

Embroidered Meteorology

By Bettina Matzkuhn

Abstract

In this essay I trace my process in producing two bodies of textile artwork that resulted from and led to a concentrated period of learning. The potential for discovery, remembrance, interpretation and imagination is sewn into this process. Conveying my new comprehension informed decisions around imagery, materials and presentation. The slow mind/hand relationship inherent in working with textiles reinforces and clarifies what I have gained through shared family experiences, research and remarkable mentors from other disciplines.

My introduction to weather

I was out in the weather a lot as a child. My father loved sailing above all else and we went out every weekend from April to October, rain or shine. I thought that to

calculate what was in store weather-wise, one could simply look in the direction from which the wind was blowing. Dad told me how the weather always comes from the west, but I couldn't understand, in a raging south-easterly gale, why one would look west for any changes. He was patient with his explanations, showing me the "glass" (barometer) and describing how low air pressure is like a dip in a surface, sometimes a deep dip. Much later, I began to see how weather systems are enormous, hemispheric phenomena, that the weather does travel west to east, and that the rain in my puddle is only a minute symptom of something much bigger than I can comprehend.

In my art practice, I use the intricate and opulent surfaces of textile to understand the natural world which itself is the most elaborate textile I can imagine. Its interlocking filaments, textures and structures inhabit my imagination. My series *Sail* is comprised of four sets of 12' tall, embroidered sails that examine environmental awareness in the maritime community. The process of making the sails led me to explore the cartographic language of meteorology and to subsequently produce a series of textile works I refer to as *Weathering*.

Sail



Figure 1: *Sail: Tides*. 2011. 360cm h x 270cm w x 120cm d. Textile, wood, metal.

Photo: Ted Clarke.



Figure 2: *Sail: Oceans*. 2012. 360cm h x 270cm w x 120cm d. Textile, wood, metal
Photo: Ted Clarke.



Figure 3: *Sail: Clouds*. 2012. 360cm h x 270cm w x 120cm d. Textile, wood, metal
Photo: Ted Clarke.



Figure 4: *Sail: Clouds*, detail.

I worked on four sets of sails as a memorial for my father. They were embroidered with tides (figure 1), pilot charts (figure 2), and patches to acknowledge the necessity of mending sails. The fourth set of sails (figures 3 & 4) featured a cloud atlas. Ideas of personal and communal knowledge were important to him: as a keen mariner, he was a devotee of the weather reports, tide books, and the marine radio station. He kept a written logbook about local conditions in the Salish Sea between Canada's west coast and Vancouver Island. For example, if there was an ebb tide and a south-easterly wind, the conflicting waves by West Vancouver's Pt. Atkinson lighthouse could be fierce. Dad pointed out to me how the wind would have a different severity on either side of the Sea. At Merry Island, close to the mainland and at the northerly end of a lot of open water, the southeasters would gain ferocity and pummel the little lighthouse. Across the water, Entrance Island lighthouse suffered the same fate when there was a north-westerly gale. Once on a calm, sunny day he barked at my mother and me to strike sail (he could bark). We did, bewildered, until he pointed at a toupée of cloud sliding down a mountainside's forehead. Within minutes the wind screamed in the rigging. His knowledge and awareness was crucial.

Weathering: Sentences

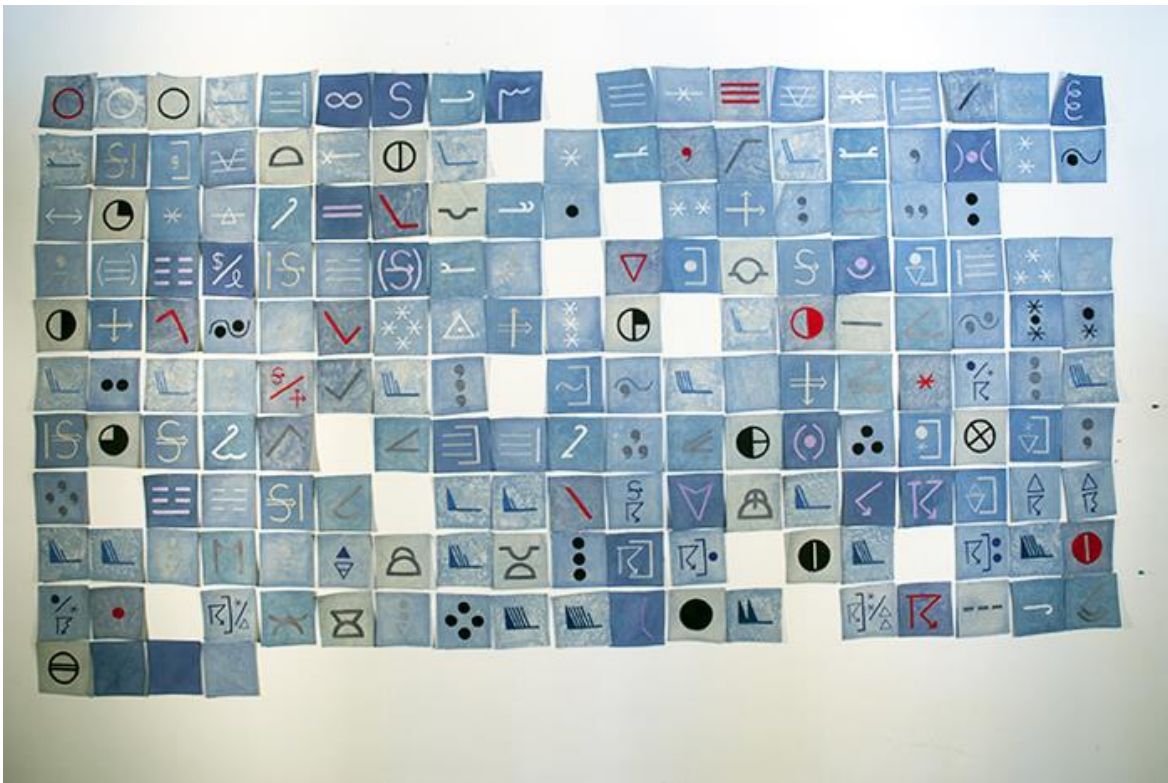


Figure 5: *Sentences*. 2013. 275cm w x 170cm (variable). Hand-dyed canvas squares, hand embroidered. Photo: B. Matzkuhn.

I remember how my dad constantly read the clouds; working on the fourth set of sails led me to learn the clouds' names – genus, species, and variety – from a book, but I became more interested in finding what they signify, what forms them, what they indicate will happen, and the progressions and interactions they embody. In a state of mild post-partum depression after finishing the *Sail* project, I began to embroider weather symbols onto 180 15 x 15cm squares as a way of learning and remembering them (figure 5). Embroidering the symbols helped me understand the nuances that meteorologists find important, for example the intensity and combinations of phenomena, barometer fluctuations and whether they increase or decrease over time.

Some of the symbols recall punctuation: a period for rain, comma for drizzle. I played with organizing them into “sentences,” from calm and stable to meteorological mayhem dissipating into the ragged clouds that announce the end of a storm. Interspersed are red symbols that indicate yesterday's weather. In

stories we situate events in time. We like to have a context for what is current. Using the symbols is subjective but always about making meaning. I found the process of making and then organizing the symbols valuable to help me try to assess local conditions, read assorted maps, and track different scenarios in the sky.

While making the squares in *Sentences* (figure 5), I read stacks of books, took notes, drew, kept a daily weather journal, and tried to make sense of the weather around me. Often I wanted to pull a meteorologist out from behind the potted palm and ask, “Why are the clouds doing this?” “Why is the weather great at sunset and dreadful the next morning?” “Why was the barometer reading so low, yet the wind was not destructive?” Senior meteorologist Uwe Gramann kindly stepped out from the palm and filled this role by explaining to me the very basic elements of forecasting. He gave me a guided tour of the symbolic language that cartography uses to tell banal or alarming tales. Meteorology is always in the service of others, he pointed out, from forest fire or flood scenarios for agriculture and industry to whether it will rain on the picnic for the rest of us. In contrast, art can, but doesn’t have to serve others. It becomes a departure for discussion.

METAR/TAF

VANCOUVER INTL/BC ([show WxCam](#))

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METAR CYVR 020000Z 18005KT 30SM FEW030 SCT055 OVC071 07/03 A3040 RMK
CU1SC2AC5 SLP297=
METAR CYVR 012300Z VRB03KT 30SM FEW035 SCT055 OVC063 07/02 A3040 RMK
CU1SC2SC5 SLP295=
METAR CYVR 012200Z VRB02KT 30SM FEW035 BKN058 OVC075 07/02 A3039 RMK
CU1SC4AC3 SLP292=

TAF CYVR 012338Z 0200/0306 VRB03KT P6SM FEW015 SCT030 BKN060 TEMPO
0200/0203 P6SM -SHRA BKN030
FM020300 09007KT P6SM -RA SCT015 OVC030 TEMPO 0203/0206 5SM -RA
BR FEW007 BKN015 OVC030
FM020600 09010KT 6SM -RA BR SCT007 OVC015 TEMPO 0206/0306 3SM -RA
BR BKN007 OVC015
BECMG 0218/0220 13012KT
RMK NXT FCST BY 020300Z=

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Figure 6: METARS. <https://flightplanning.navcanada.ca>.

From Gramann, I learned later that forecasters tend not to use the pictogram symbols I embroidered in *Sentences*, as they have METARS (figure 6), a code using numbers and letters for weather reports; perhaps these are simply easier to type out than, say, the symbol for layers of altocumulus that resembles a pair of bizarre eyeglasses. Certain phenomena can be reliably measured, such as wind and temperature. Others are more difficult to ascertain, for example, the height of

clouds as seen from the ground, or whether precipitation is really increasing. In the weather community, if someone repeatedly exaggerates or overestimates, he or she will lose credibility. How and when the symbolic language is used gives me a glimpse into another discipline's concerns.

Marc Monmonnier describes meteorological maps as memos, while other cartography is more like an extended narrative (Monmonnier, 1999, p. 214). In *Sentences*, my lines of symbols are short phrases that can be reconfigured. It is longer than a memo; perhaps it could be viewed as a very short tale that changes with each retelling/installation. J.R. Fleming (2015) talks about weather forecasting as a Gordian knot – a rewarding textile analogy – that meteorologists are trying to untangle as it constantly re-tangles itself. Forecasters are scientists but they “rely on an ability to sense patterns from scattered information in a way no computers can match” (M. De Villiers, 2006, p. 160). We all know the weather particular to our home turf, but the data that tracks the patterns of climate spans hemispheres and decades. Climate is not something you see, rather it is a model, an archetype. The extended story emerges through tracking weather over time to reveal patterns that are invisible to humans until computers help to reveal them. The tales that I stitch on textiles are understandings of data visualizations. The patterns in my work are revealed – to me and to viewers – through the labour of embroidery.

Weathering: Funnel

To understand more about immediate, short-term forecasting, Gramann explained what meteorologists call the “funnel” which is a process, not a thing. They look at “upper air” analyses, maps representing four separate layers of atmosphere starting high up at the jet stream then working down to sea level.



Figure 7: *Funnel*. 2014. 240cm w x 200cm h. Hand dyed canvas, appliqué, hand embroidery.
Photo: B. Matzkuhn.

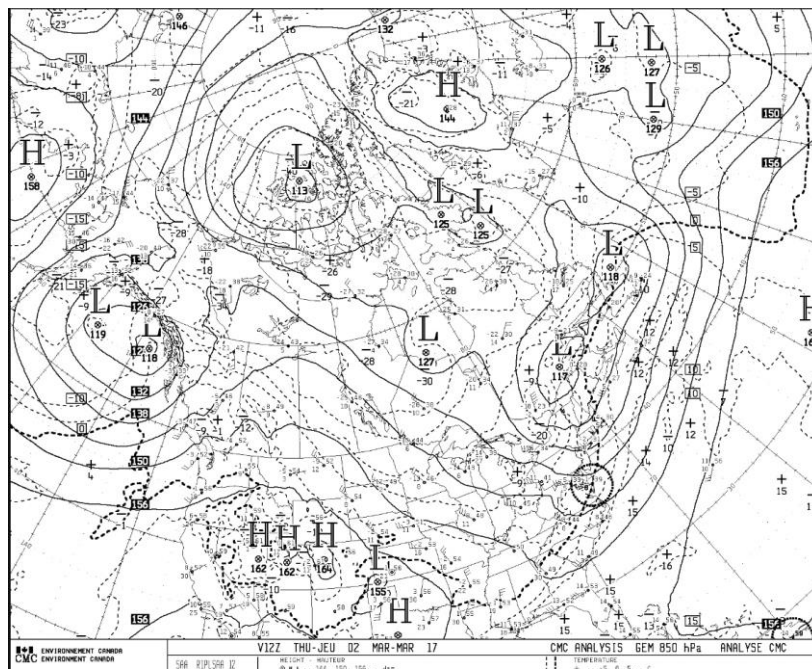


Figure 8: Upper air analysis chart for 850hPa, near sea level.
Chart from <http://weather.gc.ca/data/analysis>.

These are published for weather bureaus every six hours. What happens in the jet stream informs all the layers below, and the entire roiling mass feeds into the forecast. I printed all four layers from one time slot onto sheets of acetate so I could lay one over the other. Gramann's description allowed me to envision a funnel shape that contains all the overlapping sheets (figure 7). I began drawing. Translating small drawings into the large (240cm wide) textile piece forced me to consider what I would include. The textile medium lends itself to layers, overlaps, tangles and interconnection. I incorporated boot-lace cord for isobars, yellow fabric from an old cycling jacket for arrows, sheer fabrics for the areas of humidity. Meteorologists liken isobars (lines of similar barometric pressure) to the lines on topographic maps (lines of similar elevation): the closer together the isobars are the "steeper" or more severe the weather. Acute steepness, Gramann assured me, would involve flying cows and Volvos. A cow and a school bus (buttons) were added to a system of concentric, couched cords. I sent images to him to ensure the thing was organized correctly. He suggested elements I could add which I included.

Weathering: Ensembles



Figure 9: *Ensembles*. 2015. 5.5 m long x 2.7 w x 1.8m h variable. Textile, wood, metal.
Photo: Ted Clarke.

Meteorologists talk about “perturbation analysis.” Perturbation can mean a disturbance caused by something, implying degrees of alarm. Forecasting is concerned with observing and trying to predict the results of many repercussions. Gramann showed me ensemble forecasts called spaghetti plots that assign short-term weather data probabilities into nicely aligned strands of colour. But the same strands, seven days into the future, are rife with perturbations and appear as a serving of multi-hued spaghetti. I envisioned *Ensembles* – a row of free-standing, 180cm tall flags – on a human scale, and I wanted a material that is animated by the wind. Flags in a row are often outside airports and hotels, carrying connotations of international welcome or identities. The flags incorporate these variations within the outlines of a community of heads, their contents ranging from pleasant assurance to the verge of breakdown (figures 9 & 10). Each head is embroidered on a delicate fabric flag suspended on a flagpole; they move faintly in the ambient air currents. DAI – dangerous anthropogenic interference – is implicit in this work as humans increasingly contribute to the perturbations. I chose white for the flags – a colour that might imply surrender. Surrender to exactly what, I can’t say, but our influence on the climate will dictate many changes including changes to how we live. I combined the notion of a mental condition with the evolving spaghetti plots to embroider a metaphor for uncertainty.



Figure 10: *Ensembles*: detail mid-section.

Weather has always been a source of anxiety. It is seen as punishing. “Meteorology has no place in Paradise, the place of perpetual spring. Weather came to us ‘after the fall’” (Boia, 2005, p. 120). There is often a sense of divine retribution connected to weather, but also a terrifying randomness. Several authors (e.g., Mass, 2008, p. 216; Fleming, 2015) say the complicated systems of weather are best described by chaos theory. This reminded me of Philip Ball’s discussion of the difference between the adjectives complex and complicated (Ball, 1999, p. 9). ‘Complex’ can be described mathematically (fractal geometry, Islamic tiling, ratios of curve in a seashell). ‘Complicated’ has many interferences and disparate parts (income tax forms, willy-nilly additions to a house, an arbitrary collection). Weather includes both; complexity allows a degree of predictability. A low-pressure system will always rotate counter clockwise in the northern hemisphere, a cold front will overtake a warm one. Complication arrives as random intrusions: mountain ranges, valleys, cities, seas, roaming systems of pressure, temperature and humidity. Forecasting has become much more accurate recently, yet the unpredictable is still worrying. “Weather with its apolitical, amoral, and wanton violence is murderous if you don’t pay attention to it, murderous if you don’t respect the magnitude of it” (Solnit, 2013, p. 68). As I applied layers in Funnel and Ensembles, both “complex” and “complicated” were in my hands. My materials and making strategies are informed by the data.

Weathering: Schmetterlinge



Figure 11: *Schmetterling Nr. 6*. 2014. 100cm w x 60cm h. Photo: B. Matzkuhn.

Schmetterlinge emerged from one of the websites that Gramann showed me, Cameron Beccario's Earth (<https://earth.nullschool.net>). Beccario writes that he designed the site when he was out of work, as an extraordinary calling card. On it, one can choose from a range of weather-related data visualizations which can be overlaid on a further choice of nine global projections. Here, I discovered the Waterman Butterfly projection, designed by Steve Waterman, that shows the world's landmasses without distortion. If one were to sew up the edges it would make a globe. His butterfly form certainly evokes the creature. Choosing this specific projection on the Earth site with aspects of wind, temperature, and barometric pressure overlaid onto it, I could envision the patterns in embroidery. I adapted more maps, from NASA's carbon monoxide and abnormal temperature readings to John Nelson's exquisite map of hurricane tracks. I wanted to convey this sense of constant change, the moving warps and wefts of air and humidity on a global scale.



Figure 12: *Schmetterlinge*. 2014-2015. Dimensions variable. Fabric paint, hand embroidery, appliqué.
Photo: B. Matzkuhn.

The resulting dozen *Schmetterlinge* (butterflies in German) are each a meter across, hand embroidered on hand dyed linen or collaged shiny fabrics (figures 11 & 12). Most of the embroidery is a simple running stitch – in and out – used throughout the world to darn or decorate. They are lined with the stiffening used in hat brims and pinned to the wall. Now I am working on a small 'field guide' that credits sources and explains the various patterns such as unusual global surface

temperatures, total cloud water, or excessive carbon monoxide levels. When I exhibit them, I enjoy viewers' comments; their perceptions range from simply seeing what they perceive as butterflies to the sudden realization that the shape is a map of the world. The notion of the earth as a specimen pinned to the wall carries, for me, sadness. Specimens are dead. "Climate used to be something humans were exposed to, today climate is also exposed to humanity" (Ellingsen, 2015, p. iv). The dynamic nature of weather will, of course, survive humans, but I want to convey the sense of the atmosphere as fragile. Speaking about them, through the textile medium, requires me to focus my skills to convey my learned revelations to the viewer.

Movement is implied in all the maps, a quality that I incorporate through the restless patterns traced in thread through my physical motions of stitching. But I began to think of literally making the materials move. I received a BC Arts Council grant to make simple textile animation clips about weather. With techniques such as cut-outs, frayed thread, a zipper, and camera movement, I made *The Zoology of Weather* (figure 8; visit <https://vimeo.com/137759215> to view video). This three minute animation plays on idioms around weather – cat's paws, white horses, *schäfchen* (which is German for fleecy, lamb-like altocumulus clouds). The more extreme weather events we can anticipate in a warming atmosphere seem better described as a Jabberwock with "teeth that bite and claws that catch" after Lewis Carroll. It is something we can't entirely imagine, except that it will be fierce.



Figure 13: Still image from "The Zoology of Weather", 2015. 3 min. animated embroidery and assorted materials, animated stills of textile work. Photo: B. Matzkuhn.

Laundry

In some ways, we do “wear” harsh weather: it dictates our choice of clothing and weathers our skin. In October of 2015, at an artist residency in Gros Morne National Park in Newfoundland and Labrador, Canada, I studied the weather of an unfamiliar environment. I had planned to use the Environment Canada analysis bulletins to compare the weather in Newfoundland with what was occurring at the same time at home in British Columbia. Shortly after arriving, I found that the Internet connection did not work. This forced me to focus more on the vernacular, on my own observations. I traced 28 articles of clothing on unbleached cotton: one for each day of my stay. And at the end of each day, I painted the weather I had experienced onto one of these forms. Sewing by hand is slow; paint allowed me to work more quickly. The great flat-topped cliffs of Western Brook Pond against a radiant blue sky with one resident cloud is painted on a nightgown; dots of snow against the red maples on longjohns; grey driving rain splashes across a camisole. Making the “clothes” required me to observe and visually summarize the kind of weather I encountered. It made me orient myself in terms of direction, become aware of local variations (Rocky Harbour receives more wind than Woody Point) and physically feel the winter coming. Towards the end of my residency, I borrowed a clothesline that boasted Gros Morne Mountain as a backdrop. I hung out my “laundry” under a turbulent sky.



Figure 14: *Laundry*. 2015. Cotton fabric, fabric paint. Photo: B. Matzkuhn.



Figure 15. *Laundry*, detail.

I also gathered weather stories and lore. The Dictionary of Newfoundland English listed many. I had conversations with locals. Many expressions to do with wind are colourful: “Take da milk right outta your tea” and “blowing hard enough to knock up a nun.” The wind was almost constant during my stay, often ripping the tops off the waves. The daily weather reports included wind conditions on the “Wreckhouse,” a stretch of highway where 100km winds are regular fellow travellers. The Beaufort scale was devised by Sir Francis Beaufort and categorizes wind according to its effect on the ocean. Familiar with it from sailing, I am cobbling together a grid that combines an embroidered Beaufort scale with the local language. What new idioms will be coined to deal with the changing climate? What textile forms might I use and invent? Just as the *Sail* project steered me in the direction of weather systems and symbols, the work on the pieces in

Weathering has encouraged me to branch into new language, localities and depictions of weather. And that will, no doubt, lead to another branch of study.

Reflection

Weathering, as a series, is the record of my own learning curve, an intersection of language, science and an archaic but versatile art form. These interrelated textile pieces do not simply record the time spent making them; they represent, for me, a sequence of personal revelations that I hope is made visible to others. The very act of making allows an opening for thinking. I can't simply theorize and imagine; I need to grapple with the haptic world even if what I make is not saleable, attractive or interesting. "Visual culture then shifts from being 'representation' to a material embodied encounter as sensation. Images/pedagogies do not exist as static forms, but are experienced as processes and as movement" (Springgay, 2010, p. 121). In a lecture for the Craft Council of B.C., tapestry weaver Jane Kidd said: "I figure out how I'm going to do something as I'm doing it," referring to the physical technique but also her densely woven concepts. For the craftsperson, making and knowing are part of the same project. Richard Sennett writes, "...there is a constant interplay between tacit knowledge and self-conscious awareness, the tacit knowledge serving as an anchor, the explicit awareness serving as critique and corrective" (Sennett, 2009, p. 50).



Figure 16: *Schmetterling Nr. 1*: detail, 2014. Photo: B. Matzkuhn.

As I work, I need the physical interaction with materials in order to wrestle with ideas, presentation, and meaning – critical elements to which he refers. Synthesizing the different strands requires interpretation and this necessitates decisions that reinforce my learning and understanding of the subject (literally) at hand. While the physical act of making is essential to my work, I find it especially rewarding when I can learn from and engage with people outside of my discipline. Often they are pleased to find someone sincerely curious about their own work, and are interested in what emerges artistically. Being open to many degrees of collaboration increases the richness of the learning and the cloth.

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