Colegiul Național "Octavian Goga", Sibiu

Lifelong Learning Programme

www.futuregreeners.com

COMENIUS MULTILATERAL PROJECT

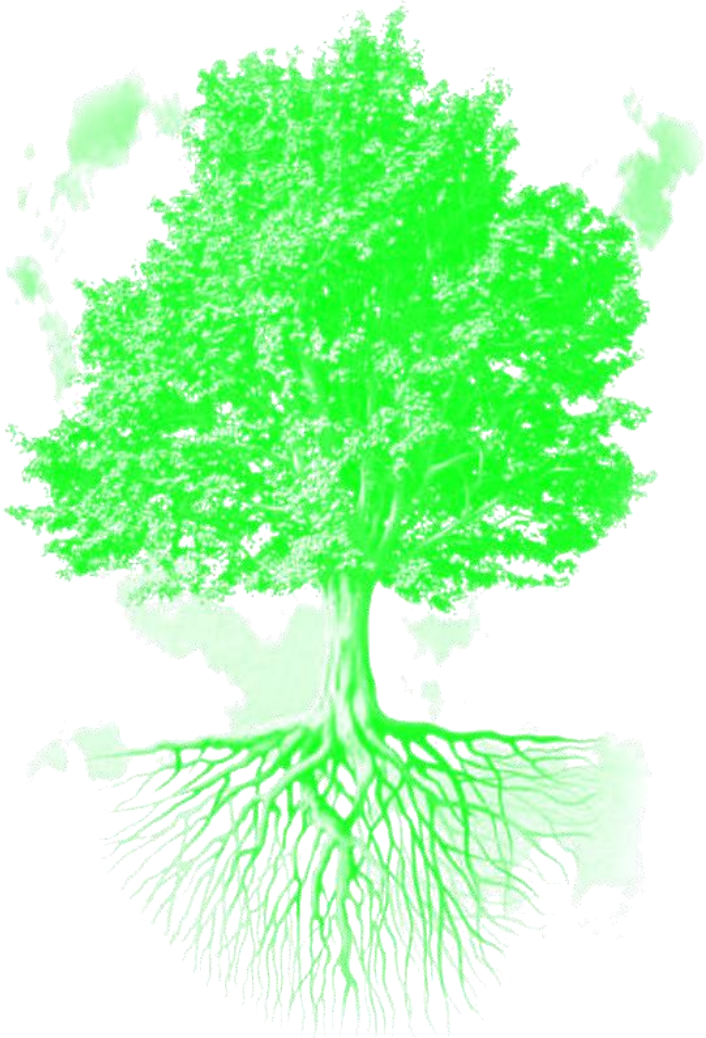
G.R.E.E.N.

GLOBAL WARMING

ÎNCĂLZIREA GLOBALĂ

NATIONAL COLLEGE „OCTAVIAN GOGA" SIBIU

ROMÂNIA



This project has been funded with support from the European Commission.

This publication [communication] reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Education and Culture DG
Lifelong Learning Programme

G.R.E.E.N.

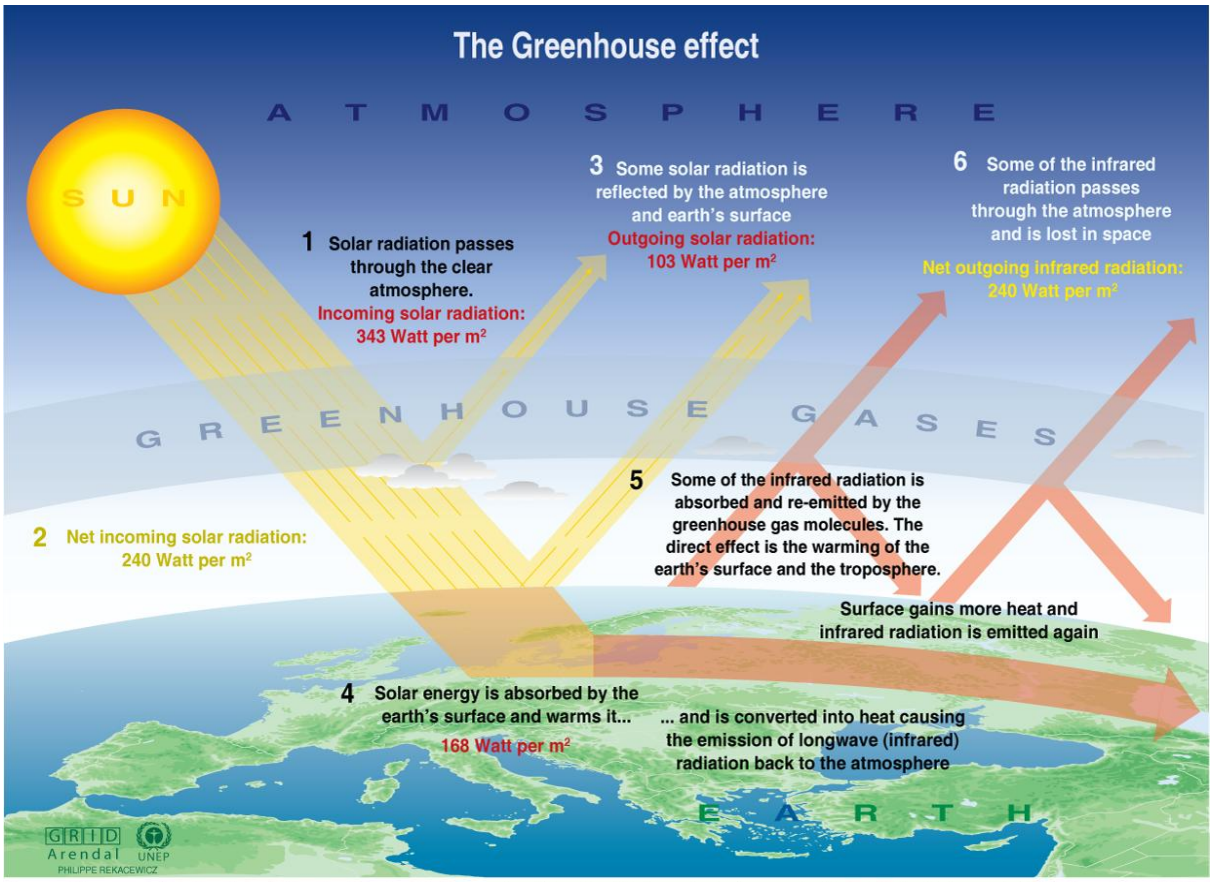
Go Re-Educate Earth Now!

ROMÂNIA

September, 2013

Greenhouse Effect

The greenhouse effect is a process by which thermal radiation from a planetary surface is absorbed by atmospheric green house gases, and is re-radiated in all directions.



Sources: Okanagan university college in Canada, Department of geography, University of Oxford, school of geography; United States Environmental Protection Agency (EPA), Washington; Climate change 1995, The science of climate change, contribution of working group 1 to the second assessment report of the intergovernmental panel on climate change, UNEP and WMO, Cambridge university press, 1996.

Greenhouse Gases

Carbon dioxide

- 40% of CO2 emissions come from electricity production.
- Cars are responsible for about 33% of CO_2 emissions.

Fluorinated gases (F-gases)

- F-gases have a global warming effect up to 23 000 times greater than carbon dioxide.
- They are used in refrigeration, air-conditioning and heat pump equipment.

Methane

- Methane is another extremely potent greenhouse gas, ranking right behind CO2.
- Sources: rice paddies, the intestines of herbivorous animals, the Arctic seabed

Nitrous oxide

- Nitrous oxide has 300 times more heat-trapping capacity per unit of volume than carbon dioxide.
- Source: the use of chemical fertilizers.

Other Causes

Deforestation

- The use of forests for fuel (both wood and for charcoal) is one cause of deforestation.
- Forests remove and store 40% of man-made carbon dioxide.

Natural Causes

- Natural causes are causes that are created by nature.
- The earth goes through a cycle of climate change which lasts about 40,000 years.

Global Warming

Myth or fact?

- Some people think that global warming is only a myth, while other people say that they can prove the existence of global warming.
- Both categories have documents to prove their claims.

VS

What Science Says vs Climate Myths

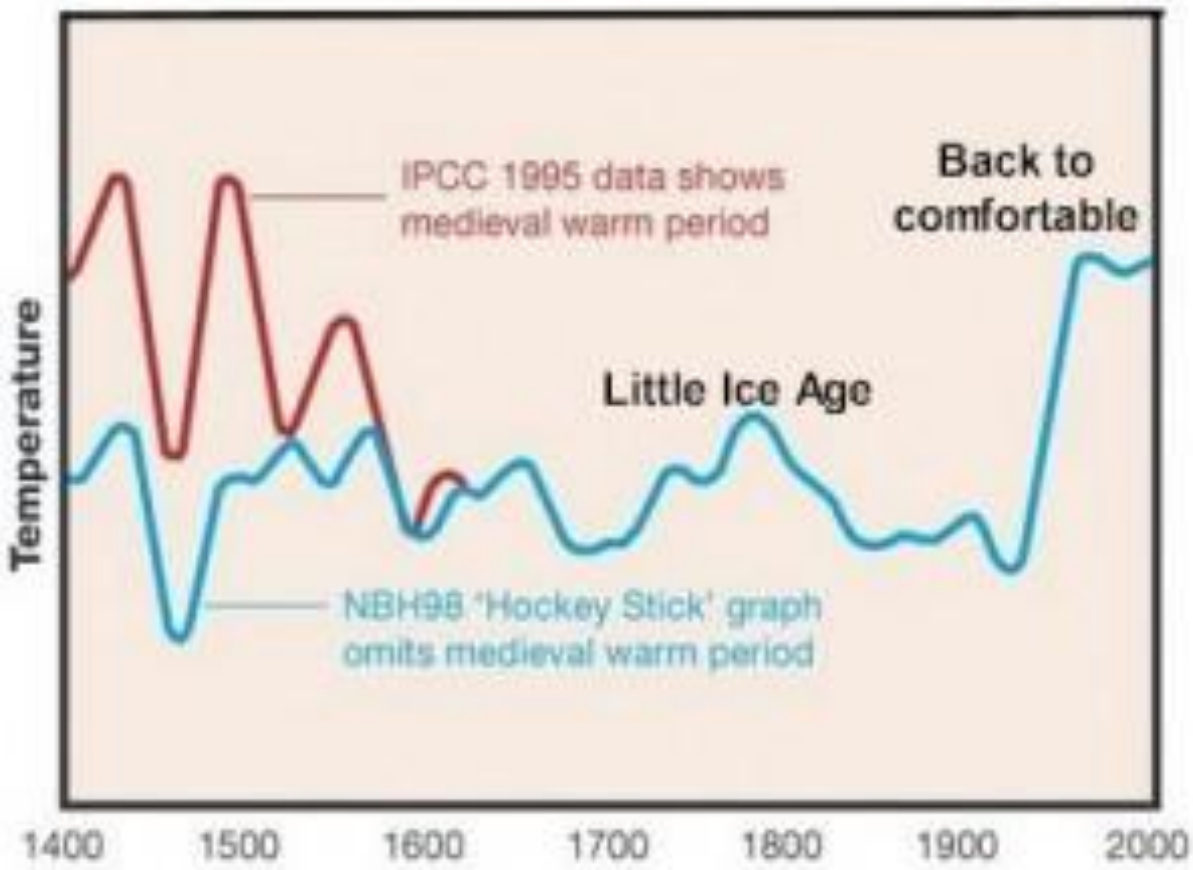
Here is a summary of global warming and climate change myths, sorted by recent popularity vs what science says.

- 1) The Earth has been both much warmer and much colder in the distant past, long before the industrial age.
- 2) The number of sunspots is increasing.
- 3) The carbon dioxide and the nitric oxide are “natural thermostats”.

- 1)Carbon dioxide in the air has increased in the last century due to the use of fossil fuels.
- 2)Global average temperature has increased by 0.8 degrees F in the last century.
- 3) Further human addition of CO2 to the atmosphere will cause dangerous warming, and is generally harmful.

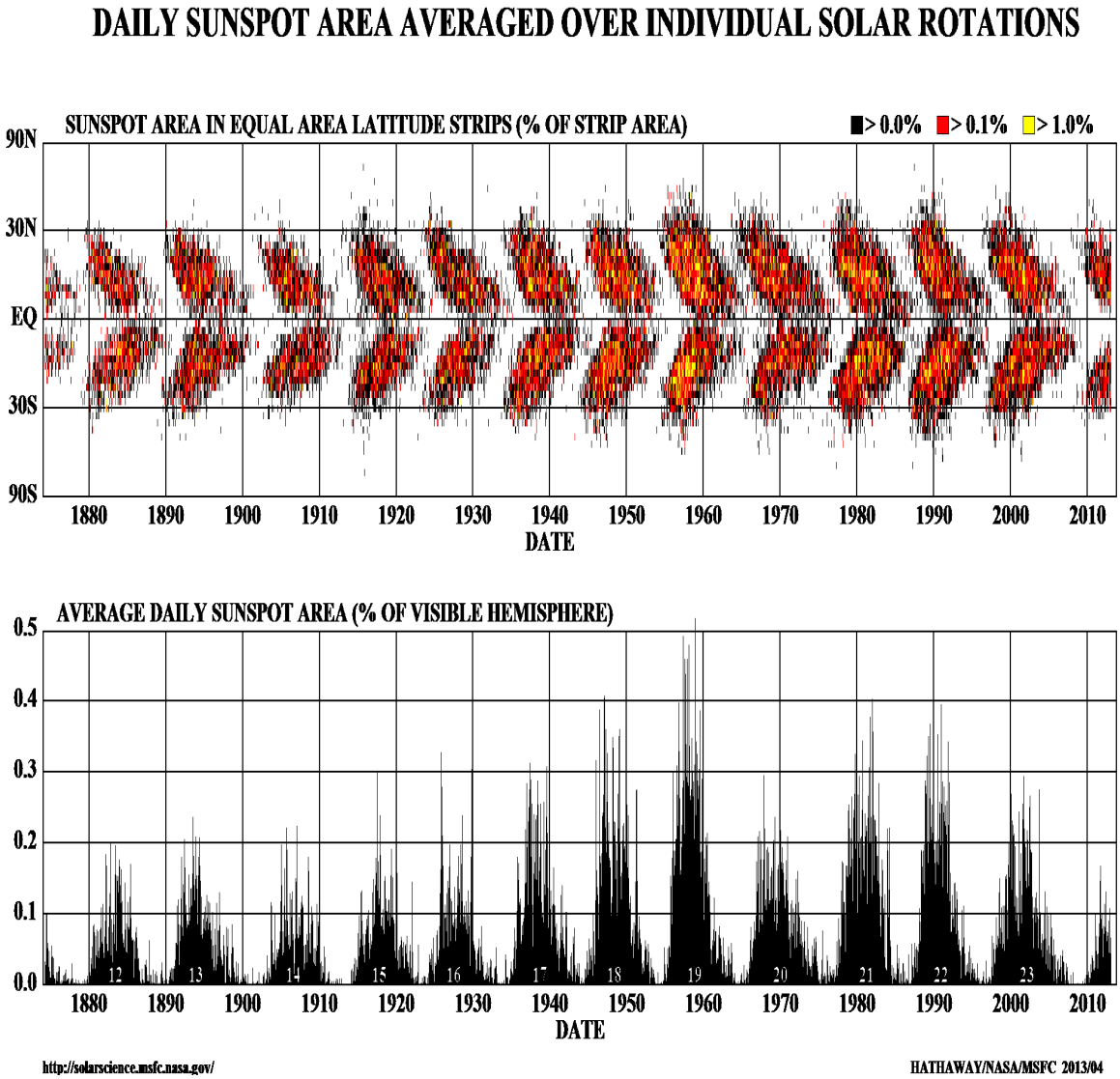
The Science

1) The Earth was both much warmer and much colder in the distant past, long before the industrial age.



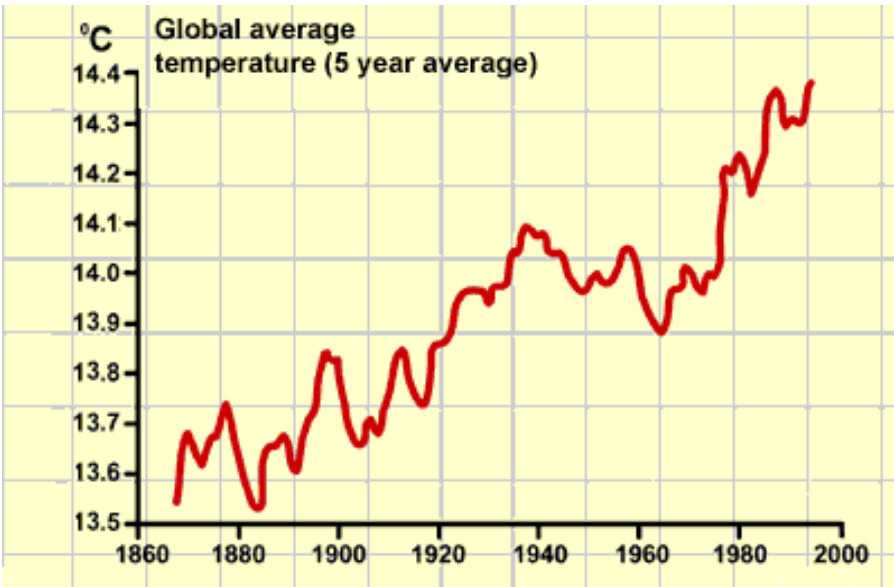
NBH98 'Hockey Stick' graph of 1998 v IPCC data from 1995 of temperature trends over the last 600 years

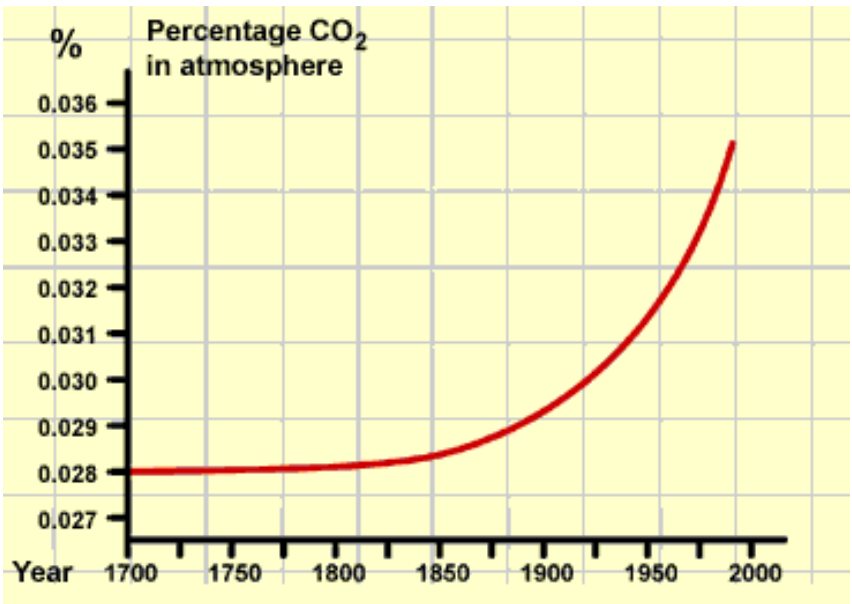
2)The number of sunspots is increasing .



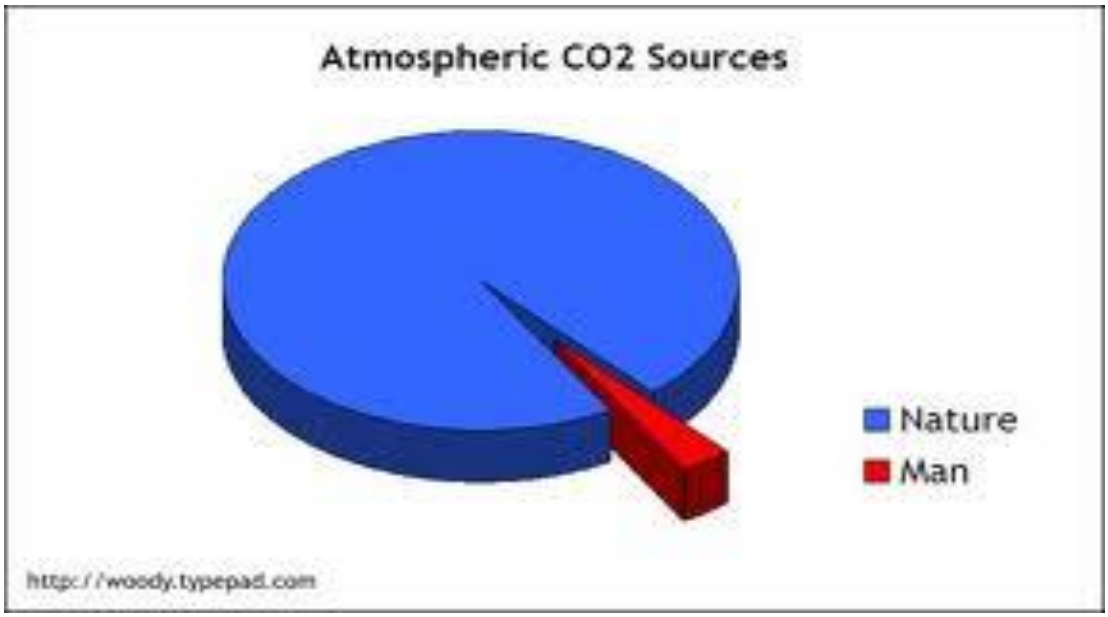
Climate Myths

2) Global average temperature has increased by 0.8 degrees F in the last century. Unfortunately, the temperature increase came first: most of the temperature increase was before 1940, and most of the new carbon dioxide was added after 1960.

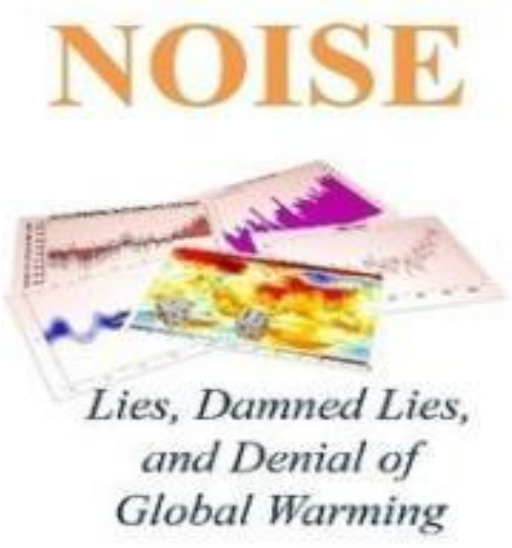




3) Further human addition of CO2 to the atmosphere will cause dangerous warming, and is generally harmful.



- Clearly, it is necessary to resist the temptation to select only data that support a hypothesis and ignore other available data.



10 Signs Climate Change Is Already Happening

1. Carbon Dioxide concentrations in the atmosphere are increasing

2. The hottest decade on record keeps changing

3. The rate of warming is unprecedented in at least 11,000 years

4. The Arctic Sea ice is in a ‘death spiral‘

5. Greenland is losing ice at an accelerating rate

6. The Antarctic Peninsula is also losing ice at an accelerating rate

7. The oceans are warming up

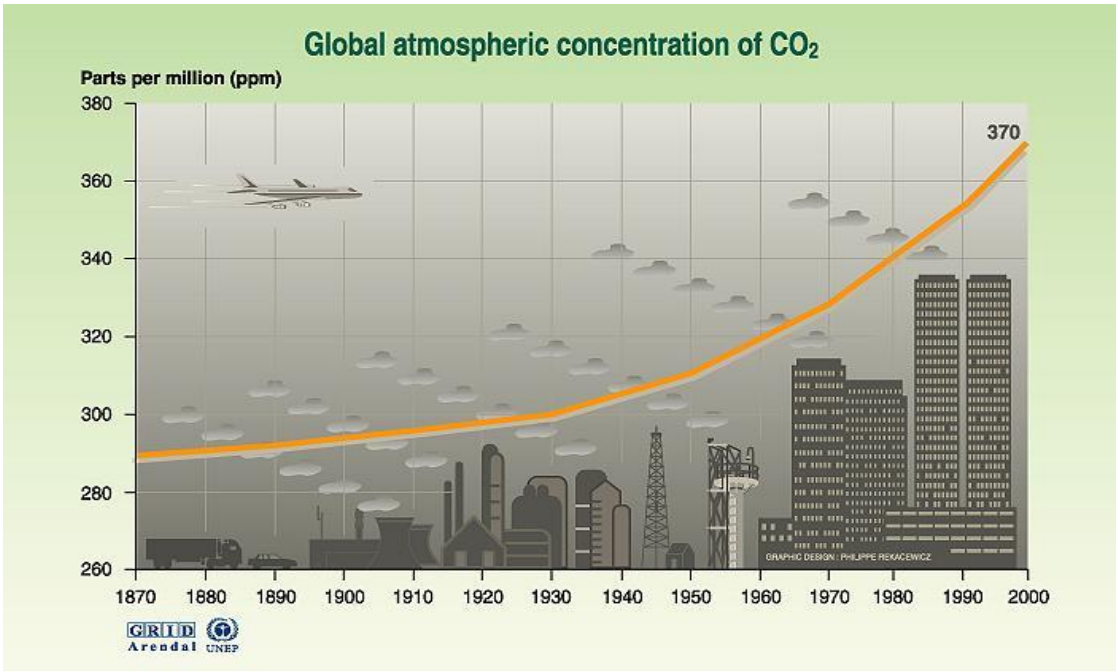
8. The sea level is rising

9. The planet is accumulating more heat

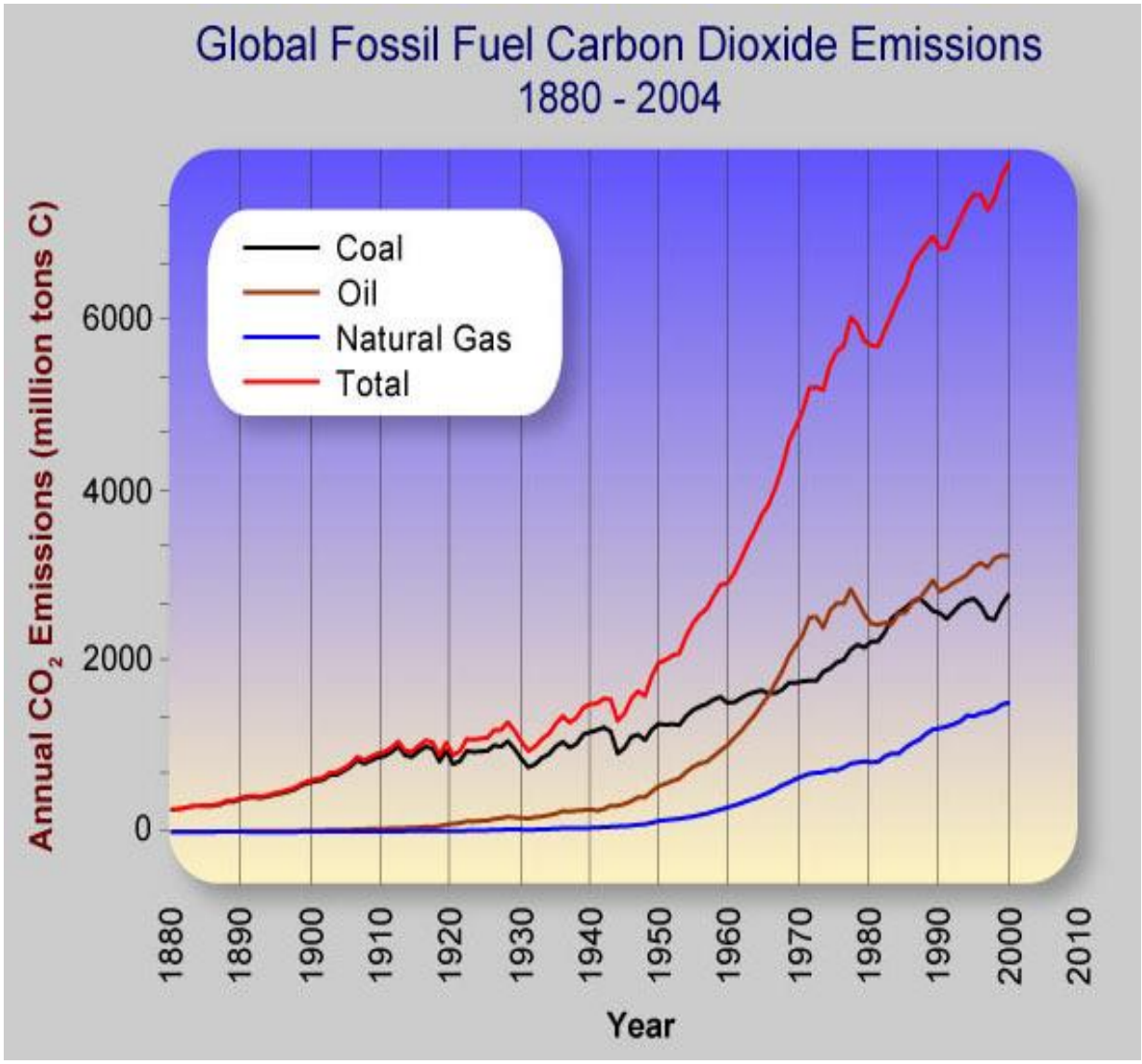
10. Extreme weather is more ... extreme

Carbon Dioxide Concentrations in the Atmosphere Are Increasing

Scientists determined that over the past 650,000 years, atmospheric concentrations of CO2 varied between 180 and 300 parts per million (ppm).



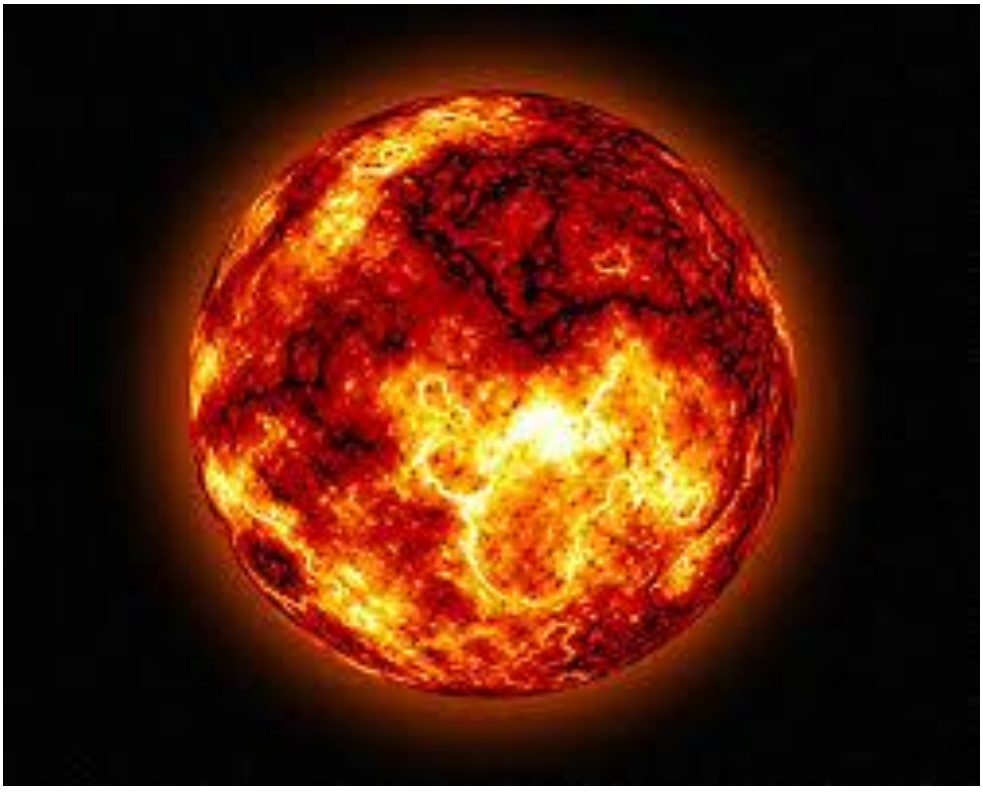
Sources: TP Whorf Scripps, Mauna Loa Observatory, Hawaii, institution of oceanography (SIO), university of California La Jolla, California, United States, 1999


Global Fossil Fuel Carbon Dioxide Emissions
1880 - 2004
Coal
Oil
Natural Gas
Total
Annual CO_2 Emissions (million tons C)
6000
4000
2000
0
1880
1890
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
2010
Year

The Hottest Decade on Record Keeps Changing

Global mean temperatures have increased by approximately 1.33 degrees Fahrenheit (0.74 degrees Celsius) over the past century.

The Rate of Warming Is Unprecedented in at Least 11,000 Years



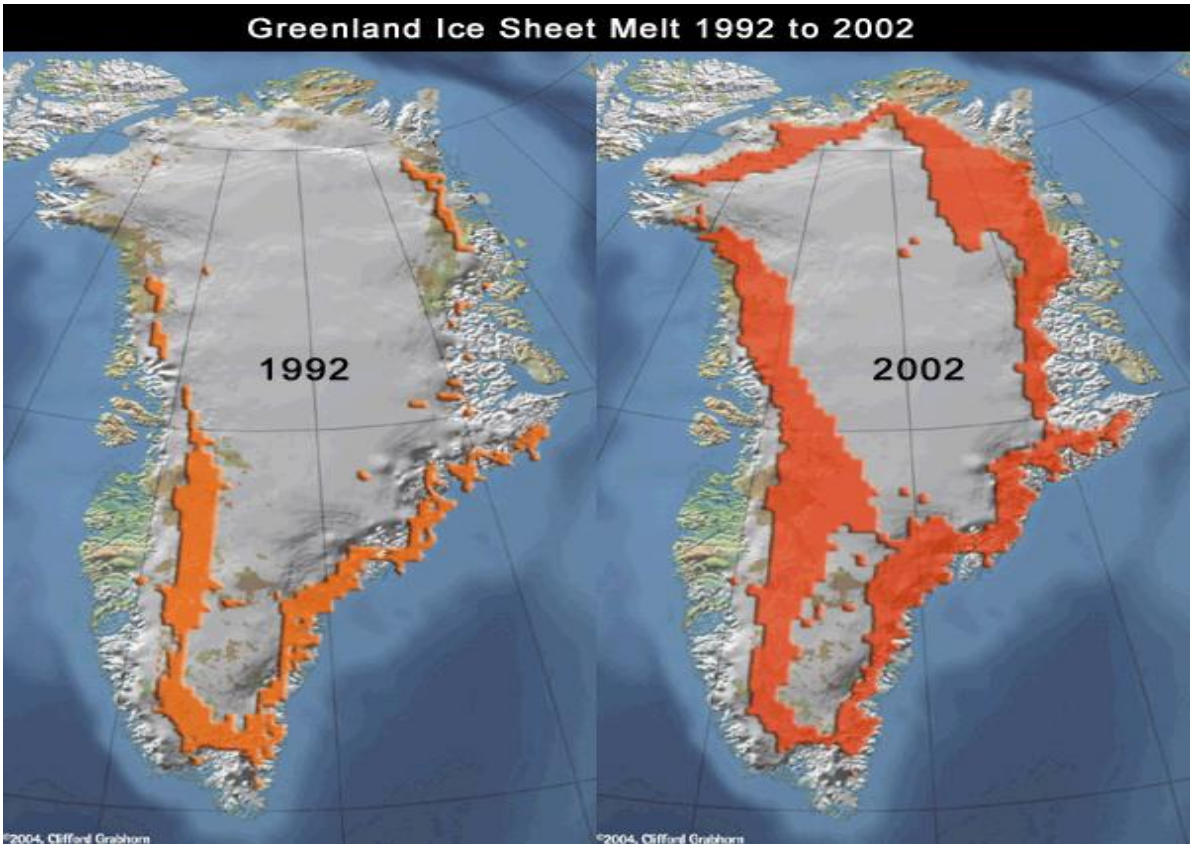
How do we know that what is happening now is not a natural cycle?

The Arctic Sea Ice Is in a 'Death Spiral'

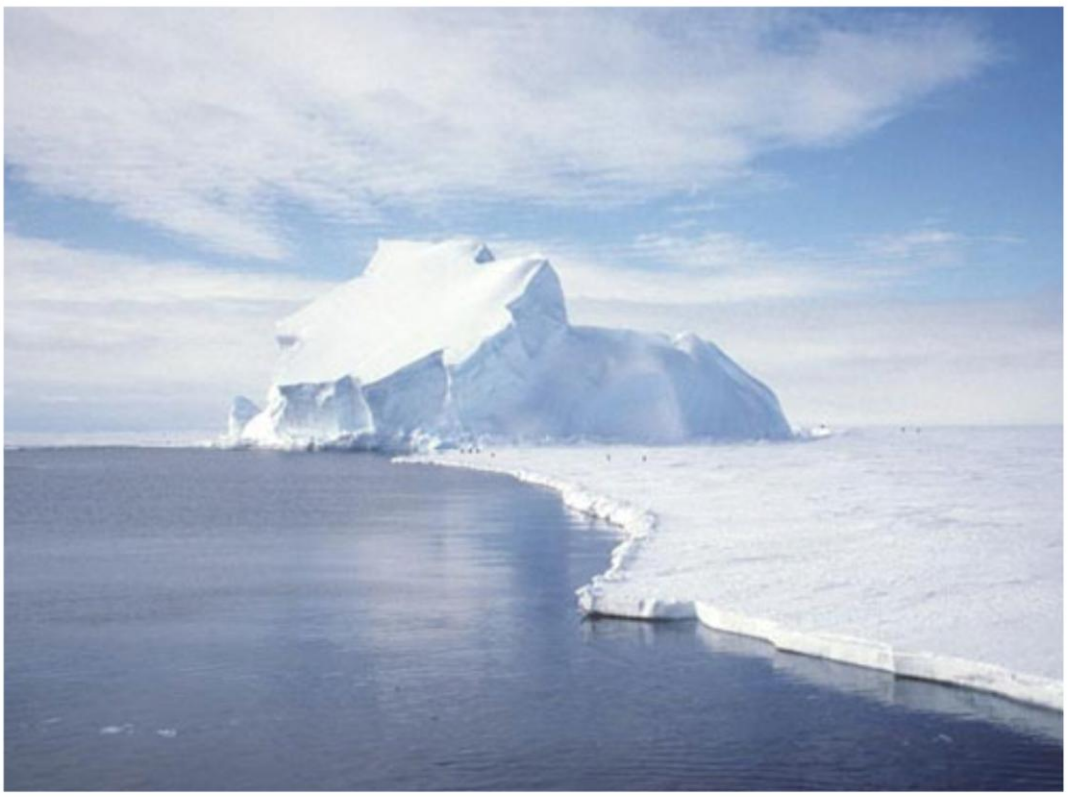
The extent of summer sea ice covering the Arctic Ocean is decreasing by a rate of about 13 percent per decade, compared to the 1979-2000 average.

Greenland Is Losing Ice at an Accelerating Rate

Evidence is mounting that Greenland - the second-largest ice sheet in the world after Antarctica - is losing mass at an accelerating rate.



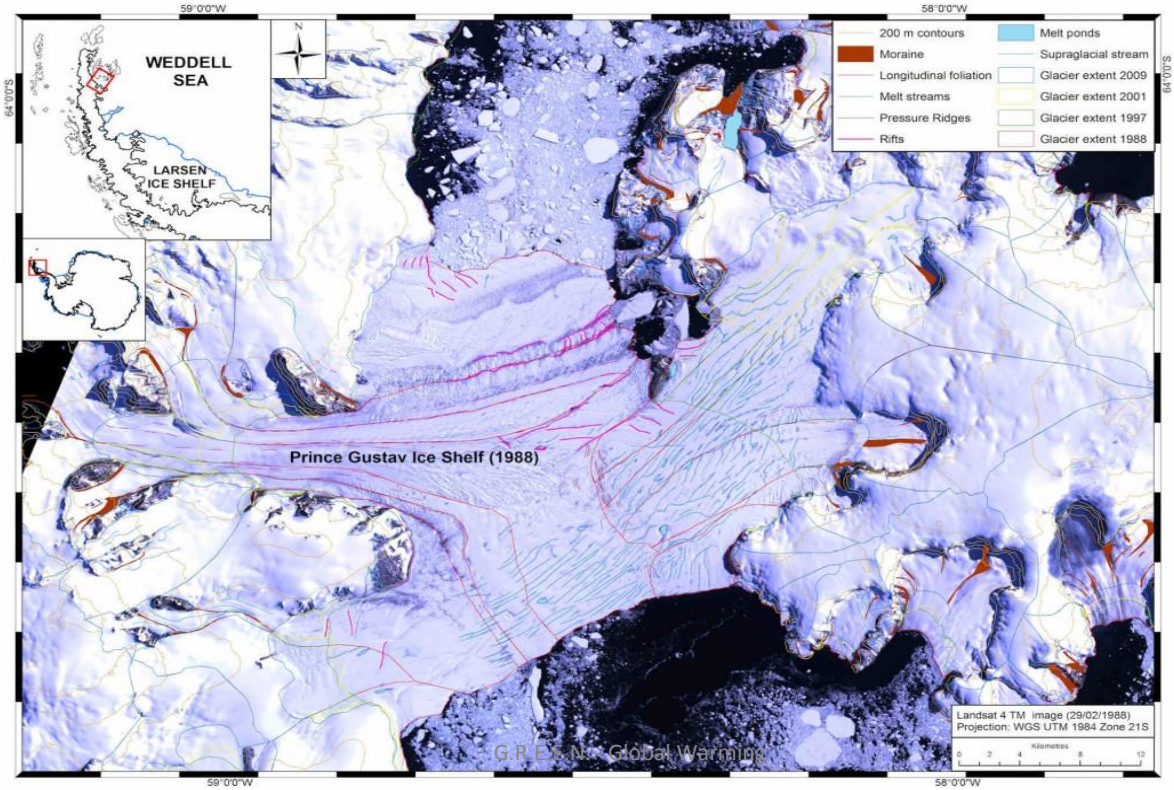
The Antarctic Peninsula Is Also Losing Ice at an Accelerating Rate



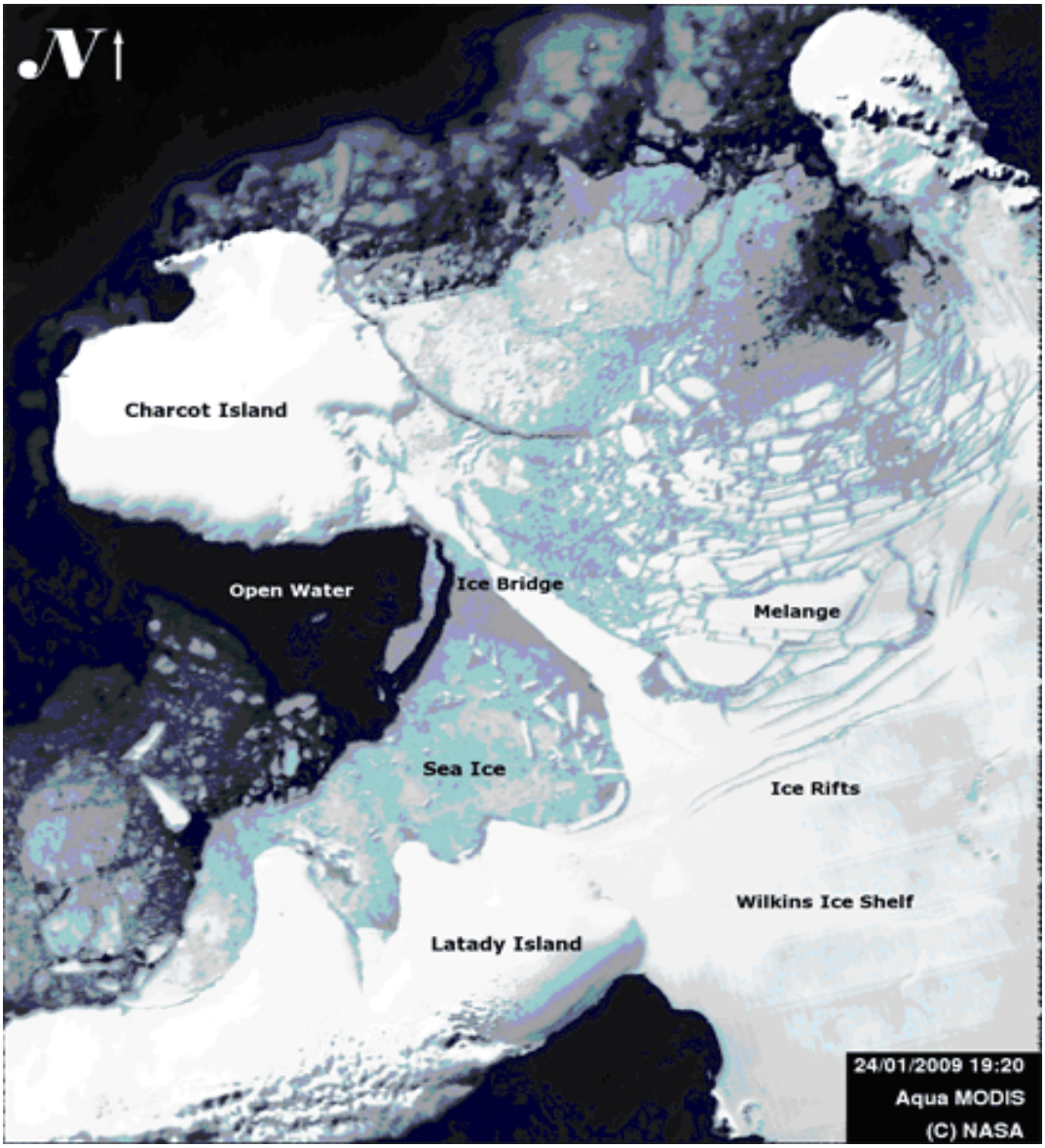
In 1995, the Larsen-A ice shelf on the Antarctic Peninsula collapsed. The Wordie Ice Shelf broke away from the Antarctic Peninsula and vanished in 2009.

Seven years later, the adjoining Larsen B ice shelf followed suit.

The same year that Larsen A disappeared, the Prince Gustav ice shelf, 60 kilometers to the north, did the same.



- The Wilkins Ice Shelf has been splintering for several years and is now hanging by a thread to the coast.

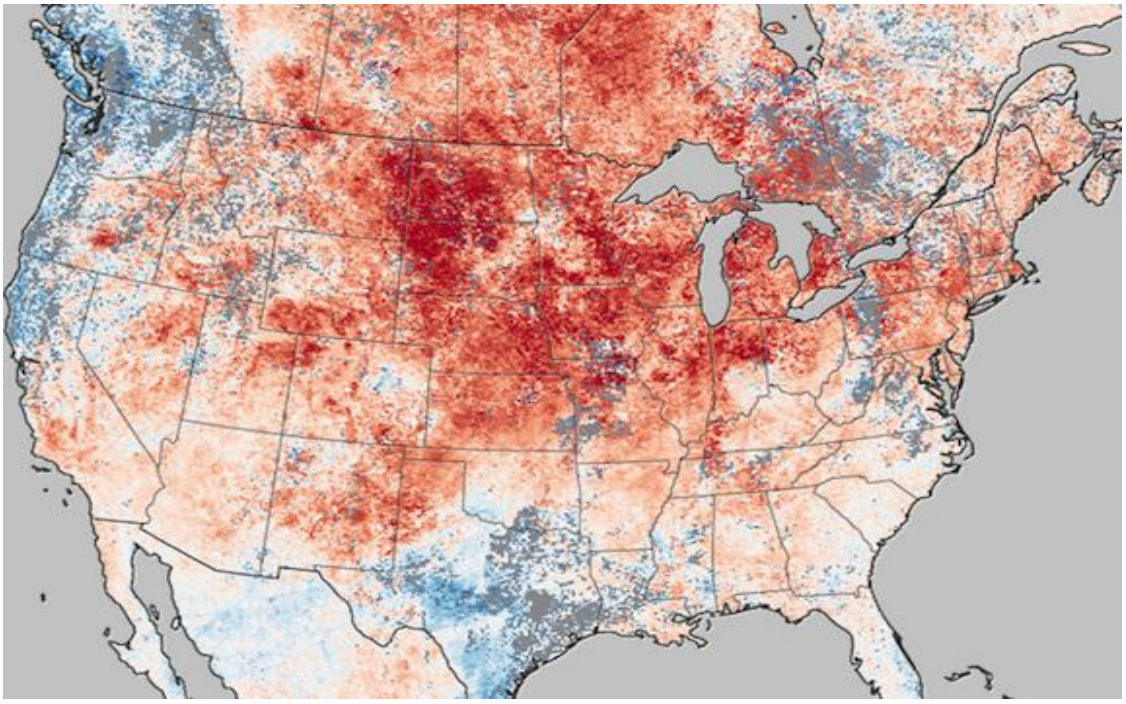


The Ocean Is Warming

The Sea Level Is Rising

Multiple measurements - using both satellites and tide gauges - show a rise in global sea levels. On average, since 1993, the sea has been rising by 3.18 mm per year.

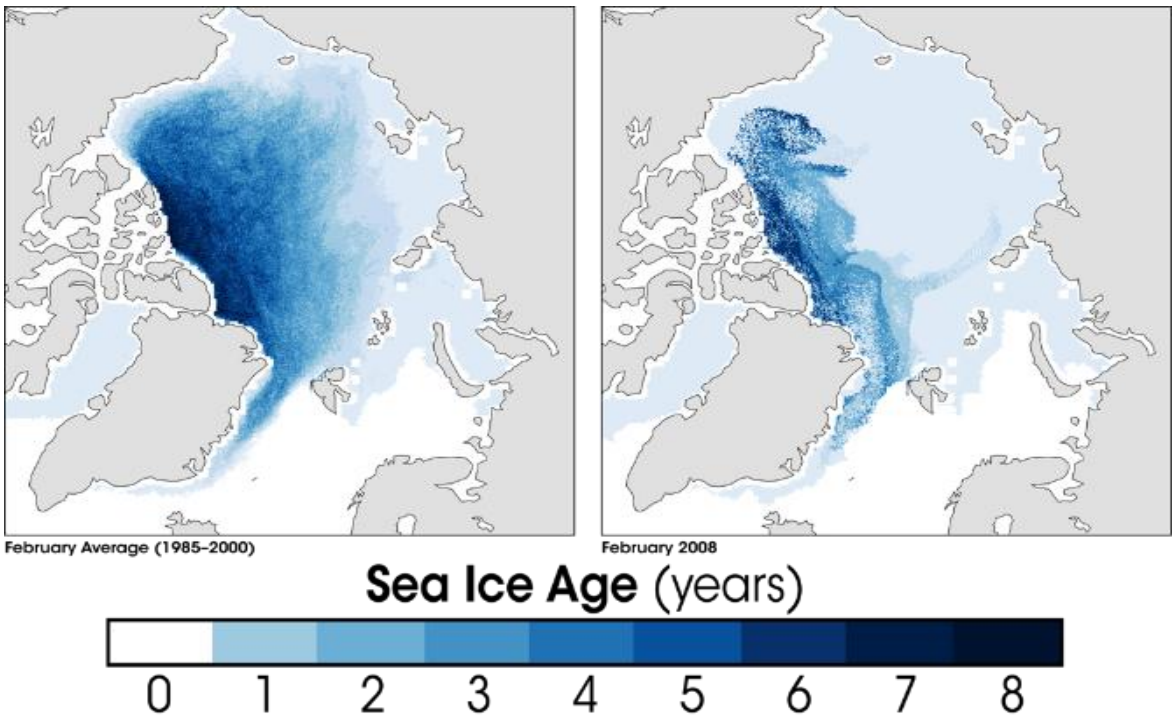
The Planet Is Accumulating More Heat



Extreme Weather Is More ... Extreme

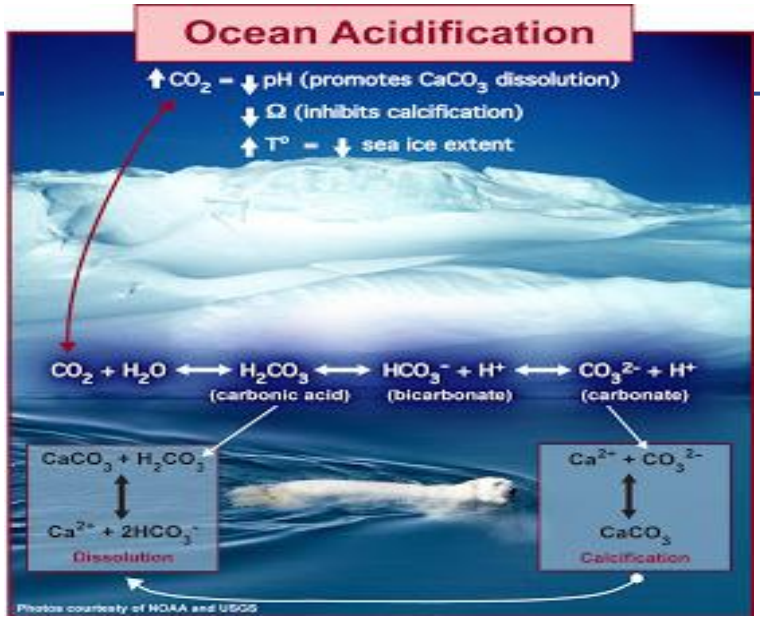
The climate creates the conditions in which weather takes place and scientists have long suspected that a changing climate will make certain weather events more likely to occur and others more extreme.

What are the effects of global warming?



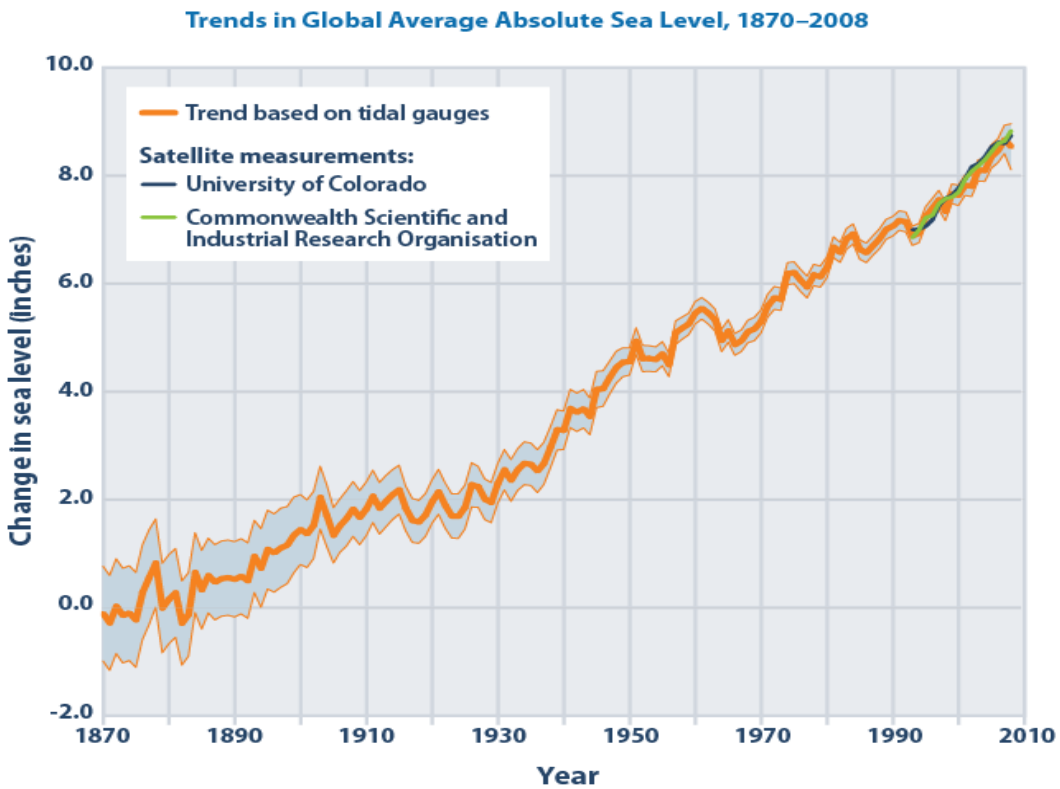
Effects on the atmosphere:

- increased rainfall
- generating storms
- desertification



Effects on the hydrosphere:

- Retreat and disappearance of glaciers, snowmelt
- Sea level rise, ocean acidification, slowing of ocean currents



Data sources:
- CSIRO (Commonwealth Scientific and Industrial Research Organisation). 2009. Sea level rise. Accessed November 2009. http://www.cmar.csiro.au/sealevel.
- University of Colorado at Boulder. 2009. Sea level change: 2009 release #2. http://sealevel.colorado.edu.

For more information, visit U.S. EPA's "Climate Change Indicators in the United States" at www.epa.gov/climatechange/science/indicators.

Effects on the lithosphere:

- increase in soil temperature leading to dryness
- forest fires

Preventative Measures

Energy Savings

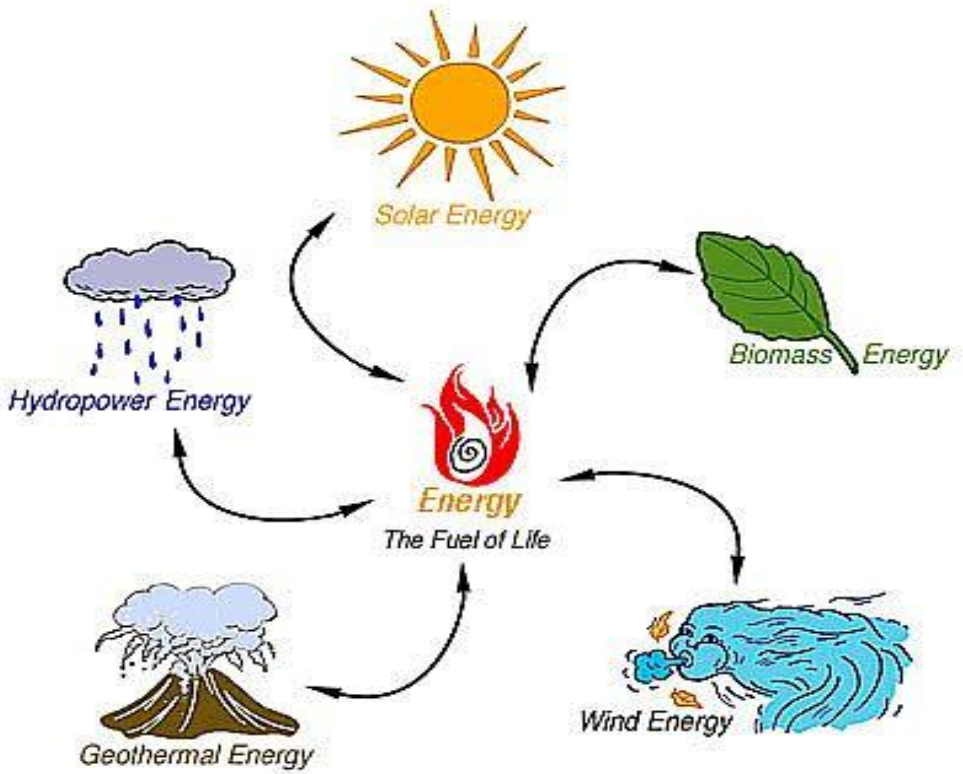
- Adoption of technologies that are not energy-intensive

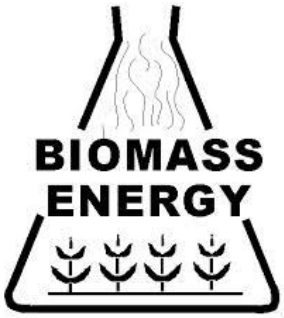
- Reducing energy consumption by reducing artificial lighting.

- Transport efficiency using hydrogen as fuel instead of oil, using biodiesel as renewable fuel and transporting goods by rail rather than by trucks

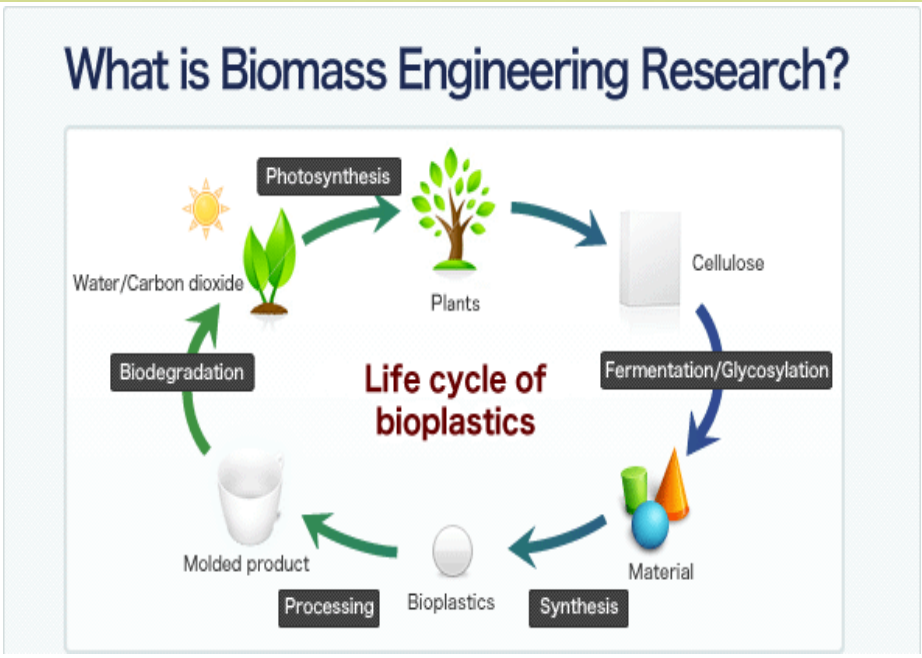
Using alternative energy

In order to reduce CO2 emissions it is recommended to use energy that does not rely on combustion technology, such as solar, hydro and wind power.





Plants use up CO2 and thus recycle it, as opposed to fossil fuels that introduce further amounts of CO2 into the atmosphere



Using nuclear energy

•Nuclear power contributes to reducing CO2 emissions - the main gas responsible for climate change.

• All this technology will reduce dependence on fossil fuels: coal, oil and natural gas.

Global Warming in Romania

- The effects of global warming are felt in most countries in the world including Romania.
- In Romania the most important effects are:

-floods

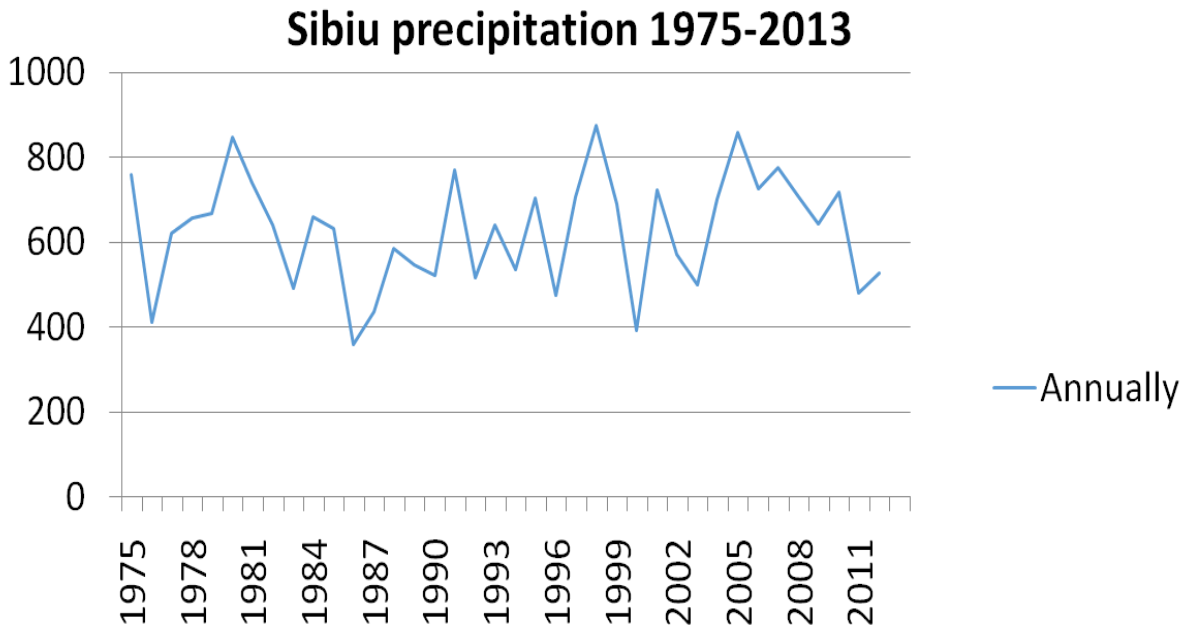
-desertification

-diseases

-deforestation

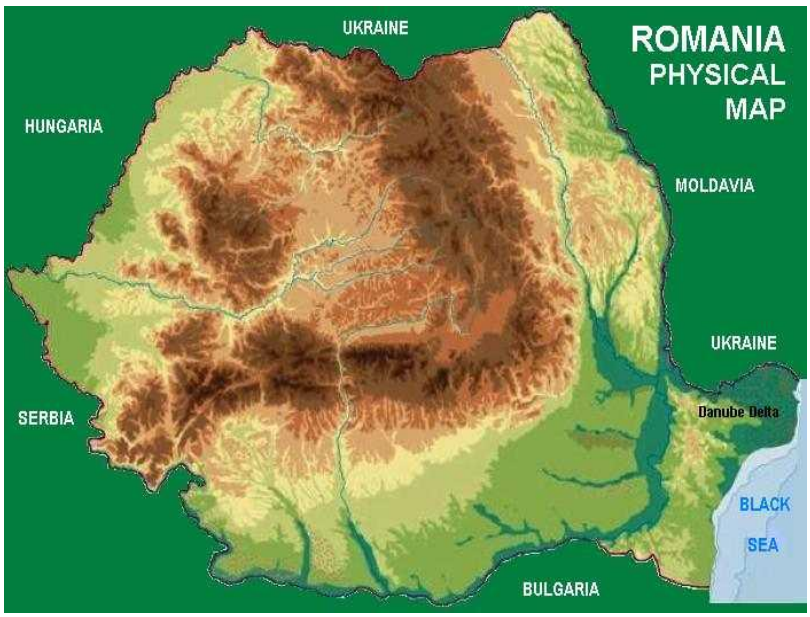
Floods

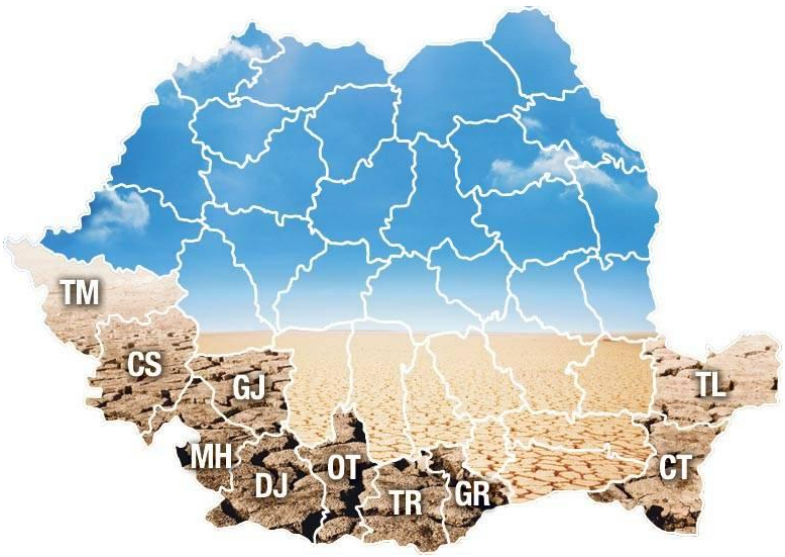
•The biggest floods in our country were in 2005, when 93 persons died because of this. The most affected counties were Argeș, Bacău, Brăila .



Desertification

Desertification is the destruction of soil layers, followed by the loss of its ability to sustain crops, livestock or other human activities. The most affected areas of the country are Oltenia, Dobrogea and Banat.





Deforestation

- In the early 19th century, Romania had a 80% forest coverage, and now we only have 26.7% forests. Romania has become a giant source of logs, the data says it all: 350 thousand hectares of forest were razed to the ground illegally.

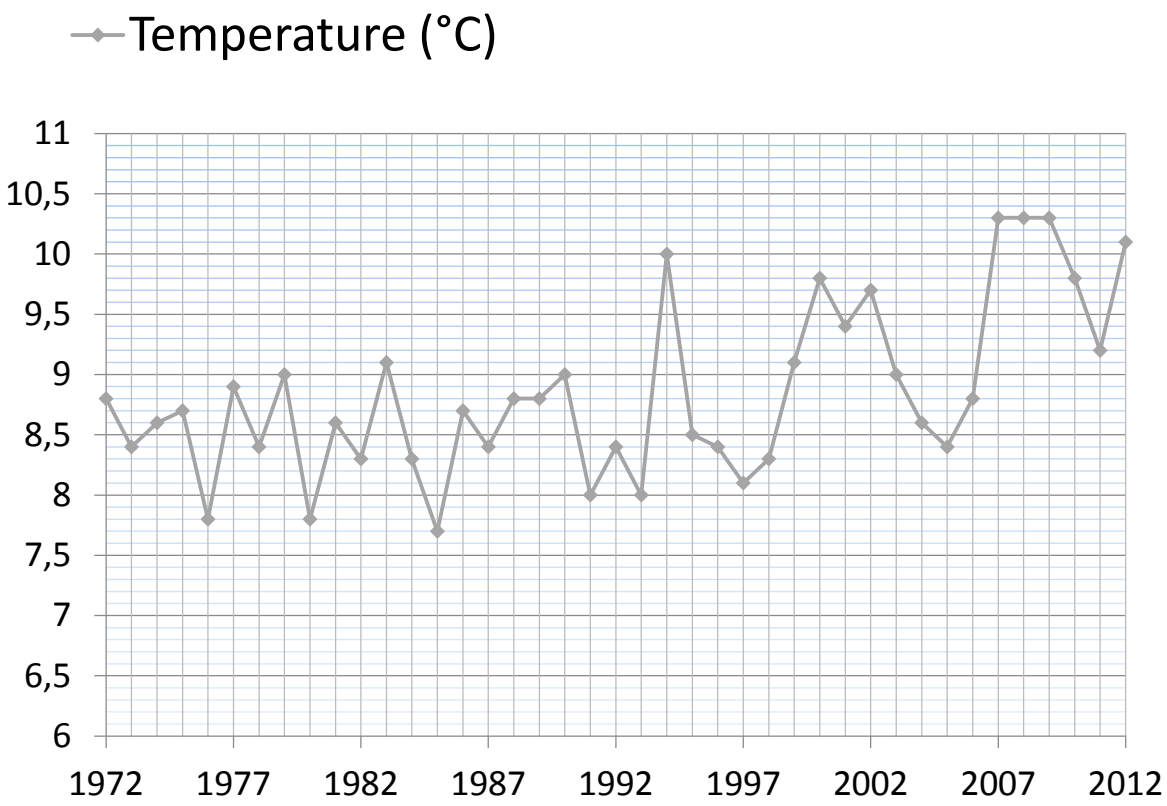
Diseases

- It is expected that in a few years in our country malaria and cholera will be a huge problem.

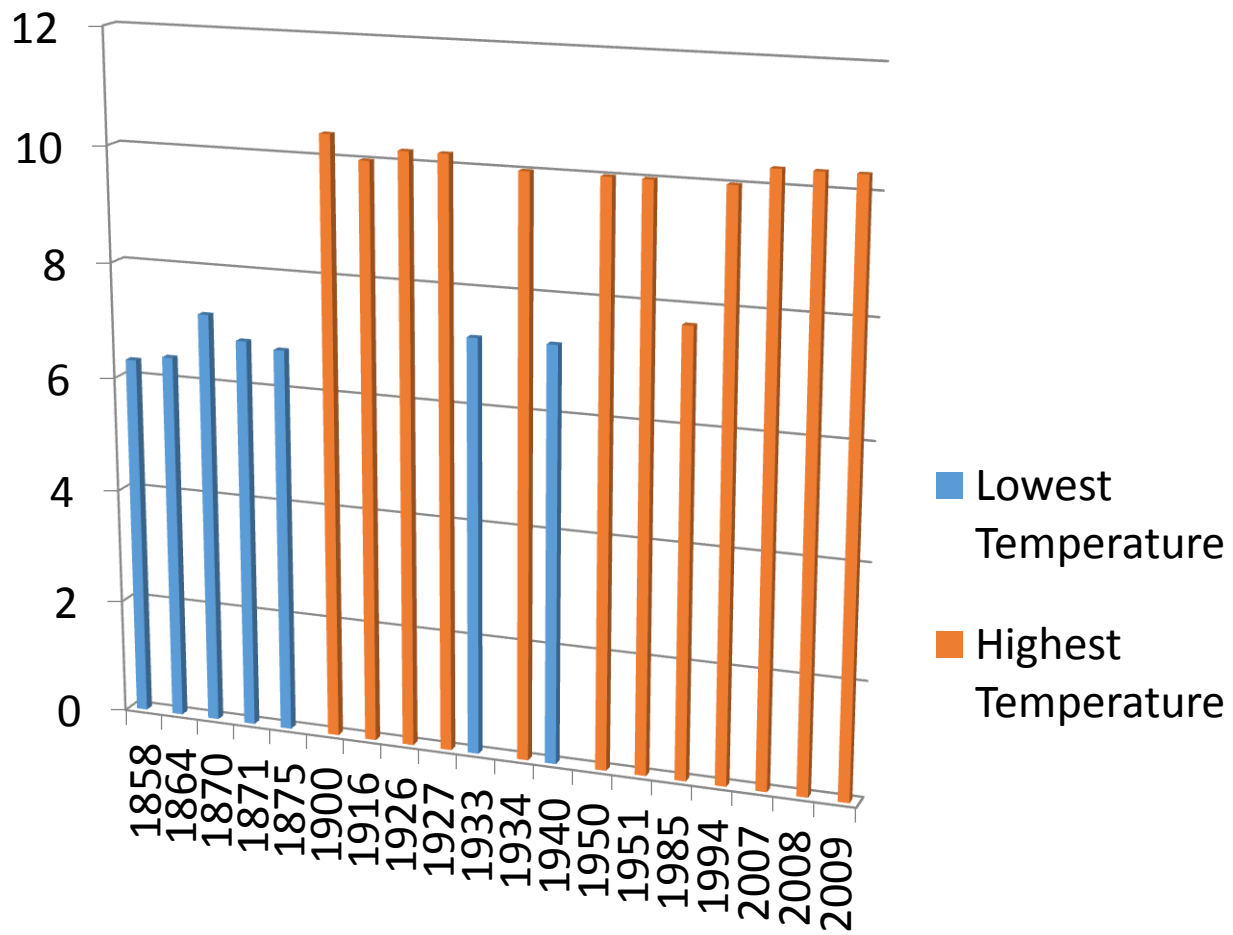
Global Warming in Sibiu

- Temperature data was collected from the Regional Meteorological Center Transylvania – Sibiu – shown in the following charts:

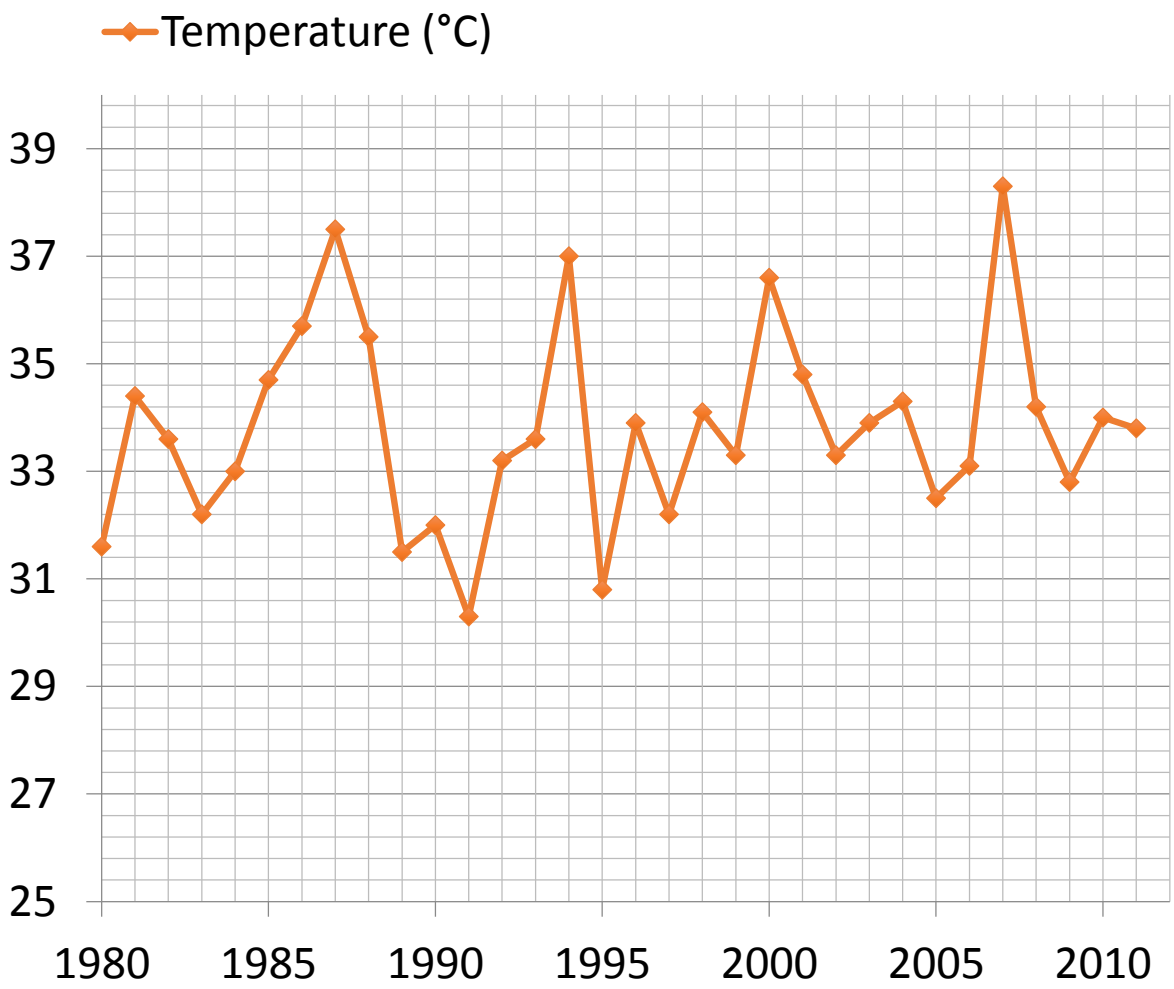
The Average Annual Temperature From 1972 to 2012



The Lowest and Highest Average Temperatures From 1851 to 2012



The Highest Temperatures from 1980 to 2012



Bibliography:

- http://en.wikipedia.org/wiki/Greenhouse_effect
- http://environment.nationalgeographic.com/environment/global-warming/gw-causes/
- http://planetsave.com/2009/06/07/global-warming-effects-and-causes-a-top-10-list/
- http://library.thinkquest.org/J003411/causes.htm
- http://ec.europa.eu/clima/policies/f-gas/index_en.htm

Made by:

- Gligor Rareș
- Pircă Ana Maria
- Popa Ana-Maria
- Tudor Alina

Coordinating teachers:

- Prof. Codruța Burlea
- Prof. Niculina Crăciunaș
- Prof. Rodica Stănculescu

Project coordinator:

- Prof. Alexandra Tischer

Editing:

- Prof. Diana Chirilă

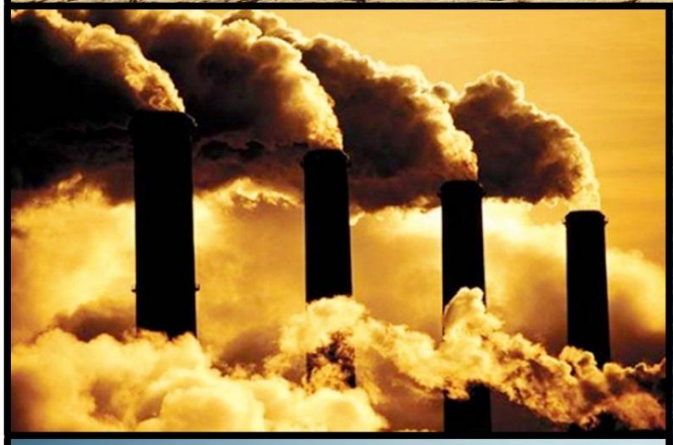
Colegiul Național "Octavian Goga", Sibiu

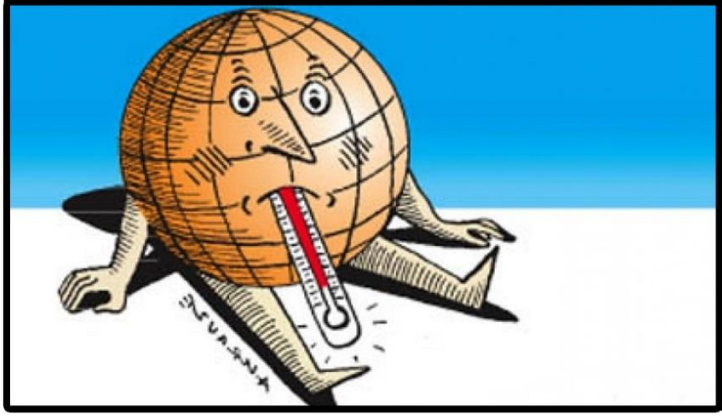
Lifelong Learning Programme

www.futuregreeners.com

G.R.E.E.N. COMENIUS PROJECT MEETING

Încălzirea globală





GLOBAL WARMING