2008
UPDATE on CLIMATE CHANGE
and
NUCLEAR ENERGY

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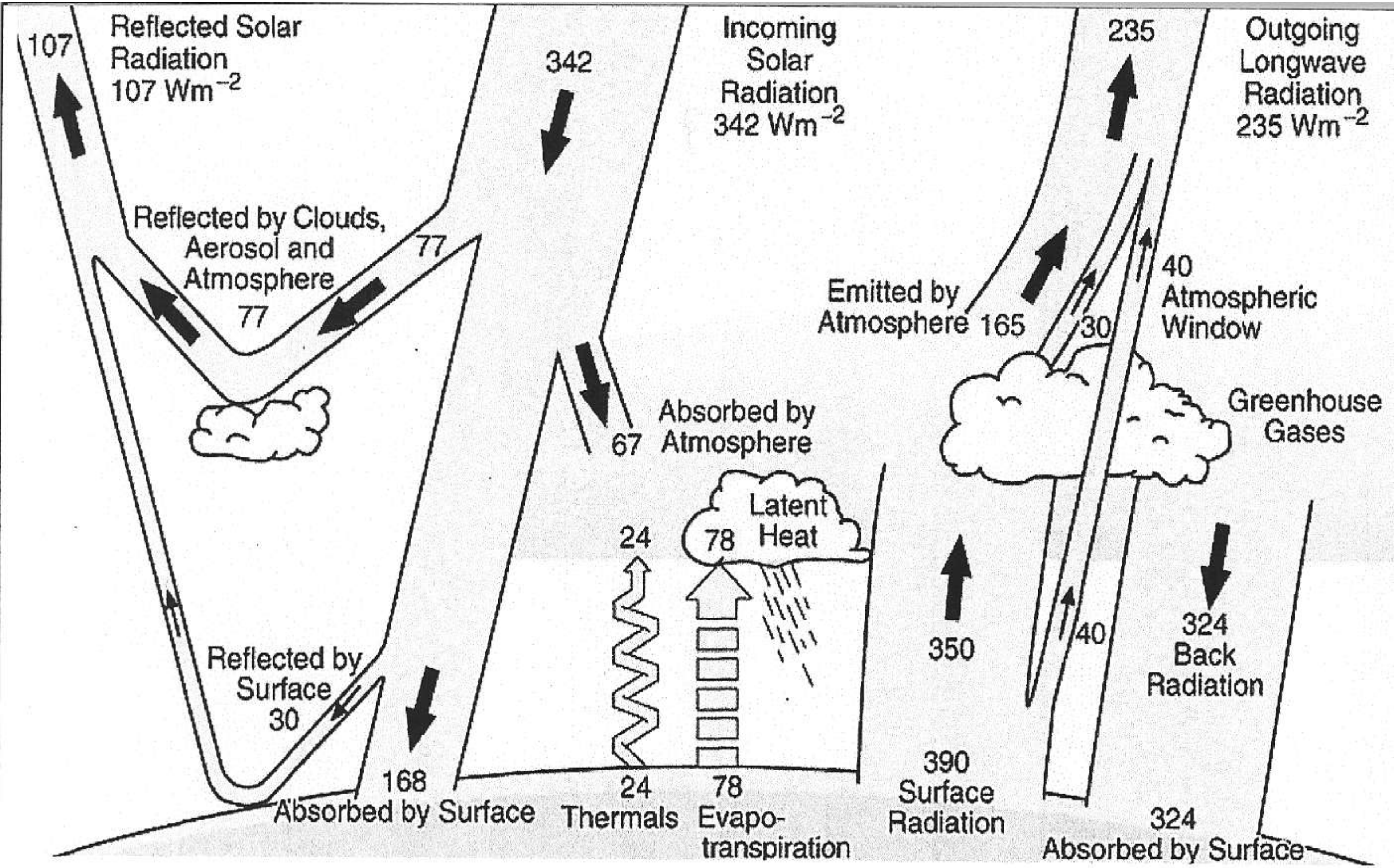
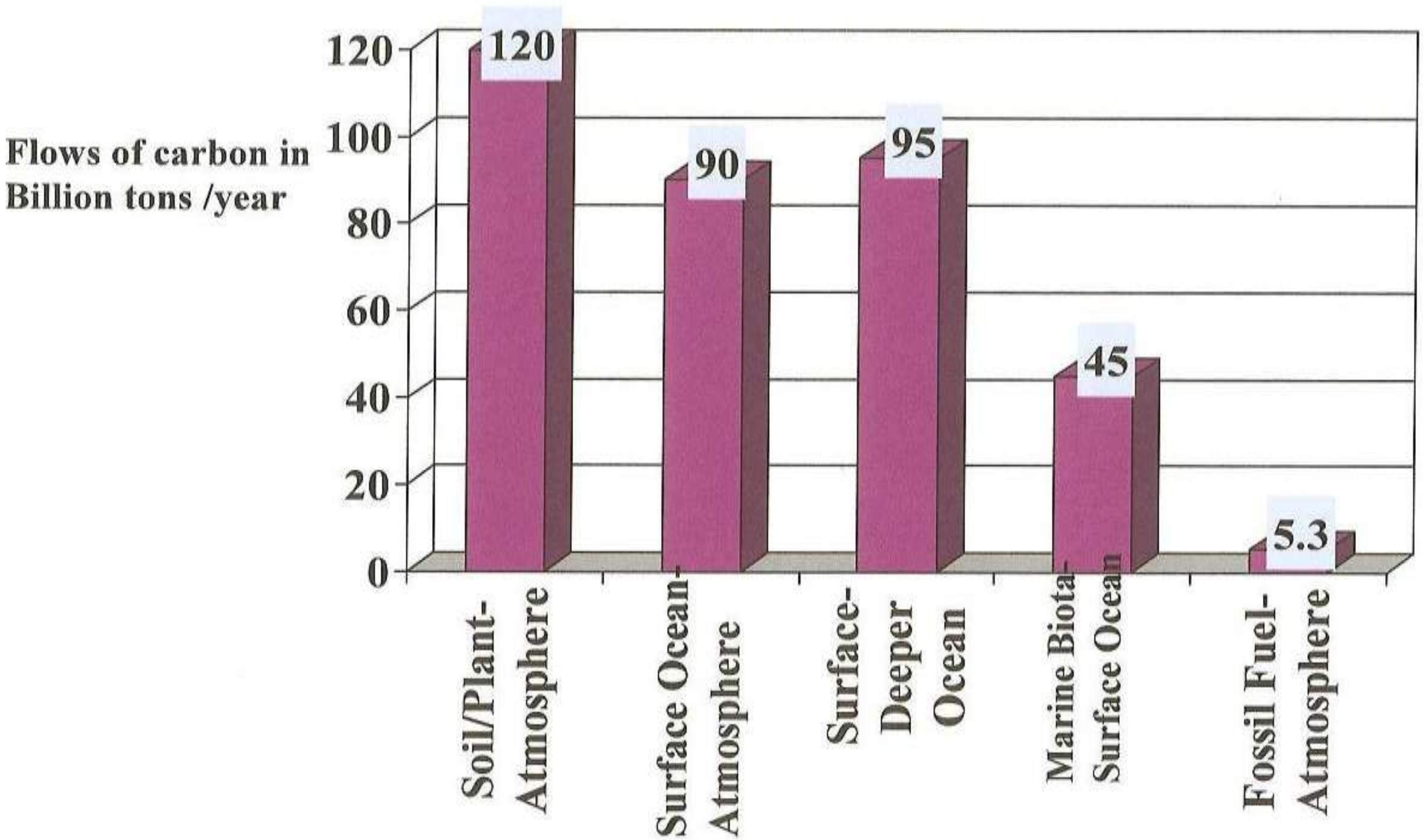
February 25, 2008

Note 342=1370 4 (ave. during 24h)



See also: Schneider (1987) Sci.Am. 256(5) 72-80

Carbon emission from fossil fuel burning annually is very small compared to other flows/exchanges of carbon in the global carbon reservoirs



Source: United Nations IPCC Third Assessment Report (2001) and Second Assessment Report (1996)

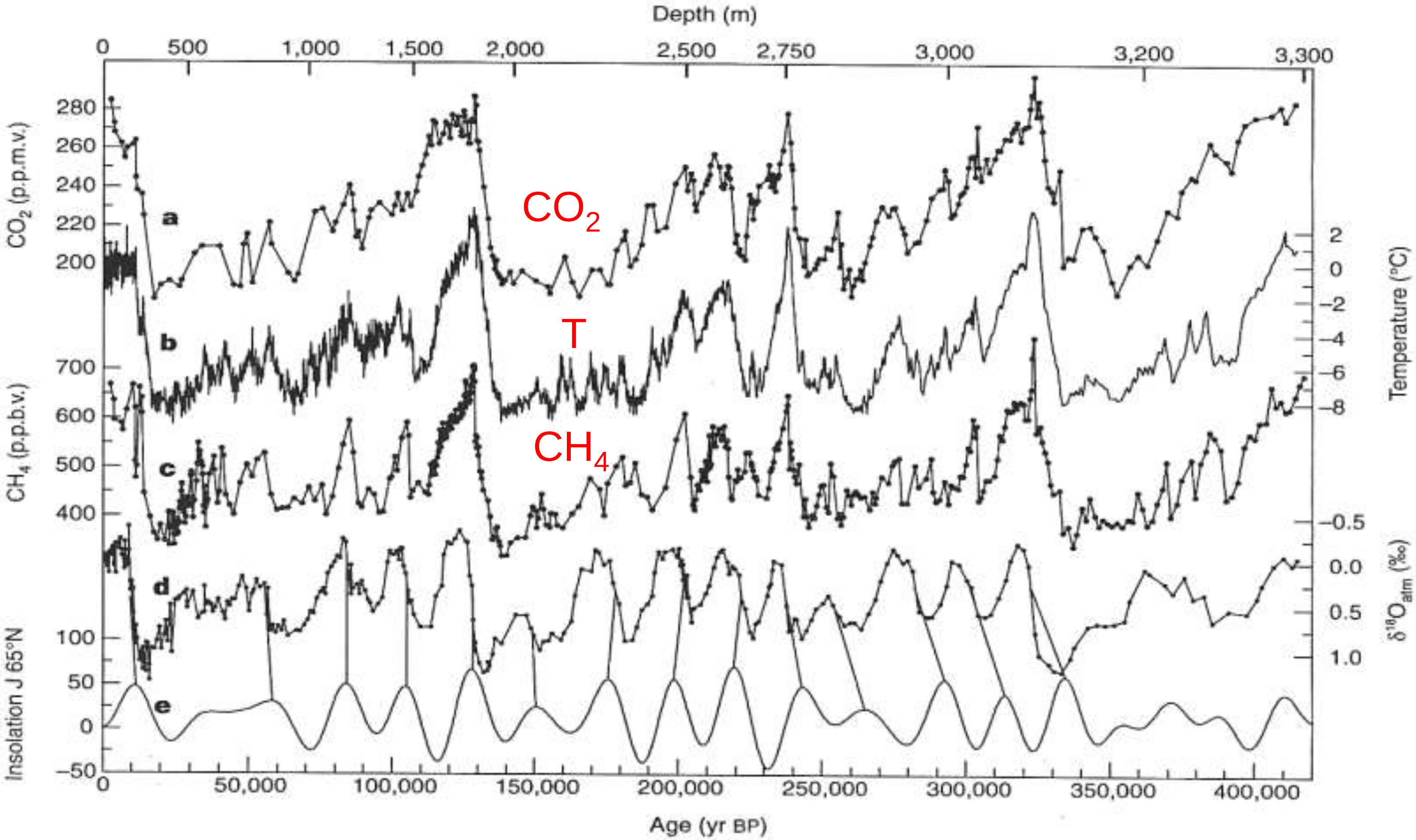
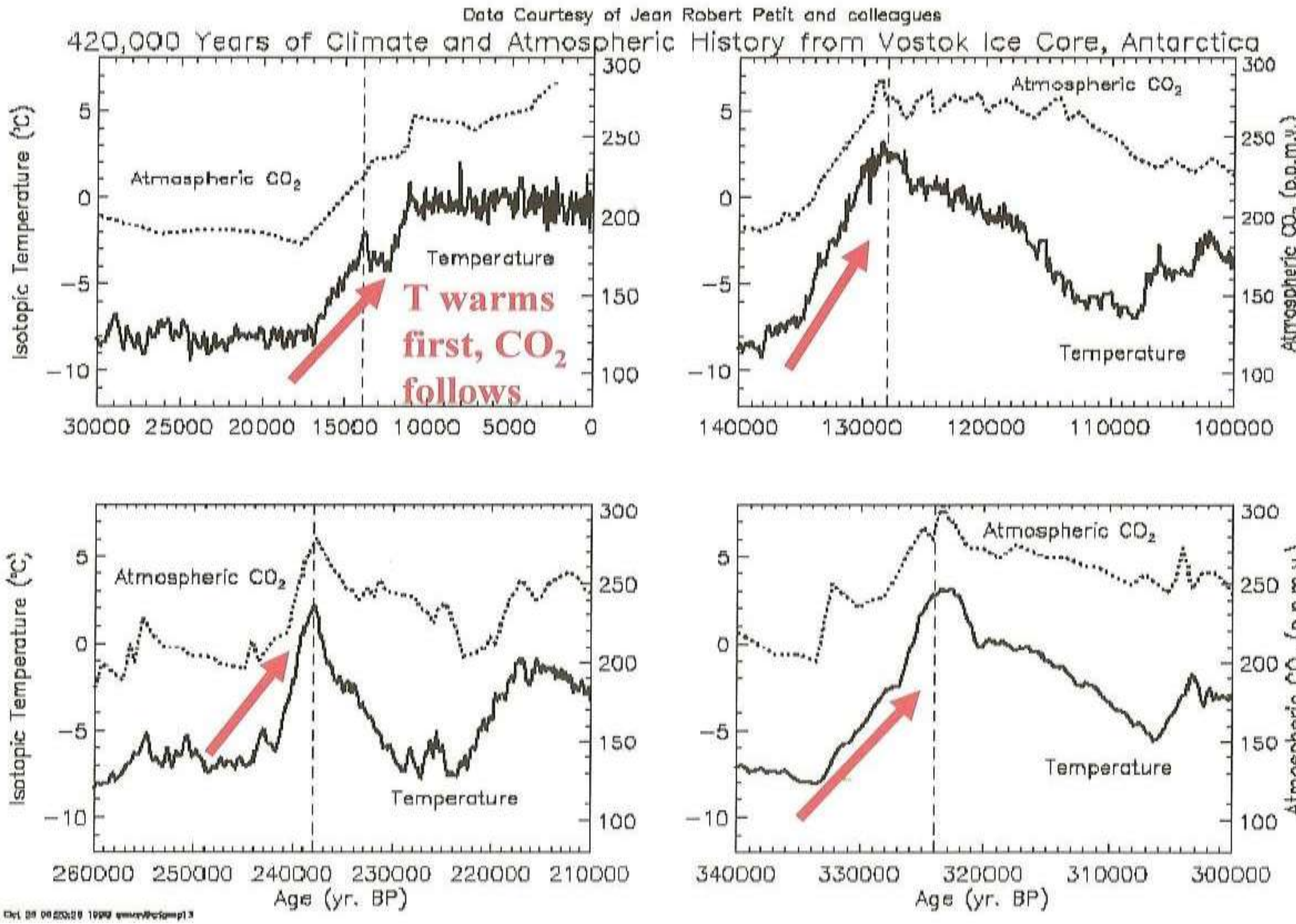


Figure 3 Vostok time series and insolation. Series with respect to time (GT4 timescale for ice on the lower axis, with indication of corresponding depths on the top axis) of: **a**, CO_2; **b**, isotopic temperature of the atmosphere (see text); **c**, CH_4; **d**, $\delta^{18}O_{atm}$; and **e**, mid-June insolation at 65° N (in $W m^{-2}$) (ref. 3). CO_2 and CH_4 measurements have been performed using the methods and analytical procedures previously described[5,9]. However, the CO_2 measuring system has been slightly modified in order to increase the sensitivity of the CO_2 detection. The thermal conductivity chromatographic detector has been replaced by a flam ionization detector which measures CO_2 after its transformation into CH_4. Th mean resolution of the CO_2 (CH_4) profile is about 1,500 (950) years. It goes up about 6,000 years for CO_2 in the fractured zones and in the bottom part of t record, whereas the CH_4 time resolution ranges between a few tens of years 4,500 years. The overall accuracy for CH_4 and CO_2 measurements are ±20 p.p.b and 2-3 p.p.m.v., respectively. No gravitational correction has been applied.

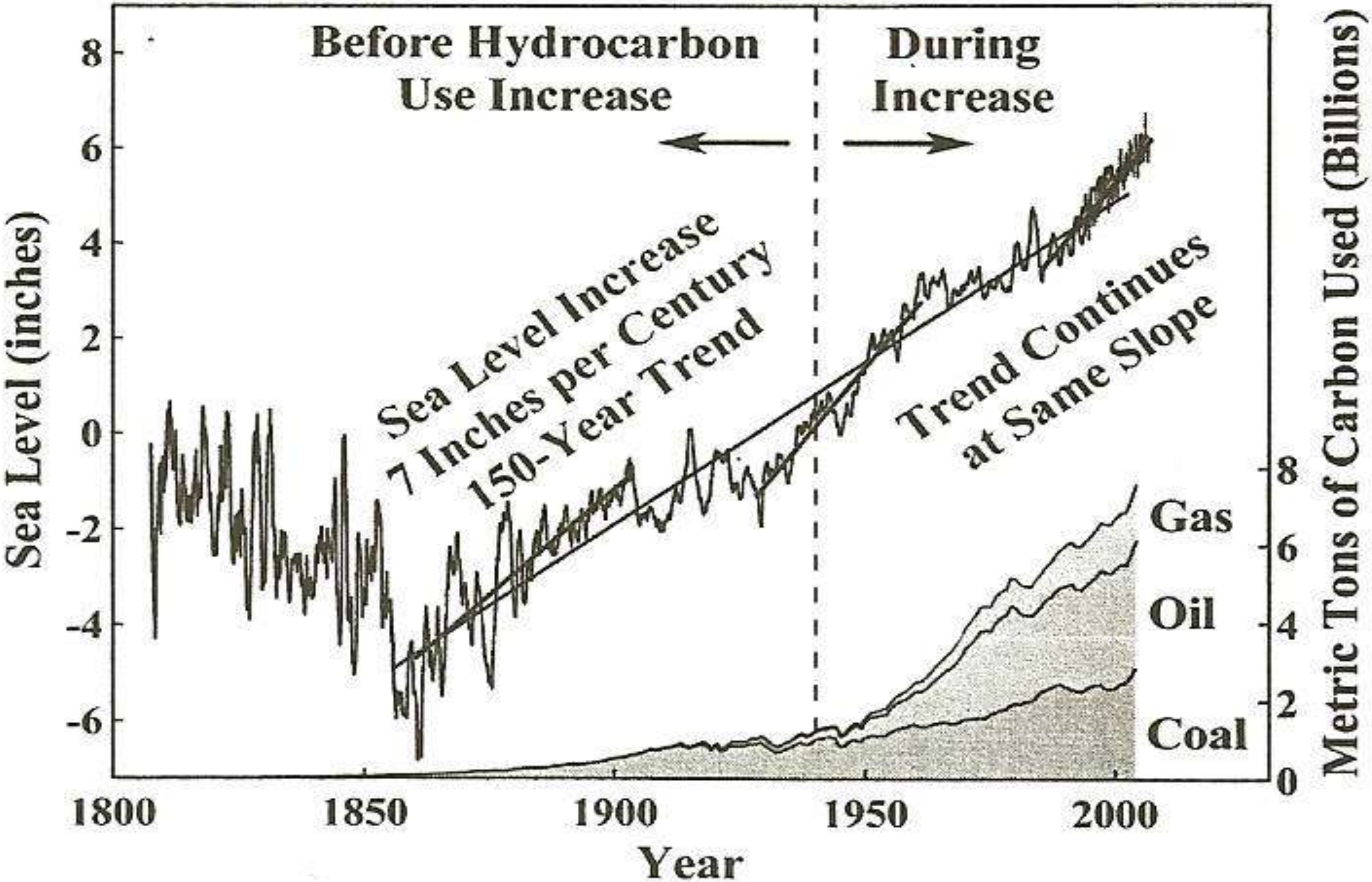
Nature, Vol.388, p.431, 3 June 1999

Can one argue that lung cancer causes cigarette smoking?

"High-resolution records from Antarctic ice cores show that carbon dioxide concentrations increased by 80 to 100 [ppmv] 600 400 years after the warming of the last three deglaciations." (Fischer et al., 1999 Science, vol. 283, 1712-1714)



PRE HOC ERGO NON PROPTER HOC?



From Jevrejevon, et al (2006) Leuliette, et al (2004), Robinson et al (2007)

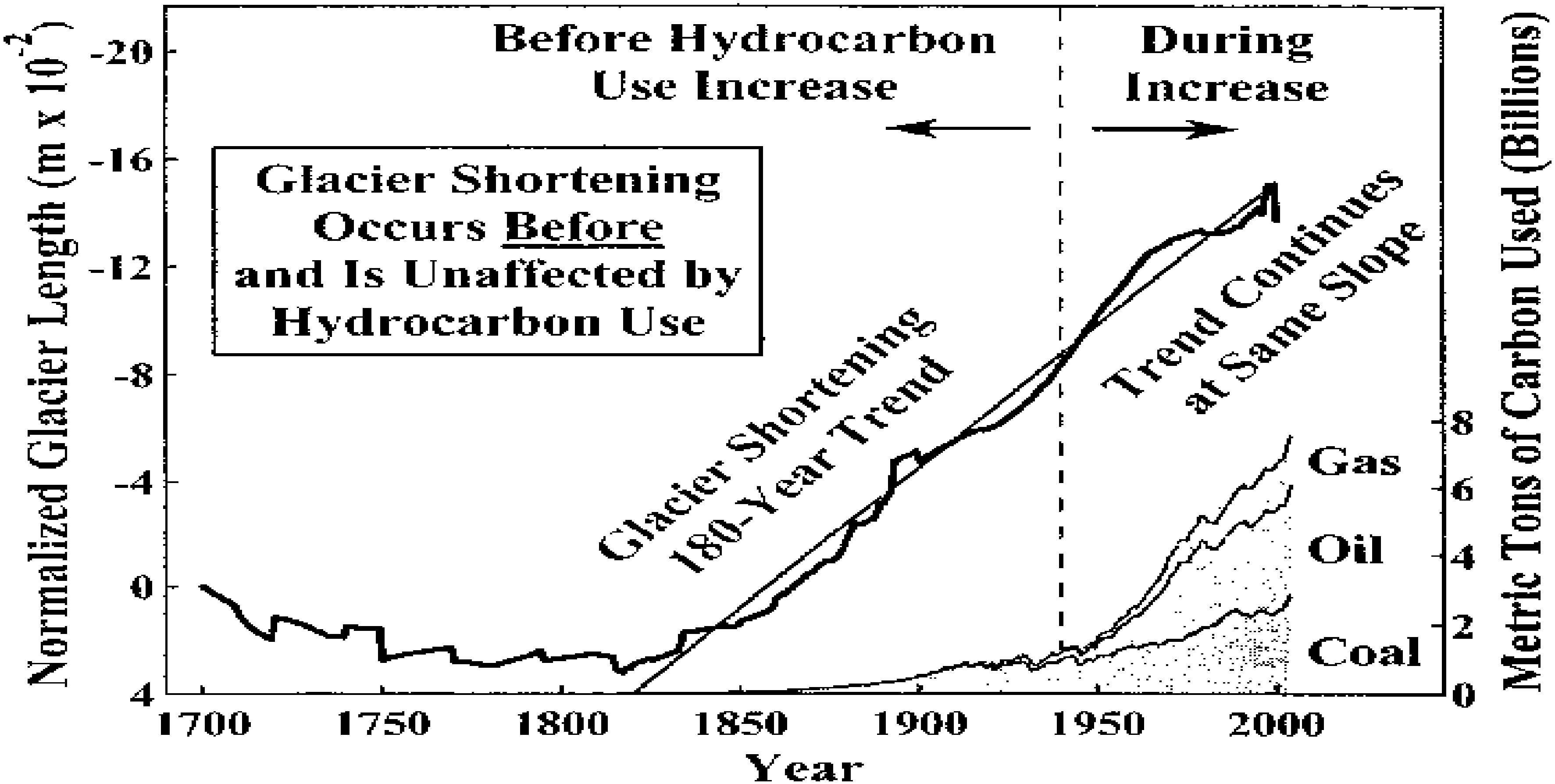
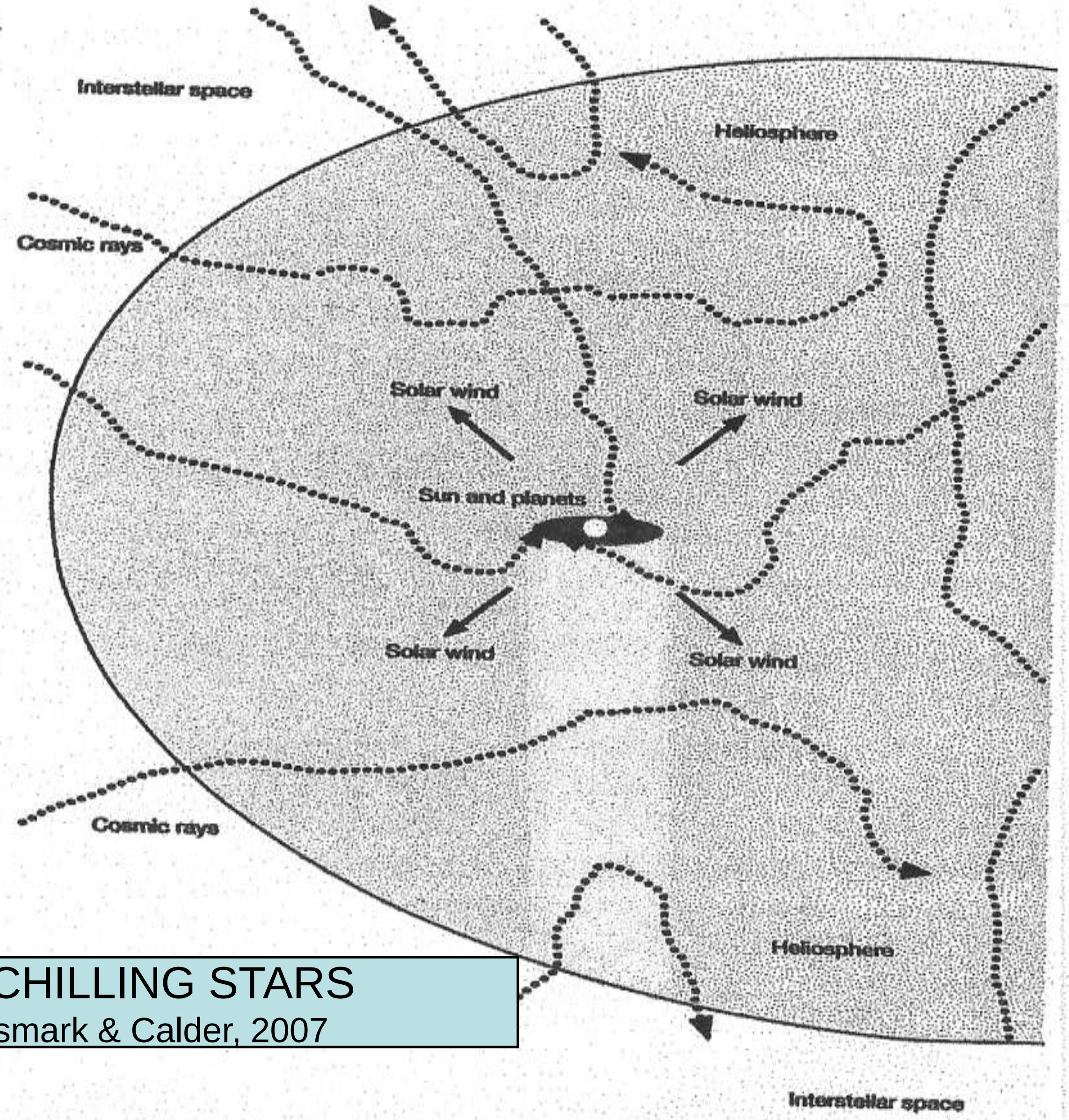


Figure 2: Average length of 169 glaciers from 1700 to 2000 (4). The principal source of melt energy is solar radiation. Variations in glacier mass and length are primarily due to temperature and precipitation (5,6). This melting trend lags the temperature increase by about 20 years, so it predates the 6-fold increase in hydrocarbon use (7) even more than shown in the figure. Hydrocarbon use could not have caused this shortening trend.

From Oerlemanns, J. (2005), Gruell & Smeets (2001), Robinson, et al., (2007)



4. The empire of the Sun extends far beyond the planets in a huge bubble called the heliosphere, blown by the non-stop solar wind. Its irregular magnetic field repels many of the cosmic rays coming from the Galaxy. When this solar shield weakens, more cosmic rays reach the Earth.

THE CHILLING STARS
Svensmark & Calder, 2007

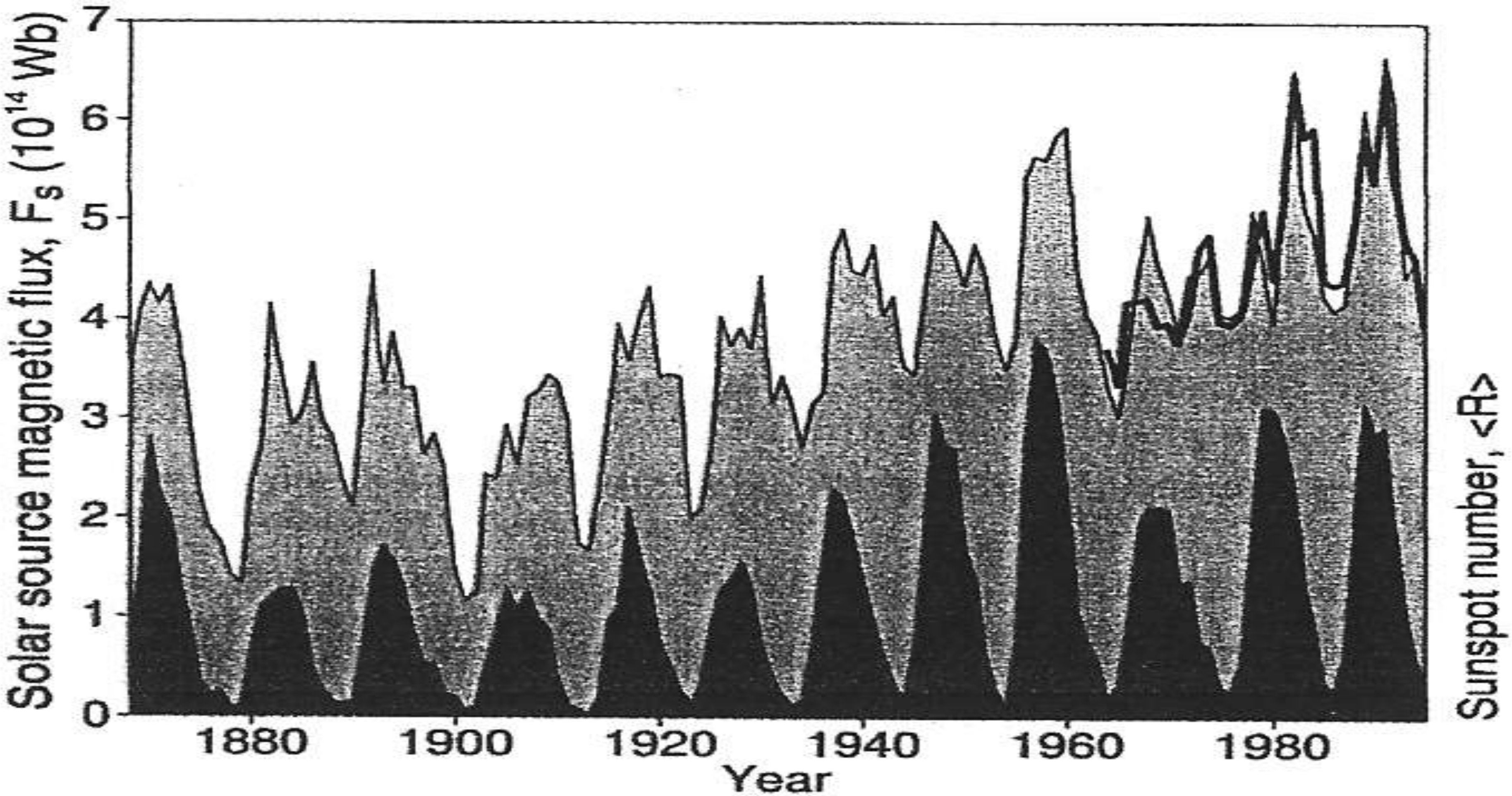
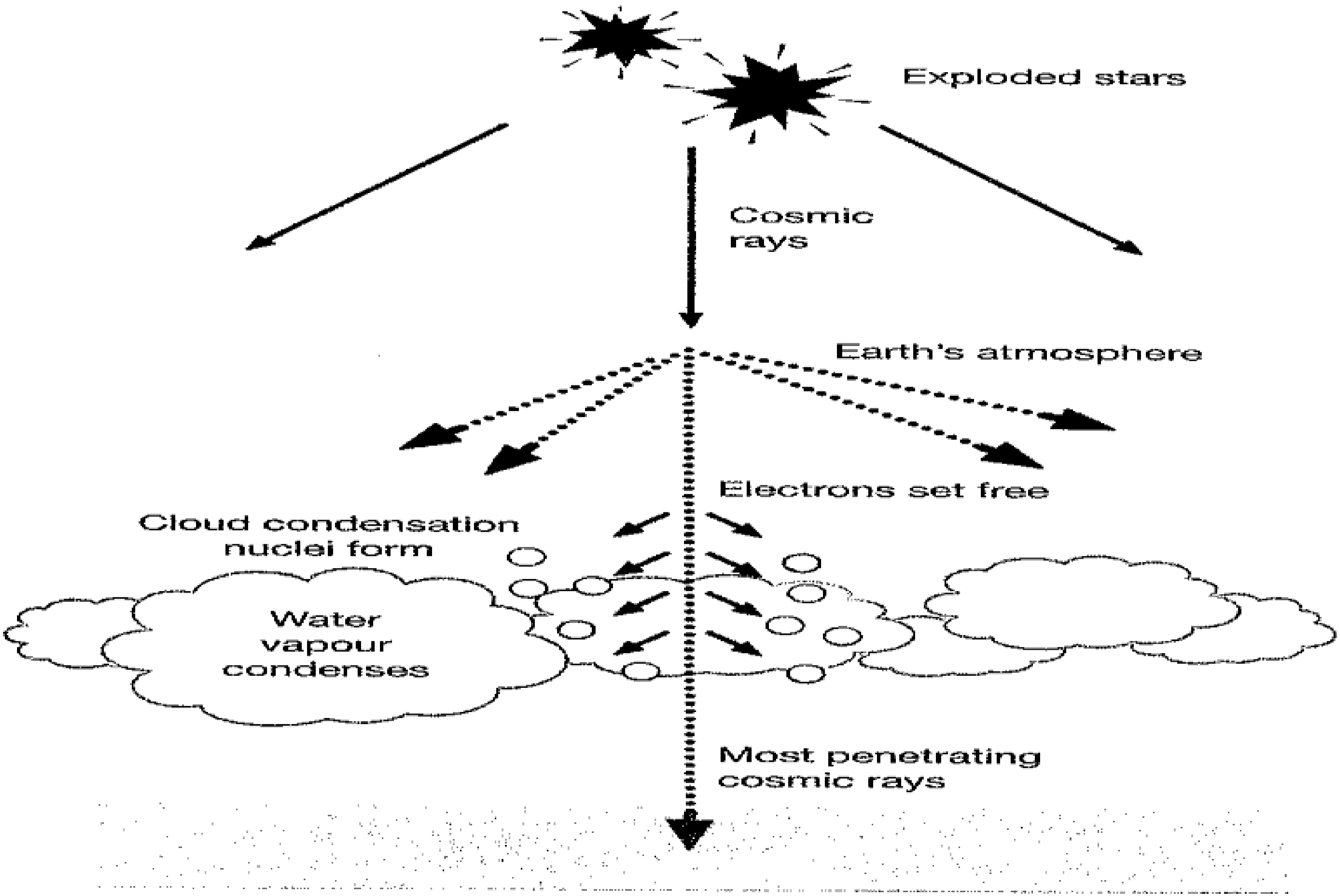


Figure 3 The total solar magnetic flux emanating through the coronal source sphere[12], F_S. Shown are the values derived from the geomagnetic *aa* data for 1868–1996 (black line bounding grey shading) and the values from the interplanetary observations for 1964–96 (thick blue line). The variation of the annual means of the sunspot number ⟨*R*⟩ is shown by the area shaded purple and varies between 0 and a peak of 190 for solar cycle 19.

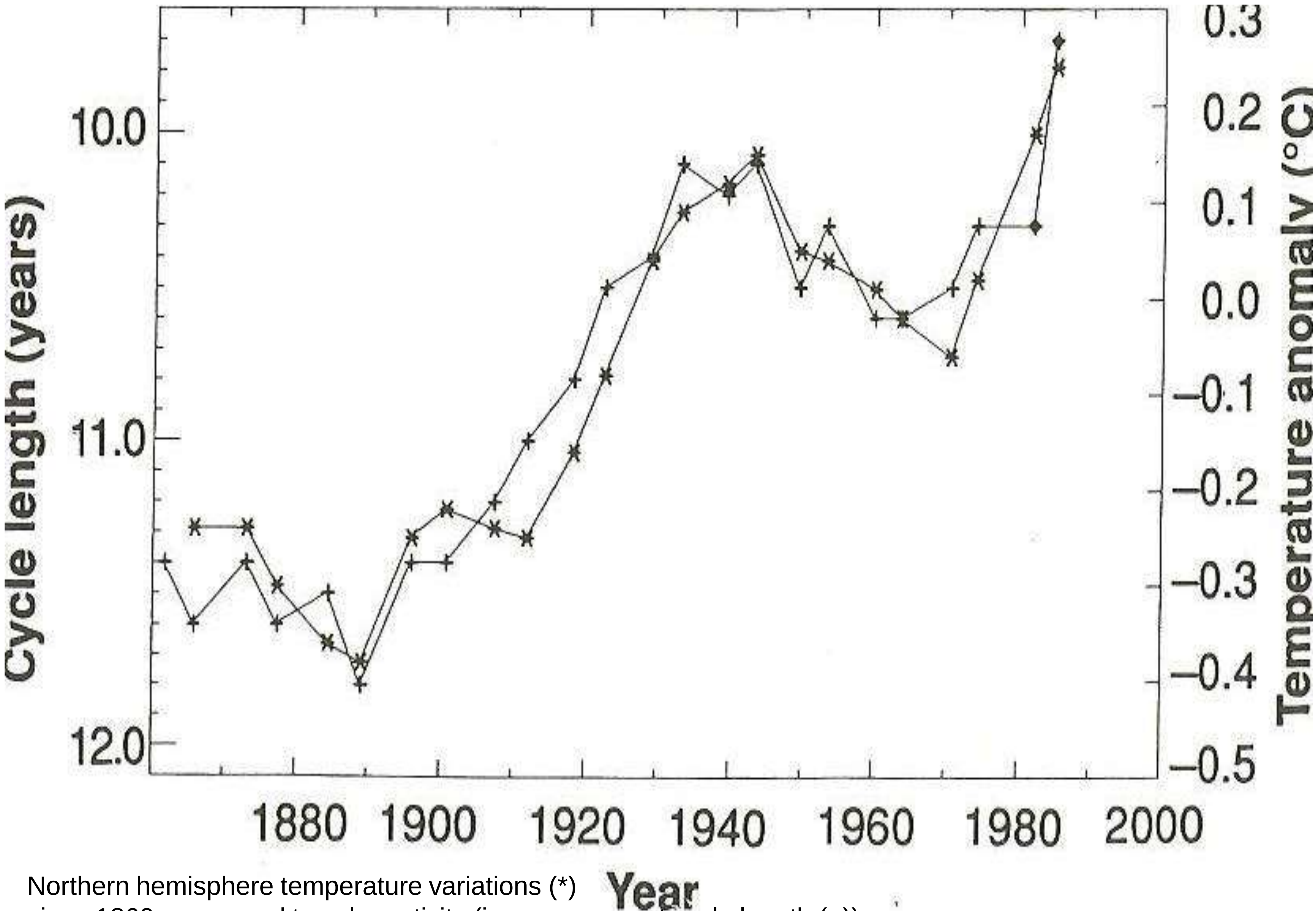
Nature, Vol.399, p.438, 3 June 1999

Note doubling of solar magnetic flux in 100 yrs.

SVENSMARK & CALDER (2007)



1. The story in a nutshell: more cosmic rays mean more clouds and a chillier world — because the cosmic rays assist in cloud formation.



Northern hemisphere temperature variations (*)
since 1860, compared to solar activity (inverse sunspot cycle length (+)).
From Friis-Christensen and Lassen, Science, v.254, p.698-700 (1991).

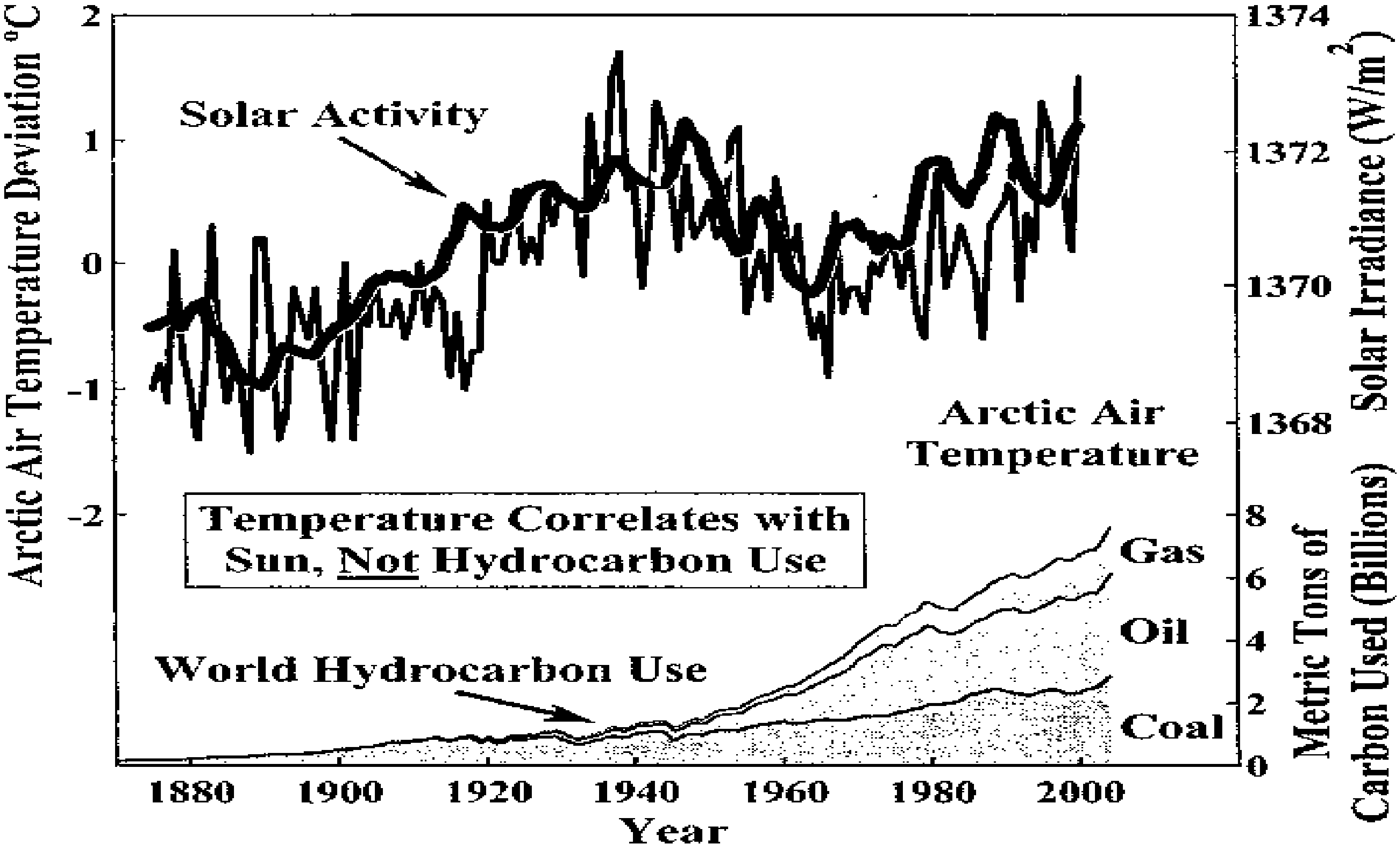


Figure 3: Arctic surface air temperature compared with total solar irradiance as measured by sunspot cycle amplitude, sunspot cycle length, solar equatorial rotation rate, fraction of penumbral spots, and decay rate of the 11-year sunspot cycle (8,9). Solar irradiance correlates well with Arctic temperature, while hydrocarbon use (7) does not correlate.

From Robinson, et al (2007), Morland, et al (2007), Soon (2005), Hoyt & Schatten (1993)

From Lomborg, “Cool It” (2007)

		CHALLENGE	OPPORTUNITY
VERY GOOD OPPORTUNITIES	1	Diseases	Control of HIV / AIDS
	2	Malnutrition	Providing micronutrients
	3	Subsidies & Trade	Trade liberalization
	4	Diseases	Control of malaria
GOOD OPPORTUNITIES	5	Malnutrition	Development of new agricultural technologies
	6	Sanitation & Water	Small-scale water technology for livelihoods
	7	Sanitation & Water	Community-managed water supply and sanitation
	8	Sanitation & Water	Research on water productivity in food production
	9	Government	Lowering the cost of starting a new business
FAIR OPPORTUNITIES	10	Migration	Lowering the barriers to migration for skilled workers
	11	Malnutrition	Improving infant and child nutrition
	12	Malnutrition	Reducing the prevalence of low birth weight
	13	Diseases	Scaled-up basic health services
BAD OPPORTUNITIES	14	Migration	Guest workers programs for the unskilled
	15	Climate	Optimal carbon tax ($25–$300)
	16	Climate	Kyoto Protocol
	17	Climate	Value-at-risk carbon tax ($100–$450)

TABLE 1 Global priority list for spending extra resources, from the 2004 Copenhagen Consensus.

MODEL OF McMICHAEL, et al., 2006

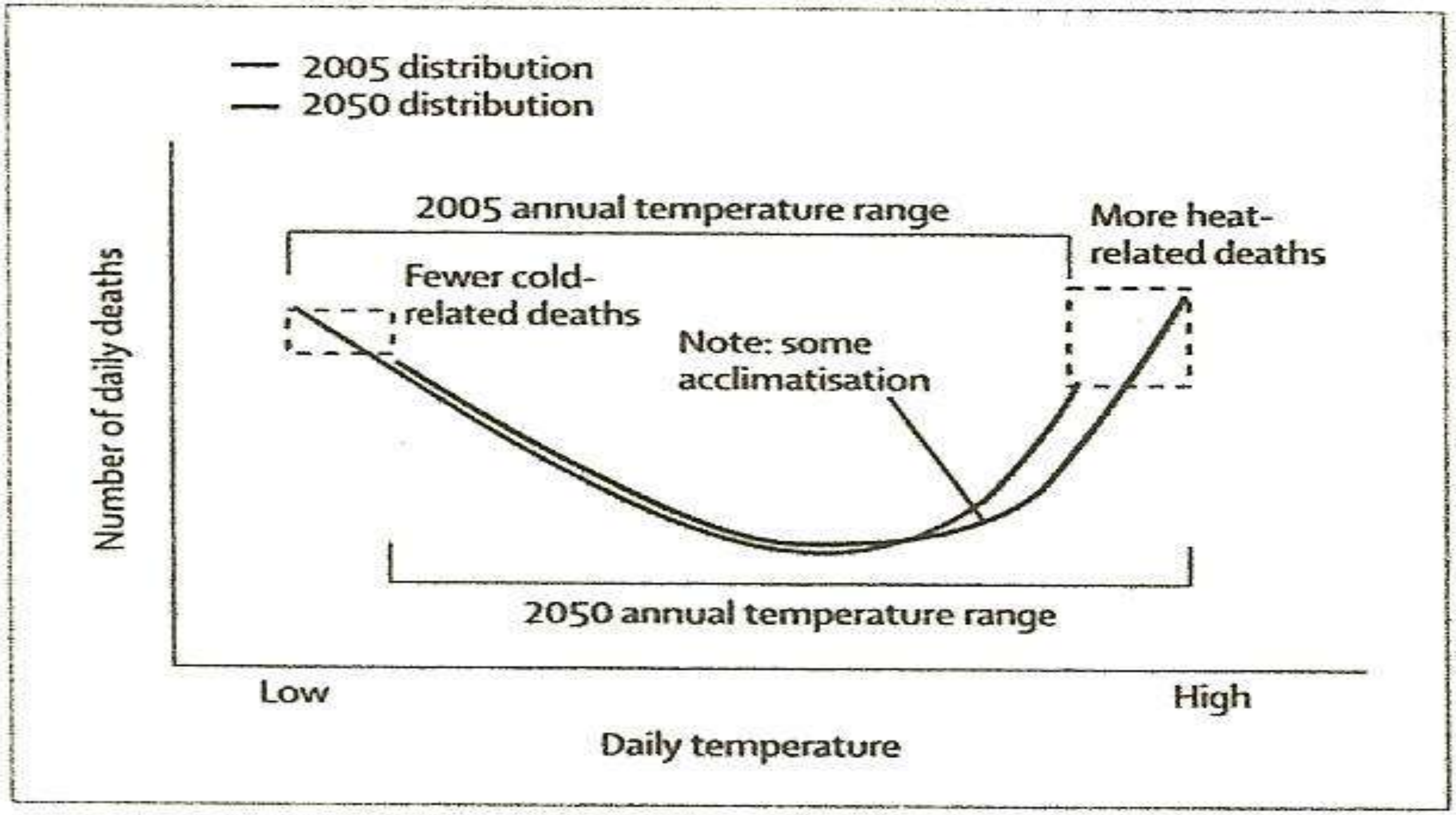


Figure 2: **Schematic representation of how an increase in average annual temperature would affect annual total of temperature-related deaths, by shifting distribution of daily temperatures to the right**
Additional heat-related deaths in summer would outweigh the extra winter deaths averted (as may happen in some northern European countries). Average daily temperature range in temperate countries would be about 5–30°C.

EUROWINTER GROUP, LANCET (1997) 349, 1342

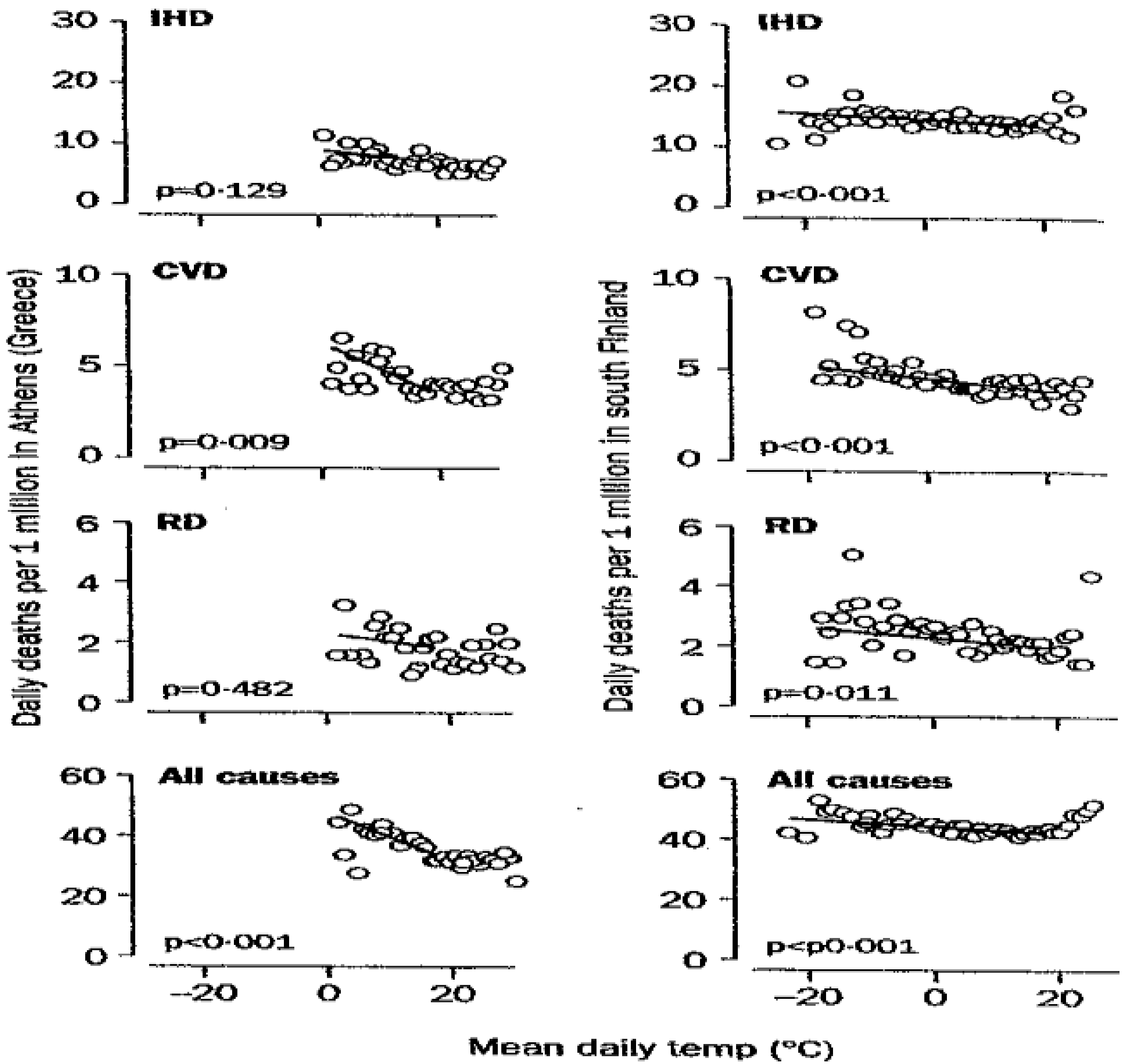
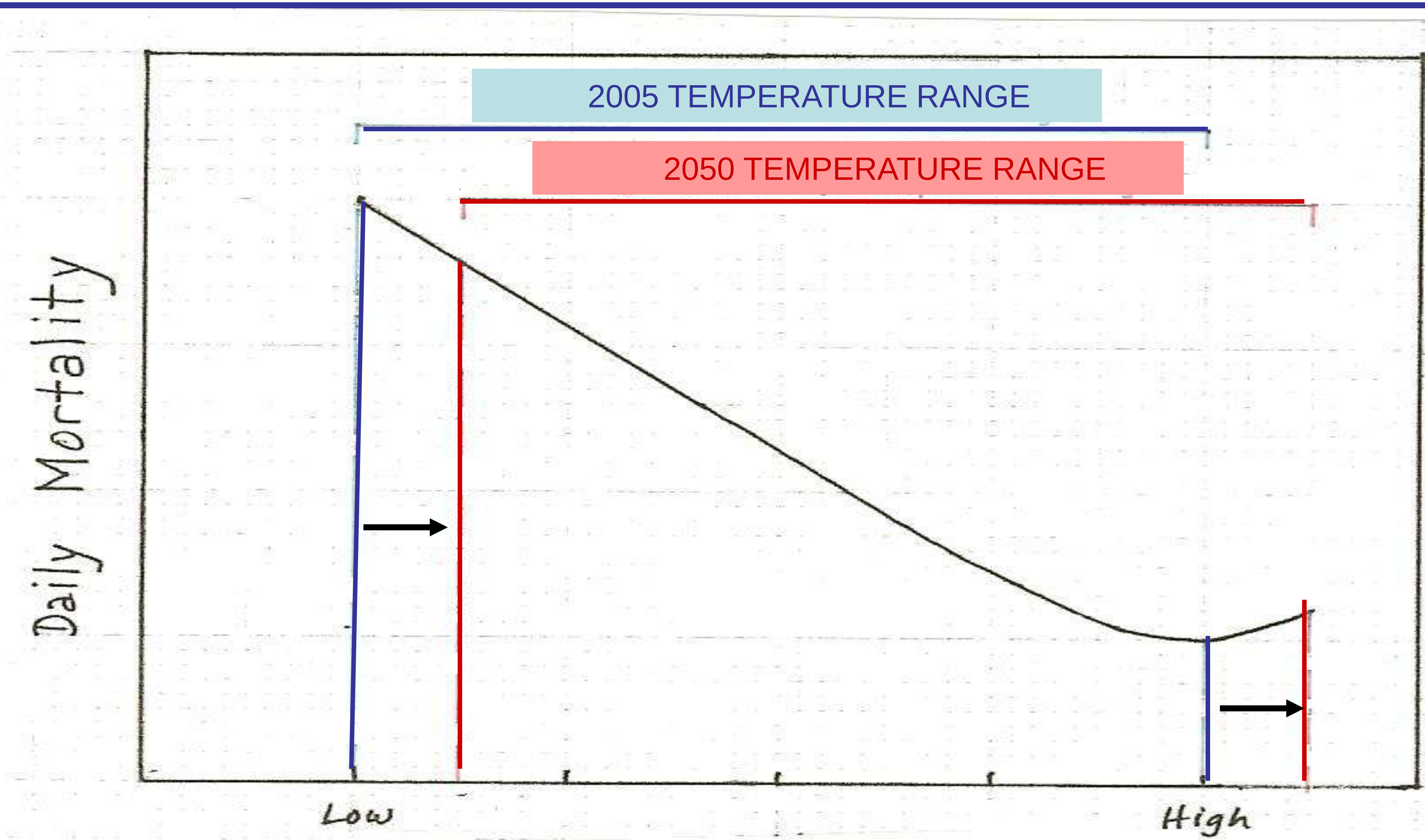


Figure 1: Deaths per day per 10^6 population in relation to mean daily temperature in one warm and one cold region

Lagged on temperature (see methods); no allowance for influenza.

Revised schematic representation of how increased average temp. would affect mortality, by shifting distribution to right. Decreased cold-related deaths in winter would outweigh heat-related deaths In summer, reducing overall mortality.



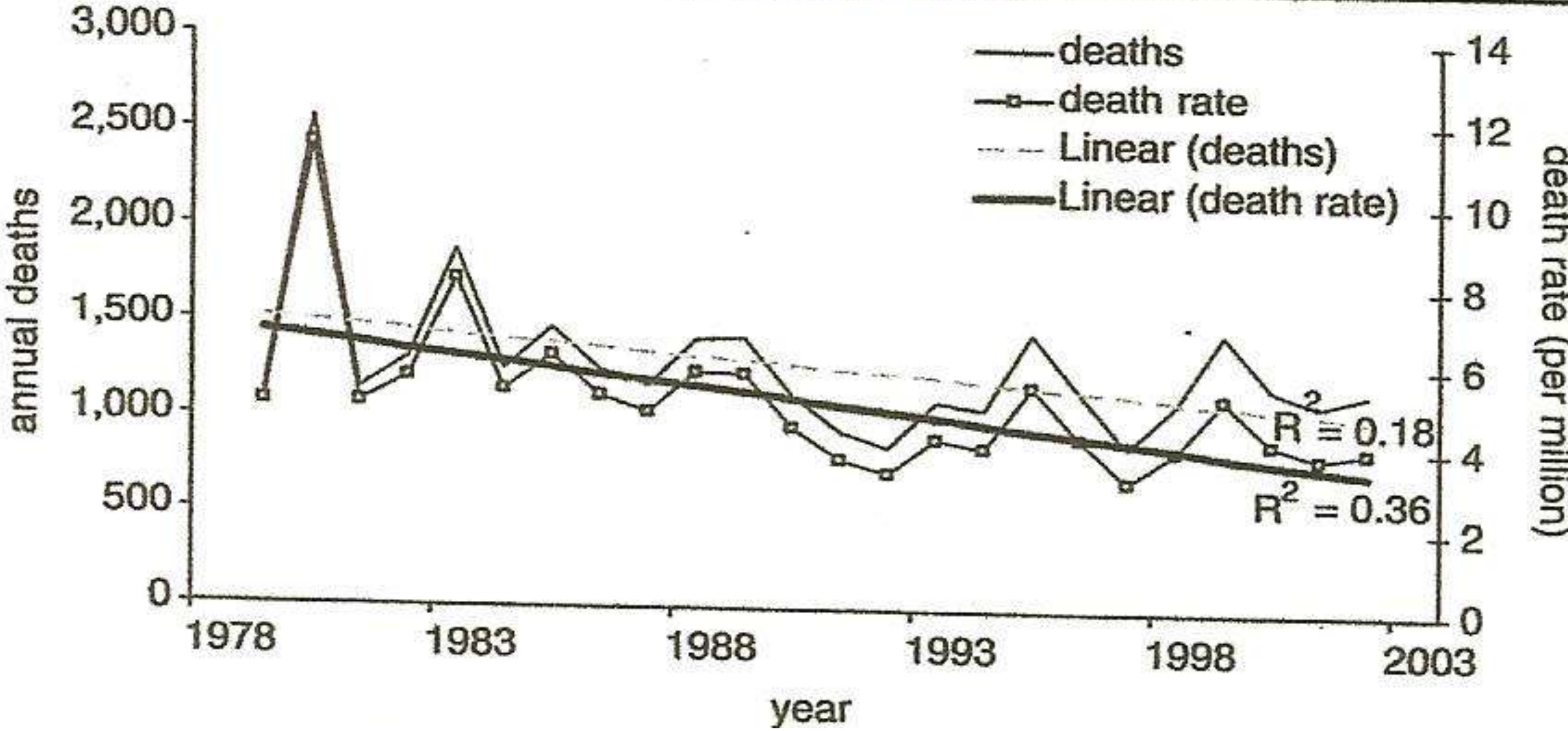
MEAN DAILY TEMPERATURE

FROM GOKLANY (2007

P.169

Figure 6.15

U.S. DEATHS AND DEATH RATES FROM TORNADOS, FLOODS, LIGHTNING, HURRICANES, AND EXTREME TEMPERATURES, 1979–2002



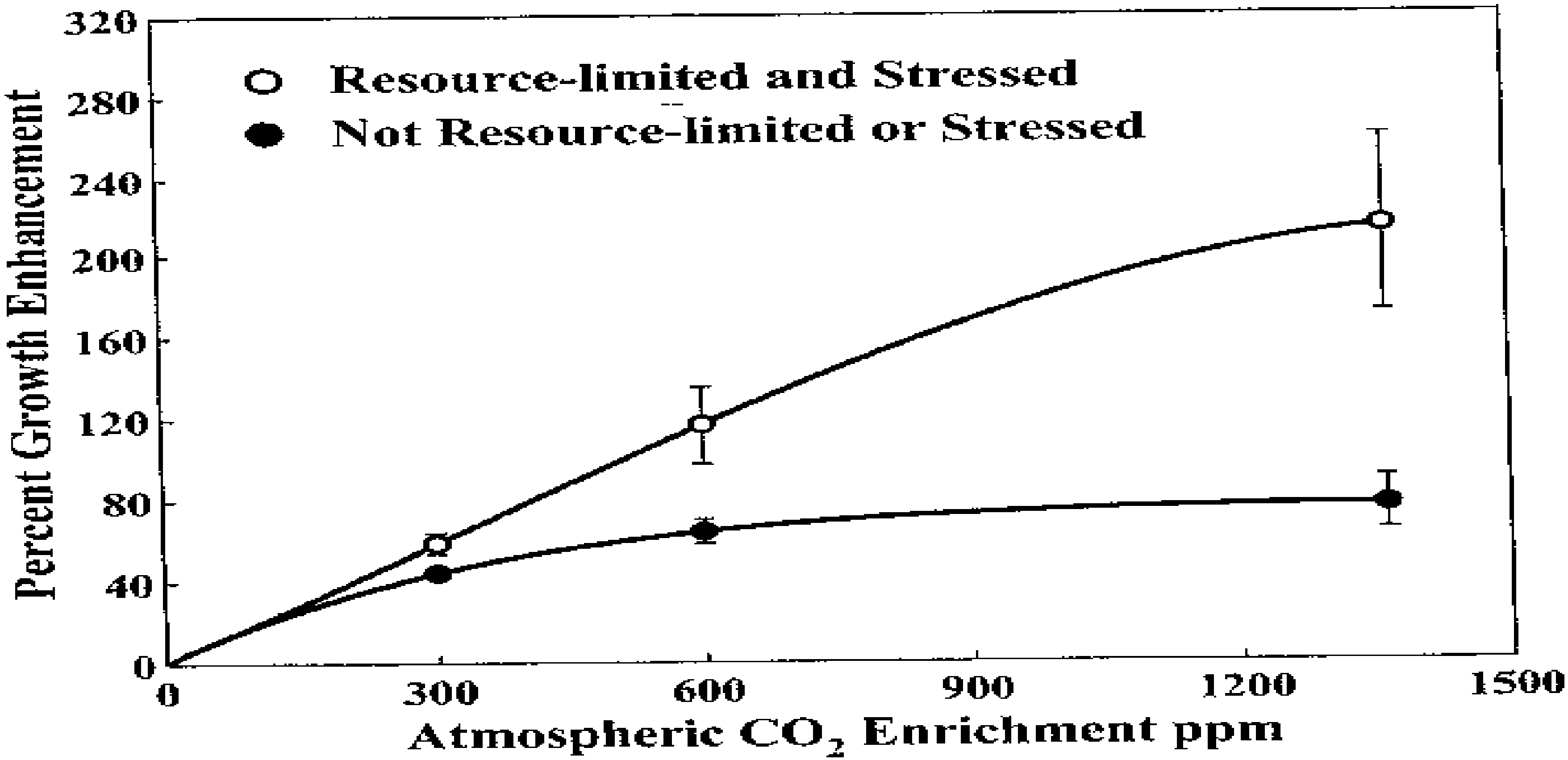


Figure 23: Summary data from 279 published experiments in which plants of all types were grown under paired stressed (open red circles) and unstressed (closed blue circles) conditions (114). There were 208, 50, and 21 sets at 300, 600, and an average of about 1350 ppm CO_2, respectively. The plant mixture in the 279 studies was slightly biased toward plant types that respond less to CO_2 fertilization than does the actual global mixture. Therefore, the figure underestimates the expected global response. CO_2 enrichment also allows plants to grow in drier regions, further increasing the response.

From Idso & Idso (1974)

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