# AWE

# Arctic Water Emissions

**Manufactured AWE and churned Atlantic warmth (CAW) are major drivers warming the Arctic, melting Greenland's glaciers and raising sea levels.**

**by**

**Stephen M. Kasprzak**

**Abbreviated Version**

## Introduction

The Arctic and Siberia are two of the fastest warming regions on Earth. If carbon and methane emissions are the major drivers, and given the minimal solar radiation available to be trapped during the sun starved winters by these fossil fuel greenhouse gases, then Arctic summers (May-Oct), with up to 24 hours of sunlight, should be warming faster or at least equal to the winters. Just the opposite is happening and the winters are warming many times faster according to the data in this study. This change is driven by extreme and abrupt increases in Arctic water emissions (AWE) and churned Atlantic warmth (CAW) pumped up into estuaries propelled by increased winter river flow (runoff) from warmed regulated discharges by Arctic mega power stations (AMPSs).

It was reported in the March 3, 1958 Fort Worth StarTelegram that Moscow radio boasted; *"Astonishing climate change would occur…evaporation (from the inland sea) would increase and with it the humidity of the air. The extremes of yearly and daily temperatures characteristic of these would be greatly modified."* The climate modifications began with 1952 and 1957 AWE tipping points with increased precipitation and temperature that were driven not only by summer domes of moisture emissions (DOMES) but also winter DOMES. Never before in geologic history have rivers flowed through the frigid Arctic winter exposing vast surface areas of new unfrozen regulated river and estuary waters to such strong evaporatice forces. Manufactured AWE and CAW from each of the AMPSs and also from each of the downstream run of the river hydropower plants (HPPs) create multiple summer and winter DOMES amplifying the greenhouse effect.

In 1973, Peter S. Borisov explained in his book, **Can Man Change the Climate?**, how the Soviets had built hydrotechnical projects to "*regulate and transfer the river run-off* " in order to *"change the thermal balance of the Atlantic and with it the climate of the surrounding continents"*. By the late 1960's, Russian AMPS had successfully changed the thermal and hydraulic balance on this side of the Atlantic in order to warm the Arctic. Then, between 1969-71, the Canadians built four AMPS's creating manufactured AWE and CAW radiacally changing the water cycle of the Beaufort and Labrador Seas, James, Hudson and Ungava Bays and the Gulf of St. Lawrence.

Water vapor is the most plentiful and powerful greenhouse gas and is vital for maintaining a climate habitable for life on Earth. However, manufactured AWE and CAW have wrecked the natural hydraulic, thermal and salinity equilibrium between the Labrador Current and Gulf Stream. They have also altered the estuarine balance between seasonal freshwater inflows and the churning they create by acting as a pump, drawing in relatively warmer deep saltwater from the sea through deep gorges and pulling it up to the surface of the estuaries to mix with the regulated discharged waters from the AMPSs.

Analysis of pre-tipping point weather data in three Arctic regions reveals copious amounts of winter (Jan-Apr,Nov,Dec) precipitation enhanced by Gulf Stream AWE at two weather stations in Table 1. The other two regions have experienced extreme increases in post tipping point winter precipitation created by manufactured Kola Peninsular and Kareliar AWE and Kara and Laptev Sea AWE. These increases were augmented by the introduction of winter CAW propelled by AMPS discharges in the watersheds of the White, Barents, Kara and Laptev Seas. (See Maps 1 and 3).

## Table 1

**Increases in Annual, Winter and Summer Precipitation Medians and Percentage Increase after the 1952 Precipitation Tipping Point (TP)**

| **Weather Station** | **Annual Median** | | | **Winter Median** | | | **Summer Median** | | |
|---|---|---|---|---|---|---|---|---|---|
| **Latitude-Longitude** | Pre-TP | Post TP | Increase | Pre-TP | Post TP | Increase | Pre-TP | Post TP | Increase |
| **Gulf Stream AWE** | | | | | | | | | |
| Barencburg[1], SV 78.1°N 14.3°E | 15.2” | 22.1” | 45% | 8.0” | 13.5” | 69% | 8.0” | 9.1” | 14% |
| Vardoe[2], NO 70.3°N 31.1°E | 22.8” | 23.9” | 5% | 10.4” | 12.3” | 18% | 10.9” | 11.6” | 6% |
| Average-2 Stations | 19.0” | 23.0” | 21% | 9.2” | 12.9” | 40% | 9.5” | 10.4” | 9% |
| **Kola Peninsular and Kareliar AWE** | | | | | | | | | |
| Vayda Guba, RS 69.9°N 31.9°E | 13.0” | 20.5” | 58% | 3.8” | 8.4” | 121% | 9.2” | 11.3” | 23% |
| Kanin Nos, RS 68.7°N 43.3°E | 10.2” | 16.7” | 64% | 2.9” | 7.7” | 166% | 7.3” | 8.3” | 14% |
| Average -2 Stations | 11.6” | 18.6” | **60%** | 3.4” | 8.2” | **141%** | 8.3” | 9.8” | 18% |
| **Kara and Laptev Sea AWE** | | | | | | | | | |
| Dikson, RS 73.5°N 80.4°E | 8.6” | 14.8” | 72% | 1.3” | 6.0” | 362% | 6.7” | 8.0” | 19% |
| Ostrov-Golojanny J. RS 79.6°N 90.6°E | 3.8” | 6.5” | 71% | 0.8” | 2.4” | 200% | 3.0” | 4.0” | 33% |
| GMO IMEK-Fedorova, RS 77.7°N 104.3E | 4.0” | 9.0” | 125% | 0.7” | 3.3” | 371% | 3.3” | 5.6” | 70% |
| Ostrov Kotelynj, RS 76.0°N 139.9E | 3.7” | 6.2” | 68% | 0.7” | 1.7” | 143% | 2.9” | 4.3” | 48% |
| Average - 4 Stations | 5.0” | 9.1” | **82%** | 0.9” | 3.4” | **278%** | 4.0” | 5.5” | **38%** |
| Average - 8 Stations | 10.2” | 15.0” | 60% | 3.6” | 6.9” | 91% | 6.4” | 7..8” | 22% |

1- Tipping Point 1957    2- Tipping Point 1980    

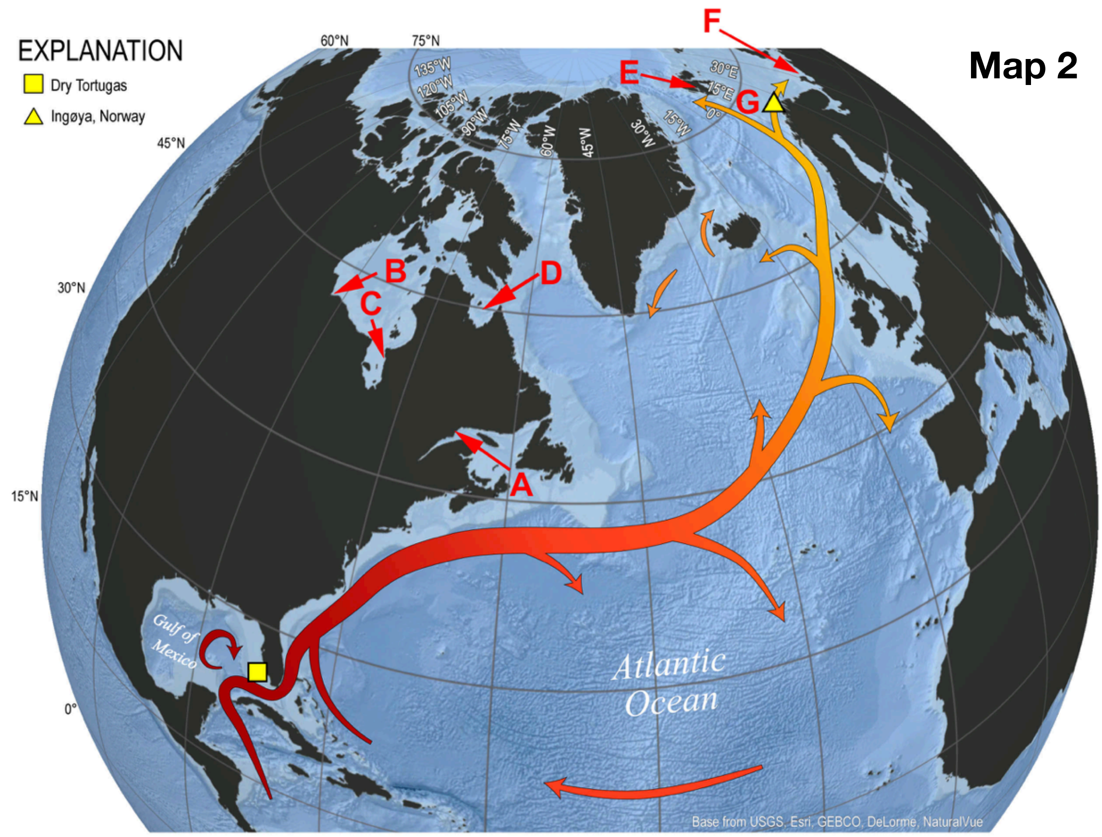
As highlighted in red, the percentage increases in winter medians are seven fold greater than the  increases of the summer medians.


Source: Arctic Circle, Wikipedia CIA World Fact Book, Public Domain

Black arrows and location names in red added by SMK/rdw 2-11-2025 **Map 1**

The Gulf Stream flows past Key West and as far north as Svalbard and the northern coastline of Norway. Pre-tipping point, the Gulf Stream AWE has created winter (Jan-Apr,Nov,Dec) precipitation medians at Barencburg, SV and Vardoe, NO that are 2 to 3 times greater than at Vayda Guba and Kanin Nos, RS and 8 to 14 times greater than at the four western stations on the coastline of Kara and Laptev Seas (See Table 1).

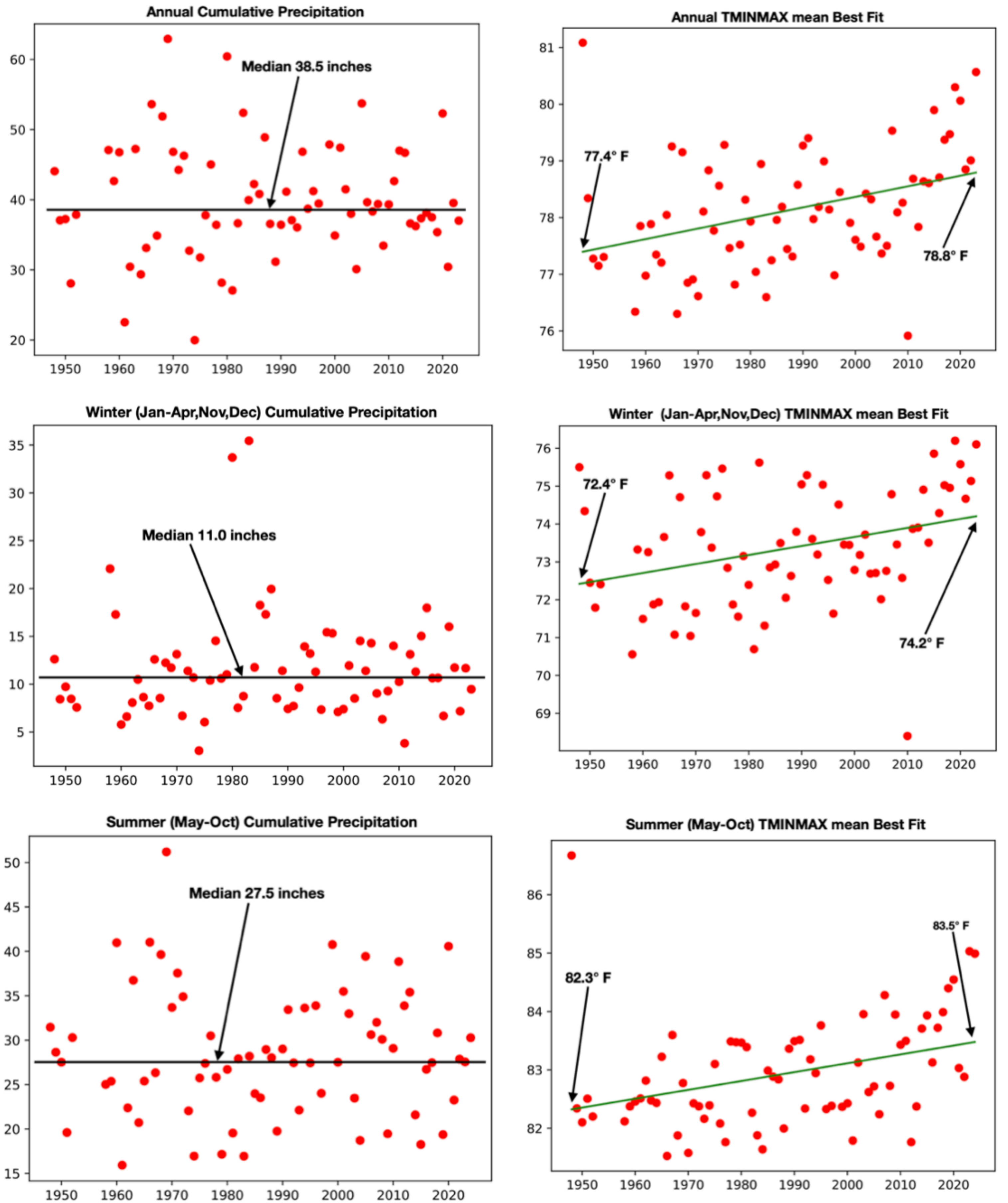
## Map North Atlantic and Gulf Stream



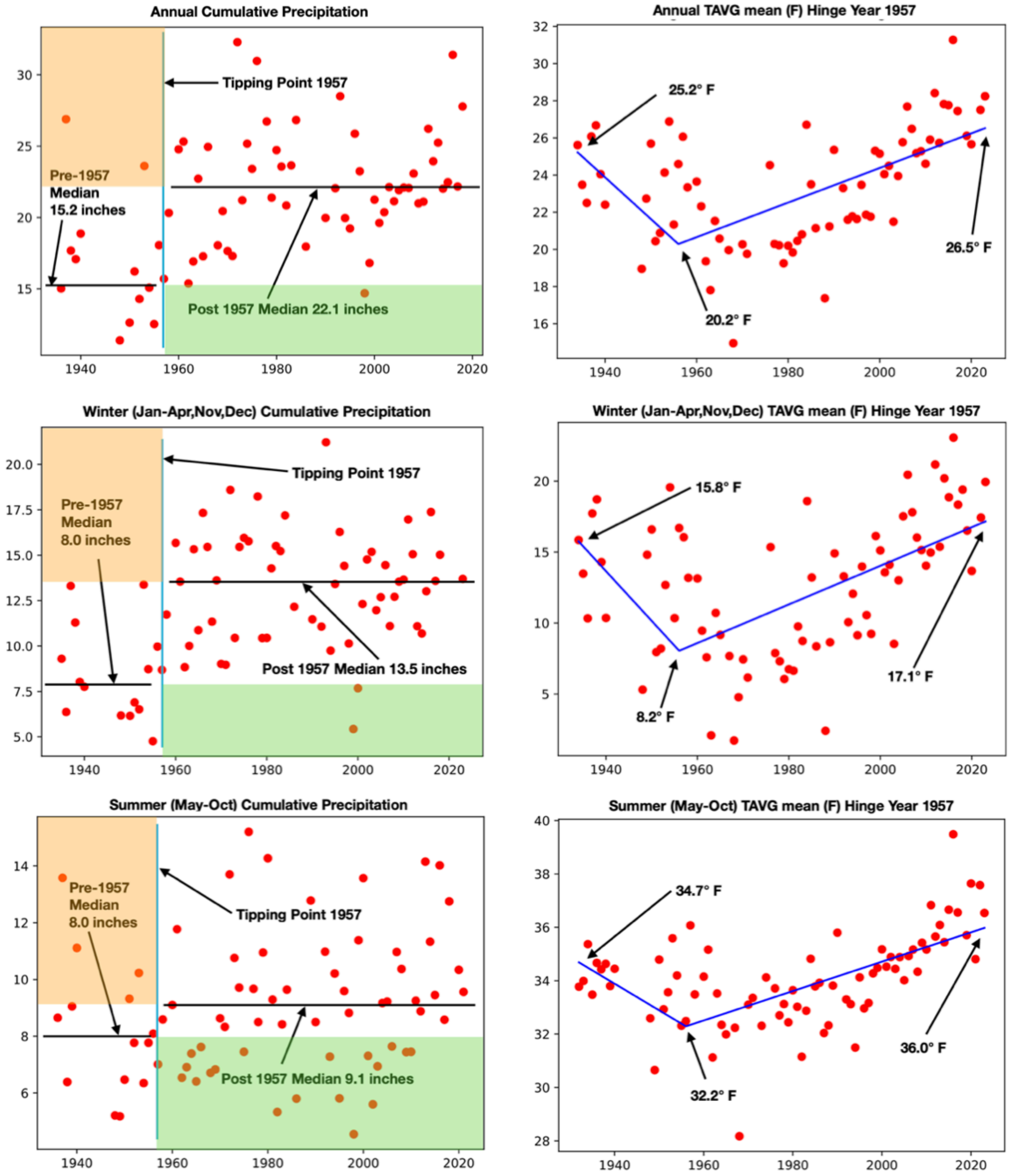

Source: USGS Ecosystems Land Change Science Program November 2021 (approx.)

Notes (letters added to Map by S. Kasprzak April 14, 2025)

A. 1970 Daniel Johnson Hydroelectric Dam Project and Manicouagan Reservoir
B. 1970 Manitoba Nelson River Hydroelectric Project
C. 1980 James Bay hydroelectric project on La Grande River
D. 1993 Brisay Dam diverted approximately 45% of north flowing Caniapiscau River waters from Ungava Bay into James Bay project
E. Barentsburg, Svalbard weather station
F. Kanin Nos, Russia weather station
G. Ingoya, Norway is on the coastline of the Barents sea




**Key West Intl. Airport** NOAA Station ID:GHCND:USW00012836 Data1948-2023 **Figure 1**
Lat 24.6° N Long 81.8° W HY Software by IPA Graphs ©June 30, 2025 S.M.Kasprzak/rdw Page 4




**Barencburg SV** NOAA Station ID: GHCND:SV000020107 Data 1932-2023 **Figure 2**

The Arctic is the fastest warming region on planet earth even though it receives about one half the annual solar radiance of the tropical and sub tropical regions. The fact that the average Arctic winter temperatures are warming much faster than its summers is also preplexing because the winters receive only half the amount of incoming summer radiation.

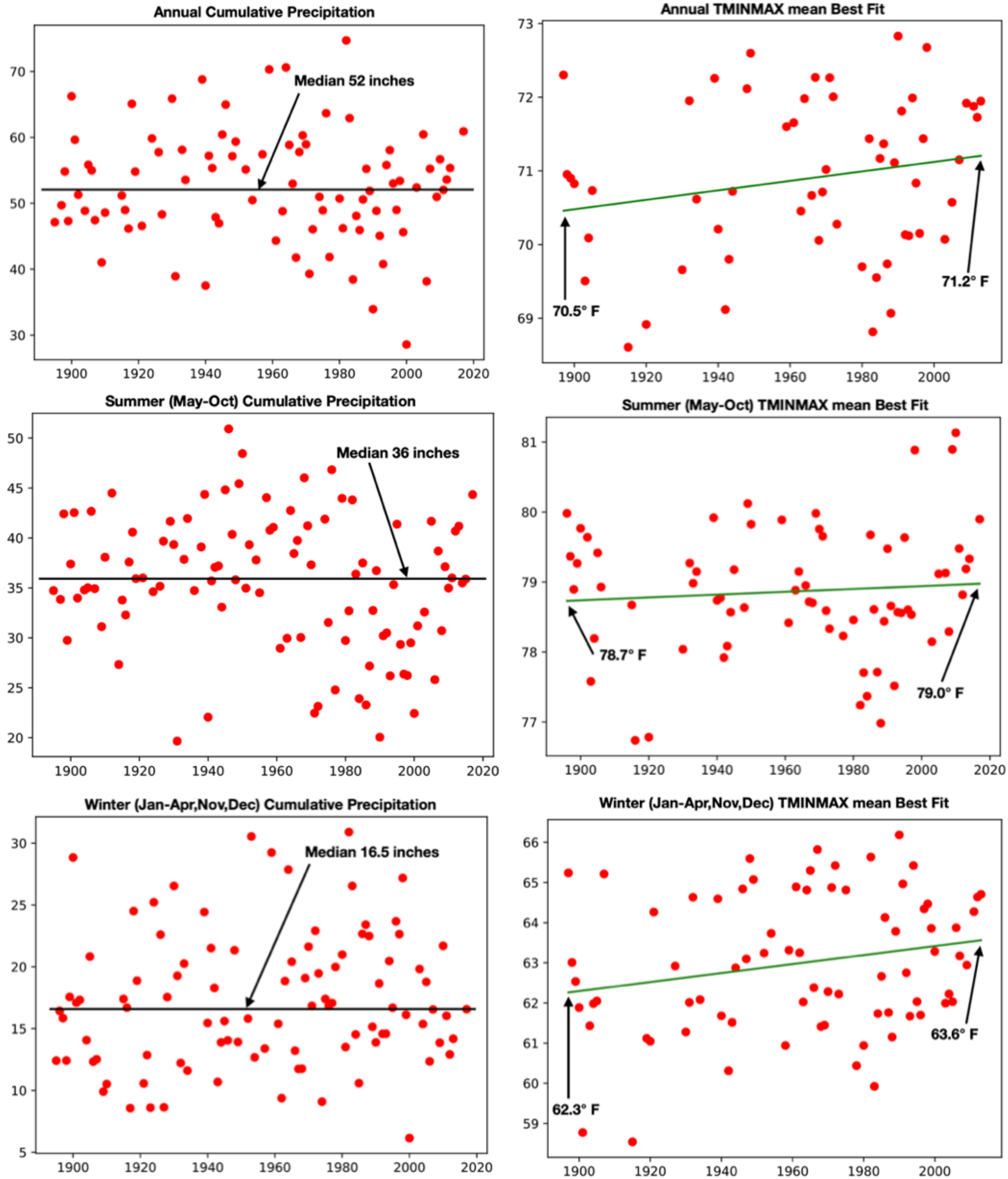
*" Air temperatures on Earth have been rising since the Industrial Revolution. While natural variability plays some part, the preponderance of evidence indicates that human activites—particularly emissions of heat-trapping greenhouse gases—are mostly responsible for making our planet warmer. According to an ongoing temperature analysis led by scientists at NASA's Goddard Institute for Space Studies (GISS), the average global temperature on Earth has increased by at least 1.1° Celcius (1.9° Fahrenheit) since 1880. The majority of the warming has occurred since 1975, at a rate of roughly 0.15 to 0.20° C per decade"* (World of Change-Global Temperature NASA 2023).

The temperature of 0.15° to 0.20° C (0.27° to 0.36° F) per decade is an average global temperature increase of 0.0315° F per year from 1975 to 2022. In this Study, 0.0315° F is rounded off to 0.032° F per year and serves as the NASA estimated baseline average annual global temperature increase between 1975-2022.

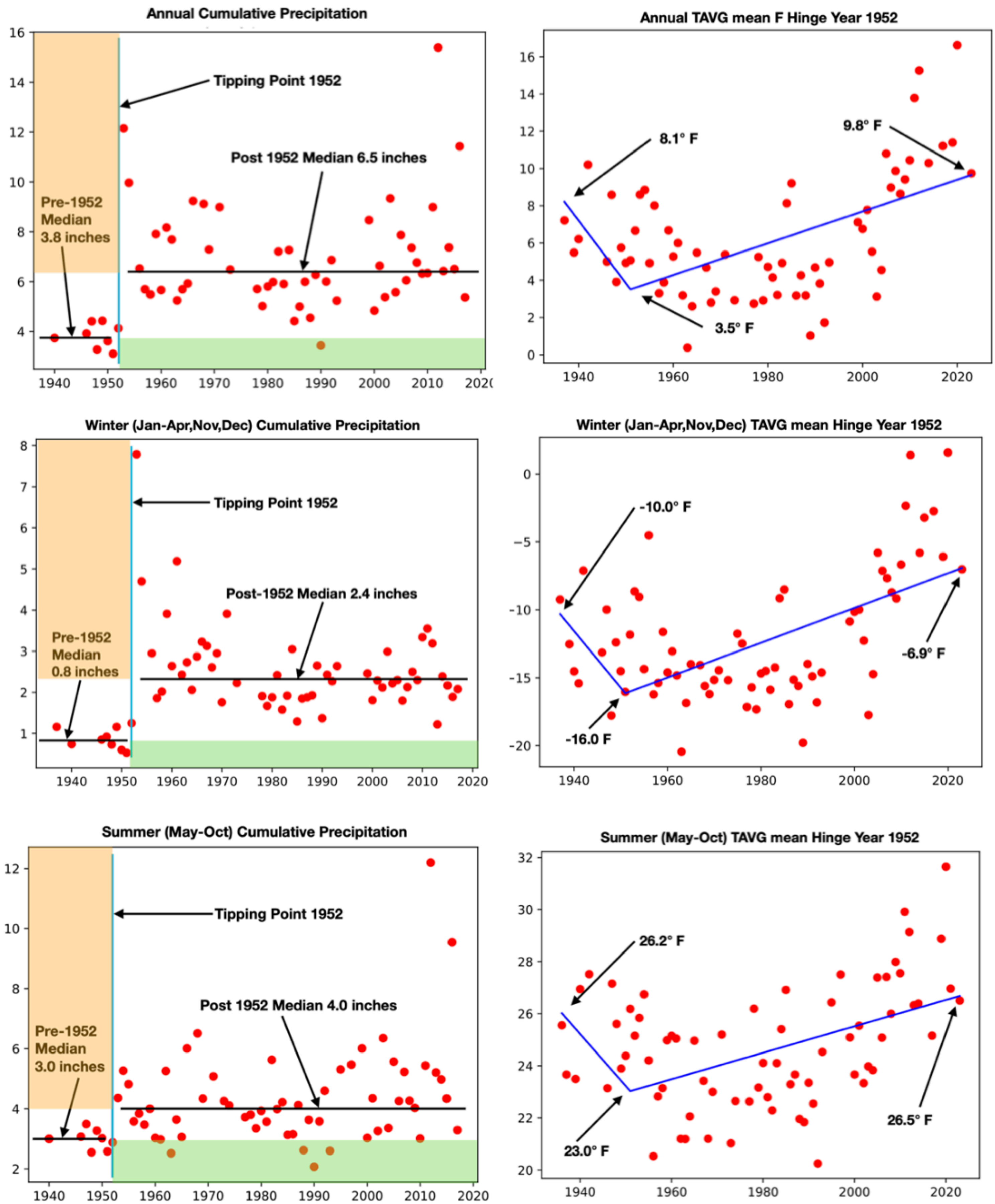
The annual average temperature in Ocala, Florida has risen 0.7° F between 1896 to 2017 or an average of 0.006° F per year (See Figure 3). This is less than half of NASA's global average temperature increase of 0.013° per year since 1880.

After the 1952 precipitation tipping point in Ostrov Golojanny J, Russia (See Map 1) the annual average temperature has warmed 6.3° F between 1952 to 2023 or an average of 0.089° F/year (See Figure 4). This is a warming rate 15 times faster than Ocala and three times faster than the global average.

**Note:** The purpose of colorizing pre and post tipping point time periods in the Ostrov Golomjanny J precipitation graphs is to highlight that the pre-1952 winter precipitation was seldom if ever as high as the post 1952 median and most of the post 1952 winter precipitation totals were higher than the pre-1952 median.




**Ocala, Florida** NOAA Station ID: GHCND:USC00086414 Data 1896-2017 **Figure 3**
Latitude 29.2° N Longitude 82.1 W Graphs ©June 16, 2025 S.M.Kasprzak/rdw




**Ostrov Golomjanny J RS** NOAA Station ID: GHCND:RSM00020087 Data 1936-2023 **Figure 4**
Lat 79.6N Long 90.6E Hinge Year Software by IPA Graphs ©June 16, 2025 S.M.Kasprzak 

## Note for temperature graphs with a hinge year:

Recorded average temperatures exhibit year to year as well as longer term variations. A trend curve averages out short term changes and retains hypothesized behavior. Traditionally, straight lines which best fit the data were used as trends. Over the last 3/4 century temperatures have increased so dramatically that trend curves need more flexibility than linearity to adequately fit temperature data. We used a trend curve, which consists of two lines joined at a year (called the hinge year) that was determined by an extreme increase or decrease in the precipitation data values. These tipping points coincide with the year an AMPS was commissioned upwind, upriver or upcurrent of the weather station. Individual Prediction Analysis (IPA)

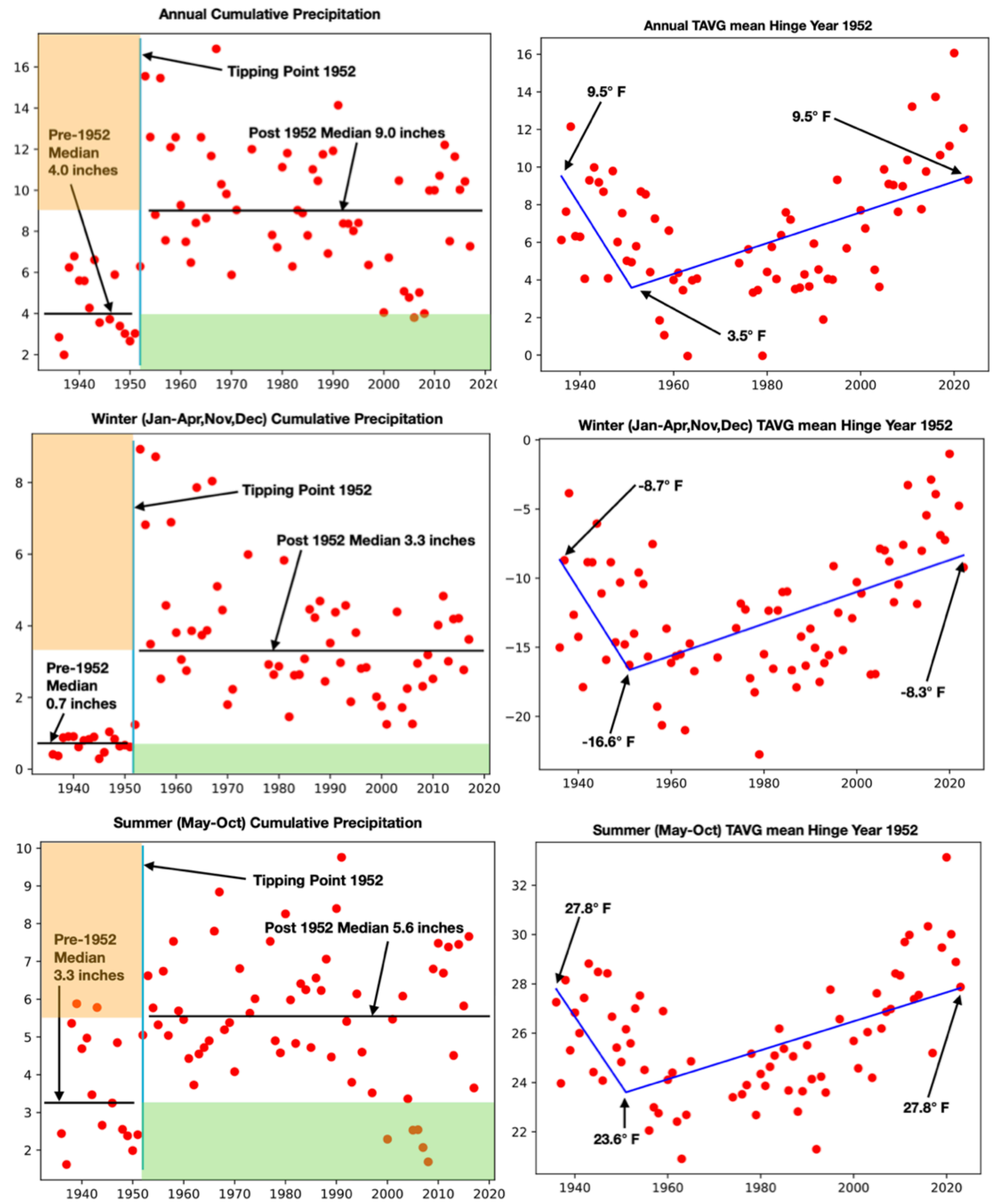
According to NASA, the loss of sea ice is one of the most cited reasons driving Arctic amplification: *"When bright and reflective ice melts, it gives way to a darker ocean; this amplifies the warming trend because the ocean surface absorbs more heat from the Sun than the surface of snow and ice. In more technical terms, losing sea ice reduces Earth's albedo: the lower the albedo, the more a surface absorbs heat from sunlight rather than reflecting it back to space"* (NASA).

If the NASA hypothesis for Arctic heat amplification is valid, then Arctic summers would be warming much faster than the winters throughout Siberia. After the building of Arctic mega power stations (AMPSs) on Arctic rivers, weather data reveals that just the opposite is occurring. Post AMPSs, Arctic winter preciptation and temperature increases have been typically much greater than in the summer.

GMO IMEK Fredorova and Ostrov Kotelynj weather stations in Russia are downwind and downcurrent of Ostrov Golomjanny J and both recorded 1952 step increases in winter precipitation and extreme increases in annual average temperature of 5.8° F at both weather stations (See Figures 5 and 6, respectively).

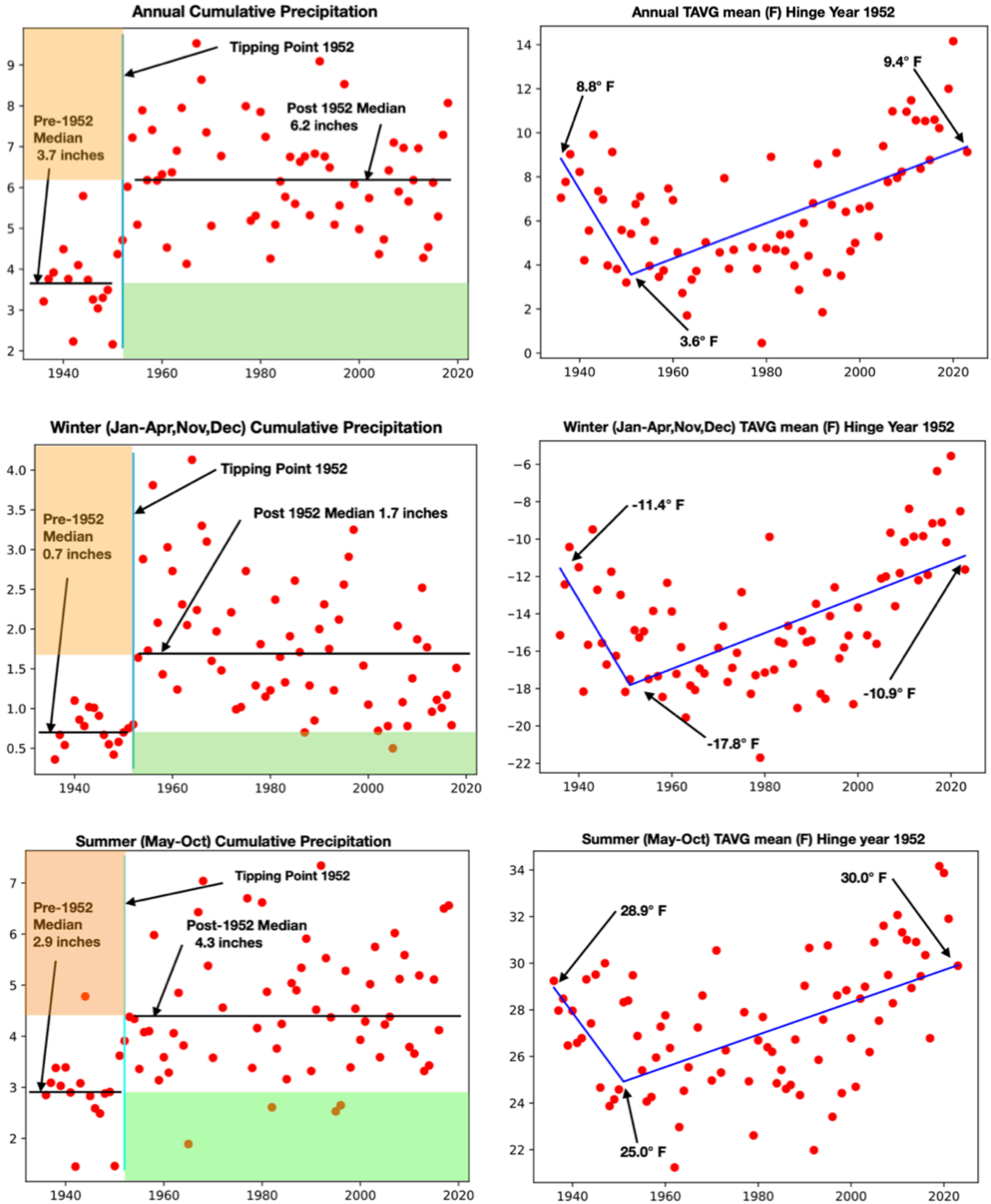
At weather stations in Ocala and Key West, Florida and Raleigh, North Carolina (See Figure 7) , there have been no significant changes in annual, winter and summer precipitation and minimal increases in temperature compared to the Arctic region.

The atmospheric concentration of CO2 is nearly uniform around the globe, and one would expect the sub tropics to be warming much faster than the Arctic and for the Arctic's summer warming rate to be much higher than its winter's. Neither of these expectations have occurred because of the introduction in the mid-twentieth century of

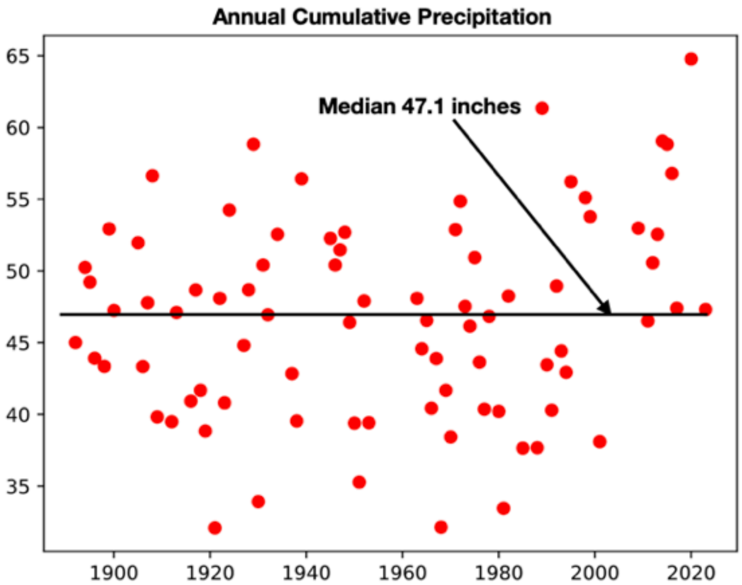


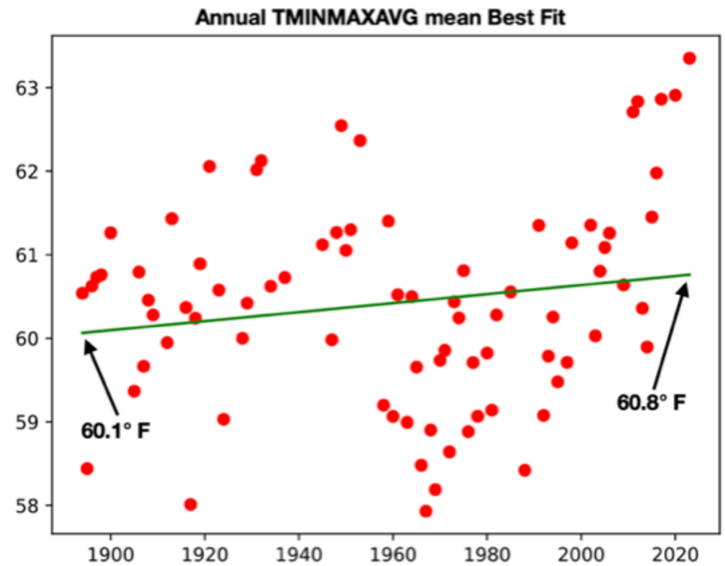

**GMO IMEK Fedorova RS** NOAA Station ID:GHCND:RSM00020292 Data1936-2023 **Figure 5**

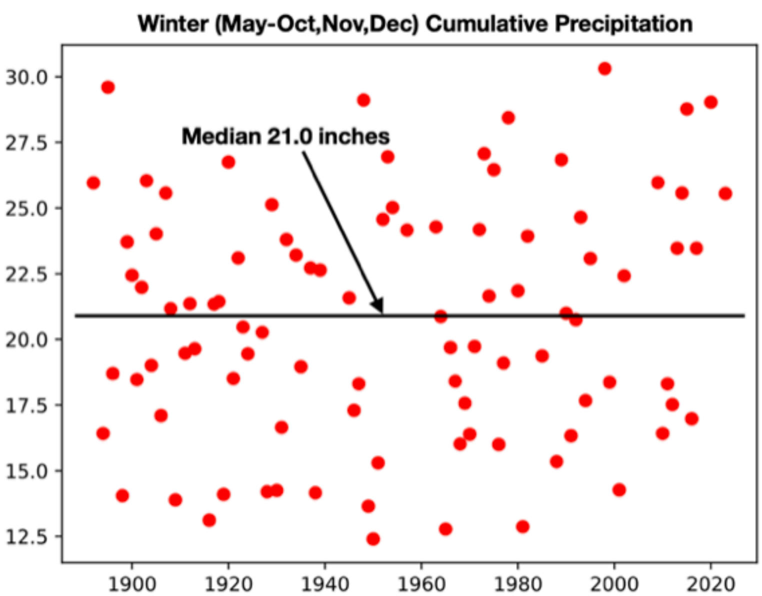
Lat 77.7N Long 104.3E HY Software by IPA Graphs ©june 16, 2025 S.M.Kasprzak/rdw 

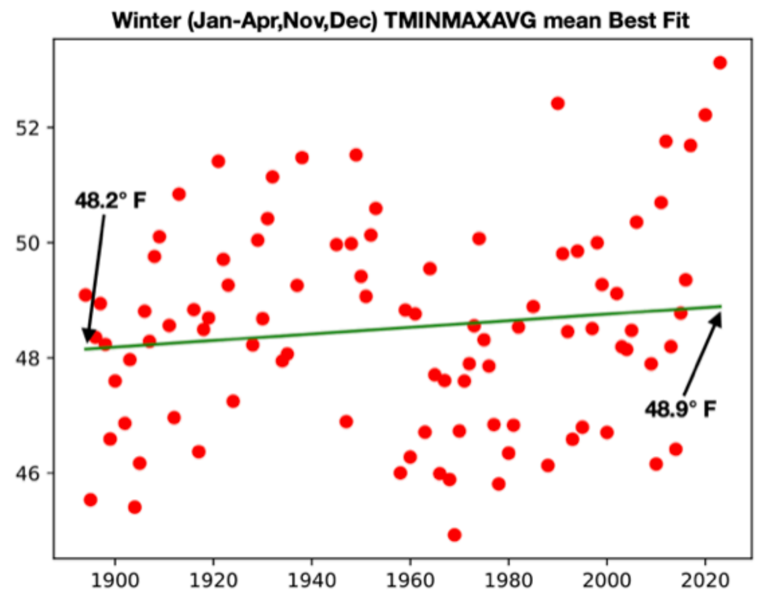


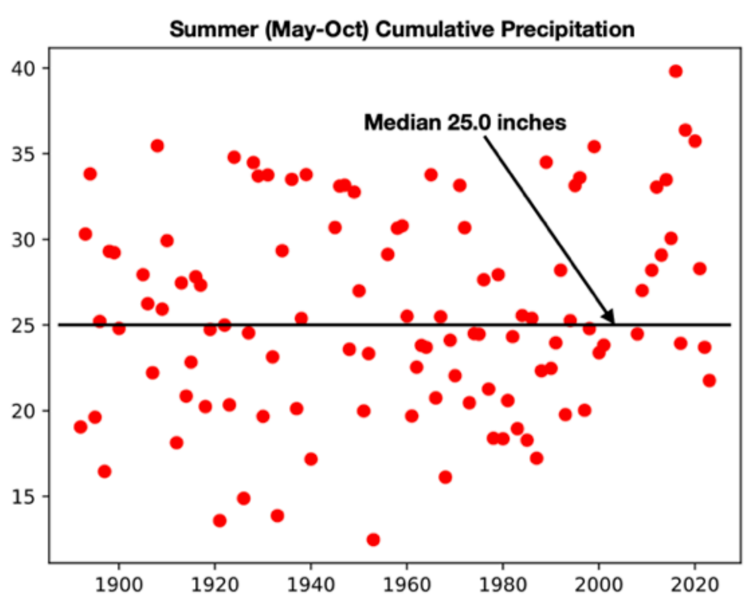

**Ostrov Kotelnyj RS** NOAA StationID:GHCND:RSM00021432 Data 1936-2023 **Figure 6**

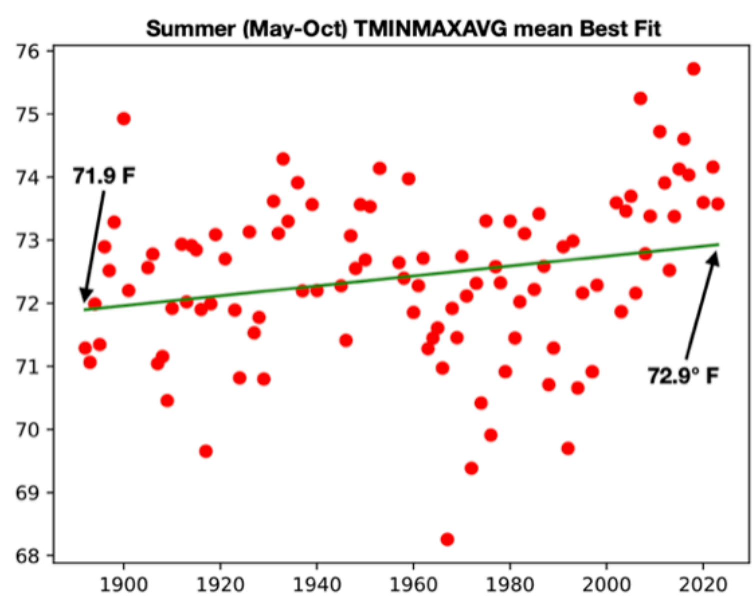



**Raleigh NC** NOAA Station ID:GHCND:USC00317079 Data 1894-2023 **Figure 7**

Lat 35.8°N Long 78.7°W Graphs ©June 16, 2025 S.M.Kasprzak/rdw copious amounts of Russian winter AWE suppressing radiation and trapping heat and the extreme increases in CAW created by the regulated 24/7 winter river runoff.

Prior to 1952, the Arctic winter water cycle was locked in ice and dormant with minimal evaporation. This cycle was suddenly awakened and extremely intensified by abrupt step increases in Arctic winter precipitation measured at Russian stations downwind, downriver and/or downcurrent of AMPSs built on rivers in the Kola Penisnsula and Republic of Karelia.

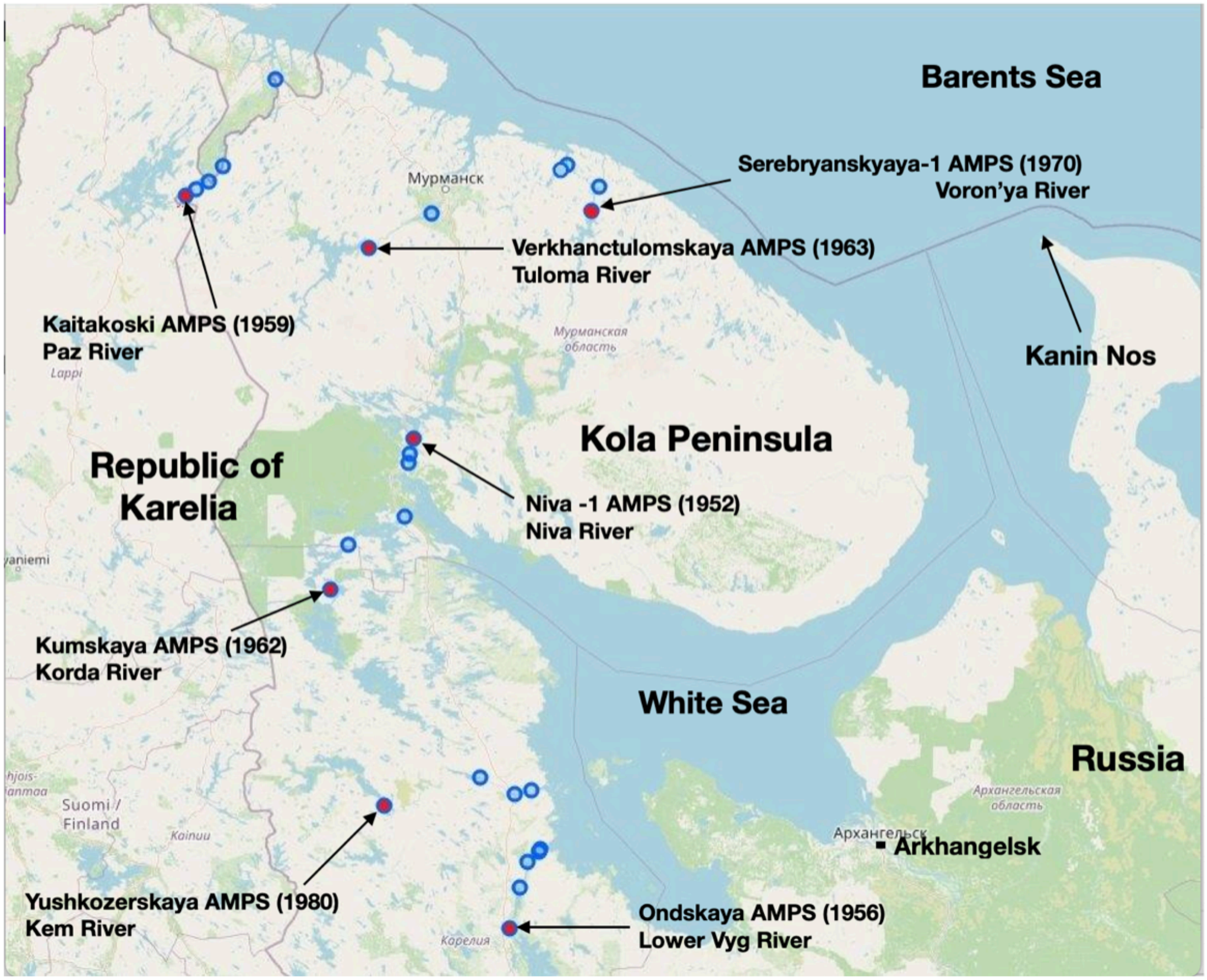
**1952 Tipping Point**

Using precipitation to measure the intensity of winter and summer water cycles reveals historic (pre-1952) winter medians between 0.7 to 3 inches at Kanin Nos, Dikson, Ostro Golojanny J, GMO IMEK Fedorova and Ostrov Kotelynj weather stations. After the commissioning of the 1952 Niva-1 AMPS on the Kola Peninsula's Niva River), all five of these weather stations documented steep increases in the post 1952 winter precipitation compared to summer increases.

The Niva-1 was built on the 22 mile long Niva River and created the Pirenskoe Reservoir downstream of Lake Imandra. This AMPS was designed and engineered to be powered by this lake-reservoir water body of 426 square miles. Before the Niva-1 was built, the unregulated runoff of the Niva River powered two run of the river HPPs, the Niva-2 and 3. The Niva-1's discharged waters have greatly increased the winter power generation and manufactured AWE from these two run of the river HPPs and are major drivers of the 1952 precipitation and temperature tipping points.

Similar lake-reservoirs AMPS were built on 6 other rivers in this region and in some cases the natural outlet from two or more lakes in the rivers watershed were impacted by reservoirs. In order to maximize energy production from the regulated discharge from these reservoirs, one or more HPPs were built downstream of the AMPSs (See Map 3 and Table 2).

## Map of Kola Peninsula and Republic of Karelia Hydropower Projects




**Map 3**

- Red dots - Arctic Mega Power Stations (AMPS)
- Blue dots - Hydropower Plants (HPPs)

Source: Hydro Power Plants in Russia database.earth
Colorization of dots, black arrows and location names added by SMK/rdw
May 1, 2025

In Table 2, I have listed weather stations in this Study north of the Arctic Circle and between latitude 52° N and the Arctic circle. All of these weather stations exhibit a step increase in winter precipitation with exceptions of Vardoe as noted below.

## Table 2

**Tipping Points Identified by a Step Increase on Winter Precipitation Graphs**

| **Weather Station** | **Latitiude** | **Longitude** | **1952** | **1957** | **1960** | **1967** | **1980** |
|---|---|---|---|---|---|---|---|
| Barencburg SV | 78.1°N | 14.3°E | | X | | | |
| Vardoe* NO | 70.3°N | 31.3°E | | | | | X |
| Vayda Guba RS | 69.9°N | 31.9°E | X | | | | |
| Kanin Nos RS | 68.7°N | 43.3°E | X | | | | |
| Dikson RS | 73.5°N | 80.4°E | X | | | | |
| Ostrov - Golomjanny J RS | 79.6°N | 90.6°E | X | | | | |
| GMO IMEK - Federova RS | 77.7°N | 104.3°E | X | | | | |
| Ostrov Kotelynj RS | 76.0°N | 37.9°E | X | | | | |
| Arhangelsk RS | 64.5°N | 40.7°E | | | | | X |
| Syktyvkar RS | 61.7°N | 50.9°E | | | | | X |
| Omsk RS | 55.0°N | 73.4°E | | X | | | |
| Tomsk RS | 56.5°N | 84.9°E | | X | | | |
| Verkhneimbatsk RS | 63.2°N | 88.0°E | | X | | | |
| Krasnoyarsk RS | 56.0°N | 92.8°E | | X | | | |
| Bratsk RS | 56.3°N | 101.8°E | | X | | | |
| Irkutsk RS | 52.3°N | 104.4°E | | X | | | |
| Viljujsk RS | 63.8°N | 121.6°E | | | | X | |
| Yakutsk RS | 62.0°N | 129.7°E | | X | | | |
| Markova RS | 64.7°N | 170.4°E | | X | | | |

* Vardoe has a 1980 Temperature Tipping Point

## 1967 and 1993  Tipping Points

In addition to the 1952 temperature tipping points on the graphs for Ostrov Golojanny J, GMO IMEK Federova and Ostrov Kotelynj, Russia, there were also 1967 and 1993 churning tipping points. The major drivers of this winter CAW were created by AMPS on rivers in the watersheds of the James, Hudson and Ungava Bays, Labrador and Beaufort Seas and the Gulfs of St. Lawrence and Maine. (See Appendices 1 and 2)

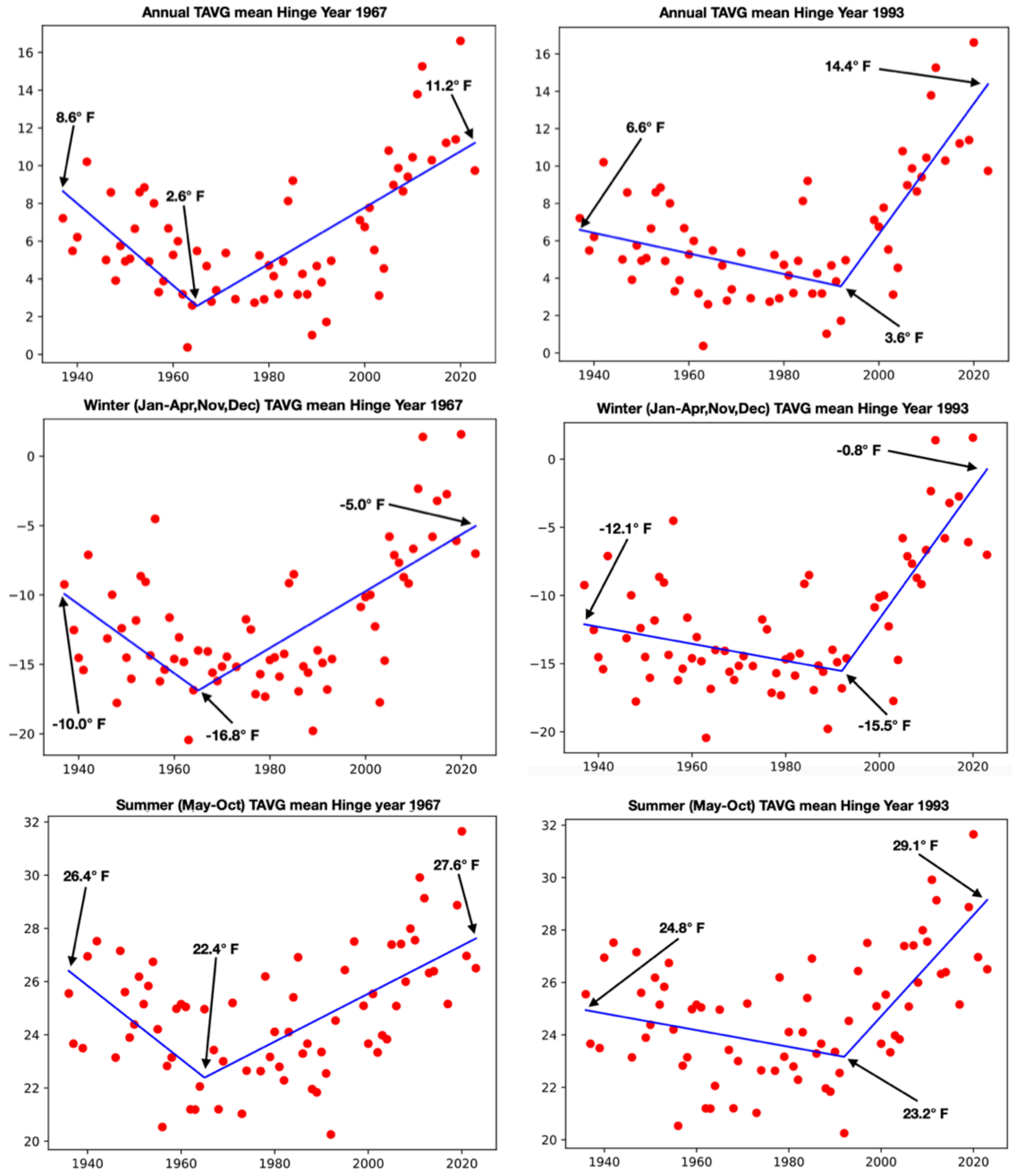
Pre-AMPS, the Gulf Stream current moderated, to a limited effect, air and water temperatures along the Norway coastline and into the Barents Sea. The suppression of the energy from the summer and spring runoff and the awakening of the dormant winter runoff has extended the impact and heat of the Gulf Stream Current thru the Barents Sea and onward and into the coastal currents and estuaries of the Kara, Laptev, and East Siberian Sea.

Temperature graphs with 1967 and 1993 hinge points in Figures 8-10 reveal acceleration in warming trends in this region. For example, Ostrov Golojanny J's annual average temperature increase of 0.23° F per year between 1967 to 2023 is seven times faster than the global baseline of 0.032° F per year from 1975 to 2022.

A more radical tipping point took place in 1993 and the warming rate between 1993 to 2022 is eleven times faster than the baseline. The six months of winter were warming at a rate 17 times faster than the twelve month global baseline average of 0.032° F per year between 1975 to 2022.

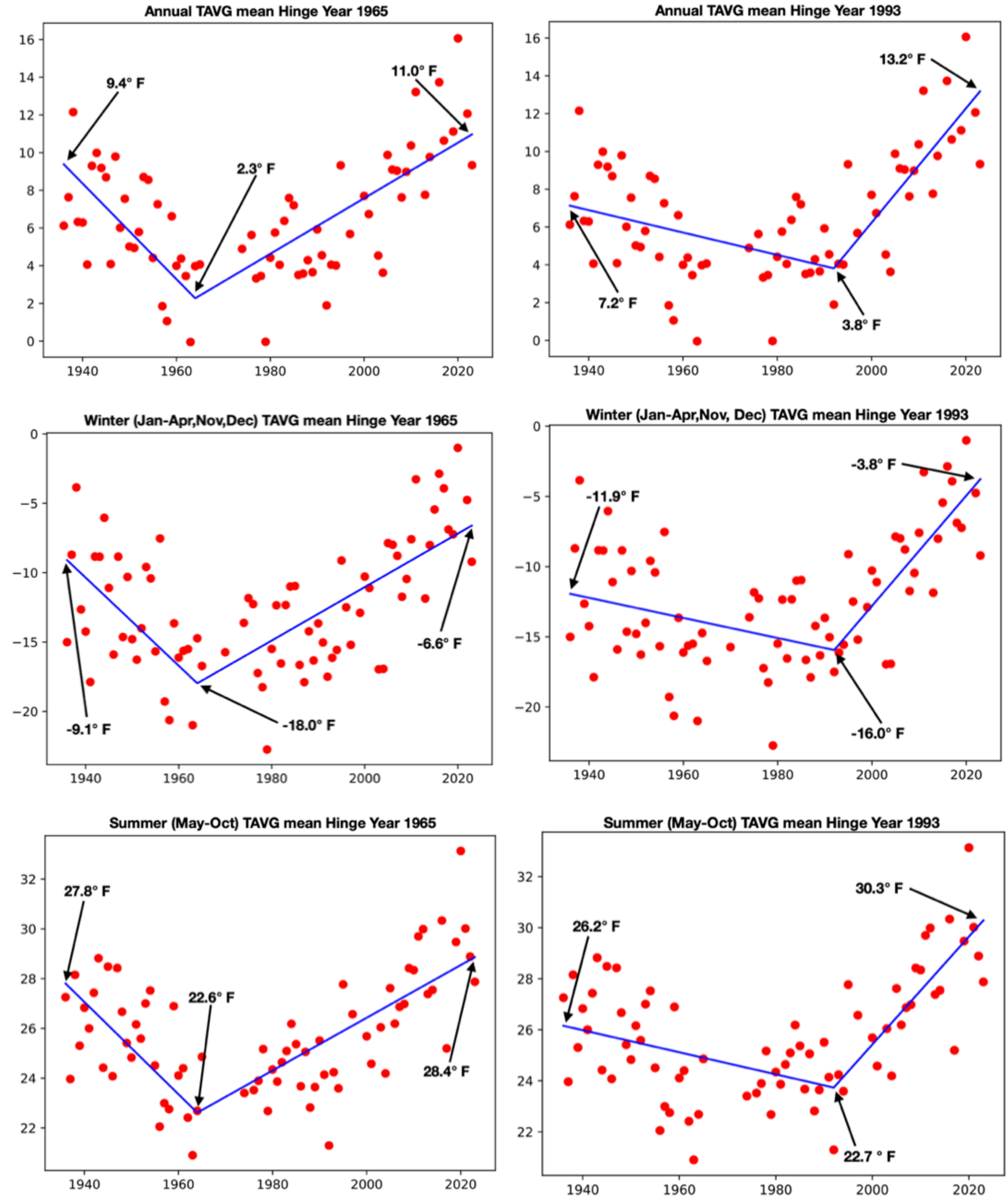
**Note for precipitation graphs**:
The precipitation graphs are handcrafted and the tipping points are determined by first analyzing the winter graphs. A tipping point is identified when the winter precipitation data clearly shows not only a steep increase in the six month average but also an increase above the historic median and where in subsequent years, winter precipitation seldom, and in most cases, never fell below the pre-AMPS median.

**The Russian and Canadian AMPSs have not only stimulated the natural evaporation, condensation, precipitation and runoff processs of the regional Arctic water cycles, but their 24/7 regulated winter discharges have also created 24/7 continous upwelling currents pumping and churning Atlantic warmth (CAW) up into these estuaries and coastal currents.**

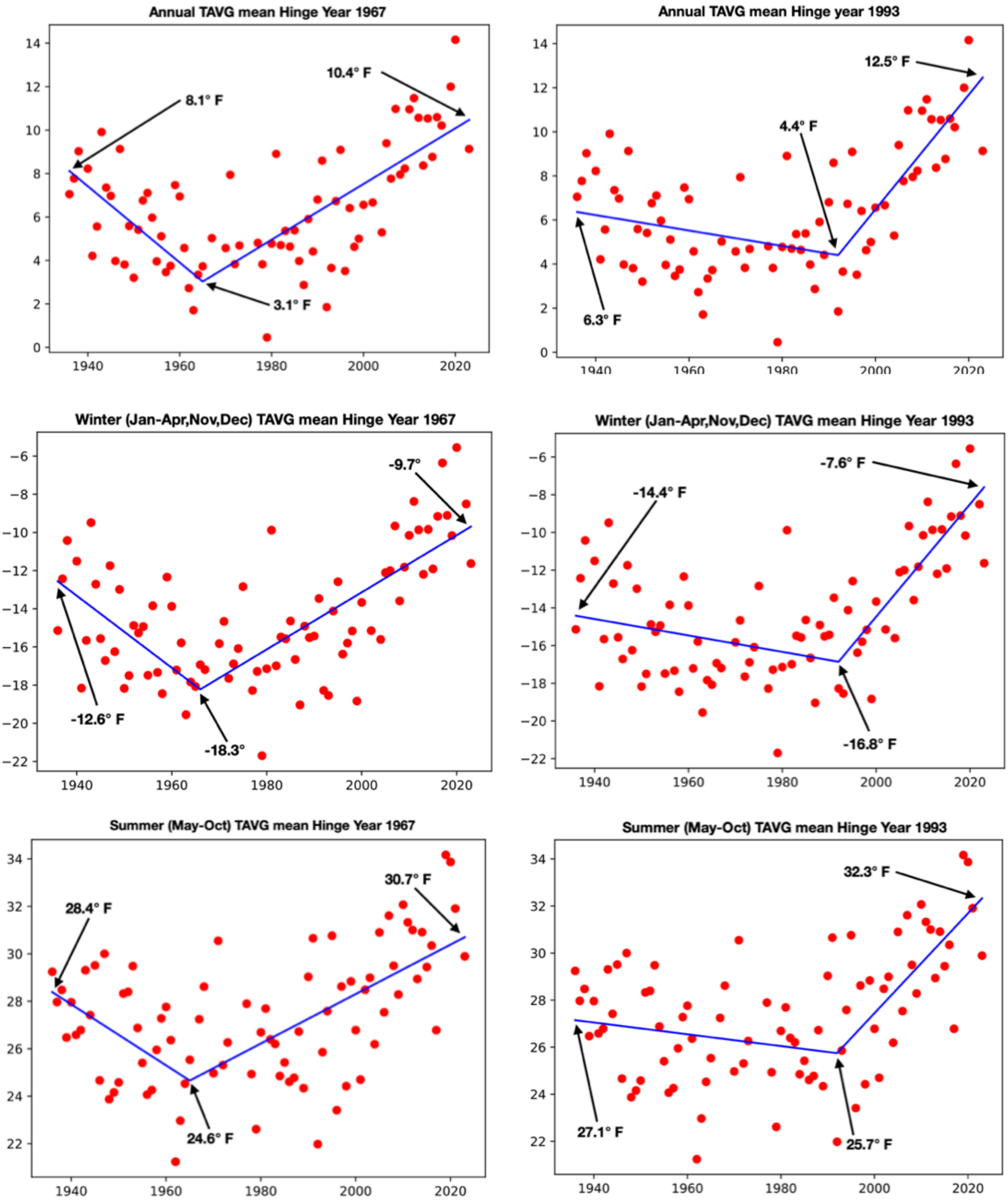



**Ostrov Golomjanny J RS** NOAA Station ID: GHCND:RS00020087 Data 1936-2023 Figure 8

Lat 79.6N Long 90.6E HY Software by IPA Graphs ©June 16, 2025 S.M.Kasprzak/rdw 




**GMO IMEK Fedorova RS** NOAA Station ID: GHCND:RSM00020292 Data 1936-2023 **Figure 9**




**Ostrov Kotelnyj RS** NOAAStationID:GHCND:RSM00021432 Data 1936-2023 **Figure 10**

Lat 76.0°N Long 137.9°E HY Software by IPA Graphs ©June 17, 2025 S.M.Kasprzak/rdw 

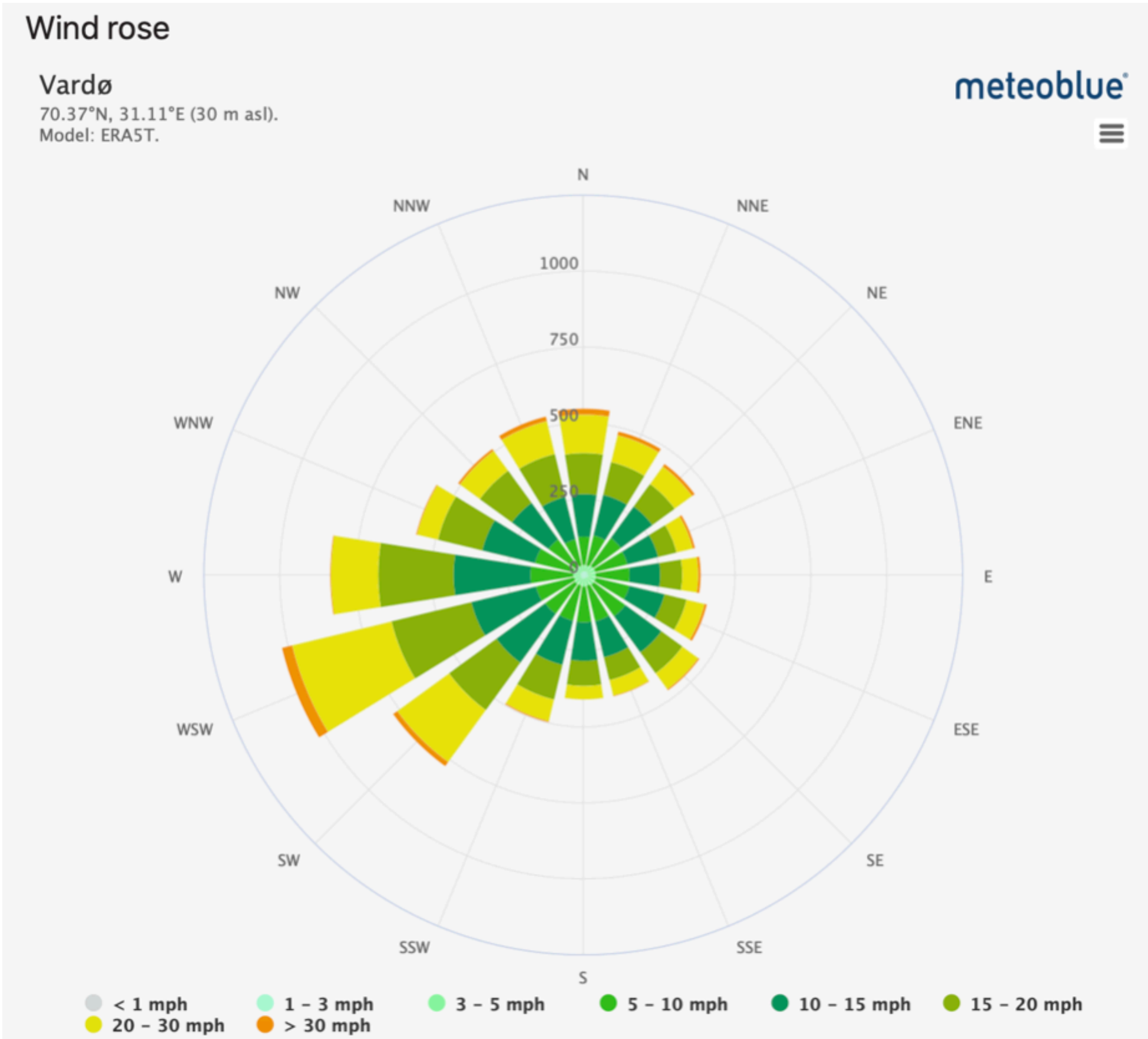



**Figure 11**

**Note:** AMPSs often seize 50% or more of the ice cold spring runoff waters where the summer sun's energy is captured and stored in its inland sea sized reservoirs. Thermal stratification of the reservoir water column forms in the first summer and winter of AMPS operation and creates water temperatures of about 39° Fahrenheit year-round in perpetuity in the deeper waters. The thermocline is the transition layer between the warmer and colder water. The water for power generation from the regulated dam releases is drawn from below the thermocline. This deeper "warmer" water in winter is called the hypolimnion. Therefore, I refer to AMPSs as hypolimnion-release dams.

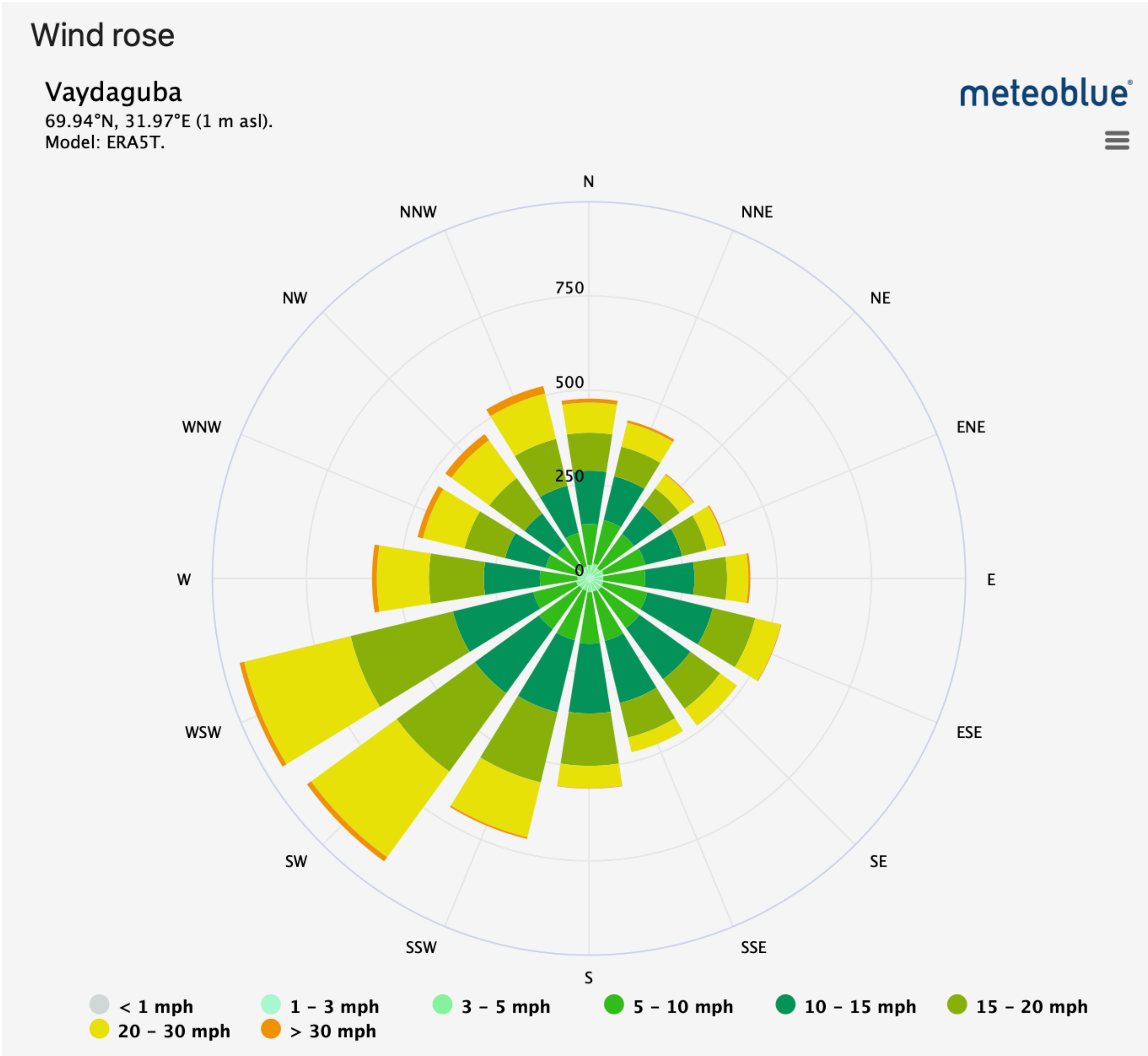



**Figure 12**

**Note:** The volume of the regulated winter hypolimnial discharges from AMPSs produces 24/7 downstrean winter flows commonly 4 to 8 times greater than the colder pre-dam flows. The new high winter downstream flows of exposed unfrozen warmer water have unleashed the ability of evaporative forces to inject AWE across the Arctic by atmosphereic superhighways of winter moisture laden air currents driven by the prevailing winds.

Earlier, I said that I was using NASA's estimated baseline average annual global temperature increase of 0.032° F per year between 1975 to 2022. I have calculated in Tables 5 average annual, winter and summer temperature increases after the tipping point for the twelve and six month winter and summer averages.

**Table 3**
**Increase in Temperature (F) After Tipping Point and Average Increase per Year**

| **Weather Station** | **Tipping Point** | **Annual Increase** | **AVG** | **Winter Increase** | **AVG** | **Summer Increase** | **AVG** |
|---|---|---|---|---|---|---|---|
| Barencburg SV | 1957 | 6.3 | 0.09 | 8.9 | 0.13 | 3.8 | 0.05 |
| Vardoe NO | 1980 | 3.6 | 0.08 | 3.8 | 0.09 | 3.7 | 0.09 |
| Vayda Guba RS | 1952 | 1.9 | 0.03 | 2.1 | 0.03 | 1.5 | 0.02 |
| Kanin Nos | 1952 | 1.7 | 0.03 | 2.5 | 0.04 | 1.4 | 0.02 |
| Dikson RS | 1952 | 5.3 | 0.08 | 6.8 | 0.10 | 4.2. | 0.06 |
| Ostrov- Golomjanny J RS | 1952 | 6.3 | 0.09 | 9.1 | 0.13 | 3.5 | 0.05 |
| GMO IMEK Federova RS | 1952 | 6.0 | 0.08 | 8.3 | 0.12 | 4.2 | 0.06 |
| Ostrov Kotelynj RS | 1952 | 5.8 | 0.08 | 6.9 | 0.10 | 5.0 | 0.07 |
| **Average** | | 4.6 | 0.07 | 6.1 | 0.09 | 3.4 | 0.05 |



Temperature increases at Vayda Guba and Kanin Nos, Russia, are significantly less than the increases at the other six stations. After the 1967 tipping point in Figures 8-10, the temperature increases were as much as 5 times faster than the global baseline of 0.032° F and after the 1993 tipping points, the annual average warming trends were as much as 10 times greater.

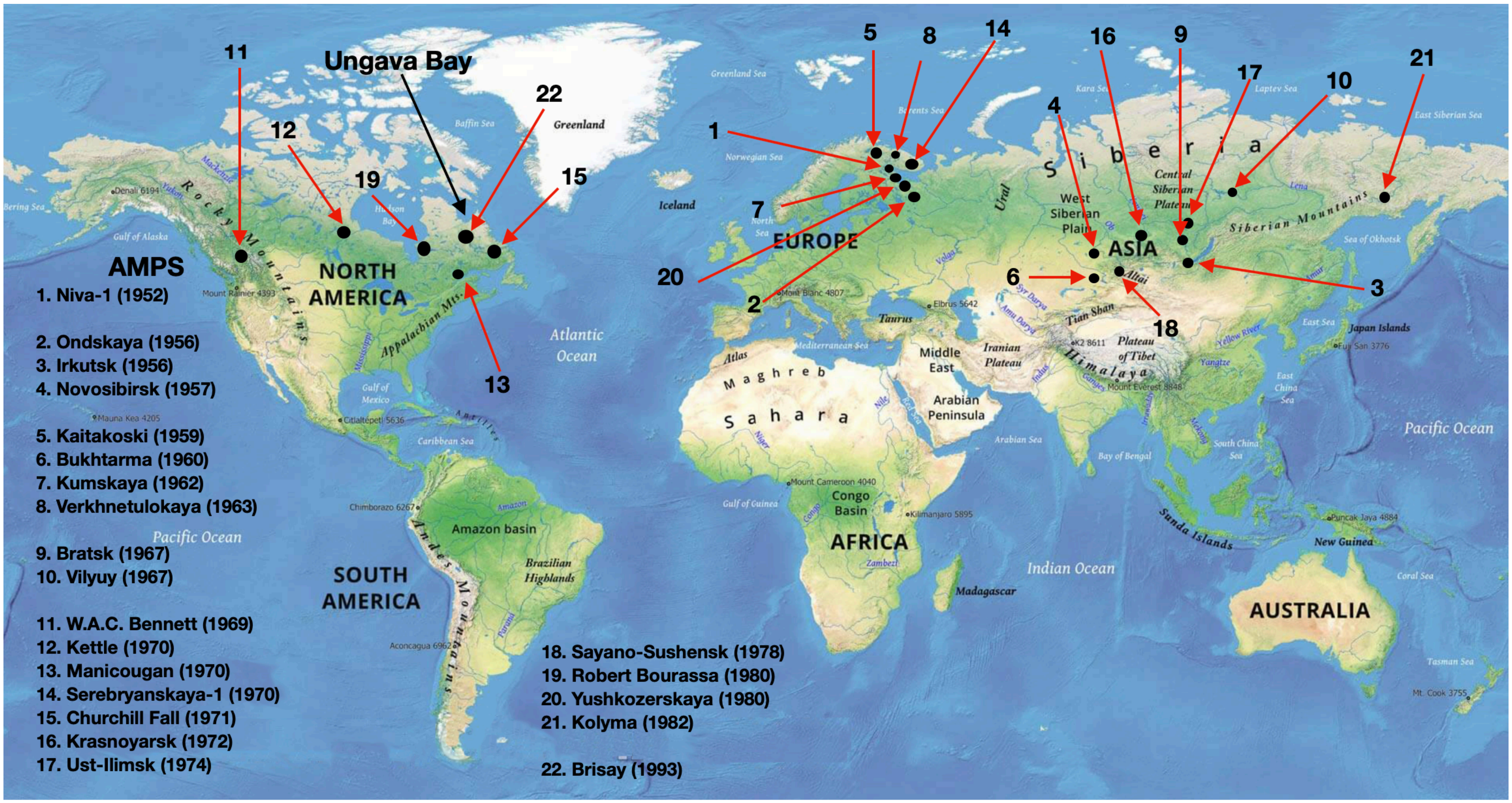
**Notes:**

1. It is my hypothesis that increase winter AWE and CAW are the major drivers warming the Arctic and the winter precipitation increases are much greater than the summers. If my hypothesis is valid then winter tempearure increases should dwarf the summers, which they do according to Table 5. This same phenomenopn occurs at the eleven weather staions analyzed in Table 5 and 6 on pages 25 and 26, respectively.
2. If increased carbon dioxide and methane concentrations are the major drivers of global and Arctic warming then the Arctic summers should be warming much faster than the winters or at least equal to, but they are not.

## TABLE 4   Canadian and Russian Hydroelectric Reservoirs

The AMPS reservoirs listed in Table 4 and shown on Map 4 are heat sinks (polluters) in the watersheds of the Arctic's coastal seas and the Labrador Current. AMPS have attacked and weakened their hydraulic cycles with increased winter and summer evaporation and suppressed summer freshwater runoff that begets strong winter reservoir discharges. This has created CAW tipping points in winter precipitation and temperature and a climate changing alteration to the hydraulic, haline and thermal balance between the Gulf Stream and Labrador Currents.

| TIPPING POINT | DATE | RESERVOIR | RIVER | AREA (sq. mi.) | RECEIVING WATER BODY |
|---|---|---|---|---|---|
| 1952 | 1952 | Niva-1 | Niva | 426 | White Sea |
| 1957 | 1956 | Ondskaya | Lower Vyg | 483 | White Sea |
| | 1956 | Irkutsk | Angara | 566 | Kara Sea |
| | 1957 | Novosibirsk | Ob | 413 | Kara Sea |
| 1960 | 1959 | Kaitakoski | Paz | 425 | Barents Sea |
| | 1960 | Bukhtarma | Irtysh | 2,084 | Kara Sea |
| | 1962 | Kumskaya | Kovda | 737 | White Sea |
| | 1963 | Verkhnetulomsky | Tuloma | 288 | Barents Sea |
| 1967 | 1967 | Bratsk | Angara | 2,112 | Kara Sea |
| | 1967 | Vilyuy | Vilyuy | 966 | Laptev Sea |
| 1970 | 1969 | WAC Bennett | Peace | 680 | Beaufort Sea |
| | 1970 | Kettle | Nelson | 130 | Hudson Bay |
| | 1970 | Manicouagan | Manicouagan | 750 | St. Lawrence Estuary |
| | 1970 | Serebryanskaya-1 | Voyon'ya | 91 | Barents Sea |
| | 1971 | Smallwood | Churchill River | 2,520 | Labrador Sea |
| | 1972 | Krasnoyarsk | Yenisei | 772 | Kara Sea |
| | 1974 | Ust-Ilimsk | Angara | 723 | Kara Sea |
| 1980 | 1978 | Sayano-Shushenskaya | Yenisei | 240 | Kara Sea |
| | 1980 | Robert Bourassa | La Grande | 1,095 | James Bay |
| | 1980 | Yushkozerskaya | Kem | 254 | White Sea |
| | 1982 | Kolyma | Kolyma | 2,241 | East Siberian Sea |
| 1993 | 1993 | Brisay | Caniapiscau | 1,667 | James Bay and Ungava Bay |




**Map 4**

Source: www.freeworldmaps.net

There are eleven winter precipitation graphs in Table 5 and all of them exhibit a step increase. If these extreme increases in winter precipitation were caused by increasing C02 and methane concentrations, then why has the range of average winter precipitation remained constant after the tipping points occurred?

## Table 5

**Increases in Annual, Winter and Summer Precipitation Medians and Percentage Increase after the Precipitation Tipping Point**

| Weather Station | Tipping Point | Annual | | Winter | | Summer | |
|---|---|---|---|---|---|---|---|
| | | Inches | % | Inches | % | Inches | % |
| Arhangesk RS | 1980 | 3.9” | 20% | 2.4” | 36% | 1.9” | 15% |
| Syktyvkar RS | 1980 | 6.2” | 33% | 4.4” | 80% | 1.9” | 14% |
| Omsk RS | 1957 | 3.6” | 31% | 2.8” | 122% | 0.5” | 5% |
| Tomsk | 1957 | 2.4” | 13% | 3.8” | 83% | 0.5” | 4% |
| Verkhneimbatsk RS | 1957 | 4.8” | 26% | 3.8” | 78% | 0.4” | 3% |
| Krasnoyarsk RS | 1957 | 3.4” | 21% | 2.8” | 108% | 0.3” | 2% |
| Bratsk RS | 1957 | 1.8” | 15% | 1.3” | 50% | 0.5” | 5% |
| Irkutsk RS | 1957 | 3.0” | 19% | 0.8” | 30% | 1.2” | 9% |
| Viljujsk RS | 1967 | 1.6” | 17% | 0.6” | 27% | 1.1” | 16% |
| Yakutsk RS | 1957 | 1.6” | 21% | 0.8” | 53% | 1.0” | 17% |
| Markova RS | 1957 | 5.9” | 60% | 4.2” | 168% | 1.9” | 28% |
| | **Average** | 3.5” | 25.1% | 2.2” | 76% | 0.9” | 10.7% |



**Note:** The average increase in winter precipitation medians for these 11 stations is 76%, which is 7 times greater than the summer increase of 10.7%. There is also a 7 fold average winter increase for the four Kara and Laptev Sea region weather stations of 278% in Table 1 on Page 1, compared to a 38% summer increase .

If increases in greenhouse gases, like carbon dioxide and methane, are the major drivers causing the earth's temperatures to rise, then one would have expected the Arctic's and Siberian summer temperatures to have risen at a rate equal to or greater than the winter increase. This is because the total amount of Arctic summer solar radiation greatly dwarf's the winter's.

This leads to the conclusion that these AMPS are creating new heat and moisture sources, namely AWE and CAW, that are driving these unprecedented increases in winter precipitation totals.

Quantitative analysis of Russian weather data in Table 5 reveals that the percentage increase in the forced winter precipitation was typically far greater than the summer increase and identifies three tipping points in 1957, 1967 and 1980.

The winter temperature increase at these eleven weather stations is typically two to three times greater than summer increases (See Table 6). This same phenomenon occurred at the Arctic weather stations listed in Table 3 on page 22.

## Table 6

**Increase in Temperature (F) After Tipping Point and Average Increase per Year**

| Weather Station | Tipping Point | Annual Increase | AVG | Winter Increase | AVG | Summer Increase | AVG |
|---|---|---|---|---|---|---|---|
| Arhangelsk RS | 1980 | 2.8 | 0.07 | 3.8 | 0.09 | 2.3 | 0.05 |
| Syktyvkar RS | 1980 | 3.0 | 0.07 | 4.4 | 0.10 | 2.6 | 0.06 |
| Omsk RS | 1957 | 4.6 | 0.07 | 6.6 | 0.10 | 3.3 | 0.05 |
| Tomsk | 1957 | 2.6 | 0.04 | 4.0 | 0.7 | 1.0 | 0.01 |
| Verkhneimbatsk RS | 1957 | 2.4 | 0.04 | 4.9 | 0.08 | 1.7 | 0.03 |
| Krasnoyarsk RS | 1957 | 2.6 | 0.04 | 3.9 | 0.06 | 1.1 | 0.02 |
| Bratsk RS | 1957 | 3.9 | 0.06 | 6.9 | 0.11 | 0.9 | 0.01 |
| Irkutsk RS | 1957 | 4.4 | 0.07 | 6.4 | 0.10 | 2.2 | 0.03 |
| Viljujsk RS | 1967 | 4.3 | 0.08 | 6.7 | 0.12 | 3.4 | 0.06 |
| Yakutsk RS | 1957 | 5.5 | 0.08 | 9.5 | 0.15 | 2.4 | 0.04 |
| Markova RS | 1957 | 2.8 | 0.04 | 3.6 | 0.06 | 3.9 | 0.06 |
| | **Average** | 3.5 | 0.06 | 5.5 | 0.09 | 2.2 | 0.04 |

*"What is the greenhouse effect? The greenhouse effect is the process through whic* heat is trapped near Earth's surface by substances known as 'greenhouse gases'. *Imagine these gases as a cozy blanket enveloping our planet, helping to maintain a warmer temperature than it would have otherwise. Greenhouse gases consist of carbon dioxide, methane, ozone, nitrous oxide, chlorofluorocarbons, and water vapor. Water vapor, which reacts to temperature changes, is referred to as a 'feedback', because it amplifies the effect of forces that initially caused the warming."* NASA- Global Climate Change

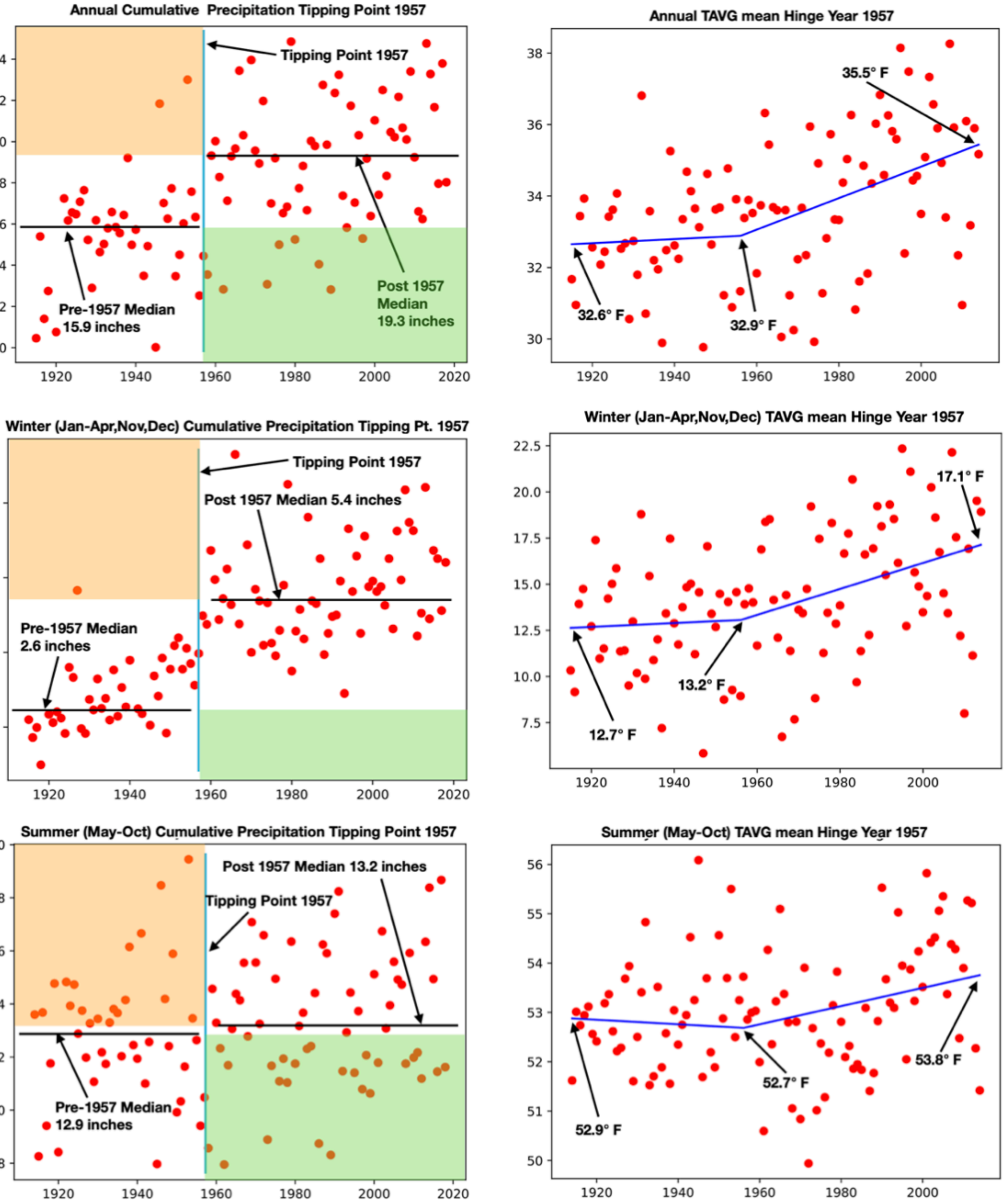
Manufactured AWE from new human DOMEs are not addressed in this definition. The AWE has been created by immense volumes of winter and summer evaporation from Canadian and Russian AMPSs and HPPs. They have caused *"positive feedbacks"* of increasing precipitation and warming temperatures in the Arctic, coastal and Central Siberia, Northern Quebec, Nunavut and Greenland's southwest coastline.

**1957 Tipping Point**

I believe there were three major drivers of the 1957 step increases in precipitation identified in Table 4. One was manufactured AWE from the 1956 Ondskaya AMPS and its 483 square mile lake-reservoir built on the Lower Vyg River downstream of Lake Vygozero. Prior to the building of this AMPS, the Lower Vyg River powered the run of the river Mathozhnevskaya HPP (1953), which was converted in 1956 into a regulated HPP, driven by the discharged waters of the Ondskaya AMPS. Three additional regulated HPPs, the Vygostrovskaya (1961), Belomorskaya (1962) and Palokorgskaya (1967) were built downstream on the Lower Vyg. The Vygostrovskaya and Belomorskaya HPPs are in close proximity with each other and are illustrated by one blue dot on Map 3 on Page 14.

The second 1957 driver was the commissioning of the Novosibirsk AMPS with its 413 square mile reservoir on the Ob River.

The third occurred on the Angara River, which is an eleven hundred mile tributary to the Yenisei River. The hydraulic, salinity and temperature balances of the winter and summer water cycles of the Yenisey estuary were significantly altered with the building of the 1956 Irkutsk AMPS at the headwaters of the Angara River on the outlet of Lake Baikal.




**Krasnoyarsk RS** NOAA Station ID:GHCND:RSM00029570 Data 1915-2018 **Figure 13**

Lat 56.0°N Long 92.8°E HY Software by IPA Graph ©June 19, 2025 S.M.Kasprzak/rdw 

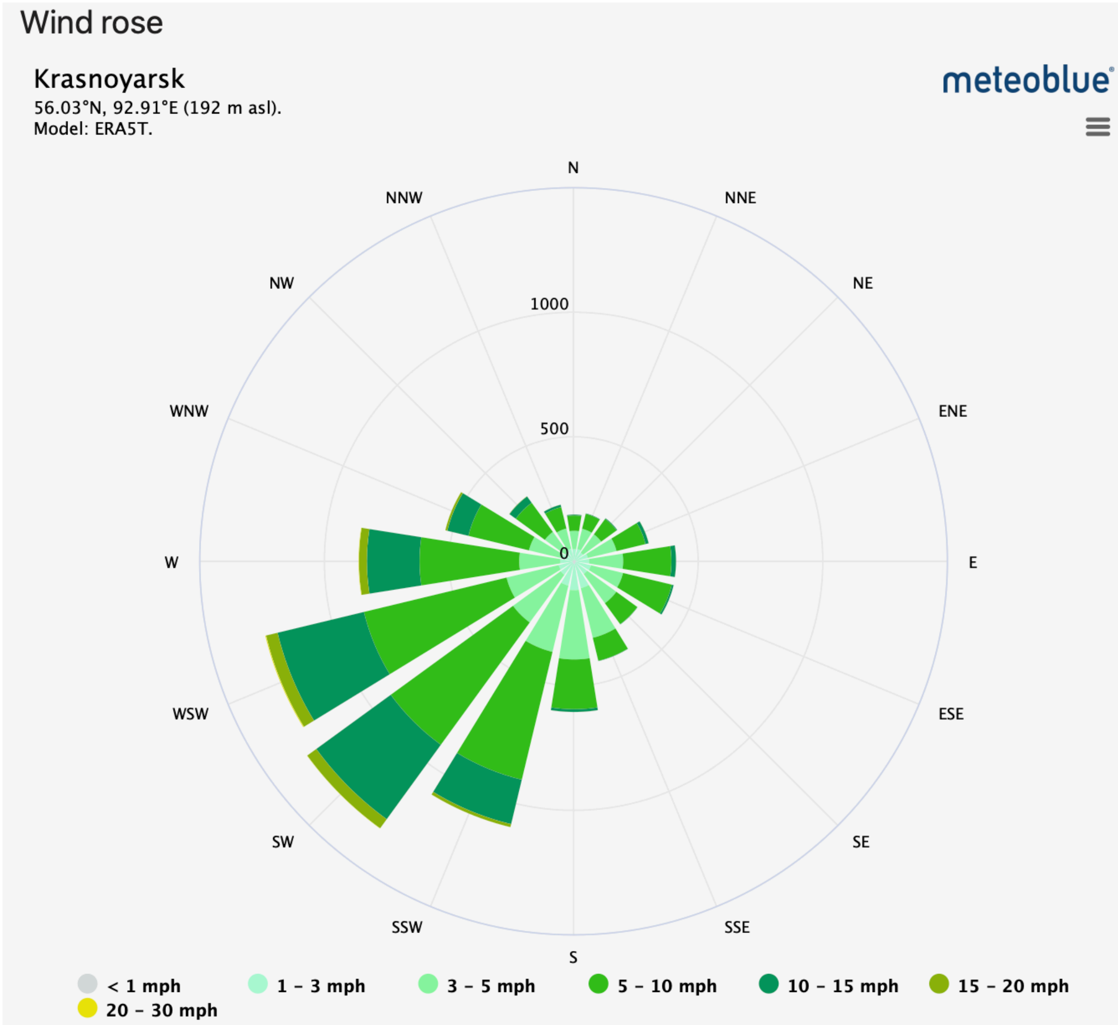
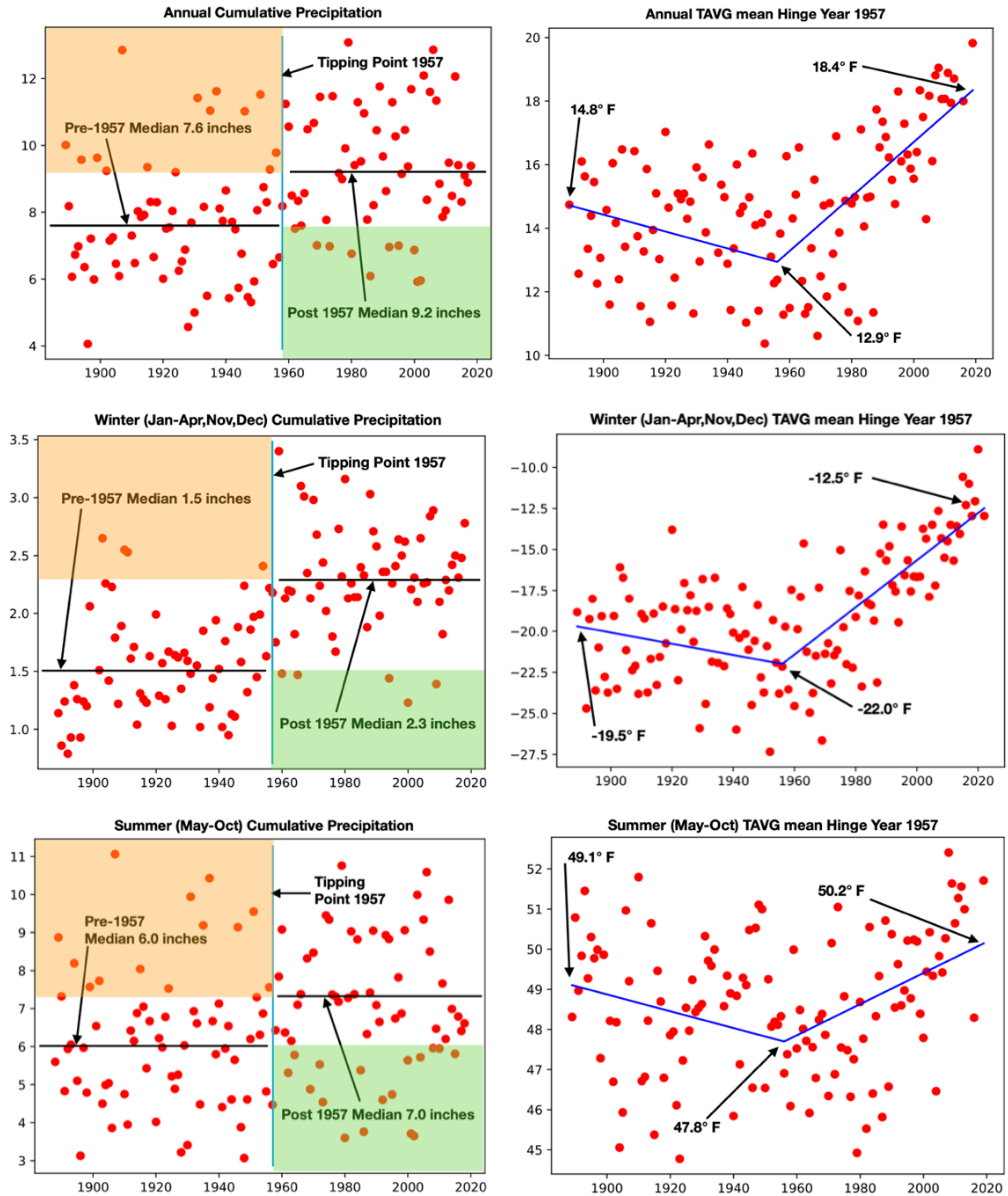



**Figure 14**

Note: 1. The Krasnoyarsk weather station is 400 miles to the east and downwind of the Novosibirsk Amps. After the start up of this 1957 AMPS, Krasnoyarsk's pre-1957 winter precipitation median of 2.6 inches doubled to a post-1957 median of 5.4 inches.

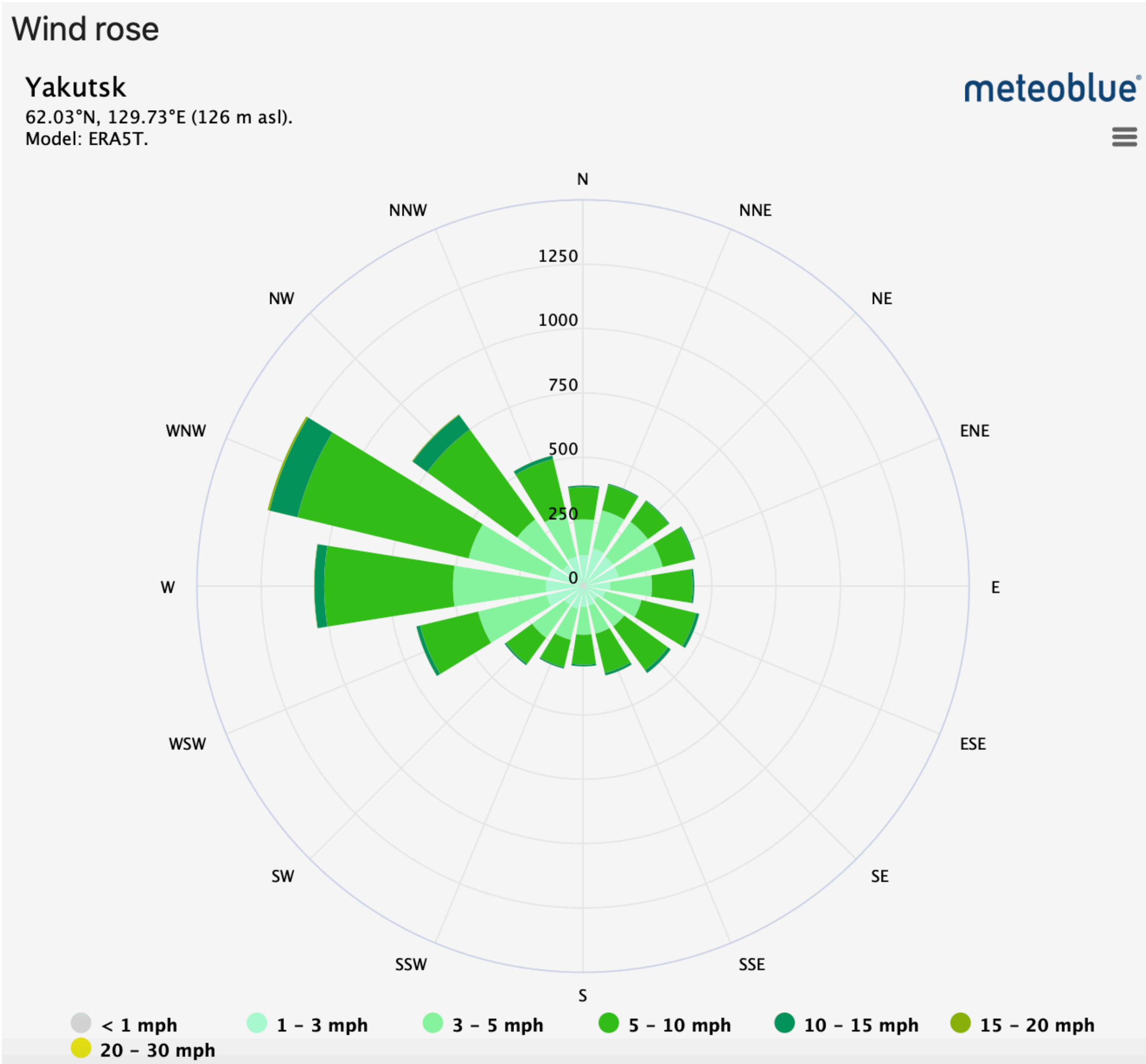
2. In 1967, the Krasnoyarsk AMPS went on line. There were no discernible tipping points on the three precipitation graphs, but the additional accumulating impact of its forced water vapor emissions bolstered the 1957 Novobirsk tipping point by keeping post 1957 winter averages much higher than the pre-1957 median of 2.6"

3. It is profound and paradoxical that the post 1957 summer median precipitation is unchanged but the post winter precipitation median doubled.




**Jakutsk (Yakutsk) RS** NOAA St. ID: GHCND: RSM00024643 Data 1889-2021 **Figure 15**

Lat 62.0°N Long 129.7°E HY Software by IPA Graph © June 19, 2025 S.M.Kasprzak/rdw Page 30

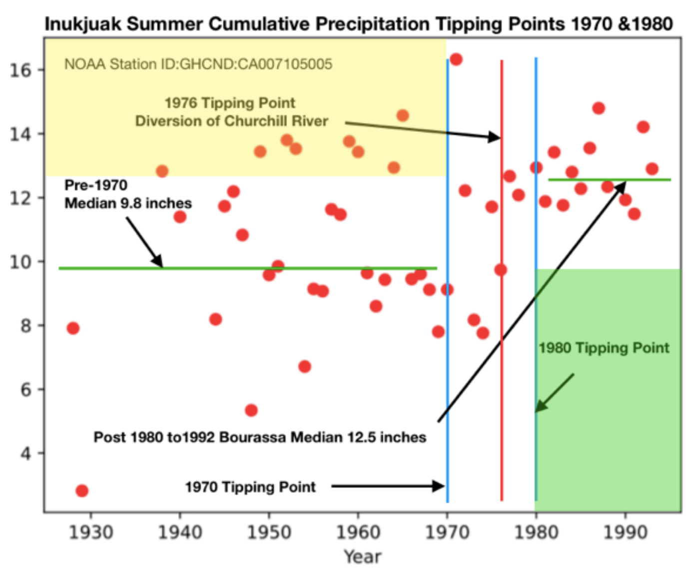


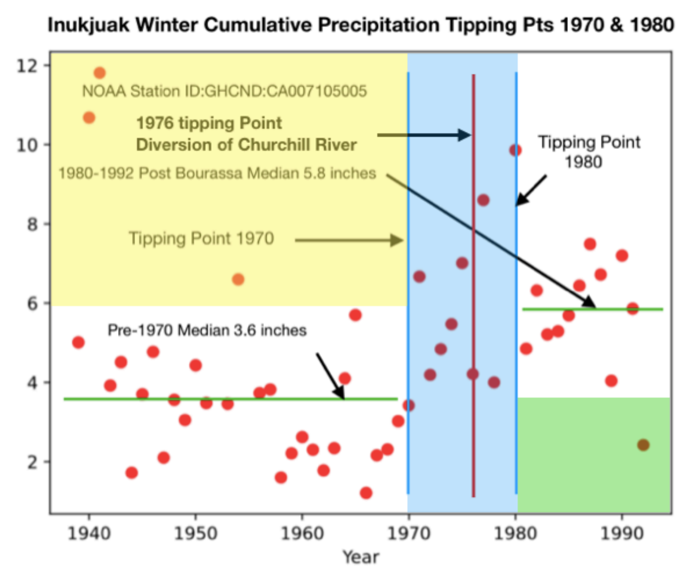
Wind rose
Yakutsk
62.03°N, 129.73°E (126 m asl).
Model: ERA5T.
meteoblue
N
NNE
NE
ENE
E
ESE
SE
SSE
S
SSW
SW
WSW
W
WNW
NW
NNW
1250
1000
750
500
250
0
< 1 mph
1 - 3 mph
3 - 5 mph
5 - 10 mph
10 - 15 mph
15 - 20 mph
20 - 30 mph


**Figure 16**

Weather stations, located upwind from southwest Greenland, document an extreme tipping point in 1993 along with earlier ones in 1970 and 1980. These tipping points coincide with the building of AMPSs in Manitoba's Nelson River and Quebec's James Bay Hydroelectric Projects between 53 and 57 degrees North. It appears that the 1949 Soviet hypothesis to use water vapor emissions, a powerful greenhouse gas, to increase atmospheric humidity has also come to fruition in northern Quebec with the buildup of these AMPSs and their resulting DOMEs in Hudson Bay's watershed. The weather data provides compelling evidence corroborating the Soviet hypothesis of a causal relationship between the summer evaporation from AMPs colossal reservoirs and my hypothesis that the summer and winter evaporation from the regulated discharges is another major driver increasing precipitation and temperatures.

Notable findings following construction of the AMPSs include the rapid increase of summer precipitation. The first tipping point was in 1970 on the Nelson River, when Manitoba Electric commissioned the Kettle AMPS, creating Stephen Lake Reservoir, which is 625 miles west of the Inukjuak weather station on the east shore of Hudson Bay (See Map on next page). The second was in 1976,when they diverted 85 percent of the Manitoba's north flowing Churchill River into the Nelson River, increasing the Nelson's mean discharge into Hudson Bay by 40 percent. The third was Hydro Quebec comissioning the 1980 Robert Bourassa AMPS on the La Grande River.




Graphs © June 23, 2025 S.M.Kasprzak/rdw

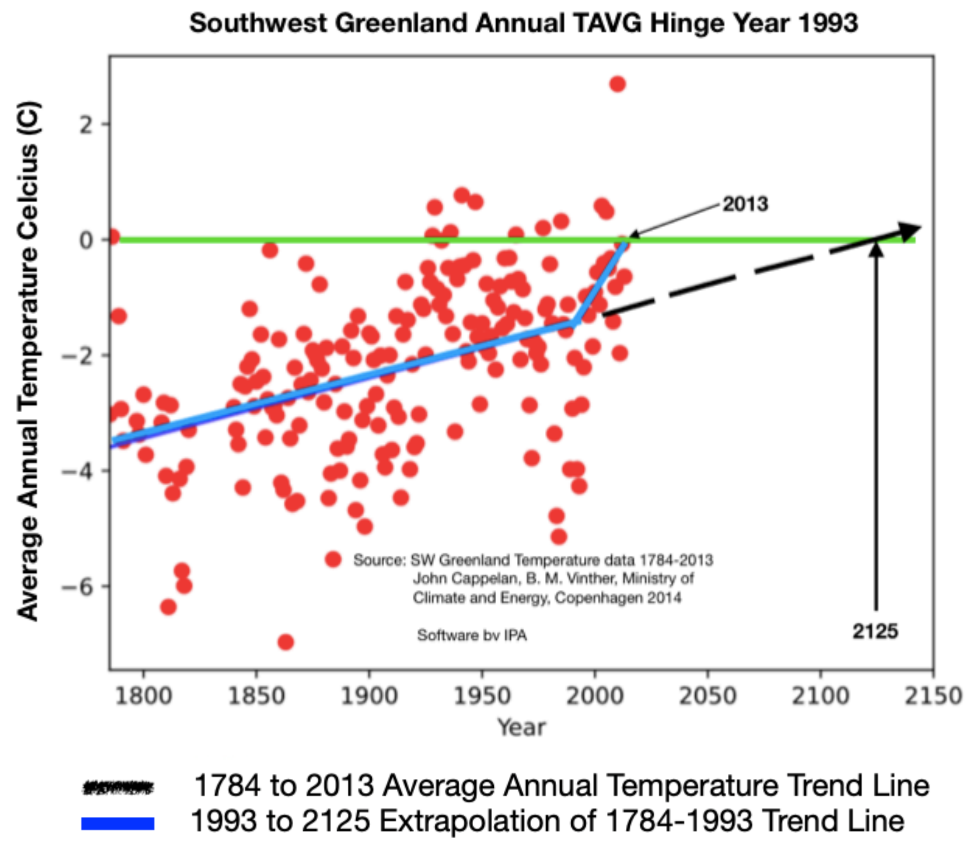
## Canada's Labrador Peninsula and the southwestern Coast of Greenland Are The Tailpipes for Forced Water Vapor Emissions from Hudson Bay Dams


Source: www.freeworldmaps.net **Map 5**

The Nelson's and Brisay's forced summer and winter water vapor emissions and their thermally warming humidity are readily transported by the prevailing west and southwesterly winds across Hudson Bay and the Labrador Peninsula and Sea to Greenland's western shore and north to Ellsmere Island.

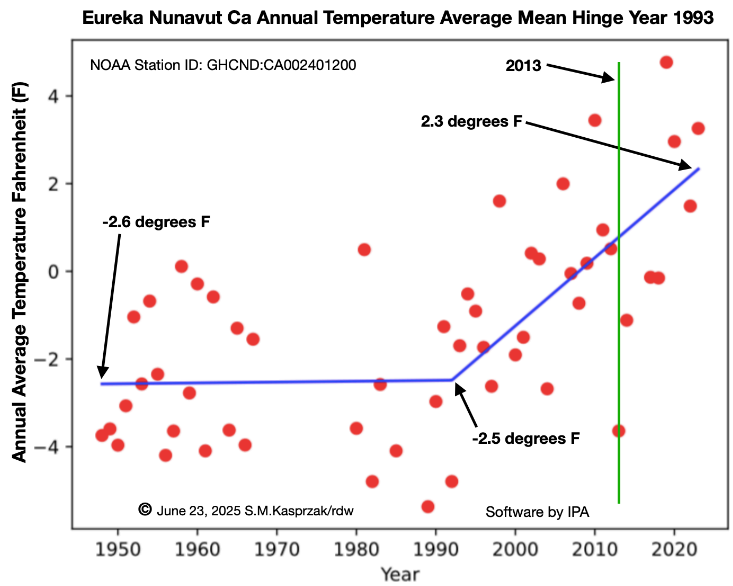
After the 1993 Brisay AMPS was built, the southwest Greenland average annual temperature rose 1.5 degrees Celsius (C) over the next 20 years to 0 degrees C, compared to a rise of only 2.1 degrees C over the previous 204 years. Extrapolating the historic trend line shows it would have taken more than 100 years after 1993 for the temperature to reach 0 degrees C.

The public availability of data from the Inukjuak weather station ceased in 1993, but there is 204 years of temperature data for southwest Greenland.




The Brisay hydroelectric AMPS is located about nine hundred miles to the southwest of the Greenland weather stations. It is my hypothesis that evaporation from the regulated and relatively warm discharged AMPS' waters and its 1,700 square mile reservoir has created forced water vapor emissions, which form a moisture laden atmospheric warming blanket extending over northern Quebec and across the Labrador Sea to southwest Greenland.

Eureka weather station is on Ellesmere Island in Nunavut, Canada and its data reveals an abrupt and extreme annual warming trend of 4.8 degrees Fahrenheit (F) since 1993. Ellesmere Island is shown at the top of the Map on page 33.



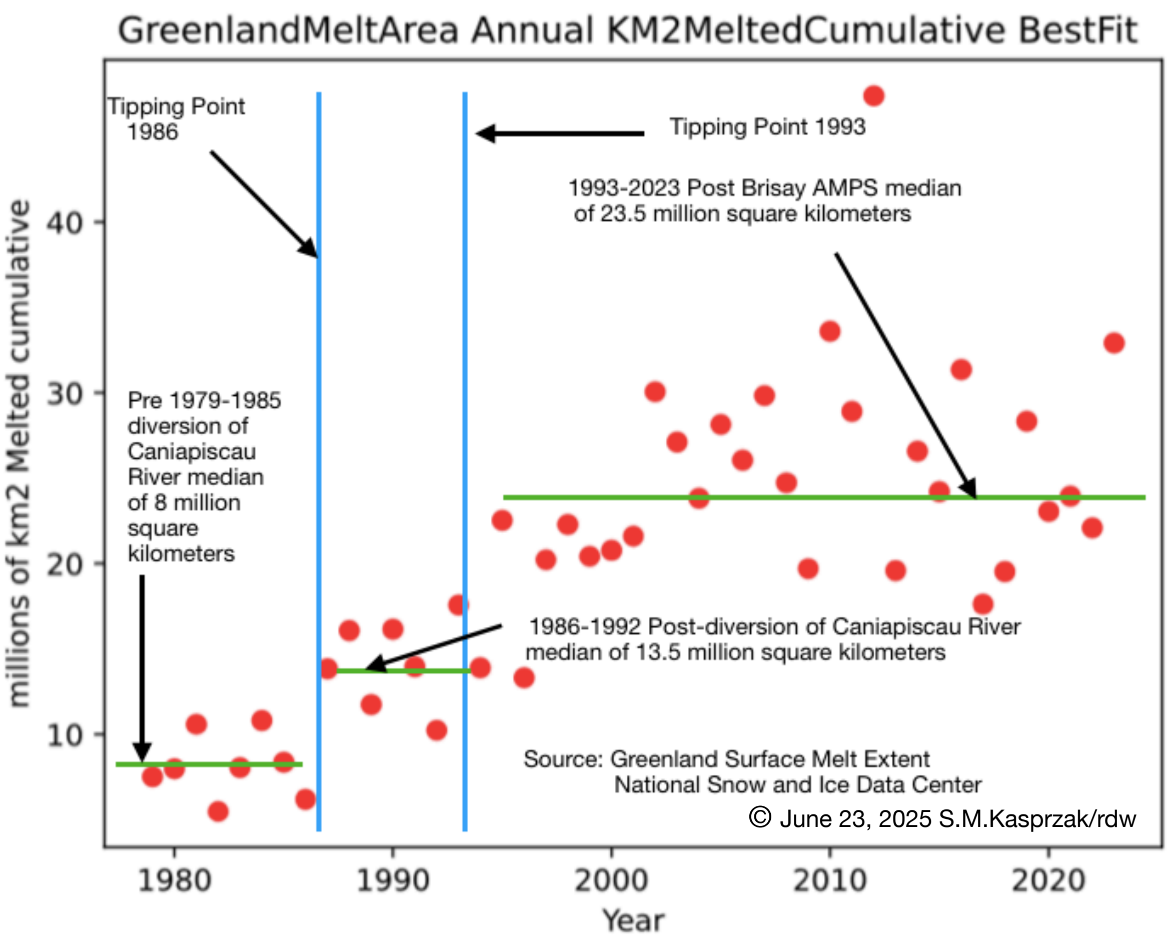

The temperature data in my graphs for southwest Greenland, Kuujjuarapik and Kuujjuaq end in 2013. Eureka's data goes through 2022 and shows a continuing escalation of the warming trend. Eureka's warming trend was documented in an **ARCTIC TODAY** article, "*With warming temperatures, Canada's Arctic glaciers are melting faster, Researchers in two separate studies documented dramatic changes beginning in the 1990s after decades of stability."* by Hannah Hoag, July 13, 2018

In one study, Adrienne White, from the Laboratory of Cryospheric Research, University of Ottawa said: *"A rise in air temperature has contributed to the glacial melt. On average, temperatures in the region have increased 0.5 degrees Celsius (0.9 degrees Fahrenheit) per decade since the 1940's. But there was a strong shift in the mid-1990s, when the mean annual temperature increase accelerated to 0.74C (1.3F) per decade from 0.12(.22F). The average summer air temperature shifted to above freezing from below freeziing since 2000.* In the other study, *"Laura Thomson of Queen's University in Kingston, Ontario, detailed the findings of four reference glaciers in the Canadian Arctic, the Meighen Ice Cap, Melville Ice Cap and White Glacier, on Axel Heiberg Island.*

*Researchers have made annual measurements of three icecaps and one mountain glacier on four islands in the Canadian Arctic since 1960. The four reference glaciers remained relatively stable until the 1990's. Then we saw large swings said Thomson. The summer melt of these four glaciers has increased more than five-fold in some years since 2005"*

**Data from NASA's National Snow and Ice Data Center documents huge increases in Greenlands's surface melt extent which coincide with the August 1985 diversion of the Caniapiscau River and 1993 commissioning of the Brisay AMPS.**

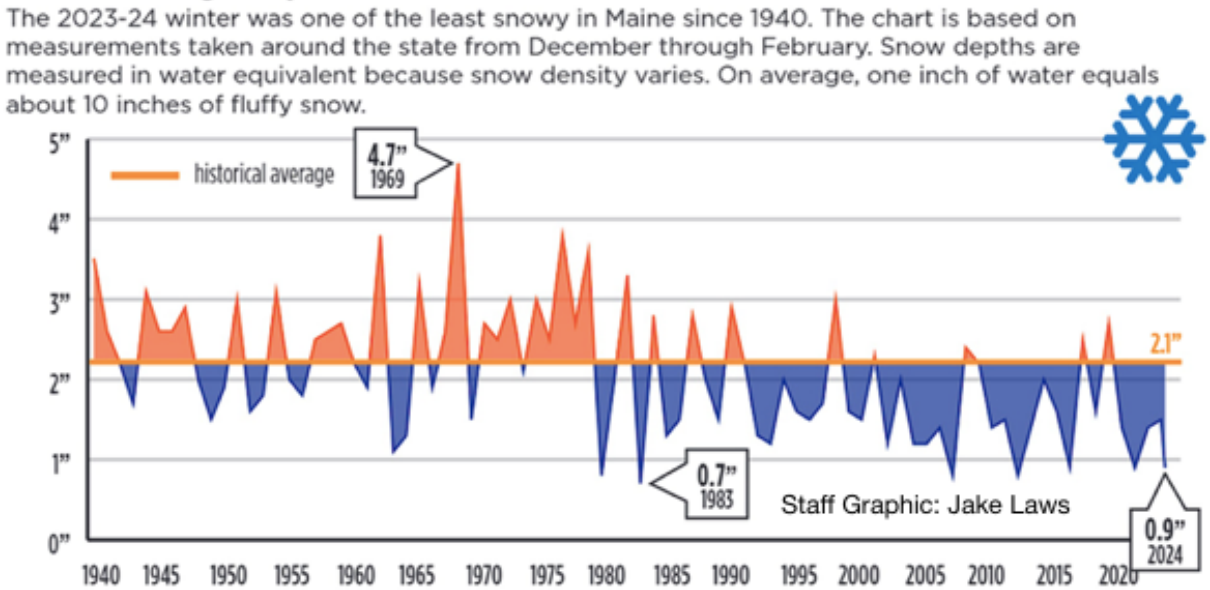
Post Brisay, Greenland's surface melt extent increased three fold and global mean sea level has risen 3.98 inches in 30 years (National Snow and Ice Data Center). This tipping point in sea level escalation was preceded by a rise of only 4 to 5 inches in mean sea level between 1900 and 1992 (**NASA Tracking 30 Years of Sea Level Rise**). Since the Brisay was commissioned, global mean sea level has risen almost 4 times faster than the historic rate.




Notes: From 1979-86 and part of 1987, the recorded data in the National Snow and Ice Center is missing data for every other day due to alternate day satellite tracking over Greenland. In order to use this data set, we assumed the melt extent on the days not recorded was the same amount recorded on the previous day.

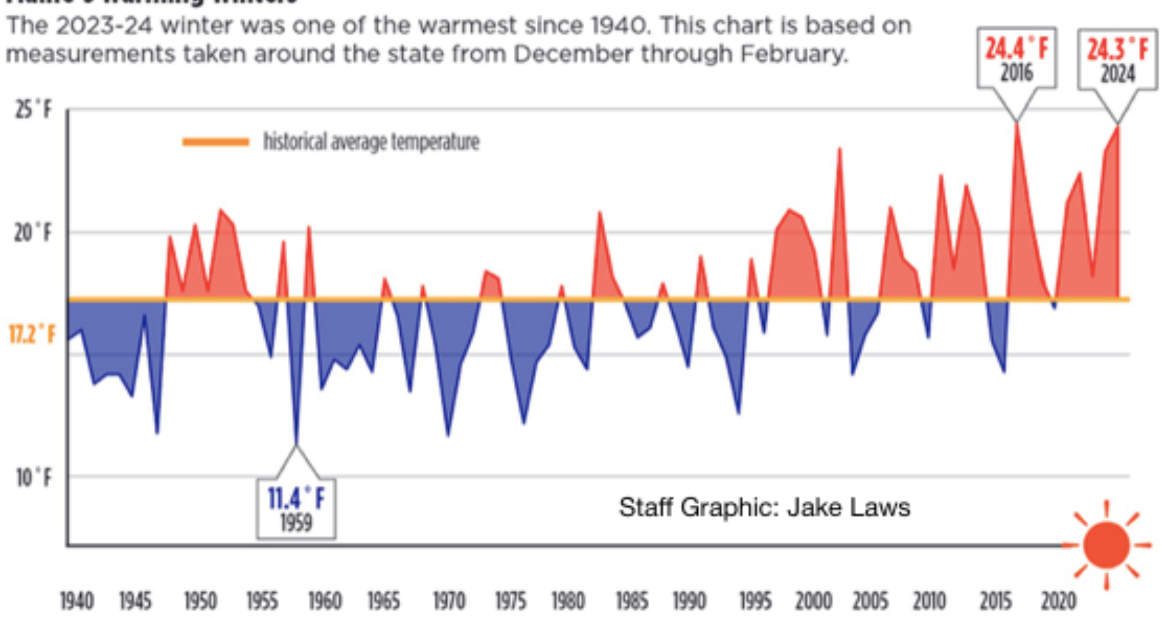
**The footprint of the 1993 Brisay AMPS's tipping point is readily apparent on these two Maine weather graphs.**

## Maine's shrinking snowpack




Source: Climate Change Institute; University of Maine - Maine Sunday Telegram March 31, 2024

## Maine's warming winters

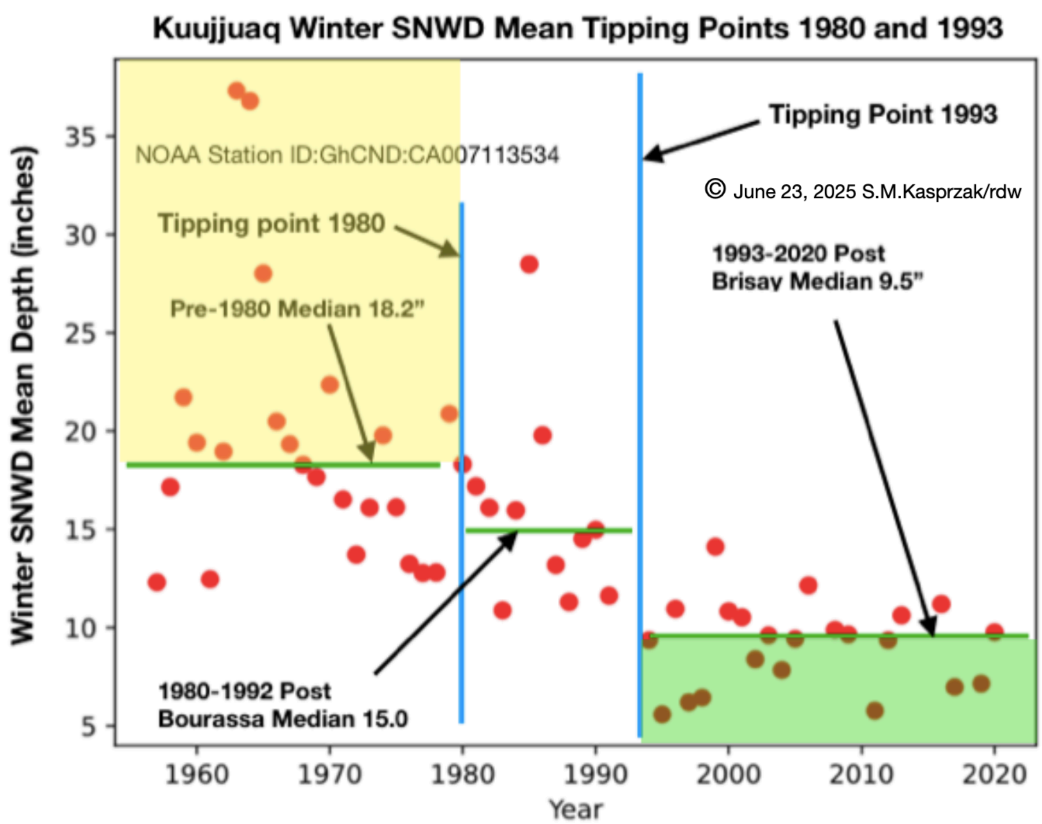



Source: Climate Change Institute; University of Maine Maine Suday Telegram March 31, 2024

**The 1980 Bourassa and 1993 Brisay winter DOMEs caused an immediate and drastic reduction in snowpack depths in northern Quebec.**

Snowpack depths were taken from NOAA's daily Record of Climatological Observations and are the amount of snow, ice pellets, hail and ice measured on the ground in inches. Kuujjuaq's historic snowpack depth pre-1980 median has declined by about 50 percent for the post 1993 Brisay AMPS and it has never recovered. This data set covers 1957-2020 and there is no data after 2020. Kuujjuarapik's data collection ended in 2013. The discontinuance of collecting and/or releasing data from these weather stations is very concerning during the accelerating climate change of the past 30 years.

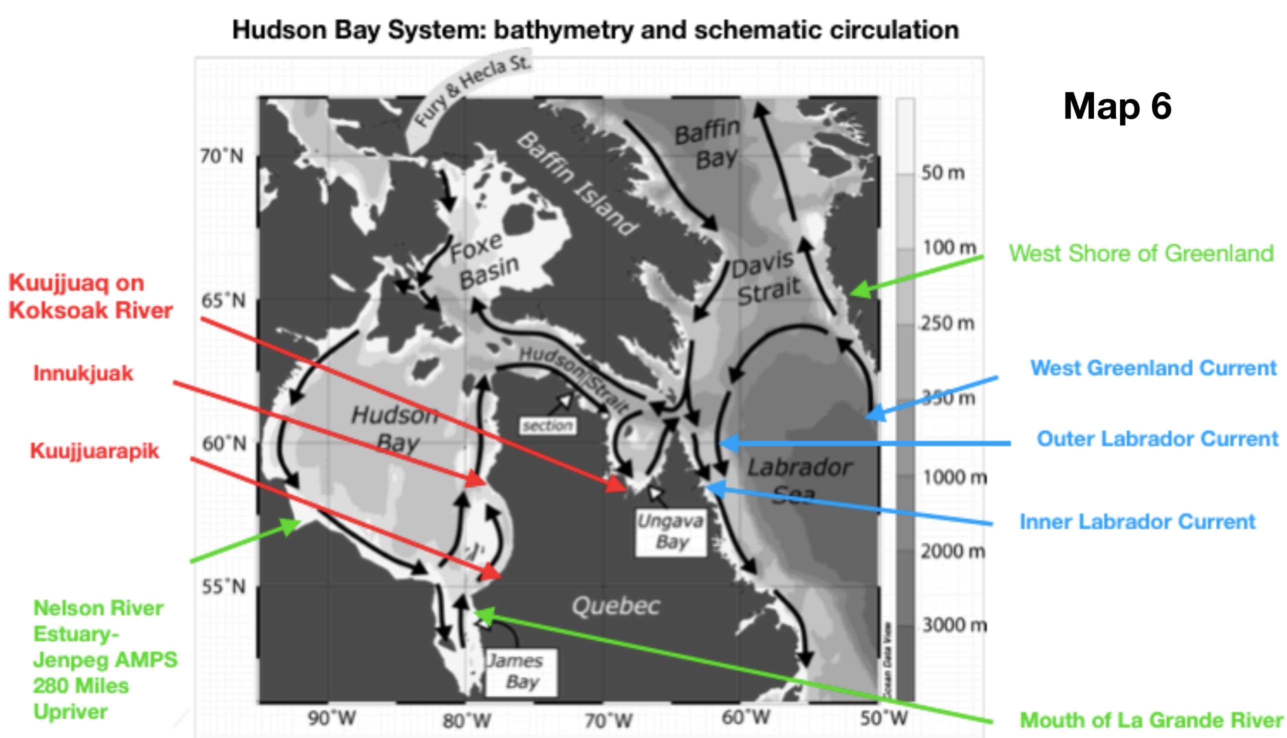
The prevailing winds across the Labrador Peninsula facilitate the transport of an immense volume of forced water vapor emissions from the winter evaporation 24/7 from these Canadian AMPSs across the Labrador Peninsula and over Hudson Strait and the Labrador Sea to Greenland. Throughout the winter, large sections of downstream unfrozen rivers warmed by the hypolimnial dam releases, continually contaminate the atmosphere with great volumes of water vapor amplifying winter temperatures and suppressing snowpack depths. Never before in geologic history have rivers flowed throughout the Arctic winters exposing vast surface areas of unfrozen water to such strong evaporative forces.



What makes Brisay such a powerful monster is the heat polluting consequences of its increased water vapor emissions driven by large relatively warm winter reservoir releases. The additional deluge of warmer winter flows is made possible by an estimated 45 percent diversion of the north flowing Caniapiscau River that once fed Ungava Bay into the La Grande and downstream through five mammoth water vaporizing AMPSs and two HPPs. Its waters now flow into the La Grande River where the regulated winter dam discharges are 8 times greater than the pre-Bourassa natural river flows into James Bay.

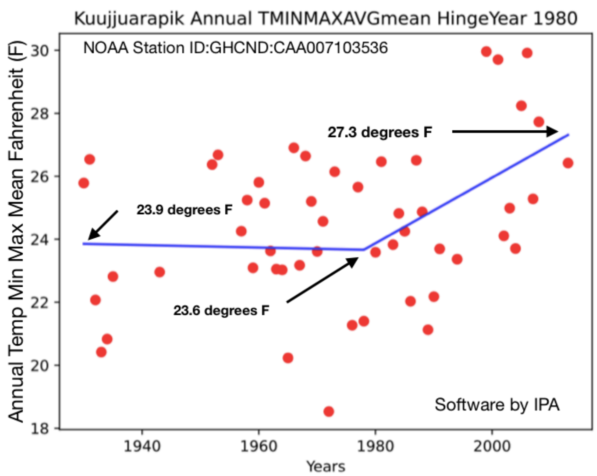
The LaGrande's spring freshet has been eradicated and the winter flows increased as noted below:

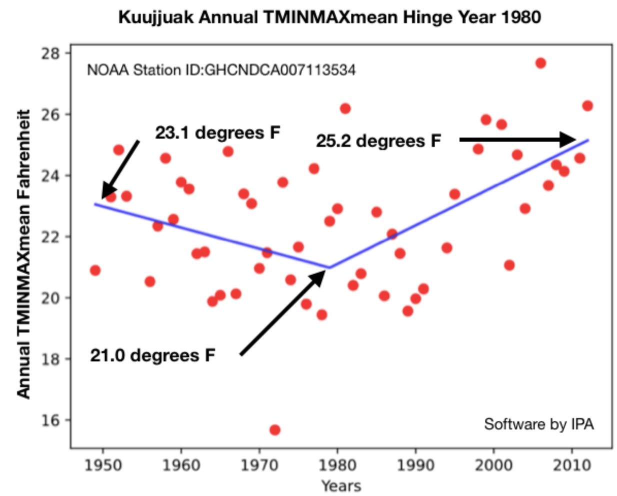
*"In Quebec, peak electricity consumption occurs during the winter when river flows are naturally at their lowest because water is locked up in snow and ice. To meet the demand for electricity during cold weather, dams and diversions have increased the flow on the La Grande by 8 times (from 18,000 to 141,000 cubic feet per second) in order to store water for the following winter and have eradicated the spring flow (flow reduced from 176,000 to 53,000 cubic feet per second)"* (“***La Grande Riviere: A Subarctic River and a Hydroelectric Mega Project***”, Harper P.P.; “***Silenced Rivers***”, McCully, P. 1996)



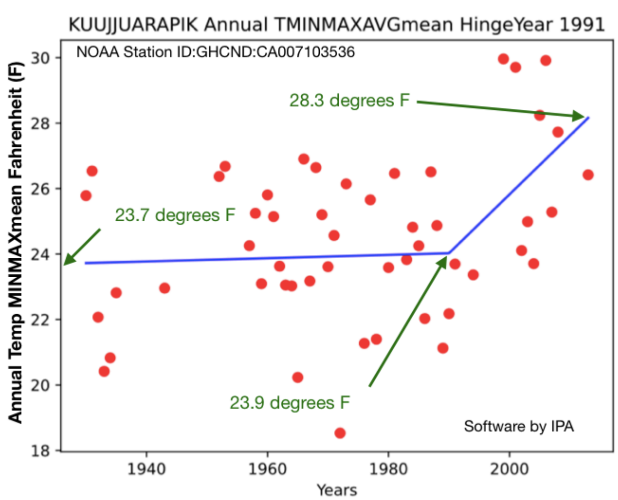

Source: Strange and Saucier Nov. 2007

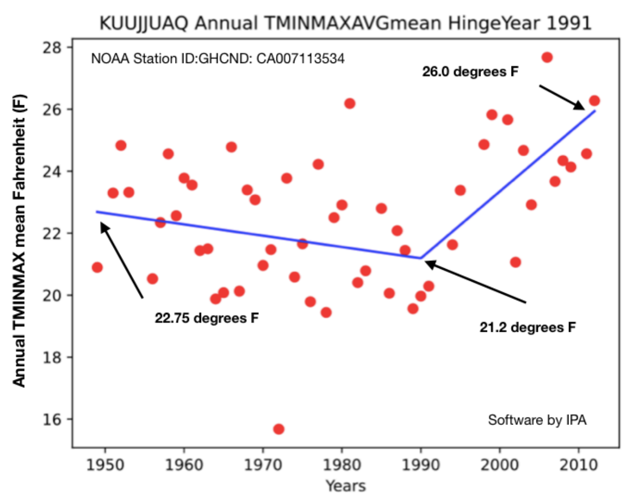
The 1980 hinge year is the year that the Robert Bourassa AMPS began operation under the ownership of Hydro-Quebec and radically reversed a 30 year cooling trend at Kuujjuak. The increase of 4.2° F between 1980 to 2013 is an average of 0.127° per year. This is 4 fold faster than the NASA estimated baseline global average temperature increase of of 0.032° F per year between 1975-2022.




Thirteen years later in 1993, with the commissioning of the Brisay AMPS a second and more powerful tipping point presented itself. The 1991 to 2013 average annual temperature trend line **for** Kuujjuarapik exposes an ominous increase in temperature of 4.4 degrees Fahrenheit in 22 years or an average of 0.2° F per year. A similar warming rate was documented at Kuujjuaq. There was no data for 1992 and IPA's algorithm moved the hinge year back to 1991.




Graphs © June 23, 2025 S.M. Kasprzak/rdw

To the best of my knowledge, there has never been an environmental study on the cumulative impacts of Quebec, Manitoba and Ontario AMPSs and HPPs on rivers flowing into James and Hudson Bays according to the following two articles.

1. **James Bay seen as test on environment** Star Phoenix, January 8, 1976, *"The man in charge of assessing the environmental impact of Quebec's massive James Bay hydroelectric project admitted Wednesday no one is sure just what its impact on the environment will be. 'We are using this project as an experience to see what will happen', Alain Soucy said in an interview. We have about $100 million to spend over the next 3 years on remedial action, though.' The head of James Bay Energy Corporation's environmental department said that even if there were severe environmental problems \caused by the project it would not be curtailed. 'We can't change the scale of the project or it will not work.' He explained."*

2. **Slow Death in the North? Impact of Hudson Bay dams being ignored, critics charge** The Toronto Star (Toronto, Ontario), Canada) April 9, 1991, *" Are Hudson Bay and James Bay facing the slow death of a thousand cuts? Many environmentalist, \native people and even a few government officials fear the answer is yes….. **Pollution and changes in the rivers flow could even alter North America's climate**….. The projects change the flow of freshwater into the bays. Normally, the rivers flow is highest in the spring. But the dams store the water until its released to spin the turbines later in the year. Cutting the spring flood can change the times and location of ice melting and also affects the bays' salinity. This alteration in a fragile, carefully balanced environment could have devastating effects on the whales, birds and other wildlife. But there's opposition from the hydrocorporation. " We're not against a global review," says Gaetan Guertin, director of impact assessment for Hydro-Quebec. "But if a decision on a 'go' or 'no go' will have to wait (for the results), there will be a reaction from Hydro-Quebec. Some of our projects are very tight in terms of scheduling."* (Emphasis added by SMK)

The graphs contained in this Study provide compelling evidence that the summer and winter DOMEs of the James Bay experiment are the footprints of an environmental Frankenstein melting Greenland's glaciers. They also confirm that studies were warranted before and after AMPSs were built on Hudson Bay regional rivers.

## Conclusion

The Earth would be a much colder place without its paramount greenhouse gas, water vapor. The process of evaporation, condensation, precipitation, and freshwater runoff are all part of its water cycle. In the lower latitudes of the Northern Hemisphere, the cycle is continous throughout the year. In the Northern higher latitudes, the cycle is dormant for about 6 months a year with minimal evaporation and runoff because the lakes, rivers and seas are locked in ice.

The awakening and strengthening of the Arctic winter (Jan-Apr,Nov,Dec) water cycle skyrocketed between 1952 and 1993. This change in hydrology was driven by numerous Canadian and Russian AMPSs built during this time period on rivers flowing into each of the six Arctic coastal seas, James, Hudson and Ungava Bays, the Labrador Sea and Gulf of St. Lawrence. Each AMPS with their massive storage capabilities contributed to a growing overall loss in the volume and flow energy of the spring freshet and summer flows. This energy is a key part of regulating earth's climate. These AMPSs to this day with their massive reservoir storage capabilities enable solar radiation to warm the stored waters. These warmed reservoir waters are then released to greatly enhance the winter runoff (river flows).

In addition, the building of upstream AMPSs transforms existing or future run of the river hydropower plants (HPPs) into conveyors and boosters of major heat pollution of manufactured AWE driven by the 24/7 discharges of regulated warm reservoir waters.

This increased regulated winter freshwater flow into estuaries acts as a pump, drawing in relatively warmer deep saltwater from the sea through deep gorges and pulling it up to the surface of the estuaries to mix with the regulated discharged waters from the AMPSs. The Russian and Canadian AMPSs have not only stimulated the natural evaporation, condensation, precipitation and runoff processes of the regional Arctic water cycles, but their 24/7 regulated winter discharges have also created continous upwelling currents pumping and churning Atlantic warmth (CAW) up into these estuaries hampering ice formation and enhancing more winter AWE.

Analysis of winter and summer precipitation and temperature data reveals that winters are warming much faster than summers and provides compelling evidence that the contribution of man-made winter AWE by the AMPSs is the greenhouse gas overriding all other heat pollution sources in the Arctic. Yes, there is an Earth Energy Imbalance driven by $CO_2$ emissions but it appears to be minimal in the Arctic region compared to the Arctic Energy Imbalance intially driven by and continually sustained by AWE and CAW.

# Power dams threat to ecology of oceans

By BRUCE LITTLE, Southam News Services

DARTMOUTH, N.S. — Protests over the environmental effects of huge power dam developments usually focus attention on what happens to the land above the dams that will be drowned in water.

Apart from that, an energy-hungry world tends to see hydro projects as a source of power that is clean relative to nuclear reactors and oil-fired thermal generators.

Hans Neu does not go along with that assessment. He is an expert in hydrology at the Bedford Institute of Oceanography here and he feels hydro power may be far dirtier than most people realize.

Instead of looking upriver for the effects of a dam, Neu looks at the ocean into which the river waters eventually spill.

In his view, well-dammed rivers like the Manicouagan in Quebec have given man the power to drastically alter the entire ecosystem of the Gulf of St. Lawrence and the Atlantic coast.

His theories start with the hydrological cycle in which ocean waters evaporate, rise into the atmosphere and return to earth again inland in the form of rain that feeds the lakes with water.

In a southern climate, the process is continuous. But in the north, nature comes almost to a half in the winter and doesn't need the water. Nature's solution is to store the water in the form of snow.

As a result, the flow of water from rivers to the sea falls off in the winter. In the spring, at the beginning of what he calls Canada's "very short but very strong biological activity season", the water is released.

It is nature's design to provide as much water as it can just at the time it is needed most. Before dams were built, water flows from the St. Lawrence, into which the Manicouagan drains, rose to an immense peak in the spring, more than three times the level of winter.

This is where the other half of Neu's theory comes in.

As the fresh water of the St. Lawrence tumbles into the Gulf, it acts as a pump on salt water, drawing in salt water from the sea through deep gorges and pulling it up to mix with the new water on top.

This churning of the deep-running salt water brings to the surface the nutrients from near the ocean floor which fish and other forms of life need for food.

The relationship of the two systems meant that the strongest flows of water, coming as they did in the spring, helped bring near the surface abundant quantities of food and nutrients.

But the damming of rivers has changed that neat interaction.

Instead of letting all that power-producing water in the spring go to waste, engineers have built huge storage lakes behind the dams that can hold the water until the following winter. Then it can be released to create power when the normal river flows would be small.

The result of these storage lakes is a flattening of the wide swings in the flow of rivers. And that means more nutrients in the Gulf are brought up in the winter, when they are needed least, while fewer nutrients are supplied in the spring and summer, when they are needed most.

Manicouagan River dams cut the flow of the St. Lawrence River by as much as one-third in the spring, according to Neu's research, and he is worried that it could produce a stagnant Gulf.

Wind and tides move the water to some extent, but fresh water flows into the Gulf, he says, strongly influence water movement.

"Stagnancy is the most poison condition of nature," Neu says. He fears that declining catches of fish may be one result.

"We may not only overfish; we also may starve nature during this period of its major peak activity with food. This is a suspicion. I have no proof. It's so complex to prove it."

Neu's theories are not new. He has been pushing them for more than 10 years. But now he is afraid that the mistakes of the past are being repeated in the James Bay power development and that the consequences could reach as far as here.

He does not think the James Bay project can be stopped. But he would like to see it scaled down with fewer storage lakes built to hold back water from Hudson Bay.

It would mean some interference with the hydrological cycle and some flattening of the swings in the river flow, but not so much to present a massive danger to the ecology of the ocean. It would also mean less power, but he figures the economics of energy have improved so much, it should still be feasible.

The aim of engineers on projects of this sort, he says, is to equalize the flow of water and "take it out of the hands of nature altogether and make it subservient to man's needs."

Unless those priorities are changed, he suggests, nature could have the last word by damaging the life systems of the ocean.

In a world that is looking increasingly to the oceans as a source of protein, it is a disturbing prognosis.

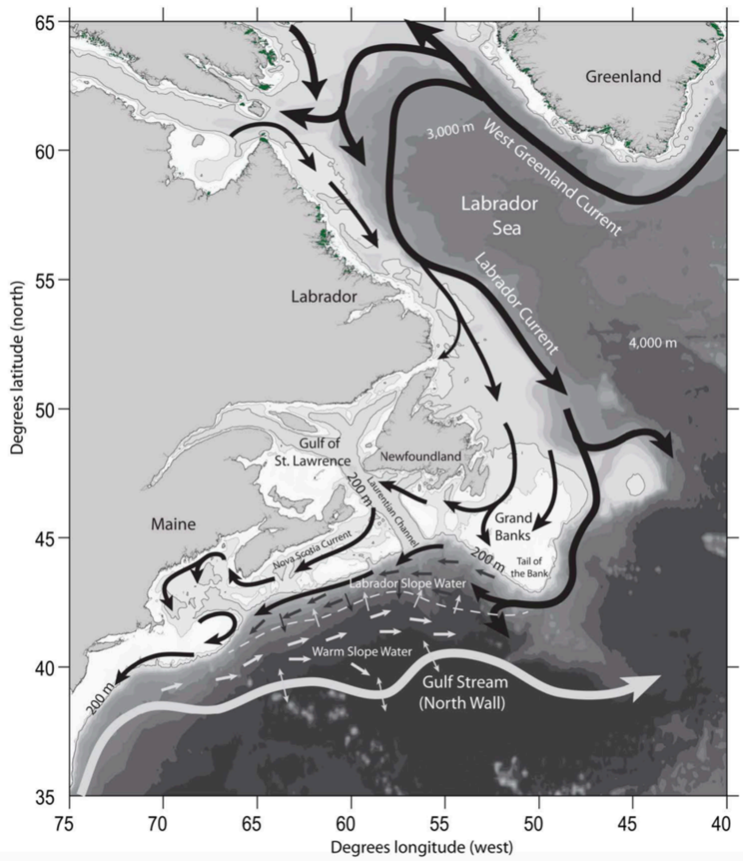
The Sun Times (Owen Sound, Ontario, Canada) · 6 Mar 1974

**Appendix 1**

# Northeast Currents

### Gulf Stream & Warm Slope Water

The Gulf Stream is a major component of ocean circulation in the Northwest Atlantic. Propagation of Gulf Stream meanders and resulting eddies can create favorable conditions for high primary productivity throughout the Mid-Atlantic Bight and northwards to the Georges Bank shelf break (Townsend et al., 2006, Ryan et al., 1999). In contrast, extreme meanders in the Gulf Stream path and interactions between Gulf Stream warm core rings and continental shelf topography can lead to dramatic changes in the shelf water properties and shelf circulation, possibly to the detriment of critical habitat (Gawarkiewicz et al., 2018). The position of the Gulf Stream appears to be a reliable indicator of bottom water temperature on the Northeast Shelf and, through this relationship, indirectly linked to the distribution of some commercially important fish species (Nye et al., 2014) as well as variations in plankton community composition (Taylor 1995). The intrusion of Warm Slope Water into the Gulf of Maine, sourced from North Atlantic Central water transported by the Gulf Stream, is mediated by the position of the Gulf Stream north wall (Townsend et al., 2006).




Bathymetric map of the Northwest Atlantic showing the position of the North Wall of the Gulf Stream and major features of the Labrador Current, with warmer currents shown in grey and colder in black. Shorter arrows indicate residual flows of the Warm Slope and Labrador Slope Waters. Figure from Townsend et al. 2015.

**Labrador Current**

The Labrador Current flows southward along the western boundary of the Labrador Sea, and the shallow and deep branches are part of the larger basin-wide gyre circulation in the northern North Atlantic. The current provides two of the three main sources of water entering the NES ecosystem: Labrador Shelf Water is the coldest and freshest water and is confined to the shelf, while Labrador-Subarctic Slope Water (LSSW) is a deeper cold/fresh water mass that arrives along the continental slope. Both of these younger water masses are lower in dissolved nutrient concentrations than those of southerly origin. These northern-source waters combine with the deep warm/salty southern-origin ATSW to define the initial temperature, salinity, stratification, and nutrient content of the shelf water within the NES ecosystem. Variations in the composition of the slope water in the Gulf of Maine are correlated with basin-scale atmospheric forcing of the North Atlantic Oscillation (NAO). When the NAO is in a positive state, the volume transport of LSSW is relatively low and water export does not reach beyond the Gulf of St. Lawrence (Drinkwater et al., 2002). When the NAO is in a negative state, volume transport of the Labrador Current is high and a greater amount of LSSW enters the Gulf of Maine through the Northeast Channel, resulting in colder, fresher, and lower nutrient bottom waters (Petrie 2007). However, the extent of LSSW entering Gulf of Maine may be diminished in years when the inflow to the Gulf of Maine is dominated by greater volumes of shelf water in the middle to upper layers (Townsend et al., 2010).

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