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*«Nature has been severely damaged,
it has been mistreated by Man.»*

Observations of Climate Change Made by Indigenous Inhabitants of the Coastal Regions of Chukotka Autonomous Okrug

Report on the project of WWF Arctic Climate Change Project
conducted by WWF Russia

Authors: Vladilen Kavry, Andrei Boltunov



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Vladilen Kavry
Andrei Boltunov

English translation by Melissa R. Mooza

During the summer and fall of 2005, surveys of indigenous inhabitants of coastal villages in the Chukotka Autonomous Okrug were conducted. The goal of this work was to gather information about whether or not the people surveyed have noticed any changes in the climate, and if so, how these changes are affecting the lives of people in the region. In the result you see clear witness of negative climate impacts.

According to scientists' predictions, climate change in the Arctic will be much more significant than elsewhere on the planet. In the next fifty years, the temperature may increase by 10 °C or more, which would lead to cardinal changes in ecosystems and in people's way of life. We have to do the best to mitigate climate change and prevent worse scenario. On the other hand, it is necessary to prepare for some unavoidable changes in advance. Traditional knowledge and observations of the indigenous inhabitants of the Arctic – who have lived millennia in this harsh, but very delicate climate – may be very helpful.

Viktor Nikiforov
Director of the Regional Programs WWF Russia
Chukotka, 2005–2006

The following list of questions (topics) was prepared for discussion with survey participants.

I. Biographic information about survey participants:

1. Name
2. Nationality
3. Age and date of birth
4. Length of time living in their current community
5. Profession
6. Experience hunting or reindeer herding
7. Composition of family (elders, parents, children)
8. Native language (language spoken at home), understanding of Chukot or Eskimo languages

II. Observations of climate changes

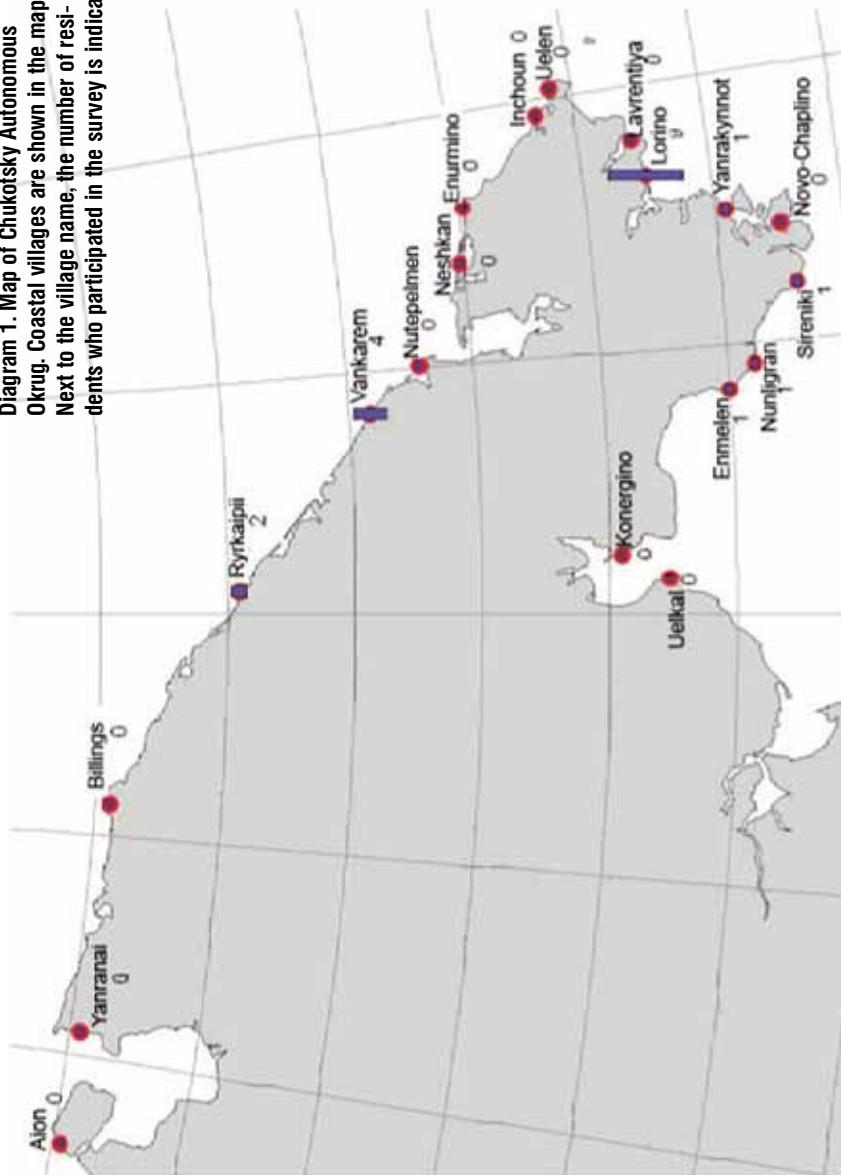
1. Have you observed any changes in the climate? If so, since when?
2. How are these changes manifested in nature? What facts could you cite that corroborate climate change during different seasons?
 - A. Spring (first summer puddles; when the ice breaks up at sea, in bays, and on rivers and lakes);
 - B. Summer (when the sea ice disappears entirely, if it becomes warmer, if there are thunderstorms);
 - C. Fall (first fall frosts, appearance of the first studge ice, and when sea-ice forms);
 - D. Winter (frequency and number of periods of thaw in the fall, winter, and spring; frequency of blizzards).
3. Have you observed any effects of the changing climate on plants and animals?
 - A. Dates of the first blossoming, start of plant harvest.
 - B. Arrival and departure of birds (appearance of species, uncommon for your locality.)
 - C. Appearance in surrounding areas of other animals, fish, etc.
 - D. Arrival and departure dates of walrus to their haul-out sites.
4. Changes in frozen ground and snow cover (melting of snow and glaciers on hillsides and in river beds.)
5. What did your ancestors say about the climate in their time compared to the present?
 - A. Do the observed changes positively or adversely affect the life and economic activities of people in your village?
 - B. What, in your opinion, are the reasons for these changes?

If the people surveyed spoke Chukot, discussions were conducted in the Chukot language.

In total, 16 men and 3 women (Diagram 1) were surveyed. Among the men surveyed, 15 identified their primary occupation as being marine mammal hunting, while one man identified himself as a reindeer herder.

The age of people surveyed ranged from 37 to 82 years (median 51). Among them, 17 people were Chukchi, 1 was Russian, and 1 was Eskimo. After preliminary discussions about the survey's goals, interviews were taped on a tape recorder. In total, 340 minutes of interviews were recorded.

Diagram 1. Map of Chukotsky Autonomous Okrug. Coastal villages are shown in the map. Next to the village name, the number of residents who participated in the survey is indicated.



Survey Materials

Ryrkaipii Village

In the village of Ryrkaipii (in the Shmidtovsky District of Chukotsky Autonomous Okrug) two people were surveyed.



**Viktor Yakovlevich
Tkachenko**

57 years of age.

*Has lived in Chukotka
since 1968.*

Russian

Marine Mammal Hunter

Has noticed significant climate changes. It has become warmer. From July to September there are southern winds. Rivers are not yet frozen in October, whereas previously they would have been by this time. Water level has risen. Where earlier, it was possible to pass, now there is water. Before, it was possible to drive through lagoons on all-terrain vehicles, and now they must be crossed by boat.

In the last five years, southern winds have dominated, the ice has broken up, and there is no ice along the shore.

Spring arrives in mid-May. Before, it was possible to hunt seals on the ice until the end of June, but now it is dangerous to walk on the ice in May. Before, the sea opened up between July 10–19, and now the ice begins to break by mid-June. Ice forms in late October and November. Previously, it was possible to walk on the sea-ice in late-September.

Even in January there are periods of thaw with rain. I don't recall that happening earlier.

He has not noticed changes in mammals. Individual walrus remain longer.

Birds arrive at the same time they did before. But, if previously, they arrived and spring had not clearly begun and there were frosts and blizzards, and many birds died. Now half of the tundra has already melted by their arrival. The birds leave later than they did several years ago.

Berries are more plentiful.

Frazils, which previously lasted year round, now melt everywhere.

He does not see a particular difference in the amount of precipitation, but it is possible that distribution by season has changed: a lot of snow falls in the spring. Thunderstorms have become frequent.



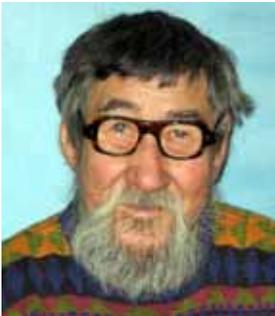
Yevgenii Aleksandrovich Etuvgi

*48 years of age
Chukchi
Reindeer herder*

Has not noticed particular changes in climate.

Vankarem Village

In the village of Vankarem (in the Iultinsky District of Chukotsky Autonomous Okrug), 4 people were surveyed.



Magtagin

*71 years of age
Chukchi
Worked as a hunter,
diesel operator, was
chairman of a collective
farm, and a bulldozer
operator.*

Has noticed significant climate changes.

He remembers that winter and frosts used to begin in September, and now it is still fall in November.

Summer is very hot. The tundra begins to blossom in thawed areas already in May; earlier this happened in late-June. In the past, berries were unable to ripen, and now they are often over-ripe. Earlier, thunderstorms were rare, and now they are more and more frequent.

Snowfields are melting, the coastline is eroding, and the sea is already inundating the lake beyond the village. The tides are very high and are washing away the spit.

Walrus always come ashore now since there is no ice, while earlier they always stayed on the ice. Birds, which resemble sparrows and swifts, have begun to appear. They have never been observed previously.

Fall has begun to arrive later. Earlier, it was not possible to get water from the well, and now it is still not frozen in November. Fall has become two months longer.

Very cold temperatures no longer occur in the winter, although the weather is different every year.

He remembers how in the 1960s and 1970s snow buntings appeared.



**Grigory Mikhailovich
Rykhtyn**

Chukchi

37 years of age

*Reindeer herder, marine
mammal hunter*

He has noticed changes in the climate beginning in the late 1980s. Nature has been severely damaged; it has been mistreated by man.

Spring comes 2–3 weeks earlier than it did before. Spring is harsh, and rain or frosts constantly alternate with one another. The first rain comes in May, and earlier this never happened. The first period of thaw happens in late April. Rivers open up much earlier than they did before (about May 25), whereas previously they did June 10–15.

Summer has become unbearably hot. Birds arrive in early May. Small birds, cranes, and ducks arrive first. In the 1980s, ducks arrived May 25–27, and now they arrive in late April or early May. The ice remains until June 11 or 12. It leaves altogether by July 15. There is no more good sea-ice. Previously, the sea opened up in mid-May, but the ice didn't go out far. All summer long, people hunted on the ice.

The frozen ground is melting, water is becoming plentiful. Snow on the hills melts entirely, even where it had previously remained all summer long. New grasses have appeared. Cloudberries have become few because the summer is hot. Tundra blossoms in late May, whereas previously it blossomed by mid-June only.

In the Neshkan tundra, badgers have begun to appear and lynx are encountered.

Fish such as speckled Arctic cod and eel-pout have been caught, but the Arctic cod are much smaller.

Fall begins in November, while previously it did in September. In the fall, periods of thaw often occur right up until early December.

Winter has become warmer. Very cold temperatures no longer occur.

Tilmyet

Chukchi

82 years of age

Marine mammal hunter

Has noticed significant climate changes.

The weather has become very changeable and difficult to predict. Winter has become warmer and summer has become warmer. Fall and spring have become longer at winter's expense. Walrus arrive tired. They have nowhere to rest, as there is no more ice in the summer. More whales are being observed.





Vladilen Ivanovich Kavry

39 years of age

Chukchi

Marine Mammal Hunter

Has noticed significant climate changes.

Ice formation lasts for a month and the ice breaks up a month earlier than it did before. Old ice no longer exists. Walrus stay longer at haul out sites. Birds (some ducks, gulls, and snow buntings) depart later. The frozen ground is melting. Snowfields are melting where they were previously preserved all summer long

Lorino Village

In the village of Lorino (in the Chukotsky District of Chukotsky Autonomous Okrug), 9 people were surveyed.



**Anatoly Nikolaevich
Ankaroltyn**

Chukchi

37 years of age

Marine mammal hunter

Has noticed climate change. It has become warmer.

Spring comes earlier, maybe because of the open sea edge, which open up every year next to the coastline. The currents are warm. Ice breaks up earlier by about 1 month.

While previously we ice fished on the lagoon until late June, now the ice melts in late May. Brooks open up earlier. In the summer and fall, frequent storms are eroding the shore.

Birds arrive earlier than usual. Cranes and snow buntings always arrive first. In about 2000, cranes arrived too early and many birds perished from the cold.

In the summer, the first blossoming begins in late May, while earlier plants began to bloom in mid-June.

Snow melts quickly from hillsides. Earlier, in Akkani (a closed village), on the seashore, old ice and snow remained beneath bluffs all summer long. Now it melts. The soil has been breaking down since 2003, and the ground is melting.

In the fall, the first studge ice appears in November, while previously it appeared in October. In about November-December, water in the sea and lagoon freezes. The lagoon begins to freeze earlier than does the sea. The sea is still open in December.

Now there is less snow in the winter than there was previously. In February, the snow was plentiful and it was dry. Winter came, everything froze and the ice edge was far away. Now the snow is always wet. Periods of thaw are frequent and this year (2004), there were periods of thaw in January and February. Sometimes it rains in the middle of winter, in December–February.



Anatoly Ranavtagin
Chukchi
64 years of age
Hunter, Marine Mammal
Hunter

Has noticed climate changes beginning in 1979, after moving from the village of Nunyamo. An eastern wind has begun to dominate. Spring differs from year to year. Usually, flooding takes place in late May. Recently, there are spring rains and snow has begun to melt quickly and rivers open up earlier.

In May, even thunder can be heard. The first periods of thaw in the spring occur in March and in early April (without changes). Thunderstorms happened before, but recently they occur earlier in the spring.

Cranes arrive in the first days of May, and sometimes in April, without change.

Summers have become warmer. Blossoming usually takes place in June. On bluffs, snow sometimes melts, but this depends on the accumulation of snow or warm weather in the summer.

In the past the sea froze in October and for this reason, it carried out old ice from the Arctic Ocean and it quickly froze. Because of the old ice and strong hummocking, the ocean edge was far away and we went to sea from Akkani (20 kilometers from the village). Now there is no old ice and for this reason the sea freezes later, about in late November. The ice edge is always close by, and the sea freezes like an almost flat field. The lagoon freezes earlier. It is already possible to travel by dogsled.

Periods of thaw in November – especially those with rains – are very harmful for breeding. In the past, there were periods of thaw, but they were rain-free.

Birds depart without changes in early September.

Earlier, winter was calm and cold, and the location of the village was very good. Usually, once a night a north-easterly wind would blow, overtake the blizzard and by morning, it would be calm again. Now, easterly winds with a blizzard dominate, and for several days. Snow is more abundant and there were never such snow banks in the village before. Only in December do we leave for the edge, while previously we left in November. Sometimes there are periods of thaw and rains in the winter



Eduard Vladimirovich Rypkhirgin
Chukchi
41 years of age
Marine Mammal Hunter

Has noticed changes in the climate. Sea ice melts more quickly. Summers have become warmer. Periods of thaw are frequent in the fall and winter. Has not noticed any particular changes in the spring.



**Vladimir Grigorievich
Tynarakhtygirgin**

Chukchi

71 years of age

Reindeer herder

Has noticed great changes in the climate. Good weather dominated previously. Blizzards were very rare, although some reindeer herders were left without reindeer. Now blizzards are frequent.

Reindeer have begun calving a little earlier than was common before. Lagoons clear up earlier. Fish runs depend on the ice. The tundra freezes as it did before. It has become warmer on the shore, and the sea does not freeze for long. Blossoming takes place as it did before. Spring has become longer. Summer and fall have increased. The arrival of birds in the spring is always a joy. By the call of birds, it is possible to determine what the spring will be like – cold or warm. In the summer snowfields melt, but not always. Elders say that the weather is swinging to the warmer side.



**Maya Niokolaevna
Nupenrultet**

Chukchi

51 years of age

*Reindeer herder
and*

**Yevgenii Vasilevich
Tatata**

Chukchi

49 years of age

Reindeer herder

Have noticed changes in the climate in the last 3–4 years.

Spring has become longer and arrives earlier. Every year is different. The birds arrive a little later.

The summer has become warmer. Blossoming occurs a little later than usual due to the prolonged spring. Swifts or sparrows have begun to appear, while they did not before. It is rumored that lynx have been encountered more frequently. Snowfields and frazils have begun to melt on the Chegitun River.

The time ice forms on rivers and lakes has changed. In the past, ice formed in late September and now rivers are still flowing in October, and only in late October do they begin to freeze. In November, there are periods of thaw accompanied by wet snow, drizzling rain, and rains. It rained three falls in a row.

In the winter, frequent blizzards bring much snow. Frequent periods of thaw, and then frosts, affect pasture lands. One year there was rain in December.

Elders talk about the change in climate: heat in the summer, ice covered ground and frequent blizzards in the winter, earthquakes, and thunderstorms and lightning.

Climate change adversely affects reindeer herding: in the winter there is ice covered ground. And if summer is hot the reindeers get severe disease of hooves causing high mortality.



Zinaida Vasilievna

Tanko

Chukchi

64 years of age

Animal breeder, Artistic

Director of a National

Ensemble

Has noticed significant changes in the climate. There was always snow on Akkani, and now it melts in the summer.

In the past, this place was calm in any season. There were never any blizzards, and now something has happened and strong winds are often accompanied by snowstorms.



Sergei Mikhailovich

Tynachaivynto

Chukchi

55 years of age

Reindeer herder and veterinary medical attendant

Has noticed great changes in the climate.

Elders also say that the climate has become entirely different. Blizzards have become fierce, long, and harsh. There are sudden increases in temperature, and then frosts. Near the village, the sea is practically free of ice all winter long.

The arrival of spring varies by 10 days. Sometimes spring is protracted.

Fall fluctuates, freezing and melting. Fall has been prolonged by half of a month. The first studge ice appears in November. There are frequent periods of thaw in October and November. They are rare in December and January. It is connected with the open sea. Lynx appear. People have recounted catching sharks. In the summer it has become hotter, and snowfields and frazils are melting. Brooks and lakes are drying up. In the past, the weather was stable; now it is unpredictable. For reindeer herding, this is very bad.



**Tatyana Nikolaevna
Gynuntegina**
*Chukchi, 55 years of age
Reindeer herder, Animal
Breeder*

Has noticed changes in the climate.

In the spring, rivers open up earlier. Ice in the lagoon melts more quickly. In the past, we ice-fished until June, and now do so just until mid-May. Summers have become hotter. Blossoming begins at different times every year. Berries sometimes over-ripen from heat and become soft and unappetizing.

Sireniki Village

In the village of Sireniki (in the Providensky District of Chukotsky Autonomous Okrug), 1 person was surveyed.



**Vladimir Petrovich
Typykhkak**
*Eskimo
41 years of age
Marine Mammal Hunter*

Has noticed changes in the climate because of global warming. Spring is long and cold. In May, high surge appears strikes the shore; in the past it appeared in late July. The sea is quickly freed of ice. Cranes arrive in April, while in the past they arrived in early May.

In the summer it has become warmer and hotter. We already gather mushrooms in early July and before we did so in late July or early August. The tundra blossoms earlier. Berries ripen earlier. Humpback salmon comes in early July, and earlier it came in late July.

In the fall, the sea begins to freeze in November only, while before it did so in September. We walk on the ocean before December. In late November we go out on the ice on lakes, and earlier we could do this in early November. Periods of thaw have become frequent and they are brought by easterly winds. Blizzards are infrequent.

Birds winter at sea; previously he did not notice eider ducks and gulls. Once he saw small dolphins and one moose.

The frozen ground is changing, and the soil is thawing. Snowfields and frazils are all melting.

His father spoke of the warming and because water levels have risen, many brooks can no longer be crossed by foot.

Yanrakynnot Village

In the village of Yanrakynnot (in the Providensky District of Chukotsky Autonomous Okrug), 1 person was surveyed.



**Leonid Alekseevich
Kutylin**

Chukchi

67 years of age

*Reindeer herder, hunter-
marine mammal hunter*

Has noticed strong changes in climate.

The tundra quickly fades. Berries spoil quickly, and many people aren't able to gather berries. Wild onion has appeared. Earlier, on November 7, he was able to travel by dogsled along the sea. Now the sea is not yet frozen in December.

Everything has changed, the sun rises differently, and the stars have changed.

In the past, there were no clocks. Everyone determined the time by the stars, by when dawn breaks. Now everything is different. Today, the old ice has been lost altogether. Earlier, it became cold when the old ice arrived. Winter was colder. Now everything melts. The sun shines differently. There are more thunderstorms. Before thunder sounded somewhere in the center of the mainland in the north. In the fall, more whales have begun coming into the bay. Sometimes, I think, 50 whales exhale all at once and it becomes warmer outside. They probably make the weather warmer. Winter has become warmer. The bay freezes and it is first covered not by ice, but by snow.

One elder died at the age of 89 and before he did he said that nature has become completely different. The coastline is eroding and storms are frequent.

Birds now arrive in April. Previously, they arrived in early May. More fish have begun to run. Fish – coho salmon has begun to be harvested. Moose are present. People have seen lynx. People have seen huge wolverines that are about the same size as brown bear.

Before, snowfields remained, which meant that it would be a good winter. Now they all melt.

There are more blizzards. The wind has become stronger. It carries sand and pebbles on the ice and the ice deteriorates more quickly in the spring.

Nuligran Village

In the village of Nuligran (in the Providensky District of Chukotksy Autonomous Okrug), 1 person was surveyed.



Nikolai Nikolaevich

Kychi

Chukchi

50 years of age

Marine Mammal Hunter

Has noticed changes in the climate beginning in 1990.

The migration of animals has changes by a month. For example, previously the bearded seal came from the north in October, and now it comes in November. Winters have become warmer and the sea doesn't freeze; this never happened before. Not even the bay freezes. An easterly or north-easterly wind dominates. There is ice-covered ground. Freezing northern winds have become rare. In the summer, southerly or south-westerly winds have begun to blow.

Periods of thaw have become more frequent in the fall and winter. Fall is delayed by about one month. The weather has become unpredictable. It becomes suddenly warm and then cold. Spring arrives earlier. Summer has become warmer and prolonged; grass has begun to grow higher. Thunderstorms are frequent.

Seabirds have begun to winter here. The arrival of birds has not changes. One time in the summer people saw a sea otter or beaver. He saw a blue whale. Sharks appear and get caught in nets.

The tundra melts and breaks down. In the summer, snowfields are melting.

Enmelen Village

In the village of Enmelen (in the Providensky District of Chukotksy Autonomous Okrug), 1 person was surveyed.



Yuri Ivanovich Yttytegin

Chukchi

39 years of age

Marine Mammal Hunter

Has not noticed particular changes in the climate. The weather is different every year. Summers have become a little warmer, but this year, people gathered guillemot eggs later than usual and it was cold. Thunderstorms are very rare.

The first frosts occur in late October, and the first studge ice at sea occurs in November. Periods of thaw are rare in the fall and winter. The winter is cold. Cranes arrive first; if the winter is cold, some die. In the winter, sea birds winter at polynias. He found a dead lynx in the tundra. In the early 1990s, people caught many sharks, and before that never happened.

White-sided bottle-nosed dolphins have been observed. There are sea lions every year. Fur seals are never observed. People have not observed changes in the frozen ground. In the summer, along the Enmelensky snow covering the hill side, the presence of walrus has been noted: melting reaches a certain point and we get ready to hunt walrus.

Summarized Results of the Surveys

Climate Changes

As is indicated in Diagram 2, the overall majority of people surveyed have noticed climate changes. At the same time, practically all respondents, who gave an affirmative answer to the question, "Have you noticed any changes in the climate?" called the changes noticeable or significant.

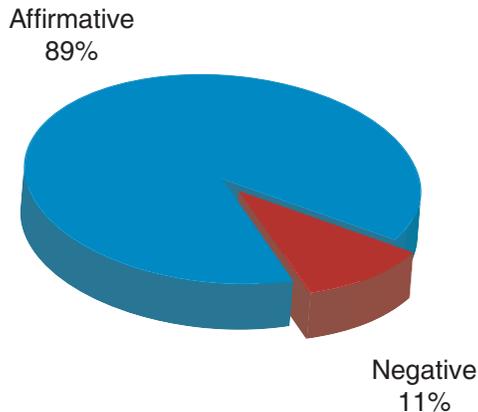


Diagram 2. Correlation between affirmative and negative answers to the question, «Have you noticed any changes in the climate?»

After detailed discussion of the changes that are taking place, it became clear that the most noticeable changes are those in weather by season. (Diagram 3). More often than not, the following changes were mentioned:

1. Changes in weather are becoming more noticeable with each year. Thunderstorms and lightning are frequent, which never happened before.
2. Changeability and unpredictability of the weather during all seasons is noted.
3. The spring comes earlier by one month, and winter is delayed by a month (it is apparent in the formation and break-up of ice on the sea and on rivers and lakes).
4. The summer has become hotter. In some places, which were previously covered by snow year round, snow has melted in recent years. Melting of the frozen ground is observed.
5. During periods of thaw in the fall, which occurred earlier, there are rains, which never happened before.
6. Winters have become milder and the frequency of blizzards has increased.

People identify melting of frozen ground, coastline erosion, and increase in sea level as objective consequences of overall warming. The state of the sea, and more specifically, the ice cover, evoke particular anxiety among marine mammal hunters. The changes in sea-ice consist of the displacement of periods of its formation and break-up. Respondents identify the absence of "old" ice as the most significant change, and on the Arctic coast, there is a complete absence of ice in the summer and in early fall.

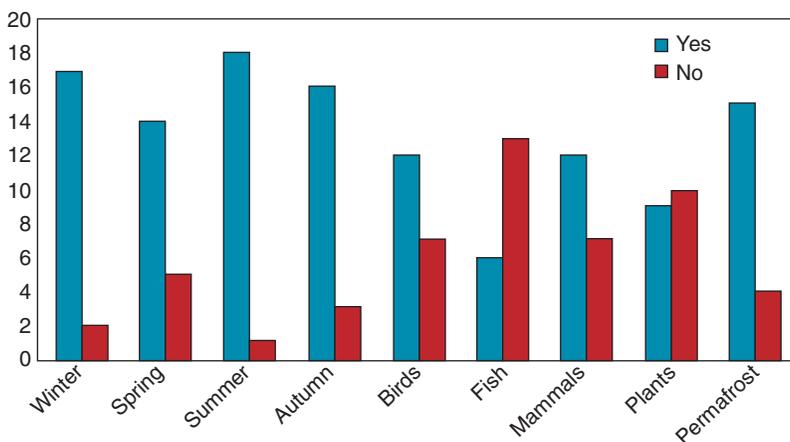


Fig. 3. Results from the surveys by main topic. Light-colored columns represent the number of respondents who noticed changes. Dark-colored columns represent the number of respondents who did not notice changes.

Climactic changes bring about changes, which the people surveyed notice in nature. Earlier blossoming of the tundra is the result of the "prolonged" and warmer summer. On the Arctic shore, berries have begun to ripen, and in more southern regions (the Bering Sea shore) people notice that berries frequently become overripe, which never happened before.

People noted the appearance of animals that are uncharacteristic for their given locality (sharks, lynx, moose). The "light" ice situation is causing whales (gray whales and bowhead whales) to penetrate further to the west and remain longer in the waters of Chukotka.

On the other hand, the lack of ice on the coastline in early fall forces walrus to come ashore and form large coastal haul-outs on the Arctic coast. Many people say that in the past the walruses used to remain on the ice and seldom came ashore, although the names of places and villages (Ryrkaipii, Vankarem) suggest that some time in the distant past haul outs existed there.

Among other things, participants in the survey mentioned that there have been earthquakes in recent years, which never occurred before.



As a rule, respondents could not explain the reasons for the changes taking place. More often than not, they cite information from the mass media. It is obvious that people are not satisfied with the climate changes that are taking place and believe that things were more «right» before.

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