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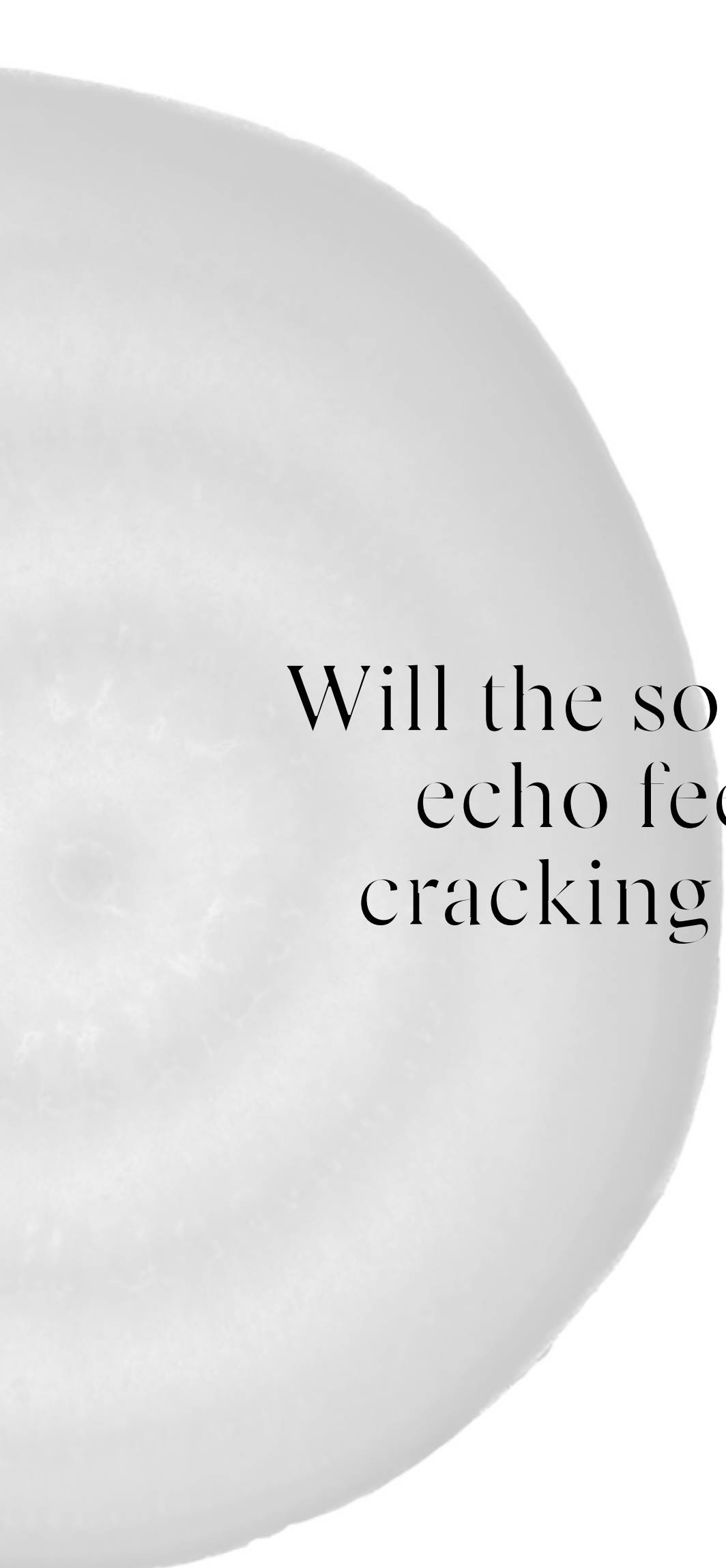




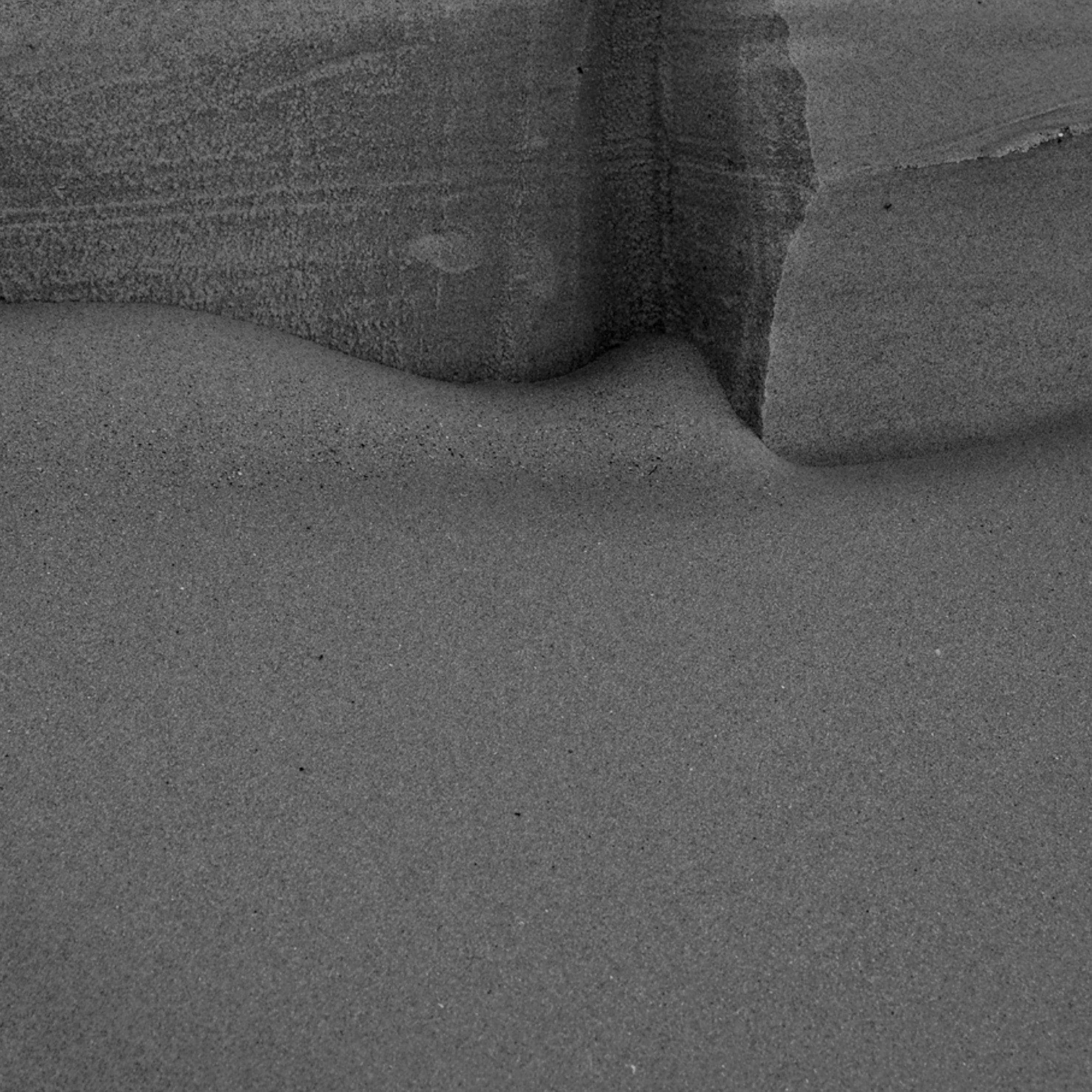


What will next year's sea bed look
like when I return to the island?

More so, what will it
sound like?



Will the sound of the elongated
echo feel like a glass surface
cracking right under my feet?



I. Understanding Sand

1. An Island; of Sand
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Natural element : Element produced by nature without any human intervention.

Natural resource : Material or substance occurring in nature which can be exploited for economic gain.

Coarse Sand : Well sorted sand with a predominant grain size between four and seventy six hundred millimeters.

Alluvial sand : Loose sand that has been deposited by running water in a stream bed, floodplain or beach.

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Sediments : Solid material that settles at the bottom of a liquid, especially earth and pieces of rock that have been carried along and then left somewhere by water, ice, or wind.

Deposition : Forming of a layer of a substance such as soil or rock.

Flow velocity : Vector field used to mathematically describe the motion of a continuum.

Coastal erosions : Loss or displacement of land along the coastline due to the action of waves, currents, tides or other impacts of storms.

Beach and dune nourishment : A process by which sediment, usually sand, lost through longshore erosion is replaced from other sources.

Sand mining : Extraction of sand, mainly through an open pit.

Sand mafia : Criminal organization, practicing illegal removal of large quantities of sand.

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Thematic map : Type of map, portraying the geographic pattern of a particular subject matter in a geographic area.

Remote sensing : A Process of detecting and monitoring the physical characteristics of an area by measuring its reflected and emitted radiation at a distance.

Bathymetry : Study of the beds or floors of water bodies, including the ocean, rivers, streams and lakes.

Amygdala : Region of the brain primarily associated with emotional processes, a neural network that mediates many aspects of emotion and memory. It is located in the medial temporal lobe, just anterior to the hippocampus.

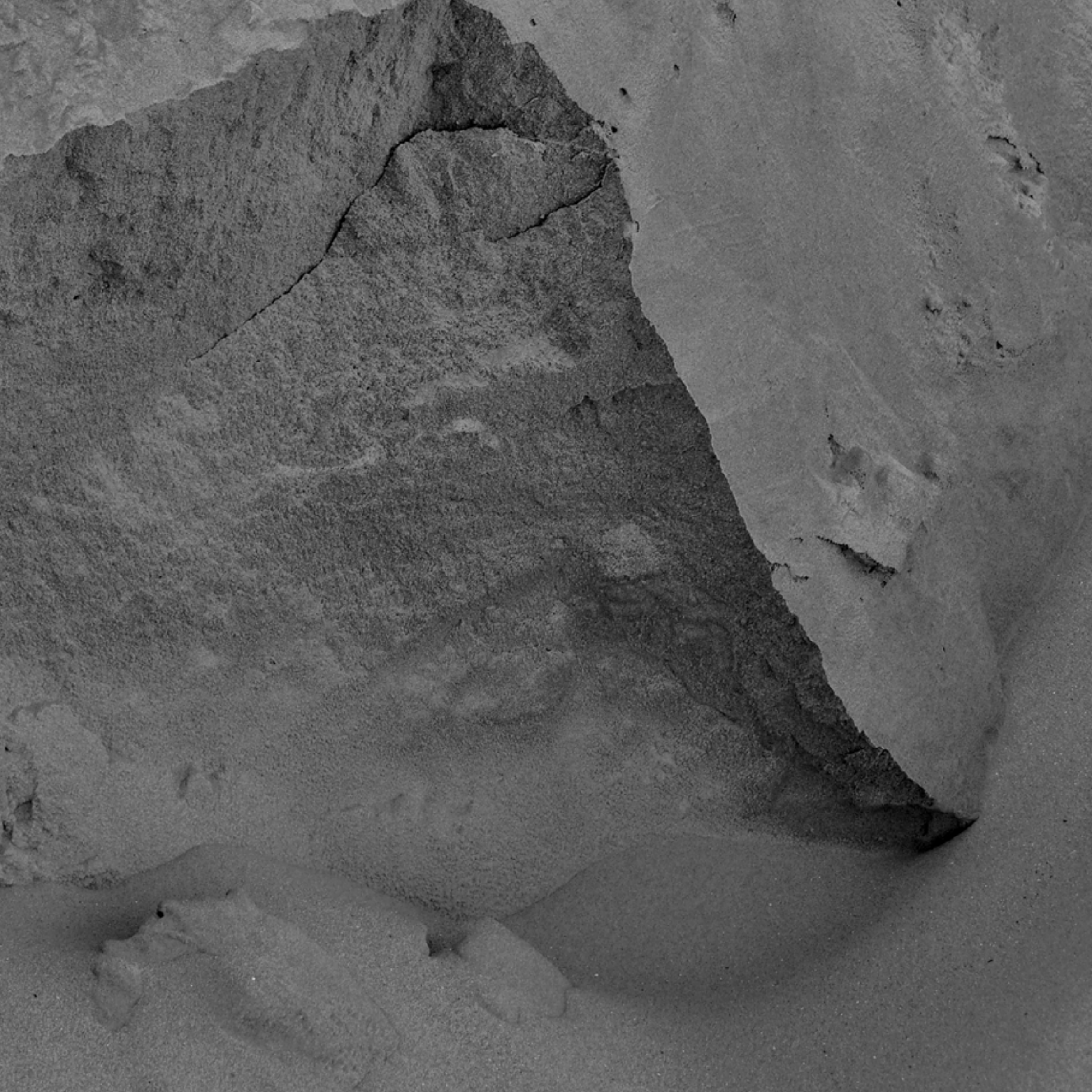
Adrenaline : Hormone produced by the body when a person is frightened angry or excited, which makes the heart beat faster, preparing the body to react to danger.

Hippocampus : Component of the brain playing a major part in the consolidation of information from short term memory to long term memory.

Dopamine : A neurotransmitter, released by neurons (nerve cells) to send signals to other nerve cells. The brain includes several distinct dopamine pathways, one of which plays a major role in the motivational component of reward motivated behavior. Dopamine is often portrayed as the main chemical of pleasure.

Dredging : Bringing up or clearing something from a river, harbor, or other area of water with a dredge.

Trailing suction hopper dredger : Ship used to maintain navigable waterways, deepening the maritime canals that are threatened to become silted, to construct new land elsewhere or to replace sand eroded by wave actions on the beaches.



Changing shapes of coasts, islands disappearing while some are appearing, a witness to time... Even in a place where nothing seemed to ever change. Until a few "new dunes" appeared, and more and more pipes were placed on the coast, to transport the Sand. In a liquid or solid form, ever since sand became a natural resource, a small hole started to slowly grow in the hourglass. Sand always moved, it actually came to be through movement. By today sand moves in various trajectories, natural ones and artificial ones, intertwining into each other. Shipped or blown to an unsuitable spot quicker than its natural pace, a distorted vision of the migration process of Sand has developed. The Sea beds sand became a resource, a demand was created, followed by an urge to preserve. A paradoxical loop emerged. If our relation to space has shaped the presence and absence of sand, how can its representation, reshape our relation to space?

I. Identifying Sand

An Island: of Sand

The island of Langeoog, a moment of pause. One of the small islands up in the northern sea, no cars, not many people.

In Ostfriesland, where my mother grew up.

I go back there each year since I was born and nothing ever changed. The baker stayed the same, the harbor café stayed the same, the interior of my grandparents house stayed the same, the typical northern red painted wooden furniture, the bike I always rode, the one my grandfather got in his twenties stayed the same. Almost like frozen in time and yet I never get bored of it, quite the opposite. In some aspects I find change positive, in this context where everything changes at an alarming pace, it is as if, for a few days, I could escape the passing by of time.

However, a few elements did change recently, entire dunes, the coast. On all East Frisian islands that are inhabited and used for growing tourism, beach and dune nourishment is necessary after strong storm surges for preserving and securing the island. Recently a few pipes have started to appear on the beach in order to drag some sand from the seabed up to the coast for nourishment. Coastal erosions are happening each year, the coast is getting smaller due to storms and floods accelerated by climate change. Storm surge happens when waters rise above their normal levels and are pushed inland by wind. The rising sea levels are partly caused by the irregularities on the seabed created by sand mining activities. The sand from the seabed isn't infinite, the seabed is running out of sand or more to say we are

running out of sand. The dredging of the seabeds sand, whether it is for coastal nourishment or for construction is creating huge sand pits which are disrupting the marine ecosystem. If the sand keeps being mined, it runs out, the island disappears, the seabed disappears.

A blueprint: of Sand

The island wasn't always there, it emerged naturally: Glaciers, waterways and wind, these are the main ways through which particles migrate. The transport of grains by glaciers is characterized by a slow and unselective movement of particles. The resulting sediments are called moraines. In rivers, the grains are sorted according to their size and to the strength of the current. Pebbles and gravel remain at the bottom of the river bed, while fine sands, silts and clay are easily transported over long distances. Wind is a very selective mode of transport as it carries only the finest particles. However, it can carry them very high, very far and in large quantities: the wind carries about 250 million tons of sand from the Sahara to the Atlantic Ocean every year. Solid, liquid and loose, sand is originally a natural element with special physical properties, already discovered in Ancient Egypt. For everything concerning the treatment of the body, whether living or dead, the Egyptians probably looked for the drying aspect of the sand, but also for its abrasive capacity. Its incompressibility, the fact that it absorbs any water rising or, that it is a load distributor are certainly at the origin of its use in construction¹. The common, coarse sand was an abundant and easily accessible material, even if in some specific cases a sand of a particular quality was sought, which would have then been transported over

many kilometers. Even though the moving process of Sand back then was mainly for a religious purpose, it still means that sand being moved by humans isn't a completely new phenomenon, however, its damaging effects are. Putting an end to it would consist in engaging in a preservation process of sand, defined by acts of protection. It seems to me that a natural element only starts to need protection once it is turned into a form of natural resource, therefore it is gradually disappearing while being more and more sought.

It is mainly through its use in construction that sand became a form of resource. The cities we inhabit are made out of cement (a mixture of limestone and sand, rarely used on its own), concrete (a mixture of cement, sand, crushed rock and water), Mortar, also called asphalt (a mixture of cement lime and sand) and glass (made of sand, soda, ash and limestone). All these elements surrounding us in our everyday life all contain Sand. Ancient Romans already used so called "opus caementicium", a material that is remarkably close to concrete to build most of their architecture, mostly consisting of volcanic ash or pit sand, volcanic rock and lime. Without any need of steel reinforcement, the created structures have an impressive longevity especially the harbor ones, due to the presence of volcanic ash. A related mineral called phillipsite grows in the concrete, as the contact with seawater occurs, a reinforced structure develops from these interlocking crystals. Even Though ancient roman concrete seemed to be stronger when it came to coastal structures, the recipe didn't perpetuate. "Romans were fortunate in the type of rock (volcanic rock) they had to work with, we don't have those rocks in a lot of parts of the world so there

would have to be substitutions made"². But that is not the only reason to its disappearance. Structures took a long time to develop their strength from seawater. Today it would probably not have enough strength to handle modern use architecture nor our expectations of building pace.

The appearance of Sand as a key binding element in modern cement, allowed built structures to gain enough strength very rapidly, the recipe was invented in Portland in 1824. This reinforced form of concrete rapidly developed. The first bridge made out of it, in San Francisco (1889), it's first street in Ohio (1891). Its high rise building ("The Ingall's building", Ohio, 1903), its homes, the first one designed and built in New Jersey (1908). Sand rapidly made its appearance in all sorts of mixtures, from cement, mortar and concrete into glass, therefore windows, cellphones and into the computer with which I am writing this text. "In the twenty-first century sand has become more and more important than ever. This is the digital age, in which the jobs we work at, the entertainment we divert ourselves with, and the ways we communicate with one another are increasingly defined by the internet, and the computers, tablets, and cell phones that connect us to it. None of this would be possible were it not for sand. High purity silicon dioxide (found mostly in sand) particles are the essential raw materials from which we make computer chips, fiber optic cables, and other high tech hardware—the physical components on which the virtual world runs."³ We tend to either value something material that we can see, hold, visualize or something immaterial but that we can feel, like, love. But sand is hidden, in a translucent form like in glass, it is invisible, like in walls, cellphones, computers. It

² Jackson, Marie, "Why 2,000 Year-old Roman concrete is so much better than what we produce today". Science Alert, (2017)

³ Beiser, Vince, The world in a Grain : The Story of Sand and how it Transformed Civilization, Riverhead Books, New York, 2018, p. 102

is material and yet invisible, partly because we have lost our relation to the making process. We lost access to the crafts that used to be visible on the main axes and streets of villages, from the glassmaker to the steelworker. Everything now emerges through an invisible process. The more or less we know about the time it takes for a carrot to grow, the more or less we value it. The more or less we know about which elements surrounding us contain sand and what it requires for it to arrive there, the more or less we'll value it.

An understanding: of Sand

Sand therefore doesn't only surround me when I am on the Island, it is in fact in everything, as mentioned by the author Vince Beiser, sand is in the glass I am drinking my water from, on the pavement I am walking on, (Asphalt, embankments -95%, Concrete -75%), in the house I inhabit, (windows -65%, solar panels -99%), in the phone that I use and in many other elements of my everyday life, (paint, cosmetic, paper -50%).⁴ Through satellite imagery we learned to identify not only where sand is located but to where and how it moves. I was always intimidated and yet fascinated by technology but more specifically by technology developed to understand nature. I grew up with a view and knowledge about nature that was probably mostly when not only defined by technology. Whether it is the daily weather report or the tide schedule for the next weeks ahead hanging on my grandfather's desk. Satellite imagery combines moderate to high spatial resolution with large spatial coverage and regular short time scale repeat measurements. Remote sensing exhibits flexibility to the spatially and temporally changing

conditions of coastal systems and at the same time it is able to distinguish subtle differences. This sounds quite accurate to me but I still am quite amazed by the fact that such a fine, almost translucent and extremely volatile element like sand can be measured and analyzed so accurately. Indeed, Sand and gravel can't be differentiated in satellite imagery, as both materials originate from the same granular composites of finely divided rock. Often the references to sandy beaches also include gravel beaches. The satellite's accuracy for the sand of a thematic map depends strongly on the site width and cannot be improved by changing the classifier. (algorithm)

To a certain extent it means indeed that even very highly developed technology not only can't entirely "grasp" natural elements but can also tend to show a disrupted vision of a specific data -referring to the fact that it is only a form of representation of nature, a very crucial one.

A vast degree of accuracy is of course present in satellite imagery, for example when it comes to dune research. A better knowledge of their dynamics can help in the prediction of their movements. During a strong dust storm, the dunes may move more than several meters. More frequently occurring storms due to human activities are causing the dune to move, a growing threat to the coastal ecosystems. In a way, the more and more common creation of artificial dunes and coastal nourishment becomes a paradoxical loop of cause and effect of climate change. The damage caused by floods and storms is being constantly masked by the illusion that each disappearing dune is immediately coming back. The sand isn't only moved by natural forces, it is

also being taken by artificial ones and transformed, leading to a more growing lack of sand. The different forms of representation we have of the state of the seabed so far are made through Bathymetry, which is the science of measuring the depths and relief of the ocean to determine the topography of the sea floor. Through so called Bathymetric measurements, the depth of water columns is being mapped. A complete bathymetry system combines a water column measurement instrument (echo sounder) and a positioning instrument (DGPS or RTK). “ Like other sonar systems, multi beam echo sounders emit acoustic waves in a fan shape beneath the transceiver of the echo sounder. The length of time it takes for the sound waves to reflect off the seabed and return to the receiver is used to calculate the water depth. ⁵”



II. Grasping Sand

Sociologically

Sand can be compared to fossil fuels: We mine more sand than nature is capable of replenishing "Sand is the most consumed resource on earth after fresh water". "Yet Sand is being excavated at a rate faster than it can renew itself, it is disappearing from shorelines, rivers and seabeds, causing disastrous effects for both environmental and human systems"⁶. How come we keep on digging a hole? Sand has always been associated with the idea of multitudes, with offerings, for example, often described as "as numerous as the sand on the shore".

As mentioned previously, the importance of sand to the Ancient Egyptians also derives from its occasional appearance in cosmogonic stories, which tend to make it an element involved in the formation of the world. Sand is found as an ingredient in figurines made in the image of the God Osiris. Osiris, ruler of the realm of the dead is also the one who initiated men to agriculture. His mythology, related to the cycles of the seasons is linked to the flooding of the Nile⁷.

During the Osirian festivals celebrating the return of vegetation, small figurines representing the divinity were molded. Alluvial sand, chosen for its fertility was used in their composition, mixed with earth, seeds and precious stones. These figurines were watered several times a day until the seeds germinated, indicating the return of vegetation and the rebirth of the god. From our earliest age on, sand is a natural element that we encounter on the coast, collect, build

with, witness being absorbed again by the sea and given back to us with the next low tide. Even in the sandbox from our park in the middle of the city, four square meters in which this material is an endless resource to fill our bucket with. And once we've built one sandcastle we want to start building the next one. Referring to the book *The molecule of more* by the author Michael Long and psychotherapist Daniel Z. Liebermann, a spike of dopamine (the molecule of pleasure) occurs when something pleasurable happens. But no matter what that is, after a little while, the dopamine surge begins to go down, to diminish, and once we get used to it, dopamine begins to fade. What is creating the dopamine is actually the opportunity to have something new and unusual. A phenomenon already mentioned in mythology through the myth of Midas. Midas asks Dionysos for the ability to turn everything he touches into gold. Unable to eat or drink as a consequence, he begs the god to take back his gift. The myth of Midas and Dionysus reflects the consequences of becoming slaves of our own desires, the accumulation of wealth. In contradiction with the Aristotelian conception of happiness⁸ that relies on a moral journey towards fulfillment rather than on a material one, Midas has the ability to fulfill his desires to accumulate wealth, but his ability to turn everything he touches into gold cuts him off completely from the foundations of life.

The human Desire to always want more to a destructive extent seems to be recurrent throughout history. Recurrent climate catastrophes are paid as a price for our desire to keep on building higher and bigger.

⁶ Block, India, "New material made from desert sand could offer low-carbon alternative to concrete", Dezeen, (2018)

⁷ Misuriello, Julie, "La double perception du sable en Egypte ancienne", *Openedition Journals*, Volume 61, (2013), p. 42-59

⁸ Brow, Lesley(Ed), Ross, David(Trans), *The Nicomachean Ethics*, Oxford University Press, 2009

Literally

As a result of population growth, changing consumption patterns and increasing urbanization, the demand for sand has tripled over the past two decades, making it an increasingly scarce resource. As mentioned in an article by Aissa Amourag for the *Maroc Hebdo* Magazine, more than ten million cubic meters of sand used in construction each year are extracted illegally. One is located between Safi and Essaouira in Morocco, which has become a rocky landscape. Or the town of Asilah (Morocco), which is experiencing severe coastal erosion due to a growing construction demand for growing tourism. Paradoxical as it may seem, most of the illegal sand is used in the construction of hotels, roads and other related infrastructure. On the one hand, beaches are being cleared by plundering the sand, while on the other hand hotels are being built in order for tourists to enjoy the view of beaches that are currently disappearing. There are different reasons for sand mining, one is for beach nourishment and the other one for construction. Even though they serve a different purpose, both are a form of sand extraction, disturbing the Oceans currents and ecosystems. Initially, the construction industry was very reluctant to use sea sand because of the presence of shell fragments and salt. Going back to Vince Beiser's writing, *The world in a grain*: researchers of the world wildlife Federation Believe Sand mining on the Mekong River is a key reason the 15, 000 square mile Mekong Delta is gradually disappearing. The ocean is overtaking the equivalent of one and a half football fields of this crucial region's land every day. This is caused partly by climate change induced sea

level rise, and partly by direct human intervention. Referring to the United Nations environment programme, nearly 50 million tons of sand are being extracted worldwide annually enough to cover the city of Denver two inches deep. Whether it is being mined in rivers in Vietnam or in the Northern sea, the sand is mainly used for the production of concrete, cement and mortar. Sand plays an important role in protecting coasts from floods and storms which are ironically mainly happening because of sand mining and disruption of natural zones. In some cases, the coasts that are being protected are also manmade. As the element is manmade the need for its protection is created. Enormous legions of marine sand from the ocean floor are being used to alter the shape of countries, coastlines and new land where there was no land before. Different types of sand are being used and their quality and diversity depend on the sandbank from which it comes. Each sandbank has a different grain size distribution and shell content.

Fine sand is used for mortar, concrete, asphalt production and for beach maintenance. Medium coarse sand is only used for concrete production. These manmade areas emerge almost overnight through specific processes, which aren't without consequences on the seabed. The sand is extracted with a Trailing suction hopper dredger, a dredging vessel that can suck up sand, clay, silt and gravel with large pumps. During dredging, a tube drags along the bottom like a Hoover. "If the head is too far from the bottom, it only sucks up water."⁹ Therefore shallow seas are more and more an interest of human activities which are interfering with the natural evolution of the seabed. Sand extraction in the North Sea area is a striking example. The created sandpits,

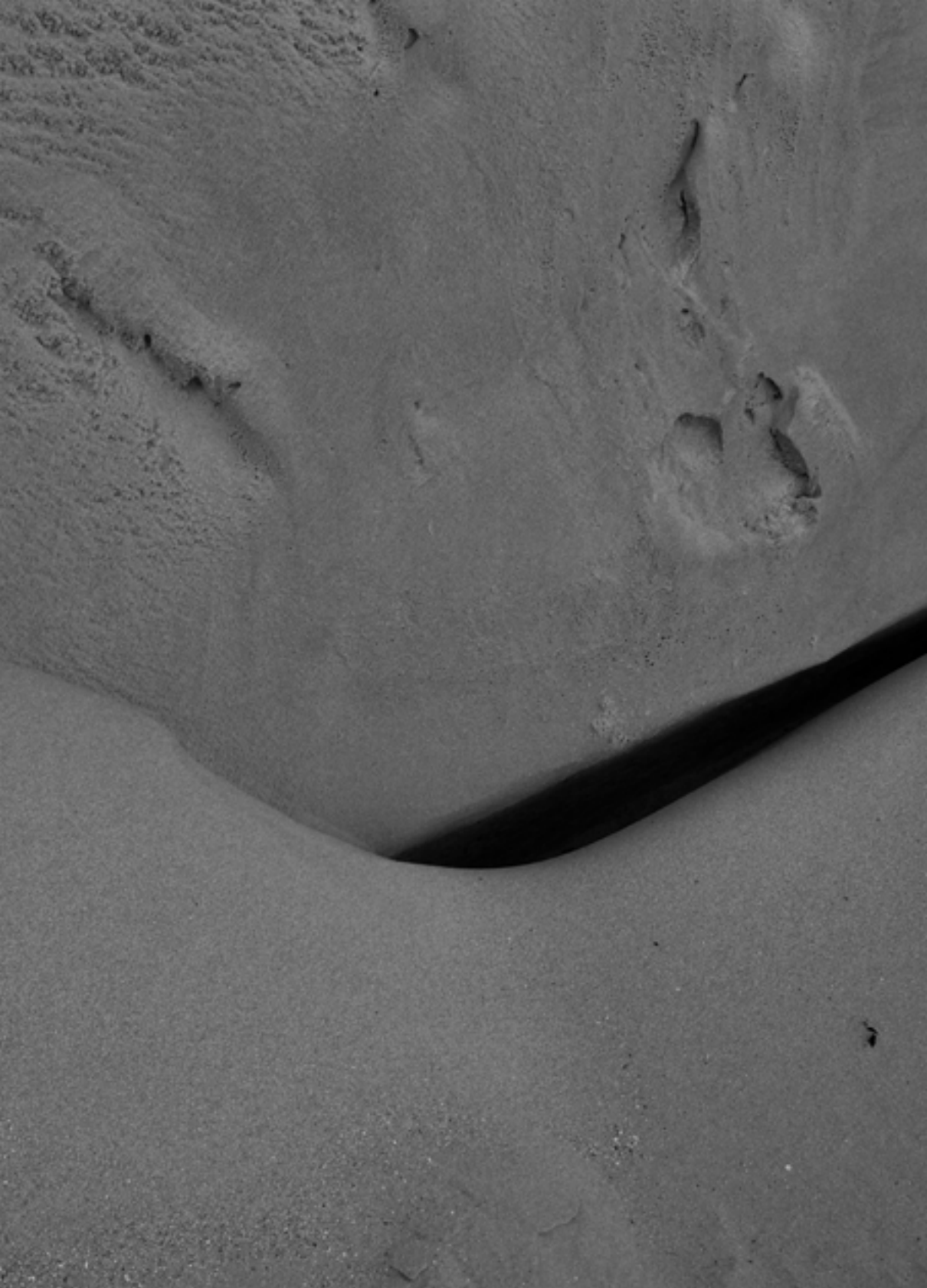
several meters deep and up to several kilometers wide, constitute a large-scale disturbance in the offshore seabed. Several measurement campaigns using hydro acoustic techniques between 1994 and 2017 revealed that up to 30 m deep pits of more than 5 km diameter were dredged into the northern seafloor. The consequences are still detectable more than 30 years later. After a year, muddy sediments dominated the deposition. A full backfill of the post-dredging pits is likely to take many decades to form.

Sensorially

When I think about sensing sand, I can feel its softness running through my fingers or sometimes its firmness disclosing my bare footprint on the ground, its liquid ness dripping, drying into small towers or its warmth hugging the back of my body. I have a hard time thinking about sensing the seabed. I never got to experience deep sea diving, I would like to, then I could feel it, to a certain extent. In a way, there is a sound to the state of the seabed. The more sand is being mined, the deeper the pits, the longer the echo they reflect. Even though there is an important urge to raise some awareness, about the created irregularities, disrupting ecosystems and sea currents, representing the seabed in the form of data in an impactful way is a challenging task. There is a form of mystery, an eternal speculation around inhabiting, sensing anything that is related to a form of depth, whether it's the seabed or outer space, let alone the attempt of sensing its wave of change. The state of the seabed, as well as the sand mining activities, are constantly hidden under a vast blanket of water. If the human brain isn't confronted with a sensorial threat, it is less likely to react to it. The amygdala is at the center of

the brain's fear circuit. Sensory information reaches the thalamus, a central brain region, and is then analyzed, or not, depending on the imminence and severity of the threat, by higher cortical structures and by the hippocampus, the seat of memory, before being transmitted to the amygdala. The amygdala then generates the organism's behavioural response via the secretion of adrenaline.

Fear involves a form of feeling of urgency. It is less likely that the alarming state of something that is hidden meters deep underwater will be a recurrent threat to the brain. In the *Issue 19*, published by the *Highsnobity magazine*, the artist Olafur Eliasson talks about his work *Ice watch*. The artist wanted the spectators to touch the shrinking ice cubes which, after breaking off from melting glaciers, were displayed on the Bankside in London. He wanted spectators to touch the shrinking ice and ask themselves: "What does climate change actually mean physically?" He develops by saying "One of the things that I'm curious about is how to actually take something we know intellectually and embody it physically (...) So that when you put your hand on a glacial ice block you are in fact physically capable of connecting what you are thinking with what you are feeling." If there is no immediate visual or sensorial stimulus, the sense of involvement is less likely to be felt.



III. Returning Sand

A paradox to mention

Coming back to the Island I mentioned in the very beginning, let's have a look at these pits, in the northern sea.

Large-scale mining pits will have a significant impact on the near-field and far-field (up to the coast) flow and wave patterns: the flow velocities inside the pit will be reduced and the wave heights may also be reduced, depending on the depth of the pit. As a consequence, the sand transport capacity inside the pit will decrease and as mentioned earlier, sediments will settle in the area, resulting in deposition. Thus, the pit will act as a sink for sediments originating from the surroundings, erosion will take place leading to a direct loss of sediment from the nearshore zone. Indirect effects result from the modification of the waves moving and refracting over the pit, which then leads to a variation of the near shore wave conditions.

An ongoing extraction, Dubai, surrounded by desert, had to import 45,700 tons of sand from Australia to build the Burj Khalifa skyscraper. Why would this place that is surrounded by the desert also extract sand from the seabed? As mentioned in an article published by *Dezeen* in March 2018, Desert sand grains are too smooth and rounded to lock together to form stable concrete and therefore can't be used for construction. In my opinion, without claiming to have a specific knowledge about construction materials in general, I think that it is mainly a question of material development skills transmitted through history. Once a certain technique of industrial processing is found and spread widely for mass production, its technique is rarely readapted, like for concrete. For example,

when looking at its development over history, once a certain recipe was found and considered effective in terms of its yield, it wasn't revisited, until very recently.

A group of Scientists in the UK developed a biodegradable construction material made from desert Sand. The material is called "finite", it is as strong as concrete but is half of its footprint. "Unlike concrete, which must be either down cycled or sent to the landfill at the end of its life, the new material can easily be reused as it can be remolded for multiple life cycle uses."¹⁰ Desert Sand that has for a long time been considered as even more abundant, unsuitable for production and therefore less valuable, is in fact like other types of sand, a potential resource. Referring to the effects of the production of dopamine leading to a recurrent and abundant consumption pattern, the same cycle of extraction and extinction would happen to repeat itself in another place with another resource, used until its last drop. Trying to find another spot from which to extract sand is not a solution. An obvious one would be to reduce its consumption. In order to reduce, alternatives need to fit the demand. Alternative materials, alternatives to producing it or looking into recycling processes.

A glass like looking material, made out of beeswax, a promising material that the artist Marlene Huissoud developed in her work. But even though the development of new environmentally friendly materials is crucial, more so are the recycling methods and processes that are leading to the development of circularity. Concrete recycling is one example. If I take the example of the country

where I grew up, 260 million tons of construction waste is produced each year in France. Currently, only a fraction of that waste is being recycled. The recycled aggregates are only 10% of the total national aggregate production. Partners like the company *Recybéton* located in Canada, have their major focus on reusing all the materials from deconstructed concrete including the fine fraction, in new concrete. Another focus is to recycle the materials from deconstructed concrete as a raw material for the production of cements. In order to engage with this recycling process, the companies have to consider the volume portion of recycled aggregates as well as the water adjustment. The mix design should take into account the high water absorption of recycled aggregates when calculating the total water in the mix.¹¹ There are alternatives to the persistent mining of sand used mainly for construction, but like often when it comes to transitions, it requires a certain input, the process might be longer, the costs higher, the production may be slower, nothing that a world defined by a growing demand, growing consumption and frenetic production aspires to.

My aim here is not to develop on the alternatives to the use of sand, as I myself, have to get more familiar with its recycling processes first, but more so to understand, draw back to a form of breaking point, origin to its frenetic consumption and therefore extinction. I more so intend to question the efficiency and inefficiency of the currently suggested or adopted practices which are attempting to break the cycle, wether juridical or environmental. I wont have the presumption to bring another practice to the table nor a direct solution, but to look at how the act of visualizing a certain embedded vicious loop,

by coming back to its origins, may or may not lead to new approaches towards our relation to natural elements like sand, exploring how the different forms of data representation play a role.

A certain presentation

In her book *le parfum des fleurs la nuit*, the author Leila Slimani quoted the writer Etel Adnan who once said that “the cities die like humans, animals and plants do. The cities and their buildings disappear carrying with them the emotions of those who loved them, knew them, walked through them.” She also quotes Pier Paolo Pasolini on a night spent in Paderno with his friend Paria in the middle of nature, where “an enormous amount of fireflies formed groves of fire.” 30 years later he then explained that pollution made the fireflies disappear. For Pasolini, the consumer society, the capitalism, the destruction of nature for profit killed the fireflies and therefore the memories of these nights spent in nature with them. He seems to say that beauty died on behalf of money. The consumer society leads to the disappearance of the landscape. Throughout my reading, I couldn't help but visualize the seabed slowly being eaten up, the Hippocampus of the earth's underwater surface being mined. If a city carrying a soul dies like a human being how about the Sea bed and its sand? In a way I tend to visualize the sea bed as the hippocampus of the ocean, memories over centuries, birth of land and ecosystems, fossils, bodies of water, sociologies, deeply buried, as much literally as metaphorically speaking. It wouldn't only be the loss of the seabed's sand, but also the loss of every other component of it. “Space is transformed. The ocean floor is wired for sound. Fishing boats

disappear in the Irish Sea, dragged to the bottom by submarines. Businessmen on airplanes read exciting novels about sonar. Waterfront brothels are demolished or remodeled as condominiums. Shipyards are converted into movie sets. Harbors are now less havens than accelerated turning basins for supertankers and container ships. The old harbor front, its links to a common culture shattered by unemployment, is now reclaimed for a bourgeois reverie on the mercantilist past. Heavy metals accumulate in the silt. Busboys fight over scarce spoons in front of a plate-glass window overlooking the harbor. The backwater becomes a front water. Everyone wants a glimpse of the sea.”¹²

Today companies are almost being considered as human beings, with a legal status. Would it therefore sound ironic if a legal status was being attributed to the seabed and its Sand? To me it does in a sense, how did it come to the point that we have to juridically label parts of nature as the only solution against our own actions. Thinking back on it, it is already happening, a lot of areas are designated as “protected natural territories” in which any human activity is forbidden. Already in 1970, the author Christopher Stone proposed legal rights for areas in a landmark article published by the southern California law review. He argues that in ancient roman Law, children were less persons than objects under the authorities of fathers. Children then acquired rights over time, followed by woman and other minority groups. Later, corporations and nations states also gained legal protections. “Through out legal history, each successive extension of rights to some new entity has been, therefore a bit unthinkable.”¹³ Since 1870, New Zealanders (“Whanganui” tribe) have been fighting for a legislation that would officially

give the Whanganui river (New Zealand) the same rights, a human being would have. The River which flows 290 Kilometers through the North Island, has been granted a legal personality by the Parliament in March 2017. On the day of the vote, a Maori Party co Leader pointed out that the Whanganui Tribe had been fighting for almost 150 years to stop the exploitation of this “life force” that is the river.¹⁴ Human rights are nevertheless not always respected. There is a form of skepticism in the efficiency of acquiring rights. It is of course certainly better than no legal protection at all but it doesn’t stop illegal actions from happening. It brings us back to questioning the very origin of the necessity of juridically attributing rights to entities in order for them to be protected.

The Indian environmentalist Sumaira Abdulali has been referred to as India’s foremost campaigner against illegal sand mining. Her numerous campaigns led to an extension of the ban on sand extraction across the state of Maharashtra. After the ban came into force in 2010, Sumaira Abdulali traveled to Bankot creek (Maharashtra) to document photographic evidence of still ongoing illegal sand mining. Abdulali’s car was then pursued and struck by another vehicle driven by the Sand mafia .

If not on earth, surveillance has been done from space. The developed technologies used, not for understanding natural elements like sand but for spying on our own actions. Chris Hackney, a fluvial Geomorphologist at New Castle University (United Kingdom), and his colleague used satellite imagery to track sand mining on the Mekong river in Cambodia. From 2016 onward, satellite imagery showed an

¹² Sekula, Allan, Okeanos, Thyssen-Bornemisza Art Contemporary, 2017, p.17

¹³ Stone, Christopher, Should trees have standing? Towards Legal Rights for natural objects, Southern California law review 45, 1972

¹⁴ Taïx, Caroline, “La nouvelle Zélande dote un fleuve d’une personnalité juridique”, Le Monde (2017)

increase in the number of mining ships. Google earth imagery and drone footage was used to convert ship counts to sand volume in order to calculate carrying capacity of the ships. It was found that the amount of sand removed in 2020 was greater than the previous estimates for the entire lower Mekong Basin. Riverbed or seabed, a natural regeneration towards former conditions is only visible at the shallow rims of the oldest dredging pits. This represents a form of crucial global inventory, which nevertheless doesn't seem to drastically scare illegal sand extraction off.

A form of visualization

Finding the shifting point that made the sand dredging pipes on the islands coast inevitable reminds me of the first step in the recovery journey of a mental illness. You don't necessarily need to understand everything, sometimes there is no explanation to some things, to certain human behaviors. But engaging with the root of a phenomenon, the very tipping point, the one characterized by the damaging shift that started to rise can lead to a process of deconstruction. To get rid of your own disruptive behavior you have to visualize it in its full size and shape, remember how it appeared in order to know how it can disappear. In other words, identifying the tools to protect yourself from yourself. In a way, environmental protection measures aren't protecting Nature, as it originally doesn't require protection. They are protecting a seized form of nature from our own actions. What does it mean to protect something that is disappearing. To keep on protecting, therefore ramifying the coast, while a concrete building is growing on it, it is like pouring water into a broken glass.

We often only feel the need to treat an illness from the moment on we start feeling it physically. If we look into the definition of what protection means it consists in the act of keeping safe from harm or injury. We are protecting nature from ourselves while keeping on injuring it, the paradoxical loop. It is the concept of "Ouroboros", the snake biting its own tail. The man made harm and injury is now requiring man made protection behind the label of a "disappearing natural element", the element is shrinking because it is now a resource, therefore the resource is disappearing.

There is surely a satisfying aspect in the idea of protecting something bigger than us, something like nature. Humans controlling humans is one thing but humans controlling what is uncontrollable is another thing: having control over natural phenomena as an eternal quest. When I heard that the very top part of the Mont blanc is on display in the Teylers museum in the Netherlands, it sounded quite absurd. At the same time I weirdly wasn't that surprised, having the top of the highest summit at a graspable distance, behind a showcase seems to illustrate this urge to hold, own something that seems unattainable, the top of a mountain. This urge to hold something which can't be locked and put in a box, which shouldn't be locked and put in a box. The Anthropologist Elizabeth Fisher suggests that human invention has its source in the acts of gathering and care that have typically been overlooked in favor of heroic, masculinist narratives of domination over nature. In her essay *The Carrier Bag Theory of fiction*, the author Ursula K. Le Guin, reminds us that rather than the hunting arrows and spears that are often identified as the first human inventions, our ancestors first

creations were in fact vessels for holding gathered nuts, berries, fruits and grains along with the bags and nets to carry them. Maybe by today the acts of gathering and care turned into spikes and arrows, being forms of vessels conceived to carry the desires of our insatiable “molecule of more”. Dopamine. Reading through an article in the Time Magazine, I was confronted with a specific form of vessel. Seeds from all over the world are being held in a huge safe in Norway. In case of a climate catastrophe the database of human agricultural history can be found inside “The Svalbard Global seed Vault” on an Island above the arctic circle between Norway and the north pole. The Svalbard Vault is a form of backup for the worlds 1,750 seed banks, storehouses of agricultural diversity.¹⁵ Even if the worst happens, we will still have access to agriculture: A bit like a life vest. Unlike a pumpkin seed, a sand corn can't be planted in order to make it grow back abundantly. Some elements do have an end, in the case of sand, an end is currently being put to the element. The continuous attempts to avoid that, leads us back to their potential inefficiency that maybe originates in the contradiction of the notion of “protection of a natural element”. An action that mainly originates in the twisted fact that we entirely created that need for nature to need us. In consequence of that fact maybe comes a unilateral way in which some data is represented. “Numerous commentators have sought to lay the ills of modern Western civilisation at the door of its alleged obsession with vision (JR Levin 1988). More than any modality of perception, they say, vision leads us to objectify our environment, to regard it as a repository of things, alien to our subjective selves, that are there to be seized by the eyes, analyzed by science, exploited by technology,

and dominated by power. If only we could redress the balance by restoring hearing to its proper place in the sensorium, it is claimed we might hope to regain a more harmonious, benevolent and empathetic awareness of our surroundings. Then perhaps, we may rediscover what it means to belong. (...) These laments are not new; to the contrary, the denigration of vision is as ancient as is its elevation to the top of the hierarchy of the senses. As Don Ihde points out, in his *Study of the phenomenology of sound*, “there is an old and deeply held tradition that vision “objectifies” and contrary but not so widely noted, there is a tradition which holds that sound “personifies”. To this later tradition belong the claims of many classical scholars that the very word “person”, is derived from the latin verb “personare”, meaning literally “to sound through”.¹⁶ Especially when it comes to hidden phenomenons, there is a necessity in the creation of a variety sensorial stimulators for a brain to react. As our memories are stored through fragments of images, sounds, touch, smells, the brain is easily triggered by sensory input. Certain circumstances can therefore be read as “dangerous”, a breaking glass as a potential cutting spark, the measuring sounds of a sonar as a disappearing seabed.

What could next year's sea bed look like when I return to the island?

What could it more so sound like?

Will the elongated echo based measurements feel like a glass surface cracking right under my feet?

The hidden loop of sand extraction, sound like a snake eating its own tail.



Bibliography

Aarninkhof, Stefan, Baart, Fedor, Donchyts, Gennadii, Hagens, Gerben, Luijendijk, Arjen & Ranasinghe, Roshanka, "The state of the World's beaches", Scientific reports, (2018), (accessed: February 2023) <https://www.nature.com/articles/s41598-018-24630-6>

A.G Smith, Thomas, "Extent, accuracy and repeatability of bare sand and vegetation cover in dune mapped from aerial imagery is highly variable", Aolian Research, Volume 60, 2023

Alfred Wegener Institute, Helmholtz Zentrum für Polar und meeresforschung, "Researching the environmental impacts of deep-seabed mining", Alfred Wegener Institute, (2022), (accessed: February 2023) <https://www.awi.de/en/about-us/service/press/single-view/umweltauswirkungen-von-ressourcenabbau-in-der-tiefsee-erforschen.html>

Amourag, Aissa, "Les mafias de sables détruisent l'environnement marocain", Maroc Hebdo, (2019), (accessed: February 2023) <https://www.maroc-hebdo.press.ma/mafias-sable-detruisent-environnement-marocain>

Anger, Romain, Fontaine, Laetitia, Bâtir en Terre : du grain de Sable à l'architecture, Belin, Cité des sciences et de l'industrie, Paris, 2009

Brow, Lesley, (Ed), Ross, David (Trans), The Nicomachean Ethics, Oxford University Press, 2009

Beiser, Vince, The world in a Grain : The Story of Sand and how it Transformed Civilization, Riverhead Books, New York, 2018

Beiser, Vince. "Why the world is running out of sand, BBC". (2019), (accessed: February 2023) <https://www.bbc.com/future/article/20191108-why-the-world-is-running-out-of-sand>

Benting, Heath. "The status project". Status irrational. (2013), (accessed: February 2023) <http://status.irrational.org>

B Glass, Jennifer, Hillary, F. Hall "Submarine volcanic morphology of the western Galapagos based on EM300 bathymetry and MRI side-scan sonar", *Geochemistry Geophysics Geosystems*, (2007), (accessed: February 2023) https://www.researchgate.net/publication/35548541_Submarine_volcanic_morphology_of_the_western_Galapagos_based_on_EM300_bathymetry_and_MRI_side-scan_sonar

Block, India. "New material made from desert sand could offer low-carbon alternative to concrete", *Dezeen*, (2018), (accessed: February 2023) <https://www.dezeen.com/2018/03/24/desert-sand-could-offer-low-carbon-concrete-alternative/>

Boetzkes, Amanda & Diamanti, Jeff. "At the moraine", *E-flux*, (2020), (accessed: February 2023) <https://www.e-flux.com/architecture/accumulation/341644/at-the-moraine/>

Bontemps, Sophie. "Maroc : Razzia sur le sable", *Arte Reportage*, 2021

Broken circle spiral hill, *Smithson Robert*, Holland, 1992

De Baan, Christine, Olof, Koekebakker, *The flood*, IABR, Rotterdam, 2005

Deleuze, Gilles, *Desert Islands and other texts*, *Semiotext(e) Forent Agent Series*, 1953-1974

Dhabban, Abdullah. "Single Beam & Multi Beam Echo Sounders", *Grabcad Community*, (2021), (accessed: February 2023) <https://grabcad.com/tutorials/single-beam-multi-beam-echo-sounders>

De Pauw, Chantal. "Tout savoir sur l'extraction de sable en mer", *News Economie*, (2020), (accessed: February 2023) <https://news.economie.fgov.be/196012-tout-savoir-sur-l-extraction-de-sable-en-mer>

Duggan, Jennyfer. "Inside the Doomsday Vault", *Time Magazine*, (accessed: February 2023) <https://time.com/doomsday-vault/>

Gardner, Edwin. "Storytelling", *Archis*, Volume 20, (2009), (accessed: February 2023) <https://archis.org/publications/volume-20-storytelling/>

Hérard, Pascal. "Pénurie de Sable : un enjeu planétaire environnemental et économique", *TV5 Monde*, (2017), (accessed: February 2023) <https://information.tv5monde.com/info/penurie-de-sable-un-enjeu-planetaire-environnemental-et-economique-185813>

Ingold, Tim. *The perception of the environment*, *Routledge*, 2000

Jackson, Marie. "Why 2,000 Year-old Roman concrete is so much Better than what we produce today" *Science Alert*, (2017), (accessed: February 2023) <https://www.sciencealert.com/why-2-000-year-old-roman-concrete-is-so-much-better-than-what-we-produce-today>

Jordan, Christian, Jan, Tiede, Oliver, Lojek, Jan Hendrik, Visscher. "Sand mining in the Mekong Delta revisited". *Nature*. (2019). (accessed: February 2023) <https://www.nature.com/articles/s41598-019-53804-z>

K. Le Guin, Ursula. *The Carrier Bag theory of fiction*. Ignota books, 1989

Kremer M.A., Peter. "Das Langeooger Flinthörn. Geschichte einer wunderbaren Landschaft". *Melkhörndüne* (2009). (accessed: February 2023)

Leary, Fiona. "Morocco's Sand Mafias". *CSIS*. (2022). (accessed: February 2023) <https://www.csis.org/analysis/moroccos-sand-mafias>

Mahtani, Nashin. "Torrential Urbanism and the future subjunctive". *E-flux*. (2020). (accessed: February 2023) <https://www.e-flux.com/architecture/accumulation/345108/torrential-urbanism-and-the-future-subjunctive/>

McCarrigle, Lia. "Eliasson on Art, the climate crisis & why we should all be activists". *Highsnobiety Magazine*, Issue 19. (2020). (accessed: February 2023) <https://www.highsnobiety.com/p/olafur-eliasson-artwork/>

Misuriello, Julie. "La double perception du sable en Egypte ancienne". *Openedition Journals*. (2013). (accessed: February 2023) <https://journals.openedition.org/te/7212>

Morris, Ali. "First there is a mountain". *Dezeen*, 2019

Morton, Timothy. *The ecological thought*. Harvard University press. (2010)

NLWKN Pressestelle. "Strandaufspülung auf Langeoog beginnt nach Pfingsten". *Niedersächsischer Landesbetrieb für Wasserwirtschaft, NLWKN Küsten und Naturschutz*. (2022). (accessed: February 2023) https://www.nlwkn.niedersachsen.de/startseite/aktuelles/presse_und_offentlichkeitsarbeit/pressemitteilungen/strandaufspulung-auf-langeoog-beginnt-nach-pfingsten-211986.html

R. Hackney, Christopher. "Sand mining far outpaces natural supply in a large alluvial river". *European Geoscience Union*. (2021). (accessed: February 2023) <https://esurf.copernicus.org/articles/9/1323/2021/>

Sekula, Allan. *Okeanos. Thyssen Bornemisza Art Contemporary*, 2017

Sivagami, Casimir. "Recybéton : L'usage des granulats recyclés dans les bétons". *AC Press*. (2019). (accessed: February 2023) <https://www.acpresse.fr/projet-national-recybeton-usage-des-granulats-recycles-dans-les-betons/>

Slimani, Leila. *le parfum des fleurs la nuit*. Gallimard, 2021

Sparavigna, Amelia Carolina. "A study of moving Sand Dunes by means of Satellite Images". *International Journal of science*, Volume 2. (2013)

Sparavigna, Amelie Carolina. "Satellite Images of Sand Dunes Filtered by means of GIMP retinex". *HAL Open science*. (2020). (accessed: February 2023) <https://hal.science/hal-02563029/document>


Stone, Christopher. Should trees have standing?
Towards Legal Rights for natural objects. Southern
California law review 45, 1972

Taïx, Caroline. "La nouvelle Zélande dote un
fleuve d'une personnalité juridique". Le Monde
(2017). (accessed: February 2023) [https://www.
lemonde.fr/planete/article/2017/03/20/la-nouvelle-
zelande-dote-un-fleuve-d-une-personnalite-
juridique_5097268_3244.html](https://www.lemonde.fr/planete/article/2017/03/20/la-nouvelle-zelande-dote-un-fleuve-d-une-personnalite-juridique_5097268_3244.html)

Theunis, Laetitia. "L'or de la mer du Nord c'est son
sable". Daily Science (2018). (accessed: February
2023) [https://dailyscience.be/04/06/2018/lor-de-la-
mer-du-nord-cest-son-sable/](https://dailyscience.be/04/06/2018/lor-de-la-mer-du-nord-cest-son-sable/)

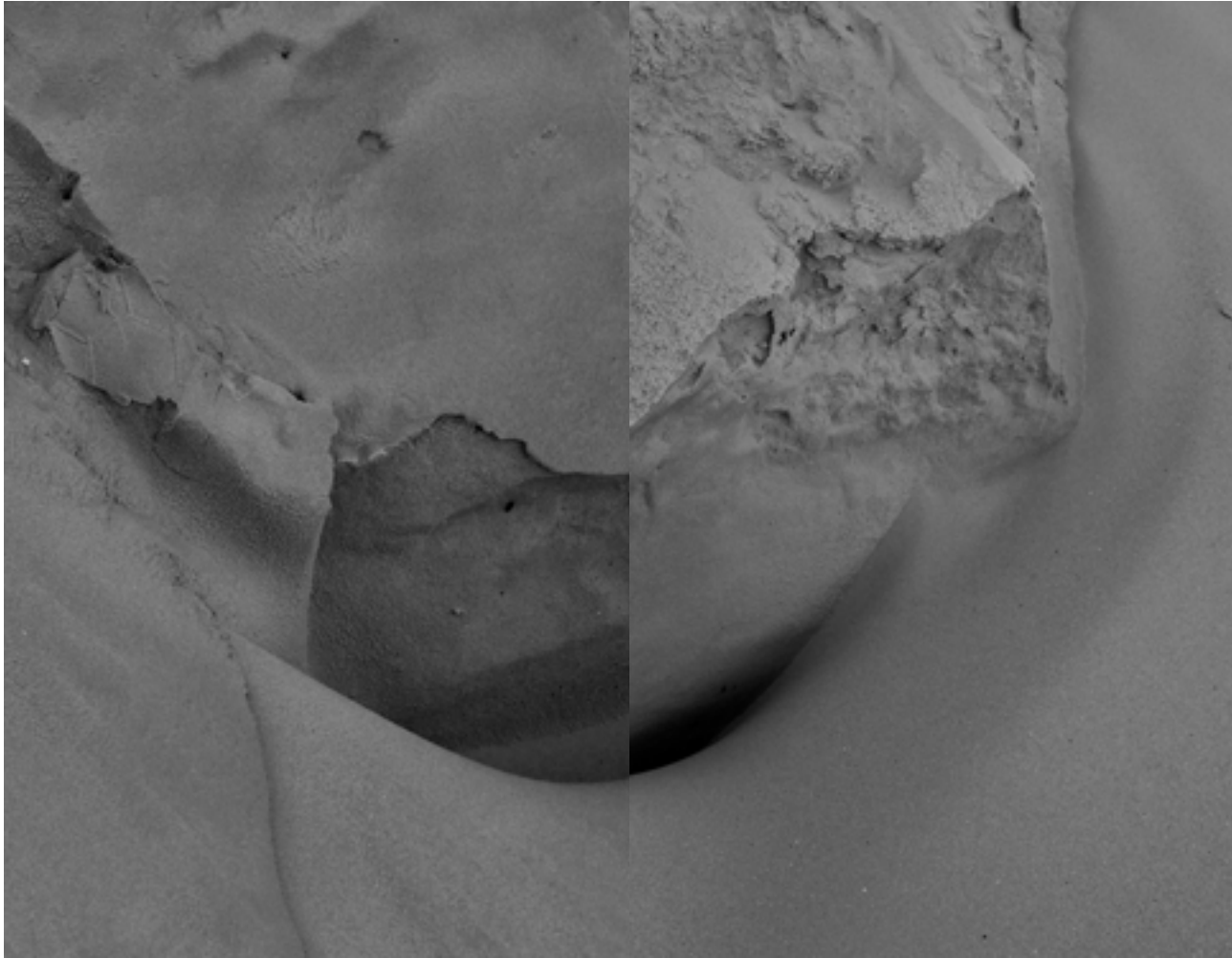
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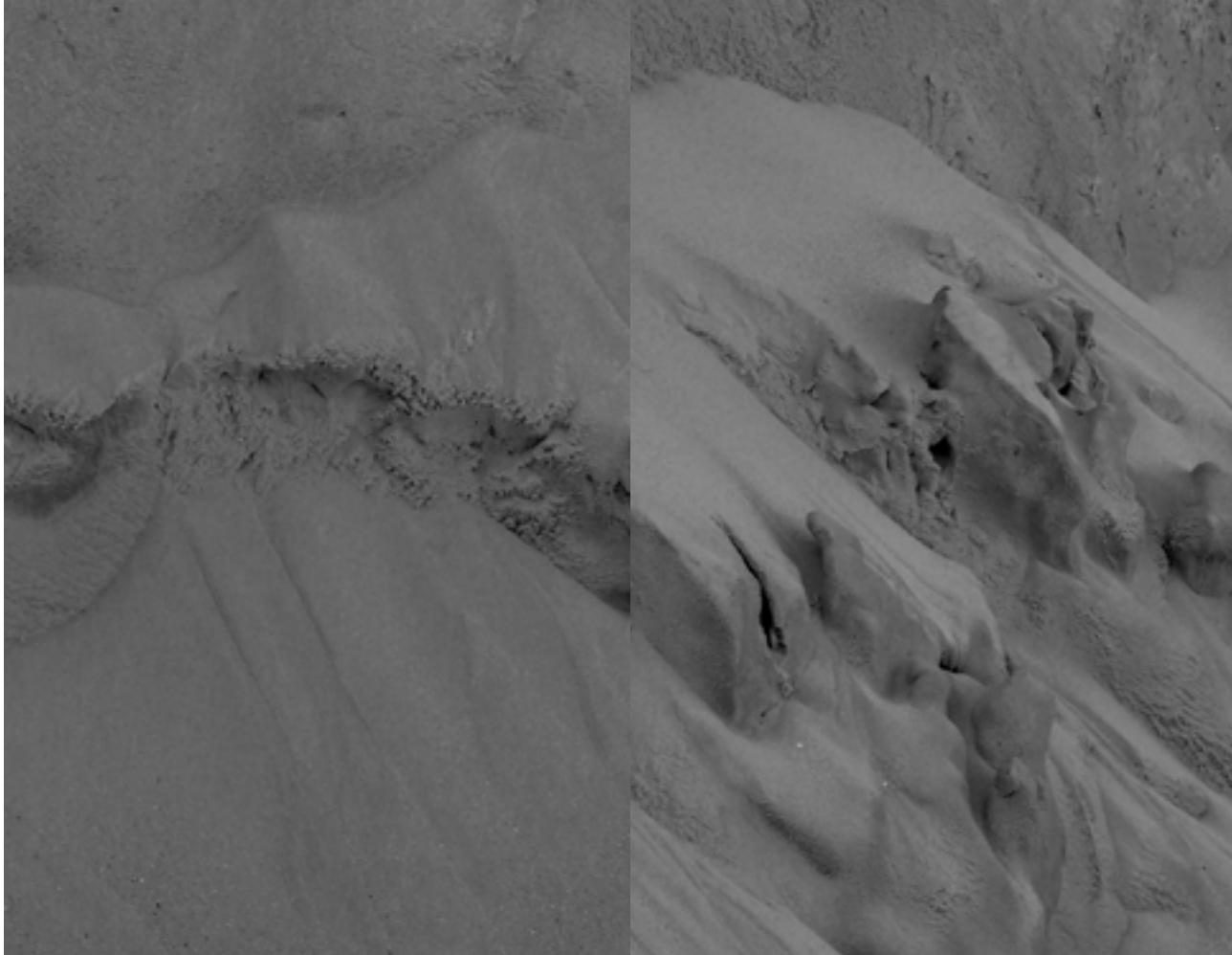
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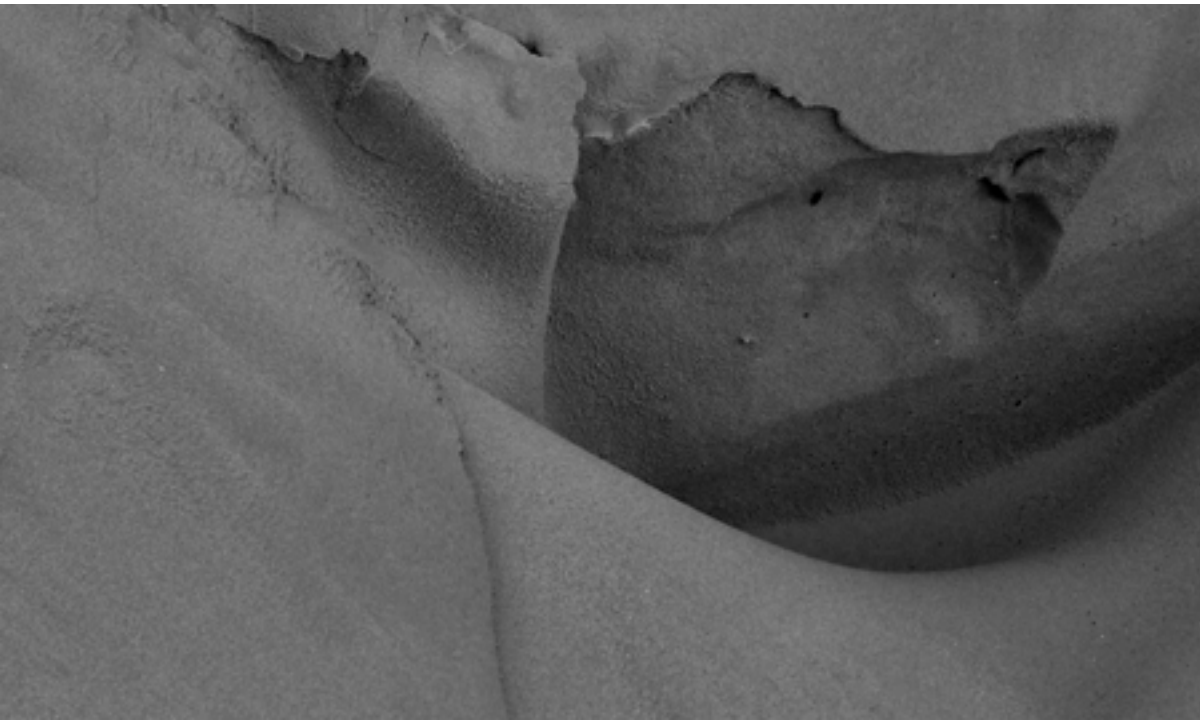
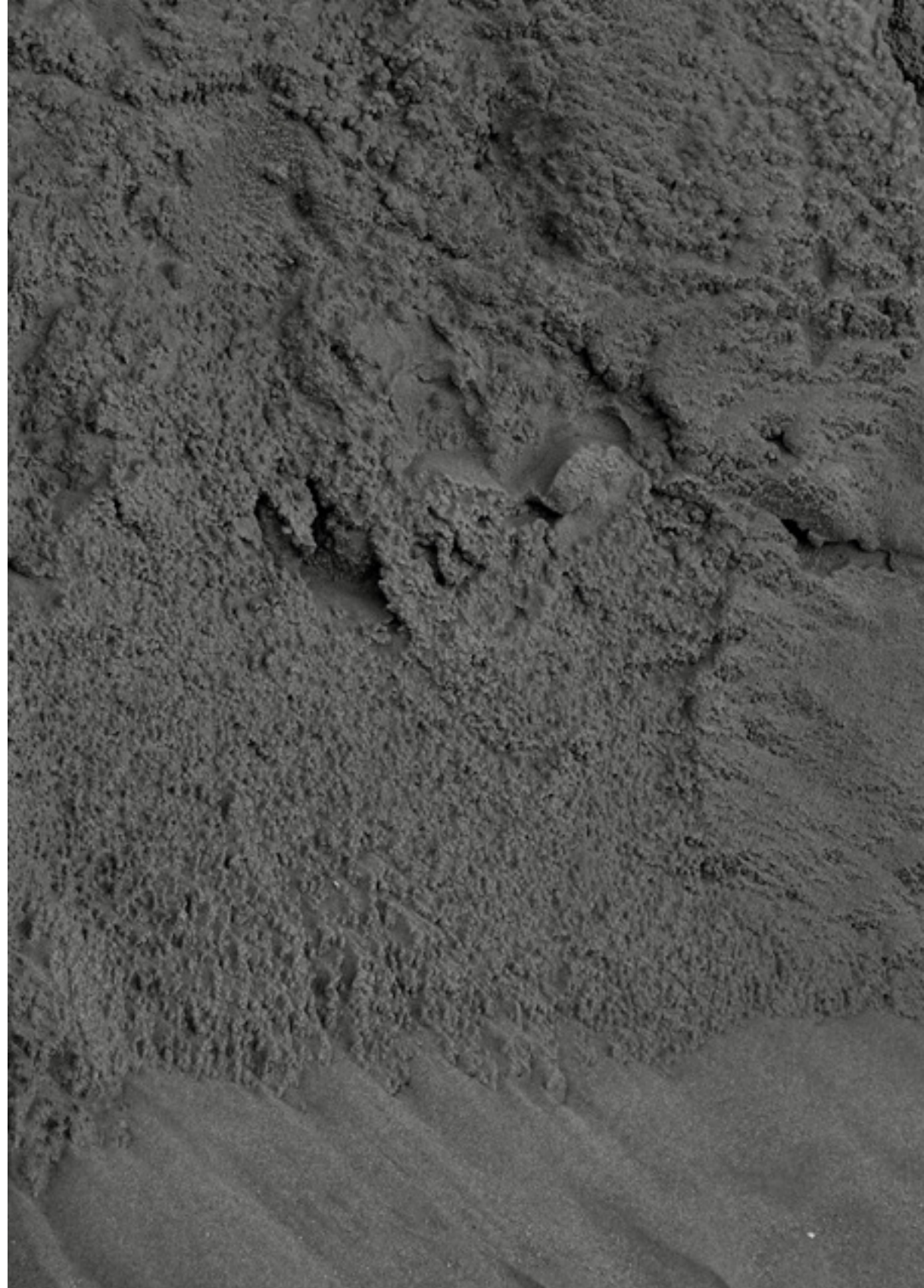


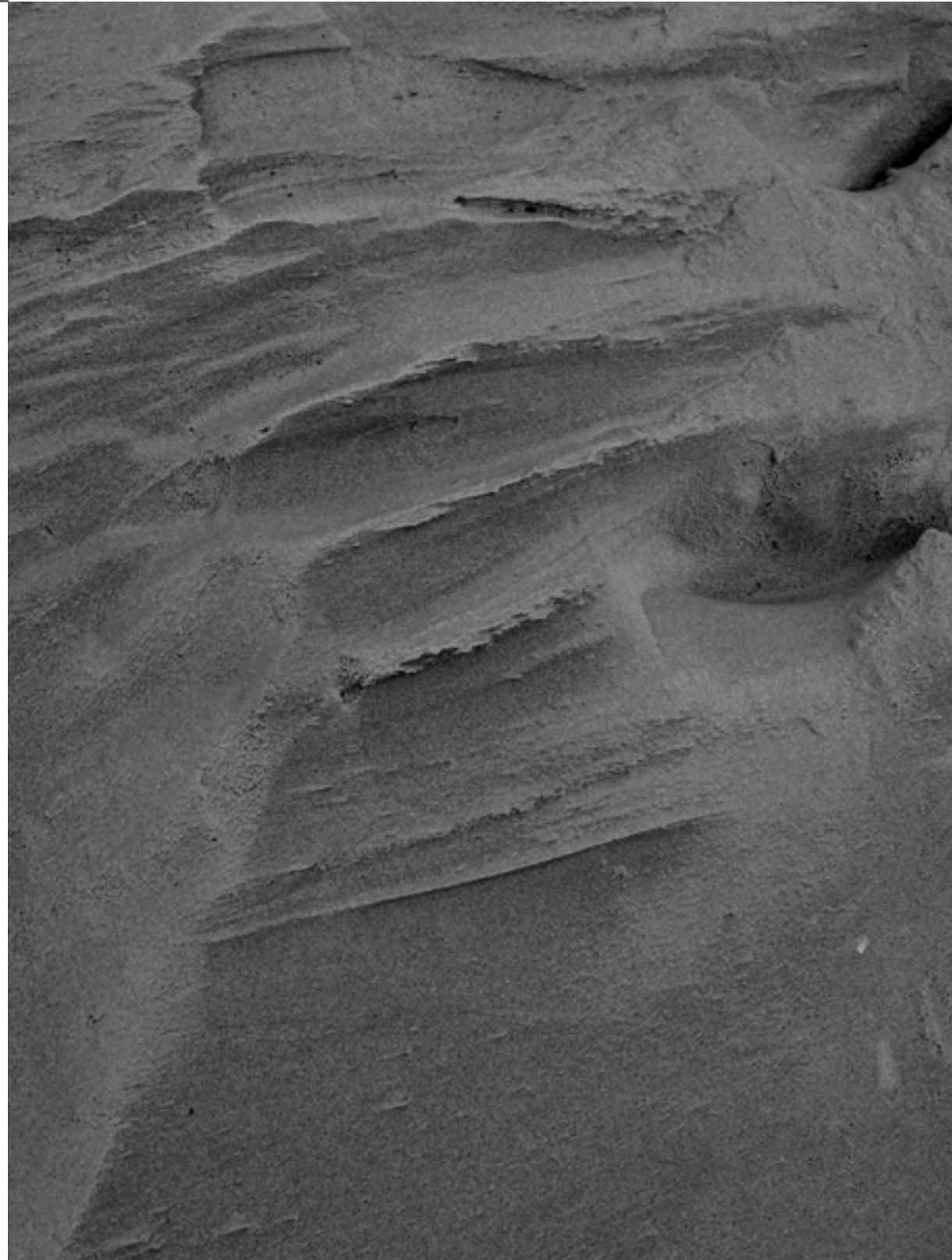
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