

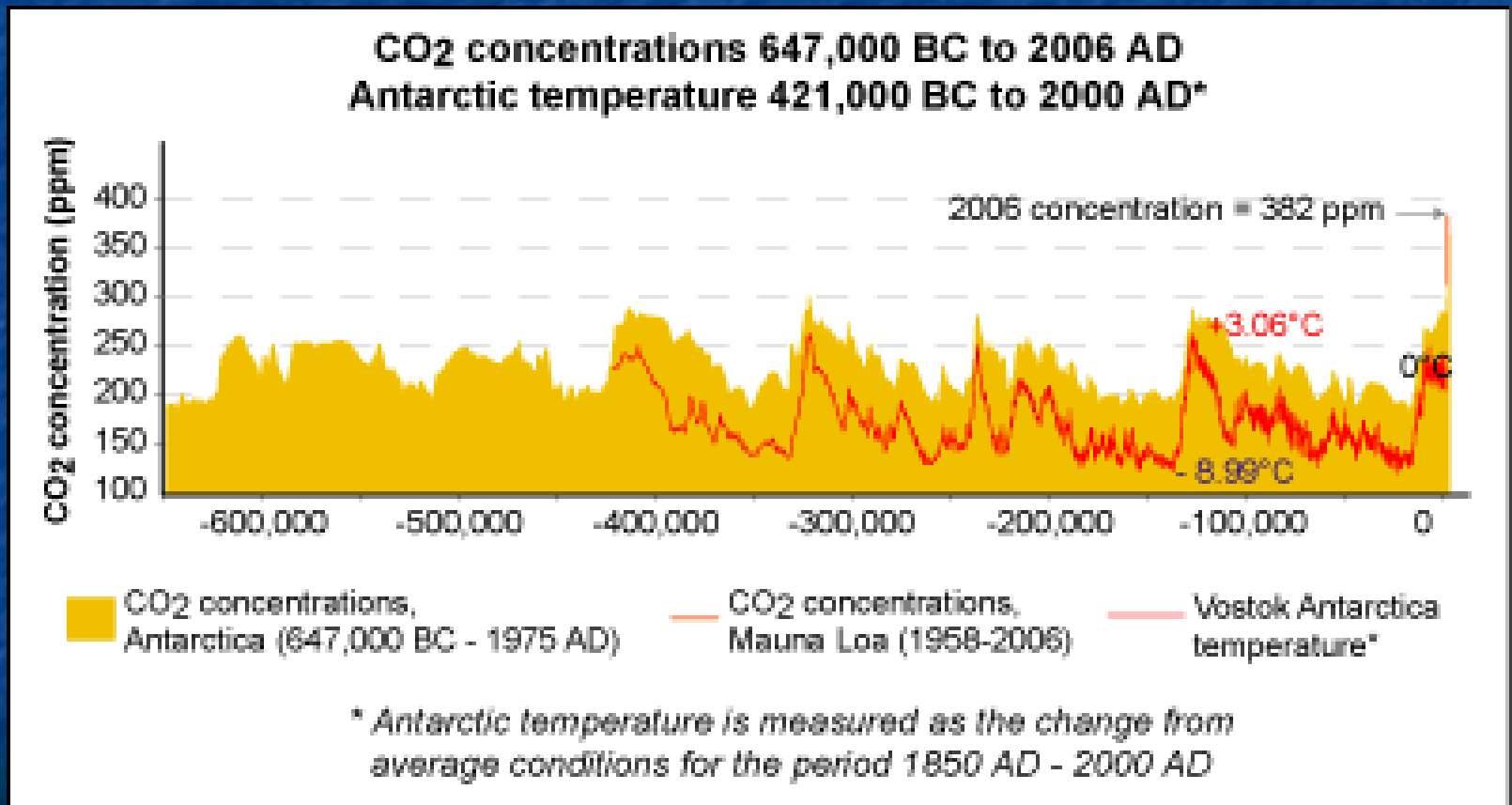
Unit 11: Climate Change

Objectives:

E5.4C - Analyze the empirical relationship between the emission of carbon dioxide, atmospheric carbon dioxide levels and the average global temperature over the past 150 years.

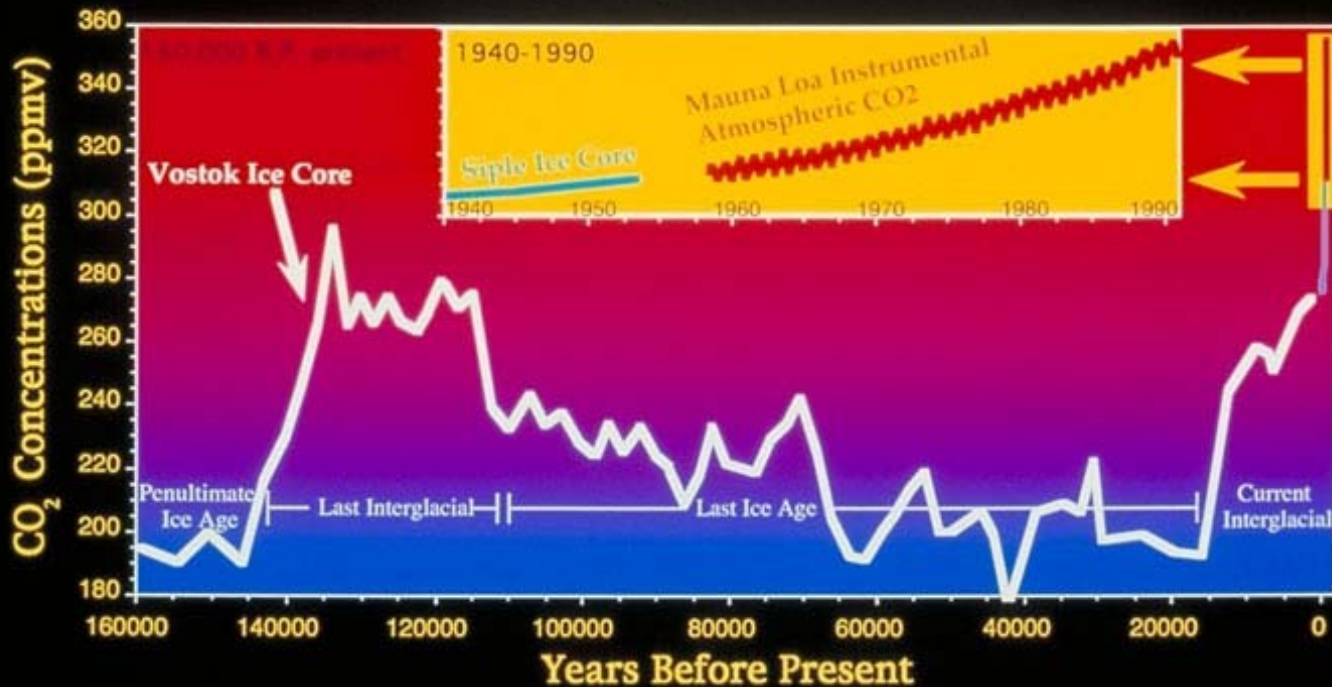
E5.4D - Based on evidence of observable changes in recent history and climate change models, explain the consequences of warmer oceans (including the results of increased evaporation, shoreline and estuarine impacts, oceanic algae growth, and coral bleaching) and changing climatic zones (including the adaptive capacity of the biosphere).

Global CO2 Emissions



Ice Core Data

Measurements of the Greenhouse Gas Carbon Dioxide (CO₂) Have Been Taken from Several Ice Cores. Data from the Vostok and Siple Cores Show That CO₂ Concentrations Are Currently at Their Highest Level in the 160,000 Year Record.



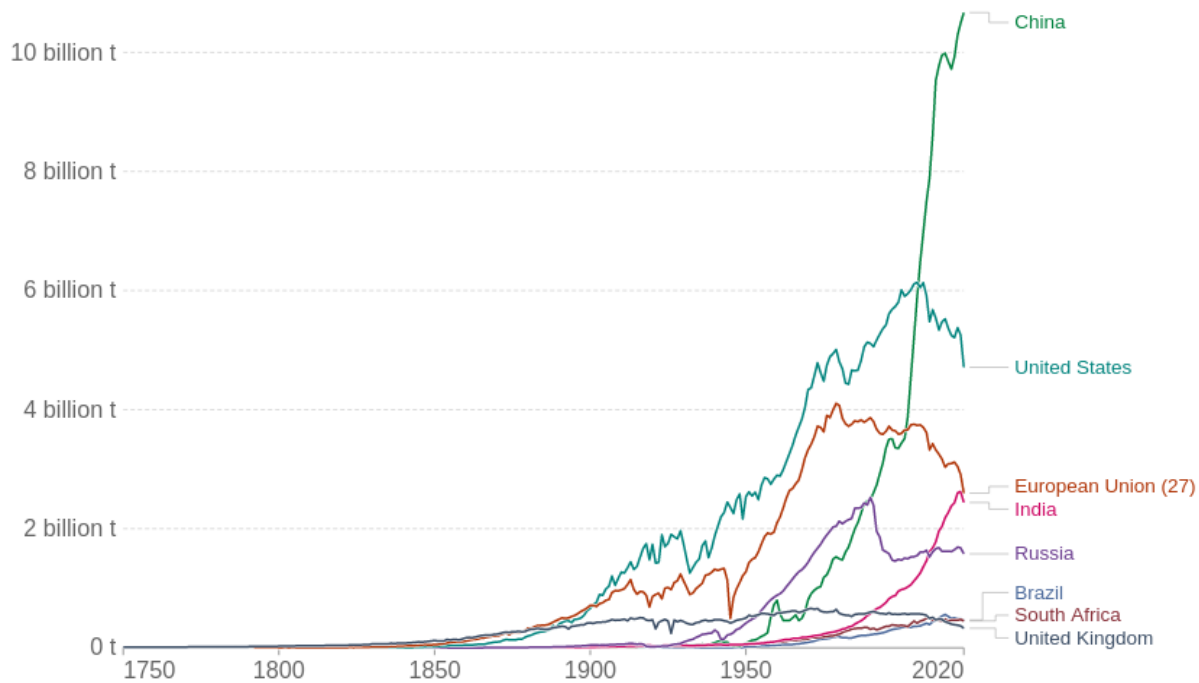
Sources: Vostok: Barnola *et al.* (1987); Siple: Friedli *et al.* (1986); Mauna Loa: Keeling and Whorf (1991).

The Past 150 Years

Annual CO₂ emissions

Carbon dioxide (CO₂) emissions from the burning of fossil fuels for energy and cement production. Land use change is not included.

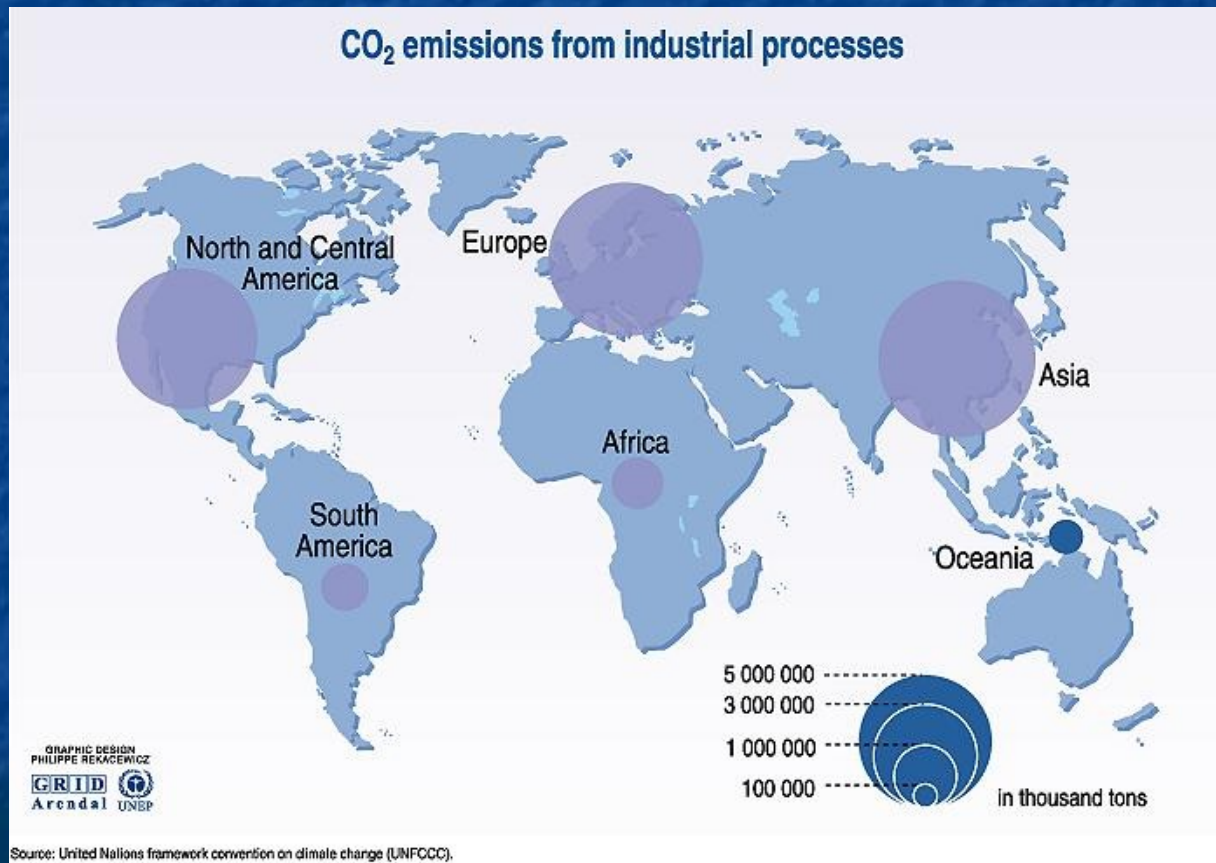
Our World
in Data



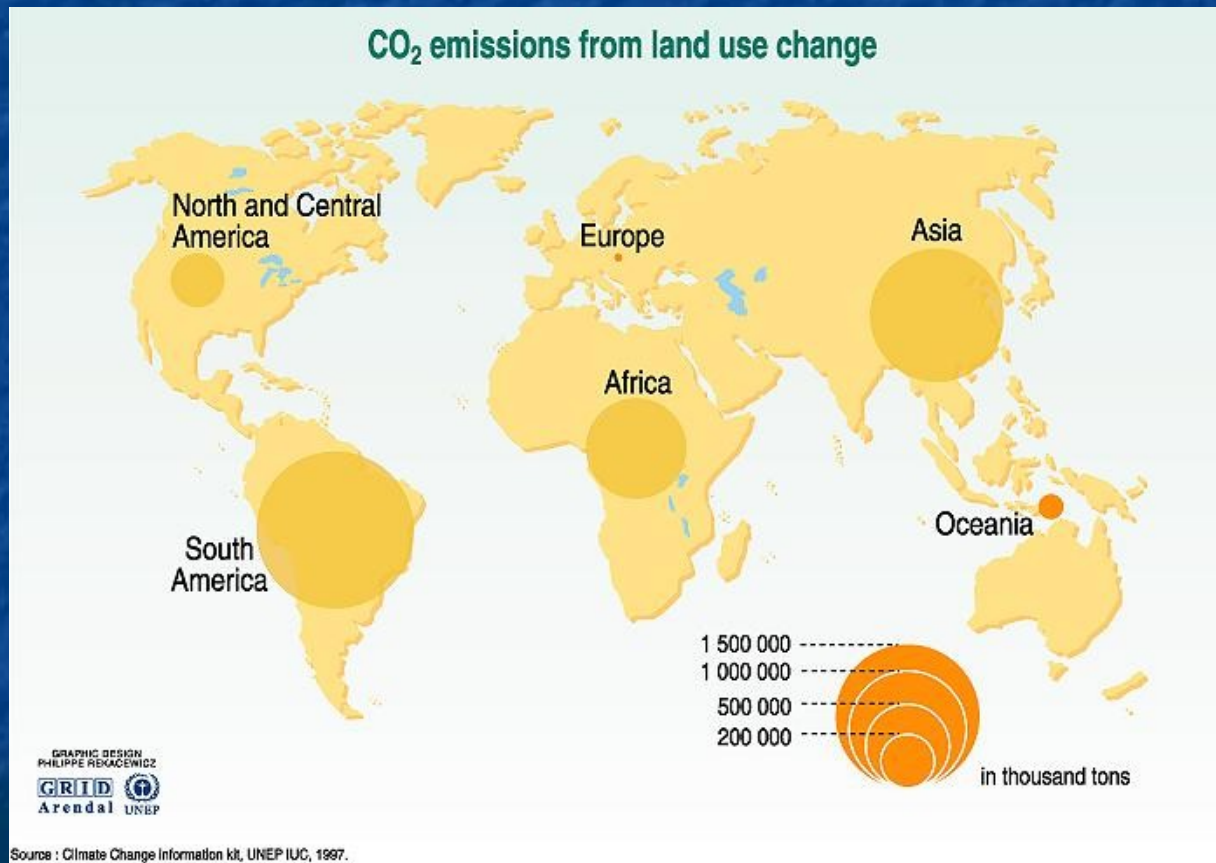
Source: Global Carbon Project

OurWorldInData.org/co2-and-other-greenhouse-gas-emissions/ • CC BY

Industry

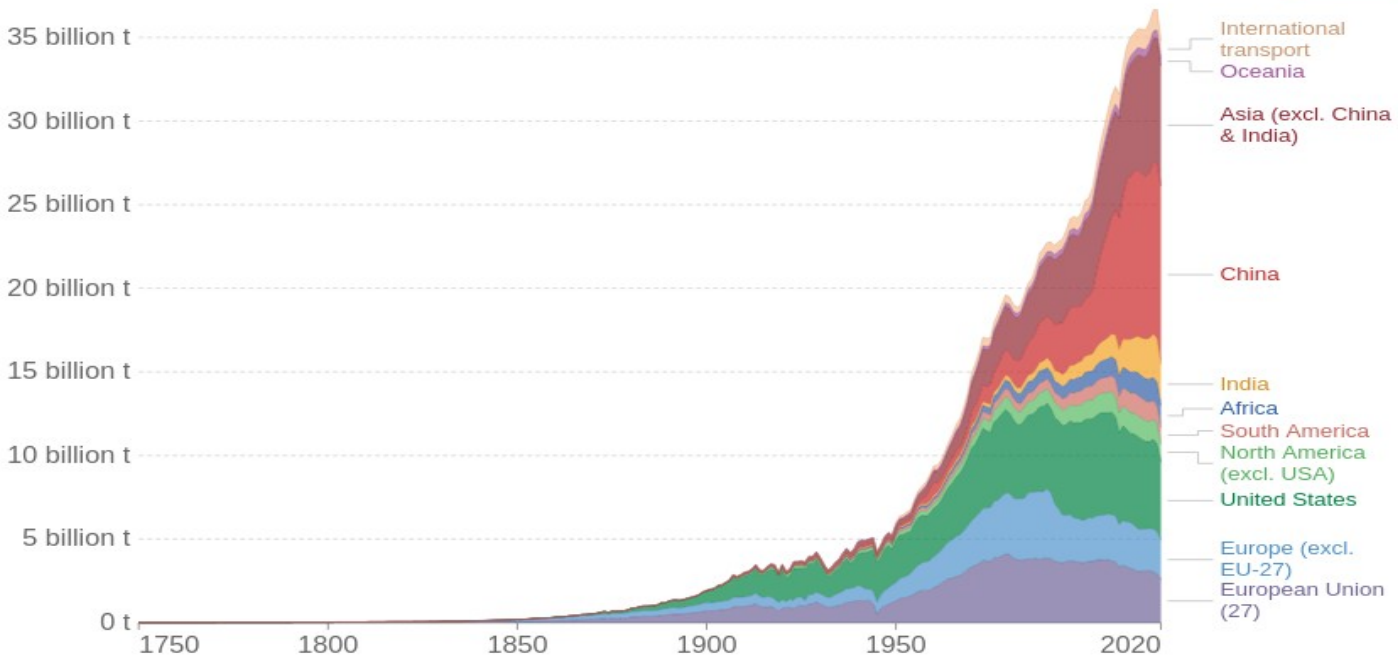


Land Use



Major Producers

Annual CO₂ emissions from fossil fuels, by world region

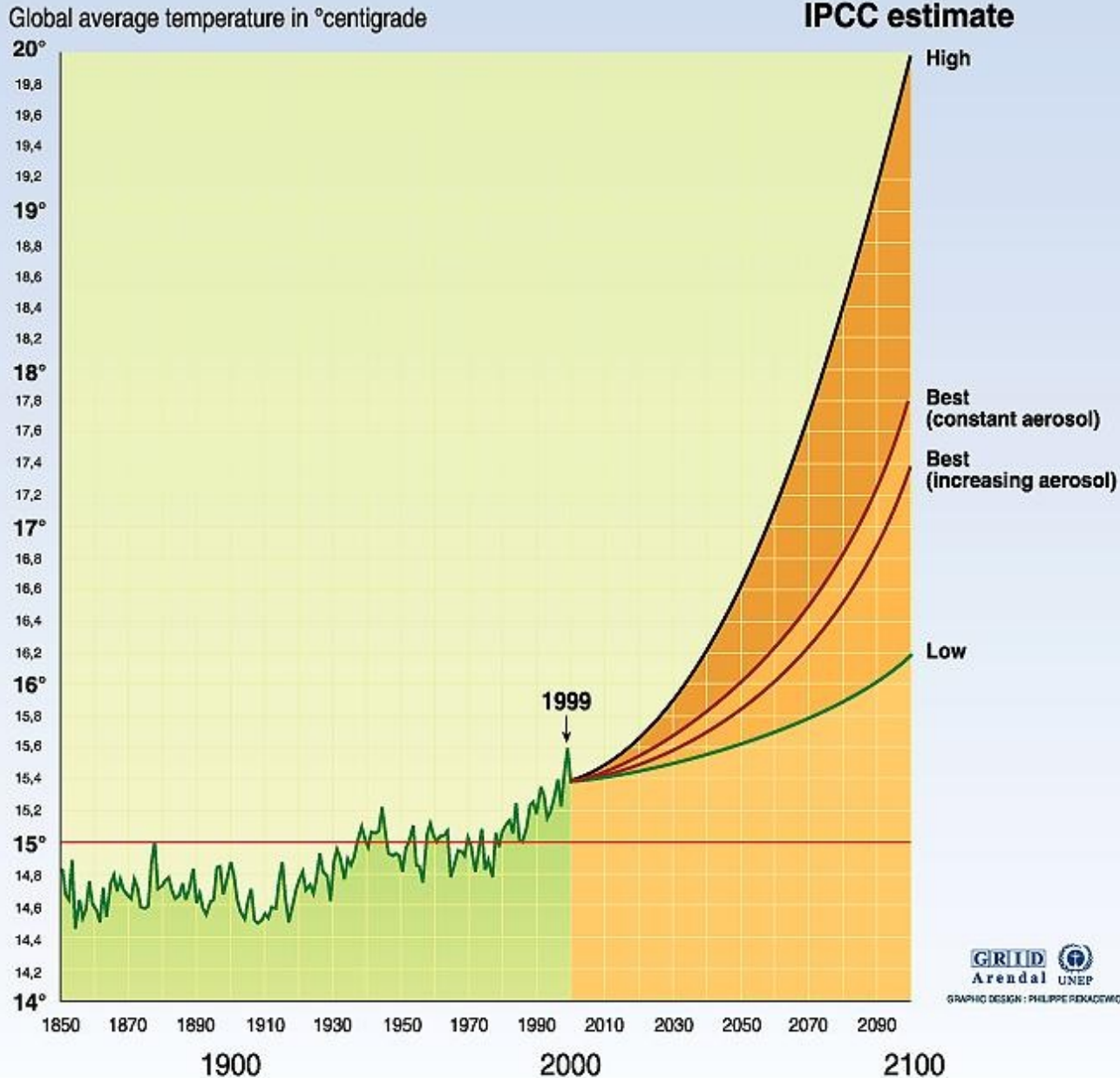


Source: Global Carbon Project

Note: This measures CO₂ emissions from fossil fuels and cement production only – land use change is not included. 'Statistical differences' (included in the GCP dataset) are not included here.

OurWorldInData.org/co2-and-other-greenhouse-gas-emissions • CC BY

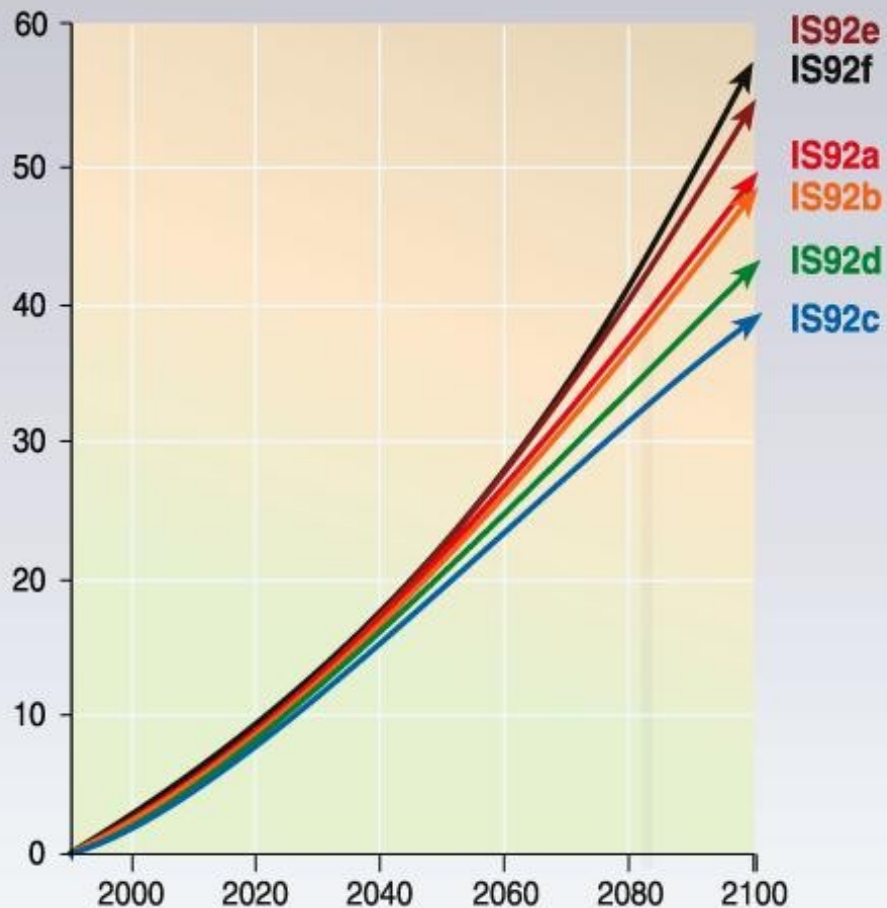
Projected changes in global temperature: global average 1856-1999 and projection estimates to 2100



Global Temp Increase

Scenarios of sea level rise

Sea level rise, cm



GRID
Arendal UNEP
GRAPHIC DESIGN : PHILIPPE REXACEWICZ

Sea Level Rise

Source: Climate change 1995, Impacts, adaptations and mitigation of climate change: scientific-technical analyses, contribution of working group 2 to the second assessment report of the intergovernmental panel on climate change, UNEP and WMO, Cambridge press university, 1996; IPCC, Climate change 1994: radiative forcing of climate change and an evaluation of the IPCC IS92 emission scenarios, 1995.

Sea Level Rise

Potential impact of sea-level rise on Bangladesh



Today

Total population: 112 Million

Total land area: 134,000 km²

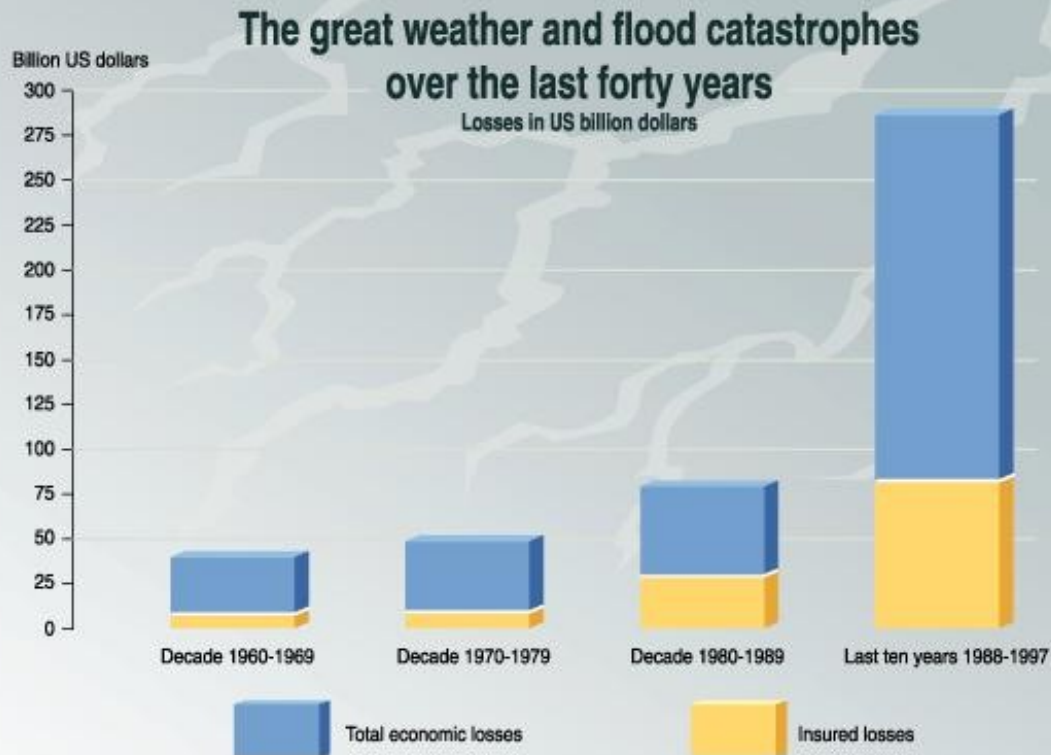


1.5 m - Impact

Total population affected: 17 Million (15%)

Total land area affected: 22,000 km² (16%)

Severe Weather

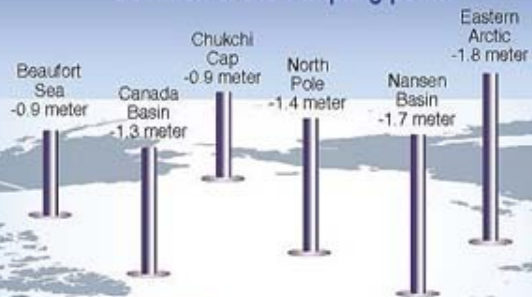


Thinning of the Arctic sea-ice

Location of the sampling points

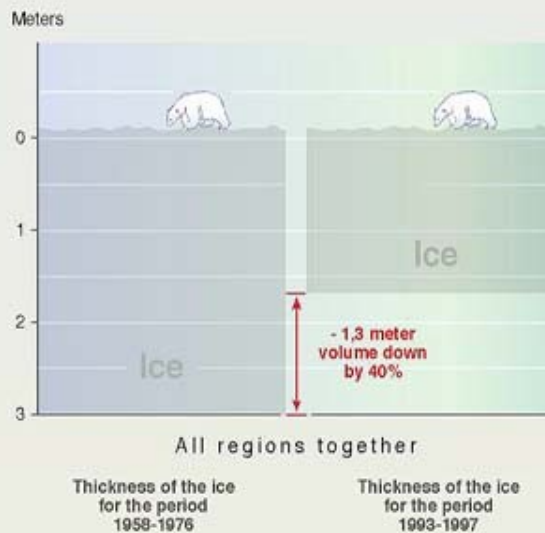
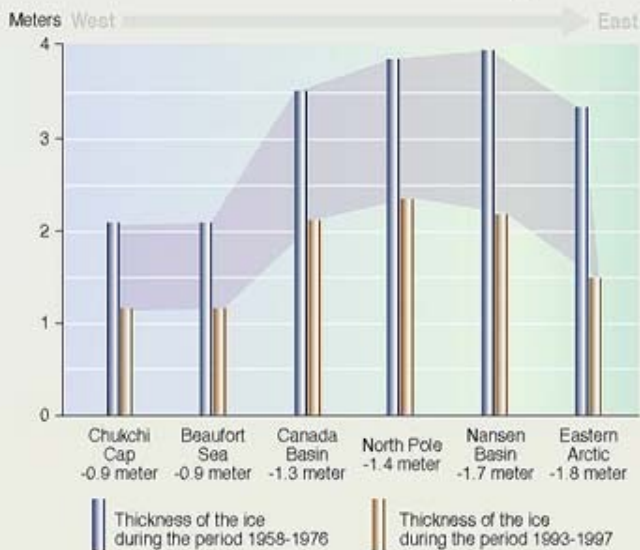
The height of the bars represent the reduction of ice thickness (draft) from the period 1958-1976 to 1993-1997

Ice draft in the 90s is over a meter thinner than three decades earlier



GRAPHIC DESIGN: THILIPPE REVAQUENY

Thinning of the Arctic sea ice cover



Sea Ice

Potential impact of sea level rise: Nile Delta

Population: 3 800 000
Cropland (Km²): 1 800

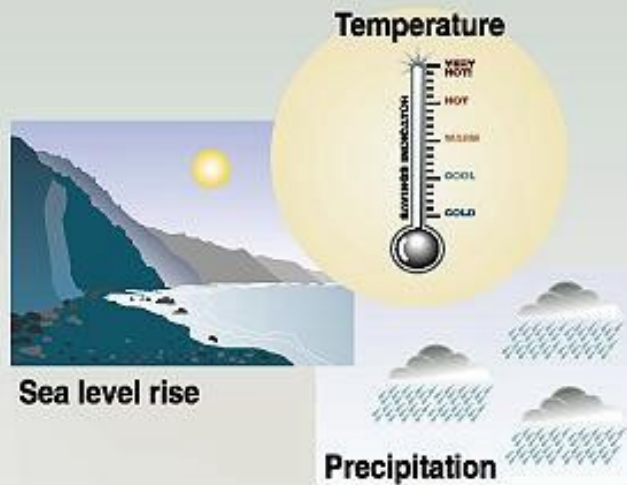


Rising sea level would destroy weak parts of the sand belt, which is essential for the protection of lagoons and the low-lying reclaimed lands. The impacts would be very serious: One third of Egypt's fish catches are made in the lagoons.

Population: 6 100 000
Cropland (Km²): 4 500



Potential climate changes impact



Impacts on...

Health



Weather-related mortality
 Infectious diseases
 Air-quality respiratory illnesses

Agriculture



Crop yields
 Irrigation demands

Forest



Forest composition
 Geographic range of forest
 Forest health and productivity

Water resources



Water supply
 Water quality
 Competition for water

coastal areas



Erosion of beaches
 Inundation of coastal lands
 additional costs to protect coastal communities

Species and natural areas



Loss of habitat and species
 Cryosphere: diminishing glaciers

Changing Zones

