effect in forming a sublime. Also, a rugged and broken surface seems to evoke stronger emotions than a smooth polished plane. Edmund Burke: *A Philosophical Inquiry into the Origin of our Ideas of the Sublime and Beautiful*, London 1823, p. 97-99.
[138] Burke 1823, p. 99-100.
[139] Eschenburg 2019, p. 172-182.
[140] Gerhard Richter: *Text, Writings, Interviews and Letters 1961-2007*, London 2009, p. 348. And: Heike Biedermann et al.: *From Caspar David Friedrich to Gerhard Richter. German Paintings from Dresden at the J. Paul Getty Museum, Los Angeles*, Köln 2006.
[141] Richter 2007, p. 158 (Notes 1986). The majority of Richter´s seascapes were painted between 1969 and 1975. The time saw the first "European nature conservancy year" (1970) and following the non-parliamentary ecological movement in the 1960´s institutional initiatives began to form. UNESCO and the UN founded programs and publications started to appear focusing on the relation between humans and their environment, while pushing for its preservation and protection. Daniela Hahn / Erika Fischer-Lichte, (eds.): *Ökologie und die Künste*, Paderborn 2015, p. 9-26.

traditions as well. His seascape brings our gaze over the surface of the ocean leading us into the dissolving horizon, which is defined by the sky rather than the depth of the ocean. In the large-scale photograph *Time Exposed #364 Bakio Bay of Biscay* (1990) we are taken across the calm surface of the ocean humming in smooth hues of grey representing the subtle play of light on the water. For Sugimoto the view over the sea arouses a sense of familiarity, of visiting his ancestors. The nineteenth century-style large-format camera, his long exposure and way of blurring waves or passing clouds, give his images a timeless appearance. He interprets it as an eternal view that humans have repeatedly experienced standing in the same place as his camera today.[142] Richter and Sugimoto´s ocean again aligns with the previous cartographic depiction, completely emptied and devoid of anthropogenic traces. It conversely appears that the more societies progressed into the ocean-space and claimed sovereignty, the more it became rendered merely as a surface, something to gaze across, an arena for psychological and emotional projection. It is conceptualized as a place away from industrializing societies where primordial and romantic ideals of nature can still be experienced.[143] As Paul Virilio points out, "The open sea was to compensate for every social, religious and moral constraint, for every political and economic oppression, even for the physical laws due to the earth´s gravity, to continental crampedness."[144]

As concepts and views of nature have changed over time the view across the ocean has remained remarkably stable. Each of the artistic positions I mentioned gave the assumption they could answer Carson´s rhetorical question, "Who has known the ocean?" However, artists perpetuated the sea in anthropocentric terms, without giving it conspicuity in itself, but rather appropriated as a stage for human endeavor.[145] The sea was always mediated through the human perspective, *by the ocean,* and defined by the same stereotypes, objections and terrestrial biases we encountered in the cartographic depictions. Most importantly, once the ocean was freed from the mythological sphere, it was perceived as a stable, confined space of the Holocene.[146] A blank surface for human reflection and

[142] Zweitens 2012, p. 6-9.
[143] Hessler 2019, p. 132-135.
[144] Paul Virilio: *Speed and Politics,* New York 2006, p. 65.
[145] As already stated, this is a selective history of the seascape focusing on major artistic positions. Individual artistic positions for example within the Land Art and Landscape Art engaged critically with the ocean removed from the seventeenth century visual tradition.
[146] Hessler 2018, p. 232. - A similar development can be observed in the skies. The instant visual experience of clouds has always been the same but the meaning, conception and knowledge about them has undergone extensive change. The sky evolved from a mythological sphere inhabited by emotional gods through the advancing scientific opening and meteorology to today´s capitalistic infiltration and human occupation in space stations.

metamorphosis, abstract yet infinite in its emotional and material scope with the horizon as the main element in which the topics unfold. This should not be dismissed as wrong, simply incomplete. As Melody Jue states: "[…] I would like to think of it as a situated perspective that responds to the fact that we live on land, are bound by gravity when we walk, and experience daily life as immersion in invisible air rather than water."[147] Sekula has identified that visual depictions of the sea, even today, conform to models established by Dutch marine painting in the seventeenth century.[148] As I have briefly shown, the contemporary works of Richter and Sugimoto continue the legacy of romantic ideas of infinity and the sublime. These concepts can now be found throughout visual popular culture and they continue to fascinate and shape viewers by perpetuating the oceans crisis of visibility, oceanographer Carl Safina describes, "[…] the Ocean could be empty and still look the same. […]as the Ocean is being emptied, and as the Ocean is dying, the surface looks the same, the waves look the same."[149]

The traditional seascape is, as Sekula remarks "redundant and overcoded," and has culturally become a vast reservoir of anachronisms reproduced and multiplied in contemporary contexts.[150] It remains tied to seventeenth century stereotypes. Ludwig Wittgenstein identified, that to imagine a language is to imagine a form of life. If we agree with his observation, and transfer it to a visual level, it becomes clear how deeply rooted the seascape is with the terrestrial perspective, engrained with horizontal movement and gravity rather than volumetric movement and buoyancy.[151] Therefore, I return to Merbold´s extraterrestrial experience. The radical shift of perspective, away from gravity and earth-bound senses was a profound experience that raised a new set of malleable questions and ideas that Frank White refers to as the *overview effect*.[152] Rönnskog and Palmesino develop this view of the ocean by evoking the cartographic perspective, but one recorded through seeing machines in the sky and through an angulate viewpoint emphasizing the three-dimensional distribution of space that moves past the simplifying view of *nowhere*. This perspective is also further detached from the rooted historical visual tradition of the seascape. As I have shown above, the horizon was a key element in the composition of the seascapes

[147] Jue 2020, p. 11.
[148] Sekula 1995, p. 43. In his writing and image-based work *Fish Story* (1995), Allan Sekula traces the development of ocean depictions from the pre-Romantic area, which saw an increase in trade, towards the sublime.
[149] Carl Safina (Cast): *Mission Blue,* Documentary/Drama, Insurgent Media 2014, 135 min, Color, English.
[150] Sekula 1995, p. 51.
[151] Jue 2020, 1-6.
[152] Frank White: *The Overview Effect: Space Exploration and Human Evolution,* Reston, VA 2014.

fostering particular historical theories and concepts. In Territorial Agency´s *Continental Shelf* we fail to find a horizon line. The concept of infinity which transformed the ocean into a limitless container for human use is abandoned.

Above the Ocean / Verticality

The *Blue Marble: The View from Apollo 17* (Figure 10) photograph taken from Apollo 17 in 1972 quickly became iconic because of how radical and revolutionary the perspective was. The image shows Earth´s totality, vitality and fragility in color, and reproduces it as an icon, index, and symbol of unity.[153] I do not want to go too far into detail on the *Earth from Space* point of view, as this is extensively discussed elsewhere, but instead I will focus on two key elements brought into focus by the image.[154] First is the concept of infinity when applied to the planet Earth, in particular the belief that the ocean and its resources are infinite appears impossible considering the finitude of the globule. Second is the immense span of the ocean across the globe. It takes up over 71 percent of its surface, stands in opposition to our human perception of living on planet *Earth.* This perception has been continuously reinforced in history. The fifteenth century provided us with the development of linear perspective which, as Philipp Lepenies argues "marked the beginning of a decisive cultural shift with lasting consequences that changed our thinking, our behavior and our approach to the physical world."[155] This leads to the conclusion, that through our history of seeing, the terrestrial bias is inherent and fueled not by what exists, but by where we stand. This becomes clear looking at the *First View of Earth from Moon* (1966, Figure 11) taken by the unmanned Lunar Orbiter 1. The image of the Earth emerging behind the Moon, was thought of as ungrounded, unmooring and perceived as sideways. Stefan Helmreich points out, the moon is not a self-evidently horizontal grounding for the Earth, but a vast and looming presence threatening to eclipse the Earth. Once the later *Earthrise* image, (1969, Figure 12) taken from the Apollo

[153] Stefan Helmreich: "From Spaceship Earth to Google Ocean: Planetary Icons, Indexes, and Infrastructures," in: *Social Research,* vol. 78:4 (2011), p. 1212-1214. - Helmrich refers to the image as an index, conforming with Charles Sanders Peirce, an index is "a sign that stands for its object by virtue of the object having made an impression in the carrier of the sign." The iconic features he implies are *iconic* as a diagrammatic representation of the *wholeness* of Earth's *quality* and in a sacred sense, as a revelatory image, pregnant with power in and of itself. Lastly, the image as a symbol, as "a sign, that stands for something by interpretive convention."

[154] Notable writing on the Earth from space view: Denis Cosgrove: "Contested Global Visions: One-World, Whole-Earth, and the Apollo Space Photographs," in: *Annals of the Association of American Geographers,* vol. 84:2 (1994), p. 270–294. - Donna Haraway: "Cyborgs and Symbionts: Living Together in the New World Order," in: *The Cyborg Handbook*, (eds). Chris Hables Gray et al., New York 1995, xi–xx.

[155] Lepenies 2018, p. 584.

8 spacecraft, was put into a landscape orientation, when it was published on the cover of the *Whole Earth Catalog*, the Earth became grounded, and stabilized.[156]

In a similar way, I believe, *Continental Shelf* interrupts and challenges our terrestrial comfort zone in order to (re)think the ocean-space. The vertical perspective, recorded with seeing machines and relying on data recorded over time, allows Territorial Agency to move away from the artificial divide between the terrestrial and the oceanic.[157] In the image Rönnskog and Palmesino replace the normal perspective with an atmospheric view across Northern Europe. Within this tilted vertical perspective, the stable horizon, the water, the clouds and the life of the sea are eliminated, generating an idealized documentary aesthetic. As described, the image is created through the use of data gathered from satellites orbiting Earth with the seafloor visualized through bathymetry. The latter will be discussed in the next chapter. Antithetical to early maps, which were created by celestial observations looking up from the earth into the sky, the image is created by looking down.[158] The shift of perspective, linked with the gathered data, brings new insight into Earth system dynamics that can be experienced with the example of the *contact zone.* Mary Louise Pratt introduced the concept of the c*ontact zone* in regard to coastal areas, defining it as the place where "cultures meet, clash, and grapple with each other."[159] The beach was considered the zone that had to be crossed and thus became the interface between imperial Europe and non-Europe, the visitor and the visited, the migrant and the resident. However, this concept is emanating from the narrow and normal perspective of *by the Ocean* that was previously discussed. Territorial Agency create an intricate overview through their working approach and are able to identify the continental shelf, not the coast, as the true interface zone of the terrestrial and the oceanic. The resource rich continental shelves are the marine space where humans most directly interact with the ocean. In legal terms, the continental shelf is defined as the natural extension of territory that encompasses the seabed and the subsoil of the shelf, slope and rise. With rising global demand for resources, claims over EEZ´s, which are

[156] Helmreich 2011, p. 1213-1215. Helmreich points out, that the later Earthrise photograph was also first presented *sideways* and only put into the landscape orientation once it was put on the cover.
[157] *Continental Shelf* combines data on shipping and transport recorded mainly from January 2016 to January 2017. All data sets used in the trajectories are available online. Territorial Agency et al.: "Trajectories," from: *Ocean Archive -Territorial Agency*, (n. d.), https://www.oceanarchive.org/ collection/49, last accessed 10. April 2021.
[158] Radiation emitted from the sun bounces of Earth´s surfaces and is captured by satellites, from where they are transmitted back to the ground station. Sensors in the imager of the satellite measure the radiance and allow for the identification of materials in the reflectance based on their indices which are accordingly represented in the multispectral images.
[159] Mary Louise Pratt: "Arts of the Contact Zones," in: *Profession*, New York 1991, p. 34.

displayed as the non-descript hovering white lines in the image, become more contested by neighboring states. As a reminder, the EEZ is the area of the sea in which a country enjoys undivided right over marine resources and energy production 200 nautical miles from the baseline. However, based on geological formations, states can further claim rights to the seabed up to 350 nautical miles from the baseline. [160] Therefore, I would propose to make the concept of the *contact zone* malleable, to incorporate the continental shelf as the prolonged area where "cultures [today] meet, clash, and grapple with each other." This techno-eye view shows us a terrestrial/oceanic interface that aligns with Alaimo´s theory of *transcorporeality,* which appreciates the substantial and perpetual interconnectedness of flows of substances and the agencies of environments.[161] From the social constructionist perspective to the circulatory effect of breathing oxygen produced by the ocean regardless of where on earth one is breathing, land and sea are not counterparts but inseparable constituents that are intricately and physically enmeshed in the earth system. The continental shelf is geologically defined as the submerged prolongation of the landmass with no sign of a demarcation line between the oceanic and terrestrial. *Continental Shelf* illustrates how human traces interact with this artificial divide manifested in the disparity of elements which will be the subject of the last chapter.

Satellites and remote sensing devices trace and record Earth´s transformations and human movement. While creating images looking through air is relatively easy technologically, the material quality of water, which reflects the light waves emitted by the sun, continues to pose limitations to the imaging of the ocean beneath the surface although technologies do continue to advance.[162] Satellites transform the ocean into an index, meaning "a sign that stands for (or points to) its object by virtue of the object having made an

[160] States can claim the extension of their continental shelf based on Article 76 of the UNCLOS, giving them sovereign rights (not sovereignty). The continental shelfs are resource rich areas of for example: oil and gas, all types of metals, fish and iron rich sand. Territorial disputes are fought over EEZ´s: In 2007 oil reservoirs have been found in Ghana´s territorial waters which led to a dispute with the government of the Côte d´Ivoire over the position of the maritime boarder. Other contestations fought by neighboring countries are in the South China Sea, the East China Sea, Indonesia. Scammacca del Murgo / Zyman 2020, p. 31-34 and p. 117.

[161] Stacey Alaimo: „States of Suspension: Trans-corporeality at Sea," in: *Interdisciplinary Studies in Literature and the Environment,* vol. 19:3 (2012), p. 476.

[162] Orbital Satellites are able to record the ocean in multiple ways – temperature, water circulation, sea level change, movement of fish through applied sensors e.g., topographic maps of the seabed – large areal images, including the water column, as we are used to on land are not (yet) possible. Google Ocean is one project aiming to create a full underwater *world view*. Yet as Helmreich concludes we "Nowhere in the semiotics of Google Ocean can we find the quality of seawater […] It is instead a diagram of the ways that many of us image now, layering icons, indexes, and symbols on top of a world of previous infrastructures, transparent and opaque, taken for granted, and found as well as forgotten." Helmreich 2011, p. 1236.

impression in the carrier of the sign," solely by reflecting its surface.[163] Therefore, the surface of the water recorded from *above the Ocean* with seeing machines still restricts the visibility, again abstracting it and generalizing it. Rönnskog and Palmesino, shift our engrained expectation within a seascape by alienating this familiar indexical representation of the undulating watery surface. I will examine this with two examples from *Oceans in Transformation*, *Continental Shelf* and *Algae Bloom* (Figure 13). I will begin with the latter.

In *Algae Bloom* we immediately identify the surface of the ocean. It is similar to the immaculate lithography of Vija Celmins, *Ocean* (1975). The same ocean, yet Territorial Agency´s depiction feels somehow different. While Celmins' work is a reproduction of a timeless, location-less prosaic ocean surface that is focused on the technique and artistic process, I cannot suppress romantic feelings of mystery, ambiguity and infinity. Rönnskog and Palmesino show a very similar view of the ocean which however feels more estranged, and particular. The waves are frothy, at times blurred and sliced with the diagonal lines of crossing ship's wakes. These lines challenge the timeless infinity of Celmins' work and anchor the image to a specific location at a specific moment in time. The water surface itself seems precise and dimensional. Looking at this striated surface I am reminded of the irregular layering of rock strata from sediment accumulated over time. Geological formations record earth´s history in layer upon layer, visibly, for the human eye. In the same way, however hidden by the opacity of the water, the ocean is, as Rönnskog and Palmesino describe, "a sensorium, [which] records in its complex dynamics the transformations of the earth […]."[164] The image is created using data derived from the Copernicus Sentinel 2 satellite operated by the European Space Agency (ESA), which monitors Earth´s surface changes through optical imagers at high spatial resolution.[165] The focus of the image is not the plain water surface but a natural color visual composite of data representing the algae bloom in the Baltic sea in July 2019.[166] Events such as this are amplified by anthropogenic input into the ocean system and are a central narrative in the trajectories of *Oceans in Transformation* which aims to visualize the oscillation between the terrestrial and the

[163] Helmreich 2011, p. 1216
[164] Scammacca del Murgo / Zyman 2020, p.8.
[165] European Space Agency: "The Sentinel Mission," from: *The European Space Agency*, (n. d.), URL: http://www.esa.int/Applications/Observing_the_Earth/Copernicus/Overview4, last accessed 10. April 2021.
[166] An algal bloom describes the event of an excessive and rapid multiplying of phytoplankton near the surface of the ocean. Although algal blooms are natural and essential parts of the marine system, agricultural and industrial run-offs and the warming of the ocean water temperature increase them. Scammacca del Murgo / Zyman 2020, p. 20-22.

oceanic.[167] The ocean loses its iconic and familiar blue color and wavering translucent characteristic. Rönnskog and Palmesino again transform the familiar image of the ocean this time through the subtle eerie estrangement of its texture. Yet, what the mode of representation does not comprise, are the dredging effects below the surface. An algae bloom can lead to *dead zones,* depleting the ocean of its oxygen, suffocating its life. It can also release toxins posing risks to humans and other terrestrial life forms.[168]

In the image, *Continental Shelf,* we are offered a view which I have already described in detail. The fluorescent hues of blue covering the physical ocean-space, which characterize Earth seen from afar, do not describe the surface of the water column. Territorial Agency shows the ocean-space humans have spanned across the ocean. The iconic blue color describes the human social and industrial technosphere that is gaining in opacity as it expands into the ocean. The recorded shipping traffic data is crashing on the coastal areas like waves with its fractals penetrating the dry land. In parts the technosphere has already been built up to such an extent that the viewer cannot see the bottom of the ocean despite the fact that Rönnskog and Palmesino have drained it of its water. The ocean surface is abstracted from the expected tactile undulating appearance and transferred into its anthropogenic state by mimicking a rare natural event. Bioluminescence (which is the light produced and emitted by a living organism) events are caused by billions of dinoflagellates (plankton) in the water which begin to glow and sparkle in an electric blue when the water is disturbed.[169] This natural phenomenon appears paradoxically surreal and unnatural. The image with its sobering documentary appearance does not openly claim the empathic response one would expect witnessing a spectacle like this, neither does it leave space for feelings of infinitude, ambiguity or sublimity because the most frightening extension, the elusive and mysterious depth, is revealed and the surface polished smooth. Within both images, *Algal Bloom* and *Continental Shelf,* the ocean, that is deeply engrained in us, is elaborated and fits Darko Suvin´s definition of science fiction. Rönnskog and Palmesino visualize the often times invisible elements of the Anthropocene ocean to estrange the watery

[167] The chlorophyll that phytoplankton uses to multiply can further discolor the ocean in hues of bright green or red, which makes the bloom visible for satellites. Veloisa Mascarenhas / Therese Keck: "Marine Optics and Ocean Color Remote Sensing," in.: *YOUMARES 8 – Oceans Across Boundaries: Learning from each other*, (eds), Simon Jungblut et al., 2018. See also: Rönnskog and Palmesino, *Baltic Sea Plume; Sentinel 2 msi, Natural Color Composite – Oceans in Transformation,* 2020, URL: https://www.territorialagency.com/oceansin transformation/ trajectory-north-sea-to-red-sea.

[168] Scammacca del Murgo / Zyman 2020, p. 21-22. – Large Algal blooms deny the underlying water column of oxygen and block sunlight causing dead zones which have devastating effects on the aquatic life.

[169] Edith A. Widder: "Bioluminescence and the pelagic visual environment," in: *Marine Freshwater Behaviour and Physiology*, vol. 35:1-2 (2001), p. 1-26.

surface and defamiliarize our present ocean. The present ocean-space is created by human society yet is so removed from our daily reality and hidden in the mechanisms of globalization and capitalism that its actual state of being feels alienating and disquieting.

Rönnskog and Palmesino call on the Anthropocentric ocean to be understood as a territory regardless of the paradoxical association resonating to the solid earth: "it is constituted by the same calculative techniques, modes of measuring and controlling, and similar forms of `grabbing´ that find expression in land surveying and extraction."[170] Again we are confronted with the estrangement of the familiar through the sobering realization of human interference in the ocean that has transformed itself into todays scattered juridical territories deeply divided between the multiple interests and regulations. The conflicts of interest between states, industries and the oceanic system itself further destabilize it in its biotic integrity. It is the core intention of Territorial Agency to bring the many disciplines and institutions guarding their data together, to evoke a cross cutting dialog to (re)think an ocean-space, but even more significantly to move past the division of science and society and past a nature-culture or human-nature dualism.[171]

Analogous to the seventeenth century, where the genre of the seascape was encouraged by rapid technological advances *on* the ocean-space, the contemporary seascape is driven by rapid technological advances *above* the ocean-space. The Satellite eye view, as a revolutionary mode of recording without a human spectator, dominates the work of Territorial Agency in *Ocean in Transformation.* The aerial perspective, often connected to notions of power and control, considers the multilayered geopolitical conception of space today across and along the *Sensible Zone.*[172] As *Continental Shelf* vividly shows, the twentieth century witnessed the annihilation of space and distance through what Malone calls the "dawn of the drone age." She sees it as a turning point in history, as the advances in the technology of surveillance and remote engagements are rapidly altering our way of life and understanding.[173] Remote aviation and digital simulations like Google Earth, provide the ability to travel the planet virtually and continue to alter our view and relation to the Earth. Aerial views today are broadly exploited in the military context, drone warfare and science but also within the entertainment industry, in cinema, advertisements and video

[170] Scammacca del Murgo / Zyman 2020, p.33.
[171] Scammacca del Murgo / Zyman 2020, p. 8-9.
[172] The Sensible Zone is a continuous zone covering the planet each 200 meters above and below sea level. Rönnskog and Palmesino argue, it is the zone humans have transformed the most and which has the strongest impact on the climate and hence the future on the planet. Scammacca del Murgo / Zyman 2020, p. 12.
[173] Bräunert / Malone 2016, p. 6-9.

games. Eyal Weizman points out, that this new vertical perspective, which increases the vertical use of space, enables new boundaries of sovereignty. Geopolitical power was distributed and fought over on a two-dimensional map like surface, which is increasingly replaced by a vertical dimension with sovereignty reaching up into the airspace as well as down into the deep space.[174]

Below the ocean / Contemporaneity

If the twentieth century saw the annihilation of space, then the twenty-first century is rethinking time through new revolutionary technologies. Rönnskog and Palmesino have described the ocean as multiple, in whatever material *nature,* and as a sensorium that records the transformations of the Earth, along a non-linear history moving across multiple times.[175] Trevor Paglen argues that, "[…] the twenty-first century may see a […] reconfiguration of time through persistent monitoring, storage, and analytical technologies that can `reach into the past´ in unprecedented ways."[176] In the following I would like to discuss the derivation of the underwater space and the way Territorial Agency visually synchronize time and space in the ocean-space-scape through the perspective *beneath the Ocean*.

Comparable to early mappamundi's, *Continental Shelf* shows a dynamic concept of time, set against a dynamic concept of space.[177] This opposes the historic notion of the ocean as a stable and static space of the Holocene as it was displayed in main maps and seascapes since the seventeenth century. A new innovative dialogue is forming, beginning to recognize the ocean as the space defined by Steinberg in the introductory chapter. Multiple discourses are beginning to reimagine the histories and historiographies of the world through its oceans with a longue dureé view.[178] Today the social sciences, health science and geography focus on a holistic study of the ocean as an integrated system. Media theorist, Melody Jue, goes as far as reexamining media by submerging it into the wet blue oceanic milieu to estrange the

[174] Bräunert / Malone 2016, p. 78.
[175] Scammacca del Murgo / Zyman 2020, p. 9-10 and p. 46.
[176] Bräunert / Malone 2016, p. 56.
[177] This can be related to real-time dynamic processes in the ocean. At the current rate of sea floor spreading, Europe and Africa will be about 2.5 meters further away from the Americas by the end of the twenty first century than they are today. Laloë p. 140.
[178] Semple remarked in the early 20th century, regarding world history: "Universal history […] fails to yield its significance as a whole, if it does not continually take into account the unifying factor of the seas. Indeed, no history is entitled to the name of universal unless it includes a record of human movements and activities on the ocean, side by side with those on land." A century later this concept is applied to several discourses, rethinking themselves not just by accounting for but also by submerging themselves into the ocean.

terms, interface, inscription and database from their terrestrial habitats.[179] These along with the cross disciplinary artistic engagement of Territorial Agency, Pinar Yoldas or The Otholite Group are (re)thinking the ocean in multiple ways, delineating it from its inherent narratives and its visual restrains.

The perspective *beneath the Ocean,* which is distinguished by its increased pressure, three-dimensional movement, light refraction, magnification and the loss of spatial hearing, is the most recent and difficult perspective to be represented holistically and visually in the mediascape. As feminist theorist Donna Haraway argues, knowledge has to be situated, meaning it needs to address the "radical historical specificity, and thus contestability, of every layer of the onion of scientific and technical construction."[180] Whereas I would argue this is even more so within the physically and metaphysically opaque viewpoint *beneath the Ocean*. The short film *Going Nowhere 2* (2011, Figure 14) by Simon Faithfull evinces how extrinsic the underwater environment is for humans.[181] The person in Faithfull´s video is dressed in everyday attire, black jeans and a white dress shirt and casually walks along, "a landscape of fish, rocks and dappled rays of light" at the bottom of the Adriatic Sea, ten meters under the surface.[182] He is determinedly walking away from the camera and slowly disappears in the murky water. His heavy strenuous movement and swaying clothes show the forces of the water - pressure, opacity, salinity, and coldness - on his body. We see his exhalations forming streams of air making their way to the surface. After a couple minutes of watching, I felt the desperate urge to take a deep inhale. Yet, Elizabeth A. Povinelli remarks "under water, alone with my unadorned body, I cannot breath."[183] She describes this respiratory constraint of *air,* or oxygen, and the means and modes of breath/respiration as the most definitive difference between earth, sea and sky for many in the West.[184] The terrestrial conventions of movement and orientation of Faithfull's figure (instinctive posture,

[179] Jue 2020. - Other notably works include Stefan Helmreich: Alien Ocean: Anthropological Voyages in Microbial Seas, Berkeley 2009. Or the iconic writings of oceanographers Sylvia Earle and Rachel Carson.
[180] Donna Haraway: "Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective," in: *Simians, Cyborgs, and Women*, New York 1991, p. 187.
[181] In his multi-media work Simon Faithfull attempts to understand and explore the planet as a sculptural object – to test its limits and report back from its extremities. Simon Faithfull: "Biography," from: *Simon Faithfull*, (n.d.), URL: https://www.simonfaithfull. org/biography/, last accessed 10. April 2021.
[182] Simon Faithfull: "Going Nowhere 2," from: *Simon Faithfull*, (n.d.), URL: https://www.simonfaithfull.org/?post_type=works&p=8525, last accessed 10. April 2021.
[183] Hessler 2018, p. 165.
[184] Ibid.

embodied habits and muscle memory all adapted to gravity) are so ingrained in us they are virtually invisible unless they get interrupted and become the subject of the film.[185]

With the eerie feeling of Faithfull´s short-film present, I would like to go into depth on how the underwater-sphere is visualized in *Continental Shelf.* The hybrid feeling and subtle estrangement of the cartographic oceanscape again destabilizes our terrestrial-based way of knowing. Territorial Agency represent the environment beneath the surface based on modes used by lawmakers and economically driven extractive industries. This idealized mode of representation of the continental shelves drained of their water and life, is codified in article 76 of the UNCLOS. Which, again, legally defines the continental shelf as the natural extension of territory that encompasses the seabed and the subsoil of the shelf, slope, and rise, but, importantly, excludes the overlying water column.[186] Companies planning the extraction of oil and gas, the dredging of sand and the mining of extensive mineral deposits in the deep sea, solely think of the ocean as the static, stable, lifeless space that is codified and conceptualized by stakeholders and cartographic history by disregarding the possible repercussions to global life networks.[187] The weight, fluidity, dynamic movement, chemical transformations and biota from macro- to micro-organisms in the seawater is neglected. The conceptual dichotomy arising from this antithetical thinking, I think can most clearly be observed in the dynamic extents of oil spills with their long lasting and far-reaching effects.[188]

The bottom of the sea has been and is still mainly discovered remotely and visualized from above the surface of the ocean. The measuring and mapping of the seafloor progressed from manual point sounding lines and sinker methods in the nineteenth century, to primitive single beam sounding methods in the twentieth century. Rapid technological bathymetrical advancements in the last quarter of the twentieth century finally allowed for large swaths of the seabed to be mapped faster and more accurately by bouncing multi beam sonar signals off the seabed. This refined bathymetry can be defined as the information that describes the submarine topography of the seabed and reveals the "variations in sea-floor relief, […] that are measured from a vertical axis," through the application of multiple modes, sonar,

[185] In her experience of learning to scuba dive, Melody Jue identifies the fundamental corporal conditions of one´s body, to be responsible for how accultured one is to the conditions of gravity rather than the buoyant and fluidity of the ocean. Jue 2019, p. 1-9. – Similarly, Nasa Astronaut David Wolfe describes his shift in bodily sensations after returning from 128 days in outer space not being exposed to gravitational forces: "the weight of your body is overwhelming. Even my ears felt heavy on my head. […]," Hessler 2019, p. 84.
[186] UNCLOS 1982, p. 53-54. - Scammacca del Murgo / Zyman 2020, p. 31.
[187] Scammacca del Murgo / Zyman 2020, p. 31-33, 35-37, 111-112.
[188] Scammacca del Murgo / Zyman 2020, p. 120-123, 185-187.

geostationary satellites and submersibles.[189] The gathered data sets are then assembled into maps, which are important tools to understand and predict the environmental dynamics and the various flows of the marine environment. They give vital information about geo-hazards and ensure navigational security, as they produce surface and sub-surface information. "Overall bathymetry forms the foundation of any comprehensive marine dataset; without it, the picture is incomplete."[190] Yet, only about 20 percent of the seabed have been mapped to provide this *God´s eye view.*[191] In fact we know the topography of the Moon and Mars in far greater detail than that of our planet. The Moon or Mars, like the land surface of Earth, are directly visible and can be experienced with our own vision or satellites picking up light or radio waves respectively. Mapping the terrestrial surface of earth or celestial objects can be done rapidly as cameras, drones and satellites can move quickly through air or space, as they do not experience any offsetting pressure compared to objects moving though water, especially at great depths. To give visibility to the seafloor we literally need to *see* through water where intuitive human based modes of vision do not work.[192] As Faithfull vividly illustrates, the human body itself is not attuned to the underwater sphere. Therefore, humans will at last come to terms with the fact that "access below a few feet underwater will always rely on harnessing technologies to overcome limitations as terrestrial, air-breathing animals."[193] The visualization of the seabed depends on acoustic sound waves, which are blasted through the water. The reverberating echo is transformed into renderings.[194]

In *Continental Shelf,* the ocean-space is filled with the actual bathymetric data of the geological structures of the seabed. The continental shelf is rendered as a natural continuation of the landmass extending into the abyss, it negates the conceptual separation between the terrestrial and oceanic. The translucent layering of geological and anthropogenic derived data illustrates the arbitrary or paradoxical definition of it as a prolongation of

[189] Scammacca del Murgo / Zyman 2020, p. 31.
[190] EMODnet: "Central Portal," from: *EMODnet,* (n.d.), https://www.emodnet.eu/en, last accessed 10. April 2021.
[191] The God´s eye view "[…] is the fantasy of viewing from all positions in both time and space." Reddleman 2018, p. 7.
[192] Phoebe Pierson: "You Asked: Why Do We Know More About the Moon Than Our Own Oceans?" from: *Columbia Climate School. Climate, Earth and Society. State of the Planet,* (29. April 2019), URL: https://news.climate.columbia.edu/2019/04/19/you-asked-moon-oceans/, last accessed 10. April 2021.
[193] Sylvia Earle: "Foreword," in: Helen Rozwadowski (ed.): *Fathoming the Ocean: The Discovery and Exploration of the Deep Sea,* London 2005, p. ix. - Only very few professionals are able to access the deep sea in submersibles to witness the diverse and dynamic composition. Most people will never interact with the ocean in this way; the public can obtain knowledge from science, but it will not be embodied knowledge. Rock et al. 2020, p. 537.
[194] This, however, is very energy intensive, produces high sound pollution to the marine environment and further takes a lot longer than the mapping through air or space.

territory. We get to experience the seabed not just as a space, but a space of specific geographical formations built up over time and intertwined in an ongoing process that began millions of years ago. To further explain this, I like to follow Rönnskog and Palmesino to the bottom of the ocean and examine another image from the project *Oceans in Transformation, Pacific Ocean Floor* (Figure 15). We are offered a black and white rugged landscape of a cliff and a valley, a vista of the continental shelf on the Pacific Ocean floor off the coast of Hawaii recorded through multi-beam sonar data. Our viewpoint is slightly elevated looking straight at the shelf break, which appears big but not overwhelmingly monumental. Small spikey, irregularly grouped pinnacles pop up from the light grey, somewhat foamy, ground. They appear like little sailboats on a wavering surface, recalling the stylized waves dotted with ships that we encounter in many seventeenth century Dutch seascapes. The shelf break rises abruptly from the abyssal plain cresting in smooth rolling light-grey peaks against the uniform black background. The edge of the break snakes around the peaks in a line leading into the distance and dividing the picture plane at two thirds. The clarity and sharpness of the image, without any of the blurring, murkiness, refraction, or opacity that we have experienced in Faithfull´s video presents an appearance as viewed through air and one would not expect it to be from the bottom of the sea.

While Rönnskog and Palmesino extensively provide aerial overviews in a cartographic manner in *Oceans in Transformation*, *Pacific Ocean Floor* does the opposite. It is one of the few images in the project that stands us back on our feet and provides the grounding experience of the *Earthrise* photograph from cover of the *Whole Earth Catalog*. To encounter the most alien environment, the most normal and traditional perspective I believe allows us to orient along the familiar horizon line, which I interpret as a key element. Beneath the surface the familiar horizon line cannot be associated with the endless view across the surface of the ocean. In this image it is used to evoke the familiar sensation of landscapes and reject notions of physiological distance, alienation, romanticism and exotification. The ocean as a space devoid of places can be traced back to the development of capitalism, when extractive interests were justified through the abstraction of time and space. Within Territorial Agency´s image we do get the sense of a specific foreign space, but one still tied with associations to landscape. While places on land are interlinked and the environment is defined by non-linear dynamics, virility and flows, this is even more significant in the ocean, which is evident in Faithfull´s film. The swaying clothes, the moving particles, the occasional passing fish and the undulating rays of light oppose the conception

of a static location. The person becomes defined by the ocean. Hessler points out, while the water seems anonymous to us, this is only due to the viewers lack knowledge of the site.[195]

Helen Rozwadowski notes, "before the last quarter of the eighteenth century, understanding the ocean´s depths derived mostly from the imagination," and "before the nineteenth century, [the] deep sea made hardly any impression on most people."[196] The seabed was originally a mental hypothesis as well as an ontological tool that gave sense to the unknown ocean according with what humans knew from land.[197] The depth of the sea, a last visual frontier leaving space for mythologies, narratives and science fiction, becomes more relatable in Rönnskog and Palmesino´s work. The perception of the deep see as a dark, impenetrable and extraterrestrial void has changed with new technological imaging devices allowing for an immersive installation viewing, meaning the view from *within* the image through the familiar perspective.

While knowledge of the ocean-space has shifted with technological advances, the broadly used visual representation of the ocean (art, media, mapping) remained the same. Territorial Agency identified the oceans crisis of visibility and produced works focusing on the hidden and invisible. *Continental Shelf* is a building block in the project that begins to resolve the guesswork and demystifies the ocean by giving it visibility though the "God´s eye view." This visualization, I would argue demands the viewer to actively deconstruct the image and *read* the transformations inscribed in it. The transformations are taking place in the ocean-space. These were traced and recorded over time, compiled into raw data, compressed and harmonized into a visual experience. Connecting to what I have outlined in chapter III as the elements of a holistic analysis into the history of maps,[198] *Continental Shelf* resembles a kind of symbiosis. It combines world history, the visual tradition of the ocean, the artist's experiences and the technological development into a single image. The image is tied into the trajectory as a puzzle piece in the quest for a new language that can describe the multi-layered and multi-temporal ocean-space.

[195] Hessler 2019, p. 142.
[196] Laloë 2017, p. 122. - Most notably are the literary illustration of the deep sea in the science fiction novel *Twenty Thousand Leagues Under the Sea* by Jules Vernes.
[197] Laloë 2016, p. 25-126.
[198] See chapter III/p.15.

VI. CONCLUSION

Rönnskog and Palmesino engaged in the three-year project *Oceans in Transformation* to esthetically visualize and unite the dynamics of our fragmented knowledge about the ocean-space with the fundamental belief that, "in order to understand the world around us, we sometimes need to draw it out. If you can´t really describe the world around you, you can´t fully act in it […]. When you can describe it, you can debate and critique it."[199] This artistic research aims to find new modes of representation complementing our ever-partial encounter with the ocean-space. To grasp the ocean-space, we need to fill the gaps of the unrepresentable, which became the unacknowledged and thus the unthinkable.[200]

I have identified that seascapes anchored within the seventeenth century tradition of art are unable to represent todays ocean-space. Human values, beliefs, and cultural understandings and misconceptions are too deeply entwined in these compositions. The stylistic devices of terrestrial perspective and the horizon line alter the meaning and define how we interpret them. I do not believe that Rönnskog and Palmesino have found a mode of representation which completely solves this crisis of visibility, but rather engaged in a way that visually confronts the overlying questions of the project which are central to the various oceanographic discourses, "How to shape polities and cultures that can coexist with the oceans? How to think from and with the oceans?"[201] Through an interplay of the subtle estrangement of the familiar ocean, embedded in an organic body of research, Territorial Agency has opened a way of thinking past a spatial and historical linearity and aligned with the words of Gregory Stone and Nishan Degnarain:

> "The solutions we are looking for are not simply an extension or fine tuning of the traditional ideas, tools, technologies, and ways of thinking surrounding traditional resource conservation management. Static, linear solutions for a dynamic, non-linear system will not work. […] Our economic systems, our governance, our environmental interventions must be rethought, reorganized and retooled. We need radically new ways of thinking and behaving."[202]

Within the narrow scope of this paper various narratives on a microscopic and futuristic perspective, especially regarding advocacy and ethics but also topics like deep-sea mining, overfishing or the acidification of the oceans were not included. Further, I have limited myself to the *Western* use and view of the ocean and remained within the geographical realm

[199] Bräunert / Malone 2016, p. 7.
[200] Rock et al. 2020, p. 537.
[201] Scammacca del Murgo / Zyman 2020
[202] Gregory Stone/ Nishan Degnarain: *Soul of the Sea: In the Age of the Algorithm*, Sedgwick, MA 2017, p. 16.

represented in the image *Continental Shelf*. However, the inclusion of multiple views on the ocean, especially from oceanic communities and individuals indigenous to the oceanic space are essential for a more complete understanding and will need to be incorporated in further research. The focus of this paper was on a macroscopic perspective that incorporated the hybrid ocean-space-scape into a broad visual dialog between cartography and the seascape, considering *Continental Shelf* as both. The abstraction and generalization of the ocean-space through time took a leading role in my research.

It is widely acknowledged that maps produced and reinforced colonialist-capitalist dynamics.[203] I will go one step further and argue that my brief analysis of cartography from the mercantile period to today demonstrates this dynamic not only impacted the continents but the ocean as well. The ocean in visual representation continues to be dominated, colonized, commodified and not granted *agency*. The mediated ocean is shown as "a decontextualized mass, an unspecific fragment, recorded and stored far from the site and time of viewing," subjected to human dominance and simply there to be entirely consumed by the human gaze.[204] *Continental Shelf* intercepts the abstraction and generalization of the ocean. A limitless friction free space that fails to be possessed is exposed as measurable, industrialized and territorialized, completely absorbed by human desires. The cartographic image is developed by adding time to the dynamic and a malleable ocean-space is shown to be a part of society. The perception of a last true *wilderness* is overhauled. Cultural representations of the ocean led to its perception as a sealed container for human use. The idea of an infinite ocean contributed to the sublime and created a comforting consciousness for humanity because the ocean produces much of the oxygen that we breath and the food that we eat. It also produces increasing amounts of energy, oil, gas and other raw materials while it absorbs vital amounts of carbon and heat. Rönnskog and Palmesino remind us that the ocean is not infinite. The repercussions of human interference in the ocean system are highly uncertain. This uncertainty arouses fear, excitement, terror and awe in Territorial Agency´s finite and transparent ocean-space. The electric blue color recalls bioluminescence events, which one could interpret Rönnskog and Palmesino instrumentalized for reason beyond the visual similarities. In their work, designed to highlight human consumption, they

[203] Hessler 2019 p. 65 - 67.
[204] Hessler 2019, p. 74.

represent our actions with a luminescent glowing effect that in the ocean is a natural defense mechanism to scare off predators.[205]

Images of Earth from space are often accused of disconnecting, enabling asymmetry, or producing a perception of a planet that can be consumed in its entirety due to its conciseness in the image. I believe Territorial Agency´s development of the *overview effect*, in the project *Oceans in Transformation* is a necessary change in perspective because the conciseness of the planet, the finite limits, are what we need to comprehend. It is not just the way we see but understanding where we stand and what we see. The doorway to solutions can only be opened when we realize that we are not living *on* Earth, we are living *in* Earth.

[205] Cell Press: "Dinoflagellate plankton glow so that their predators won't eat them," from: *Science Daily*, (17 June 2019), URL: https://www.sciencedaily.com/releases/2019/06/190617110538.htm, last accessed 10. April 2021.

APPENDIX

Figures

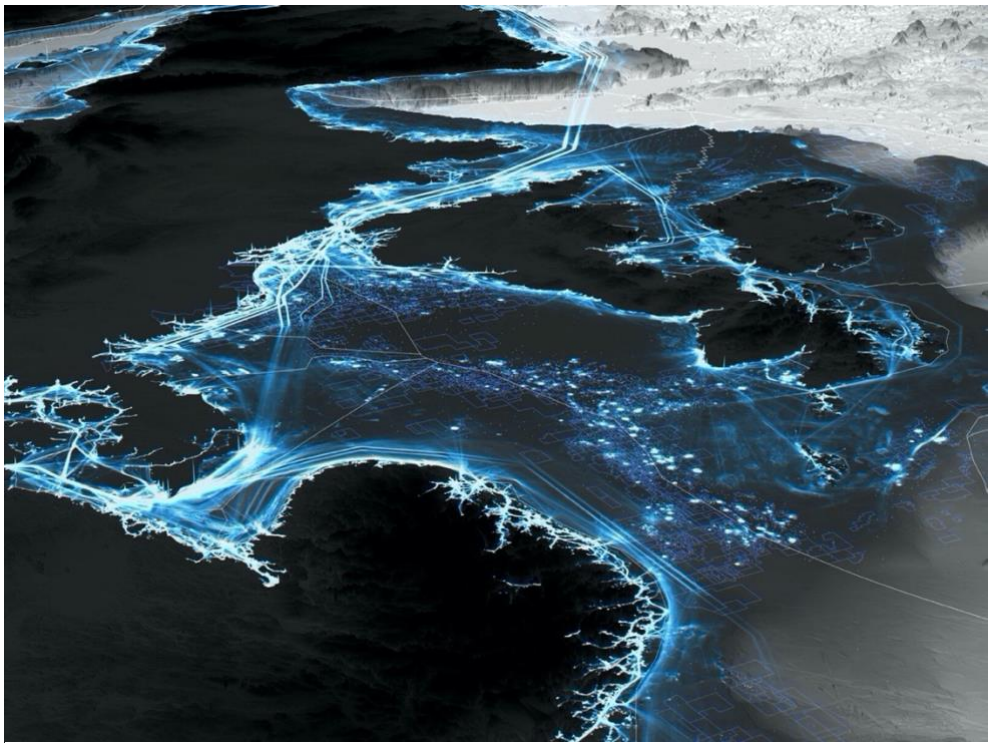

Figure 1: Territorial Agency, Oceans in Transformation - *The European continental shelves are among the most exploited areas of the global ocean. Aggregate shipping activity and oil licenses. EMODnet data*. Oceans in Transformation is a research project by Territorial Agency, commissioned by TBA21–Academy. (Digital Image ©Territorial Agency)

Figure 2: Territorial Agency, Oceans in Transformation – *North Sea to Red Sea, Still from Trajectory*, 2020, remote sensing Data. Oceans in Transformation is a research project by Territorial Agency, commissioned by TBA21–Academy. (Digital Image ©Territorial Agency)

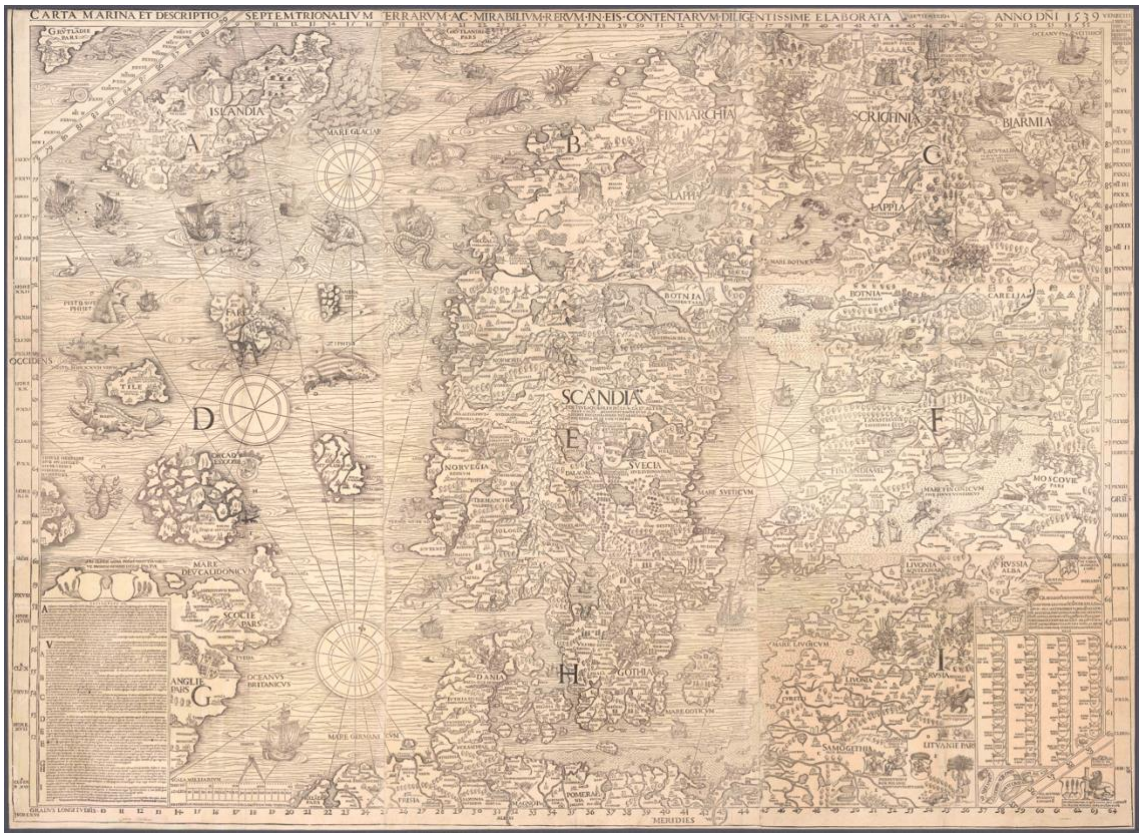

Figure 3: Olaus Magnus, *Carta Marina*, 1539, woodcut, 170 cm x 125 cm, University of Uppsala, Uppsala, Sweden.

Figure 4: João Teixeira Albernaz, *World Map*, 1630, in *Taboas geraes de toda a navegacao*.

Figure 5: Jean Baptist Nolin, and Nicolas François Bocquet, *Le globe terrestre représenté en deux plans-hémisphères: dressé sur la projection de Mr. de la Hyre de l'Académie Royale des Sciences, et sur plusieurs routiers et mémoires des plus habiles pilotes et savans voyageurs le tout rectifié et calculé selon les dernières observations, et dédié à Mgr. l'Abbé Bignon, conseiller d'état ordinaire*, Detail of South America, 1708.

Figure 6: Google, *Google Maps View of Northern Europe*, screenshot, taken 10. April 2021.

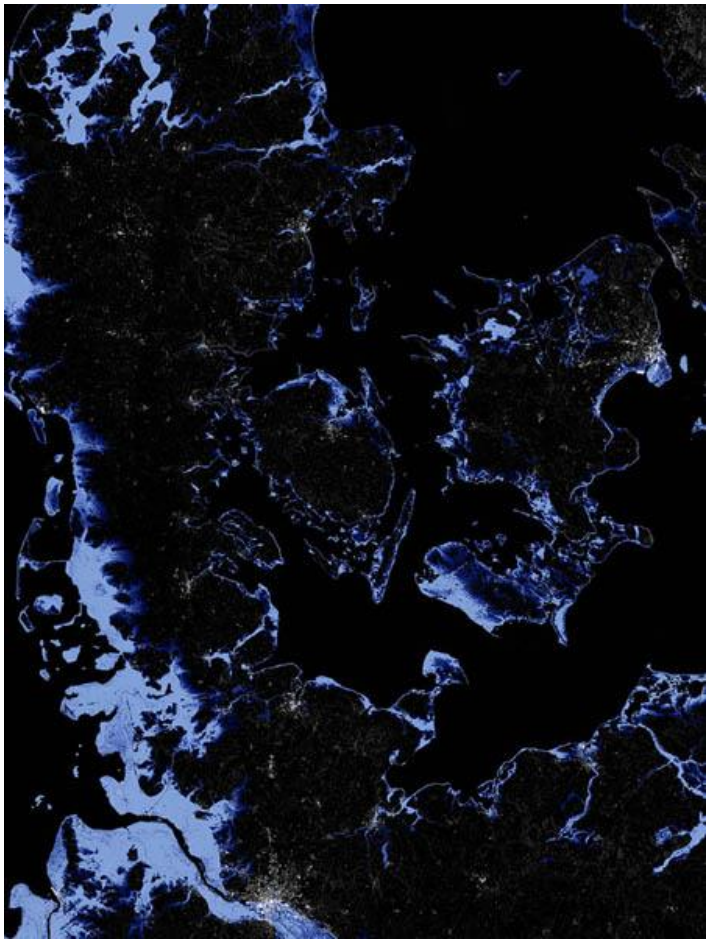

Figure 7: Territorial Agency, Oceans in Transformation, *Denmark*, *Sea Level Rise*; Scenarios for low and high carbon emissions: 1m, 5m, 9m; 2020, SRTM30, Sentinel1. Oceans in Transformation is a research project by Territorial Agency, commissioned by TBA21–Academy. (Digital Image ©Territorial Agency)

Figure 8: Hendrik Cornelisz Vroom, *The Return to Amsterdam of the Second Expedition to the East Indies*, 1599, oil on canvas, 102.3 x 218.4 cm, Rijksmuseum Amsterdam. License CC0 1.0.

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Figure 9: Willem van de Velde (II), *Dutch Ships in a Calm Sea*,1665, oil on canvas, 86.8 x 120 cm, Rijksmuseum Amsterdam. License CC0 1.0.

Figure 10: NASA, *Blue Marble: The View from Apollo 17*, 7. December 1972, photograph taken from Apollo 17, Astronaut photograph AS17-148-22727.

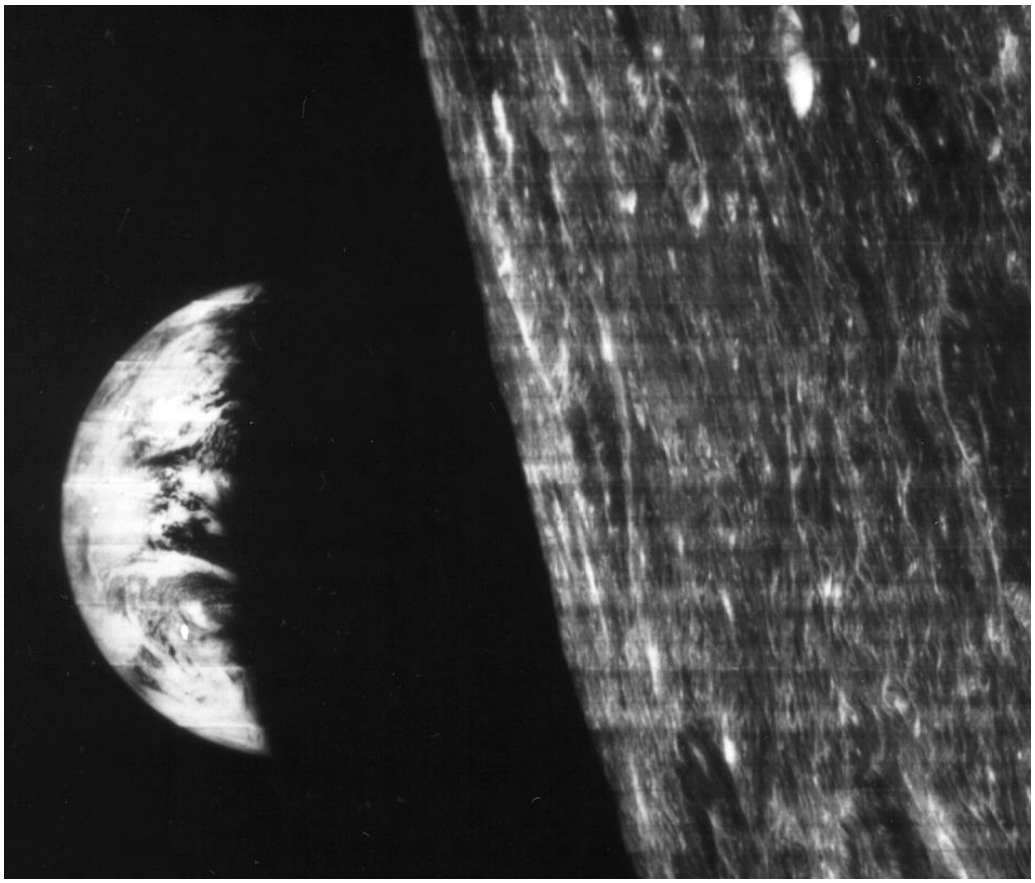

Figure 11: NASA, *First View of Earth from Moon*, 23. August 1966, Lunar orbiter 1.

Figure 12: NASA, *Earthrise*, 24. December 1968, Apollo 8 first manned mission to the moon.

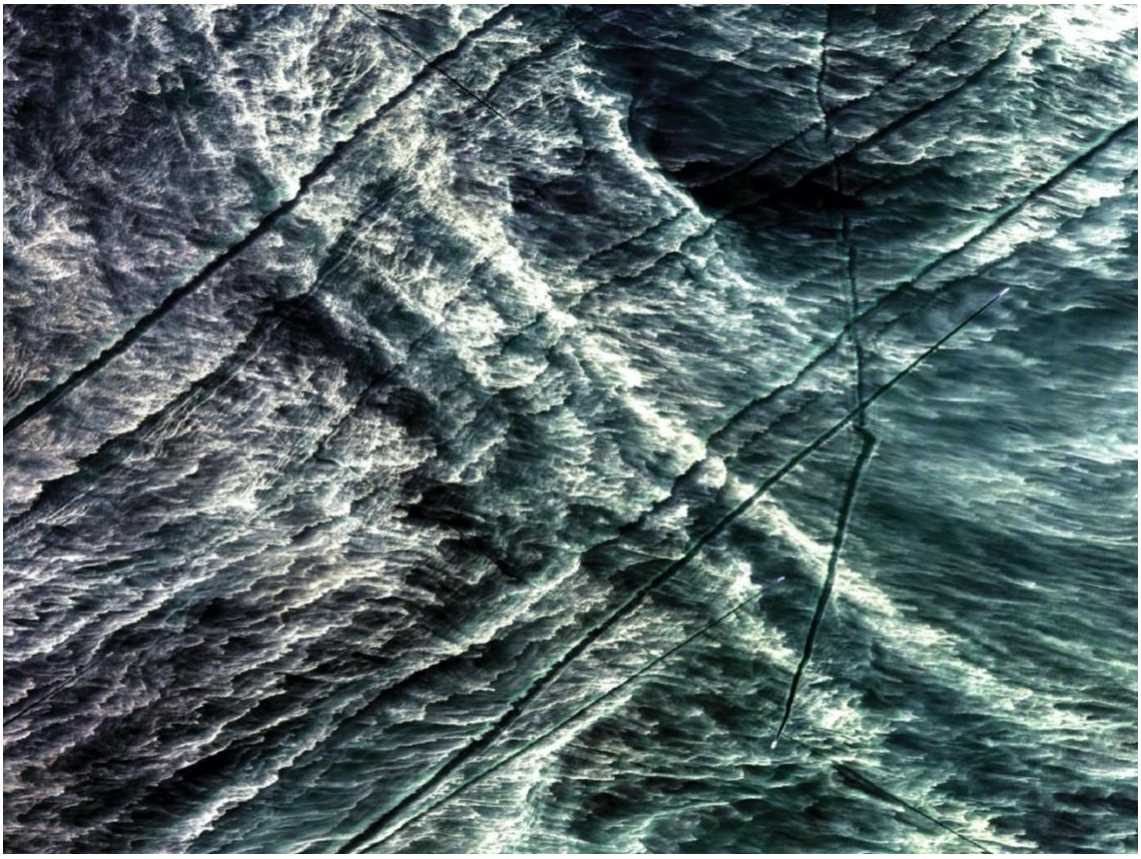

Figure 13: Territorial Agency, Oceans in Transformation – *Algae bloom in the Baltic Sea*, July 2019, ESA Sentinel 2 data. Oceans in Transformation is a research project by Territorial Agency, commissioned by TBA21–Academy. (Digital Image ©Territorial Agency)

Figure 14: Simon Faithfull, *Going Nowhere 2,* video still 0:17 min, 2011, HD Video (silent), 5 min. Image courtesy of the artist.

Figure 15: Territorial Agency, Oceans in Transformation – *A view of the Pacific Ocean floor, off the coast of Hawaii,* 2020, Multi-beam sonar data. Oceans in Transformation is a research project by Territorial Agency, commissioned by TBA21–Academy. (Digital Image ©Territorial Agency)

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