

Project Results Summary
for
Ice, Through Inuit Eyes
*Characterizing the importance of sea ice processes, use, and change around
Cape Dorset*



*This project was proposed and undertaken by
Gita J. Laidler
and was made possible through the support, feedback, and participation of
community members in the Hamlet of Cape Dorset.*

This report is intended to provide a summary of the sea ice knowledge and expertise shared by hunters and elders in your community. I have tried to put this together as accurately as possible, but I can never capture the true depth of knowledge and experience that were so kindly shared with me over the past few years. Please consider this summary a starting point. The contents can be changed and improved over time through contributions from community members or by expressing your comments to me directly.

“[I]n the winter [the sea ice] is very useful. We rely on it, that’s why we have to know the conditions so much because we [use] it from beginning to the end. It was so much so in the past, but not as much now. We don’t rely as much on country food, like it’s only a percentage now of our daily diet. [B]ut still we use that information. [It] is good for as long as we live here because we’re still going to use [the ice]. I don’t see any highways out on the land, so it’s still going to be our highway. The kids still have to learn the points, the fall and the spring and the winter, the conditions, they will have to learn that. [A] big part of our life is spent on the ice, especially here where our name is, where our regional name is so much recognizable as people who live ‘where there’s water’, not just ice, but where there’s water. It’s very important to know [about the sea ice].” (Matthewsie Joanasia)

The importance of sea ice

“[The] way this island is built, around the Hudson [Strait], because of the way it’s shaped around here, that’s why the ice never goes any further than where it goes. That’s why it’s called *Sikusilaaq*, but if you go further southeast of here, like 100 miles from here, it could take you a whole day’s trip to get to the floe edge from the edge of the mainland. But over here it’s not like that, it’s only like a 10 minute drive from this town.” (Ningeoseak Peter)

Sea ice for travel

- ❖ Strong Hudson Strait currents prevent solid ice formation from extending far offshore, creating a dynamic sea ice environment.
- ❖ Despite the lack of extensive ice cover around Cape Dorset, sea ice remains an important part of life for this island community.
- ❖ Sea ice was described as being as important for local travel as highways are in southern Canada → it provides access to Baffin Island to reach fishing lakes, caribou hunting grounds, soap stone mines, cabins, and other communities (such as Kimmirut).
- ❖ Community members are stranded on the island in the summer if they do not have access to a boat, which mainly older hunters or families with more financial resources are able to afford.
- ❖ Ice travel is smoother and faster than on land, so it is like a shortcut, allowing people to save time by crossing inlets instead of following the winding coastline.

Sea ice for hunting

- ❖ Sea ice is a valuable hunting platform and provides essential habitat for a host of marine mammals.
- ❖ Sea ice travel and hunting allows people access to country foods (e.g. Arctic char, caribou, seals, walrus) which are still an important part of northern diets → seals and walrus are a mainstay for the community, along with caribou (when available) and Arctic char.
- ❖ Old sea ice, grounded icebergs, or the surface of certain ice formations, are a source of drinking water that is much preferred to tap water.

“[To me the sea ice] is part of life, [I] can go hunting on it, walk on it, and it will give you peace of mind if you’re out there doing your thing. It provides for the families that use it.” (Etulu Etidlouie)

Freezing and Melting Processes

The general order of freezing and melting processes in Cape Dorset, as well as links to the floe edge and tidal cracks, is shown in a **diagram on the next page**. This diagram was created to help link different terms with different stages of freezing or melting, and the related terminology descriptions are provided in point form, according to the order shown in the diagram.

Near shore freezing

- ❖ *sikuvaliajuq* – when the ice starts freezing in the fall, it is hardening, but not safe to walk on [variations: *sikuvalia*, *ukiuqpaliajuq*]
- ❖ *qinnu* – early stage of ice formation, a slushy consistency in the water, the ice particles are soft and never really freeze [variations: *qinnujuq*]
- ❖ *ilaupalia* – the process of ice forming at low tide (where it is shallow, along the rocks) and breaking off at high tide (process of *ilu* formation)
- ❖ *ilu* – early ice formation during low tidal stages, freezing from the bottom [variations: *ilujuq*]
- ❖ *kuiviniq* – ice frozen over top of rocks in shallow areas, although it is attached to the rocks it breaks off at high tide [term not used frequently in recent times]
- ❖ *qaikut* – early stage of ice formation, the ice is frozen to the ground but will eventually pop up after several tides
- ❖ *sikurtusijuq* – ice that has formed a little past the low tide area
- ❖ *sijja* – ice that has formed around the edge of land, either along the mainland or island coastlines, also where the ice tends to start thickening outwards to form *siku* and then *tuvaq*

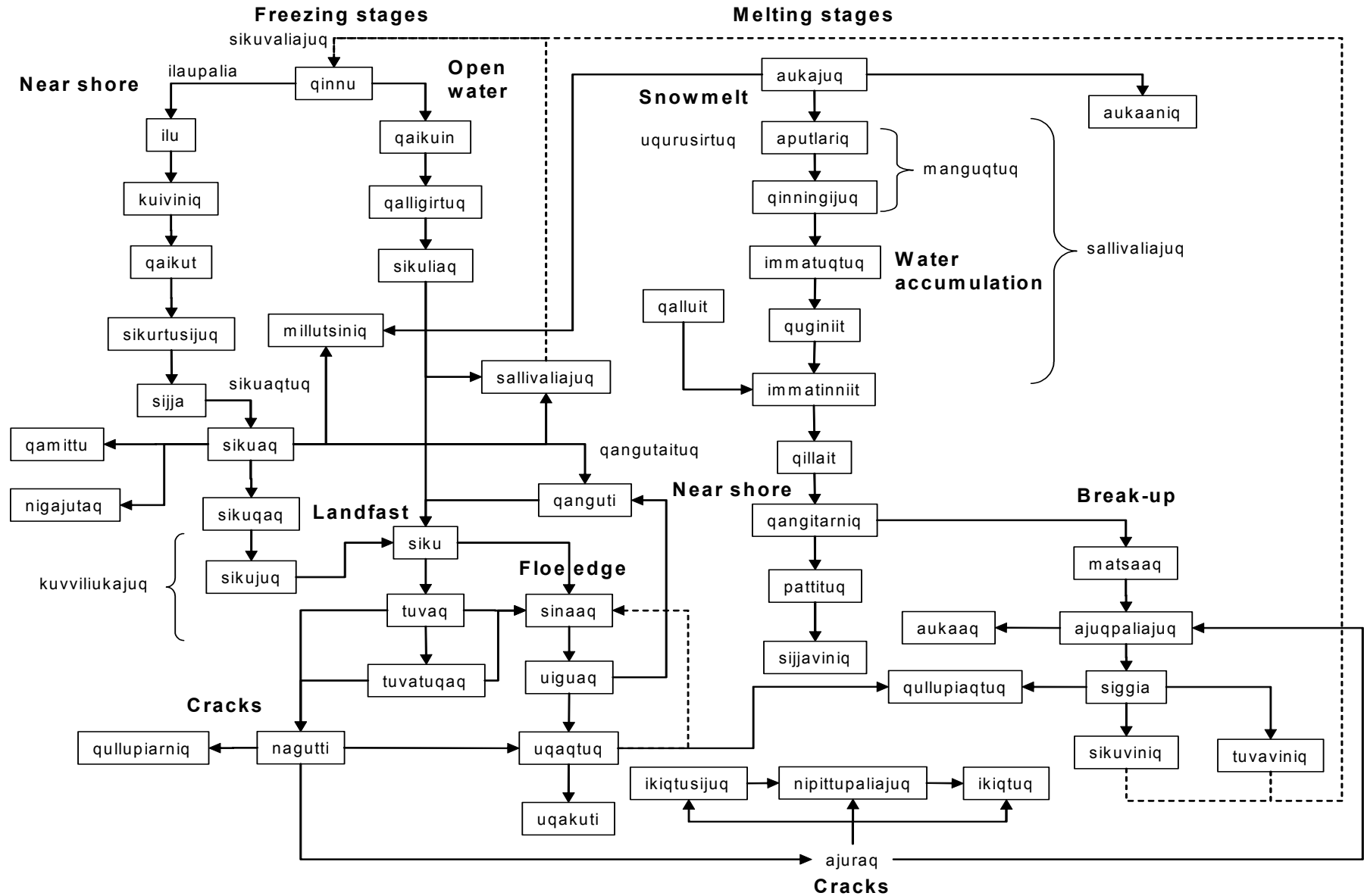
Open water freezing

- ❖ *qaikuin* – chunks of ice that form after *qinnu* in open water or at the floe edge (*sinaaq*), winds form batches of rough ice and they move with the currents
- ❖ *qalligirtuq* – ice forming on top of ice, it thickens because it is being pushed together by currents
- ❖ *sikuliaq* – newly formed flat ice in open water

Sea ice thickening

- ❖ *sikuaq* – the first layer of frozen ice, it has just formed so it is thin, shiny, and approximately ¼ inch thick; it is attached to the *sijja*; it is possible to stand on it but a harpoon must be used to test its strength (if it takes two harpoon strikes to puncture a hole it is strong enough to stand on)
- ❖ *sikuaqtuq* – the process of *sikuaq* forming, it takes approximately two or three nice cold days, without wind (or three to four days with wind)
- ❖ *qamittu* – ice with a little bit of water on it
- ❖ *nigajutaq* – a hole in newly formed ice; can be different sizes from small to basketball or barrel size; can be safe to travel on as long as it is tested with a harpoon; seals and walrus sometimes use these holes to breathe
- ❖ *sallivaliajuq* – ice is thinning, could be caused by rainfall, snowfall, or wind, which helps melt the ice; it could apply to either freezing (i.e. snow, wind, or rain affecting new thin ice) or melting processes; used in the spring time to refer to a period where the ice is thinning and seals start having their pups (around April or May) [variations: *salluvaliajuq*]
- ❖ *uqurusirtuqsimajuq* – when snow falls on newly formed, or thin ice, at any time of year, it insulates the ice similarly to how a down jacket insulates a person from cold air, it will usually cause melting or thinning of new ice, and will prevent thicker ice from increasing in thickness
- ❖ *millutsiniq* – a patch of ice where it is mushy, usually caused by snowfall over thin ice (e.g. if snow had fallen over where a crack had recently formed); the snow melts the ice due to *ukurusirtuqsimajuq*, rendering it more of a slushy consistency; a dangerous condition where people can easily fall through, it cannot be easily seen due to the snow cover [variations: *milutsinilaq*]

Conceptual diagram of freeze-thaw processes, interactions, and terminology based on interviews conducted in Cape Dorset.



- ❖ *qanguti* – ice condition in fall or beginning of spring that looks like little snowflakes on the ice even though no snow has fallen; little points or little chunks on top of the ice that looks almost like plants growing from the ice; an indicator that it will be nice and smooth ice in that area when all the ice has thickened; it may all look the same but in some areas it is possible to travel and while in others it will be dangerous, so always use a harpoon to test the ice [also a general word for frost-like formations in tents, cabins, porches, parka hoods, etc.]
- ❖ *qangutaituq* – the process of *qanguti* forming
- ❖ *sikuqaq* – ice formed more solidly, closer to land and covering inlets, it is no longer moving; it is possible to walk on the ice and look for seal holes; ice that is a few weeks old when you start walking on it
- ❖ *sikujuq* – ice that has thickened more than a few inches, and can be used for travel [variations: *sikugai*]
- ❖ *siku* – ice that is a week or a month old, it can be used for any kind of travel because it is more solid than *sikujuq*
- ❖ *tuvaq* – solid, landfast ice; older than *siku*
- ❖ *tuvatuqaq* – old, mid-winter ice, after snow has accumulated on thick ice (*tuvaq*)
- ❖ *kuvivilukajuq* – sea ice that will not be breaking off anymore; the ice has solidified and is safe for dog team or snowmobile travel without having to constantly test the ice with a harpoon

Tidal cracks

- ❖ *nagguti* – tidal cracks that form during the winter and re-freeze after opening; they re-occur with the influence of tidal stages [variations: *naggut*, *aniuqaq*]
- ❖ *qullupiariniq* – a crack that opens, freezes, and then cracks open again in the same spot, sometimes leaving a peaked formation
- ❖ *ajuraq* – tidal crack that stays open in the spring time; like a *nagguti* but with open water remaining in the crack; mainly occurs between April and June

Floe edge

- ❖ *sinaaq* – floe edge, the edge of the landfast ice (*tuvaq*) [also used to delineate an edge of anything]
- ❖ *uiguqaq* – new ice that forms at the *sinaaq*, meaning an “add on” either as the edge of the *tuvaq* becomes established or after a piece has broken off (*uqaqtuq*) and it is re-freezing; it is usually thin and dangerous, but can sometimes be walked on if it is cold enough
- ❖ *uqaq* – when strong winds break off *tuvaq* at the *sinaaq*
- ❖ *uqaqtuq* – the action of *uqaq* occurring, the ice is breaking off and floating away; usually happens where a *nagguti* or *ajuraq* had formed, often caused by a strong tide
- ❖ *uqakuti* – a piece of ice that broke off in the process of *uqaqtuq* and is now free-floating

Snowmelt

- ❖ *aukaaniq* – areas where the ice starts wearing out, melting, earlier than others in the spring time (April or May); these areas quickly become unsafe to travel through; often located near or around a *saqvaq* or other areas with stronger currents [variations: *aukaan*, *aukarniq* – sometimes referred to as a *saqvaq*, depending on dialect or context]
- ❖ *aukajuq* – identification of a very early stage of melting [variations: *aukasijuq*; *autsajuq*]
- ❖ *aputlariq* – when the snow melts the ice; a lot of snow falls in April and May, which insulates the ice and thus helps it to melt (*uqurusirtuq*)
- ❖ *qinningijuq* – condition where the snow is very soft and wet, but the ice is still solid below the layer of snow [variations: *qinnirijuq* used as well in recent times]
- ❖ *manguqtuq* – general process describing the onset of ice melt beginning with snowmelt and influencing the sea ice underneath [variations: *manguqtaliqpaliajuq*]
- ❖ *sallivaliajuq* – ice is thinning, could be caused by rainfall, snowfall, or wind, which helps melt the ice; it could apply to either freezing (i.e. snow, wind, or rain affecting new thin ice) or melting processes; used in the spring time to refer to a period where the ice is thinning and seals start having their pups (around April or May) [variations: *salluvaliajuq*]

- ❖ *uqurusirtuq* – around May when everything starts getting warmer and snowfall melts the ice – like insulation on top of the ice [variations: *uqurusirtuqsimajuq*]

Water accumulation and drainage

- ❖ *immatuqtuq* – an early melting process, when water is starting to form on top of the ice [variations: *tikpaqtuq*, not used frequently in recent times]
- ❖ *quginiit* – like little creeks on top of the ice; they show up after the snow or ice has been melting for a few days; the water will start draining into seal holes or cracks [this word can even be used in the middle of winter if it warms up enough to cause melting]
- ❖ *immatinniit* – melt puddles that form on top of the ice, the water remains on the ice until it can drain through or off the ice [variations: *tasiaruq*]
- ❖ *qalluit* – holes formed in the ice by seaweed or something on the ice that sinks downwards; it melts the ice because of faster heat absorption, thus water forms around the sunken seaweed (or other material)
- ❖ *qillait* – holes that form as the ice has melted right through, allowing for the drainage of meltwater
- ❖ *matsaaq* – when water starts draining through the ice (e.g. through *ajurait* or *atluan*) [term not used frequently in recent times]; drainage also occurs through *ajurait*
- ❖ *qangitarniq* – when the ice is floating on top of the water, it is not broken up, it has just popped up from the bottom and is floating [variations: *puggaqtuq*]

Break-up

- ❖ *pattituq* – when there is no more ice along the tidal zone
- ❖ *sijjaviniq* – used to be *sijja*; after the shoreline ice has broken off and is free-floating; characterized by rough ice conditions due to the continual movement of ice near the shoreline throughout the winter
- ❖ *ajuqpaliajuq* – where the cracks are widest the ice starts breaking off
- ❖ *aukaaq* – when the ice starts breaking away/up, usually caused by winds; when it starts getting dangerous on the ice
- ❖ *siggia* – when the ice is breaking up [variations: *siruqtiq*]
- ❖ *qullupiaqtuq* – when the ice collides and is pushed on top of other ice as it breaks up [term not used frequently in recent times]
- ❖ *sikuviniq* – used to be *siku*; former sea ice that was attached to land, closer to shore; floating, usually smaller and rougher pieces than *tuvaaviniq*
- ❖ *tuvaaviniq* – used to be *tuvaq*; former land-locked ice (if it breaks off with no one on it); floating flat ice that is big and thick

Cracks/leads

- ❖ *ikiqtusijuq* – a crack that is widening a little
- ❖ *nipittupaliajuq* – a crack that is not wider than jumping distance
- ❖ *ikiqtuq* – a crack that is widening, that would require a boat to cross it

The influences of winds on sea ice

Summary of predominant directional and seasonal winds around Cape Dorset, and their related influences on sea ice

Direction	Season	Ice influence
West	<ul style="list-style-type: none"> • Fall • Predominant 	<ul style="list-style-type: none"> • Break up the ice • Less = multi-year ice closer to town
NW	<ul style="list-style-type: none"> • Predominant 	
North	<ul style="list-style-type: none"> • Fall and winter • Predominant 	<ul style="list-style-type: none"> • Promotes freezing • More = multi-year ice far from town
NE	<ul style="list-style-type: none"> • Predominant • Fall 	<ul style="list-style-type: none"> • Nice weather • Promotes freezing
East		<ul style="list-style-type: none"> • More = multi-year ice far from town
SE	<ul style="list-style-type: none"> • Fall 	
South	<ul style="list-style-type: none"> • Fall • Winter • At full and new moons 	<ul style="list-style-type: none"> • Break up the ice • Prevents freezing • Less = multi-year ice closer to town • Lots of ice near town
SW	<ul style="list-style-type: none"> • Spring • Fall 	<ul style="list-style-type: none"> • Less = ice stays longer • More = ice will leave sooner • More = breaks off the ice

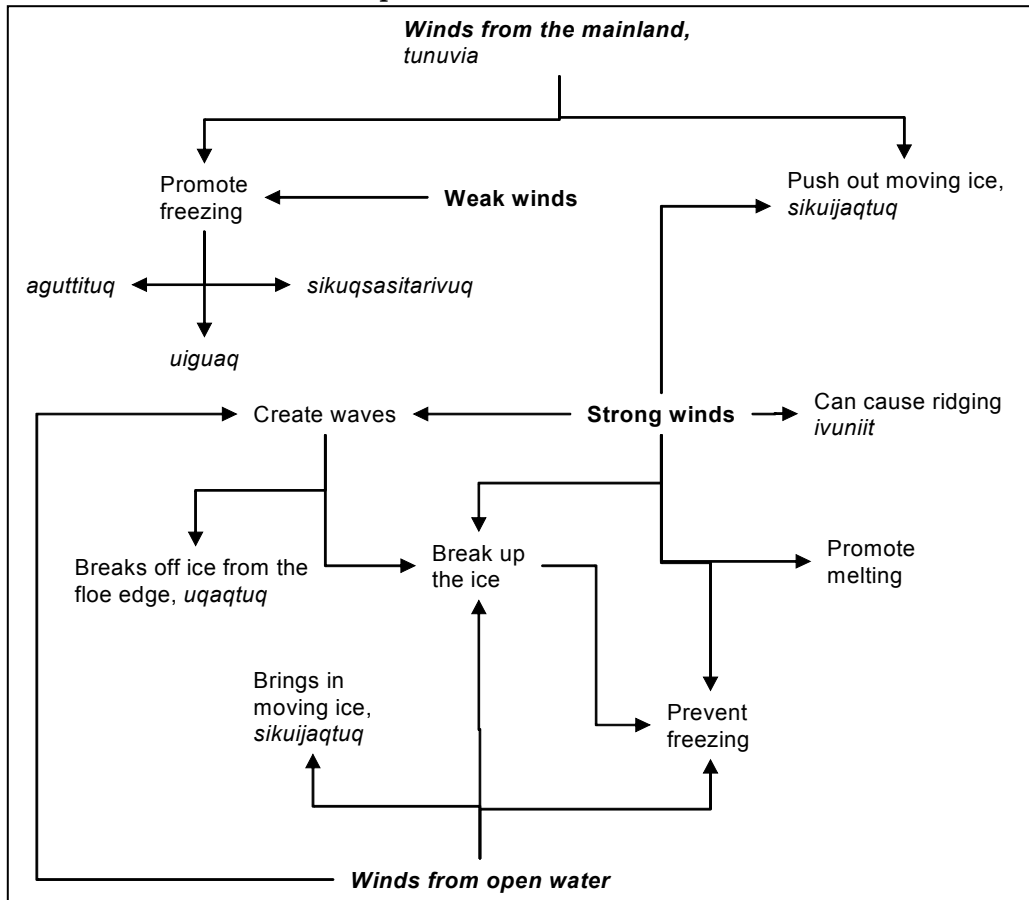
Because of the variation in descriptions of prevailing wind direction, the focus was placed on winds between West and East towards the North as being “from the mainland” (Baffin Island), and winds between the West and East towards the South as being from “open waters” (Hudson Strait). The **diagram on the next page** shows the linkages between wind direction and ice formation, decay, or movement. Terminology is described in the relative order shown in the diagram.

“When it’s time for the ice to freeze, it will usually freeze from the north side, from the mainland side going down. But if it’s been windy from the south side for a bit of time, the ice usually won’t freeze up for a while. Like [I] said, winds are part of breaking [the] ice.” (Atsiaq Alasuaq)

- ❖ *tunuvia* – weather that comes from the mainland
- ❖ *sikuqsasitarivuuq* – ice that forms outwards from the edge of land, forming with cold winds from the land
- ❖ *aguttituq* – ice formed with the direction of the wind
- ❖ *aukaaq* – when the ice starts breaking away/up, usually caused by winds; when it starts getting dangerous on the ice
- ❖ *uqaq* – when strong winds break off thick ice (*tuvaaq*) at the floe edge (*sinaaq*)
- ❖ *ivuniit* – ice formation caused by winds or currents pushing thick ice on top of other ice, and it re-freezes into rough ice (like ridges)
- ❖ *sikuijaqtuq* – when the sea ice is moving with the wind, in open water

“[S]ometimes the ice has broken off from [another] area, it will go right up to around Cape Dorset, and sometimes it will be stuck up [here] for a while. A lot of our hunters will say that there is no floe edge close by because of the ice that has broken off and kind of settled up [here] for either a few days, or weeks at a time.” (Mikisiti Saila)

Conceptual model of the influences of winds on sea ice formation, movement, or decay based on interviews conducted in Cape Dorset.



The influences of tides and currents on sea ice

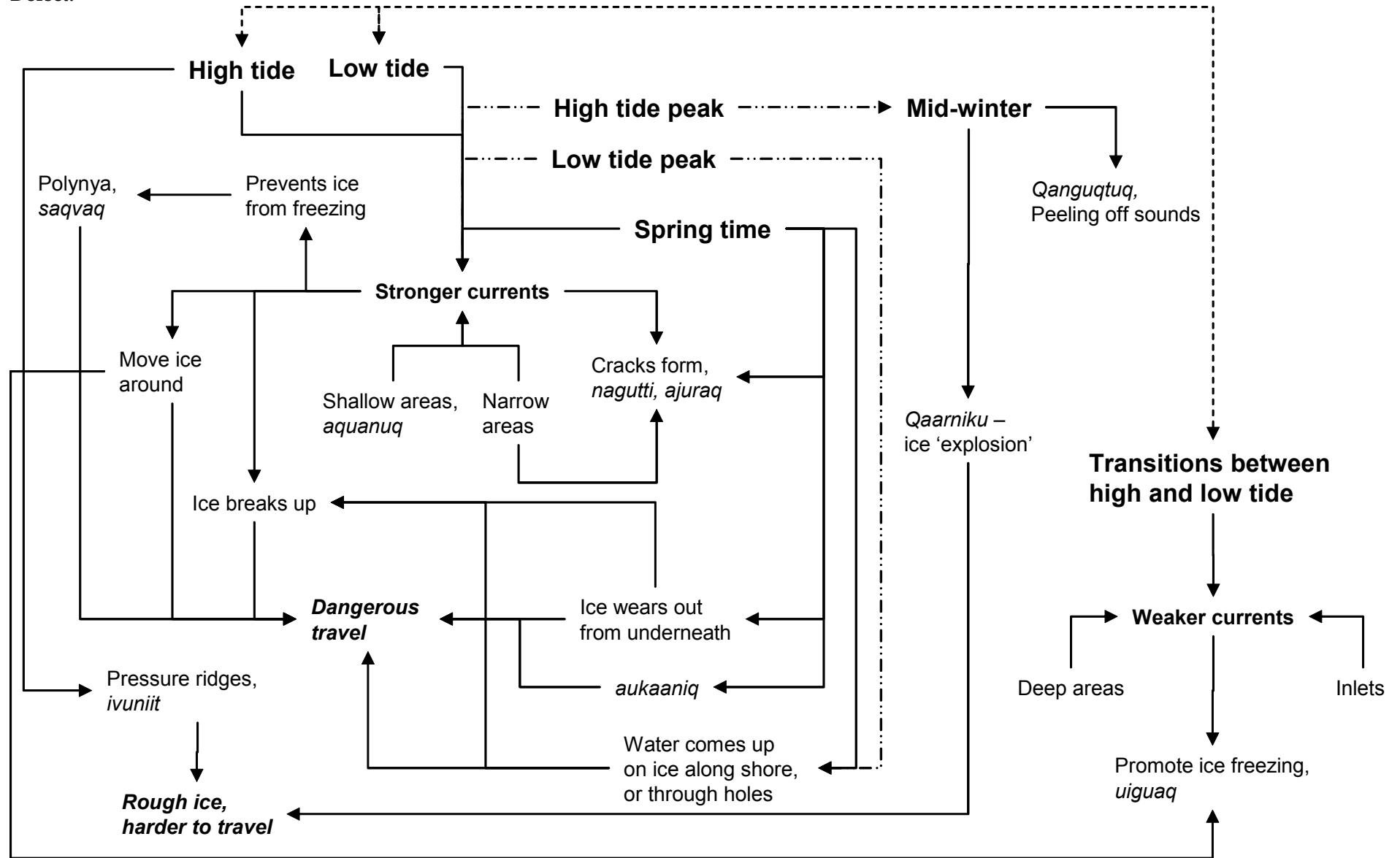
The **diagram on the next page** shows the linkages between wind direction and ice formation, decay, or movement. Terminology is described in the relative order shown in the diagram.

- ❖ *aquanaq* – a shallow area that is somewhat like a reef, which creates stronger currents
- ❖ the cycle of high and low tides determine the direction of currents, the water is described as moving towards the north (up/in) at high tide, and towards the south (down/out) at low tide
- ❖ beyond the daily high and low tide cycles, the monthly new and full moons are especially influential on current strength (i.e. peak high and low tides), and thus ice conditions
- ❖ *saqvaq* – an area “where there are currents”, that does not usually freeze over in the winter [variations: *saqpaq*]

“The ice will form mainly around the edges, because it’s all currents on [the West] side. Mainly around the edges...in between these two islands it doesn’t usually ice in between there. So mainly close to the mainland here, it will form only mainly in inlets because there’s too much currents...It doesn’t go, even most places it doesn’t go right up to the points, just the little inlets will be ice.”
(Etidlouie Petaulassie)

- ❖ *ivuniit* – ice formation caused by winds or currents pushing thick ice on top of other ice, and it re-freezes into rough ice (like ridges)
- ❖ *nunniq* – ice condition where an area freezes over that does not normally freeze (e.g. a *saqvaq* or the mouth of an inlet)

Conceptual model depicting the influences of currents and tides on sea ice formation, movement, or decay based on interviews conducted in Cape Dorset.



Where: — = general process direction - - - - = daily cycle - · · - = monthly cycle

“[E]specially when it’s full moon season, that’s when the currents start moving a lot, that’s when [certain] areas are no longer safe to be traveling through, full moon season. And the new moon season is same as, almost like a full moon, cause the tide is not as low as it would be when it’s regular low tide.”
(Mikisiti Saila)

- ❖ *qaarniku* – a type of ‘ice explosion’ that is caused by very strong currents (usually at a full moon) creating pressure deep under thick ice; once the pressure gets too high the ice is forced upwards to create an action like an explosion
- ❖ *qanguqtuq* – the sounds made at the peak of a very strong tide (usually at full moon) when the currents push the ice upwards and it is peeled off the ground
- ❖ *sikuliaqta* – frozen, piled ice that has been taken by currents to an area away from where it formed
- ❖ *aukaaniq* – areas where the ice starts wearing out, melting, earlier than others in the spring time (April or May); these areas quickly become unsafe to travel through; often located near or around a *saqvaq* or other areas with stronger currents [variations: *aukaan*, *aukarniq* – sometimes referred to as a *saqvaq*, depending on dialect or context]

A few key terms associated with moving ice include:

- *aniqsai* → sea ice that moves with the ebb and flow of the current, without breaking up or melting [variations: *aniqsaq*]
- *asaluaan* → sea ice formed into a ball-like shape, in open water
- *aulaniq* → moving ice in general [variations: *auraniq*]
- *marruluin* → when there is a lot of broken ice from different areas, with seaweed or other ocean debris on top
- *puktaan* → small pieces of floating ice moving in open water
- *qaikuin* → ice that moves with currents
- *qapvaq* → large moving ice that comes from far away, usually from the north, considered like multi-year ice; when they congregate close to the *sinaaq* they prevent boat travel
- *qunni* → ice that will not crack, floating in open water
- *savittuq* → a small piece of ice that broke off and is floating away
- *sikurasaan* → small pieces of ice gathered in one area, moving as one

Sea ice travel

Sea ice travel and hunting are nearly inseparable components of Inuit sea ice use because travel on the sea ice is mainly for the purpose of hunting or accessing hunting grounds. However, for the purpose of this write-up, travel and hunting are discussed separately. The dangers involved with sea ice travel, and some ways to minimize the risks involved with sea ice travel, have been summarized in the **table on the next page**. Some additional suggestions for safety are included in the following **quotes**.

“The main tool, if you want to know about the condition of the ice, if a person doesn’t know anything about the ice you can use the harpoon to check the thickness of the ice. That’s one way of using the harpoon. If you’re going to be a hunter you should know all these things, even the smallest things about the ice. If you don’t, you’re going to go through the ice.” (Mangitak Kellypalik)

“[T]he best way to be traveling through the ice is with a harpoon...like not completely going down like that, you have to have it at an angle going out a little bit when you poke [the ice] to see if it’s safe to be traveling on...[I]t has to be at an angle outwards a little bit from the guy [who] is holding a harpoon. You don’t do it straight down because if you go straight down you might go right through, and the person that’s holding the harpoon might go right down with it. So they do it like at an angle.” (Etulu Etidlouie)

Summary of sea ice-related exposure and associated risks for community members in Cape Dorset, including some methods of minimizing these risks

Type of Exposure	Associated Risks	Actions to minimize risk
Tidal stages, strongest currents associated with new and full moons	<ul style="list-style-type: none"> ➤ Early January, new moon may cause flooding along shoreline ➤ Wear out the ice from underneath, or prevent ice formation ➤ Dangerous to travel in narrow areas, straits, or between islands 	<ul style="list-style-type: none"> ➤ Avoid ice travel when shorelines are flooded ➤ Bring or use boats to travel on open water ➤ Be alert when traveling near areas with strong currents – conditions can change overnight ➤ Listen for (thunderous) cracks to indicate instability ➤ Know where currents are strongest, avoid those areas
Polynyas	<ul style="list-style-type: none"> ➤ Changing size and extent of freezing, depending on current or wind strength (i.e. most ice cover at weakest currents and winds) 	<ul style="list-style-type: none"> ➤ Avoid traveling over these areas despite whole or partial freezing ➤ Avoid traveling near polynyas during windy conditions or peak tides
Floe edge	<ul style="list-style-type: none"> ➤ Changing position due to ice bumping into the edge, making it hard to determine the edge delineation ➤ Potential break off events when currents or winds are strong 	<ul style="list-style-type: none"> ➤ Avoid travel near the floe edge where the currents are the strongest ➤ Avoid travel near the floe edge when winds are strong ➤ Bring or use boats to travel on open water ➤ If broken off on the ice, note wind and current directions, as there are predictable landing locations depending on wind and current conditions
Broken, moving ice near town	<ul style="list-style-type: none"> ➤ Southerly winds or high tides can bring the ice towards the floe edge 	<ul style="list-style-type: none"> ➤ Hunters will not go too far from town by boat in the winter when moving ice is near by – if it is broken up and blown in it could be hard to get back to town
Snowfall	<ul style="list-style-type: none"> ➤ Snowfall on newly formed ice insulates the ice, causing it to soften or melt ➤ Snowfall covers the ice conditions underneath, making it hard to evaluate the ice thickness and safety 	<ul style="list-style-type: none"> ➤ Avoid travel right after a new snowfall ➤ Use dog teams to detect safe ice conditions
Freeze-up	<ul style="list-style-type: none"> ➤ Thin ice conditions and non-uniform freezing 	<ul style="list-style-type: none"> ➤ Avoid travel until ice has thickened, unless tested with a harpoon
Break-up	<ul style="list-style-type: none"> ➤ Deteriorating ice conditions ➤ Some areas open up 2 – 3 weeks earlier than others ➤ Dangerous when water accumulates on the ice and is starting to drain 	<ul style="list-style-type: none"> ➤ Travel closer to town to avoid being stranded on land away from town when ice is no longer travelable ➤ Stay away from areas with stronger currents

Some conditions that are particularly hazardous include:

- *aukaan* → starts melting early, and not safe to travel through
- *aukaaq* → starts getting dangerous on the ice, breaking away
- *millutsiniq* → when snow has fallen over a recent opening in the ice, so you can't see the water and people will fall through if not careful, usually occurs close to the floe edge
- *nigajutaq* → safe to travel on even shortly after it has opened up
- *qalligirtuq* → when ice is forming and pieces start to break off and go on top of one another, once it refreezes it's safe to travel on
- *qangitarniq* → may be mistaken for safe ice, but it is really floating
- *qangutaituq* → may all look the same, but some areas won't be safe
- *qinnu* → cannot always be identified by sight, hunters will just fall right through

“[U]sually when it's new moon or full moon time that's when usually a lot of chunks of ice will usually break off...But even though it's usually around that time you always have to make sure that even if it's not new moon or full moon you are still alert because you will hear a big thunder or sound. That usually means that the ice you're on is breaking off, if it's really loud like that. You

won't hear a vibration or anything, you just hear loud thumping sound or cracking sound. But a lot of time you hear it and you try to cross over to where you thought it had cracked, usually it's too late to be going through the ice. So usually if they hear a big crack or anything like that they try to get on their machines and get off the ice right away. But usually it's usually too late by the time they try and cross it. (Qvianaqtuliaq Tapaungai)

"[When we] were traveling in the fall time, it is usually the most dangerous time to be traveling or to be out hunting, because a lot of time some of [our] dogs would go through the ice. [I]'s not the lead dog that will usually fall down, [my] lead dog would usually take a different turn if there's thin ice. It's just that other dogs that are in the back they would usually [fall] first if they're not familiar with the ice conditions that they're traveling on. Usually [I] would take the older dogs that know where if it's going to be safe or not to be traveling on the ice, in the fall time it's usually older dogs that [we] would take out hunting."
(Ningeoseak Peter)

Sea ice hunting

Sea ice is an essential platform for hunting many of the marine birds and mammals important to community members in Cape Dorset; however, it is also an important means of accessing other staple animals such as inland Arctic char fishing lakes, caribou feeding grounds or migration routes, and fox trapping trails.

"Seals, seals were the main food all the time. Even today it's even the main food. After that when [we] had run out, [we] could have scrap food for dogs or something. Even when [we] were out of meat, [we] would still use seal skin clothing or blankets as food for the dogs, and even [ourselves]. It has been [our] main food since when [I] could start walking. Today the main use of seal skins would be mitts and *kamiks*, not that many parkas anymore." (Mangitak Kellypalik)

Seals

- ❖ Seals are hunted from the ice, or by boat in the open water.
- ❖ Around Cape Dorset it is common to set seal nets in annual tidal cracks.
- ❖ Hunters also follow *naggutiit* looking for seal breathing holes, or they wait for seals to pop up in *ajurait*.
- ❖ Seals are also hunted in the open water of polynyas.
- ❖ Boats are used to retrieve seals at polynyas, or at the floe edge, where currents may be taking them away from the ice edge.
- ❖ It is easier to hunt seals when the ice is still relatively new (*sikuaq*) because their breathing holes are identifiable (even at a great distance, 1km or so) → you can see the little 'tent' that seals form as they poke through the ice → but it also makes travel and hunting more dangerous, so hunters have to be more careful at the same time.
- ❖ In the spring, seal pups are desirable and popular targets as they bask on the sea ice.

Walrus

- ❖ Walrus tend to be hunted by boat off the floe edge in the winter, or in open water in the summer.
- ❖ A walrus (or a seal) sitting on top of either a rock, or more commonly the ice, is termed *uttuq*, but it is also referred to as *qaqimajuq* more commonly today.
- ❖ However, if walrus are resting on top of the ice it is usually on moving ice, and rarely on landfast ice, they are usually in the open water where the ice is broken up.
- ❖ Going hunting for walrus (or seals) on ice is termed *uttuniaqtuq*.

Wildlife habitat

Beyond the importance of sea ice for travel and hunting, it is also habitat for many of the wildlife already mentioned. Arctic animals are uniquely adapted to the cold climate as well as to the cold and frozen seas. A full description of sea ice use by different species is beyond the scope of this project. However, statements of sea ice as habitat frequently entered interview discussions and are thus included here.

- ❖ Habitat at the ice edge, mainly referring to the floe edge but also to polynyas, is important to a variety of bird and mammal species, making it one of the more dynamic and biologically productive areas relating to sea ice.
- ❖ Ringed seals, bearded seals, and walrus are found on or near the ice all year round.
- ❖ In the spring time, marine birds such as eider ducks, guillemots, murrens, seagulls and even Canada or Snow Geese, congregate at the floe edge or polynyas to access their food.
- ❖ Cod live under the ice, while beluga whales and narwhals migrate along the ice edge in spring and fall.
- ❖ Even animals such as caribou, foxes, or wolves, that do not live on the ice, are dependent on the sea ice so they can travel between islands or across inlets.

Seals

- ❖ Seals are perhaps the most versatile, and the most extensive in their use of the sea ice – ringed seals in particular use many different ice conditions.
- ❖ Always needing to breathe air, seals will either seek out open water, or areas of thinner ice to make breathing holes (*atluan*).
- ❖ This means that seals can be found in areas of extensive ice cover, in tidal cracks, or in open water such as at the floe edge or polynyas.
- ❖ Ringed seals also make their dens on the ice, under the snow, hidden from inexperienced eyes – they seek out areas with large snowdrifts, or rough ice (e.g. between islands), to make their dens.
- ❖ These dens are where the seal pups are born and raised – in each den the seal maintains an associated breathing hole and escape hole into the water, but there is no hole through the snow to identify them on the surface (but you can tell they are there by looking for small sparkling ice crystals when facing the sun).
- ❖ Seals also enjoy basking on top of the ice in the long hours of spring sunshine, while using the ice to molt and change their fur.

Walrus

- ❖ Walrus mainly lie on top of the ice, and would have their young either on ice or on dry land, but not in the water.
- ❖ Walrus stick closer to open water, either at the floe edge or on moving ice pans further offshore.
- ❖ The odd time walrus will create a breathing hole by breaking through solid ice, but it is rare that they will maintain it.
- ❖ They migrate northwards in the spring to access food.
- ❖ It is said that they move north to get away from the ducks, that they do not mix well because they fight for the same food.

Beluga

- ❖ Beluga feed under the ice, where they can stay underwater for up to half an hour.
- ❖ The beluga around Cape Dorset are also the same ones that migrate further north to Igloodik in the spring (May or June), and back in the fall (August or September) (a similar timeframe as the walrus).
- ❖ They tend to stick along the floe edge, or in areas of broken ice to enable easy breathing access.

Observations of change

Community members in Cape Dorset have observed, and are experiencing, considerable change in their local climatic and sea ice conditions.

- ❖ Observations of change have been noted mainly in the last few years (indicated as approximately 2000 – present), but some indications of change were discussed as early as ten years ago. Most recent changes included increased snowfall, ice thinning, more break-off events at the floe edge, increased presence of open water, closer floe edge position, altered freezing processes and timing, and different wind directions.
- ❖ In contrast, the time periods of comparison (i.e. expected conditions) vary from ten to seventy years ago. In general, the 1960s are used as a baseline reference for expected freeze-up timing and processes, as well as floe edge location. Several elders used their childhood and adolescent years as an important reference point (i.e. 1950s and earlier – estimated based on their birth dates).

“[T]oday’s weather is not even close to same as what it was when [I] was growing up. Nowadays [I] listen to a lot of radio, there’s more accidents that have to do with ice nowadays. But [I] also hears that it’s getting warmer up north. [I] don’t think it’s getting warmer up north, it’s just the ice is not freezing when it’s supposed to, and it’s breaking up a lot earlier than it used to. [To me] it doesn’t seem to be getting any warmer, it’s just that the ice is not freezing at the time [it is expected to] and not breaking up at that certain time of the year, it’s a lot sooner than that now.” (Oqutaq Mikigak)

Summary of observed indicators and associated changes around Cape Dorset. The number of observations refers to the number of people that mentioned this change.

Indicator	Change	# of Observations
Floe edge	a) Closer to town	a) 14
Weather	a) More unpredictable	a) 5
	b) Different	b) 6
	c) Warmer	c) 6
Freeze-up	a) Takes longer/freezes slower	a) 4 b) 8
	b) Occurring later	c) 1
	c) More watery	d) 3
	d) Not as solid	
Break-up	a) Melts/breaks up earlier	a) 10
	b) Melt stages happen faster	b) 1
Ice thickness	a) thinner	a) 12

Floe edge

- ❖ The location of the floe edge is gauged based on the distance from town that it has formed.
- ❖ Inuit elders and hunters consistently mention the floe edge as being closer to town, often using *Aupaluqtuq* Point as a reference.
- ❖ Cracks normally formed at this nearby point, but more recently it is where the floe edge is located.
- ❖ Ice at the edge was also noted to break off more frequently in recent years, without warning.

“[T]he ice from years ago, the ice would form all the way down almost to the point, but if it was still like that today the cracks would start from *Aupaluqtuq*, if the ice was still in there. But since the ice hasn’t formed all the way down there anymore the ice will be, the floe edge will be around *Aupaluqtuq* area, and then just before that is where cracks would be forming, depending on the month. Like full moon month, we have seven months that are winter here, about that

many times it will start breaking off in that area and will freeze over again. But this area here, it doesn't go that far anymore, but it used to." (Mikisiti Saila)

Weather

- ❖ Elders and hunters find weather to be more unpredictable and generally warmer.
- ❖ Traditional weather prediction skills and indicators (e.g. winds and clouds) are no longer considered reliable.
- ❖ Some people even feel like they would be lying if they tried to predict weather variations over a few hours or days.

"As far back as [I] can remember winds usually came in from the north. But today it's even in the fall, summer, spring time winds are coming from all directions not from one direction anymore. If there was a whole bunch of students that asked [me] for advice on what kind of weather it would be tomorrow, if [I] was to look to out there at the weather now and if it was 20 years ago [I] would predict what kind of weather it would be in the next couple days. But if [you] were to ask [me] what weather we're going to have like next couple days, and if [I] tell [you] [I] would probably be lying because the weather changes in a matter of more like minutes than days now. " (Quvianaqtuliaq Tapaungai)

- ❖ Even weather forecasts received over the local radio are not deemed reliable.
- ❖ They are often opposite to the current conditions, leading to some people being stranded on the land when relying on weather forecasts
- ❖ The fall and winter seasons seem consistently warmer, this is partially indicated by the decrease in ice crystal formation on people's faces and parka hoods but also perhaps because people are not spending as much time outside.
- ❖ Despite some comments on general warming of the weather, there were also several suggestions that it is the ocean – and not the air – that may in fact be warming.
- ❖ This increased water temperature may be a key contributor to closer floe edge proximity, thinning sea ice, and alterations in freeze-up and break-up timing.

Timing of freeze-up

The changes in freeze-up timing are summarized in the **diagram on the next page**.

"[I]t's definitely not the same nowadays, especially around Christmas time. [Just] this past Christmas we still had open water in our inlet. In November when [I] was growing up, November was the time when [we] could, everybody, anybody could go on a dog team in November." (Oqsuralik Ottokie)

- ❖ Changing winds are potentially linked to later freeze-up dates, as more unpredictable winds, and from different directions (shifting to more easterly and southerly winds), break up the ice and prevent solid formation.
- ❖ More winds, especially from the southerly directions, also create rougher ice formations and affect the position of the floe edge.
- ❖ The ice used to freeze from the bottom of the low tide area, but this process does not seem to happen anymore.
- ❖ When cracks used to open up they would refreeze smoothly and were thus important for hunting and travel.
- ❖ Now they are re-freezing more roughly but they are still used for hunting (AP1).
- ❖ Furthermore, some stages of the freezing processes seem to be skipped, such as: i) no *qanguqtuq*; ii) no *qaiku*; and, iii) *ilu* not happening anymore.

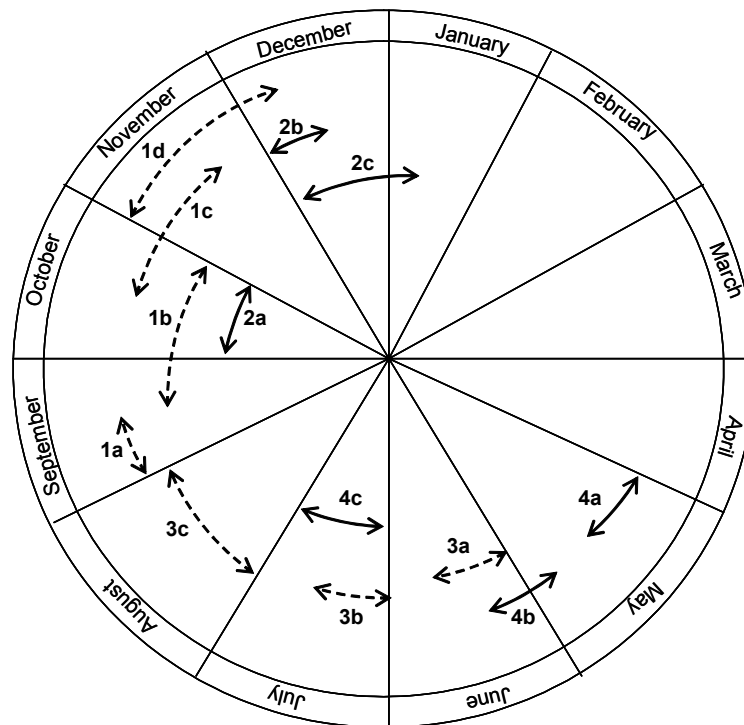
Timing of break-up

The changes in break-up timing are summarized in the **diagram on this page**.

“[I]n June [we] used to go by dog team. But now [we] don’t even snowmobile in this month of June, it doesn’t look like it’s going to happen again. Because [we] used to go by dog team, and snowmobiling in June, but now nobody goes dog teaming or snowmobiling in June.” (Oqsuralik Ottokie)

- ❖ The deterioration process is noted to be occurring faster due to thinner sea ice, making it more unpredictable in terms of safety.

Summary of the changes in freeze-up and break-up timing observed in Cape Dorset.



----- Previous freeze-up

- 1a** – would begin freezing around the start of school
- 1b** – used to start freezing around September and October
- 1c** – typical freeze-up between October and November
- 1d** – able to drive across inlet in November; freeze-up in November; dog team races in early December

----- Recent freeze-up

- 2a** – just starting to freeze in October
- 2b** – only freezing around the 1st or 2nd week of December; still no ice in mid-November, or at least not travelable; joking about canoe races in December
- 2c** – almost Christmas when it freezes, and even still some open water present

----- Previous break-up

- 3a** – used to break up around the beginning of June; used to travel by dog team in June; used to have ice until June
- 3b** – used to be able to travel on sea ice until the 3rd week of July
- 3c** – used to only be able to access the soap stone mine by boat in August

----- Recent break-up

- 4a** – sea ice breaking up around the beginning of May
- 4b** – cannot travel on sea ice even in mid-June; now no ice in June
- 4c** – can access the soap stone mine by boat in July

Ice thickness

- ❖ Sea ice was consistently described as being thinner than in the past, based on a few key indicators:
 - seal breathing holes are no longer as deep or tunnel-like
 - ice at open cracks is no longer as deep
 - ice is thinner in comparison to personal height – usually gauged when drilling a fishing hole or setting seal nets

- travel routes are not as sturdy or solid as previous years (e.g. more open water on the winter soap stone mine route, which can also link Cape Dorset to the community of Kimmirut)
- multi-year/moving ice are smaller and not present as frequently

“No, we don’t measure, like because we don’t fish in the salt water ice, but last year we’ve noticed, in the later part of the season the ice started to break off in big, very large chunks. Yeah, breaking away, and then you know closer to Dorset the ice never got very thick. But it was safe to travel, but not thick thick you know?” (Jimmy Manning)

- ❖ Where comparisons of personal height were demonstrated, ice thickness changes of approximately 0.5m were indicated, while in other cases changes were more like 0.2m or less.
- ❖ Thinning ice is also indicated by the formation of new polynyas, and more open water seen during airplane flights between communities.

Wildlife

- ❖ Polar bears are being spotted in and around the community much more frequently than in the 1960s and 1970s.
- ❖ One possibility for the larger number of bears in town is that they are traveling further north from Hudson Bay because of deteriorating ice conditions in the south.
- ❖ Another suggestion is that there are more bears around now due to the quota system → previously, any polar bear seen would be hunted, especially due to the rarity of such a sighting in the past.
- ❖ With the quota system each bear spotted cannot necessarily be hunted, and perhaps this is either affecting the size of the population, or decreasing the bears’ wariness of humans.

“[E]specially in the past few years there has been more bears. Men in those days rarely caught polar bears. But today there are more men that catch them, he thinks there are too many bears now.” (Paulassie Pootogook)

- ❖ Seal behaviour seems to be changing as they have been observed popping up more in polynyas and even basking on top of the ice in the winter → this could be an indicator of thinner ice or warmer air temperatures.
- ❖ Less bearded seals are being caught these days, which may be linked to changing seal behaviour or simply to the fact that they are not being hunted as often.
- ❖ Beluga whales are not sighted as often and their fall migration seems to be occurring later in the year now.

**[N]ot too many people that know about these changes [are] talking about it on the radio, so there’s been more accidents than there would [otherwise] be. If there was more people that were letting the local people know about the difference of the ice from years ago, if somebody can do that everybody would be a lot safer.”
(Oqutaq Mikigak)**



Gita traveling by dog team in May, 2004



Atsiaq Alasuaq testing the *uiguaq* in Jan, 2005



Hunters waiting for seals at a *saqvaq* in Jan, 2005



View of Cape Dorset in Oct, 2003

THANK YOU to all the people who participated in interviews between May, 2004 and April, 2005 (in alphabetical order left to right, based on last name):

Alasuaq, Atsiaq	Etidlouie, Etulu	Ezekiel, Ashevak
Joanasie, Matthewsie	Kelly, Sandy	Kellypalik, Mangitak
Mangitak, Eliyah	Manning, Jimmy	Mikigak, Oqutaq
Nuna, Adamie	Nunguisuituq, Iqadluq	Ottokie, Oqsuralik
Parr, Aleka	Petaulassie, Etidlouie	Petaulassie, Qatsiya
Peter, Ningeseak	Pootoogook, Paulassie	Saila, Mikisiti
Solomonie, Kanayuk	Suvega, Simigak	Tapaungai, Quvianaqtuliaq

Interviews were translated by: Pootoogoo Elee

Please note that all original audio and video tapes, transcripts, and full glossary have been deposited at the Community Learning Centre. They are available to anyone who is interested in getting more details about this project.

Maps and posters will also be placed in the Hunters and Trappers Association office and Peter Pitseolak High School.

*If you have any comments, questions, or suggestions, please contact **Gita Laidler** at:*

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