

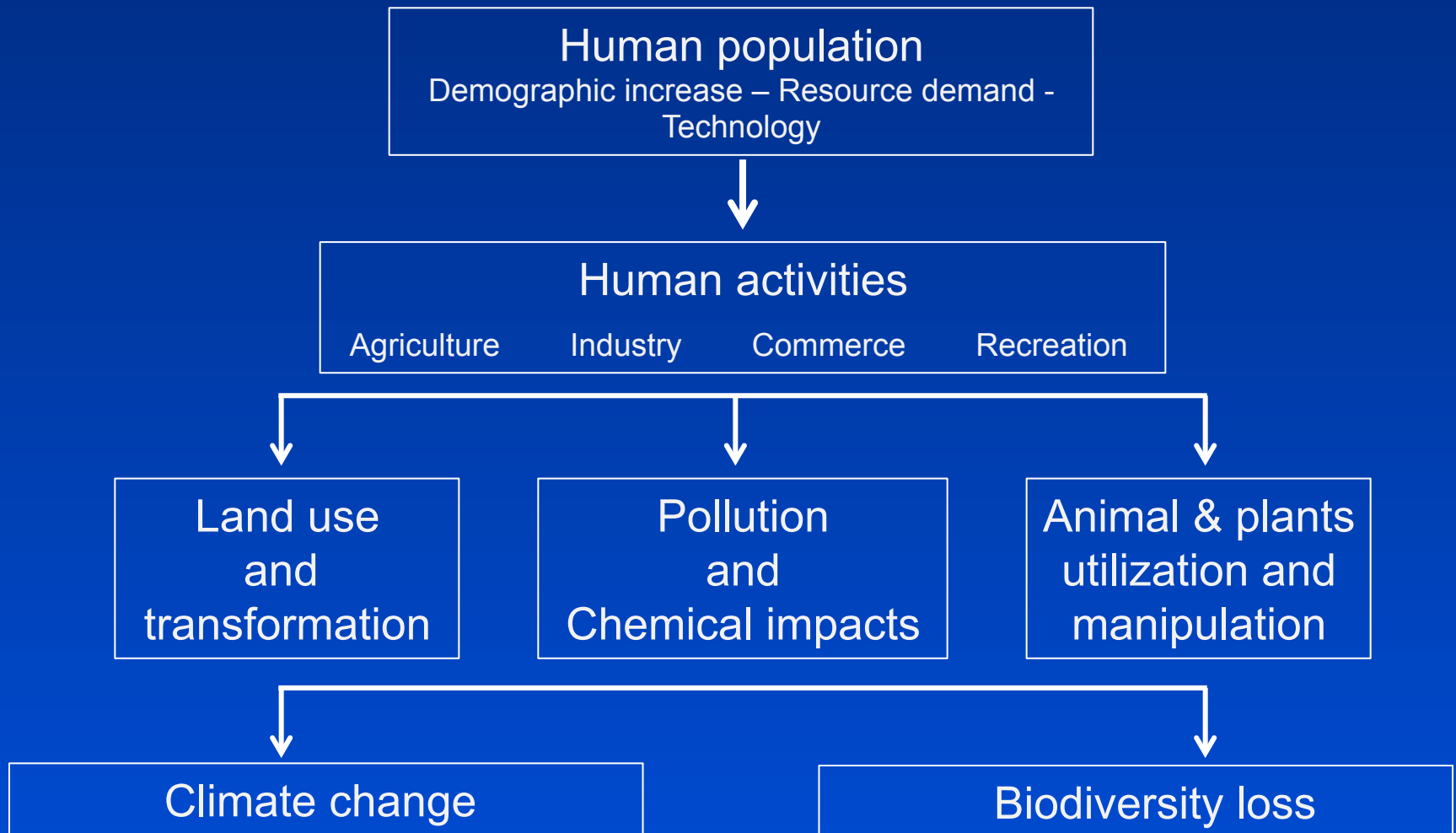
The Earth's anthropocenic prophyle

Guido Chelazzi

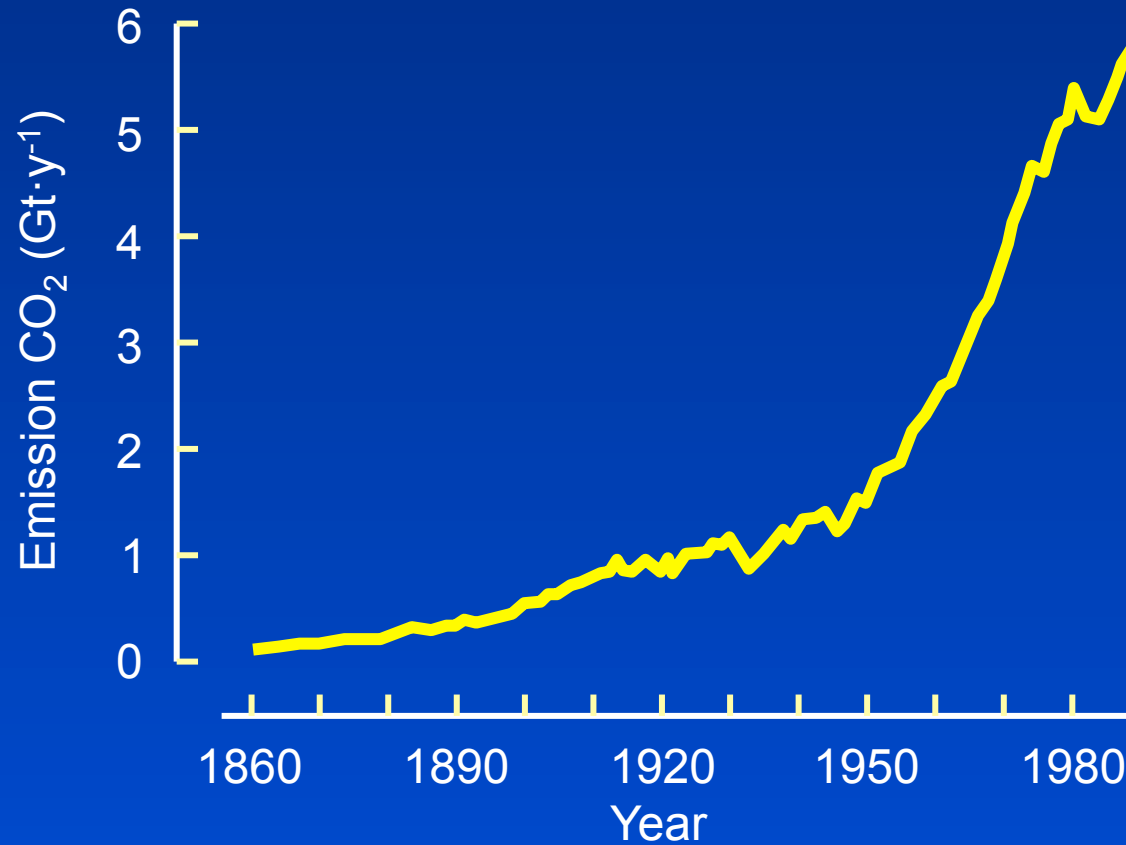


Human domination of Earth's Ecosystems

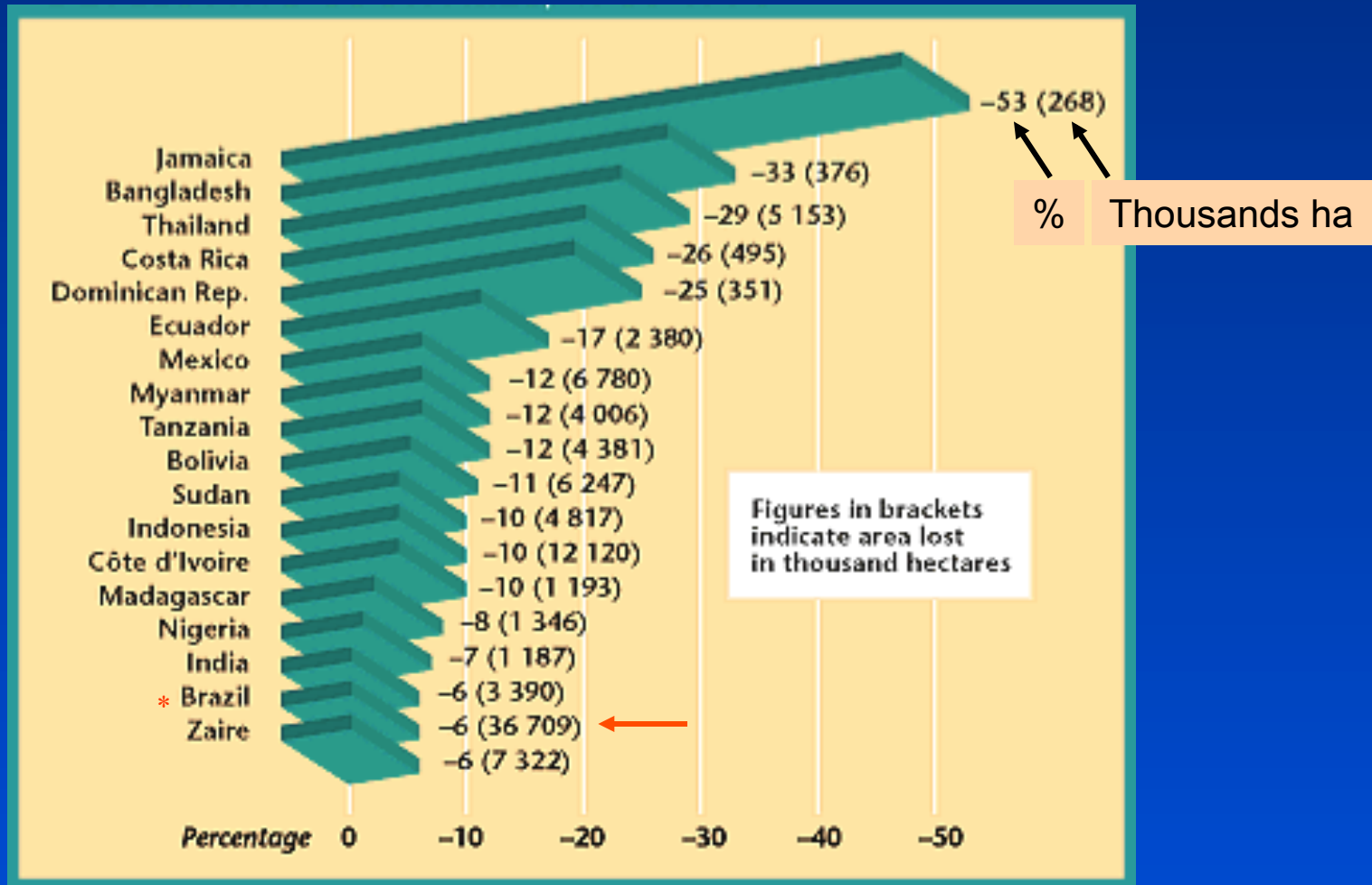
Vitousek, Mooney, Lubchenco, Melillo *Science*, N. S. 277 (1997)



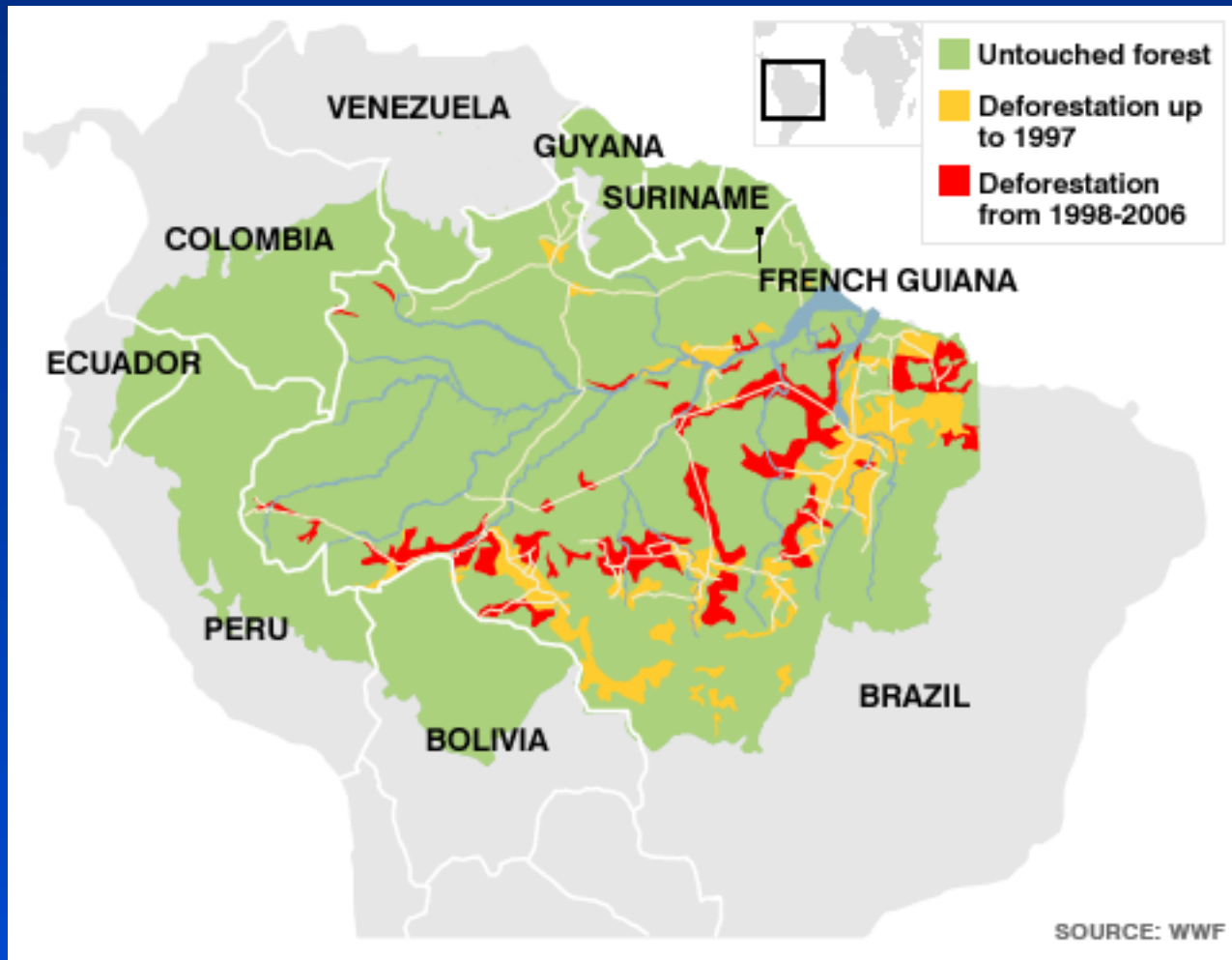
Global CO₂ anthropogenic emissions



Deforestation: the dark age (1980-1990)



Deforestation of Amazon forest

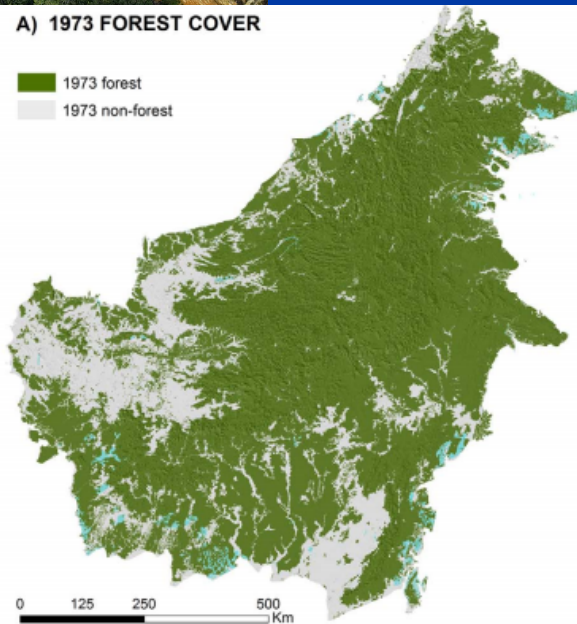


Deforestation of Borneo since 1973



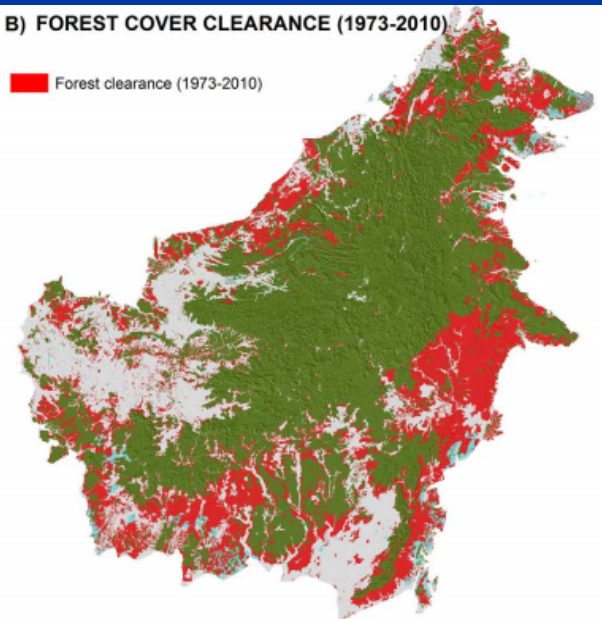
A) 1973 FOREST COVER

■ 1973 forest
■ 1973 non-forest



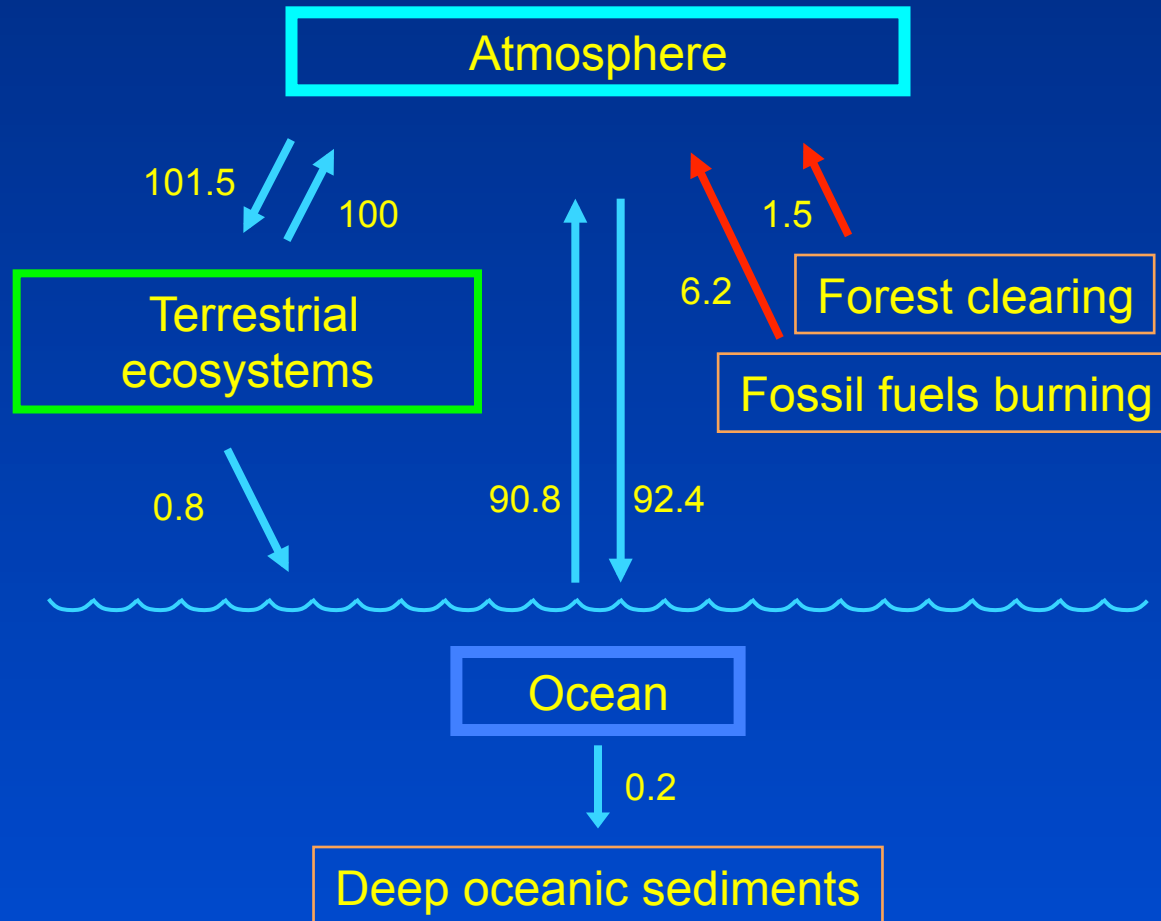
B) FOREST COVER CLEARANCE (1973-2010)

■ Forest clearance (1973-2010)

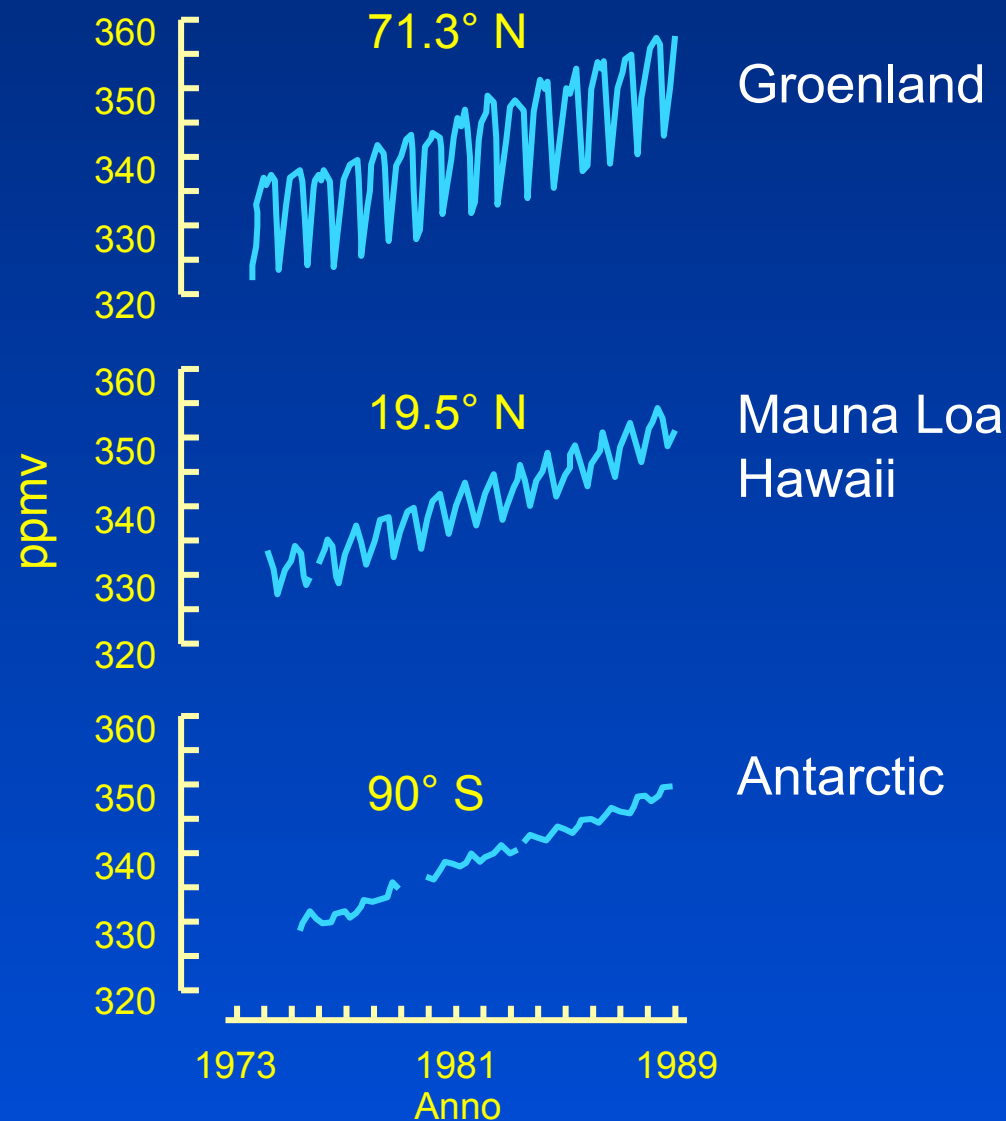


C - Global biogeochemical cycle

C Gt/year average 1992-1997

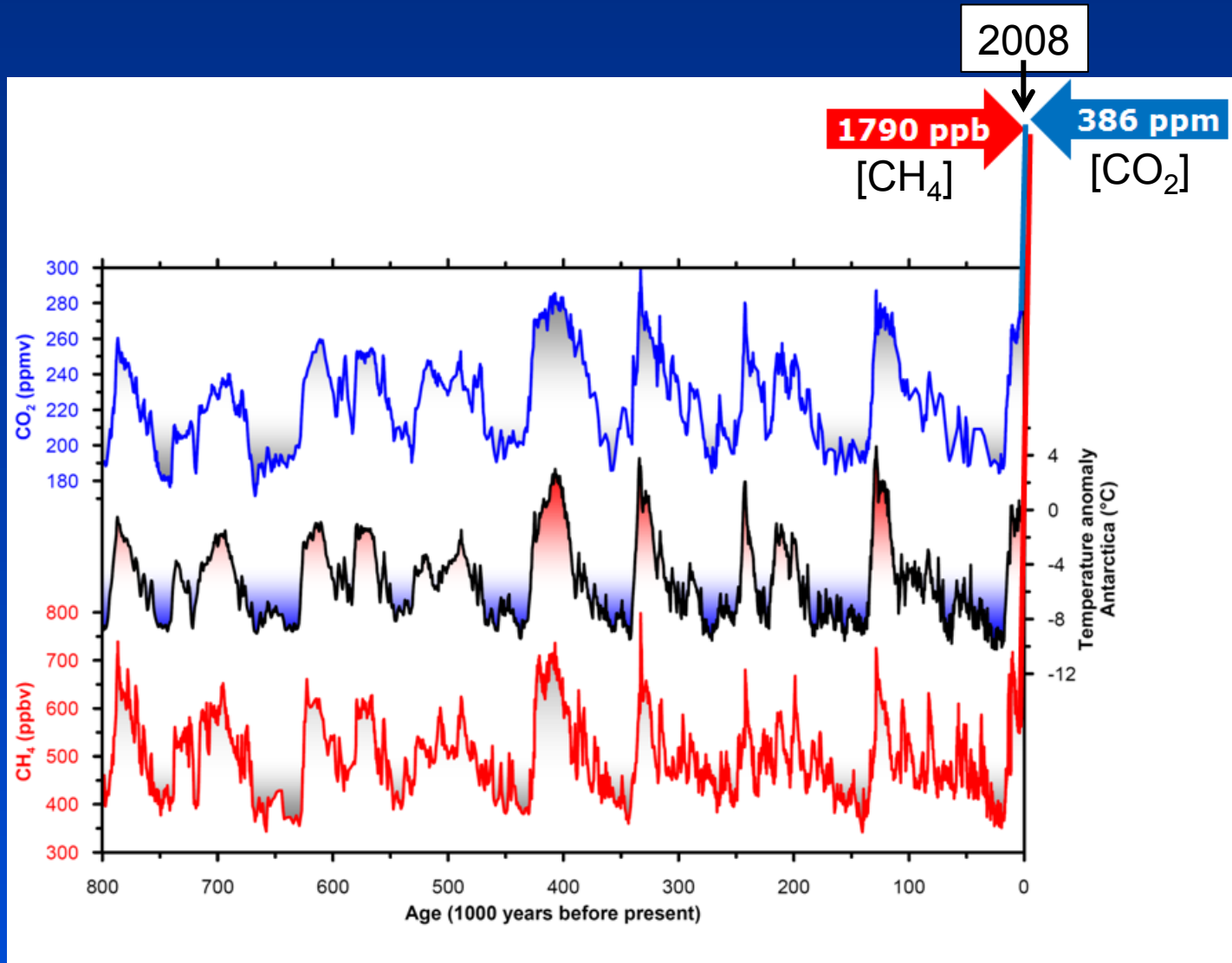


Atmospheric CO₂ concentration

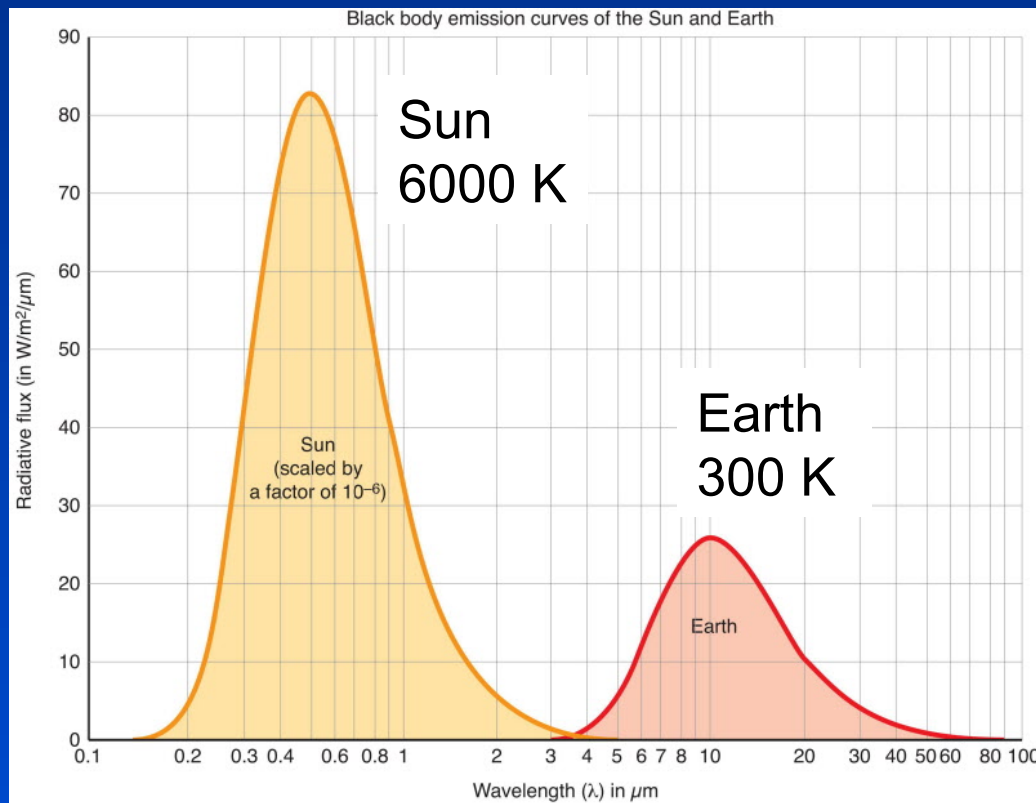


CO₂ CH₄ and temperature variation

EPICA recordings in Antarctic

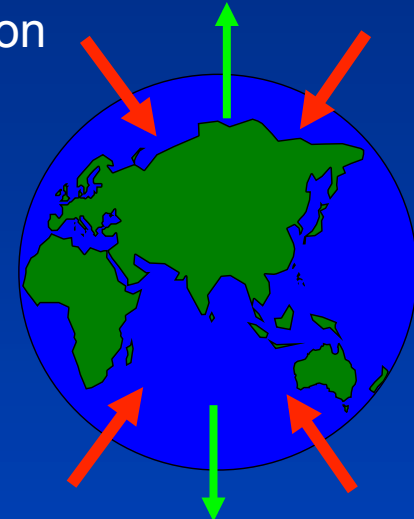


Earth's radiation (heath) balance

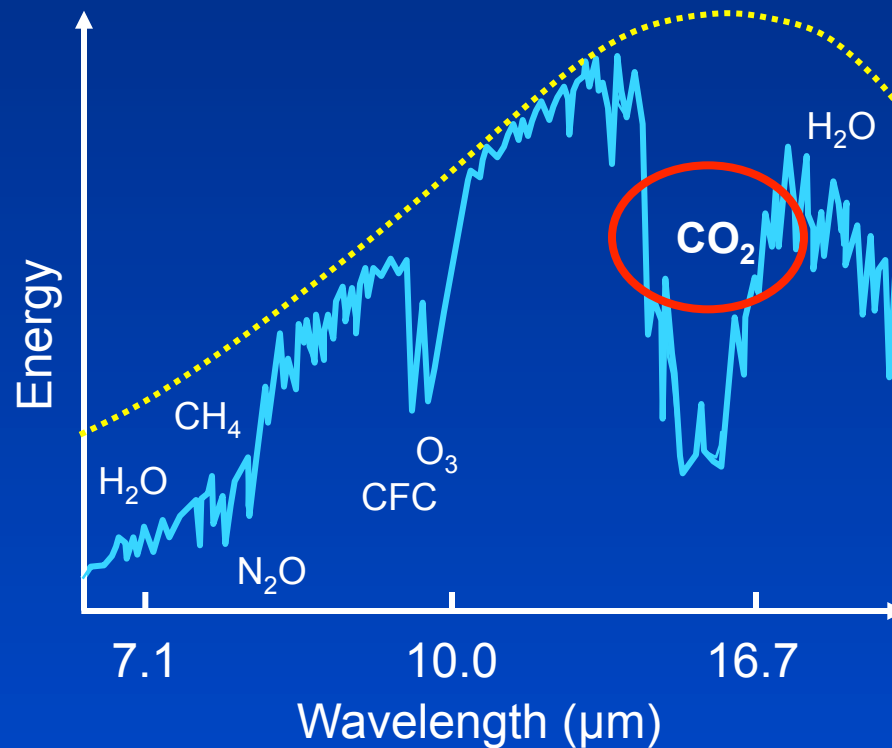


Earth re-emission

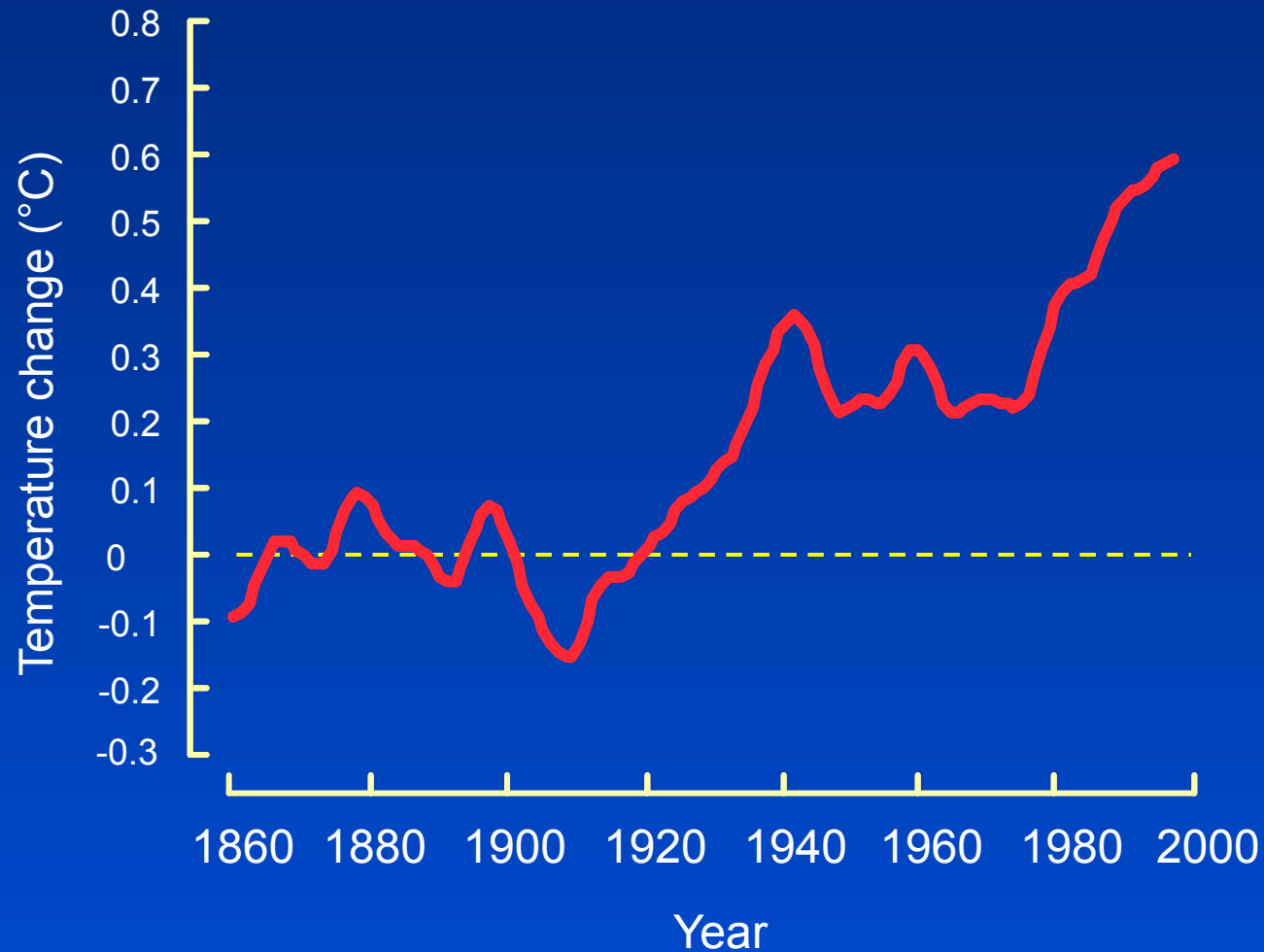
Sun irradiation



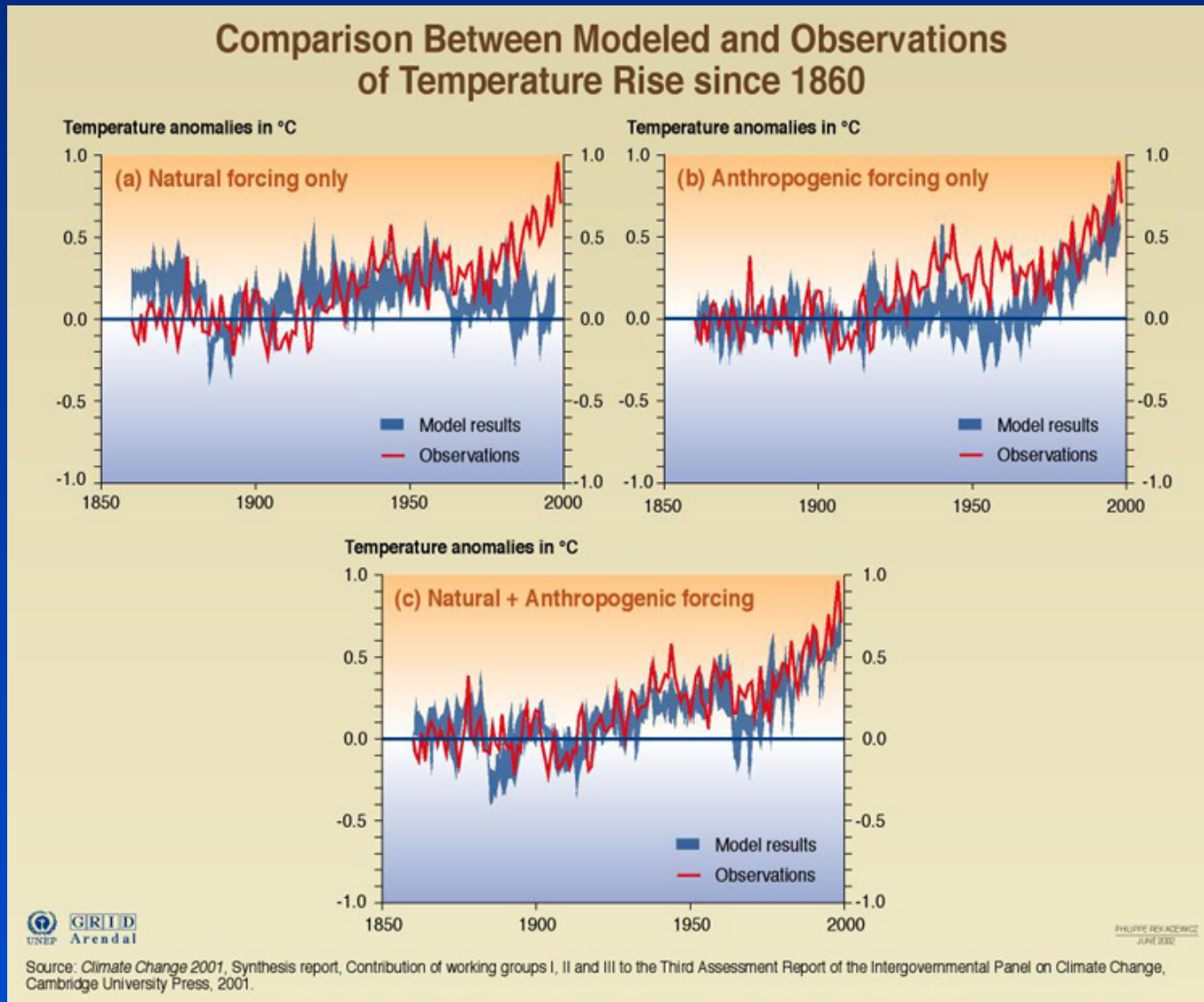
Radiation absorption by greenhouse gases



Trend of climate change (temperature)

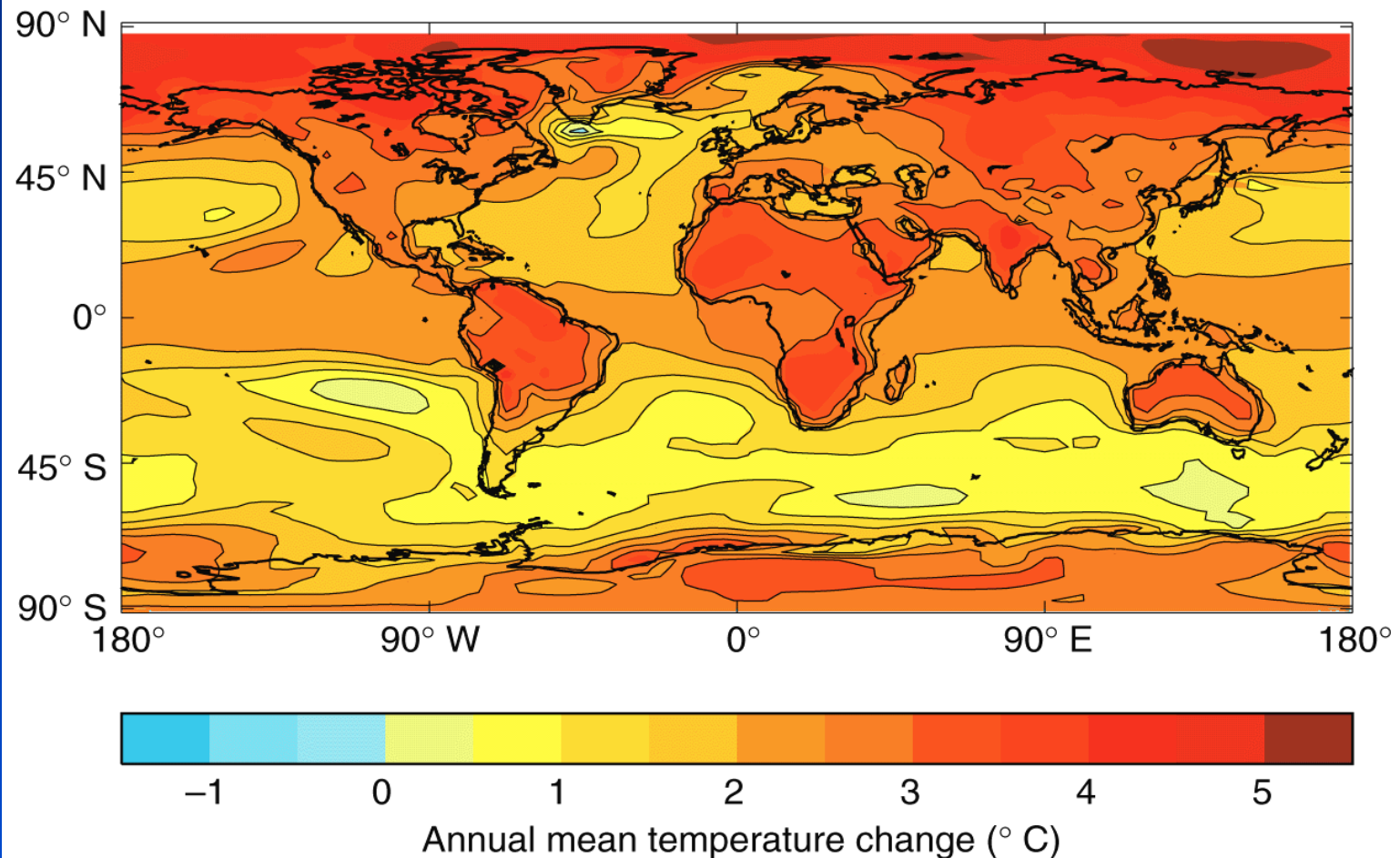


Human responsibility in temperature change



Predicted future temperature increase

Hadley Centre for Climate Change



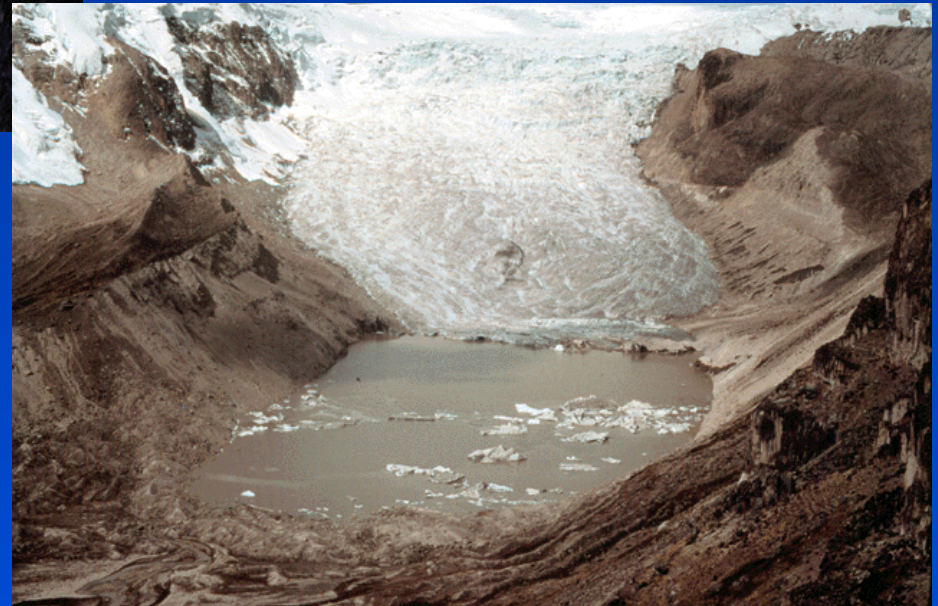
Continental glacier retreat



1978

Qori Kalis Glacier

2000

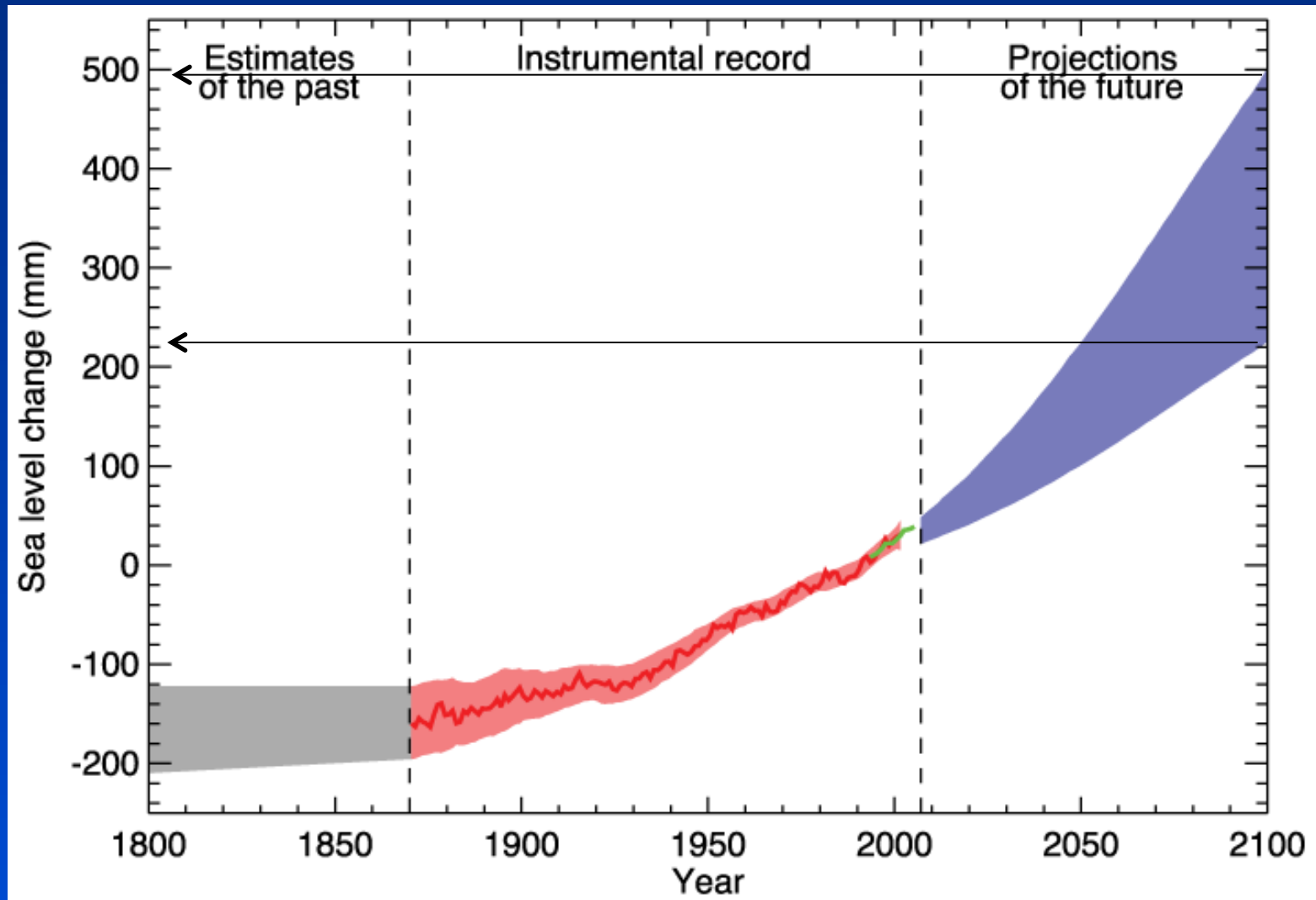


Arctic Sea Ice variation

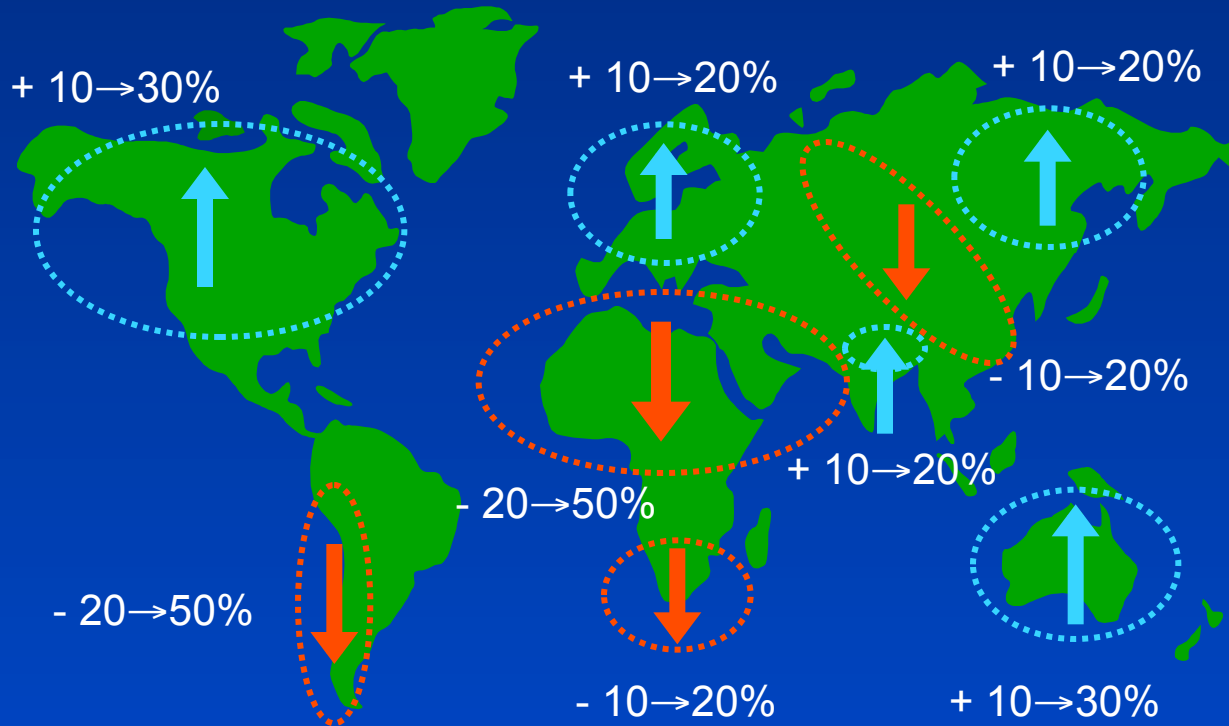


Source: <http://psc.apl.washington.edu/wordpress/research/projects/arctic-sea-ice-volume-anomaly/>
Created by: Andy Lee Robinson <http://youtube.com/ahaveland> Oct 2015

Sea level variation (recorded and predicted)

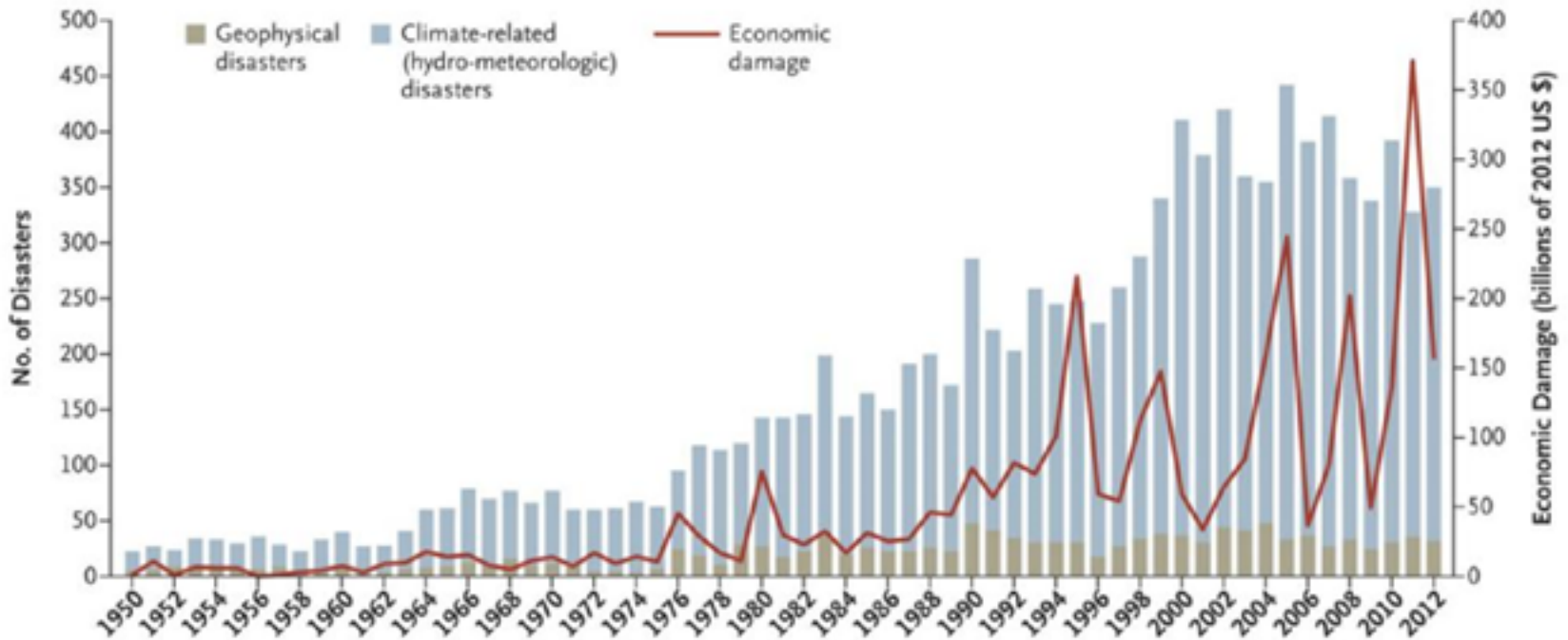


Water cycle variation (extremization)

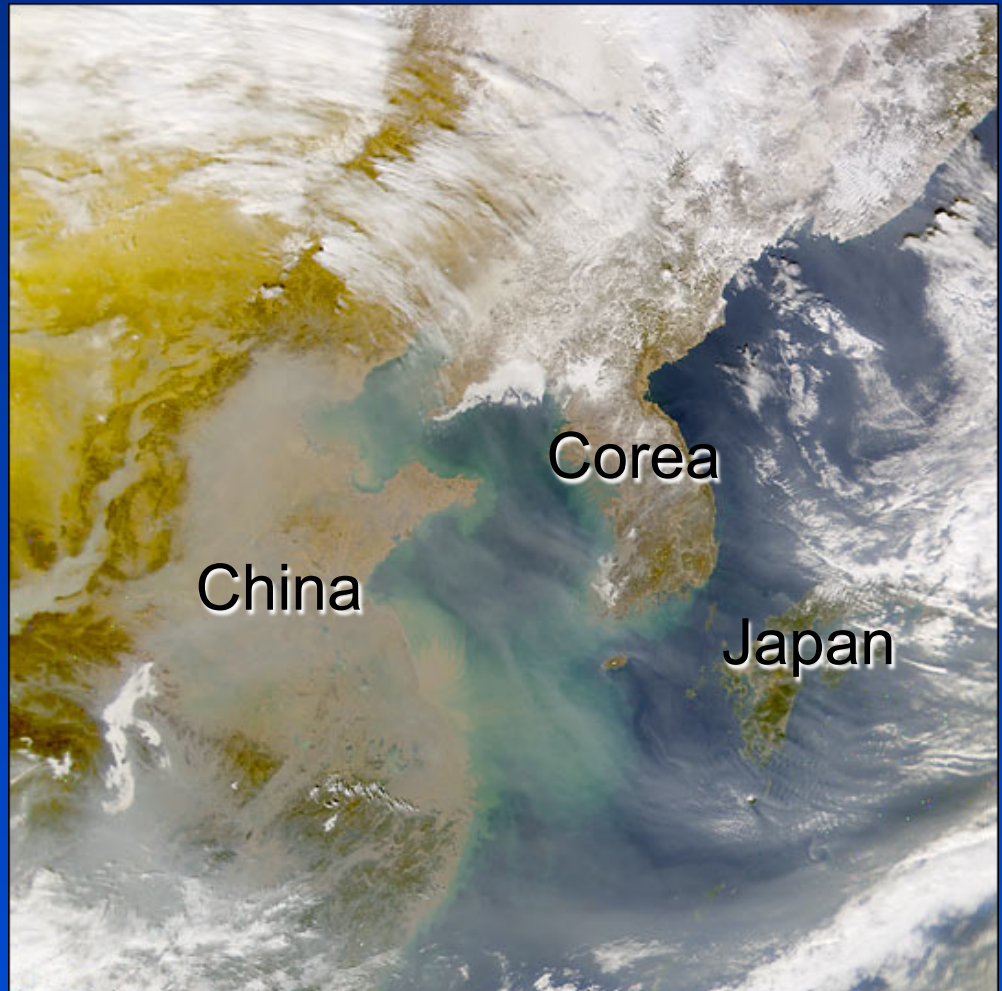
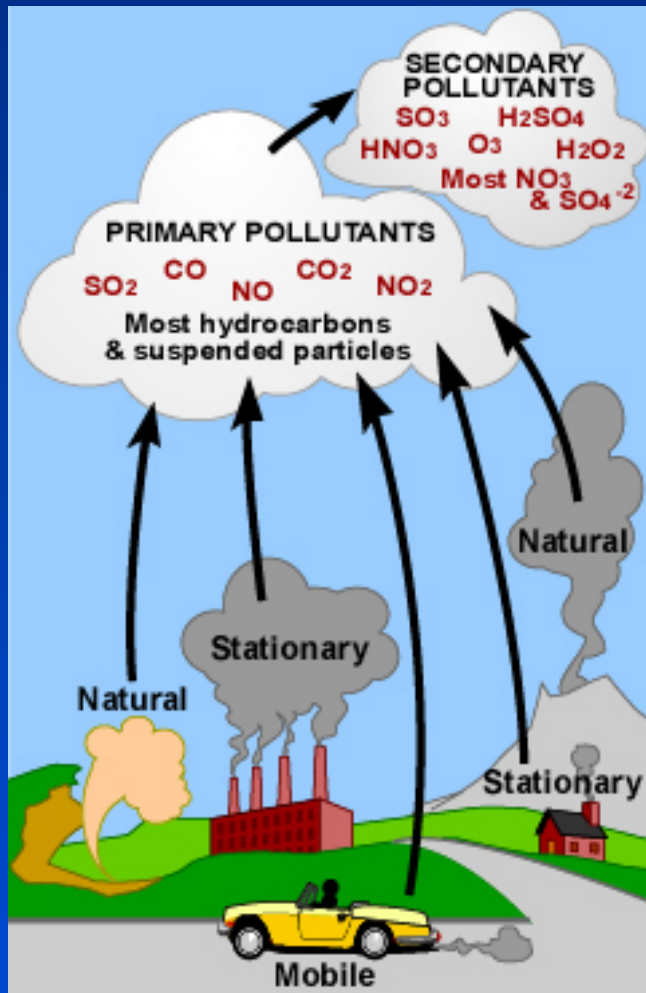


Hydro-meteorological extreme events

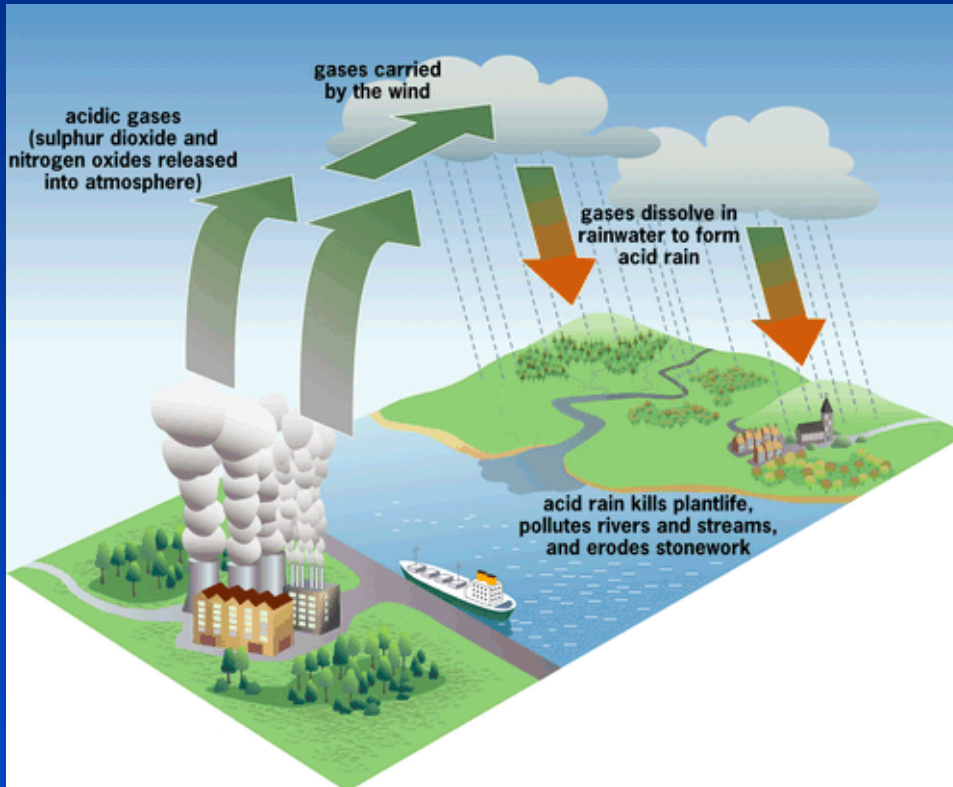
FIGURE 1: NUMBER AND TYPE OF NATIONAL DISASTERS, 1950-2012⁵



Atmospheric pollution



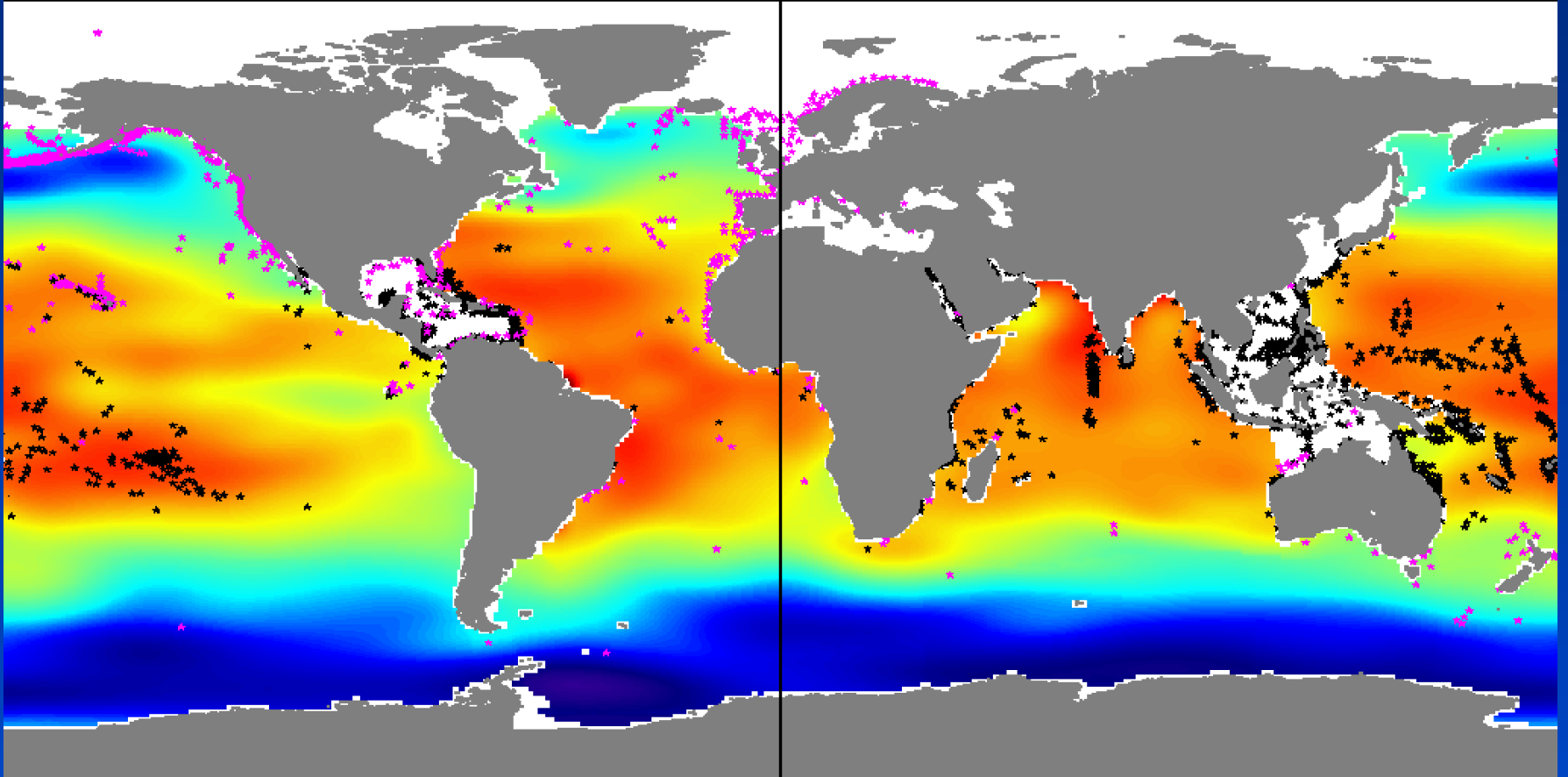
Acid depositions



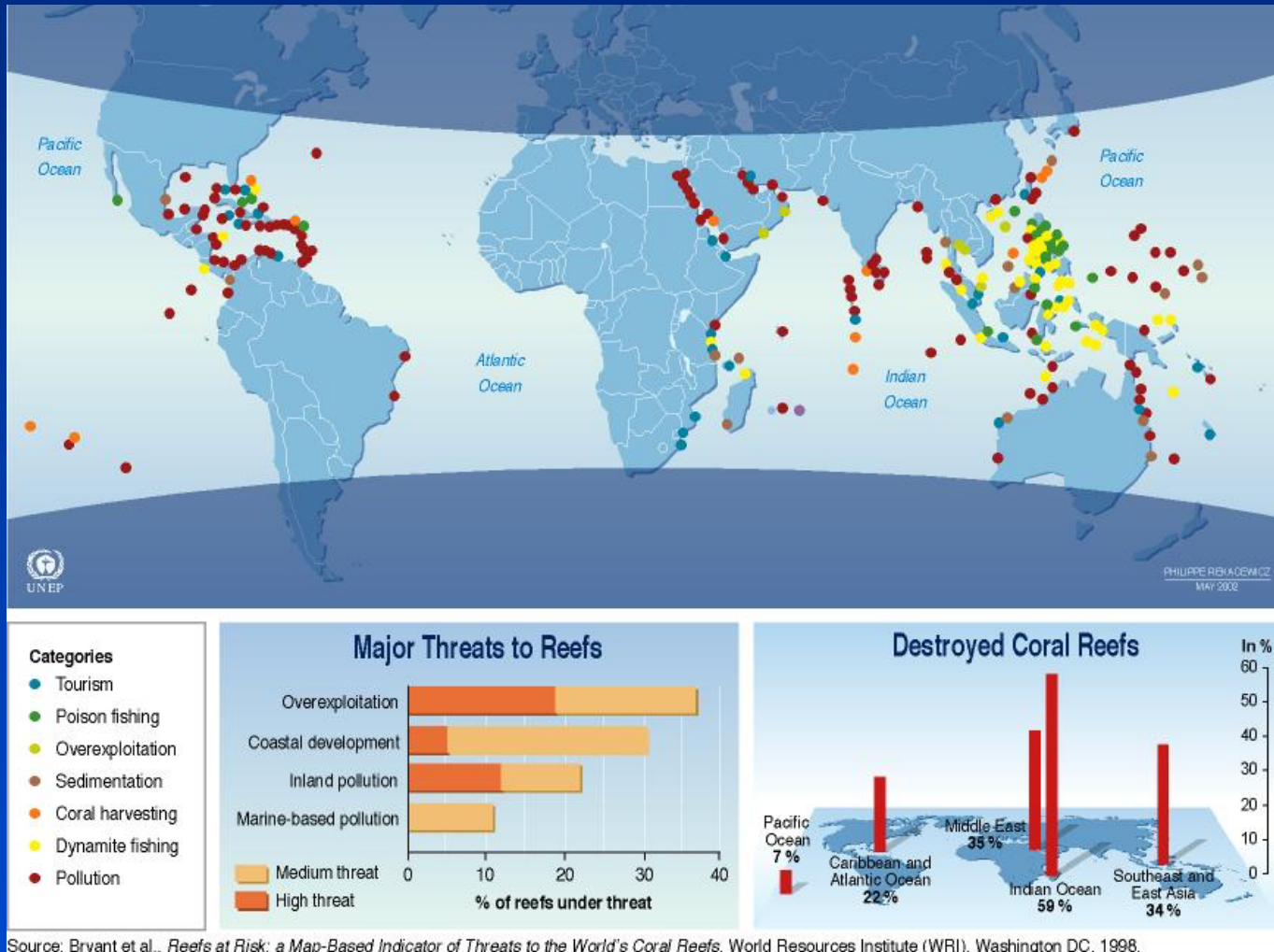
1908

1969

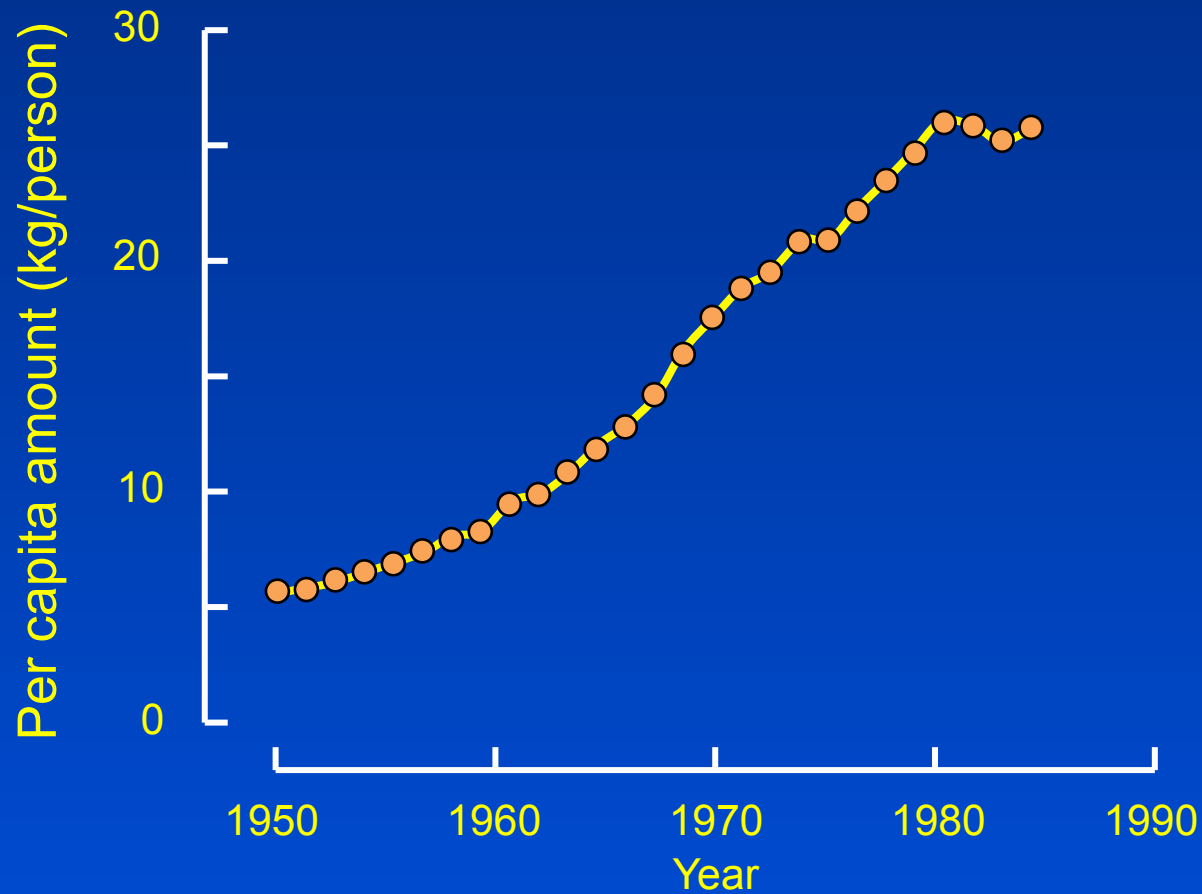
Ocean water acidification



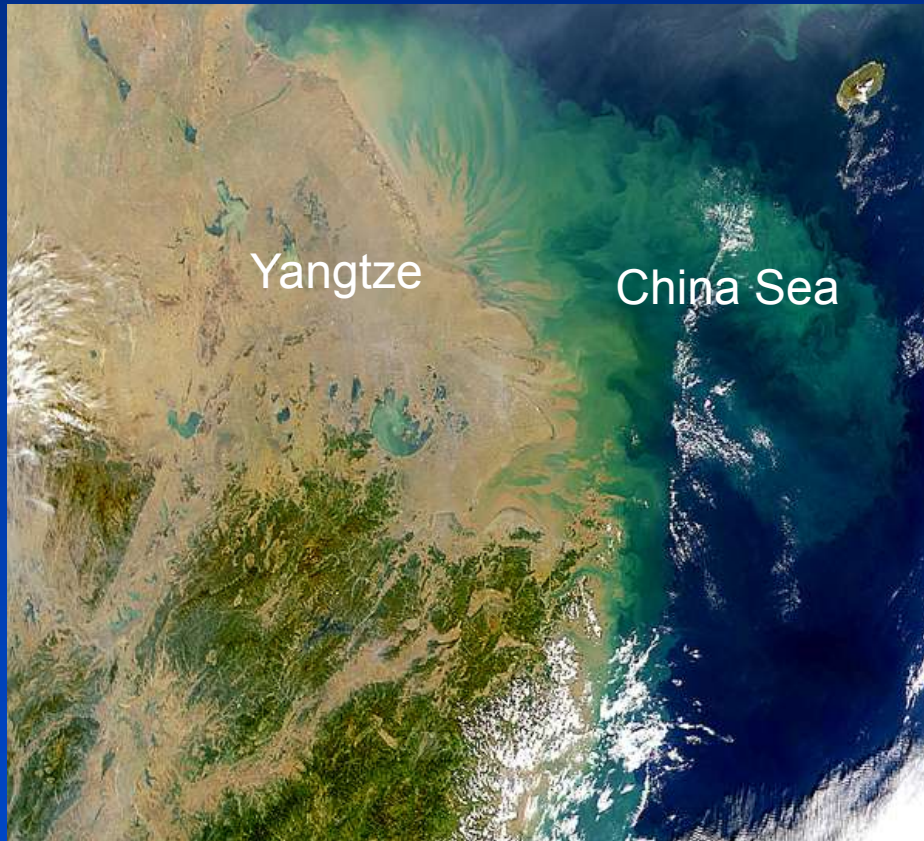
Disappearing coral reefs



Use of fertilizers (world average)

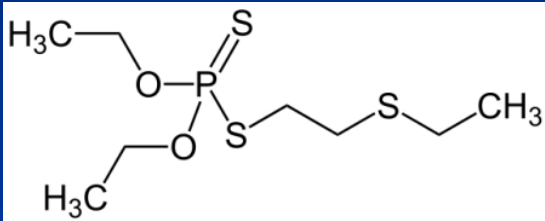


Water eutrophication

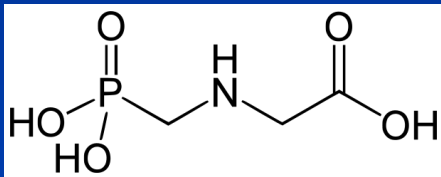


Xenobiotics pollutants

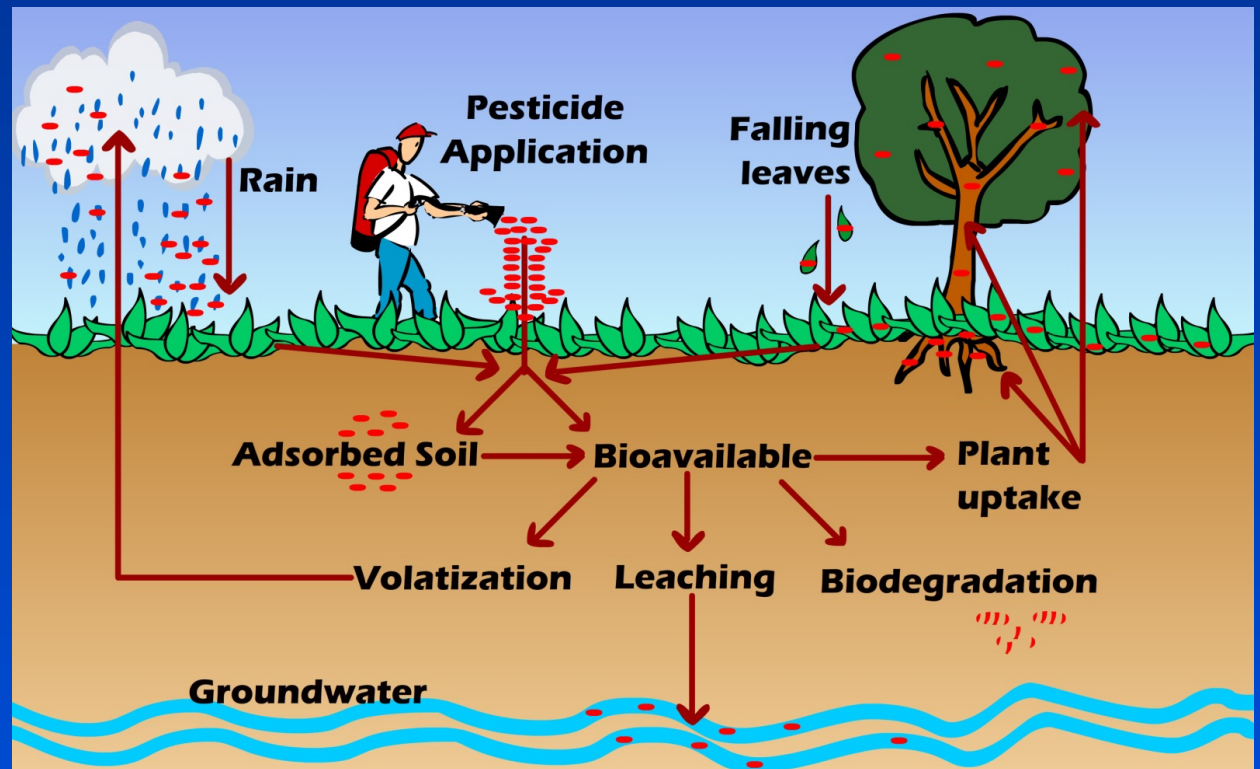
e.g. Organophosphoric compounds



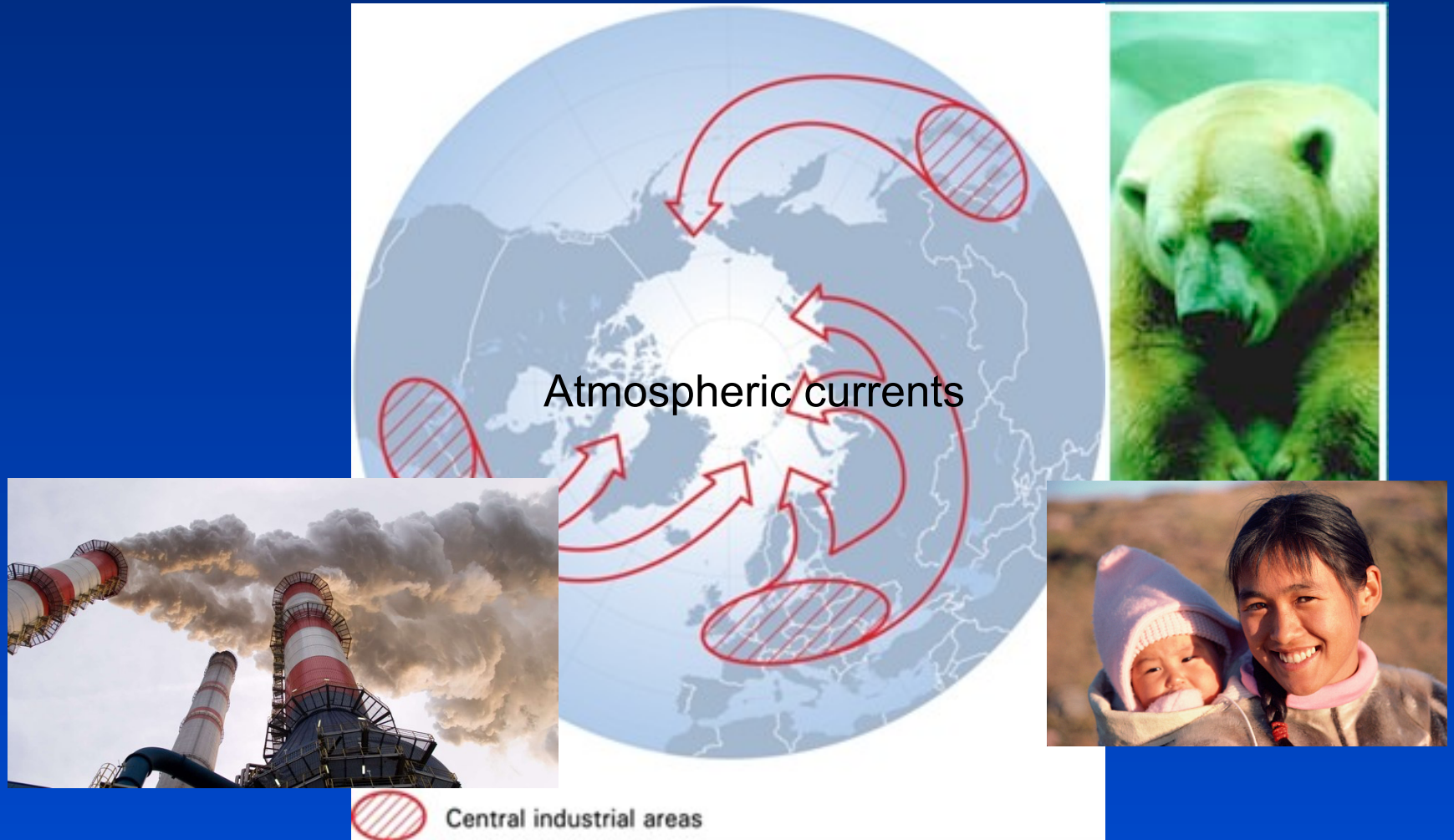
Pesticides



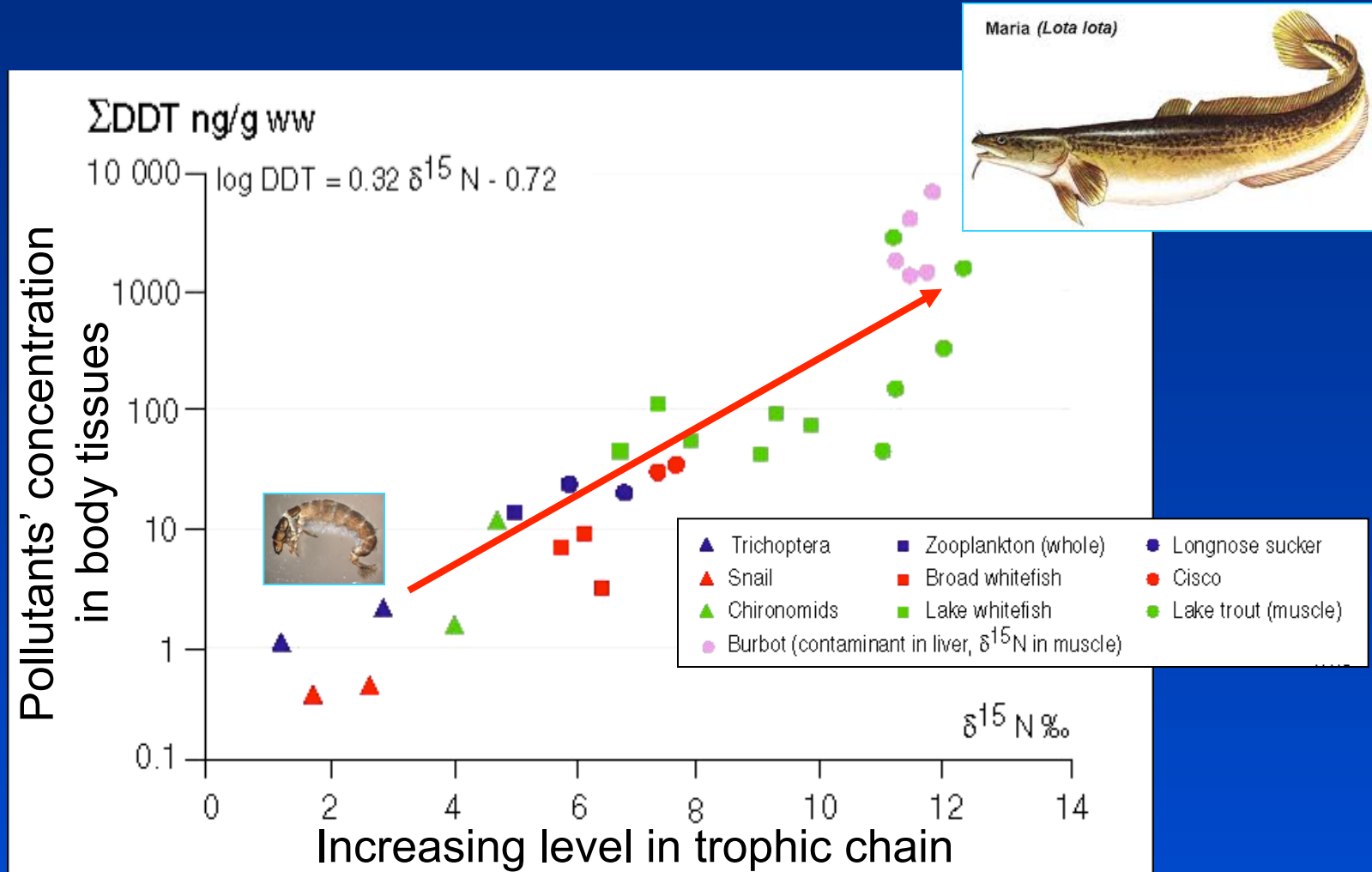
Herbicides



Long range transport of persistent pollutants

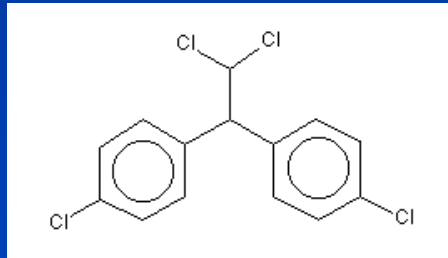


Biomagnification of persistent pollutants



Biomagnification of persistent pollutants and community disruption

DDD treatment of Clear Lake (California)
to eliminate the non biting dipteran
Chaoborus astiptocus



Diclorodifenildicloroetano



Flint & van der Bosch, 1981
in Begon et alii, 1990

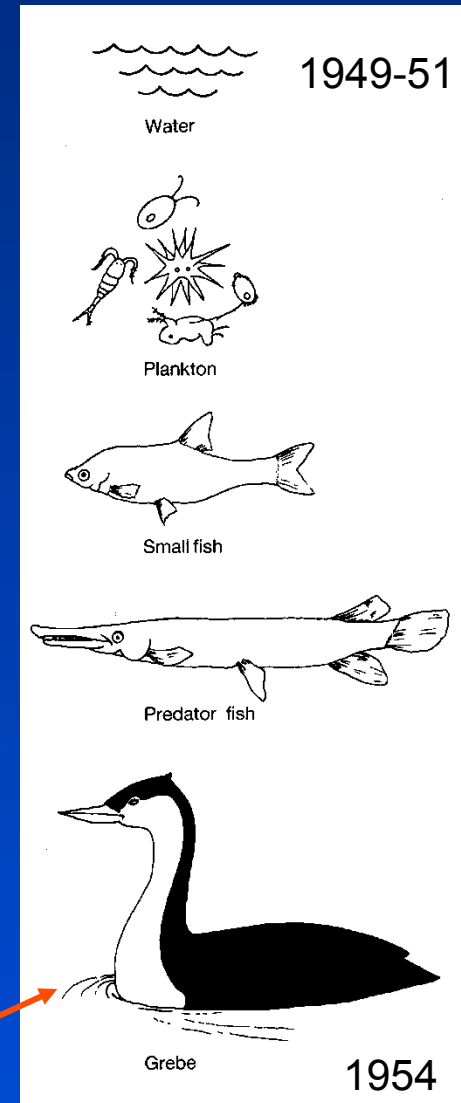
0.02 ppm

5 ppm

10 ppm

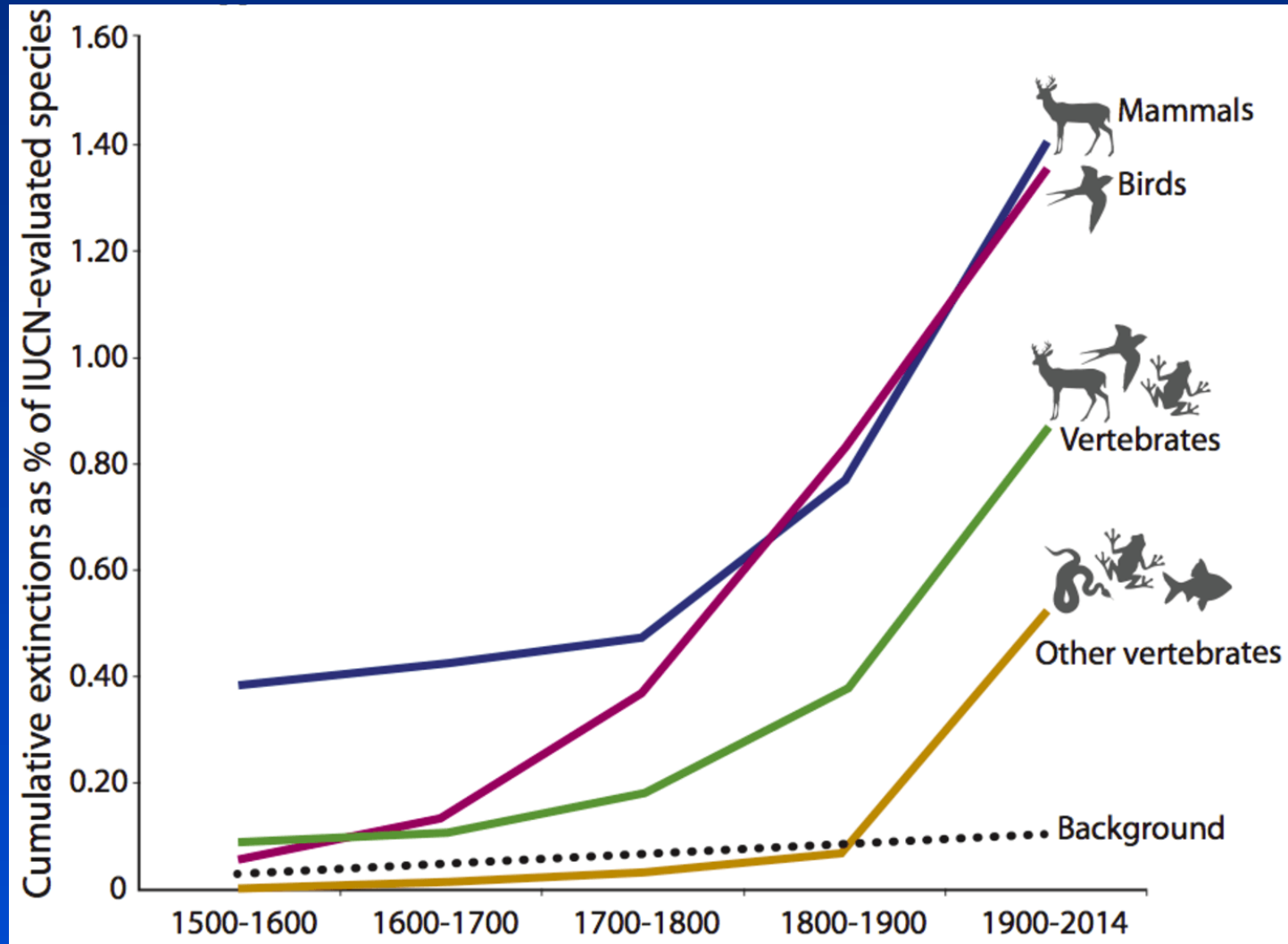
1500 ppm

1600 ppm

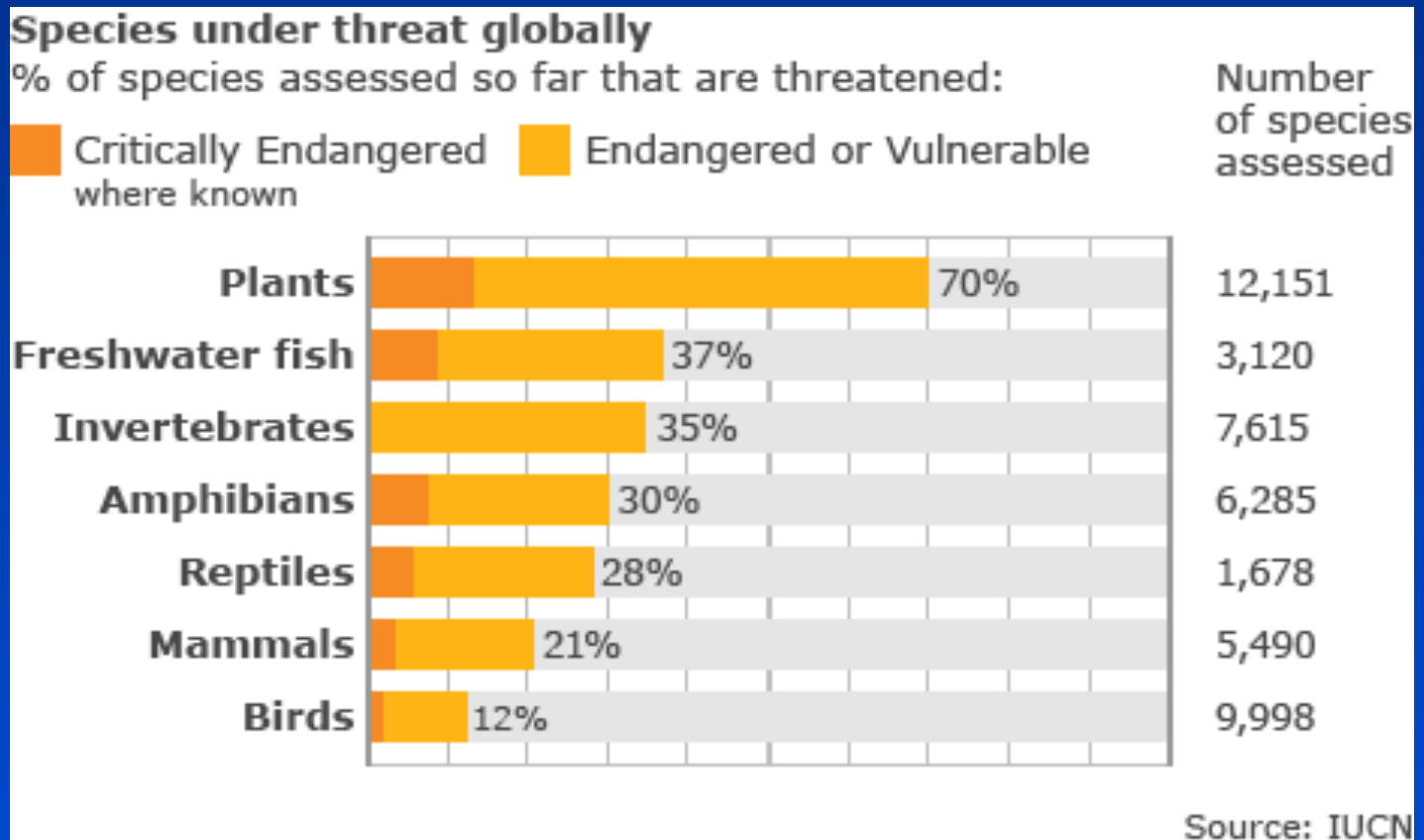


Grebe disappearance

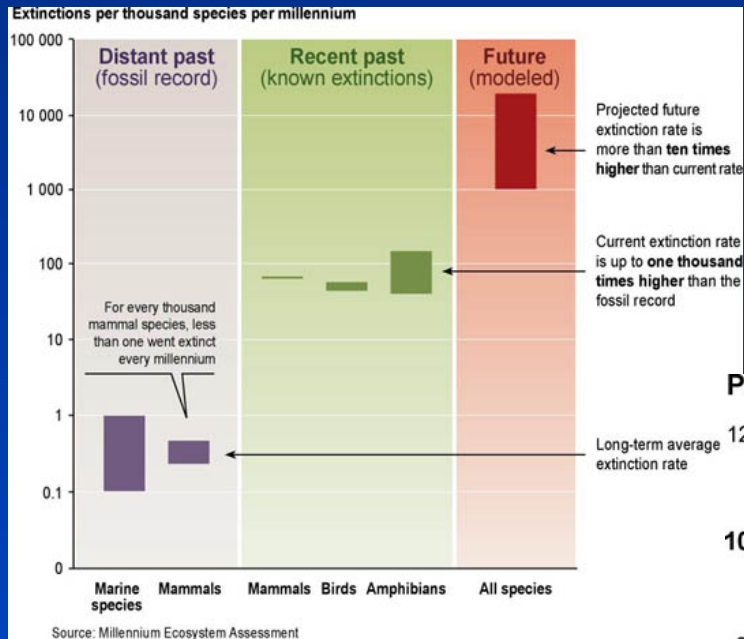
Biodiversity reduction according to IUCN



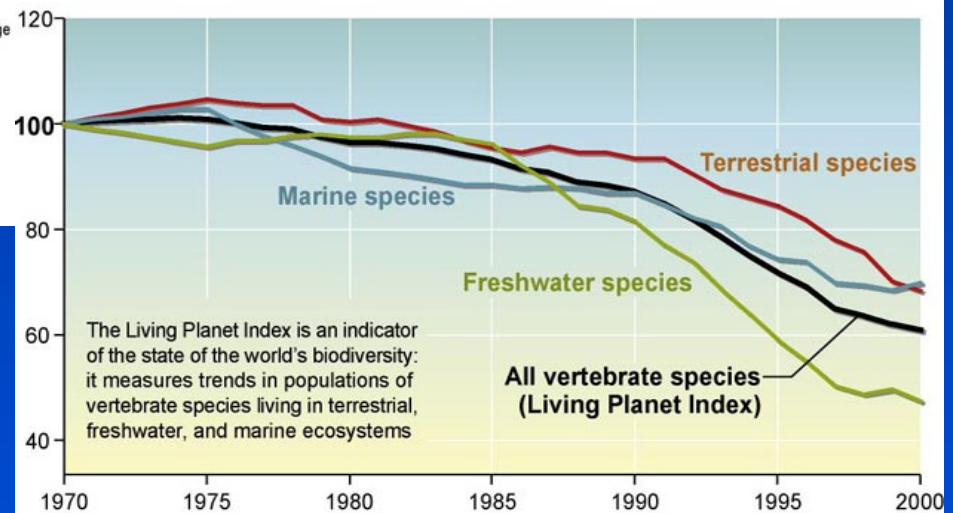
Biodiversity reduction according to IUCN



Biodiversity reduction according to IUCN

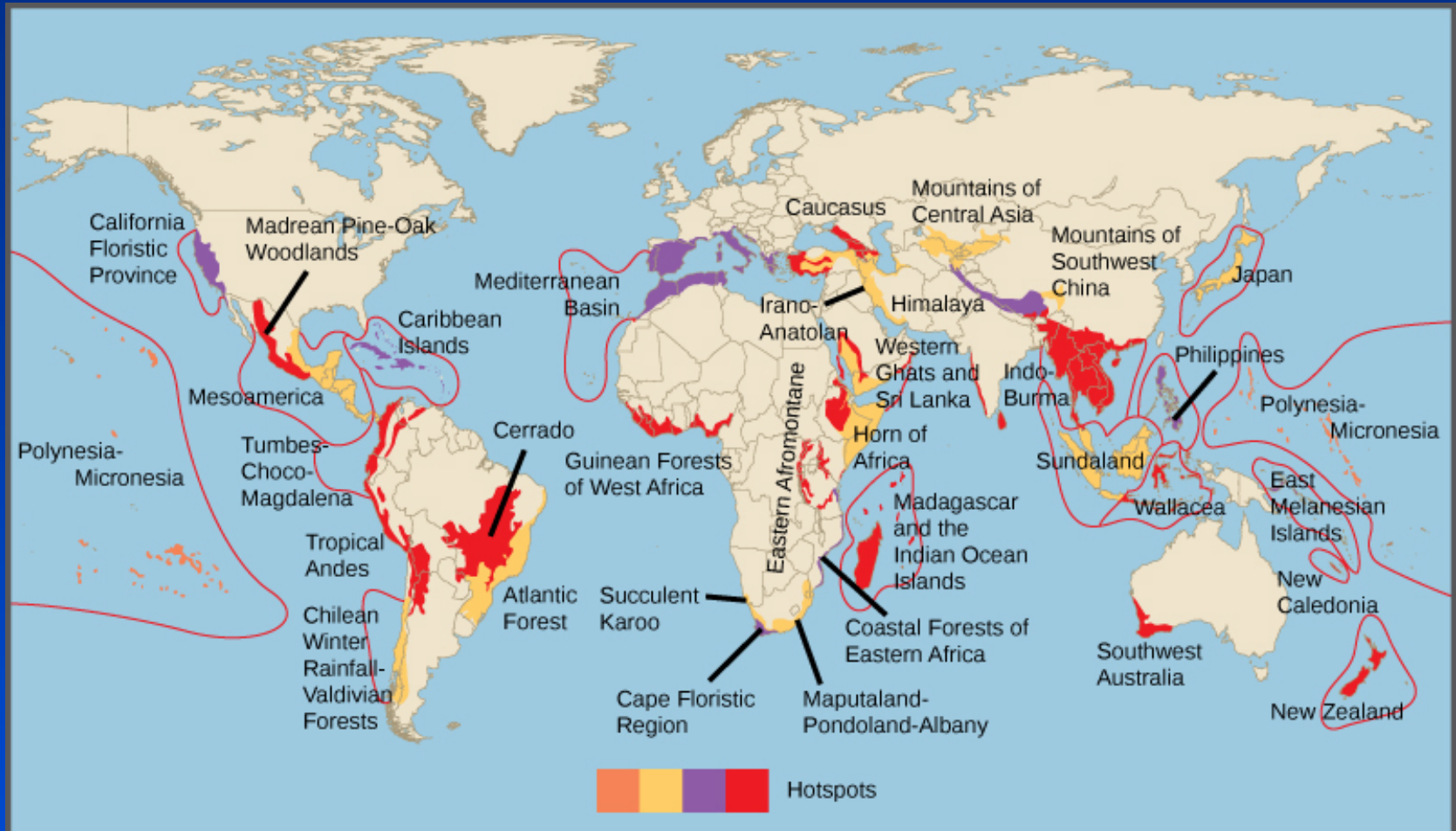


Population Index = 100 in 1970

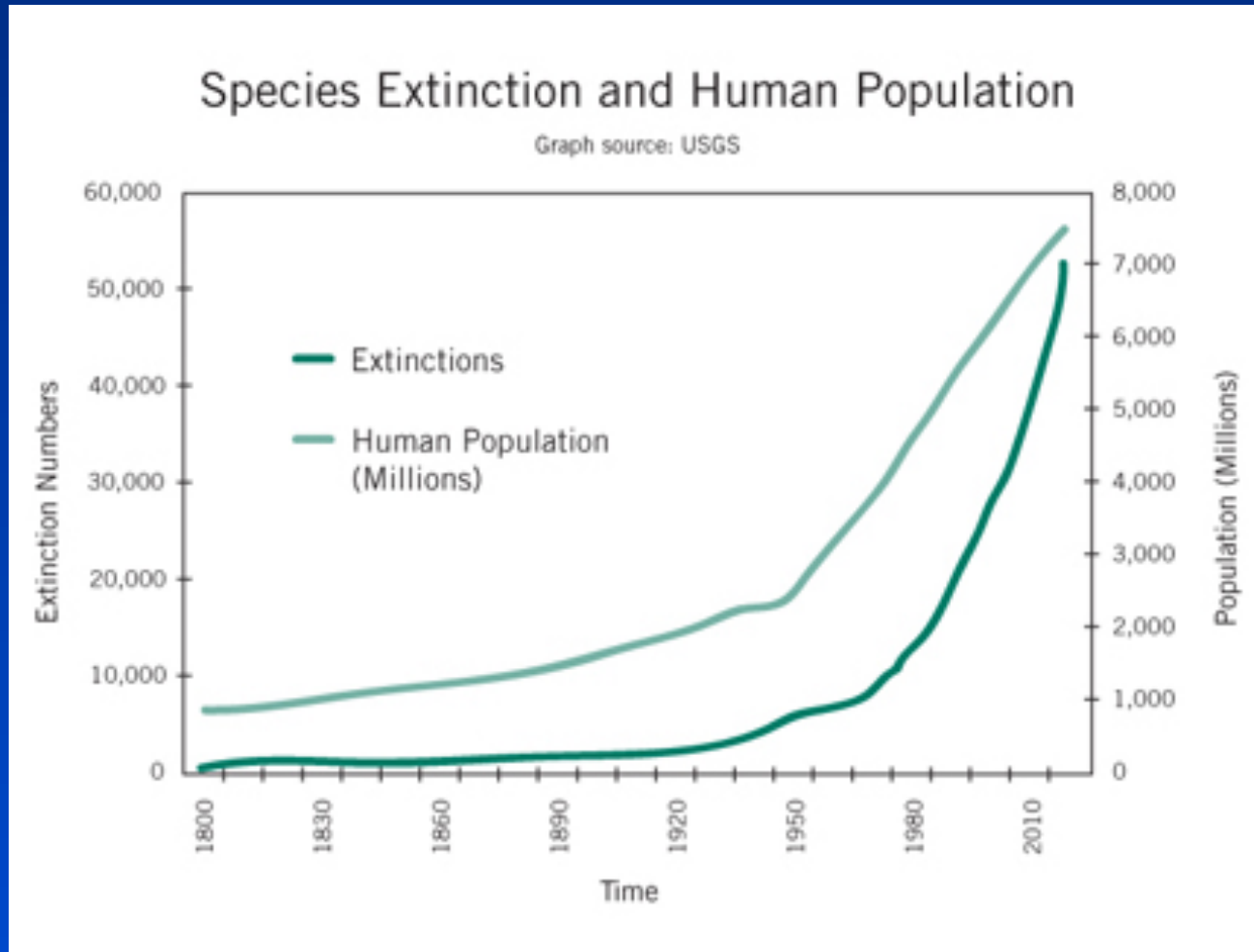


Source: WWF, UNEP-WCMC

Biodiversity (endangered) hotspots



Biodiversity reduction vs human demography



Causes of biodiversity loss

