My World is Melting:
Living with climate change in Svalbard

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Foreword

On Saturday the 19th of December 2015, snow came thundering down from Mount Sukkertoppen and into Longyearbyen, which was just in the process of waking up. A two-year-old girl and a father died. On the 21st of February 2017, a new avalanche came down from the same mountain and swept through a terraced house. There was a landslide just beside the graveyard and one which came down into the dog kennel after heavy rainfall in autumn 2016.

Time and time again, people in Longyearbyen have been evacuated from their homes when huge deluges of water makes the earth sink and split apart, when torrential downpours turn the snowy mountainside into slush in the winter, and when the winter winds slacken the snow on the mountainsides.

In 2006, I started working as a journalist at Svalbardposten. In December, it was clear that this would be the warmest year in Svalbard since the temperature measurements began. One of my colleagues interviewed a climate scientist at the Norwegian Meteorological Institute, who warned us that the temperature in some areas of the archipelago would rise by more than 8 degrees over the next hundred years. The greatest rise in temperature would be in the winter.

I'm not sure if I even read the article – at least, it didn't make an impression on me. One degree warmer here and one degree warmer there. I didn't think about it as I whizzed around on my snowmobile, the wind on my hair and freckles on my nose. It was so beautiful, so wild, demanding and real.

I had heard the old fellows talking about the ice which settled across the huge Isfjord. About total coverage right over to the other side, to the cabins and trapping stations, about seals who had their young on the Adventfjord just down from the town. Once, the inhabitants of Longyearbyen were isolated from the time the ice settled in the autumn until it disappeared in the spring and well into the summer. Over the last few years, freight carriers have sailed the whole year round. The fjord lies dark and open.

The ice will come back, the weather, wind and landscapes have always been varied, say those who have seen many seasons from the seat of their scooter. I chose to remain calm about it, but I'm not calm anymore.

We have built a house here in the town, have two children, call this place home, and I suddenly started getting worried when bad weather was forecast. The dark times became especially heavy, with a lot of rain. I invested in a lined raincoat, thought about the house, about whether it was wise to tie all our money up here. I was unsure whether or not it was safe to walk in the mountain where I usually went. Emotions started to take over. I felt a need to get a grip, to understand what was actually happening, how nature was connected, how the climate system worked, what would happen with the weather on this group of islands and across the rest of the world if – or when – the Arctic melted.

On one of those dark, glassy, soaking wet winter days in 2018, I decided to spend the rest of the year finding out about it.

This is a book about how I am experiencing climate change, and about Longyearbyen, which is now partly being defended from natural hazards. Is it possible to fully protect a town from the avalanches, floods and extreme weather which is reported to happen more often as we move forward? Should I stay here with my family?

Falling Down

The town lies warmly in the night
guarded by the mountains high,
glittering like countless diamonds,
like an earth-bound starry sky.
An echo of a star-strewn sky
among the glorious northern lights,
as though the work of creation
has in this place been put to rights.

Hans Engebretsen

Her body is completely stuck. Eli Anne Ersdal thinks she is lying on her stomach, perhaps under the kitchen table as her face is crushed against some woodwork. She can move her right hand a little and can feel some pieces of wood. Somewhere in the snow, she hears the two-year-old wailing. Then everything goes quiet. She thinks that everyone is dead now, her two friends and their children. Now she is dying, 33 years old, on the 19th of December 2015 – five days before Christmas.

It would have been better if she'd died during the summer. Her father won't be able to fix this. She has to get out. She tries digging a little with her hand, but it's no good.

The only thing she can hear is the sound of her own death anxiety. Panic and hyperventilating don't help. She knows this and forces herself into yoga mode, breathing calmly in and out and saying to herself: "You mustn't dig now. After 15 minutes in an avalanche, the chance of survival decreases sharply. But you have pieces of wood in front of your face. It's giving you an air pocket and extra time. Whether the four others in the house are dead or not is something you have to think about later."

That same Saturday, I'm sitting on the play rug in the living room with my children, two-and-a-half-year-old Lotte and Nor, who will celebrate his first Christmas. There is a pile of presents in front of them. We're having a pretend Christmas, since we will celebrate the day itself with relatives further south.

Our little terraced flat lies on the outskirts of the town centre, east of the opening of the narrow Longyear Valley. We've started building a new, bigger house wall-to-wall with the old one at the end of the street. The first thing I did when I woke up was look out of the window and down towards the first of the walls which were erected just below. The meteorological institute had released a severe weather warning for wind the day before – the first since 1997. It could turn into a hurricane with especially strong gusts of wind.

My colleagues in Svaldbardposten had been at work most of the night. The roof had been blown off of an empty student accommodation building. Roof tiles had loosened from the school, metal was torn from pipes just by the gallery, cars had been forced off the roads, but nobody had been injured. And our walls were still standing. Thankfully.

Now we can enjoy small children's hands, struggle with wrapping paper, and sip coffee in between.

Suddenly, my husband's pager screeches – a sound we don't want to hear. Although Trond is a fireman, he's not on duty just now. The alarm has sounded for all of fire and rescue services in Longyearbyen. I only hear a little bit of the message – something about an avalanche and houses. Trond dives into the hallway, pulls on some clothes and slams the door behind him. The door remains ajar. Some snow has wedged itself between the door and the frame, as it often does. When I go to close the door, I see that Trond has started his snowmobile and tears himself free from a mound of snow on the other side of the road. He can forget about his car. The street is filled with snow. I've never seen anything like it.

It's soon 10:30. I turn on my Mac and open the news websites for Svalbardsposten and NRK Troms. No information. I click refresh again and again, in between changing nappies, breastfeeding and playing on the rug. Half an hour later, the first piece is published. The situation is chaotic. "Police, firemen and other civilian volunteers are at the scene in order to gain an overview and are going from house to house. An avalanche has broken off from Mount Sukkertoppen and swept down towards the houses. The extent of the injuries is as yet unclear. The scope of the avalanche is also unclear, but police at the scene have confirmed that ten houses have been hit," it says. What does this mean? I can't picture it.

I take a photo of what was unfolding on the computer and send it to family on the mainland so that they won't worry about us. "Ten houses caught up in an avalanche. Dad is out on his snowmobile with his fire alarms blaring, he's helping out, but everything is fine with us. The avalanche hit a different part of the town. No danger here."

Meteorologist and oceanography scholar Eli Anne Ersdal was excited by how much snow had fallen overnight. Outside her window she saw that her snowmobile sled was completely snowed in outside her apartment in Blåmyra. She wanted to dig it free and see what the town looked like after the storm. She found her measuring stick and a shovel before trying to open the outside door. It wouldn't budge. There was snow in the way. She saw a man by the terraced house on the other side of the street and shouted for help.

The man cleared the snow and Eli Anne went out of her apartment and into the December morning. She was completely transfixed by how the wind had shaped the snow. Towards the top end of the road, the snow was perhaps two metres deep and covered the cars. Towards the bottom end there was hardly any snow, apart from that which had gathered by her front door. She left her sled where it was, preferring to go and look for her snowmobile which was parked slightly closer to the town centre. Fortunately, that wasn't snowed in.

Relieved, she decided to put off digging out her snow sledge. Her friend, Malte Jochmann, had invited her for coffee the day before, and she would rather do that. Eli Anne set course for the iconic houses at the foot of Mount Sukkertoppen, where Malte lived with his partner Elke Morgner and their daughters Elida (2) and Svala (8 weeks).

A couple was walking in front of her. Eli Anne followed their footprints as far as they went. She waded on towards the red house her friends lived in, second row from the

mountain, first on the right-hand side. The light inside was warm and golden, and a Christmas star was shining in the living room window. The wind had calmed down. Just a few snowflakes floated gently towards the ground. When she had worked as a weather forecaster at the Meteorological Institute of Tromsø, her hometown, avalanche warnings was one of her duties. In the lights coming from the town, she could see the sharp overhang of Mount Sukkertoppen. A large snowdrift had accumulated, hanging further out from the mountain than usual, a large bulge on the mountainside.

Eli Anne stamped the snow from her and knocked on the door.

"I've never seen the snowdrift look so intense before," she said as she walked into the hallway.

Malte was on his way out into the white surroundings with his eldest daughter but paused the excursion in order to have another coffee. In the kitchen, Eli Anne tried to show Elke the snowdrift, but a streetlight blinded their view. Elke was the co-ordinator for Longyearbyen Red Cross Search and Rescue Corps and showed an above-average interest in snow. Malte was a geologist working for Store Norske, a mining company, as well as PhD scholar at the University Centre in Svalbard.

Everyone wanted to go out and look at the snow, but first, coffee. Elke held Svala to her chest and Elida sat in a highchair beside Eli Anne, while Dad was in charge of the coffee.

"Would you like milk in your coffee?" he asked.

"Yes please," replied Eli Anne.

Then the explosion came. She was thrown right across the room. Her head crashed into something hard – first the back of her head, then her forehead. Then came a quiet swoosh, and she knew that it was the sound of the recent snow filling the room.

Malte managed to think that it was strange that the rumbling threw the snow towards the window. Then he was standing, stuck fast, wearing a white t-shirt and jogging trousers with around half a metre of snow above his head. He doesn't quite know how, but by squirming and wriggling with all his might, he freed himself. The snow reached almost up to the roof by the kitchen cupboard, not quite as high by the window. It was completely black outside. Both the houses and the streetlights which usually illuminated the street were gone.

Had he lost his entire family?

He heard his partner shouting. Using only his fingers, he dug until her freed her head. She asked him to find something to dig with. The only thing he found was a wok lid which was sitting on top of one of the cupboards.

Svala had been torn out of Elke's arms, but she heard the baby crying. She couldn't be far away.

Elke shouted:

"Hold on, little Svala, hold on!"

Malte found his daughter where Elke had heard the crying, carefully pulled her free in the darkness and put her into the cot in the living room. Then he dug Elke out. She sat down in the living room to breastfeed and calm the screaming baby. It didn't work. She put her daughter down again. It was like a switch had been flicked inside her head, changing her mindset. They had to get everyone out! Elida was still lying beneath the snow. They had to find her and Eli Anne.

They dug and dug. Their fingers were burning. The wardrobe had been swept away, but they managed to find gloves which fit Elke. Malte's blue, freezing fingers dug on without protection.

They didn't speak to each other. They just dug and dug and shouted for help. A policeman appeared with spades, but then disappeared in order to gain an overview of the situation.

The area was unrecognisable. 5,000 tonnes of snow had loosened from Mount Sukkertoppen. The slab of the avalanche was 200 metres long and between two and three metres high. Eleven houses on Vei 230, spread over two rows of houses, had been hit. Elke and Malte's house had been twisted a little, while the other houses had sailed between 30 and 80 metres with the snow. Everything was helter-skelter. Cars, snowmobiles and remnants of woodwork lay mixed up in the white.

In one of the other houses, Anne Kristin Jaksobsen was half-sitting, half-standing, stuck in the snow among broken dishes and the wreckage of her kitchen wall, but she managed to bang on a microwave oven. She banged and banged.

In the house next door, father-of-three Tor Selnes woke up with snow and building materials burying the bottom half of his body. He fought for his life, tried to save himself. Then everything went black. When he regained consciousness, nothing was where it should have been. Tor freed himself, crawled out and stepped on some nails on the way. Stark naked, with snow to his waist, he saw that the remains of his green house were in the wrong place. They had surfed 80 metres downhill with the snow.

The children, how were the three children? Tor shouted, screaming to his eldest.

"Here," he heard from inside.

"Are the two others alive?" the father asked.

"Yes," the boy replied.

Elke and Malte shovelled and shovelled while the baby howled in the room next door. Then help arrived.

Elke threw down her spade and rushed to her youngest daughter. She took off her cold cotton clothes and bundled her into a blanket. It had been half an hour since the avalanche.

She isn't religious, but she sent a thought to God and prayed that Elida would still be alive.

Eli Anne heard the snow creaking and Elke shouting. She tried to reply, but the snow smothered any sounds. The panic came in waves, but it helped to feel the pieces of wood in front of her face with her right hand. As part of a course at the University Centre in Svalbard, she had read old avalanche reports. She knew that there was an avalanche risk on the mountainside above, that an avalanche could, in theory, reach the walls of the houses in the next street over. She was now lying, completely stuck, wondering if the snow really could go as far as that. Right into the house in the second row from the mountain.

She was freezing. With her right hand, which was pressed against her face, she managed to grab hold of the zip on her high-necked woollen jumper. She pulled it up as far as it would go. Maybe it would help to keep the cold out.

After a while, Eli Anne heard new noises. People and shovels, but they were far, far away. She breathed. In and out. In and out.

Suddenly, there was air and rescue workers above her.

"There's five of us. I heard Elida whining close by me," she said, and felt one of the rescue workers place his hand on her shoulder.

"We have you now," he said.

Then she let her guard down. She would have to get out so that the rescue workers could get to the place where the two-year-old mostly likely was.

It had been 38 minutes since the snow came thundering down.

Eli Anne had been thrown to the other side of the room and into the kitchen counter, into the second-top drawer, the one with the sharp kitchen knives. Luckily, the sharp edges had been facing the wall.

She was accompanied through the affected area without any shoes on, sat on a snowmobile and driven to the hospital.

Just after, they found the buried Elida. She was lying with her back against the kitchen furnishings in thin woollen undergarments beneath two metres of hard-packed snow. The floor there had been pushed down 40 centimetres. When a fireman pinched the two-year-old's cheek, she started making noises.

"Children's screams will never be the same again," said one of the rescue workers later on.

He tore a cabinet loose from the kitchen. It worked well as a stretcher.

Trond came home late in the evening. His eyes told of tragedy.

The rescue workers had heard Anne Kristine Jakobsen banging on a microwave oven, and after 38 minutes she was dug out as well. But when she, Eli Anne and Elida were taken out of the affected area, there were still three people over two houses still missing.

Sisters Pernille (3) and Nikoline (2) Røkenes lived in the row of houses closest to the mountain. The girls were on their way out to go sledding on the toboggan they'd received as an early Christmas present. They had started getting ready in the entrance hallway while their father was in the bathroom. When their parents, just seconds later, rushed out to look for the girls, the hallway was empty. Where they should have been standing was nothing more than air and snow.

A long chain of volunteers, ready for action, stretched from the affected area and down along Hilman Rekstens vei. The people in the first line shovelled snow behind them and used chainsaws to cut through what remained of the buildings in the aftermath of the avalanche. After an hour and fifty-five minutes, the rescuers found Nikoline, the youngest girl, in the hard-packed snow. Eight minutes later, her older sister was dug out. Both were sent by air ambulance to the hospital in Tromsø.

Over three hours passed before Atle Husby was found. He was found in his bedroom under hard-packed snow and building materials. He was alone in the house when the snow came down. His three children were at their mother's house a bit further away in Lia that day. They were physically unharmed, but still caught up in this white nightmare.

The next day, I trundled out into the streetlights and snow drifts so I could see, because I couldn't understand. Floodlights illuminated the slab of snow on the mountainside. The houses stood helter-skelter.

On the way, I was told that little Nikoline probably wasn't going to make it. I didn't understand. Both Nikoline and Pernille had gone to the same nursery as my daughter. We had eaten breakfast there together almost every morning. Nikoline died, but her sister was a miracle.

The whole town rose to the challenge when the alarm went off. They shovelled, made food, looked after children, drove ambulances, readied the hospital, opened the airport, informed, comforted, provided equipment, and made space in their houses for those who were evacuated. For a long time after the avalanche, people hugged each other in shops and cafes, spoke to each other and looked each other in the eye. Not everyone's gaze was the same as before.

There were memorial services, burials and meetings to inform people of what had happened and of an avalanche warning system which would now be put in place.

It took a long time before I understood the scope of the catastrophe, and that it could have been much worse. Altogether, there were 25 people in eleven house who were caught up in the avalanche. Ten of them got trapped in the snow. Eight survived.

Elida was taken to the hospital in Tromsø by air ambulance, where she was assessed and reported to be fit and healthy, eating the freshly fallen snow.

We were advised to tell little two-and-a-half-year-old Lotte about what had happened so that she wouldn't imagine that things were worse than they were. We told her than an avalanche had hit some houses, that Elida had been in one of them, but that she was fine, that two people died, that Nikoline was one of them. She understood it in her own way and talked a lot about her nursery friend. Later, she became anxious when the wind started picking up. She didn't want to read her book about the who troll who got stuck in the ice and blew out bad weather which moved the houses in Longyearbyen. A little boy was picked up by the wind and blown away from his mother.

We told her that people had learned something. That there was now someone who made sure that nobody was living in the houses where an avalanche could hit. We spoke about death often, that we'd definitely get really old, just like great grandma.

"But not everyone. You can be unlucky. Nikoline was really unlucky," she said.

The nature on Svalbard has always been wild, beautiful and unpredictable. Several people have perished out in the terrain: they have walked into crevasses, gone through the ice, got caught in in avalanches, froze to death, drowned and been attacked by polar bears. This wilderness was one of the things that attracted me when I first came. Reading glaciers and sea ice, learning how to save friends in a kayak, learning to shoot a signalling pistol and a rifle. You always had to have your wits about you when you were out and about, but I was safe in the town. Right until the 19th of December 2015. Even then, I thought about the avalanche as a tragic one-off event.

Reports back in 1992 tell of avalanche risks in Lia. The reports recommend securing the area, or avalanche warnings and evacuations of inhabited areas in the vicinity. When the climate prognosis at the start of the 2000s showed that there would be warmer winters and

more snow from then on, the authorities were warned that the avalanche risk could increase. Longyearbyen's local authorities and landowner of Store Norske, which built houses in its time, could not agree who was responsible for security. In 2008, they signed a deed saying that they disagreed and forwarded the case to each department. At the end of 2013, it was clear that the Norwegian Water Resources and Energy Directorate would take responsibility for this, just as it would be on the mainland. The following spring, they started mapping out different natural hazards.

After the 19th of December 2015, the authorities received criticism. People were angry that avalanche security measures were not permanently in place, that nobody thought to evacuate people during the storm that was forecast, that the tenants in the houses were not even informed that they lived in an area with a high avalanche risk. Some people reacted to the fact that people no longer kept an eye on how much snow lay on the incline behind the houses. A yardstick once stood there, and people kept an eye on it.

The Norwegian Bureau for the Investigation of Police Affairs later concluded that there was no basis for punishing anyone.

It wasn't long before the avalanche too was placed into a wider context.

A wet black autumn and new avalanches

The bad weather of 2015 did not come alone. After the snowstorm came the rain, making Christmas even blacker – if that was possible. Autumn 2016 was one of the wettest on record and, with no snow covering the mountainsides, the darkness swallowed everything.

I was at work covering a flea market which was being held to support a charity donation drive when I got a message that a landslide had sailed down Platåberget, glided past the graveyard and spilled out onto the road. I took photos of the rain, water, mud and road blockages.

In November, after the frost had barely begun to nip our cheeks, the floodgates opened once again. Over a twenty-four-hour period, the equivalent of a third of the average yearly rainfall fell. The ground on the dark mountainsides sank down and split apart in several places. There were also several smaller landslides. Local authorities evacuated 259 people from their homes, roads were closed, and I rushed out to the dog kennel, where a landslide had claimed ten cages. Thankfully, the dogs in the cage at the back were also evacuated.

In the Longyear Valley, helicopters whizzed around and lit up the mountainsides in order to see if they were in the process of breaking loose.

Between Christmas and New Year 2016, the Meteorological institute forecast similar weather to that which surrounded the deadly avalanche the year before. By then, an avalanche warning system was in place in the town. Trond was on duty with the fire brigade. He attended preparatory meetings and evacuated guest houses, flats and apartments in Nybyen. I was out taking photos of ploughs shovelling snow. Thankfully, the only injury I heard of was a dent and a smashed mirror on my car, caused by a loose toboggan which coursed along with the wind.

When the storm was over, the year could be summarised as such: 2016 was the warmest and wettest year ever recorded on Svalbard, a whole 6.6 degrees above the normal temperature. When weather reports talk about normal in relation to the weather, they mean the average for the period between 1961 and 1990. 310 millimetres of rain had fallen by Svalbard airport – 120 millimetres over what was normal. If we had collected all the water in 10 litre buckets, we would have had to balance 31 buckets on top of each other per square metre.

2016 was also the warmest year ever recorded globally.

But it didn't stop there. Before I'd even fixed the damage to my car with an insurance company after the storm between Christmas and New Year, there was commotion again. On the night of the 21st of February 2017, a warm front blew in from the east with a reach of over 20 metres per second. It was snowing heavily, and the wind carried masses of snow down the sheltered side of Mount Sukkertoppen. Longyearbyen local authorities sent out a notice that

there was a great risk of an avalanche on the terrain, but that it wouldn't threaten any houses in the area. A new natural hazard report had just been released, and the data models had worked out where and how far the avalanche would go.

On my way to work, my car got stuck in a snowdrift beside the refuse container on our street. When I finally got into my office in Svalbardposten, I noticed that something blue and yellow was driving a little too quickly past Hilmar Rekstens vei below Mount Sukkertoppen. Just afterwards came people, both on scooters and on foot. With shovels. My stomach started churning.

When I got to the scene with my camera and notepad, I saw that an entire building with six flats altogether was sitting askew. There was a gaping hole through one of the flats. Cars, refuse containers, a tracked carrier and snowmobiles lay strewn about. People had climbed out through the living room window wearing only their socks. The rescue services pushed their measuring sticks systematically through the snow between the houses. Eleven people were in the houses which were hit. Fortunately, everyone got out in one piece, and luckily nobody was out walking in the street when the snow came down this time either. But the unrest was palpable. The avalanche warning system had betrayed us. What would parents say to their children next time the wind picked up?

We told Lotte and Nor that there had been a new avalanche, that they people who were keeping an eye on it had made a mistake. But our street – no avalanche would reach us now.

Sleep, little shoot

In February 2018, when the light started to come back and the walking season should have been in full swing, rain came pouring down on prominent guests from all over the world. Svalbard's global seed vault, the biggest safety vault for seeds in the world, was turning ten years old.

The vault is situated in the mountain above the airport in Longyearbyen. A blueish light shining in all directions, like a diamond. In the mountain caverns behind the diamond are seeds from over 5,000 plant species, beans, maize, corn and rice. They will lie cold and safe in the permafrost, even if the freezer unit loses electricity. The seeds are a protection again war, sickness, natural disasters and the rising of the oceans. In Autumn 2015, 128 boxes of Syrian seeds were collected from here after the seed bank in Aleppo was bombed. Syria is where a lot of our most important food plants were cultivated for the first time. Most of the grains we use often, like wheat grain and barley, come from there.

By taking care of the seeds, we can also help these food plants adapt to a changing climate and utilise those which manage best. Now the irony was that the warehouse itself had not adapted to the new Svalbard climate. When the Norwegian Directorate of Public Construction and Property built the seed vault, they dug a deep trench in order to reach the mountain itself. They constructed an entrance tunnel and packed rubble over and around it. The permafrost didn't come back to the rubble around the tunnel as was originally thought. When it rained and thawed, water flowed into the tunnel and down towards the seed halls in the mountain. The fire services had to pump water out of it several times, but this should never have been a danger for the seeds.

In connection with this soaking wet ten-year anniversary, the Minister of Agriculture and food Jon Georg (Progress Party) gifted 100 million kroner. Now the warehouse would get a new watertight tunnel, a powerful concrete construction.

The seeds were also celebrated with a dance performance called "Frozen Songs" in the cultural centre. Eli Anne sat beside me in the hall. Naked feed thumped rhythmically on the ground, bodies bloomed, swayed, a mother looked after her child, a child who was freezing. On a screen, large chimneys spewing out gases and particles appeared. The performance hit me right in the stomach. I pictured my own children. What would their future be like? What are we doing with nature, with our lives?

After this dance of gravity was finished, we went out into the glassy darkness.

"I think it's actually a good thing that it's raining today," said Eli Anne, wrapping her scarf tighter around herself.

"So you can actually work on your PhD, or what?" I asked, because she was often out skiing on cold, pink days.

We glided from the entrance to the cultural centre to the pavement which didn't glitter as much beneath the gravel.

“No, it’s good it’s raining because there are so many important people here just now. It’s good they get to see what’s happening. What’s going on with the weather is pretty dramatic,” she said.

That evening, I decided to spend the rest of the year trying to find that out. What on earth is happening?

Climate on speed

On the first day of summer 2018, I sit in my home office in my new yellow house by the mouth of the Longyear Valley. It’s almost two years since we moved in. Now most of the photos are hung on the walls, outdoor toys lie strewn across the veranda, and I have an office on the first floor with a panoramic view. I look down at the open Adventfjord and at Mount Hiorthfjellet on the other side, lying beneath heavy clouds. Patches of snow lie on the mountainsides. The terrain is muddy. The children, who are soon five and three, love it. They jump into puddles, smear themselves in it and put on muddy “make-up”.

The month of May, which has just ended, was the warmest ever recorded in Longyearbyen.

Three weeks ago, a river of meltwater flowed through our street. Our children waded through it and sailed paper boats in it. The ice, with its traces of car tyres, lay thick beneath the water. We have new neighbours in the street with small children who have been looking forward to cycling. We have as well, but I gave the newcomers a reality check: it’ll be several weeks before the ice is gone completely. I had to swallow my I-know-best comment after just one week. We could then set our bikes on the dry, gravelly asphalt, and our girl cycled on two wheels for the first time.

The May temperatures joined a long line of records. The Svalbard and Barentsburg region is the area of the world with the fastest growing temperature. While the UN shouts warnings about the consequences of global temperatures rising by more than 2 or 1.5 degrees since pre-industrial times, the yearly temperature in Longyearbyen has already increased by 3.8 degrees since records began in 1898.

If we look at 1961, the beginning of the so-called normal period, the average temperature on Svalbard has risen by 5.6 degrees. To compare, the temperature in Blindern in Oslo has risen by two degrees in the same period. The global temperature has risen by 0.9 degrees. The temperature rise on Svalbard is therefore three times higher than in Oslo and six times higher than it has been globally.

While I sit and watch the boats out on the fjord below, it won’t be long until the temperature has been above normal for 100 months in a row.

What is it that is causing the group of islands that make up Svalbard to warm up so much quicker than the global average? And is the warmth to blame for the avalanches which have been affecting the town? This is what climate researcher Ketil Isaksen from the Meteorological institute is going to help me understand.

The researcher has had his eye on Svalbard since he came as a brand-new student in 1995. One of the first things he noticed was that the houses in Longyearbyen didn’t have rain gutters. For the most part it doesn’t rain, was the explanation, it’s an Arctic desert. Now many people reckon that this is going to change.

“As a climate researcher, I’m interested in trends, and the trends I’m currently seeing in Svalbard, according to both my research and others’, makes me frightened. Not concerned. Not worried. Frightened,” he wrote in Aftenposten just after the black, soaking wet autumn of 2016.

Then unusual temperatures and amounts of rainfall came thick and fast in a short space of time.

He is still just as frightened, afraid we don’t have control. Researches use models, but it’s complicated to put the climate into a computer programme. For example, the sea ice is melting faster than the models say it will, the permafrost is thinning more rapidly, and newer research points to the fact that global warming could be even greater than the researchers in 2016 predicted.

Isaksen is particularly worried that global authorities don’t seem to understand the seriousness of it, despite many years of clear-cut results and advice from researchers the world over. We urgently have to decrease emissions, but there is not clear sign that the world is heading in the direction of what was set out in the Paris agreement: to keep global warming under 2 – and preferably under 1.5 – degrees above the temperature of pre-industrial times. Nobody has control over what will happen if the temperature should rise above that limit.

But he has hope. Emissions can transform rapidly if we have binding international climate agreements, or if renewable energy becomes able to compete with energy from fossil fuels.

The most important reason that the Svalbard region is warming up faster than the rest of the world is that the sea ice is melting. Previously, the snow-covered ice acted as an isolating lid between the warm water and the cold polar air. When the ice lay on the fjords, minus twenty-five degrees was completely normal on cold, clear days in March and April. Now that the ice is gone, the water is warming the air and it rarely gets colder than minus fifteen degrees. Since 1961, the Svalbard winters have, on average, become 9 degrees warmer.

The fact that the temperature is rising faster here than in other places in the Arctic is because the loss of sea ice is greatest here.

As well as protecting the cold atmosphere from the warm water during the winter, the ice reflected the beams of sunlight while the sea absorbed it. Freshly fallen snow reflects 90% of the sun’s energy, the summer sea ice 60%, while the sea sends back only 10%. The rest warms up the water. The snow season is also getting shorter: the spring comes earlier and the autumn comes later. Where the sun’s energy was once reflected by the snow, it is now drawn towards the ground, heating it up. All of this helps to strengthen the increase in temperature.

The ocean is also connected to the atmosphere and the weather. All of the processes work with each other.

“In the region of Svalbard, both ocean and air currents play a role, and less ice and snow strengthens the rising temperatures. It is a particularly complex picture. When you talk to researchers, they will have different opinions on what had the greatest influence on the rising temperatures. It’s probably because they know most about their own area,” says Isaksen.

What about the avalanches? Can we blame the climate for them?

Isaksen believes that it’s too early to say if the avalanche in 2015 was a direct consequence of rising temperatures, that it was possible that nature simply gave Mount

Sukkertoppen everything it had that day: icy ground, lots of snow and wind blowing in the "right" direction. Would the accident have happened 30 years ago in the same type of weather or was there an increase in precipitation because of higher temperatures? he asks himself.

If we set the avalanche in context, along with the avalanche we had in 2017 and all the landslides we've had in recent years, a clear trend starts to appear. When the temperature rises, the air can hold more moisture, and we can get more precipitation. With an increase in rainfall and other snowy conditions, the risk of all types of avalanche increases.

The average temperature in Longyearbyen will possibly be above zero degrees during some winters as early as this century if we keep holding out on reducing CO2 emission like we are doing today. To compare, the average temperature for the winter months after 1898 was 13.6 degrees. Sparklingly cold days where you can see your breath, where the snow is rasping and sandpaper-like, and ice appears on your eyelashes.

Increasingly more of the winter deluge will come as rain, just as it did during the seed vault celebration in February. When we tumbled into March 2018, the winter came back. The rain settled and froze, resembling the icy bonnet of a car. The neighbour's children skated on the plain down from our house. They made figures of eight and did pirouettes on the tundra. Others skated far across Advent Valley. We also shimmied out onto the ice, we knocked on it and looked at the yellow-brown tufts below. It was cold, pink, blue, purple and endlessly beautiful. We counted down to the 8th of March, the day of the sun, when its beams would pour over the mountain tops and into our valley.

Just after came the message that the three winter months which had just finished were the warmest ever recorded.