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Chapter 1

When the Sound Is Frozen

Extracting Climate Data from Inuit Narratives

CANA ULUAK ITCHUAQIYAQ

Reader, I am writing to you, colleague to colleague, human to human, heart to heart, to tell you a story about stories. The way I tell this story may bend the rules you are used to when discussing "academic" things because this story is beyond that level of abstraction. This is a human story and whether you recognize it yet or not, you are a character in its plot.

This story goes back at least three generations in my Inuit family, and it will extend out into every generation forward. It is a story about bodies, and it is a story about ice.

* * *

I was born in my homelands in Northwest Alaska in January, or *Siqiñaasrugruk,* which means the first appearance of the sun. In January in the Alaskan Arctic, the sun remains low on the horizon, and it is cold. My great-uncle, Qiġñak, described how the Ipani, the Iñupiat from long ago, would tell one another about the weather: "The Ipani . . . had no way to determine the temperature, but he could tell how cold it was. If he had been out hunting and someone asked him when he came in, 'How cold is it today?' he would answer: 'I can hear my breath freezing in the cold air like something sizzling. It must then be 50 to 60 below zero when you can hear your breath freezing'" (Wells, 1974, p. 11). For those who live in the Arctic today, understanding weather relies upon both reports from the National

Weather Service and the ways the body perceives and encounters weather, much like my ancestor describes. For me growing up in the Arctic, I had my own ways of interpreting the concept of 50 or 60 degrees below zero based on how it felt to my body. When I was a young woman in the 1990s in the Arctic, I was too vain as well as too lazy to put on winter gear every time I had to go outside. However, when I left home wearing only jeans rather than wearing snow pants as an outer layer, I knew it was dangerously cold when it quickly felt like my skin would split if I slapped my thigh. When I felt that sensation, I knew it was 50 or 60 below and wearing only jeans outside for an extended period was not a good choice. In those moments, I used my body as an instrument to understand weather and evaluate action.

Reader, at this point I want to take a moment to recognize that you might not have experience existing in -50°F temperatures. That observation—"I do not have experience in -50°F temperatures"—provides important context for my overall argument: Inuit lived experience in Arctic environments is an essential component to scientific understanding of the Arctic. Although Indigenous knowledges and lived experiences have increasingly been incorporated into climate change research, their use has generally been relegated to only providing local context rather than scientific data (Ellam Yua et al., 2022; Simonee et al., 2021). Technical communication as a field is uniquely positioned to assist researchers in both recognizing and utilizing the rich sources of data contained in narratives describing lived experiences and observations.

In this chapter, I will describe the use of *context-based knowledges* to ascribe and extract "scientific" meaning and data from narrative utterances. What I mean by context-based knowledges is that these knowledges are subjective and specific to particular contexts. These contexts can be shared among groups of individuals with similar experiences in much the same way that an inside joke operates where a key word or phrase is used to recall a particular set of experiences to a particular

group of people. These contexts can also be used to share or communicate meaning to others outside of these experiences, although it generally requires some explanation much in the same way outsiders can be let "in" on an inside joke. By comparison, *place-based knowledge* is rooted in place as a fundamental starting or connection point. Place-based knowledge assumes that individuals with experience in a place share, to some degree, similar experiences and observations of that place. Context-based knowledges, on the other hand, account for the nuances related to an individual's or group's particular experiences related to place or other such *contexts*, such as Qiġñak hearing his breath freezing in -50°F temperatures or me feeling like my thigh would split from the cold.

While that observation "I do not have experience in -50°F temperatures" indicates one point of expertise of Inuit or others living in the Arctic, it does not exclude anyone from making similar observations. Most individuals have some experience gauging temperature or weather conditions using their own contextual and bodily knowledges as the basis of such observations rather than relying on the use of thermometers or other instruments. For example, people with curly hair might understand air humidity levels based on how their hair reacts. Or perhaps you live in a location where the weather gets cold and dry. Imagine being outside in the fall and your nose starts running. That observation, "my nose started running," is easy to make because you will likely be compelled to react to your nose running by removing that mucus, say by wiping it with the side of your pointer finger and then wiping that finger on your pants. In those collective experiences, you might come to an understanding that "it is cold and dry" because "my nose started running." According to Dr. Andrew Lane of Johns Hopkins University, our nose's primary purpose is to condition the air we breathe. Noses run as a response to cold, dry air because our lungs prefer warm, moist air (NPR, 2009). Hence, you can quantify the "my nose started running" experience into a specific range of temperatures and weather data by consulting a weather app on your phone after wiping your snot onto your pants. Once you have connected a

weather condition, say ~40°F and ~40% humidity, to the experience of "my nose started running" through multiple runny noses and temperature checks (see table 1.2), you can then equate "my nose started running" to "it's ~40°F and ~40% humidity."

While this might be a bit of a hard transition, I want to present two tables of possible data from what I've shared thus far to demonstrate how one might use narratives as technical communication from which to extract data. Table 1.1 presents the narrative discussing -50°F to -60°F weather as air temperature data, and table 1.2 presents an iterative approach to understanding the phenomenon "my nose started running" as contextual weather data. Granted, there are other factors that might contribute to the phenomenon "my nose started running," such as physical activity or health. If it helps conceptually, for table 1.2 imagine that the field observations are taken while sitting and watching an event outside. The point is that one can become attuned to bodily responses to external conditions and with some experience, individuals can use those responses to make more concrete observations about those conditions.

[INSERT TABLE 1.1_ITCHUAQIYAQ HERE]

Narrative Reference	Air Temperature	Notes
"I can hear my breath freezing in the cold air like something sizzling. It must then be 50 to 60 below zero when you can	-50°F to -60°F	Qiġñak equates the sound of one's breath freezing to -50°F to -60°F.

hear your breath freezing" (Wells, 1974, p. 11).		
When I . . . went outside wearing only jeans rather than wearing snow pants as an outer layer, I knew it was dangerously cold when it quickly felt like my skin would split if I slapped my thigh. When I felt that sensation, I knew it was 50 or 60 below and wearing only jeans outside for an extended period of time was not a good choice.	-50°F to -60°F	Itchuaqiyaq equates the feeling of their skin potentially splitting open at -50°F to -60°F.

Table 1.1. Equating -50°F to -60°F to bodily experiences.

Field Test	Conditions	Notes

"My nose started running," observation #1.	43℉, 41% humidity	Checked weather app once my nose began running for each test.
"My nose started running," observation #2.	37℉, 39% humidity	
Results:	*40℉, 40% humidity*	*The average results from three field tests.*

Table 1.2. Sample field test of conditions related to "my nose started running."

My mother, I'yiiqpak, has always told me that members of our family were known for being especially attuned to the weather before technologies like thermometers or weather stations came to the Arctic. My great-grandmother, Matulik, born before white missionaries came to our lands and brought with them concepts like numbering years or assigning numbers to the surrounding air, would read the sky in the evening and the early morning and predict the weather. She could forecast storms by reading the sky, which is an important skill still used today in Inuit communities (Simonee et al., 2021). My mom remembers being a child and hearing her mother, Uluak, say, "Matulgum taiñña siḷa tautuviksaulgitchchaa. Siḷagiiḷiñiaqpalulgitchchuq" (Matulik is intently looking at the sky. Maybe we're coming to a bad weather.) Not only did Matulik watch the sky to predict bad weather, others in the community watched Matulik watching the sky to make their own weather predictions and to

prepare accordingly. Similarly, my father, Lumen, taught me about how hunters used *aqargiq*, willow ptarmigan, to predict snowstorms. *Aqargiq* are easy to butcher in the field. You can remove their crop, a little holding sac attached to their throat, and observe its contents. If the crop is filled with food, that means that there is a storm coming because the *aqargiq* stored away food in preparation to bed down for a few days. My father would bring home these little sacs filled with small seeds and blow them up like a balloon to dry, calling them rattles, and use them to tell us a storm was coming.

Growing up in a subsistence family in the Arctic, I experienced descriptions of weather in both qualitative and quantitative ways. Sometimes these observations were presented in parallel with one another. For example, if I were to ask my mother about the weather, she might say "it's 30 below" and that the coldness of the air "just takes your breath away." Even when I do not explicitly ask her about the weather, I will often receive references to the weather as openers to her stories because it is a typical and relevant detail that is included in everyday conversation for people who live in the Arctic. In our language, Iñupiatun, we do not have a word for hello. Instead, when people greet one another in traditional ways, it is with an observation of the weather. Elders, when greeting one another in Iñupiatun, might say something along these lines: "Anuqłiqsinniġaa" (It is windy). "Ii, napmuŋnaġuminñaitpaluktuq" (Yes, it's not a good day to go anywhere). For example, if I were to ask my mother about what she's been up to and she responds, "It is so cold. I went to the post office and the air took my breath away just walking outside that little bit," I am receiving data, or rather technical communication about weather, derived from her body and lived experiences as instruments to gauge and report on weather conditions. In this exchange, because of previous parallel observations she's made to me and through actively listening for cues about the weather, I am able to interpret the data she's presenting through narrative. Table 1.3 demonstrates the technical communication embedded

within I'yiiqpak's narratives using a prior parallel observation as the basis for subsequent references to "the air takes your breath away."

[INSERT TABLE 1.3_ITCHUAQIYAQ HERE]

Narrative Reference	Air Temperature	Notes
Parallel Observation A: "It's 30 below" and that the coldness of the air "just takes your breath away."	-30°F	When I'yiiqpak mentions that the air takes one's breath away, she equates that bodily experience to -30°F.
Post office story: "It is so cold. I went to the post office and the air took my breath away just walking outside that little bit."	-30°F	Uses Parallel Observation A that equates "the air takes your breath away" with -30°F.

Table 1.3. I'yiiqpak says, "The air takes your breath away."

The activity of the weather is both observable in the way one's body responds and in physical manifestations on the land, water, and ice. My family's home in Kotzebue, Alaska, is located on a long peninsula surrounded by the waters of the Kotzebue Sound that are visible from our home's windows. In deciding whether and when to go out in our boats on the water, my brother, Qaluraq, will look out the window and read the water before consulting the weather forecast. If there are white caps visible on waves in particular locations, he knows that it is windy and the conditions to cross the sound from

our peninsula to the adjoining mainland shorelines will likely be perilous. When the sound is frozen, darkness on the horizon might indicate open leads in the ice with exposed water, or may indicate overflow, called *qaaptit*, a layer of water on top of ice, and unstable ice conditions are likely coming soon. It is common for members of rural Inuit communities to combine weather information from reading the sky, lands, and waters with weather forecasts from apps in order to make decisions about traveling out in the country because the information from the apps themselves are not reliable enough (Simonee et al., 2021).

I have been out in unstable ice conditions exactly once in my lifetime and that was enough for me. My role in our family is more of the resident nerd, writer, and spreadsheet-maker rather than any kind of subsistence provider. However, I once filmed a documentary that followed the harvesting of seals in my family, from ice to table, for a school project. My brother, Qaluraq, took me far out onto the ice where the seals, weighing upward of 200 pounds each, were hanging out and enjoying sunny, springtime conditions. My inexperience seal hunting is both traditional—men typically fulfilled the hunting part of the seal harvest while women completed the butchering and other side duties—and situational—I tended to be "away" at school during the spring seal hunting season. Going seal hunting with my brother for this documentary was a new experience for me, but one that I naively thought I understood. In other words, growing up hearing seal hunting stories is not the same as being a mile out on the ice and completely dependent on understanding, predicting, and responding to spring ice conditions while barreling over snow-covered ice at 30+ miles per hour pulling a sled with 800 pounds of seals loaded in it.

During our hunting expedition, we rode out far onto the ice of the Kotzebue Sound and on our way out the ice seemed like it was good. We rode around until Qaluraq spotted groups of seals sunbathing in the distance. When he spotted them, he'd stop the snogo a little way away from the seals

and creep up on them by foot while I waited on our rig. Over the day, he successfully shot four adult seals. They were big animals and weighed about 200 pounds each and would be shared with multiple families in our community. As we rode on the ice with a sled heavy with seals, I filmed the white, snow-covered ice on the trail behind us breaking open and exposing a long, jagged line of black, freezing water. I trusted Qaluraq—I had to—but I also recognized that I was in extreme danger.

I yelled in his ear. I had to be loud to be heard through his fur hat and over the sound of the snogo's engine. "The ice is breaking behind us! It's too thin. I don't want to become a statistic. What are we going to do?"

Qaluraq simply responded, "We'll go fast," and kept driving us and our load of seals away from shore searching for a thicker area of sheet ice to safely drive on.

Because of this experience, when I hear stories that mention "the ice was thin," or "my trail kept breaking," or "we had to go fast," I understand the dangerous ice conditions those phrases imply. When I hear hunting stories that mention "the ice was good," it describes a different set of ice conditions. In scientific terms, "my trail kept breaking" means that a load that was less than one ton, consisting of an ~500-pound snowmobile carrying two people weighing about ~350 pounds together and pulling a sled carrying ~800 pounds of seals, was enough to break a section of the brackish ice in the Kotzebue Sound. According to the Alaska Clean Seas' *Ice Safety Awareness* booklet (n.d.), sea ice can bear less load than river ice (p. 24), and so the brackish nature of the Kotzebue Sound—a mixture of both sea water from the Chukchi Sea and river water from the Noatak and Kobuk rivers—makes it similar to, though less stable than, river ice (Fransson, 2009). River ice must be four inches thick to withstand a one-ton load (US Army Corps of Engineers, n.d., b). If river ice can bear a person on foot, it is at least two inches thick; if it can bear a snogo and a hunter, it is at least three inches thick (US Army Corps of Engineers, n.d., a). But if it fails once the hunter riding on a snogo is pulling a sled

filled with seals weighing less than 2,000 pounds total, then the ice is less than four inches thick (see table 1.4).

[INSERT TABLE 1.4_ITCHUAQIYAQ HERE]

Narrative Reference	Ice Thickness (x) in inches	Notes
During our hunting expedition, we rode out far onto the ice in the Kotzebue Sound and on our way out the ice seemed like it was good.	$x \geq 3$	Ice held under ~850 lb. load: • snogo (500 lbs.) • two adults (350 lbs.)
When he spotted them, he'd stop the snogo a little way away from the seals and creep up on them by foot while I waited on our rig	$x \geq 2$	Ice held under ~200 lb. load: • man on foot (200 lbs.)
	$x \geq 3$	Ice held under ~650 lb. load: • snogo (500 lbs.) • one adult (150 lbs.)

As we rode on the ice with a sled heavy with seals, I filmed the white, snow-covered ice on the trail behind us breaking open and exposing a long, jagged line of black, freezing water.	$3 \leq x < 4$	Ice *broke* under ~1,650 lb. load: • snogo (500 lbs.) • two adults (350 lbs.) • four seals (800 lbs.)
"The ice is breaking behind us. It's too thin. I don't want to become a statistic. What are we going to do?"	$3 \leq x < 4$	Ice *broke* under ~1,650 lb. load: • snogo (500 lbs.) • two adults (350 lbs.) • four seals (800 lbs.)

Table 1.4. Seal hunting story.

In these tables I've presented thus far, I've extracted specific data from narratives using both context clues, such as I'yiiqpak equating the temperature -30°F to the air taking her breath away, and correlating published data with points in a narrative, such as ice load bearing information from the US Army Corps of Engineers and the approximate load described in the seal hunting story. Narratives are a way of communicating specific embodied knowledge and expertise about phenomena, such as weather or climate. Technical communication (TC) has a growing body of scholarship that places narrative as a theory-building methodology to "represent embodied knowledge" (Jones, 2017, p. 327),

especially with regard to the lived experiences of members of multiply marginalized communities (e.g., Jones, 2016a, 2016b, 2016c, 2017, 2020). Similarly, Indigenous rhetorical practice and Indigenous inquiry also position narrative as theory and as a powerful teaching tool (e.g., Denzin & Lincoln, 2014; King et al., 2015; Riley Mukavetz, 2014; Powell, 2012). Narratives are a method of communicating important local expertise that is often overlooked as *scientific* knowledge in attempts to understand complex environmental situations. In the Arctic, the ice becomes a temporary extension of our land and is used heavily by members of our community. Studies related to the ways climate change is affecting the ice and the surrounding community's use of the ice can benefit by including user experience (UX) narratives. Bacha (2018) argues for the use of reflective storytelling in UX research, especially with a focus on "stories gathered during casual conversations . . . those opinions are just as important as more formally collected sets of usability data" (pp. 190–200). In other words, including local UX of ice—especially informal utterances like "we had to go fast" or "the ice is real bad"—can complicate or complement how "science" understands ice.

My father, Caleb Lumen Pungowiyi, was a respected Siberian Yupik leader, climate change researcher, and advocate for considering Indigenous context-based knowledges as expert knowledge in scientific research. In a 2001 lecture at the University of Alaska–Fairbanks, he critiques western frames of "scientific" methods that exclude lived experience with climate change as data because it isn't scientifically measurable:

> One thing that . . . caught my eye . . . was "scientifically measurable programs." And I said oh my goodness . . . I think that we should not limit ourselves to scientifically measurable programs. To me, I think sometimes science is limiting . . . you don't get to see the whole world. And I think we should open the windows that give you the opportunity to see the whole

> world, and what that is, because sometimes science becomes a crutch that keeps you from proceeding or going forward.
>
> We know that the ice is . . . a lot thinner, it forms later, forming a lot later than what it used to in the 1950s, and it melts a lot easier. Maybe I shouldn't say "melts"—dissipates a lot easier—because "melts" means that it's melting with the heat of the sun and those kinds of things. But there are other factors that play into the dissipation of the ice, and as Native people or people who live on the coast, ice to us is kinda like supportive of life because it supports the seals, the fish, the birds, and the other things that are ice dependent, and it also becomes an extension of our land when it freezes over. We travel over it; we go fishing on it; it becomes, you know, part of our everyday life. But as it changes, though, it affects that opportunity for us to get out there. And a lot of you, if you were to talk to the hunters in springtime and the ice conditions are not ideal to them, "The ice is real bum this year," they'll say. But there's a deeper meaning to it in terms of what "bum" means, ok?
>
> We see ice in different "qualities." . . . If the winter is warm and ice doesn't freeze real solidly, it breaks up real easily in the springtime. Ice, when it forms, forms several ways. . . . Air temperature and water temperature play a very important role in the "quality" of ice that I talk about. As it gets colder the ice crystals squeeze, and they squeeze out this brine that's in the ice, the salt water. If it's not cold enough, some of that brine stays on the ice and it makes it really soft, easy to break up. And that's what I mean by a "quality" of the ice that we see. (Pungowiyi, 2001)

In this lecture, Pungowiyi demonstrates that there are many qualities about the ice that are contained within local Indigenous user observations, such as the utterance "the ice is real bum this year." TC as a field has historically leaned toward "scientifically measurable" data in its research, but as Pungowiyi argues, this focus is too narrow when it comes to accessing a nuanced understanding of issues like

climate change. If Arctic researchers focus only on scientifically measurable data and continue to ignore the potential contextual data contained in local user narratives, then they are missing the opportunity to see "the whole world." Using the narrative extraction method I've developed and demonstrated in this chapter expands narrative's use as a form of technical communication that contains a wealth of useful data for researchers and can help guide climate action.

This narrative extraction method is useful in examining existing narratives, such as those provided earlier, as well as in the process of gathering new narratives. For example, if one was interviewing a hunter about a seal hunting experience on the ice and the hunter mentioned, "We had to go fast out there," this is a key moment where the interviewer should note that they need to ask a follow-up question regarding why they had to go fast. If the hunter then answers, "Because the ice was thin and kept breaking under our rigs," questions about the load (e.g., how many passengers, approximate weight of passengers, weight of load in sled) and about the date and location where this occurred would provide other useful data points. Obviously, asking the hunter if they knew the thickness of the ice and how they made that observation are other important follow-up questions. In my experiences hearing people telling stories about being out on the ice, multiple parallel observations are often described, such as mentioning the color of the ice, or mentioning water-filled snow on the ice, called *pukak*, or overflow, called *qaaptit*, or even physical descriptions of the ice's thickness from direct observation. All these narrative details, if noted and if the appropriate follow-up questions are asked, can yield useful quantitative data. Furthermore, once those data are correlated to a specific expression, they can be used as a reference point that the interviewer and the narrator can use to clarify subsequent details.

At this point it is important to state clearly that the data extracted from narratives in this manner do not necessarily produce exact measurements. Instead, they are a method of extracting data

from stories at a relatively coarse granularity. These data can then be refined to a finer granularity by using follow-up questions or overlaying other correlating data (such as the ice load bearing data I used in my example). The more layers of correlating data, such as knowing the exact date of a hunting trip and then using that date to look up related weather conditions, the finer-grained data can become. The technical communication contained in narratives is a launching point to meaningfully incorporate these observations in research, much as Jones (2016a, 2016b, 2016c, 2017, 2020) has described. The use of narratives in scientific research is useful for enacting equity in methodology. For example, Jones (2016c) states that "narratives not only allow other voices and points of view to be heard and understood, but it pushes the researcher and scholar to examine his or her own positionality and enactment of power and agency in a reflexive manner. This acknowledgement of positionality can aid the technical communicator in embracing his or her political stance and enhancing agency in others in an attempt to bring about social change" (p. 351). Not only are narrative methodologies useful in incorporating the lived experiences of local experts, such as Inuit discussions of climate change's effect on their everyday lives, their use contributes to equity in research practices. Equity in this sense, contributes to a sense of cultural empowerment and allows participants to "guide the meaning-making process by sharing their own stories in their own voice" (Jones, 2017, p. 327). Further, narrative methodologies offer a useful way for Inuit communities to meaningfully contribute to research design, data collection, and data analysis and become full partners in research in their own communities.

Discussions of how worldview affects stories and their interpretation are important to consider, especially with regard to Inuit communities. For example, I've realized that western scientific/academic practice leans heavily on an anthropocentric worldview where humans are the ultimate actor in relationships with the world *around them*. In other words, humans are positioned as *the* point of view (POV). In my Inuit worldview, I rely heavily on a *kin*centric perspective—where

human agency is tempered by, and in concert with, the agency of the world *in which* humans participate. In other words, humans are positioned as *a* POV. I do not consider human agency as the central, determining, or strongest vector in the web of interconnectedness of what is known as the world. It isn't the "world around us" at all; rather, it is, like my father states, the "whole world."

* * *

Reader, it is at this point that I again take up my letter and my story having done the work of demonstrating different ways of listening to my story and the stories of others to recognize the potential contained in what we are actually communicating. Here is where your work begins.

I have been researched. My family has been researched. We have given access to ourselves, our experiences, our ancestral knowledges, and our homes to fulfill others' ambitions, all in the hope that these actions can help our community. We have trusted others to depict our lives, experiences, knowledges, and communities fairly and accurately. We have lent our social capital to outsiders and vouched for them so that they may gain access into the homes of others in our community. We have incurred risk.

Tell me: What risk have you incurred?

* * *

In the summer of 1996, my family was hired to be field research assistants for a US Fish and Wildlife Service (USFWS) seabird survey on St. Lawrence Island in the Bering Sea off Alaska, where my dad Lumen is from. My sister Uula and I were hired as field assistants that summer and were trained to count crested auklets by the 100s with little handheld clickers. My mom I'yiiqpak was hired to be the

camp cook and to keep everyone fed and comfortable. My father was a research partner in the project and also acted as a guide and a translator. He was key to the USFWS's access to people and lands on the island.

However, while we were there doing this research the joke on the island was the research itself. My father was teased by his family and by his friends because the people from the island *already knew* the kinds and numbers of birds that lived on the island. For example, my father told the USFWS that people on the island had already determined that the seabird population was roughly five million birds. However, the USFWS sent two western-trained scientists to supervise the bird counts on St. Lawrence Island to verify these observations. I remember sitting on a rock after being quickly trained to gauge what a 100-bird chunk looked like and then pressing the clicker for each 100-bird chunk I counted in the swirling dark cloud of thousands and thousands of birds above me. I clicked and clicked and hoped my chunking skills, gained after five minutes of training, were accurate. Islanders had been observing these swarms of birds for generations yet I, a college student with five minutes of training, was providing the "real" data. The irony of this situation was that my father spent his career trying to convince the scientific community to recognize the expertise of Indigenous peoples regarding their own lands and cultures. Regardless of my father's advocacy, there we were counting birds because the USFWS trusted my clicking abilities over the observations of the Siberian Yupik people living for millennia on St. Lawrence Island. It turns out there were indeed roughly five million birds (Stephensen et al., 1998), which was a win for my father's work to position local Indigenous observations as reliable, valuable, and accurate.

While my father never spoke in a negative way about this research experience on St. Lawrence Island, it privately became an inside joke between us. We used it to make lighthearted comments about what I came to understand as the tendrils of colonial scientific practice. For example, we might point

out a gaggle of researchers arriving at the Kotzebue airport (zippy pants, lots of sturdy totes, and no hunting or kayaking gear). One of us might say to the other, "Maybe they're checking to see if we got five million birds," and we'd laugh. However, embedded in that simple exchange is a frustration that Indigenous knowledges are not recognized as equal to western scientific knowledge—even if Indigenous participation is an essential component to the success of western scientific research in Indigenous lands, waters, and communities. Jeannette Armstrong, Syilx/Okanagan Nation member and associate professor of Indigenous studies at the University of British Columbia, recently critiqued positioning western scientific frames as superior to Indigenous ones: "A general definition of Indigenous knowledge consists of those beliefs, assumptions, and understandings of non-western people developed through long-term associations with a specific place. . . . Therefore, Indigenous knowledge is considered the second tier of knowledge, that is, below science. This is racist" (Bonneau, 2021, para. 9–10). Indigenous knowledges are not secondary to western, "scientific" ones. Indeed, Inuit knowledges of our lands and waters are scientific, sovereign, and often sacred (Ellam Yua et al., forthcoming). These knowledges come from our communities observing, interacting, surviving together, and depending on the same lands and waters where our ancestors existed. Indigenous knowledges are at once intuitive, intergenerational, individual, communal, contextual, and complex. As I recently stated in a news article discussing the need for Indigenous representation in climate research in the Arctic, "[Western scientists] confirm what we already know, instead of investigating what we want to know. . . . It's taken tons of time for academia and the sciences to catch up to us. . . . They're just catching up" (Itchuaqiyaq quoted in Early, 2021, para. 12–14). Shifting one's worldview changes how things are done, valued, and enacted (Itchuaqiyaq, 2021). It is traditional for my people to have a kincentric worldview in their approach to understanding the "whole world," which is in direct contrast to approaches taken by western scientific method. This whole-istic knowingness, like

understanding the way the weather feels and respecting the power of those conditions and how they affect you and everything else, is tapping into a deeper intuition we all have, but many ignore. My people are still very connected to that intuition because our lives *still* depend on it.

The Iñupiatun word for "environment" is *siḷa*. However, *siḷa* also has a broader meaning that is similar to a collective consciousness, whole-istic knowingness, or wisdom shared by everything. Canadian Inuk author Rachel Qitsualik describes it thus, "S*iḷa*, for Inuit, became a raw life force that lay over the entire Land; that could be felt as air, seen as the sky, and lived as breath" (Qitsualik quoted in Todd, 2016, p. 5). Data extracted from Inuit narratives demonstrate the power of *siḷa* for understanding our human impact, connections, and place in "the environment"—and for recognizing the multitudes of other "kin" and their impact, connections, and place in "the environment." *We* kin *are* the environment; we are both/and the whole and a part. The recognition of this "whole world" intuitive knowledge is itself action that drives *reaction*. This connection I've described, in part, is communicated when Indigenous peoples say things like "we are part of the land," or "we come from the land." Our peoples in the Arctic are in a deep communication/interaction/being with *siḷa* and that influences our actions and reactions. Therefore, having Inuit in leadership roles is vitally important for research or climate change policy activities, and so on, that aim to understand and generate action plans for the Arctic. The intuition related to *siḷa*, and the ability to recognize and understand that intuition, is included in terms like "Indigenous knowledges."

Unfortunately, while Indigenous knowledge is considered valuable, *how* it is incorporated in research or policy reflects institutional bias (Ellam Yua et al., 2022). Indigenous knowledges are not typically considered "scientific" but are instead considered "cultural," or "primitive," basic observations. However, in reality, there is often rich, data-oriented detail contained in mundane utterances or observations about lived experiences in the Arctic. Because of this institutional bias,

Inuit intuition/bodily knowledges are not typically used in developing policy, action plans, or research plans related to climate change monitoring or response.

Indigenous rhet/comp scholar Regina McManigell Grijalva (2020) argues that ethical storytelling and storylistening practices must pay particular attention to contexts and how they affect the communication process. McManigell Grijalva explains: "An important concept to understanding indigenous communication is that the sacred, the spiritual, and the physical are often conceived of as unified and not easily separated. . . . The coherence of a context with all its related reasons, values, and actions will illuminate the interconnectedness of their underlying ethics" (p. 33). In other words, while I'm trying to teach you a method of extracting data from Inuit narratives, I'm also trying to convey a bigger message: Inuit living in the Arctic have unique expertise about climate change and its a/effect on communities, landscapes, waters, ice, plants, and animals. This same message was conveyed by my father and others decades ago and has been continually expressed by Inuit leaders and scholar-allies since that time (e.g., Krupnik & Jolly, 2010, Ellam Yua et al., forthcoming). Henry Huntington, a non-Indigenous scholar-ally and close friend of my father describes the importance of Indigenous contributions to scientific knowledge: "Researchers need to understand the implicit method that lies beneath the knowledge of Arctic peoples, just as they work diligently to follow the scientific method in other research. Only in this way can researchers appreciate not only the information that is generated by the knowledge of the Arctic residents, but also their perspective on the environment, their relationship with it, and what if any actions are needed to protect that relationship" (Huntington, 2010, p. xxxii). Inuit scientific observations are not second tier to observations made via the scientific method. Rather, Inuit expertise is essential to research within Inuit communities and their related lands and waters. Thus, Inuit should lead these research efforts rather than fulfill subordinate, supportive roles, such as merely acting as research participants relegated to supplying access or narratives. Yes,

our stories are important, and I argue that they provide important data. But *how* can that data be properly understood, analyzed, and integrated into findings and conclusions without active Inuit leadership, expertise, and analysis in such research? It is interesting to note that these arguments for a reconsideration of how scholars approach knowledge and research with/in Inuit communities echo existing critiques of service-learning partnerships or community-engaged learning projects between universities and organizations (e.g., Batova, 2020; Kimme Hea & Wendler Shah, 2016; Scott, 2004).

* * *

Reader, there is a lot to unpack in this story I've been attempting to tell you. I've told you about my family and our activities and how those activities have helped us understand the "whole world" around us. I've told you about our adventures and our frustrations. I've provided examples of using narratives as potential scientific data sources. I've described a method of narrative data extraction and indicated how overlaying complementary data sources, such as ice load data, and listening for potentially rich data contexts, such as "we had to go fast," can help to refine such data. Ultimately, I've argued that methods like narrative data extraction in Inuit communities require a contextual understanding of the situation from which these narratives arise in order to successfully apply these methods. Thus, narrative methodologies require equitable local partnerships at a leadership level in the data collection, in the data analysis processes, and in the research design itself. Inuit partnerships enrich research regarding climate change in Arctic landscapes as well as inform climate action to protect those landscapes. We Inuit have been taught to value and develop our relationship with the land, the waters, and the ice that surround us. We have been taught to listen to its stories.

Reader, I'll end my narrative with a story my dad told our family many times and that shaped how I think about the world in profound ways:

> I was [raised by my grandmother]. . . . And one of the things I remember is one time we went camping by ourselves in the summertime. I was about seven, eight years old. . . . We went out [to camp because] she wanted to gather greens for the winter. So, we went over there just by ourselves, just me and my grandmother, and she'd do the picking and I'd do the wandering around exploring, but my job was to pack that bag of greens back to the camp. And she would take a break once in a while, and one time I remember her telling me, "Son, listen to the whispers of the grass," in our language, "and it'll tell you stories of ages long past." And I used to wonder what that meant. What did she mean by "listen to the whispers of the grass"? I've thought about it over the years, and I think that if we don't listen, we don't hear. . . . And to me the whispers of the grass has meant a lot to me, to listen to the whispers of the grass. (Pungowiyi, 2001)

Quyanaqpak for listening.

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