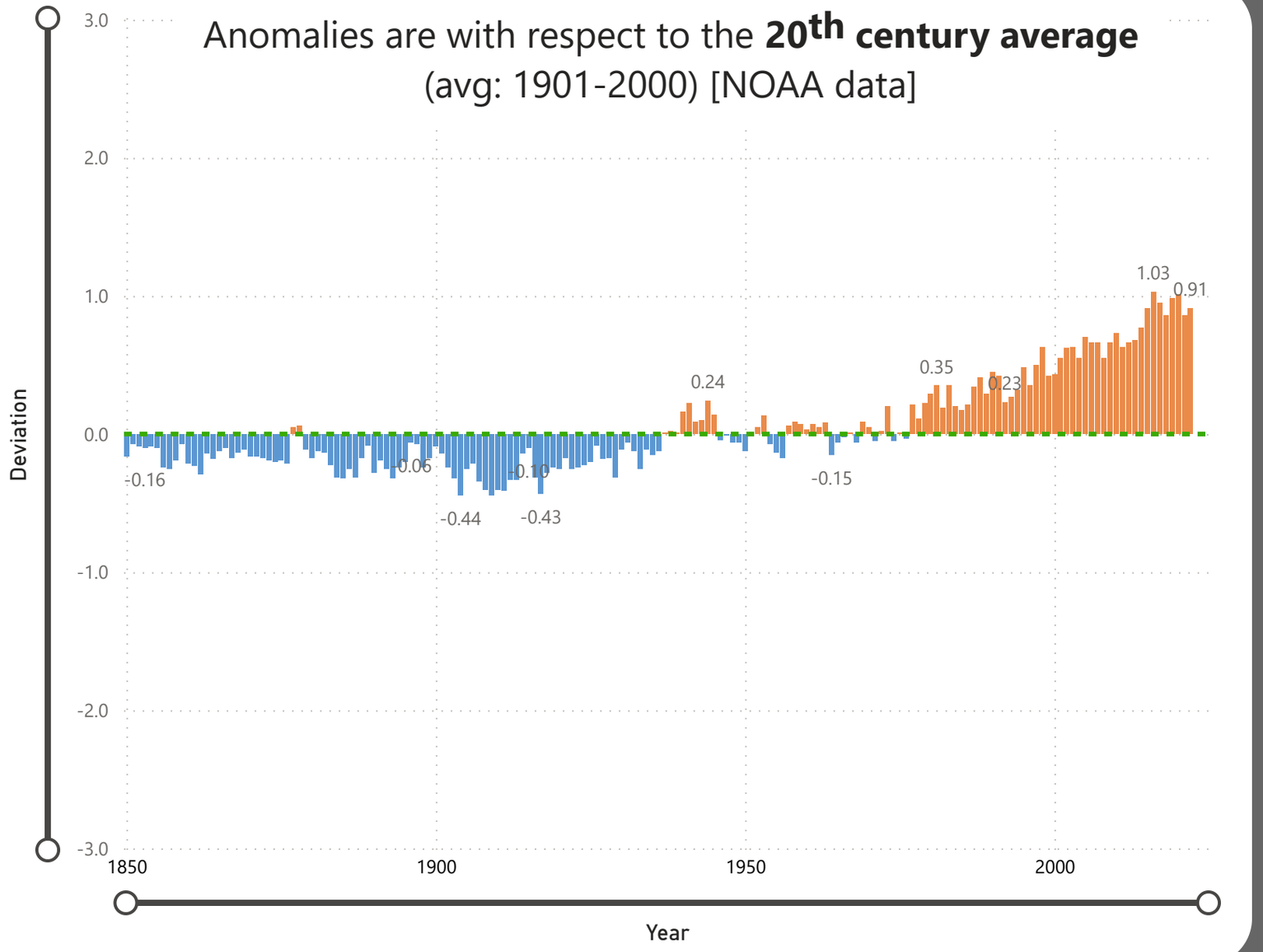
What Is Climate Change?

Climate change refers to long-term shifts in temperatures and weather patterns.

Why does it happen?
Is Climate Change really anthropogenic ?
Do we have to worry about it?

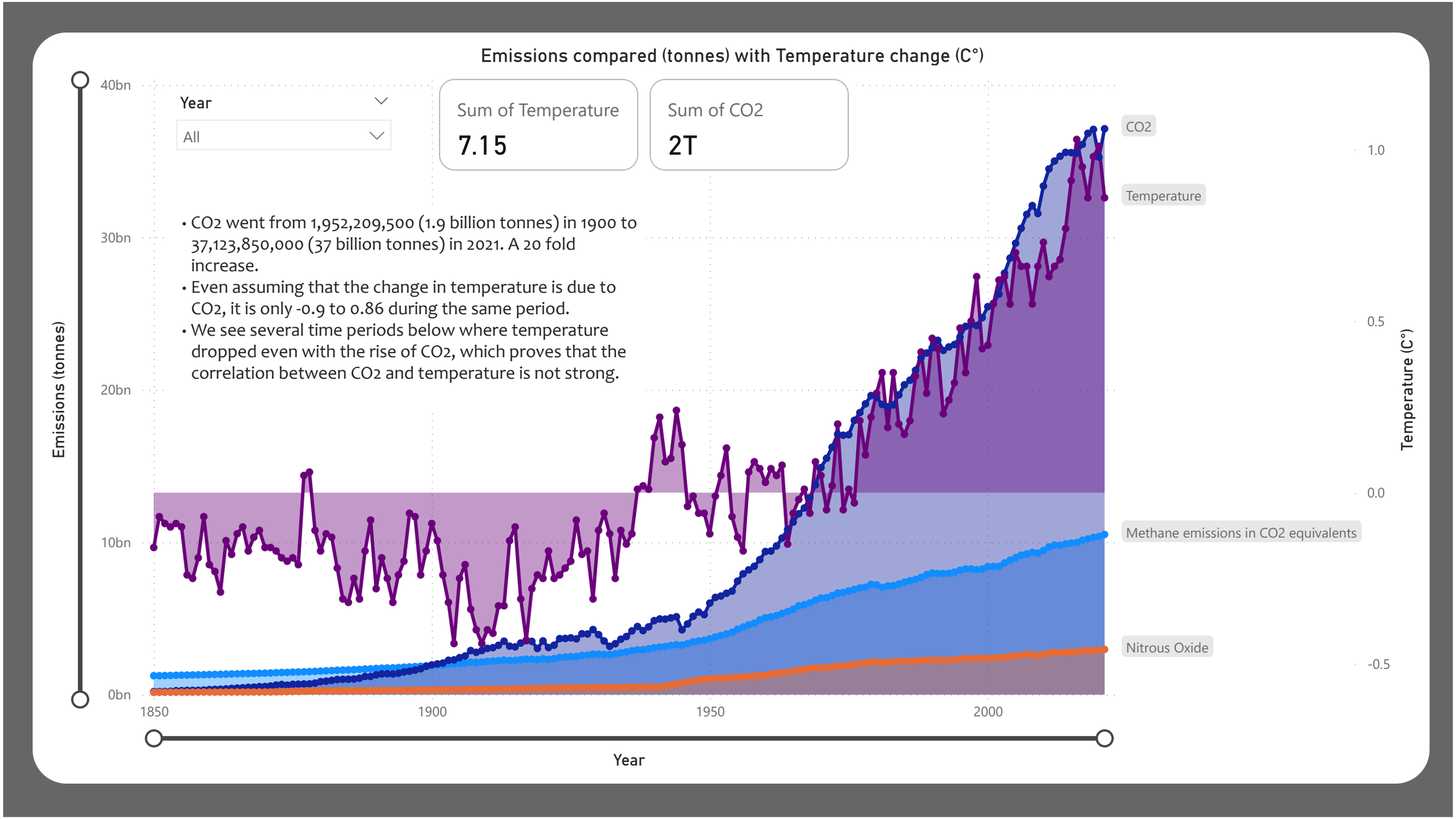
Temperature Deviation



- Over the past 170 years (*data: 1850-2022*), the temperature variation from the mean has not been greater then 1.03 (C°) at any point in time.

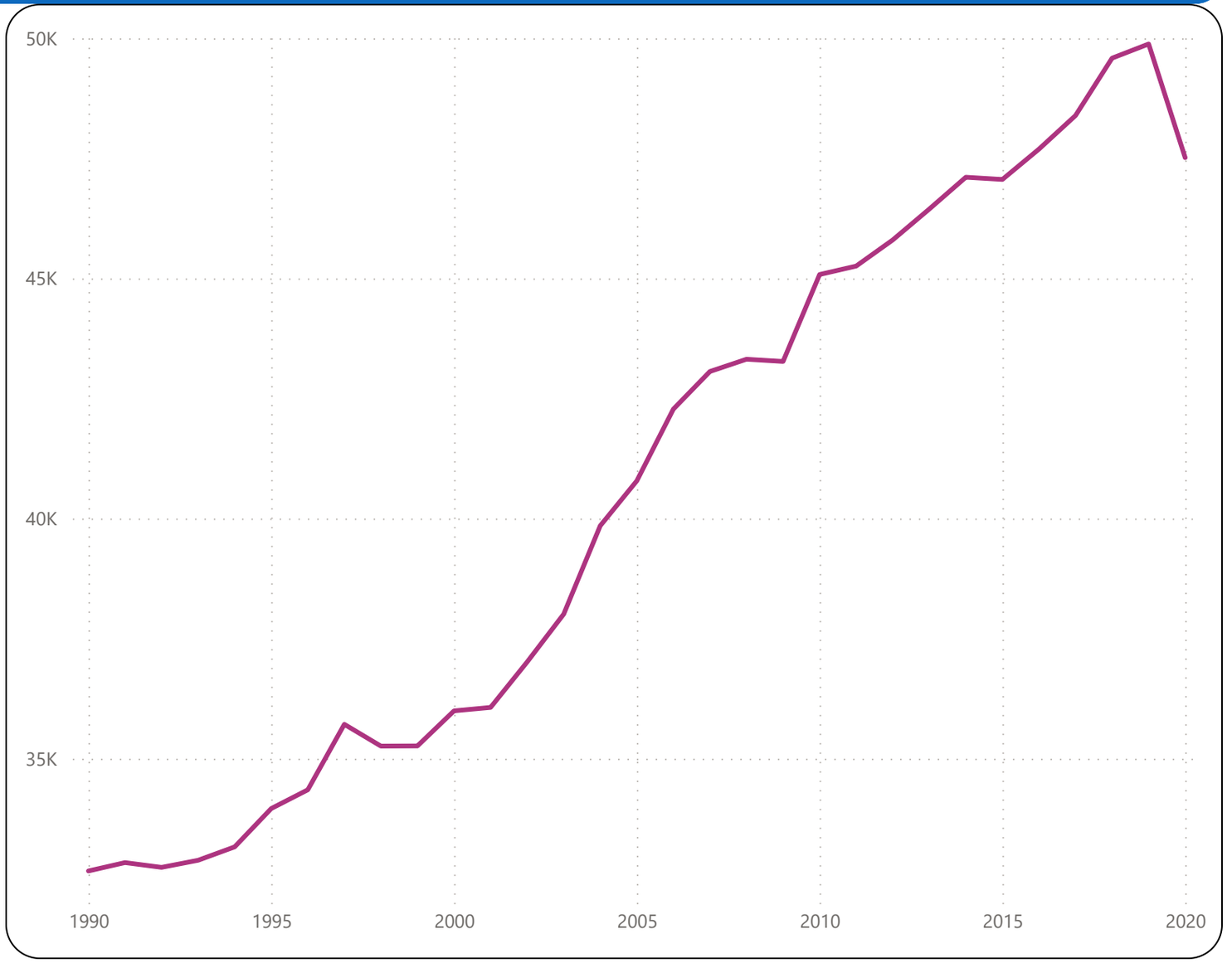
- The target is to have no more than a mean change of 1.5 (C°) from the pre-industrial (1750-1850) temperatures. So far, we are well within this range.

- Climate activists often blame the increase in greenhouse gases solely on human activities, especially CO2 for the increase in global temperatures, but is this true?


Emissions compared (tonnes) with Temperature change (C°)
Year
All
Sum of Temperature
7.15
Sum of CO2
2T
• CO2 went from 1,952,209,500 (1.9 billion tonnes) in 1900 to 37,123,850,000 (37 billion tonnes) in 2021. A 20 fold increase.
• Even assuming that the change in temperature is due to CO2, it is only -0.9 to 0.86 during the same period.
• We see several time periods below where temperature dropped even with the rise of CO2, which proves that the correlation between CO2 and temperature is not strong.
Emissions (tonnes)
40bn
30bn
20bn
10bn
0bn
1850
1900
1950
2000
Year
Temperature (C°)
1.0
0.5
0.0
-0.5
CO2
Temperature
Methane emissions in CO2 equivalents
Nitrous Oxide

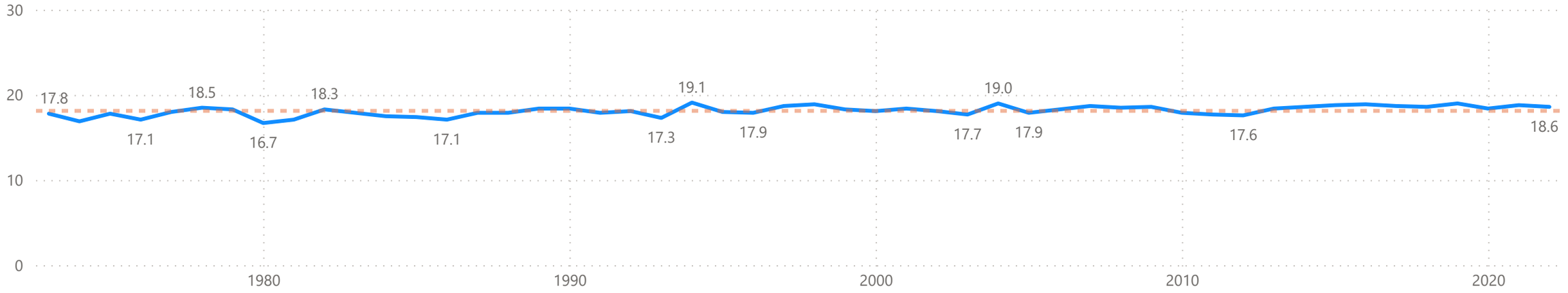
Global Greenhouse Gas Emissions Across Time

- Increase in GHG throughout the world during the past 30 years
- Change is a little more than 10,000 MTCO2e
- Significant dip from 2019 to 2020 because of the pandemic

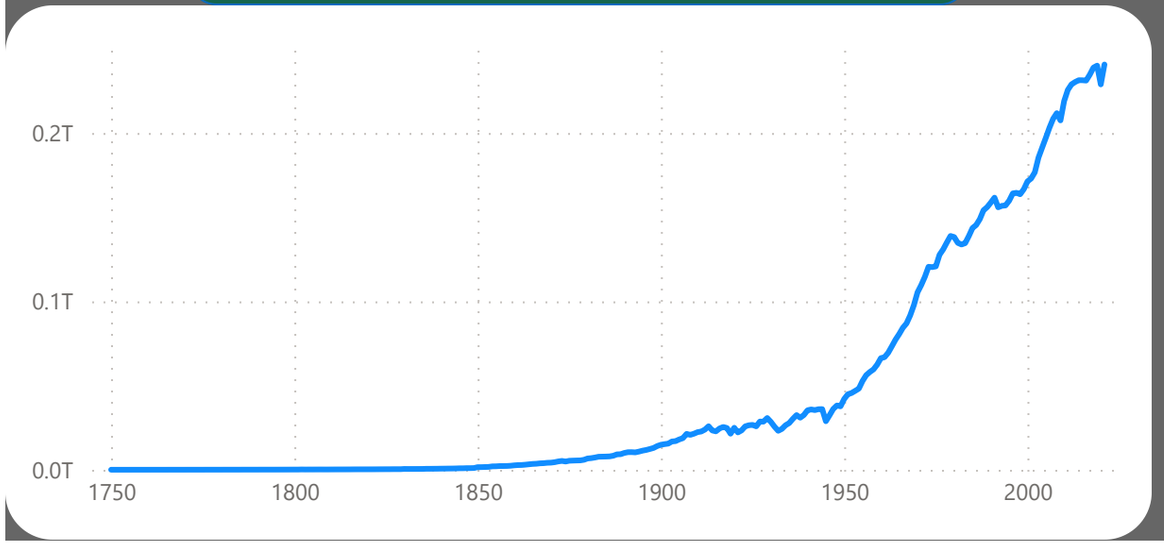


South Korea endorses our viewpoint

Average Temperature

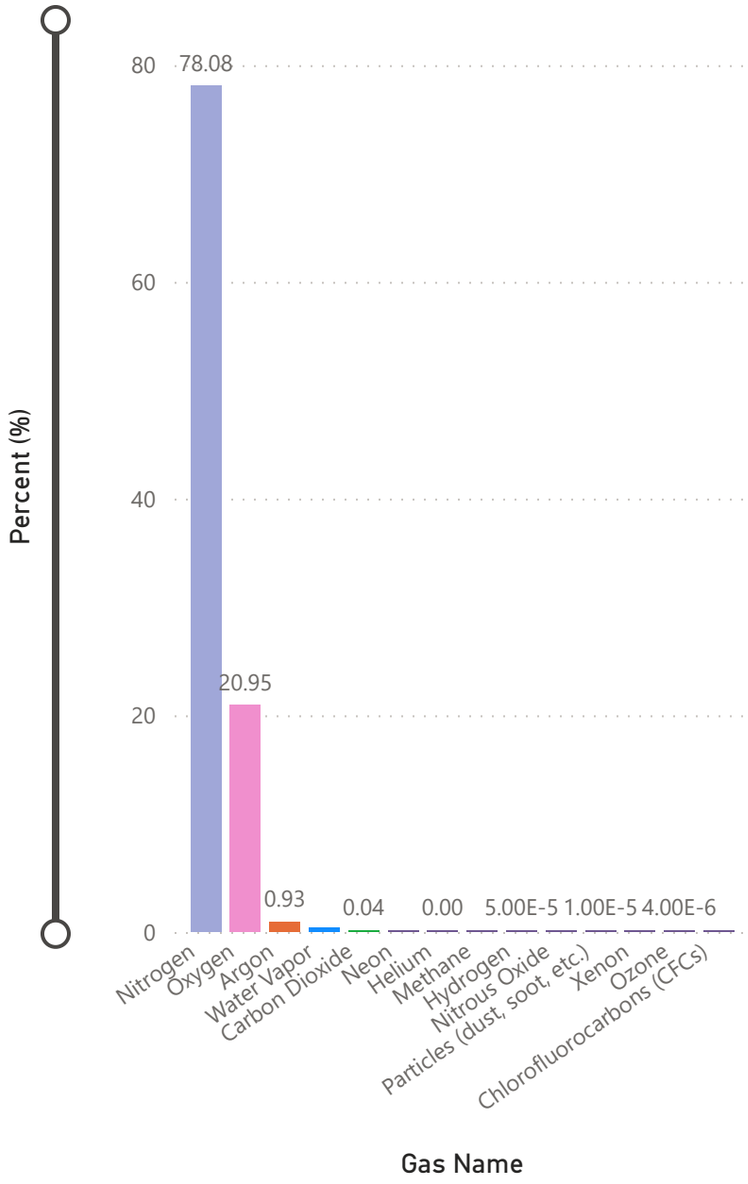


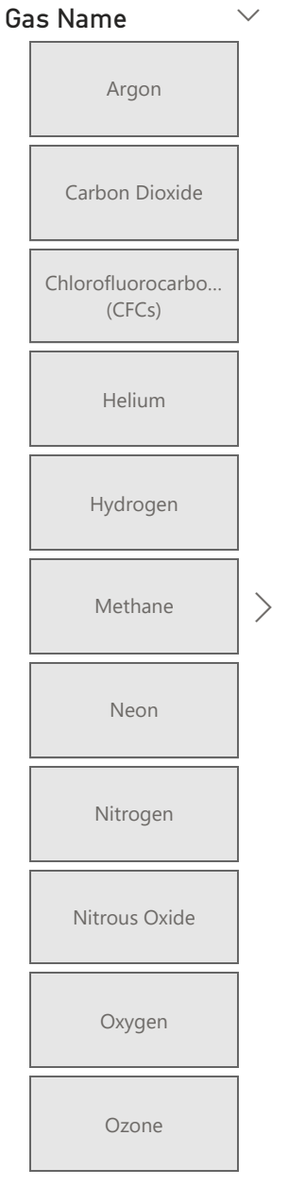
CO2 Emissions



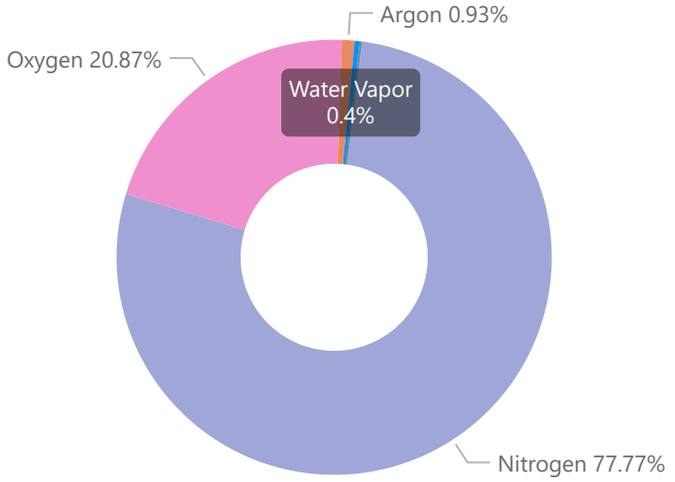
All GHG Emissions

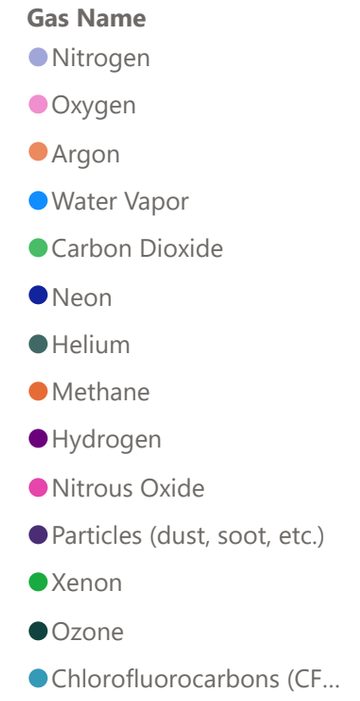
Composition of Atmospheric Gases

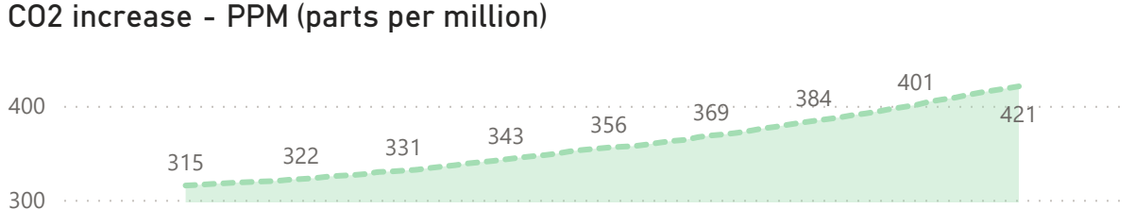




Gas Name	Percent %
Argon	100.40257302



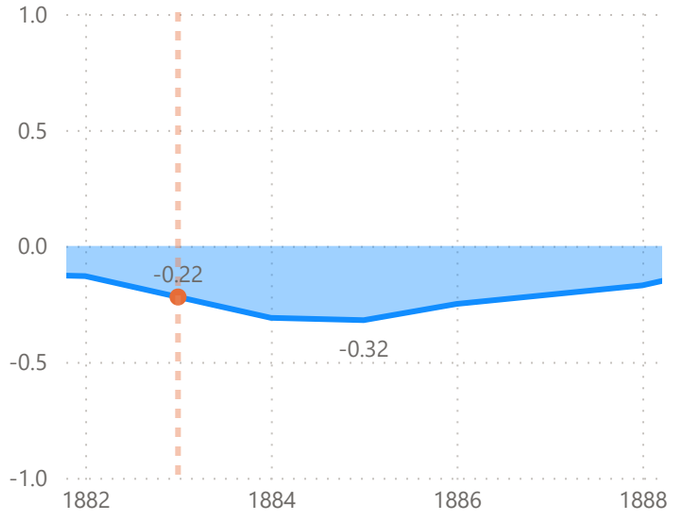




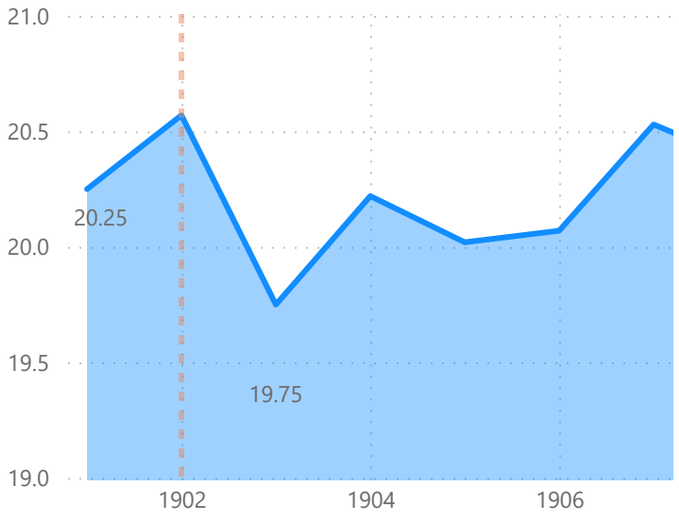
Some major volcanic eruptions and their impact on global temperature

- Temperature drop after a Volcanic Eruption.
- The cooling effect can last for months to years after the eruption.

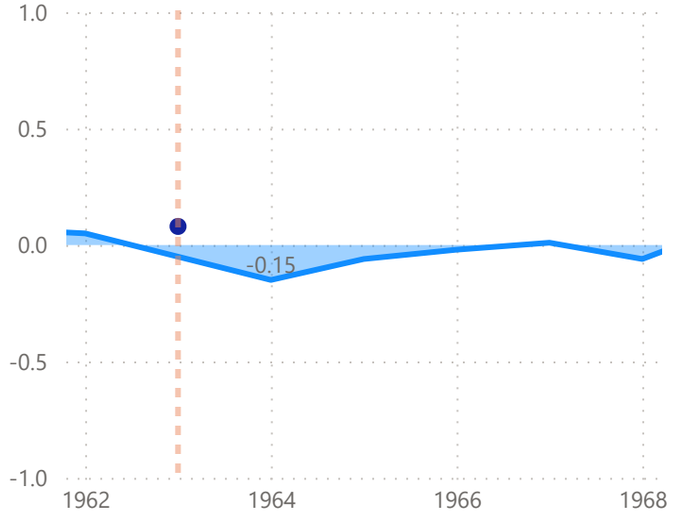
Krakatau - 1883



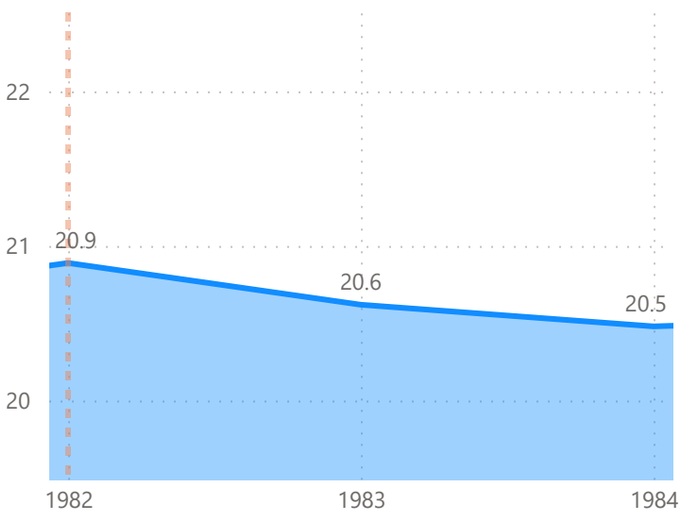
Santa Maria - 1902



Agung - 1963

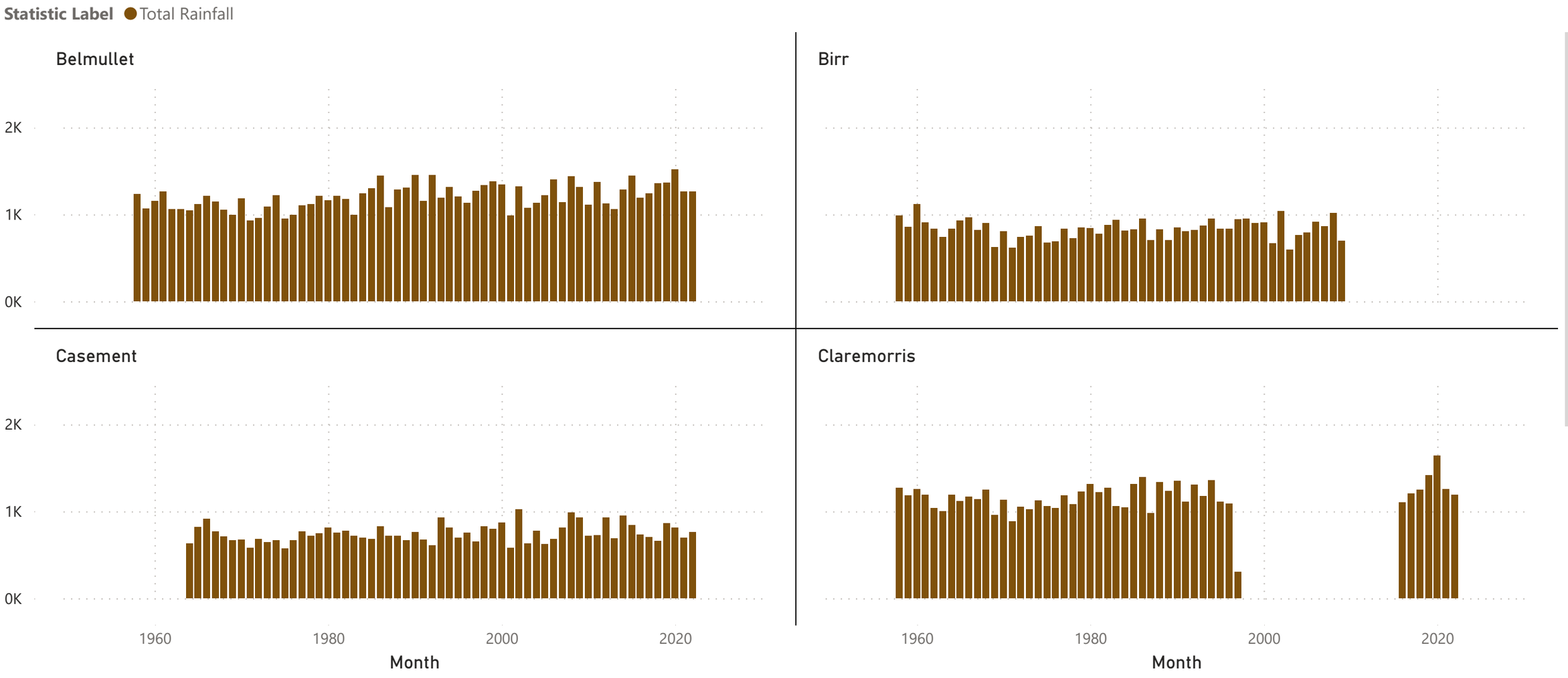


Chichon, El - 1982



Irish Precipitation Patterns

Total Rainfall by Meteorological Weather Station

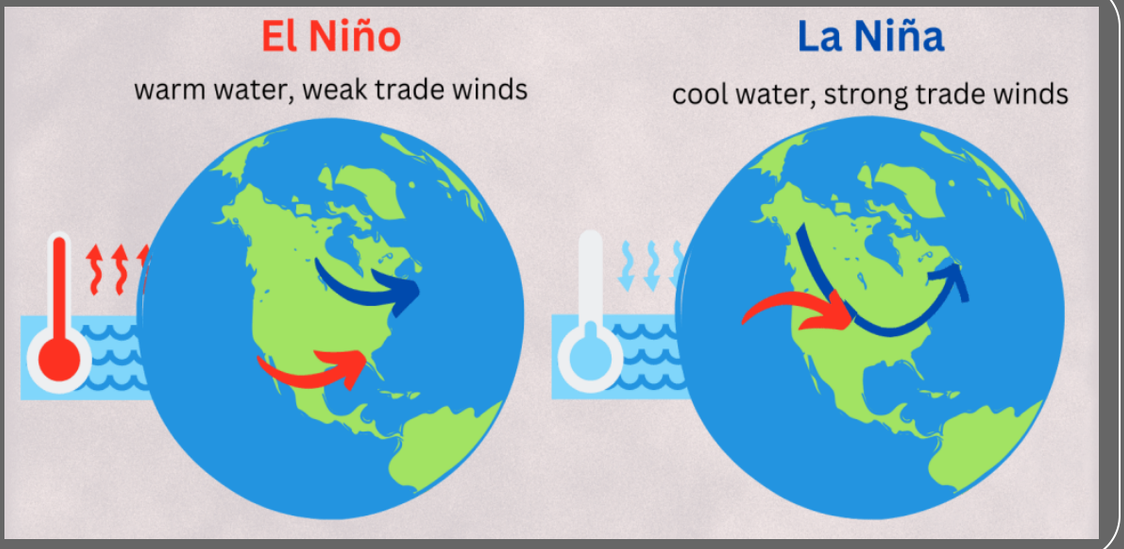


Belmullet | Birr | Casement | Claremorris | Clones | Cork airport | Dublin airp... | Galway | Kilkenny | Malin head | Mullingar | Roches Point

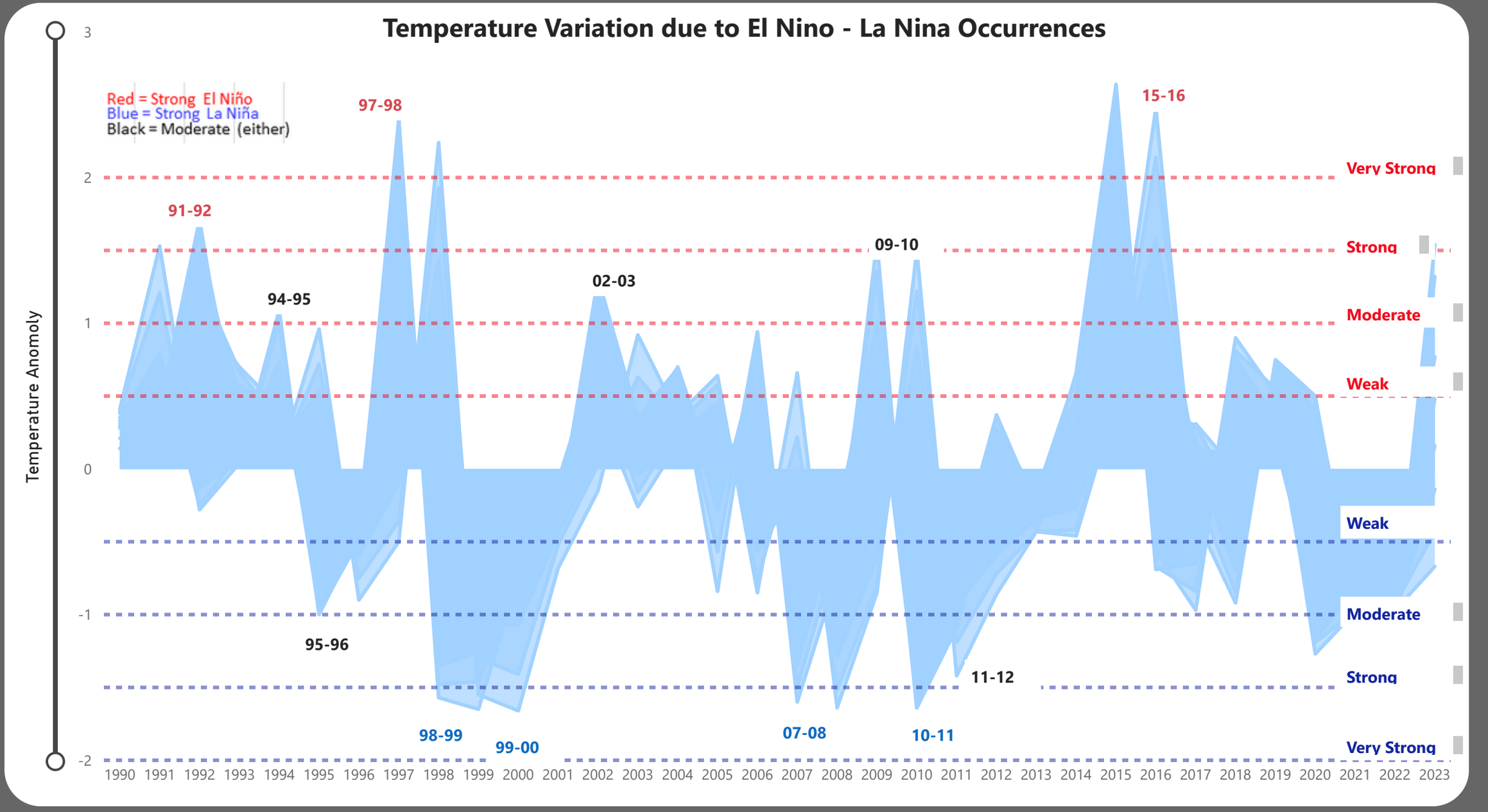
- **El Niño** and **La Niña** are terms which describe the biggest fluctuation in the Earth's climate system and can have consequences across the globe.

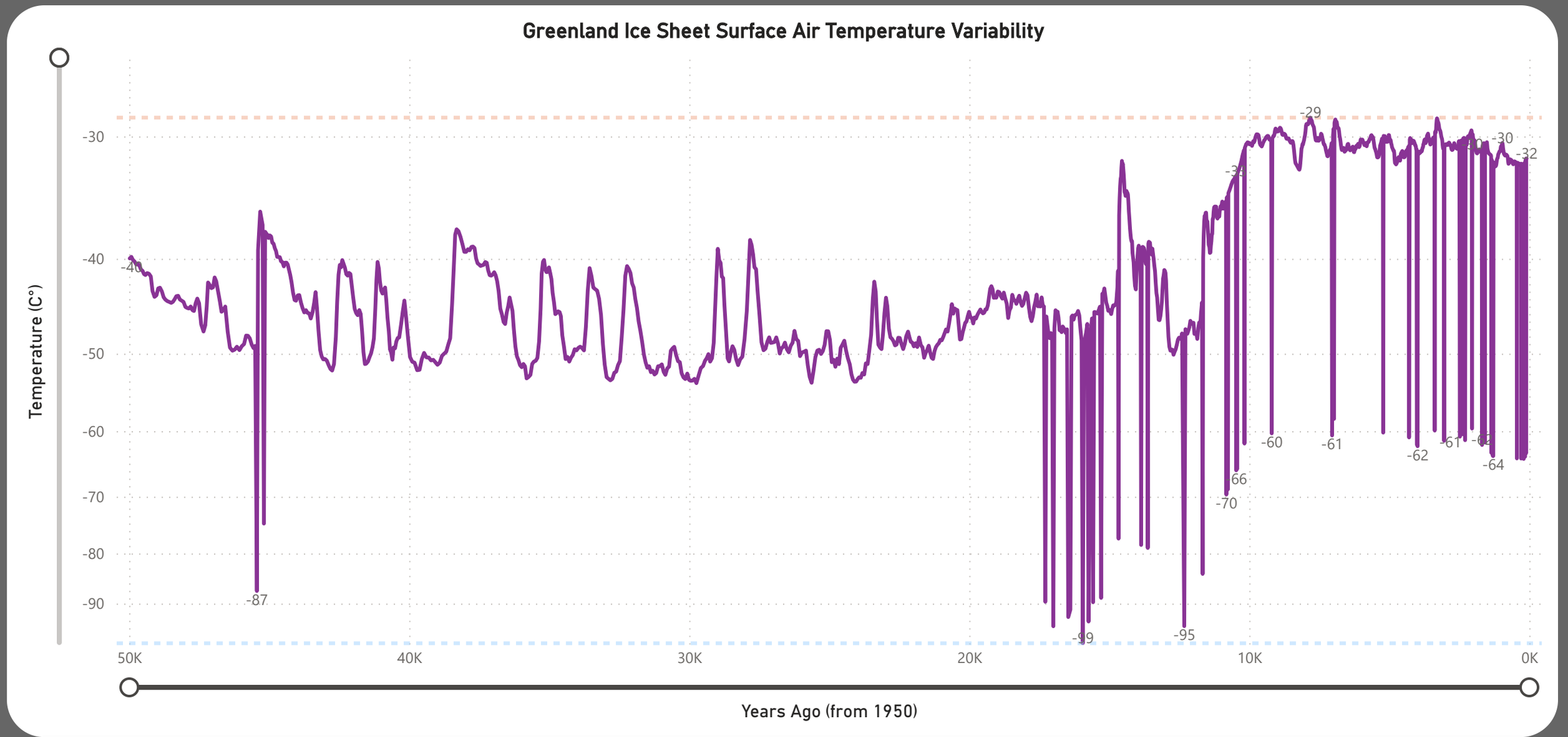
- The name **'El Niño'** is widely used to describe the warming of sea surface temperature that occurs every few years, typically concentrated in the central-east equatorial Pacific.

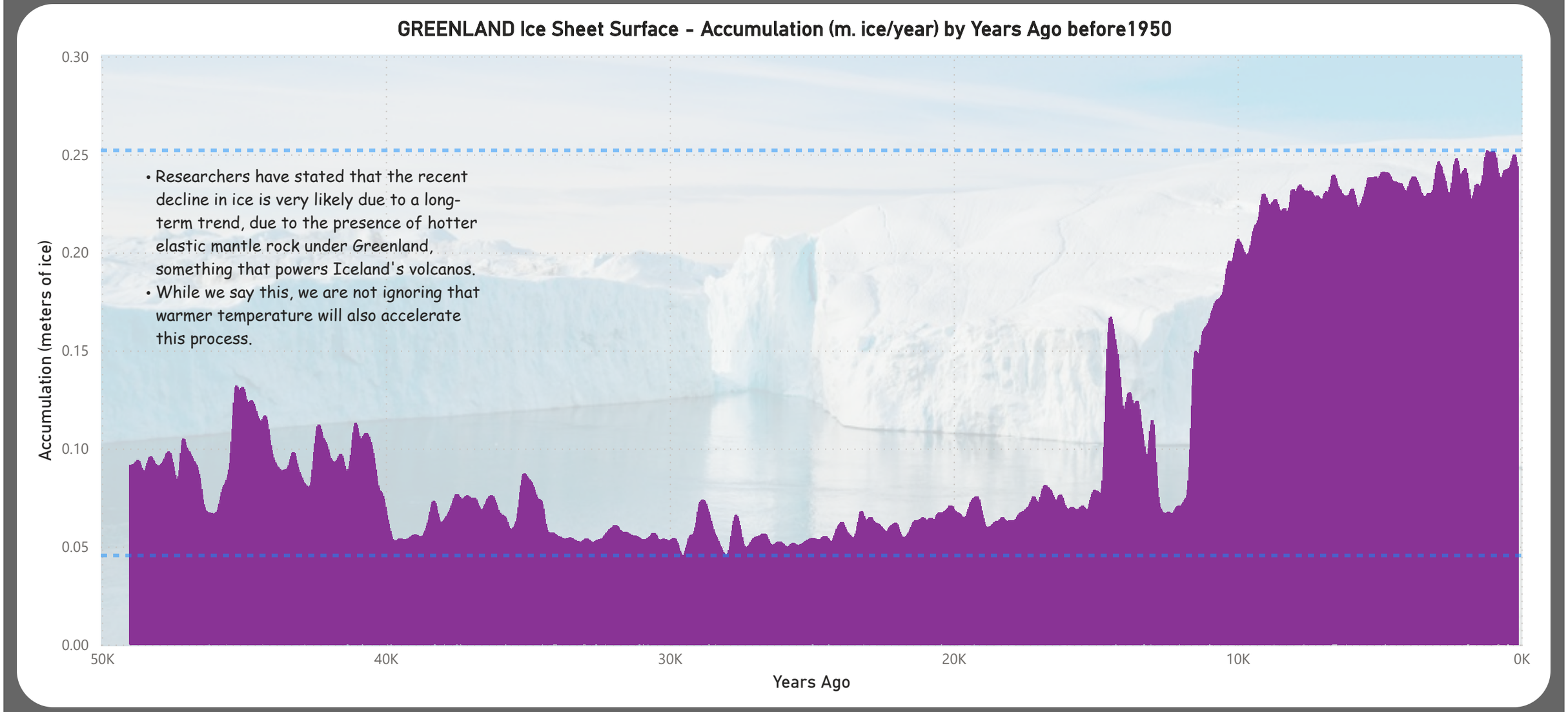
- **'La Niña'** is the term adopted for the opposite side of the fluctuation, which sees episodes of cooler than average sea surface temperature in the equatorial Pacific.



El Niño - 27				La Niña - 25		
Weak - 11	Moderate - 8	Strong - 5	Very Strong - 3	Weak - 12	Moderate - 6	Strong - 7
1952-53	1951-52	1957-58	1982-83	1954-55	1955-56	1973-74
1953-54	1963-64	1965-66	1997-98	1964-65	1970-71	1975-76
1958-59	1968-69	1972-73	2015-16	1971-72	1995-96	1988-89
1969-70	1986-87	1987-88		1974-75	2011-12	1998-99
1976-77	1994-95	1991-92		1983-84	2020-21	1999-00
1977-78	2002-03			1984-85	2021-22	2007-08
1979-80	2009-10			2000-01		2010-11
2004-05	2023-24			2005-06		
2006-07				2008-09		
2014-15				2016-17		
2018-19				2017-18		
				2022-23		


Temperature Variation due to El Nino - La Nina Occurrences
Red = Strong El Niño
Blue = Strong La Niña
Black = Moderate (either)
Temperature Anomoly
3
2
1
0
-1
-2
91-92
94-95
95-96
97-98
98-99
99-00
02-03
07-08
09-10
10-11
11-12
15-16
Very Strong
Strong
Moderate
Weak
Weak
Moderate
Strong
Very Strong
1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023


Greenland Ice Sheet Surface Air Temperature Variability
Temperature (C°)
-30
-40
-50
-60
-70
-80
-90
-40
-87
-99
-95
-70
-66
-60
-29
-61
-62
-61
-64
-30
-32
50K
40K
30K
20K
10K
0K
Years Ago (from 1950)

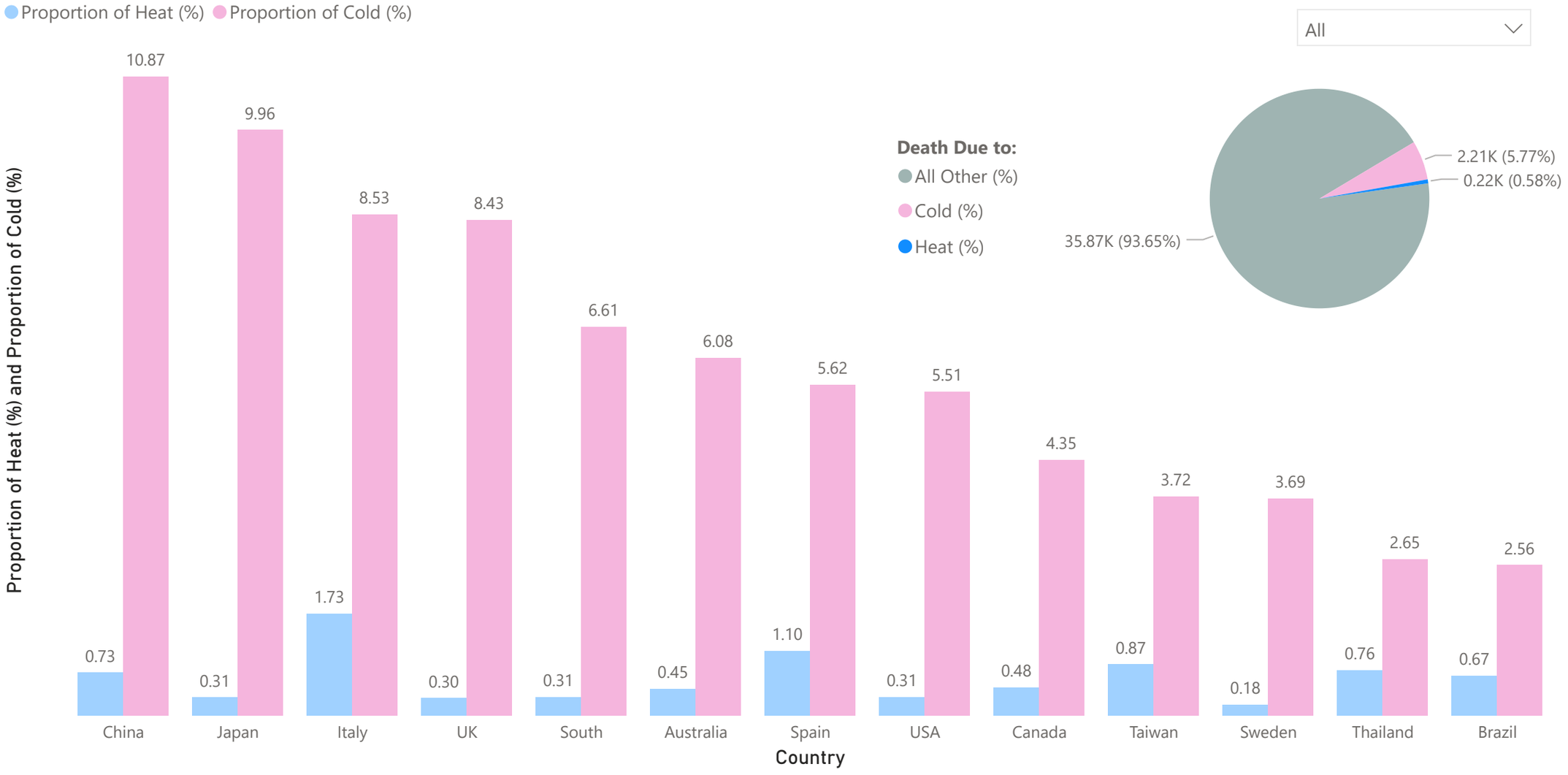

GREENLAND Ice Sheet Surface - Accumulation (m. ice/year) by Years Ago before1950
0.30
0.25
0.20
0.15
0.10
0.05
0.00
Accumulation (meters of ice)
• Researchers have stated that the recent decline in ice is very likely due to a long-term trend, due to the presence of hotter elastic mantle rock under Greenland, something that powers Iceland's volcanos.
• While we say this, we are not ignoring that warmer temperature will also accelerate this process.
50K
40K
30K
20K
10K
0K
Years Ago

High CO_2 levels and Temperatures are not too bad after all...

They can positively impact:

- **Plant Life**
- **Human Life**
- **Coral Reefs**

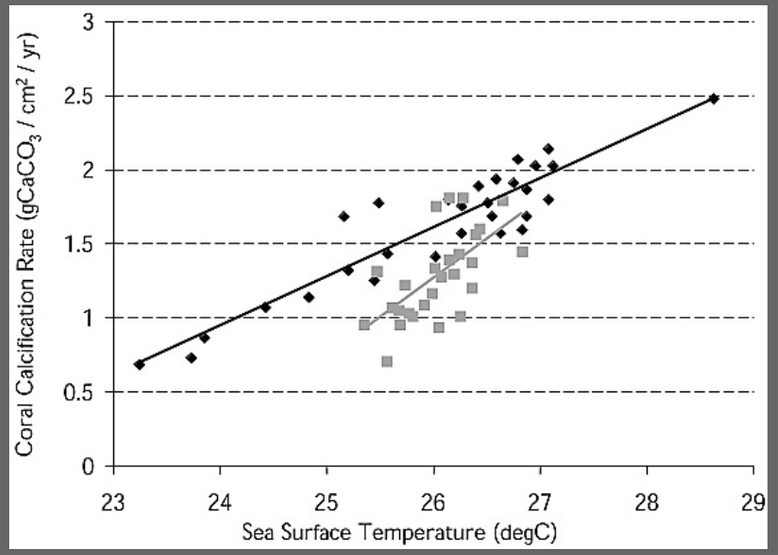
Deaths Due to temperature



*Analysis of 74,225,200 deaths in the above countries between 1985 and 2012

Increase in Coral Calcification with increase in sea surface temperature

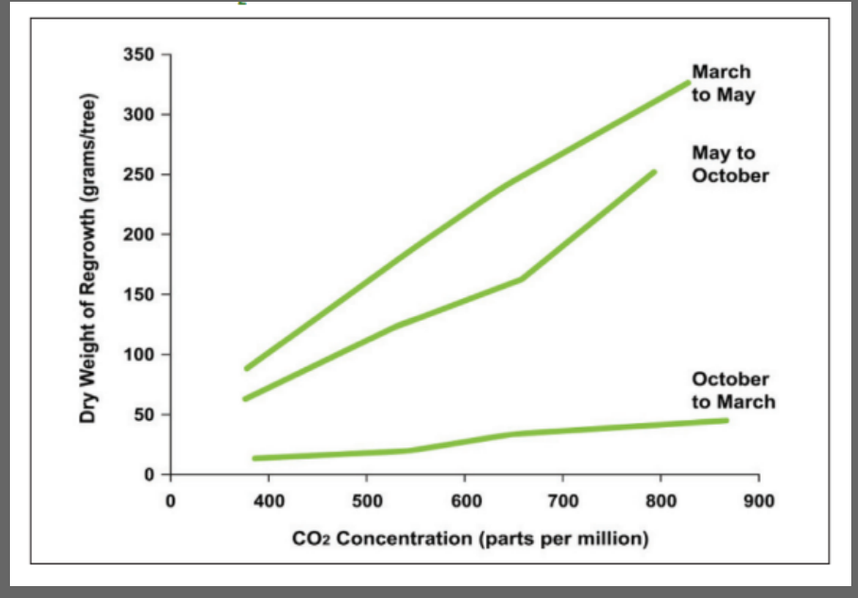
*(Source: NOAA, unpublished data 2004)



Increase in plant growth, biomass with increase in CO2 concentration

*(Source: American journal of botany, 1994, Agricultural and Forest Meteorology Volume 104 - 2000)

Crop	% Biomass Change	Crop	% Biomass Change
Sugar cane	34.0%	Rye	38.0%
Wheat	34.9%	Plantains	44.8%
Maize	24.1%	Yams	47.0%
Rice, paddy	36.1%	Groundnuts, with shell	47.0%
Potatoes	31.3%	Rapeseed	46.9%
Sugar beet	65.7%	Cucumbers and gherkins	44.8%
Cassava	13.8%	Mangoes, mangosteens, guavas	36.0%
Barley	35.4%	Sunflower seed	36.5%
Vegetables fresh nes	41.1%	Eggplants (aubergines)	41.0%
Sweet potatoes	33.7%	Beans, dry	61.7%
Soybeans	45.5%	Fruit Fresh Nes	72.3%
Tomatoes	35.9%	Carrots and turnips	77.8%
Grapes	68.2%	Other melons (inc.cantaloupes)	4.7%
Sorghum	19.9%	Chillies and peppers, green	41.1%
Bananas	44.8%	Tangerines, mandarins, clem.	29.5%
Watermelons	41.5%	Lettuce and chicory	18.5%
Oranges	54.9%	Pumpkins, squash and gourds	41.5%
Cabbages and other brassicas	39.3%	Pears	44.8%
Apples	44.8%	Olives	35.2%
Coconuts	44.8%	Pineapples	5.0%
Oats	34.8%	Fruit, tropical fresh nes	72.3%
Onions, dry	20.0%	Peas, dry	29.2%
Millet	44.3%		



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- Deaths vs Temperature (data in Supplementary Material): https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4521077/
- Coral Calcification: https://gml.noaa.gov/icdc7/proceedings/abstracts/mcneil1HI75.pdf
- Greenland Ice Sheet Data: https://www.ncei.noaa.gov/access/paleo-search/?dataTypeId=7
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- El Nina - La Nino Source: https://ggweather.com/enso/oni.htm
- Volcanic Eruption Data Source: https://www.ngdc.noaa.gov/hazel/view/hazards/volcano/event-data?minVei=5&minYear=1800
- Nitrous oxide emissions: https://ourworldindata.org/grapher/nitrous-oxide-emissions
- Methane emissions: https://ourworldindata.org/grapher/methane-emissions
- CO2 levels in atmosphere: https://ourworldindata.org/co2-dataset-sources
- Global temperatures (NOAA): https://www.ncei.noaa.gov/access/monitoring/global-temperature-anomalies/anomalies
- Supporting arguments from the book: Nature, Not Human Activity, Rules the Climate: http://climatechangereconsidered.org/

thank you!