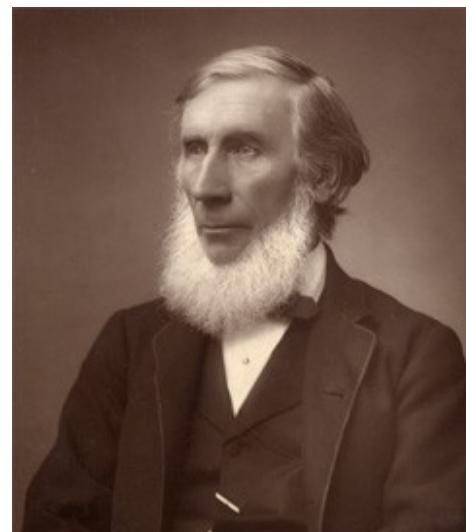


Globální oteplování

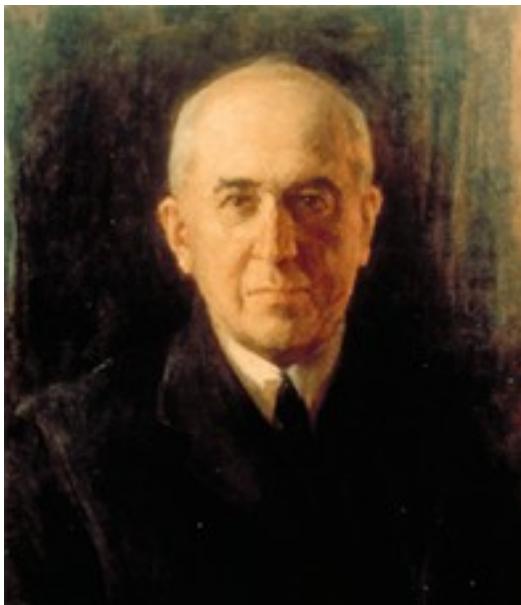
- Historie výzkumu GO
- Měření CO₂
- Měření globální teploty
- Skleníkový jev
- Zpětné vazby
- Globální cirkulace atmosféry
- Emisní scénáře

Historie výzkumu globálního oteplování

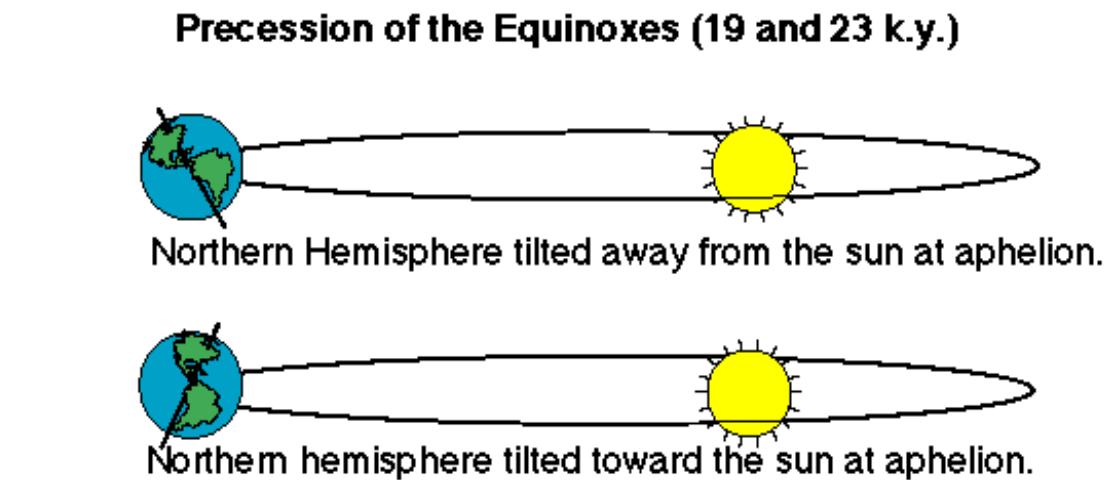
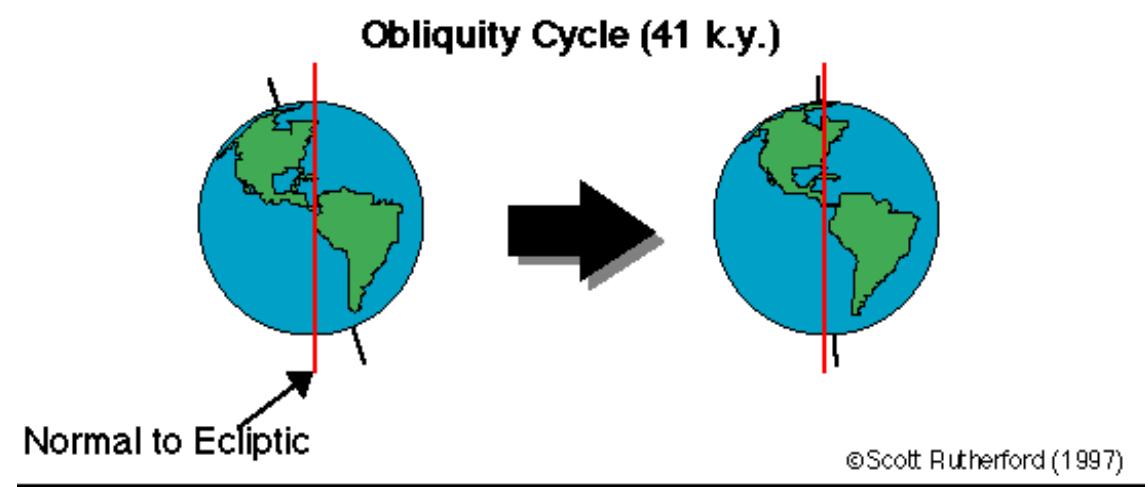
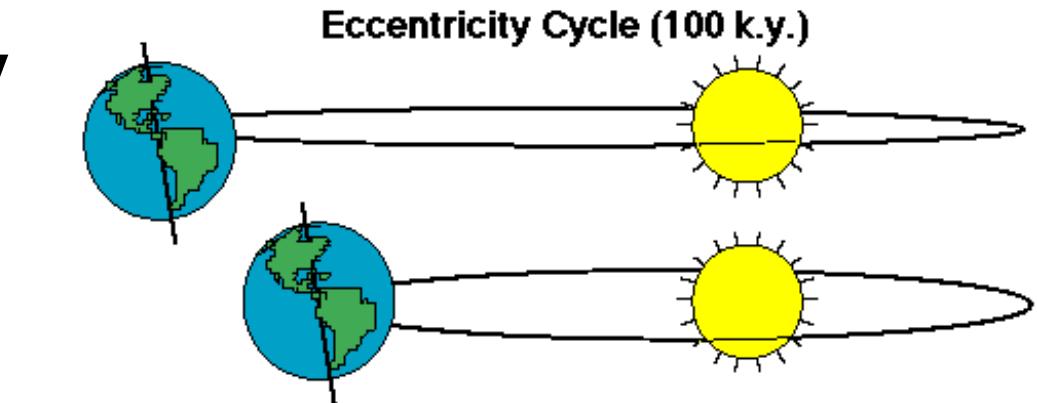
- 1824 – Joseph Fourier (formuloval skleníkový jev)
- 1859 – John Tyndall (proměřil účinnost skleníkových plynů)
- 1894 – Svante Arrhenius (spočítal „citlivost klimatu“)

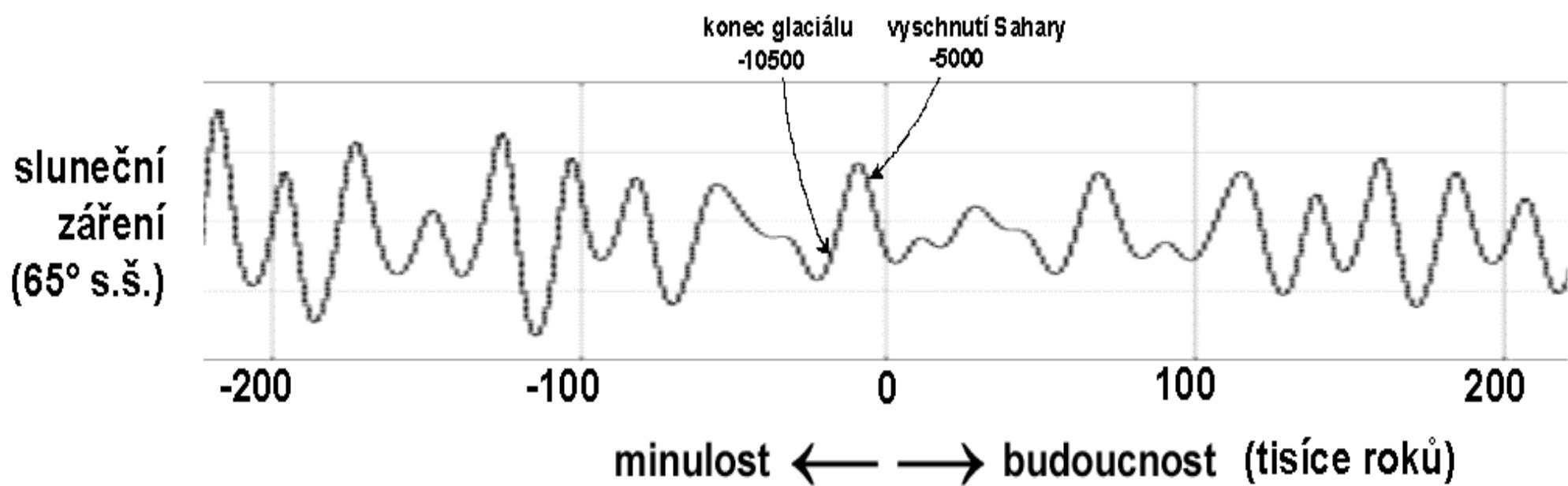
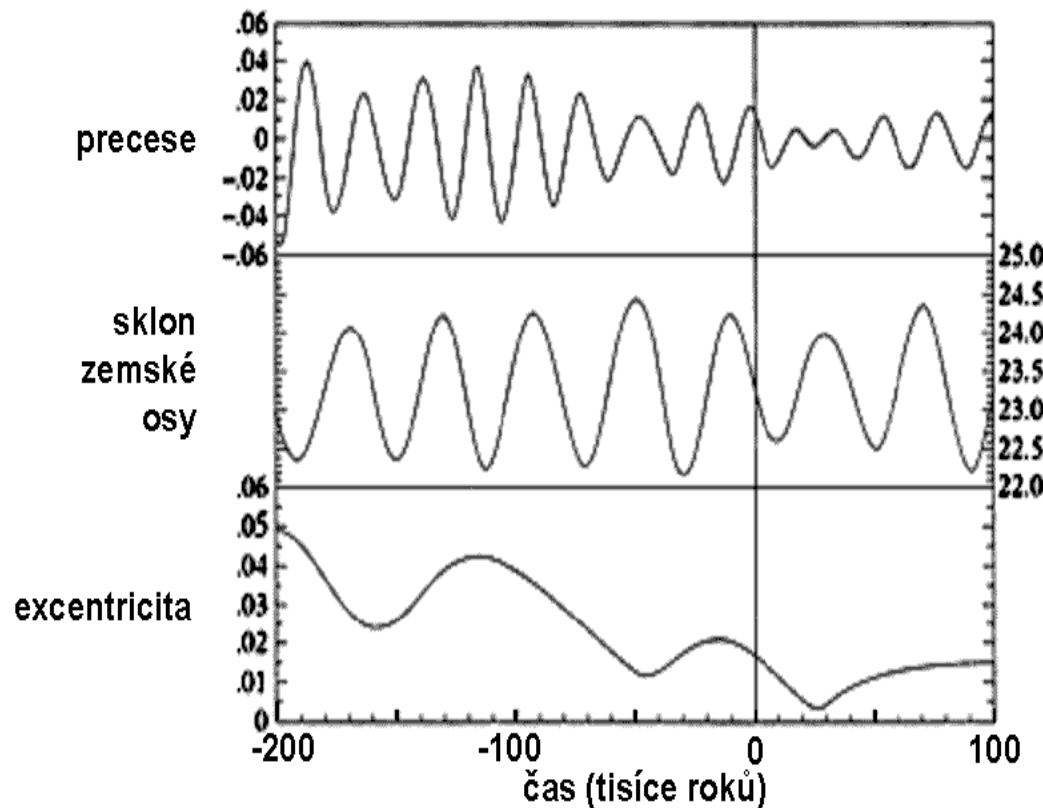


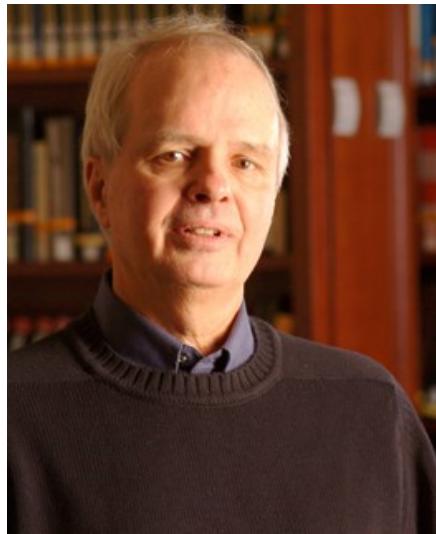
Milankovitchovi cykly 1879-1958



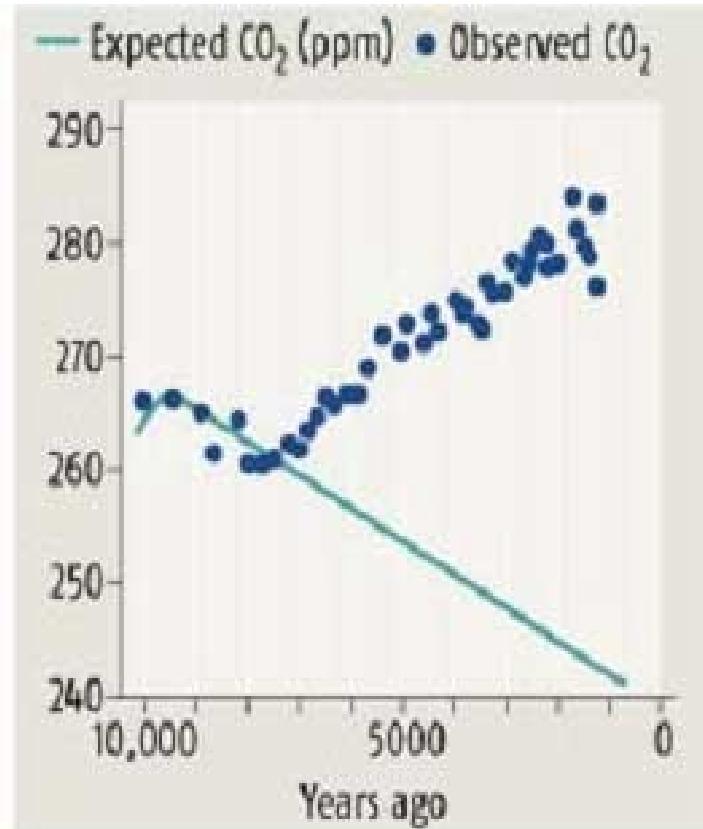
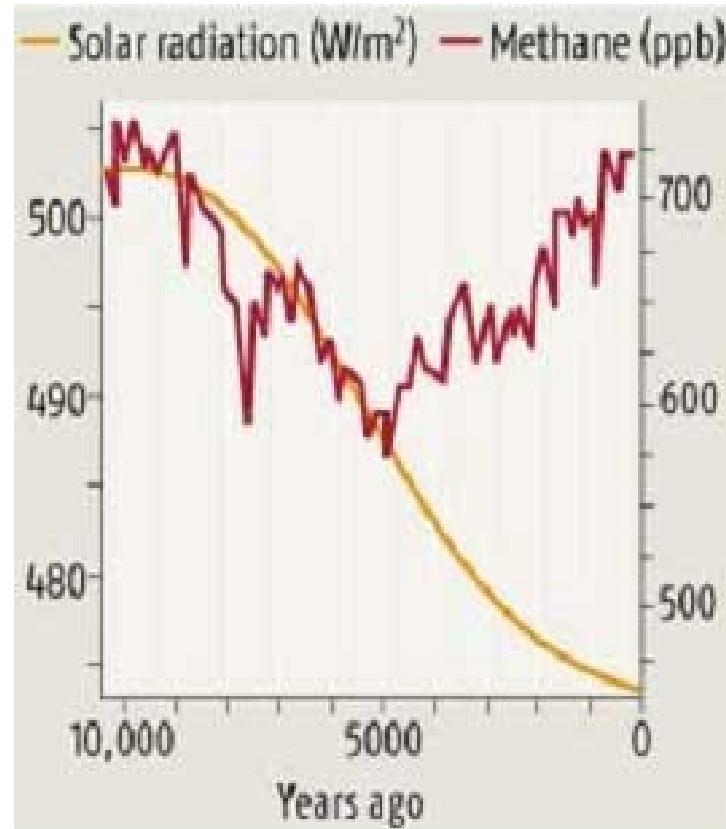
- excentricita
- sklon osy
- precese



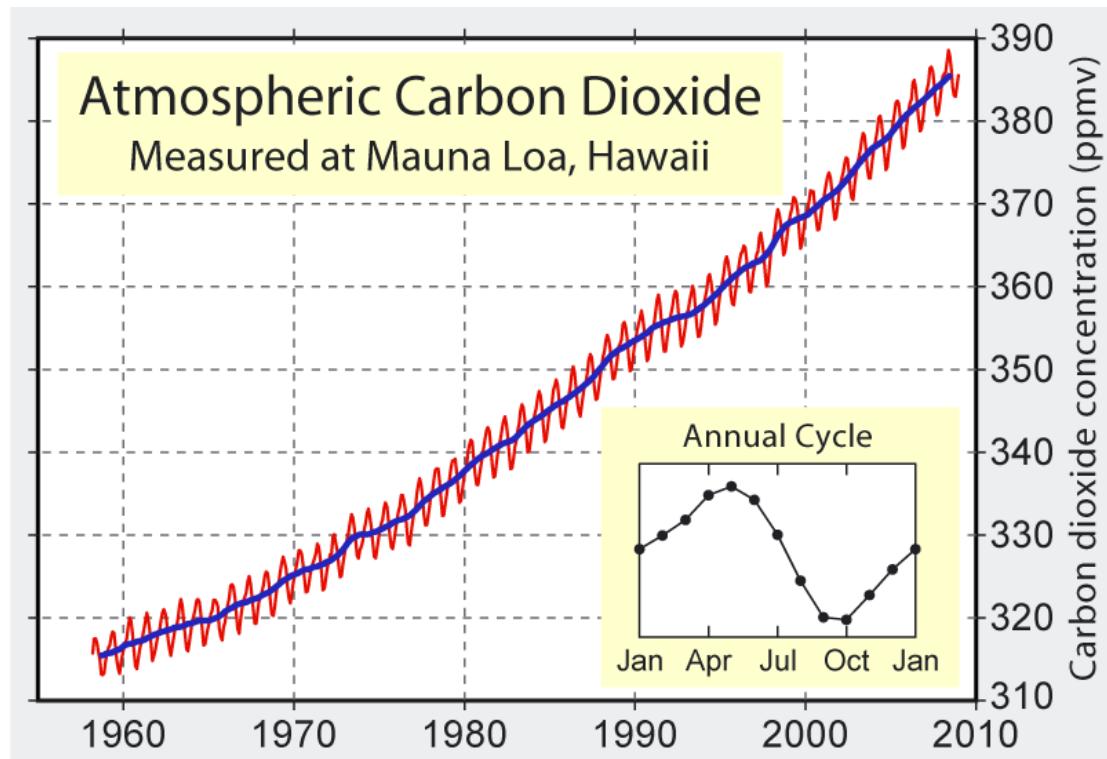




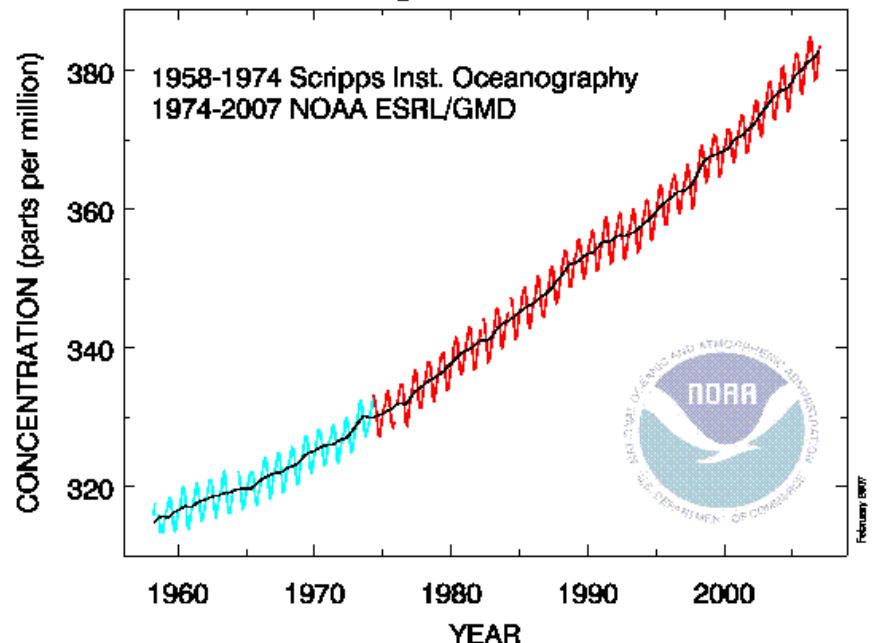
William Ruddiman



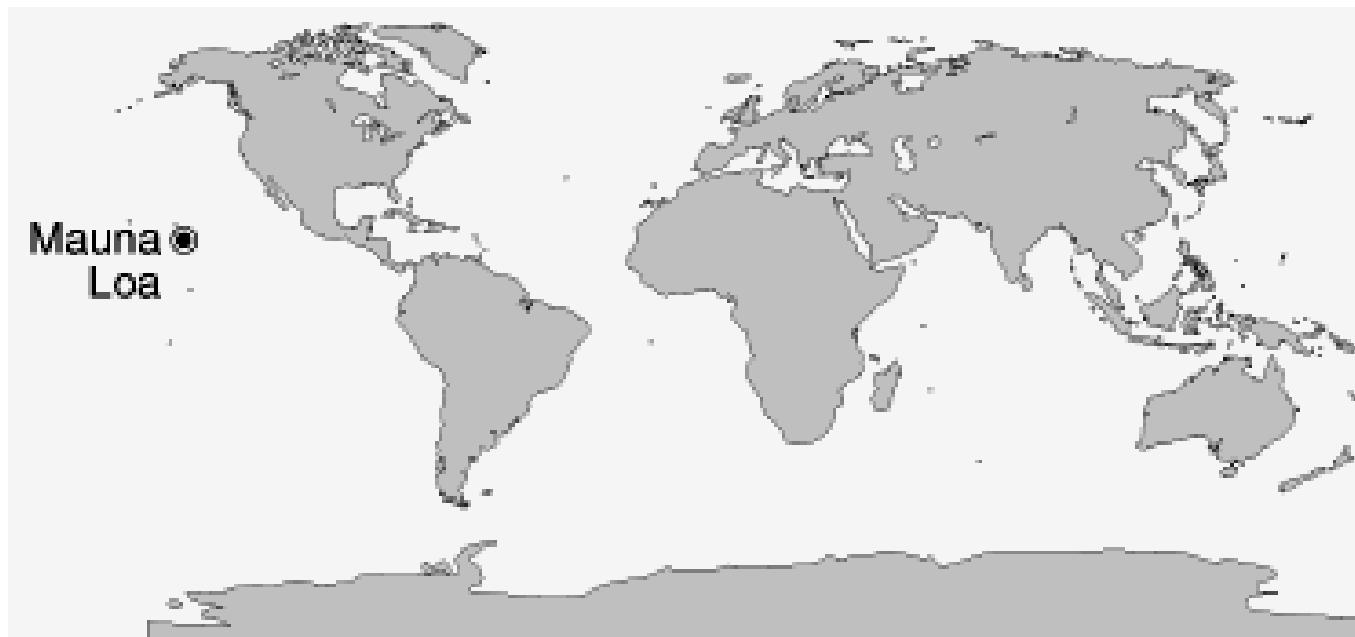
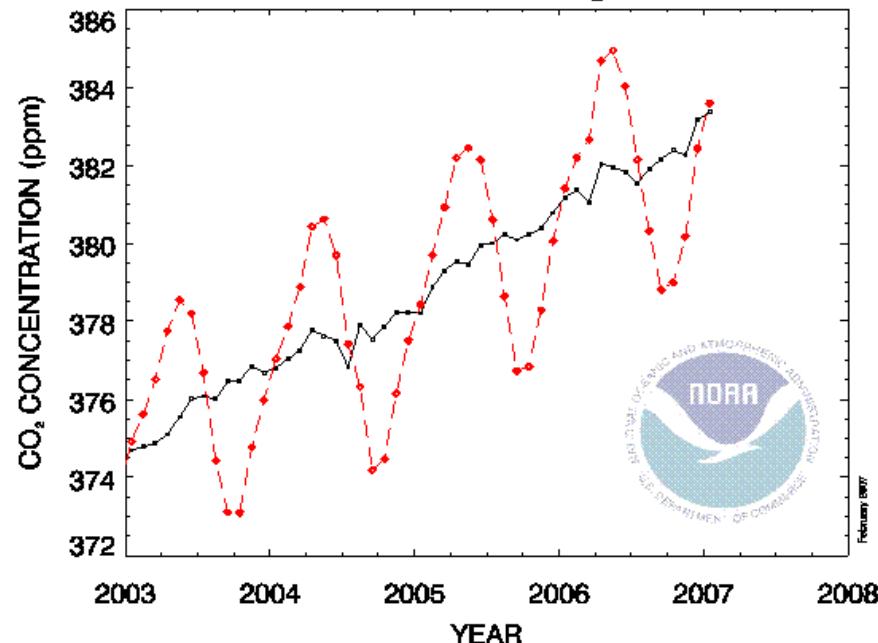
Charles David Keeling - 1958



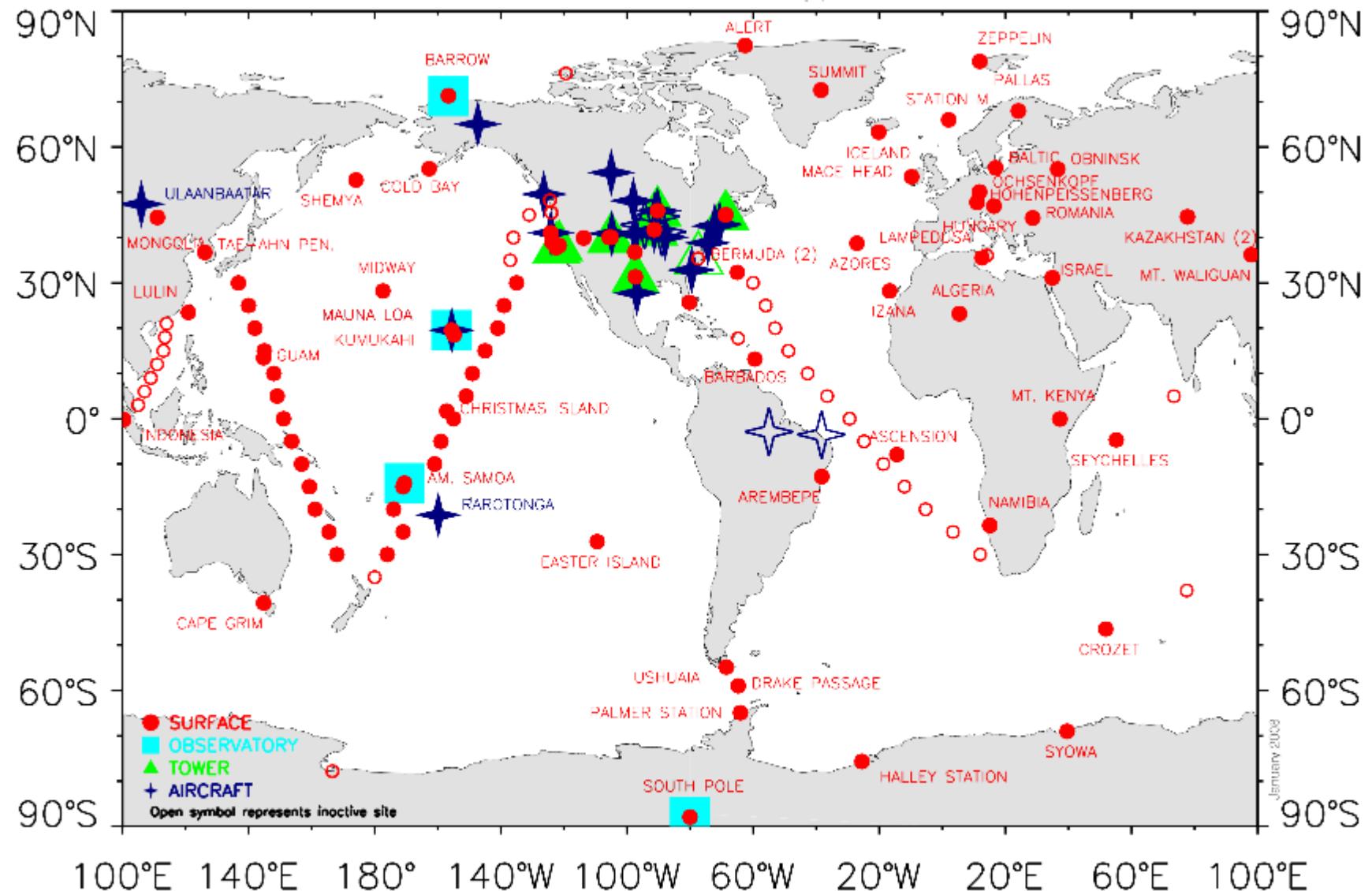
Atmospheric CO₂ at Mauna Loa Observatory



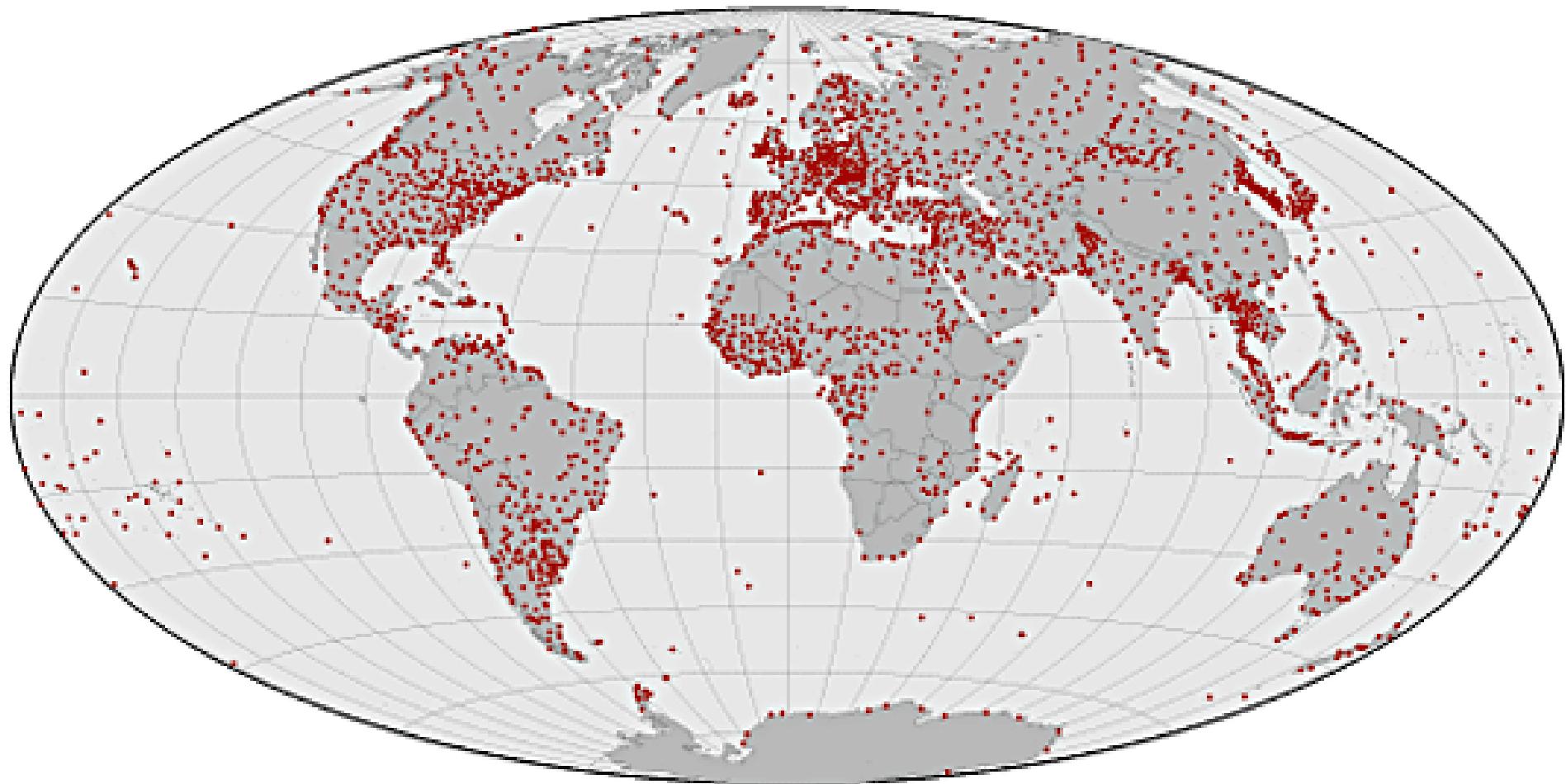
RECENT MONTHLY MEAN CO₂ AT MAUNA LOA



Měření CO₂: The NOAA Earth System Research Laboratory global cooperative air sampling network

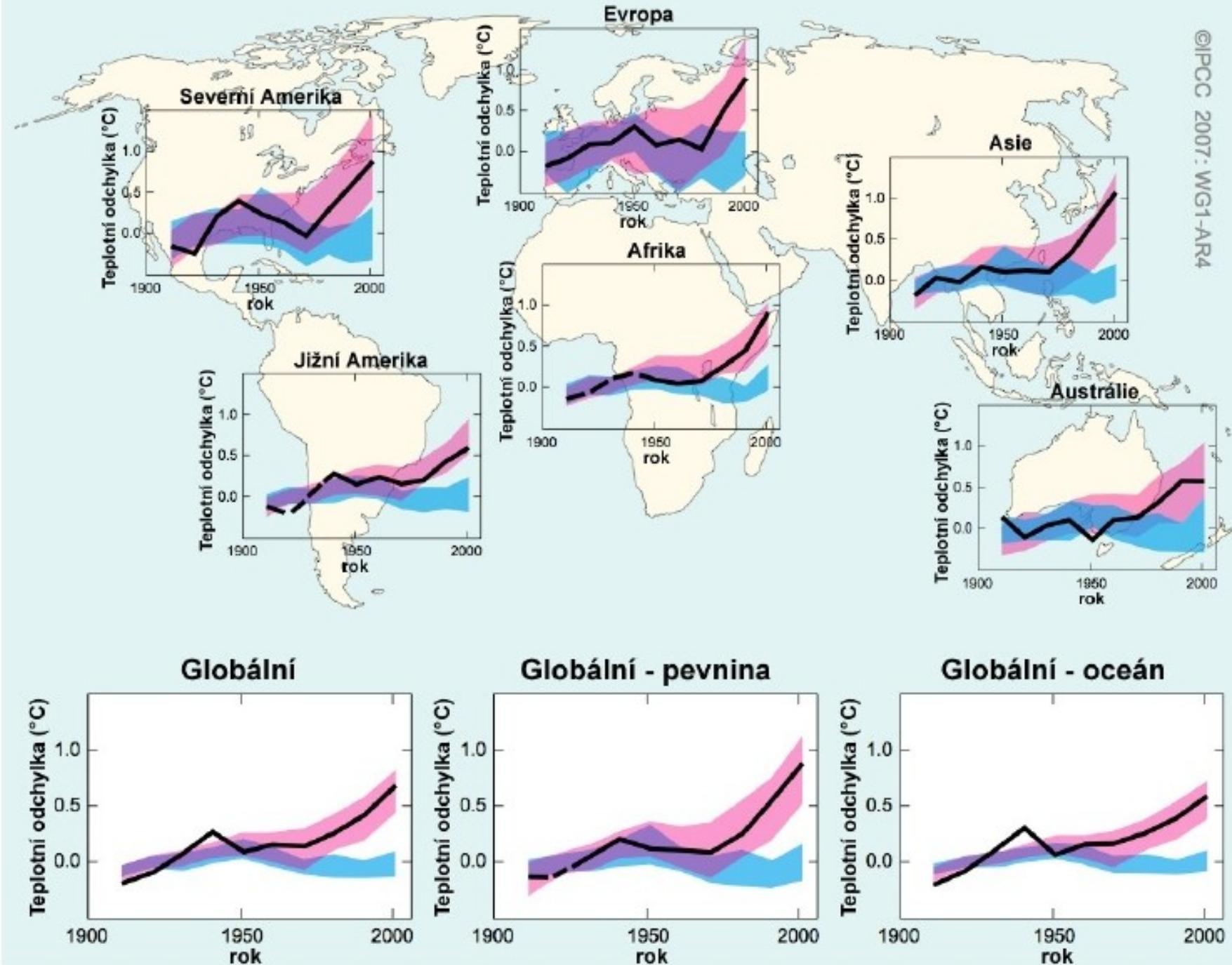


Sít' meteorologických stanic

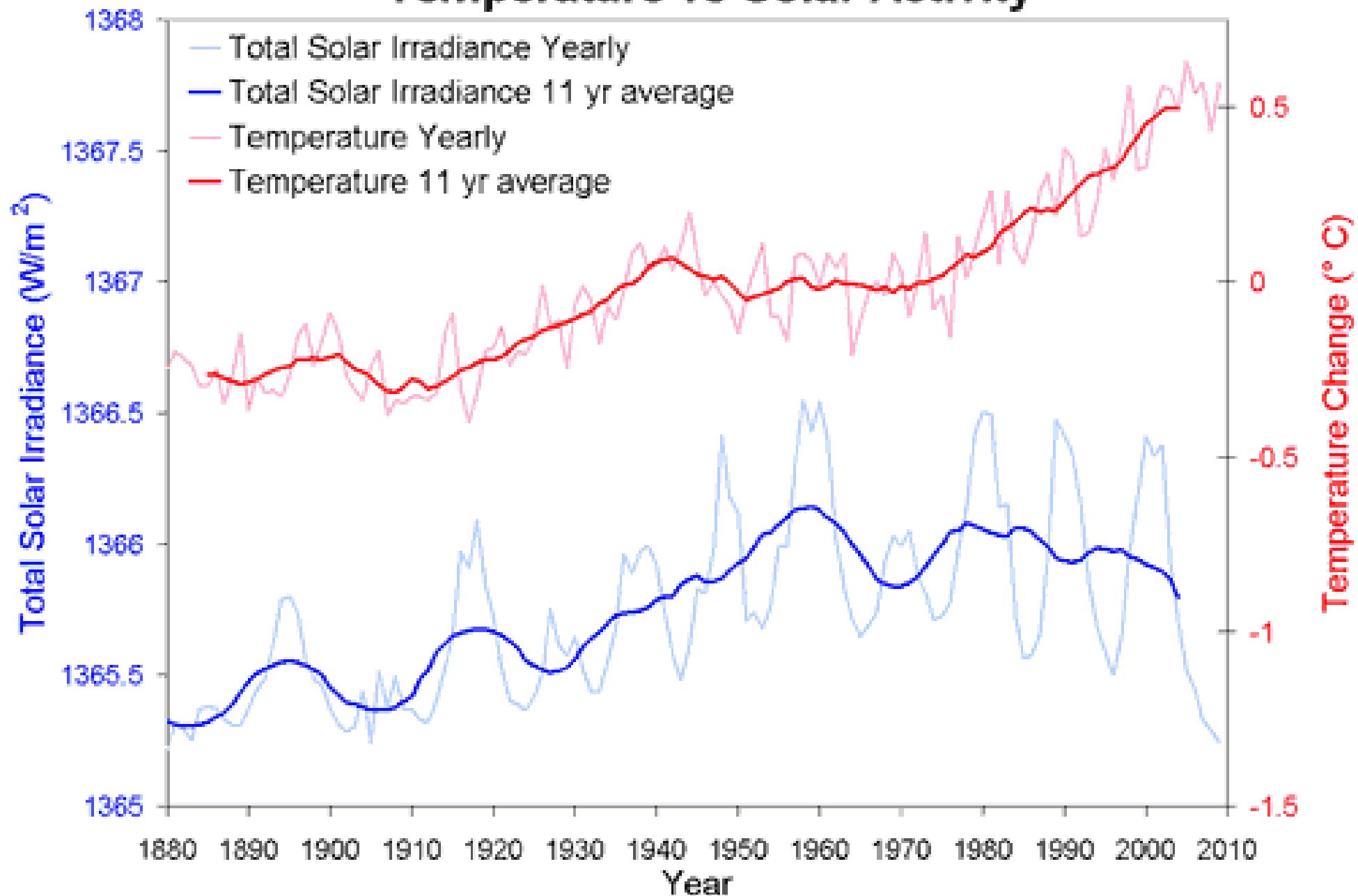


Změna globálních a kontinentálních teplot

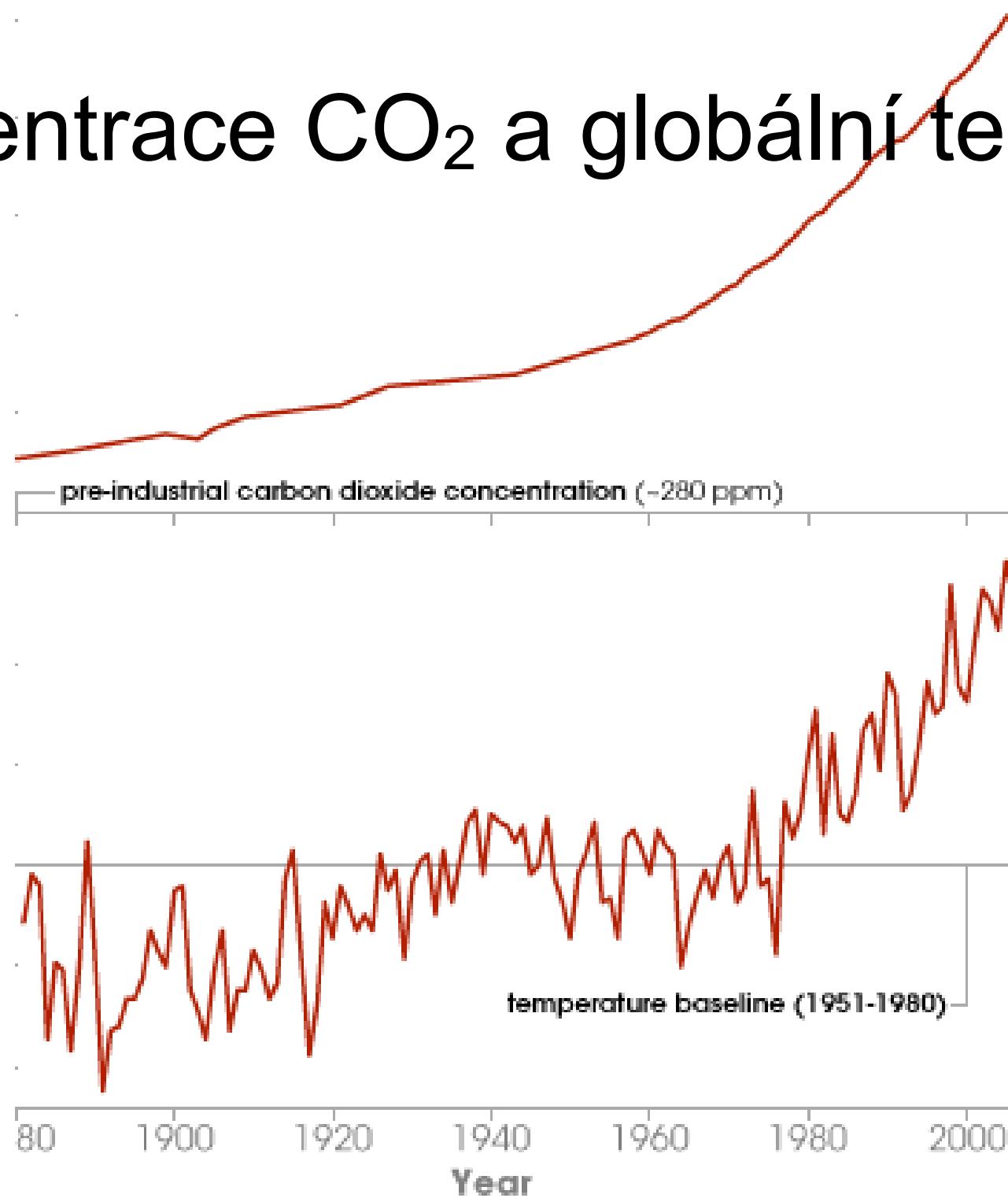
©IPCC 2007: WG1-AR4



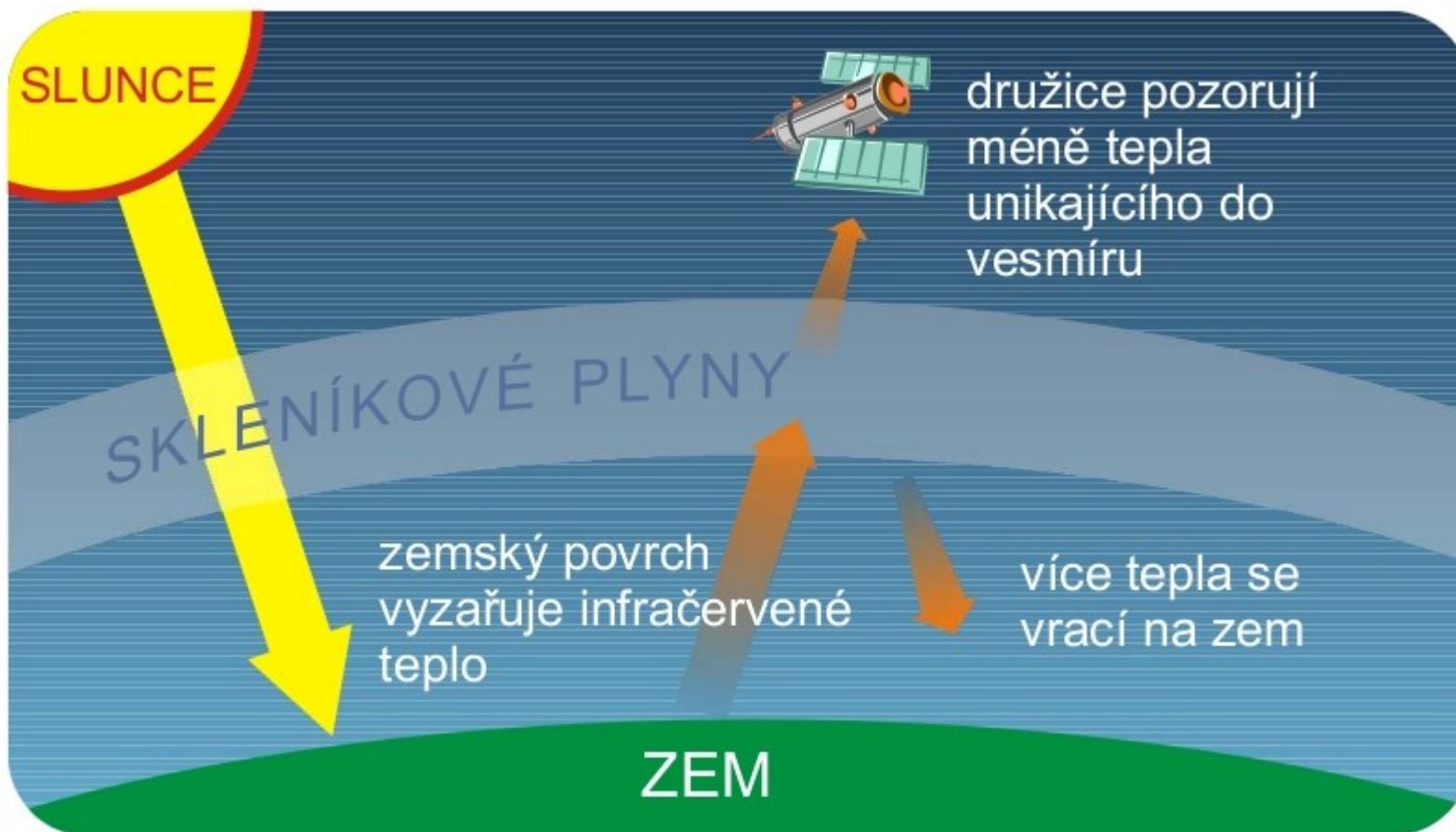
Temperature vs Solar Activity



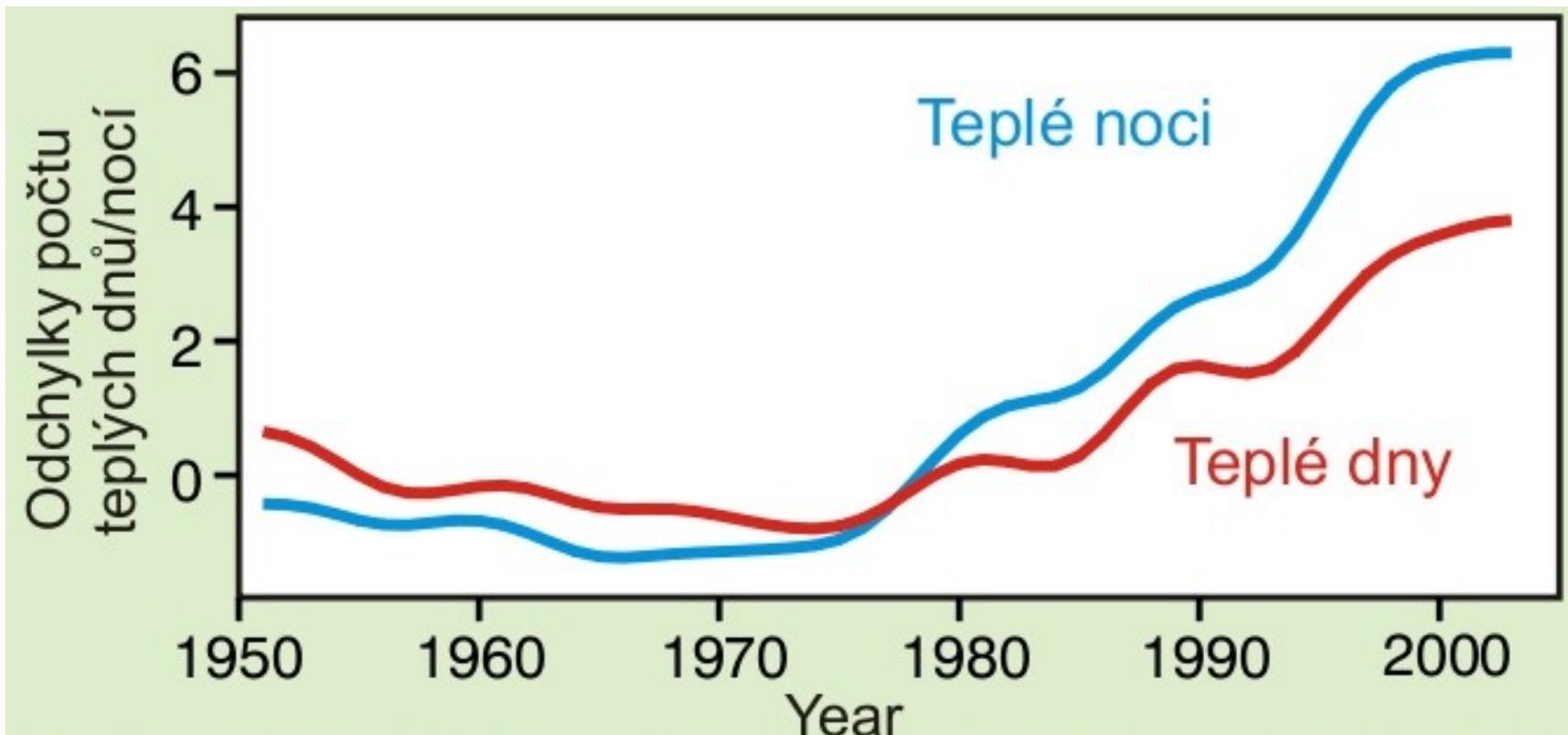
Koncentrace CO₂ a globální teplota



Skleníkový efekt



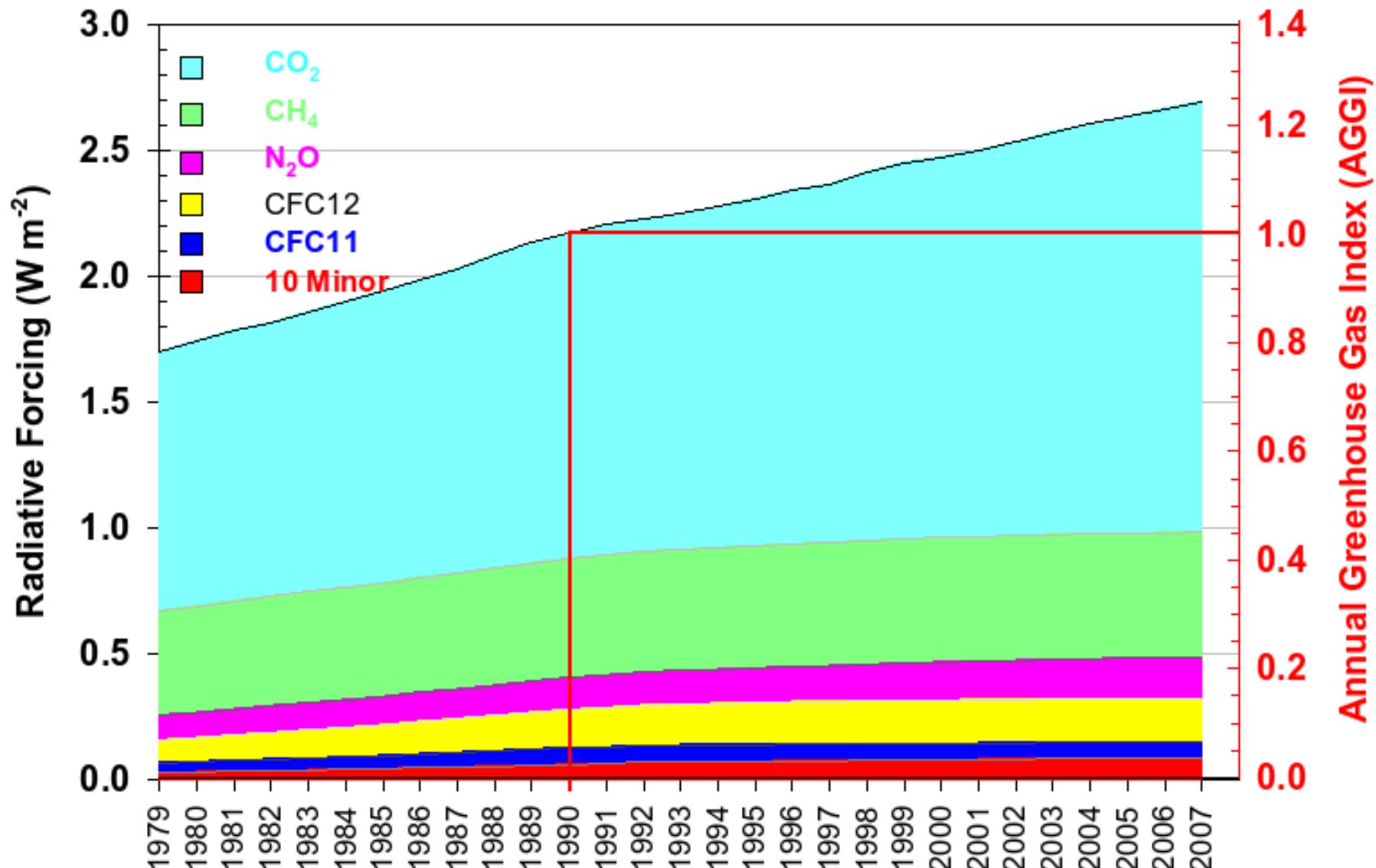
Noci se oteplují rychleji než dny



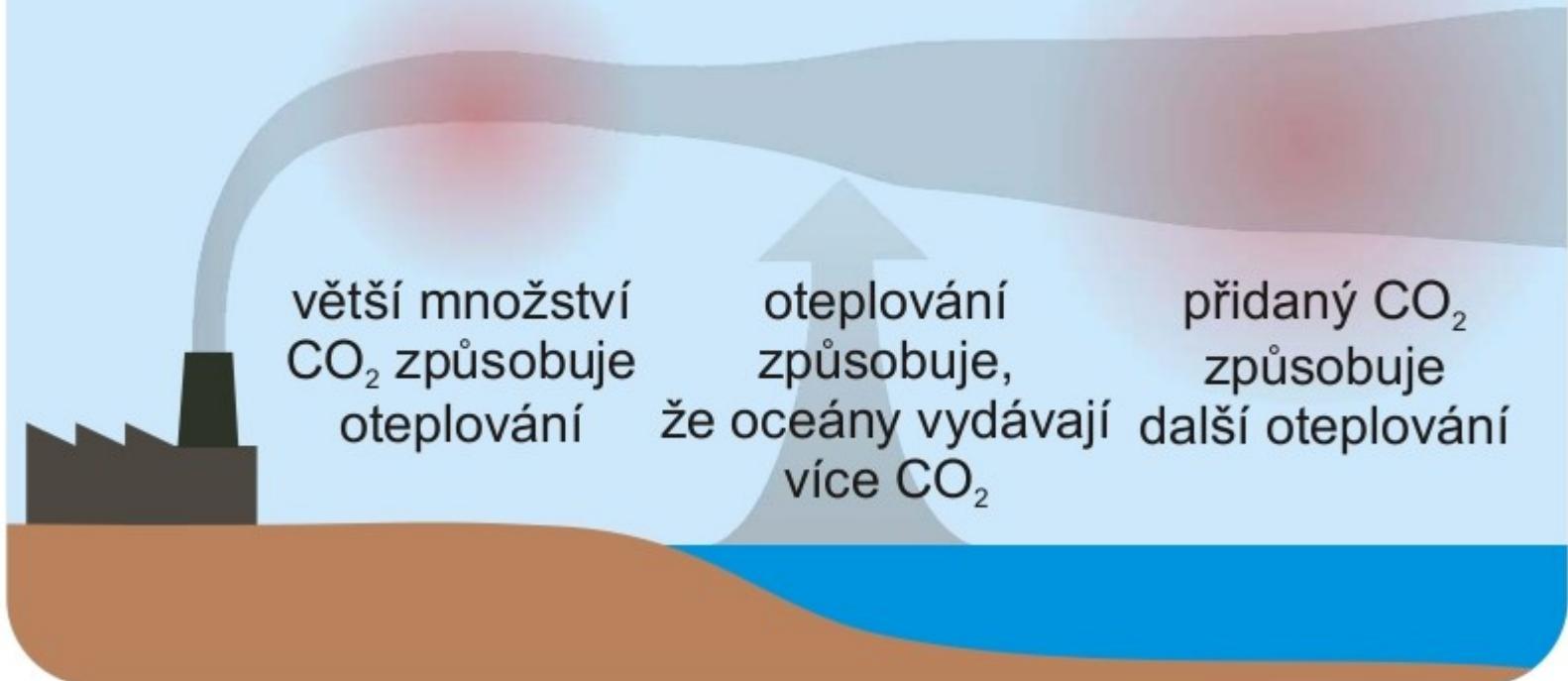
Dlouhodobé odchyly počtu teplých dnů (červeně) a teplých nocí (modře) za rok. Mezi „teplé“ patří horních 10 %.⁶

Skleníkové plyny

NOAA Annual Greenhouse Gas Index

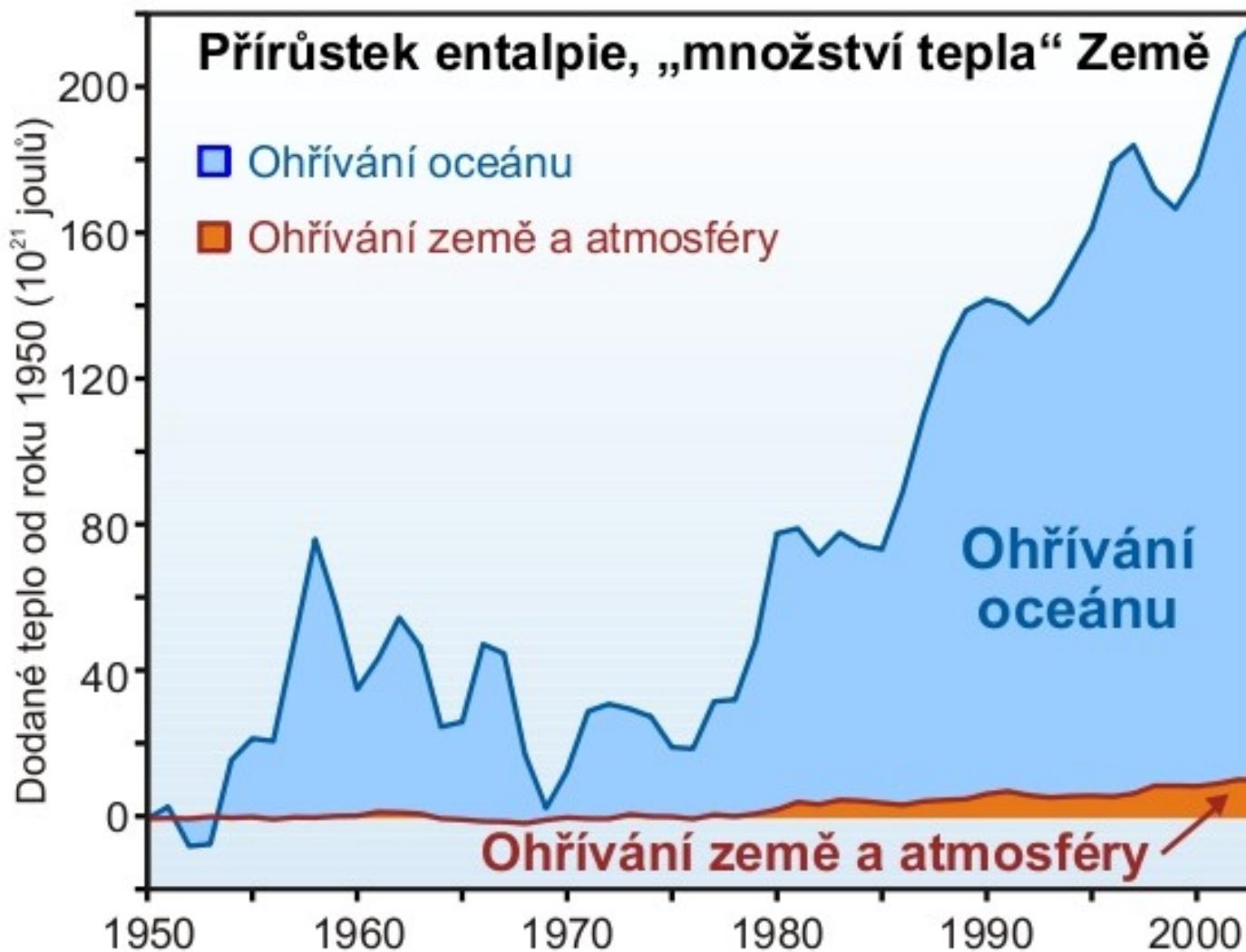


Příklad pozitivní zpětné vazby



Příklady klimatické zpětné vazby

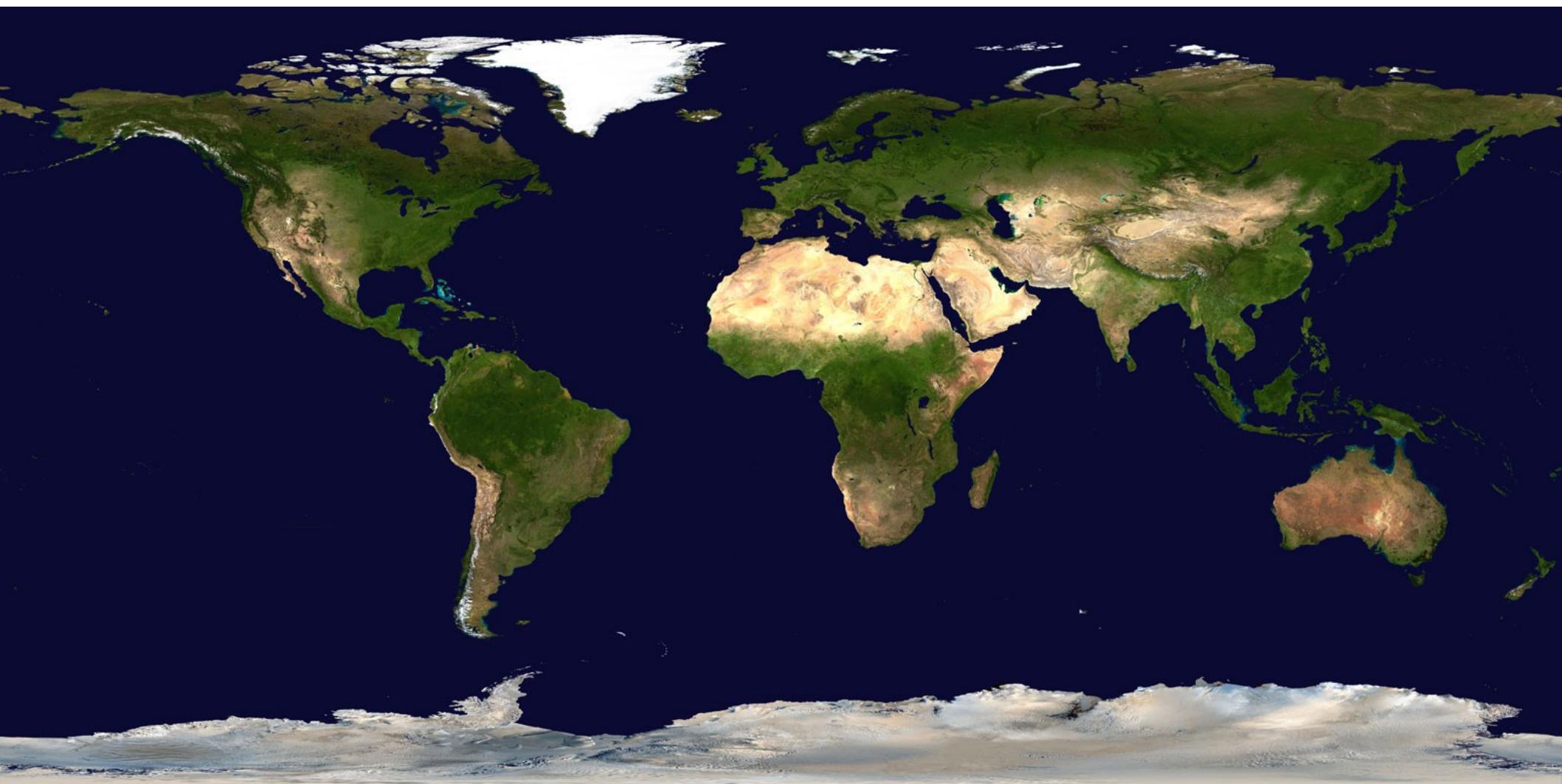




Indikátory oteplujícího se světa



Parmesan & Yohe 2003³², NOAA³⁴



The world: 4°C warmer

No one knows exactly what this world will look like, but models provide insights into forced human migrations and our future power generation

Arctic passage

With no sea ice, this valuable shipping route is open all year, providing transportation links between habitable zones in Canada and Russia

Greenland

Greenland's ice sheet will be melting rapidly

Canada

Reliable precipitation and warmer temperatures provide ideal growing conditions for most of the world's subsistence crops

South-west US

Desertification led to the last inhabitants of this region migrating north. The Colorado river is a mere trickle. The land is used for solar farming and geothermal energy

Amazon Desert

North Africa/Middle East/Southern US
Solar Energy Belt stretches for thousands of kilometres, employing a mixture of photovoltaic and solar thermal energy. At frequent intervals a high voltage direct-current substation sends power north

Peru

Deglaciation means this area is dry and uninhabitable

Patagonia

Melted glaciers revealed a new arable zone, although the poor soils needed preparation

Western Antarctica

Unrecognisable now. Densely populated with high-rise cities

Scandinavia/UK/Northern Russia/Greenland

Compact high-rise cities would provide shelter for much of the world's population

Siberia

Reliable precipitation and warmer temperatures provide ideal growing conditions for most of the world's subsistence crops

Southern Europe

Deserts have encroached on the continent, rivers have dried up and the Alps are snow-free. Goats and other hardy animals are kept at the fringes

Southern China

Dried rivers and aquifers mean this region has been abandoned. Intense monsoons have helped erode the land, leaving a dustbowl

Polynesia

Vanished beneath the sea

Asia

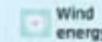
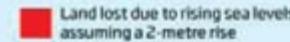
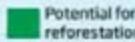
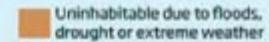
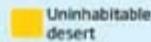
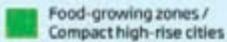
Most of the Himalayan glaciers have melted, with repercussions for many of the major rivers in the region. Bangladesh is largely abandoned, as is south India. Pakistan and Afghanistan. Isolated communities remain in pockets

Australia

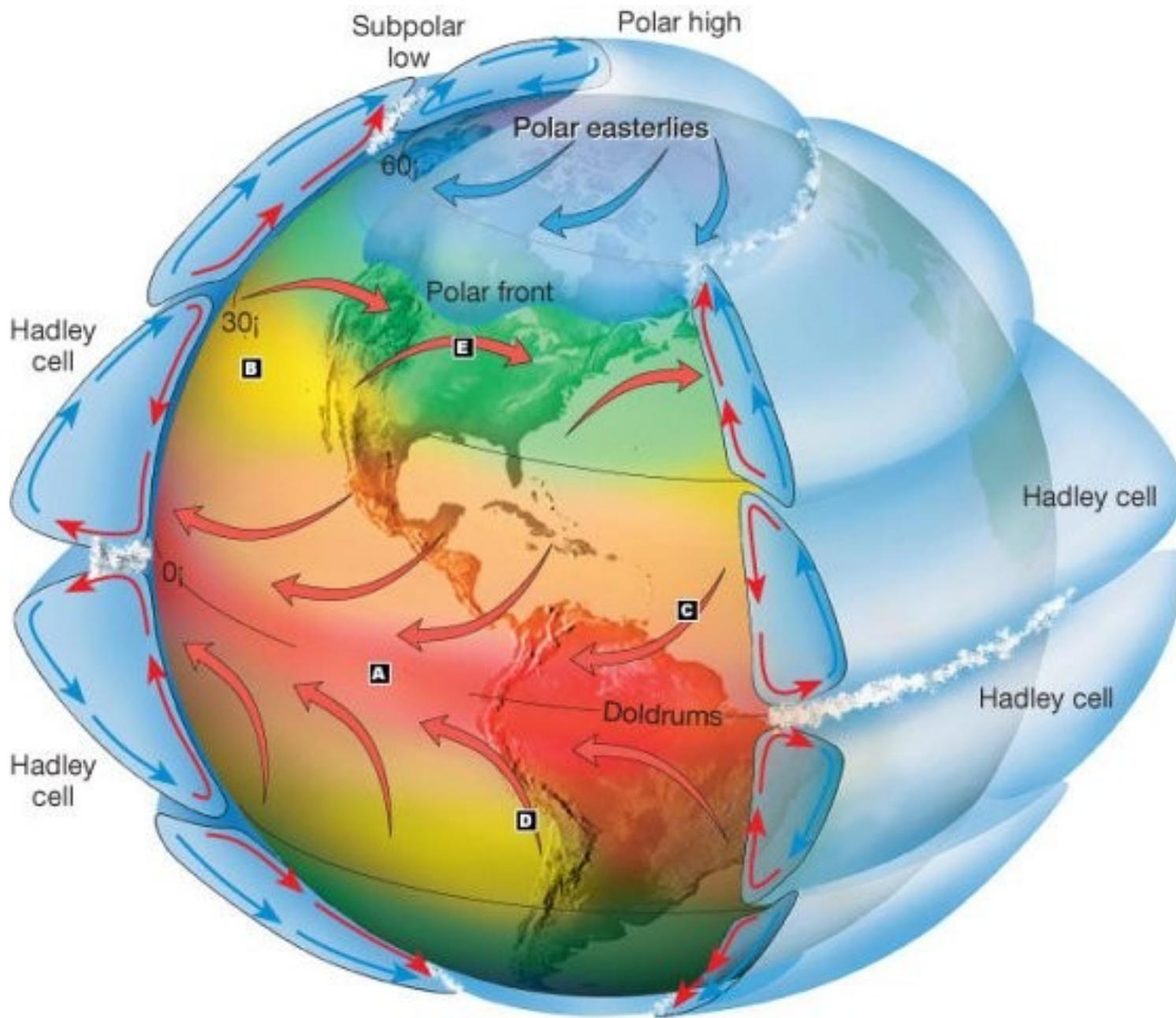
In the far north and Tasmania, compact cities house people and crops are grown. The rest of the continent is given to solar energy production and uranium mining for nuclear power

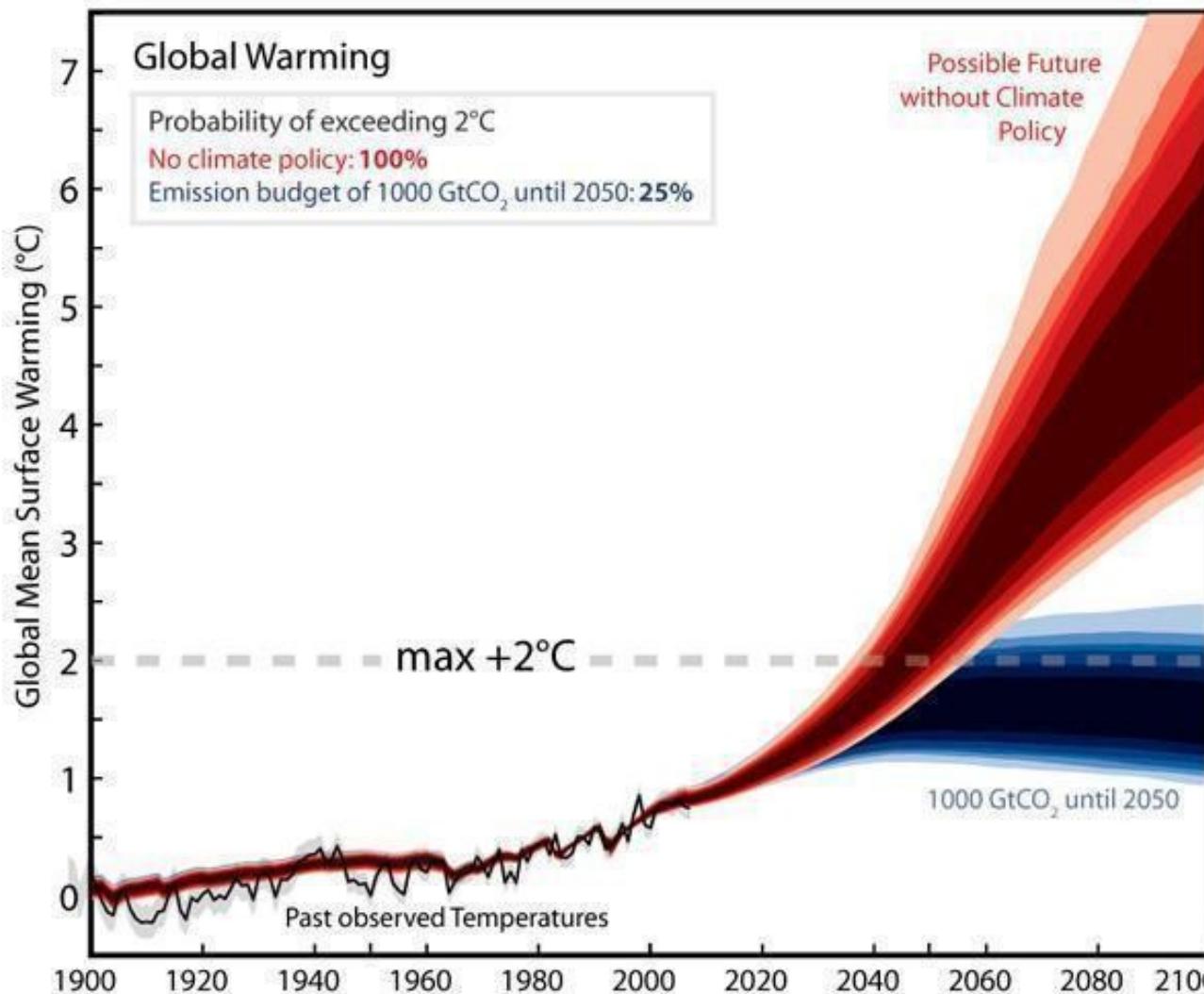
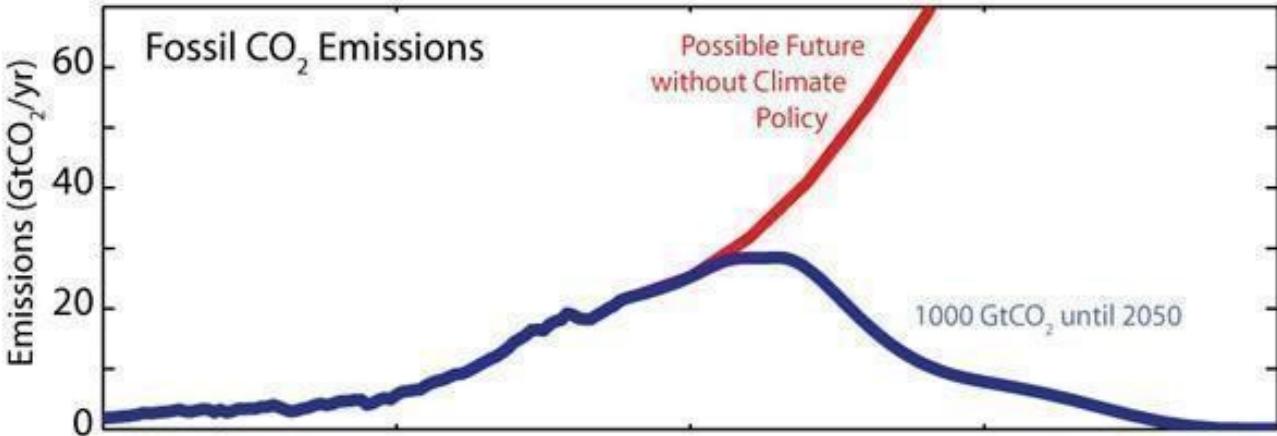
New Zealand

Unrecognisable. This densely populated island state has high-rise cities and intensive farming



Globální cirkulace atmosféry



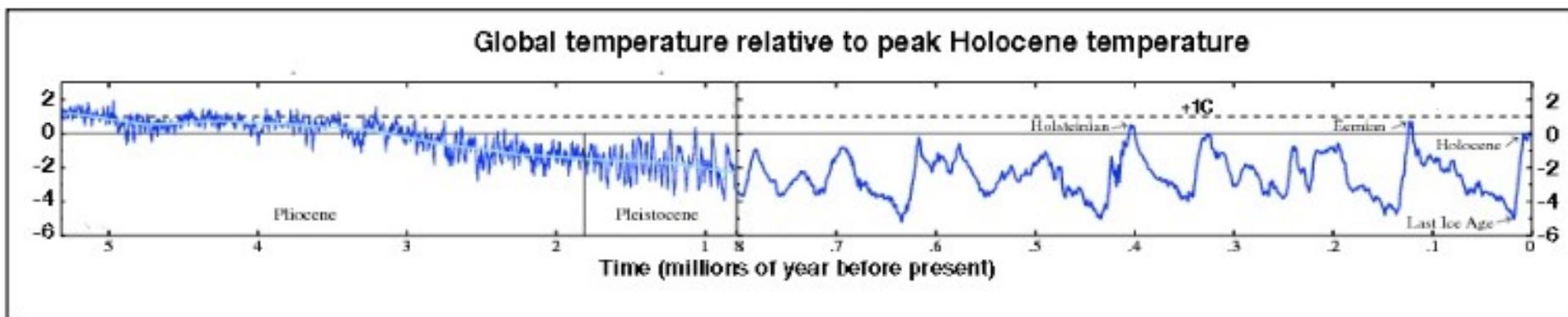
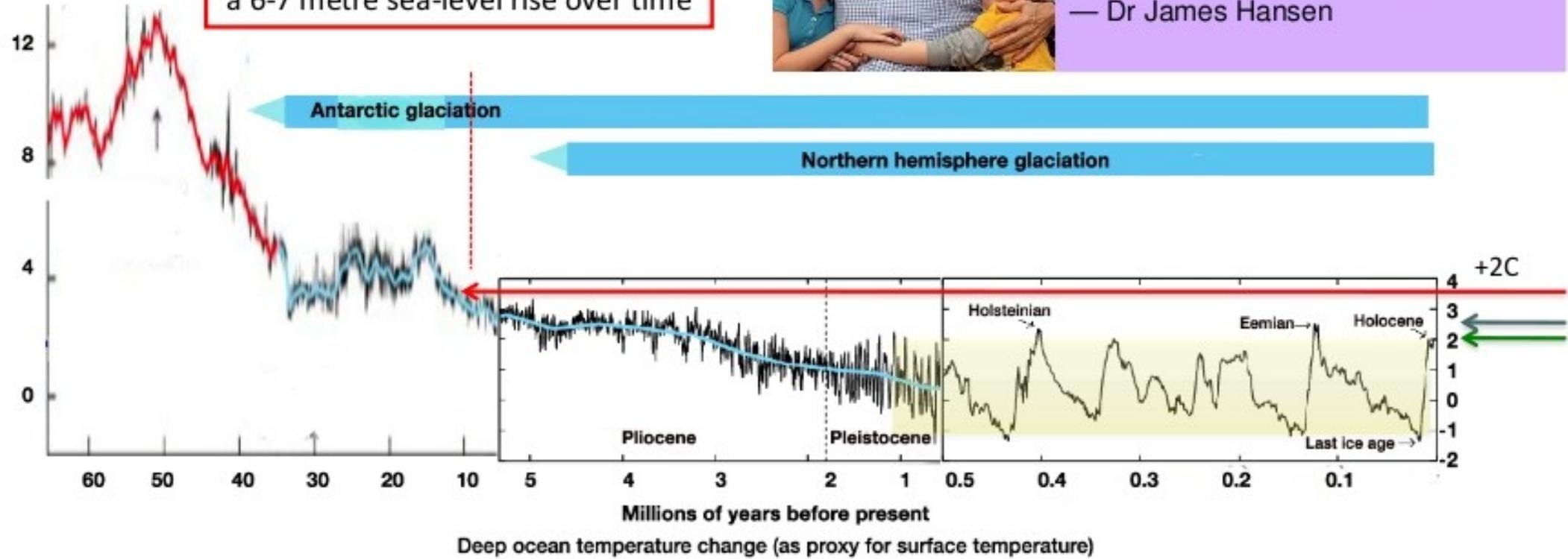


Source: Adapted from Meinshausen et al. (2009)

... which is sufficient for large parts of Greenland and West Antarctic ice sheets to be lost, leading to at least a 6-7 metre sea-level rise over time



"Goals to limit human-made warming to 2° C.. are not sufficient – they are prescriptions for disaster"
— Dr James Hansen



Kritické emise CO₂ z fosilních paliv

