

Irminger Sea; Oct 9 - Nalunnguarmiup Atuarfia School

Questions from the students at Nalunnguarmiup Atuarfia school, Sisimiut, Greenland

Apeqquiti Kalaallit Nunaani atuartut apeqquasiaat (Answers to Greenland questions) -- by Woods Hole Oceanographic Institution biological oceanographer Carin Ashjian and graduate student Kjetil Våge -- in Greenlandic, followed by a translation into English

1. Immap kissassusia qaffassagaluarpat, imaami uumasunut sorlernut suniuteqassava?

Imaani kissassuseq qaffapilooraluarpat imaani uumasut tamarmik eqqorneqassapput, imaani uumasut amerlanerit orniginartittarpaat imartaq kissalaarnerusoq, amerlanerusullu kiatsinnera anigorluarsinnaavaat. Imaq kissarnerusoq imaani uumasunit aammalu uumasuaqqanit sukkanerusumik alliaartortarnerannut suniuteqassaaq, taamaasilluni nerisassaqaarnerullerlutik amerliartorluarsinnaanngussapput. Imaanili uumasut ilaannut kissannera ajoqutaassaaq, tamannalu uumassusillit arlaannut piuneerunnermik kinguneqarsinnaalluni. Illuatungaanilli kissassuseq arriitsumik qaffakkiartoruni, tamanna imarmiunut periafissaqartitsissaaq avannarparternissamik imalunniit nalimmassarnissamut kissalaarnerusut. Pingaaruteqartut ilagivaat, kiannerulerpat sermeq annikinnerulissaaq tamannalu imaani naggorissutsip periusaanut amerlasuutigtut suniuteqassalluni. Sequnngup qinnguga imaani sermikinnerulerpat annertunerulissaaq, imaani naasut uumasut nerisartagaat amerlissapput tamannalu immap uumasuinik aamma amerlanerusunik pilersitsissalluni. Aalisagaqaarnerulernera puisit nerisassaqaarnerulernerannik suniuteqassaaq, puisillu amerlanerulernerannik pilersitsissalluni. Taamaakkaluartoq uumasut imarmiut puisit, aarrit nannut assigisaallu uumaniarnerminni sermeq siku pingaarutillit atorfissaqartippaat. Sikulu kiatsinneranik tammarpat uumasut pineqartut uumaniarnermikku ajornartorsiuillissapput, ikiliartulernermillu kinguneqassalluni.

1. If the temperature rises, which animals will be influenced?

All animals will be influenced if the temperature increases too much. Most animals have a range of temperatures over which they are comfortable and can survive. And, (see below) warmer temperatures mean that the plankton (plant and animal) may grow faster and so there will be more production, or food, in the food chain. At some point, the temperatures may become too warm for some animals and they would not survive. If temperatures warm slowly enough, animals can adapt either by moving further north or by becoming used to the warmer temperature. One important effect of increasing temperature is a decrease in sea ice. This can have many important effects to the ecosystem. At the base of the food chain, more light may mean more plant (phytoplankton and seaweed) growth if there are enough nutrients. This then would mean more food for animals higher up the food chain such as the fish that in turn feed the seals. However, ice is important as a base home for many animals including seals, walrus, and polar bears. With less ice, there is less habitat for these animals to live and they may have trouble surviving.

2. Imaata tarajoqassusia allannguuteqassagaluarpat, imaami uumasunut sorlernut suniuteqassagaluarpa?

Amerlanertigtut imaata tarajoqassusia allannguuteqaraangat annertuneq ajorpoq, uumasunut akornutaasinaasumik. Annertuumi allannguuteqartoqassagaluaruni soorlu tarajoqangaatialerluni, tamanna imartap uumasuinut akornutaassaaq, allaallu immap uumasuinik piuneerutitsisinnaalluni.

2. If the salt content changes, how will it influence the animals in the sea?

Most of the changes in salt that have been predicted are smaller than would be necessary to hurt the animals in the sea. There would have to be really dramatic changes in salt, such as an increase to levels in the Dead Sea, to hurt the animals.

3. Immap uumasuaranut qanoq suniuteqassava, imaq kissarnerulerpat?

Immap uumasuarai immap naasuiniq nerisut aammalu immami naasut, immap kissassusia qaffappat akuutissat akuleruttarneri sukkanerusumik ingerlalissapput, tamatumunnga ilavoq seqinerup qinngornera atorlugu naasut naasarnerat alliaartortarnerallu, tamakku tamarmik sukkanerusumik pinngoralissapput alliaartulertullu. Piffiillu ilaanni nasut immallu uumasuarai kissannera annertuvallaalissagaluarpat nungunnerannik kinguneqassaaq.

3. What will happen with the seaweed (plants) if the temperature rises?

For phytoplankton and seaweed, an increase in temperature means that all of the chemical reactions that are part of photosynthesis will occur more quickly. So the plants and phytoplankton would essentially grow faster. At some warmer temperature, however, it would be too warm and the plants would die.

4. imaani uumasut kujasissumiittut, kiannerulerneranik imartamut avannarpassinnerusumut pialissagaluarpat, uani eqqarsaatiginerullugit sarullik, suluppaagaq, qaleralik aammalu nataarnaq?

Aap, avannaata kitaata imartaani aalisakkat ilaat takusinnaalerparpat avannarpartersimasut Bering – ip imartaanut pialersimapput, siusinnerusukku imartami tamaani nassaassaasimangikkaluarlutik. Aammattaa Alaska – p aalisaga "Salmon" siornatigtut avannaata imartaani takusaanikuunngikkaluartoq, massakku piffinna amerlasuuni avannaani imarmi pisarinqarsinnaalersimalluni.

4. Will some species that previously lived in southern waters now move north, in particular codfish, redfish, halibut, and hali fish?

Yes, changes in where fish are found is an important effect of increasing seawater temperatures. Already in the western Arctic Ocean we are seeing species of fish occurring farther to the north in the Bering Sea than previously. Also, Alaskan salmon are now found all the way to the north in the Beaufort Sea where previously they were not usually seen. Changes in species distribution is an ongoing effect.

5. Ukiup ingerlanerani sikuusanginnera siviunerulerpat, tamanna immap naasuinut sunniuteqassanerluni?

Immap naasui seqerngup qinngornera aammalu akuutissat pisariallit atorlugit alliaartulersarput. Avannaarsuani sikuusarnera aammalu apummik qillersimasarnera imaani uumasunut naasunullu killilersimaartitsisarpaq, ukiukkummi sikuutilugu seqerngup qinngornera imaanut apuuttartinnagu immap uumasuarai naasuilu alliaartorsinnaasangillat. Immap naasui uumasuarailu immap qummut killinganut pillutik, seqerngup qinngornera atorluariartortarpaat, tamaanilu alliaartulersarlutik. Sikuusarnera siviukinnerulerpat seqineq siviunerusumik ukiup ingerlanerani imaani piusalissaaq, tamatumunnga atatilugu pineqartut soorunalimi aamma alliaartornissaminut amerliartornissaminnullu pisariaqartippaat akuutissat (nitrogen, silika, fosfor) amerliartussagunimmi allartorlutillu qaamaneq kisiat atorlugit pinngoriartorsinnaangillat, akuutissallu pineqartut pisariaqarput aamma.

5. If there are longer periods without ice, will this influence the production of plants?

Plants grow using both light and nutrients. In the Arctic, sea ice and snow are important to limit the amount of light that enters the water and reaches the phytoplankton and, in shallow water, the seaweeds that grow on the seafloor. If there is less ice, there should be more light. However, since the plants also need nutrients (nitrogen, silica, phosphorus), an increase in production with an increase in light will only be seen if enough nutrients are also present.

6. immap naasui annertusiartulisagaluarunik, imaani uumasut nerisariijaannerannut sunniuteqassagaluarnerluni? Sorlu aalisakkat, qaleruallit, puisit arferillu.

Aap, immap uumasuiara naasunik nerisut (phytoplankton) amerlanerulissapput taamaasillunilu immap uumasuarai allat(zooplankton), immap uumasuarai naasutortunik nerisartut amerlanerulissapput, taakkuuppullu arferit nerisarisartagaat, arferillu nerisassaqarnerulissallutik.

6. If the production of seaweed increases will it influence the rest of the food chain? Fish, bivalve, seal, whale, etc.

Yes. More phytoplankton in the water means that the zooplankton will have more to eat and so they can reproduce and grow more. The zooplankton in turn are eaten by fish that are in turn eaten by other fish or the whales or seals. Some whales (for example bowhead whales) even eat zooplankton, so more zooplankton will mean more food for the whales.

7. Silaannaap kissatsikkiartornera pissutaalluni nunarsuup nillerfia pinngorsinnaanerluni? Eqqarsaatigineqarluni isiginnaagassiaq "The day after tomorrow"

Goftrøm Amerika – p kujataata kangiaata imartaaneersoq imaq kissartuq tarajoqarluartorlu, imarpissuup Atlanti – kup imartaanut pisarpoq, piffimmilu salaannaq nillertoq kiassartarlugu, tamannalu nunarsuup avannaata inuuffigiuminarneranik pissuteqarpoq. Avannamut ingerlaarnera ingerlaqqilluni kujammut imaq tarajugissaartoq nillertorlu immap pissusaa oqimaannerulersittarlugu, tamannalu pissutigalugu immap naqqatigut kujammut sarfarluni ingerlaqqittarluni. Silaannaap kissatsikkiartornera pissutigalugu sermersuaq, qaqqani sermersuit aammalu immap sikuujuaannartup sikua, sukkanerusumik annertunerusumillu aakkiartulersissavai, tamanna pissutaalluni avannaata immap qaavatunga tarajoqassutsimigut sakkukinnerulissalluni. Taamak pisoqassagaluarpat imaanilu tarajoqassuseq annikippallaalerluni, imaq immap naqqanut kivisartuq tarajoqarluartuq, immap naqqanut kivisarunnaassagaluarpoq taamalu kujammut ingerlaqqittarunnaarluni. Piffimmilu ingerlaqqigani nillerneranik qerissalluni. Tamanna Gulfstrøm – ip ingerlaarneranut sanngillitsissaaq, nunallu avannaanittut nillernerulissapput, taamalu pisoqassagaluaruni piffissaq siviisooq atorlugit nillertikkiartornera sunniuteqariartilissaaq. Isiginnaagassiami "The day after tomorrow" tassangaannartumik Gulfstrøm ueriataarpoq tamannalu pissutigalugu nunarsuup nillerfia piffissaq siviisuararsuaq atorlugit pilerluni, tamanna pissutit piviusut aallaavigalugit nunarsuatsinni pisinnaangilluinnarpoq.

7. Is it possible that there will be a little ice age coming from global heating? Thinking of the movie: The day after tomorrow.

The Gulf Stream brings warm and salty water from the south to the North Atlantic, where it cools and releases heat to the atmosphere. This helps make the northern climate comfortable. Afterwards the water is cold and salty, which makes it very dense, and it can return south along the bottom of the ocean. Global warming will make the glaciers and sea ice in Greenland and the Arctic melt faster, and then the surface of the North Atlantic becomes fresher. But if the water in the North Atlantic becomes too fresh, it can no longer sink and return south (it will freeze instead). This will slow down the Gulf Stream, and make the countries surrounding the North Atlantic colder. However, if this happens, it would take a very long time. In the movie "The day after tomorrow" the Gulf Stream shut down immediately which caused a sudden ice age, which is completely unrealistic!

8. Avannaata imarta tarajukinneruvoq pissutigalugu siku sermerlu piffimmi aattortarmat, tamanna imartanut allanut qanoq sunniuteqarsinnaava?

Silaannaap kissarnerulissagaluarpat qaqqat sermersui immallu sikorsua aatsinneqassapput. Sermeq sikulu aattortoq avannaata imartaanut naaffeqassaaq, tarajoqassutsimullu annikillitsissalluni. Kalaallit nunaata imartaanut tamanna milunniutilimmik tarajoqassutsiminik annikillitsutigissava, sikulu sermerlu aattortut annertussutsimikkut qaffappata nunarsuup imartaanik qaffititsissaaq. Silaannaap allangornera nunarsuarmi piffiit ilaani panernerulersitissaaq soorluttaaq aamma silaannaap allangornera immaq tarajoqassusianut illannguuteqartitsissasoq.

8. The north sea stream has lower salt content because of ice melting. How will this influence the ocean?

If the air temperature warms, glaciers and sea ice will melt faster. This will increase the amount of fresh water that enters the polar oceans. In particular, the waters surrounding Greenland will become significantly fresher. If enough of the northern ice melts, this will cause the global sea level to rise. However, keep in mind that in a changing climate some places will become drier, which will also influence the salt content of the ocean.

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