Climate Change and Respiratory Health

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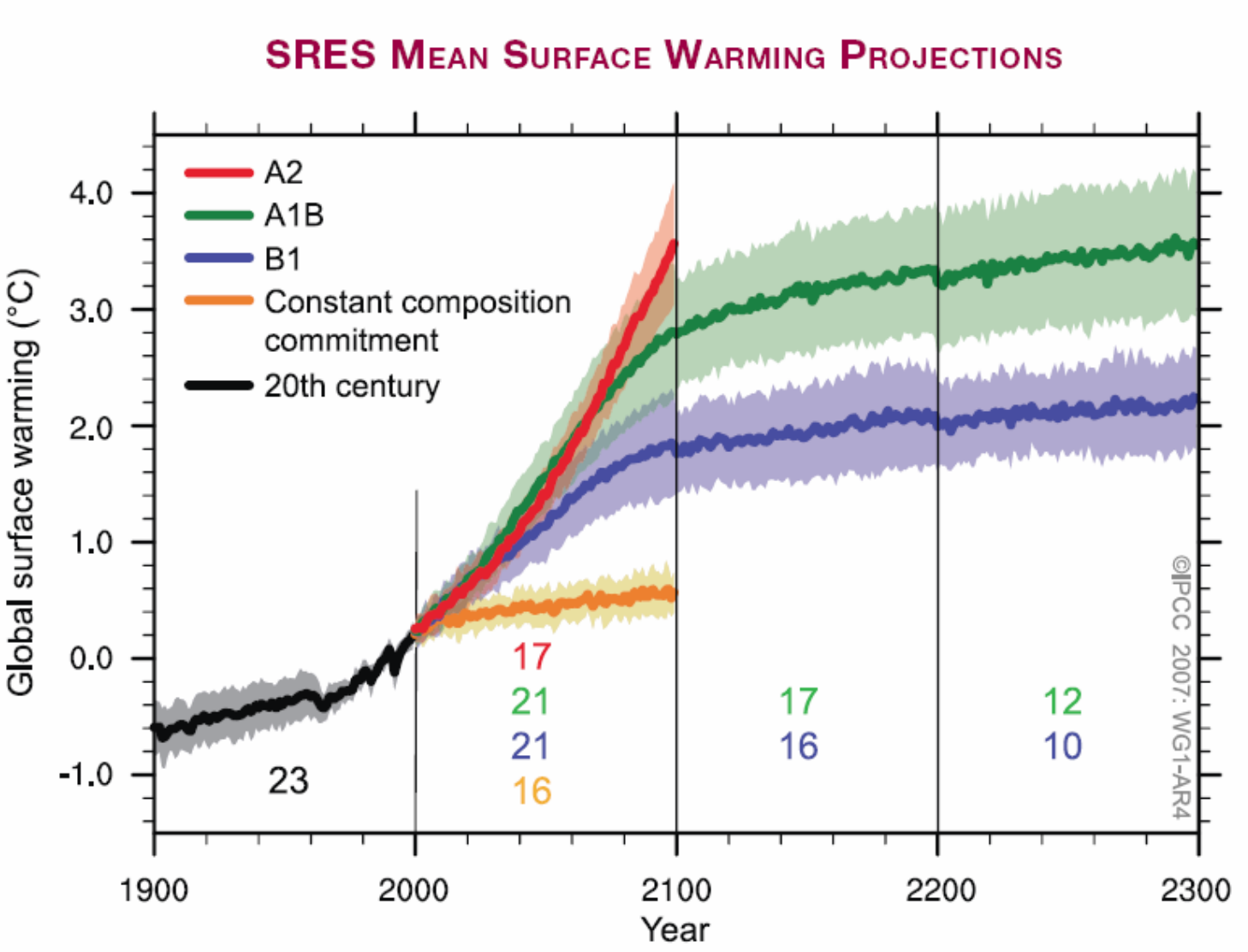

IPCC 2007

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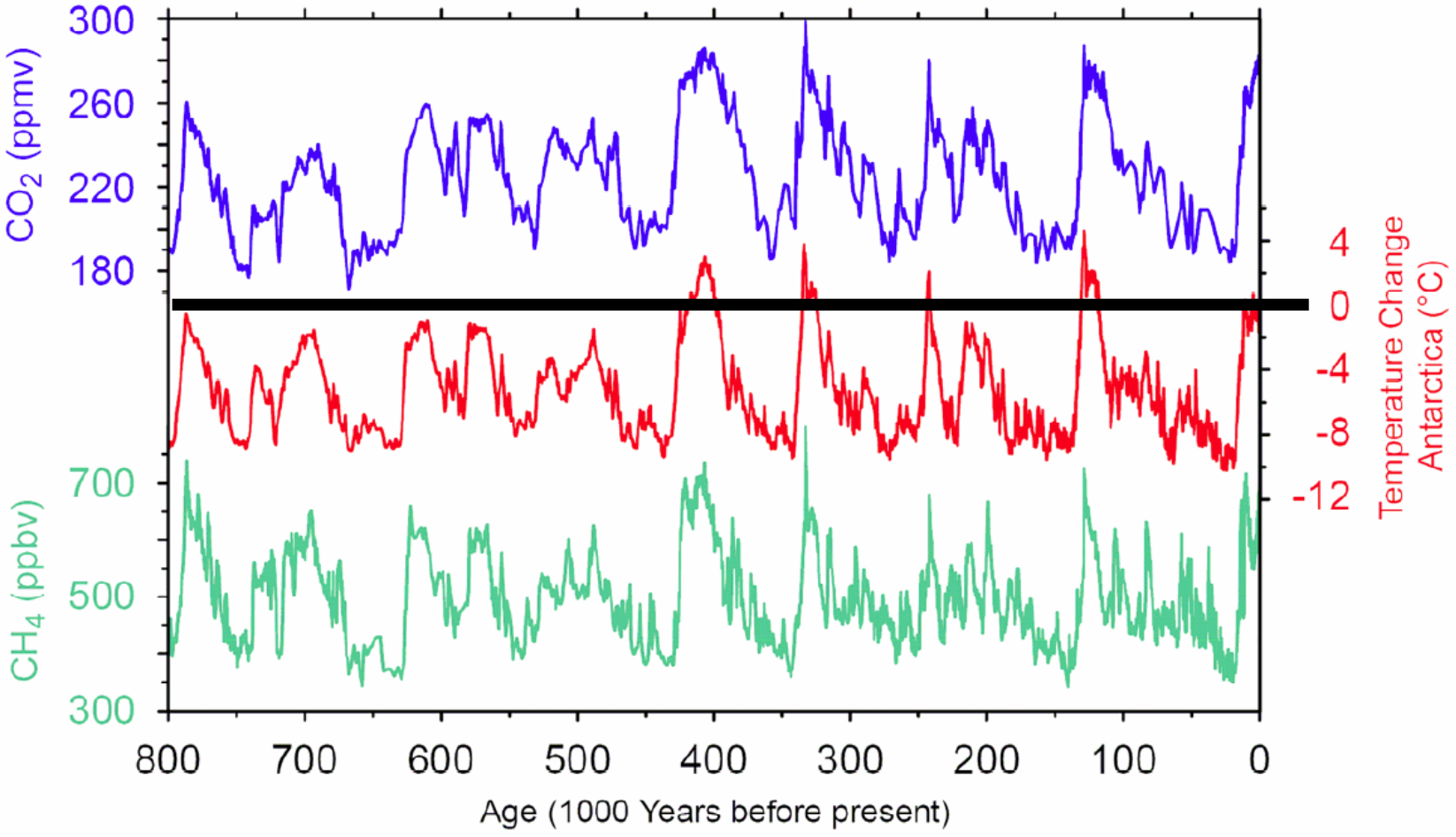
Temperature variations over the last 800,000 years



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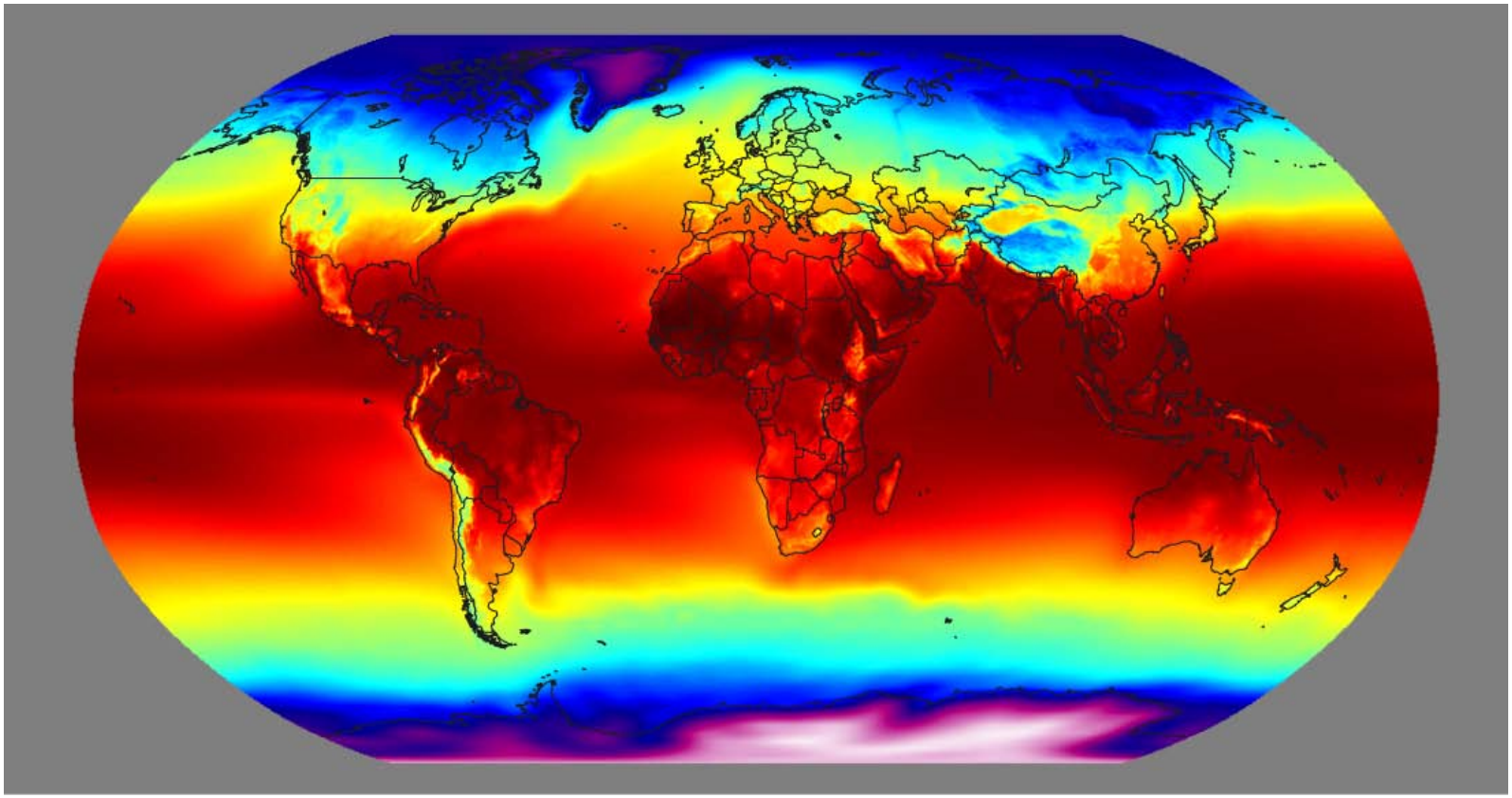
Source: IPCC 2007



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http://www.globalwarmingart.com/images/a/aa/Annual_Average_Temperature_Map.jpg

WHO 2003

Table 20.17 Estimated disease burden (000s of DALYs) attributable to climate change in the year 2000, by cause and subregion

Subregion	*Malnutrition*	*Diarrhoea*	*Malaria*	*Floods*	*All causes*	*Total DALYs/million population*
AFR-D	293	154	178	1	626	2185.78
AFR-E	323	260	682	3	1267	3839.58
AMR-A	0	0	0	4	4	11.85
AMR-B	0	0	3	67	71	166.62
AMR-D	0	17	0	5	23	324.15
EMR-B	0	14	0	6	20	147.57
EMR-D	313	277	112	46	748	2145.91
EUR-A	0	0	0	3	3	6.66
EUR-B	0	6	0	4	10	48.13
EUR-C	0	3	0	1	4	14.93
SEAR-B	0	28	0	6	34	117.19
SEAR-D	1918	612	0	8	2538	2080.84
WPR-A	0	0	0	1	1	8.69
WPR-B	0	89	43	37	169	111.36
World	2846	1459	1018	193	5517	925.35

Comparing 2000 to 1990, 0.3^0 C temperature increase
NOTE: NO DALYs attributed to temperature per se

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Climate change and respiratory disease: European Respiratory Society position statement

J.G. Ayres, B. Forsberg, I. Annesi-Maesano, R. Dey, K.L. Ebi, P.J. Helms, M. Medina-Ramón, M. Windt and F. Forastiere, on behalf of the Environment and Health Committee of the European Respiratory Society#

CLIMATE CHANGE AND RESPIRATORY DISEASE

The key climatic change factors that could potentially influence respiratory disease are extreme temperature events (both hot and cold), changes in air pollution, flooding, damp housing, thunderstorms, changes in allergen disposition and consequent allergies, forest fires and dust storms, the effects either being short or long term.

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ERJ 2009

Daily temperature and mortality

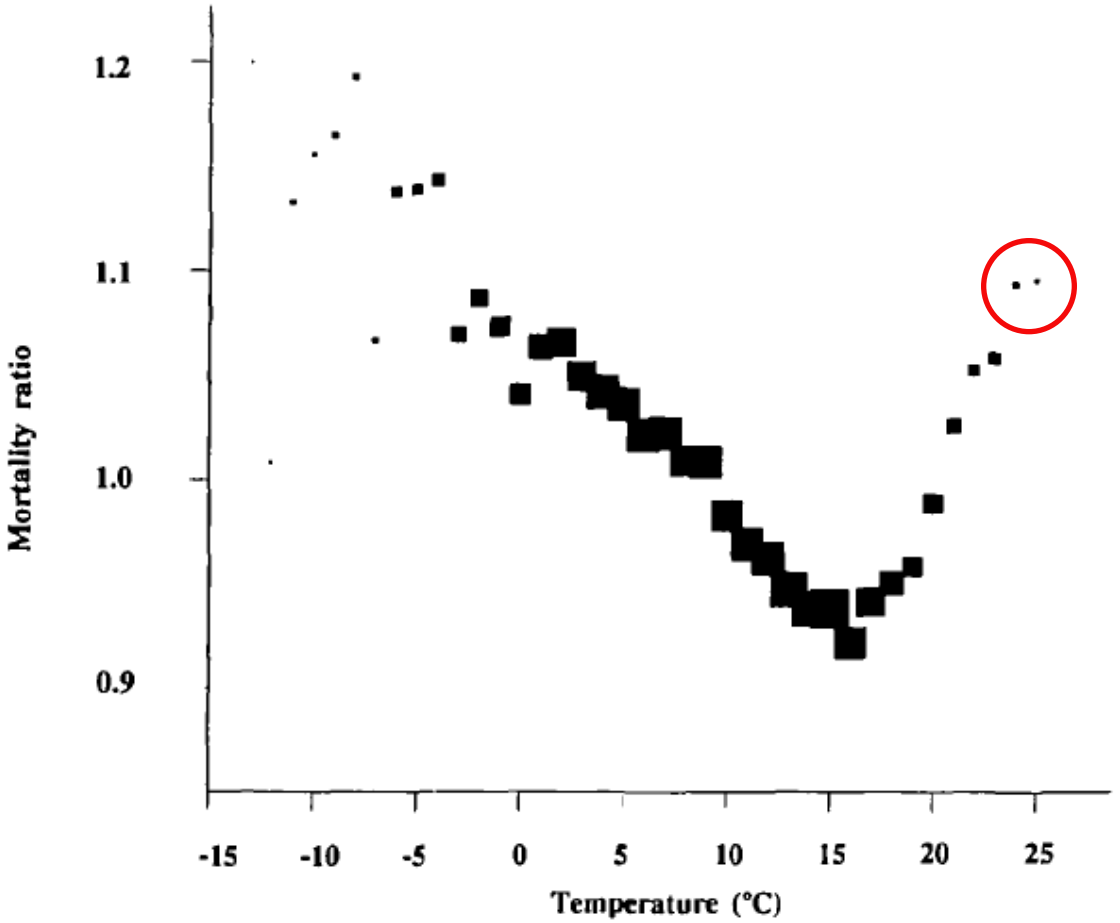

FIGURE 1. The mean mortality level at days grouped according to average temperature, the Netherlands, 1979–1987. The size of the block is proportional to the square root of the corresponding number of days.

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Am J Epidemiol 1993

Harvesting….

- Refers to short-term mortality displacement
- Has been suggested for effects of high but not low temperatures (e.g., Braga, Epidemiology 2001)
- May NOT apply to extreme weather events such as the 2003 heat wave

The Grim Reaper….

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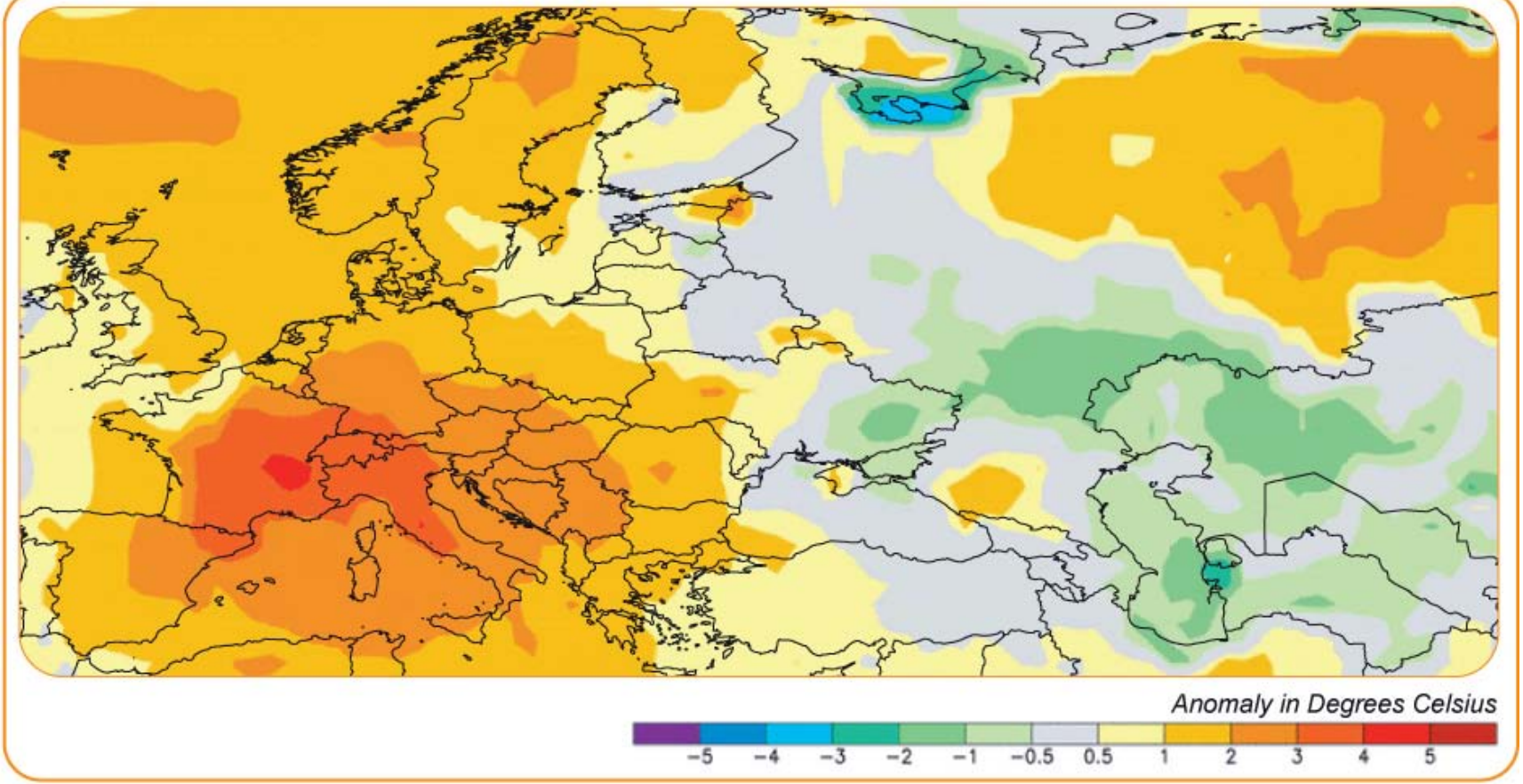
Surface temperature anomalies between 1998 and 2003 summers



This map, produced from both in situ and satellite information (NDC/NOAA), shows the extreme deviation from the average as recorded from June to August 2003. In some areas the difference exceeds 4°C. Climatological base period is 1988-2003.

Sources: NCDC / NOAA
Cartography: UNEP/DEWA/GRID-Europe, March 2004
The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

UNEP | GRID Europe

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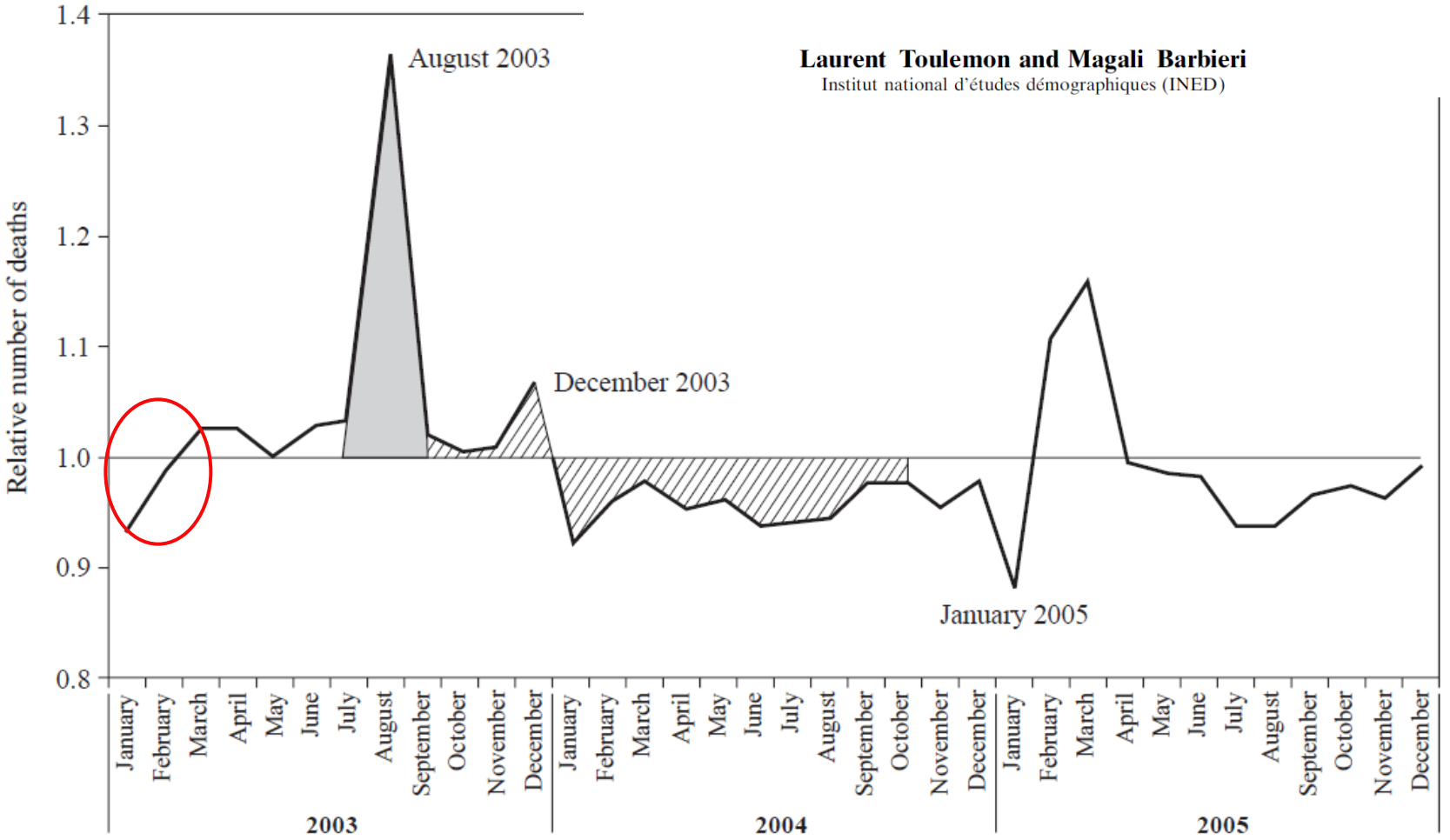
The mortality impact of the August 2003 heat wave in France: Investigating the 'harvesting' effect and other long-term consequences

Laurent Toulemon and Magali Barbieri
Institut national d'études démographiques (INED)



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Pop Studies 2008

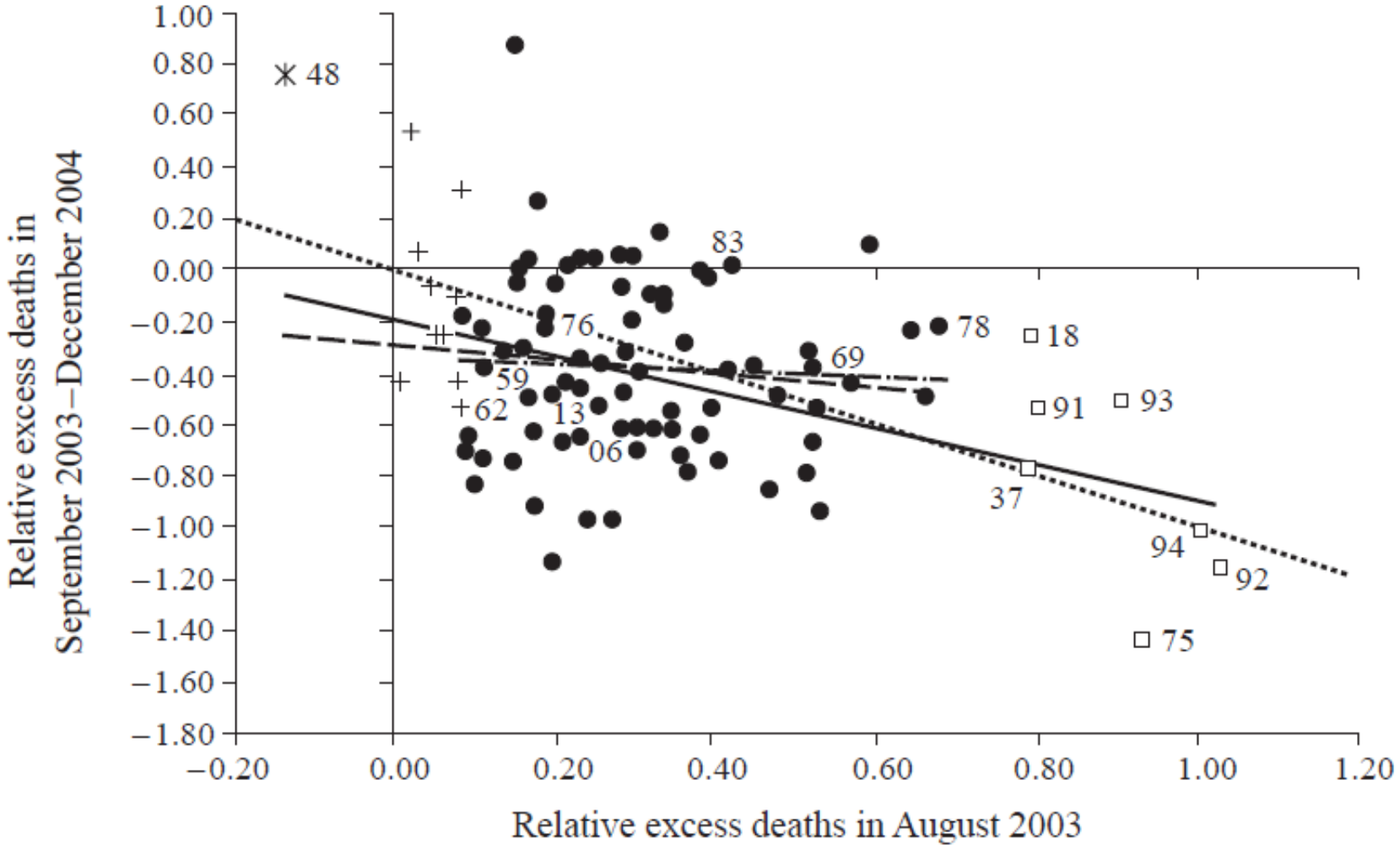

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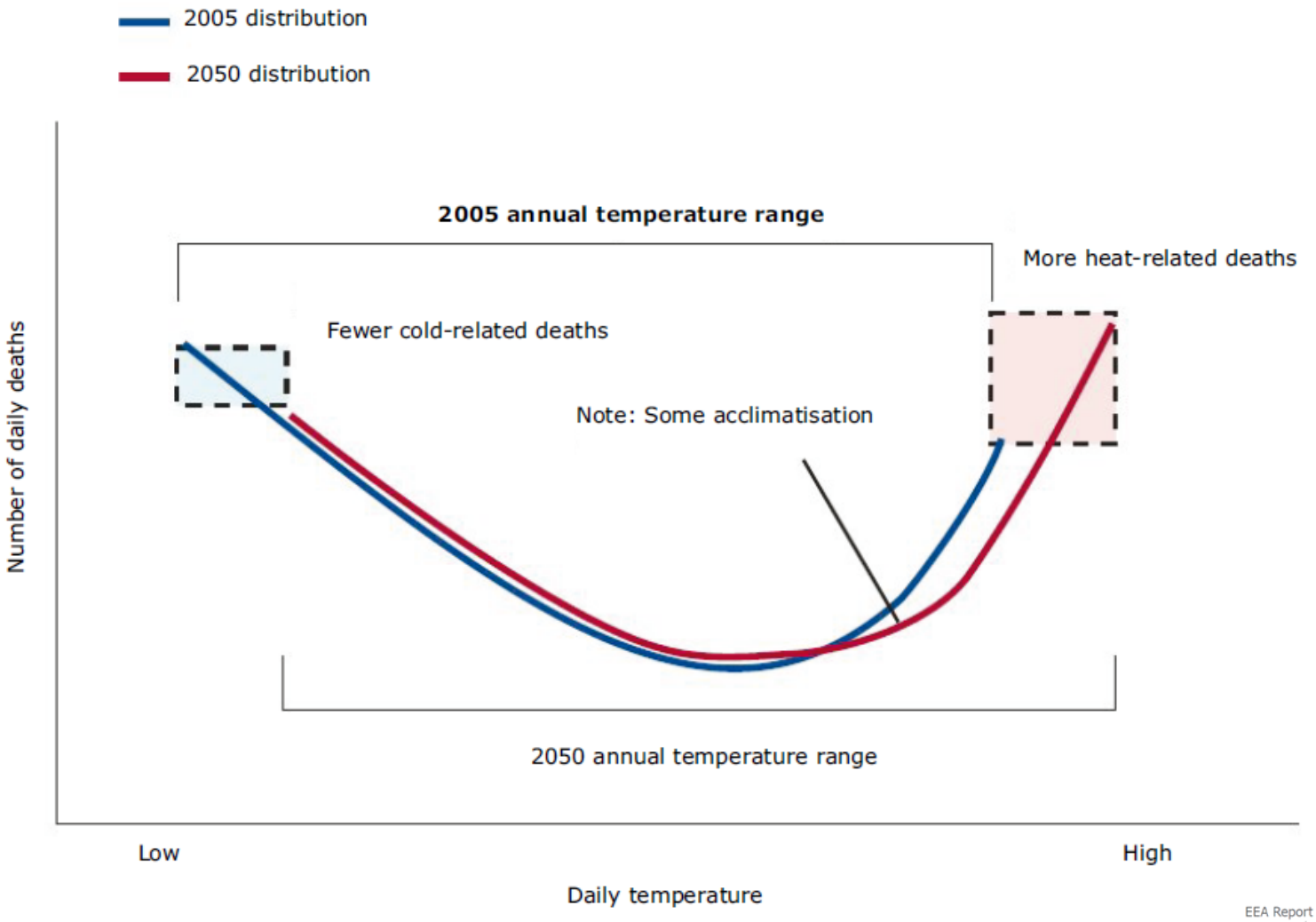
Figure 5.42 Relationship between number of temperature-related daily deaths and daily temperature



EEA Report | No 4/2008
JRC Reference Report | No JRC47756

Impacts of climate change in human health in Europe. PESETA-Human health study

Table 3 *Total heat and cold-related deaths, and average annual death rates, under the period 2011-2040, with and without acclimatisation*

Note climate change induced difference shown.

	Climate change induced difference - no acclimatisation		* Climate change induced difference – with acclimatisation / decline in sensitivity	
	European total number of deaths	Average death rate (per 100,000)	European total number of deaths	Average death rate (per 100,000)
	HEAT-RELATED DEATHS			
Climate-dependent functions	27337	5.5	3978	0.8
Country-specific functions	26372	5.3	3938	0.8
	COLD-RELATED DEATHS			
Climate-dependent functions	- 50272	- 10.0	- 19422	- 3.9
Country-specific functions	- 98529	- 20	- 6893	- 1.4

(-) implies a benefit (fewer deaths), (+) implies an impact (more deaths).

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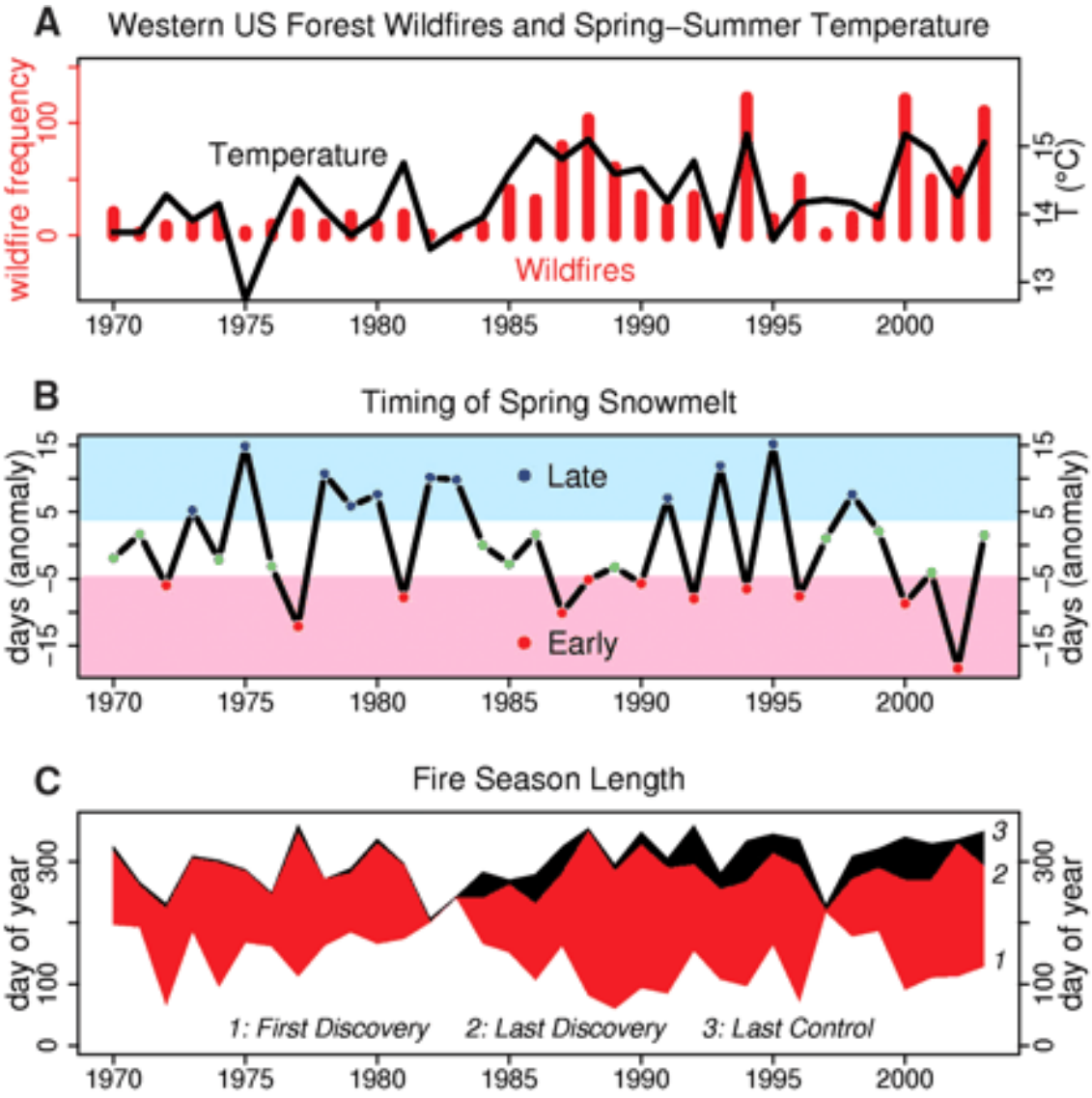
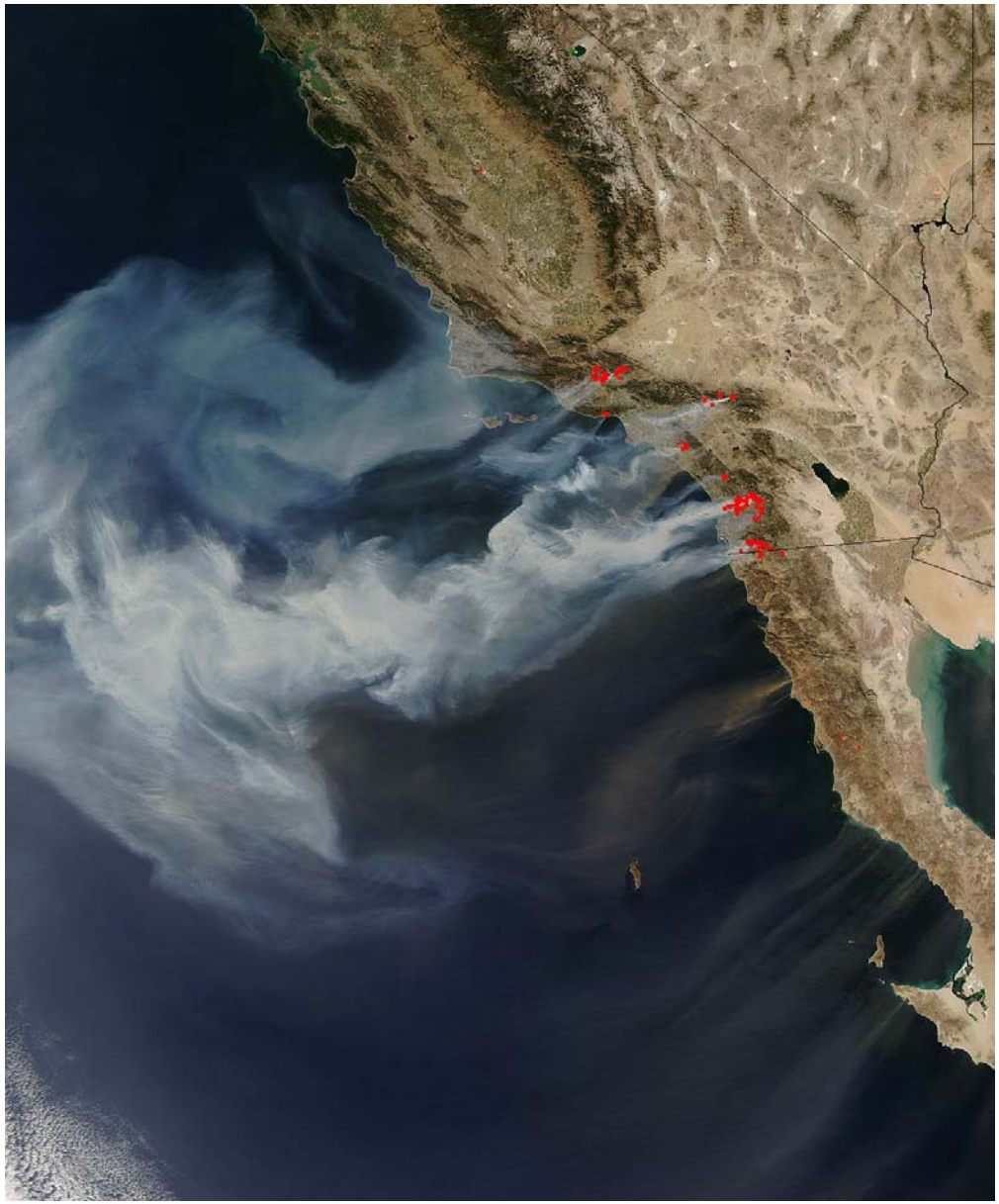
http://ftp.jrc.es/EURdoc/JRC55393.pdf

Warming and Earlier Spring Increase Western U.S. Forest Wildfire Activity

A. L. Westerling,[1,2*] H. G. Hidalgo,[1] D. R. Cayan,[1,3] T. W. Swetnam[4]



SCIENCE 2006



California, 22/10/2007

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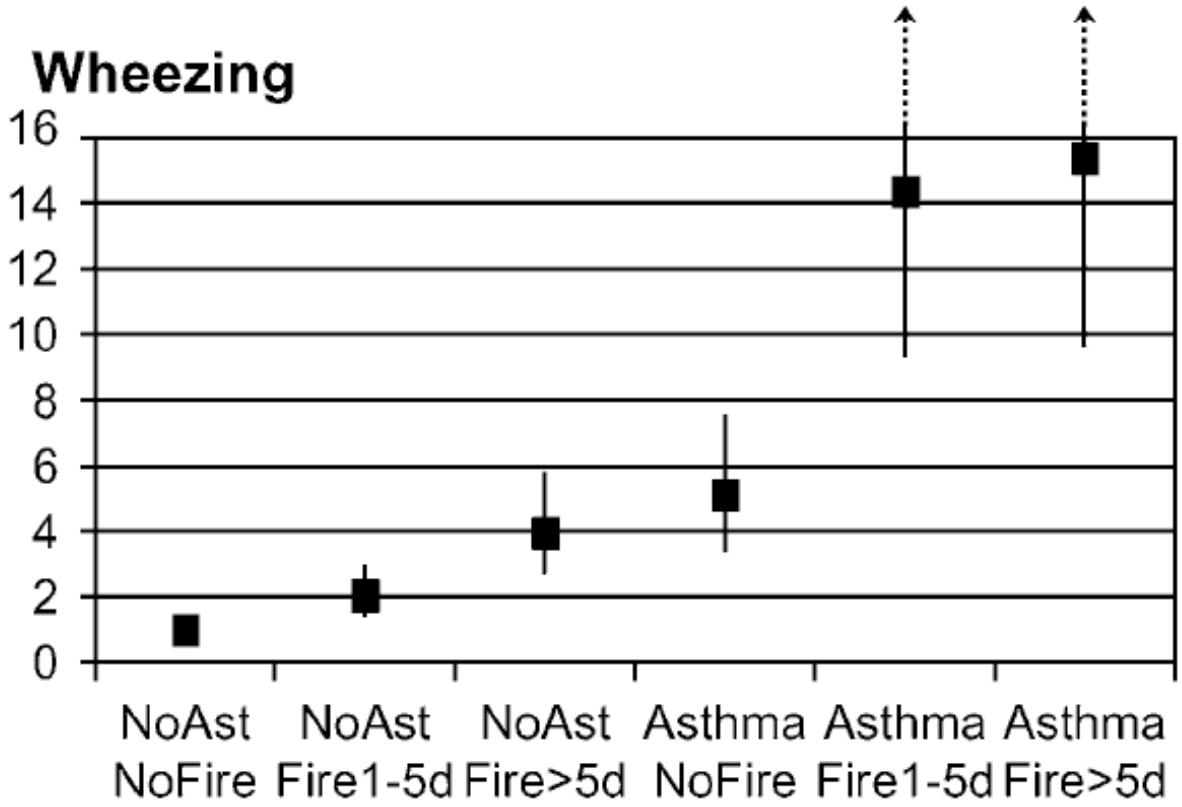
Health Effects of the 2003 Southern California Wildfires on Children

Nino Künzli, Ed Avol, Jun Wu, W. James Gauderman, Ed Rappaport, Joshua Millstein, Jonathan Bennion, Rob McConnell, Frank D. Gilliland, Kiros Berhane, Fred Lurmann, Arthur Winer, and John M. Peters

AJRCCM 2006



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Moscow, summer 2010

Sugar cane burning in Southern Brazil

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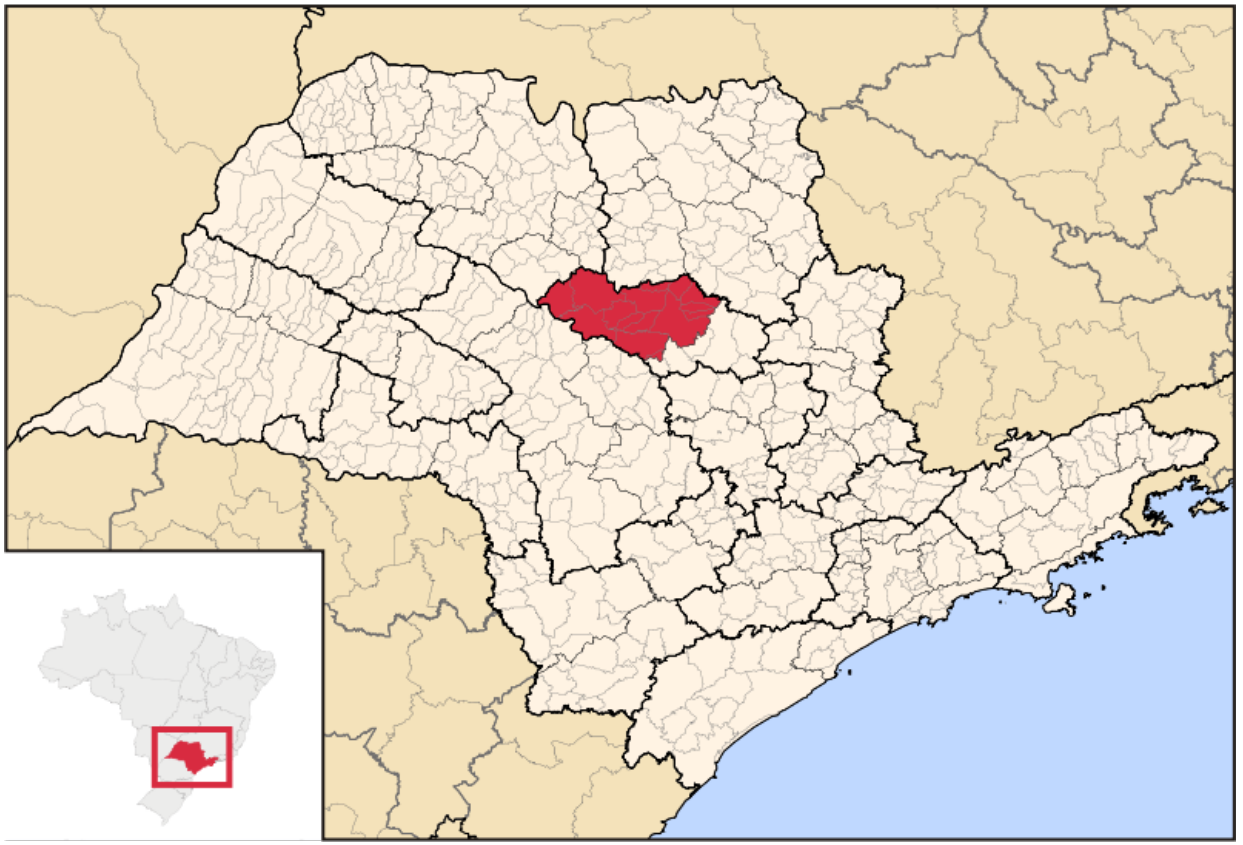
EVIDENCE BASED PUBLIC HEALTH POLICY AND PRACTICE

Air pollution from biomass burning and asthma hospital admissions in a sugar cane plantation area in Brazil

Marcos Abdo Arbex, Lourdes Conceição Martins, Regiani Carvalho de Oliveira, Luiz Alberto Amador Pereira, Flávio Ferlin Arbex, José Eduardo Delfini Cançado, Paulo Hilário Nascimento Saldiva, Alfésio Luís Ferreira Braga

J Epidemiol Community Health 2007;**61**:395–400. doi: 10.1136/jech.2005.044743



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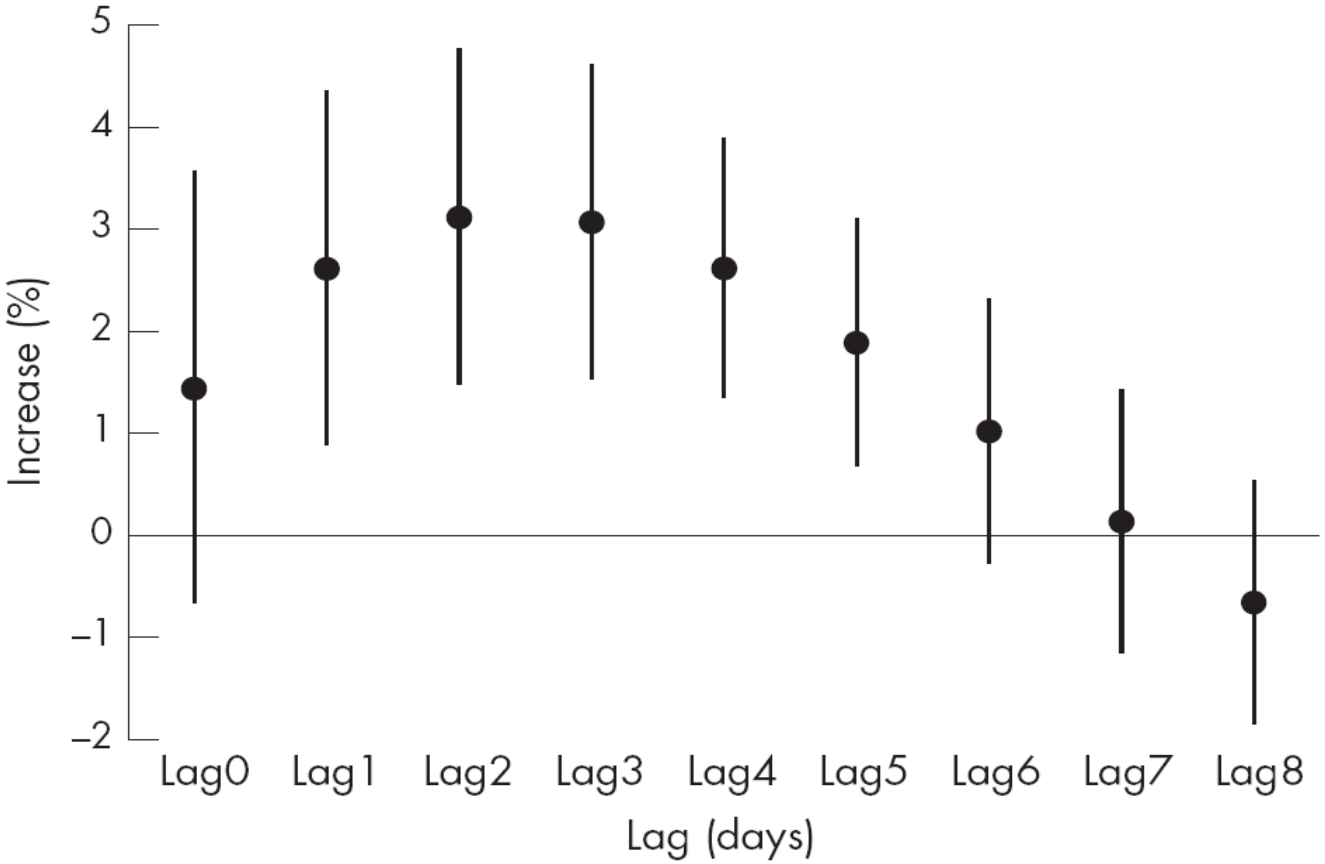

Figure 2 Percentage increases and 95% CI in asthma hospital admissions in the concurrent and six subsequent days following a 10 μg/m^3 increase in total suspended particle concentrations.

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Effects of climate change on environmental factors in respiratory allergic diseases

CEA 2008

G. D'Amato* and L. Cecchi†,‡

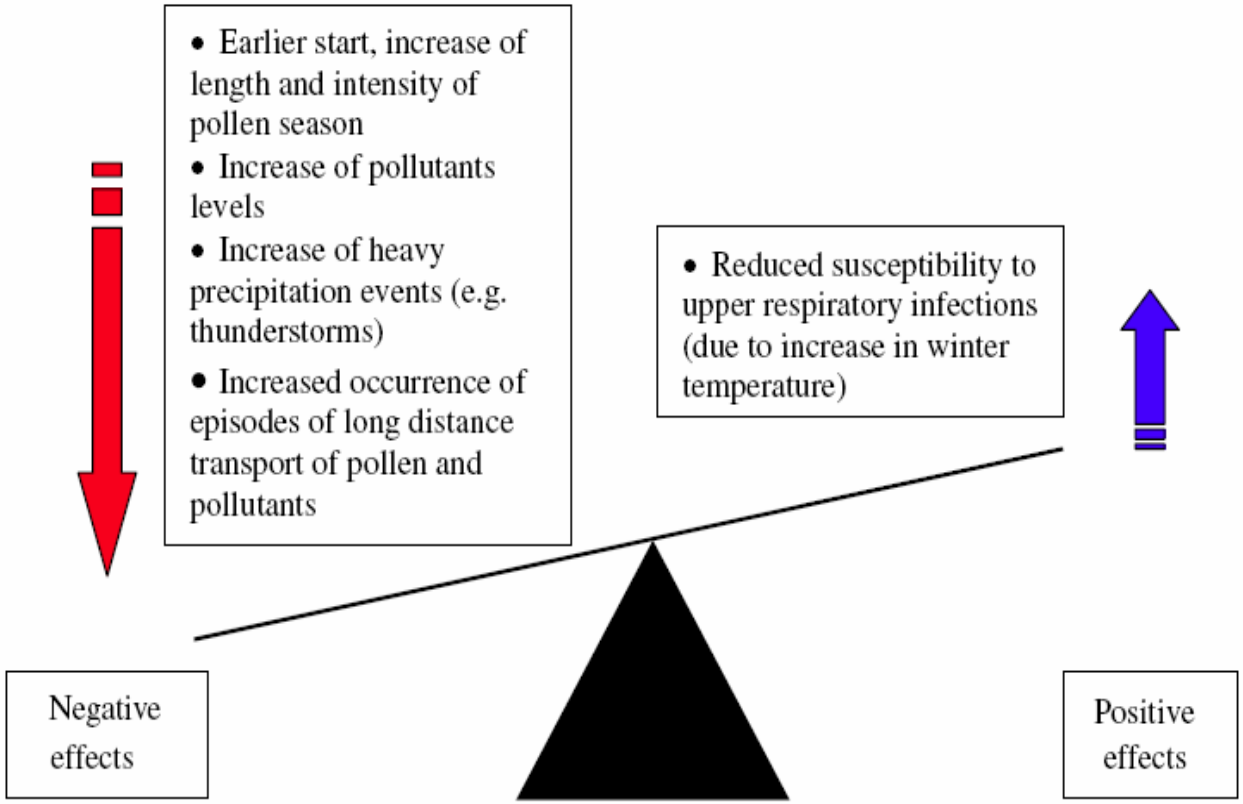

Fig. 1. Possible effects of climate change on patients affected by respiratory allergy (see text).

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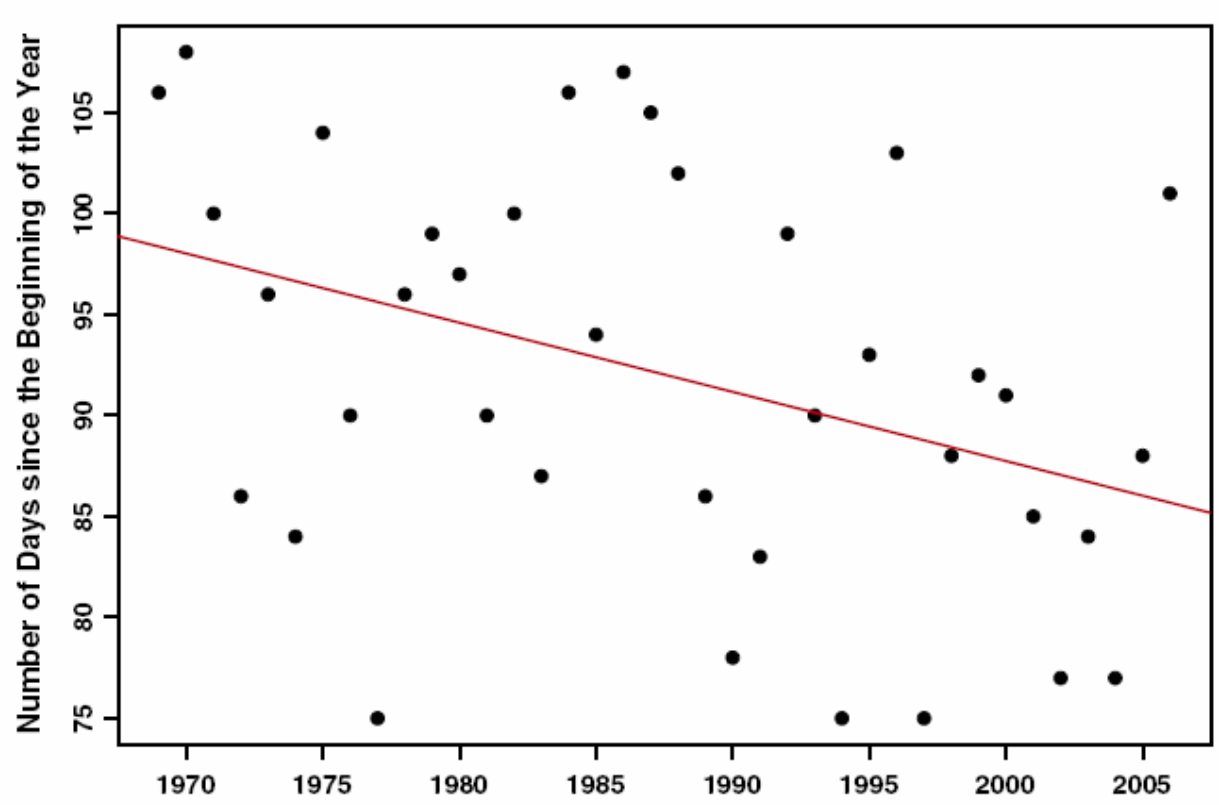
Climate change and its impact on birch pollen quantities and the start of the pollen season an example from Switzerland for the period 1969–2006

Thomas Frei · Ewald Gassner

Fig. 4 Start of the birch pollen season in days since the beginning of the year Basel, 1969–2006



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Pollen counts in relation to the prevalence of allergic rhinoconjunctivitis, asthma and atopic eczema in the International Study of Asthma and Allergies in Childhood (ISAAC)

CEA 2003

M. L. Burr*, J. C. Emberlin†, R. Treu†, S. Cheng‡, N. E. Pearce‡ and the ISAAC Phase One Study Group

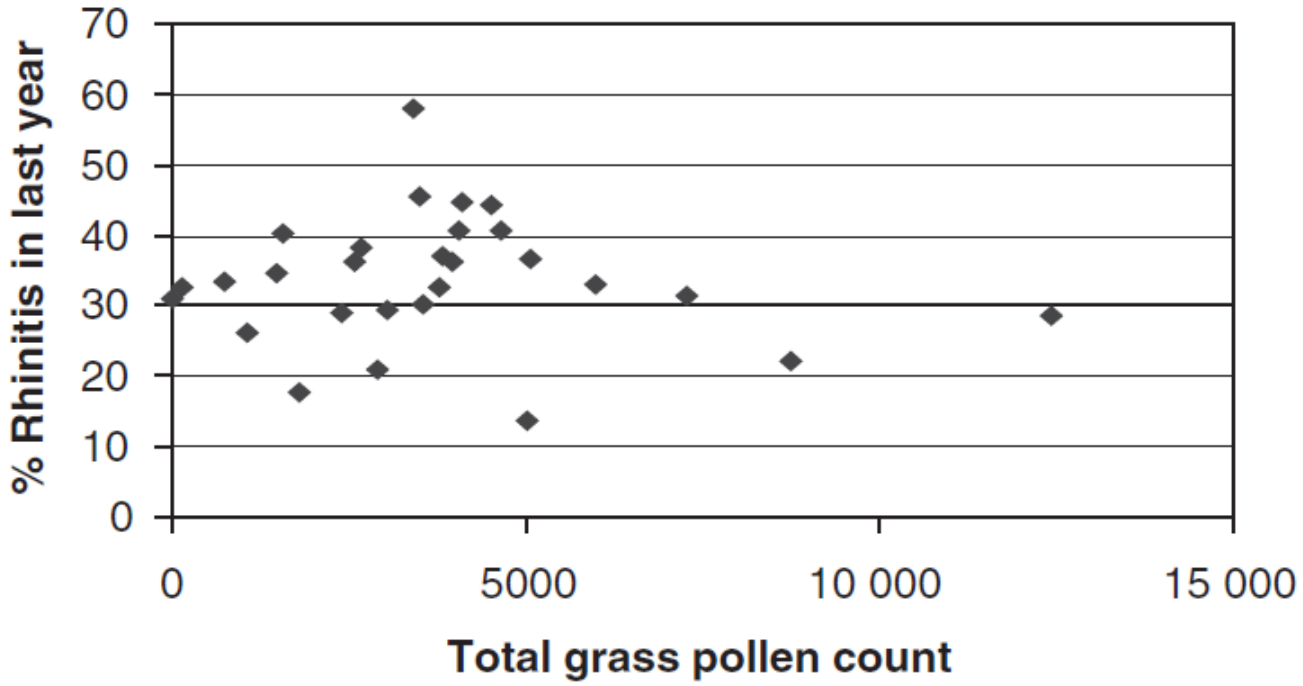

Fig. 1. Relationship between total grass pollen count and prevalence of allergic rhinitis in the last year.

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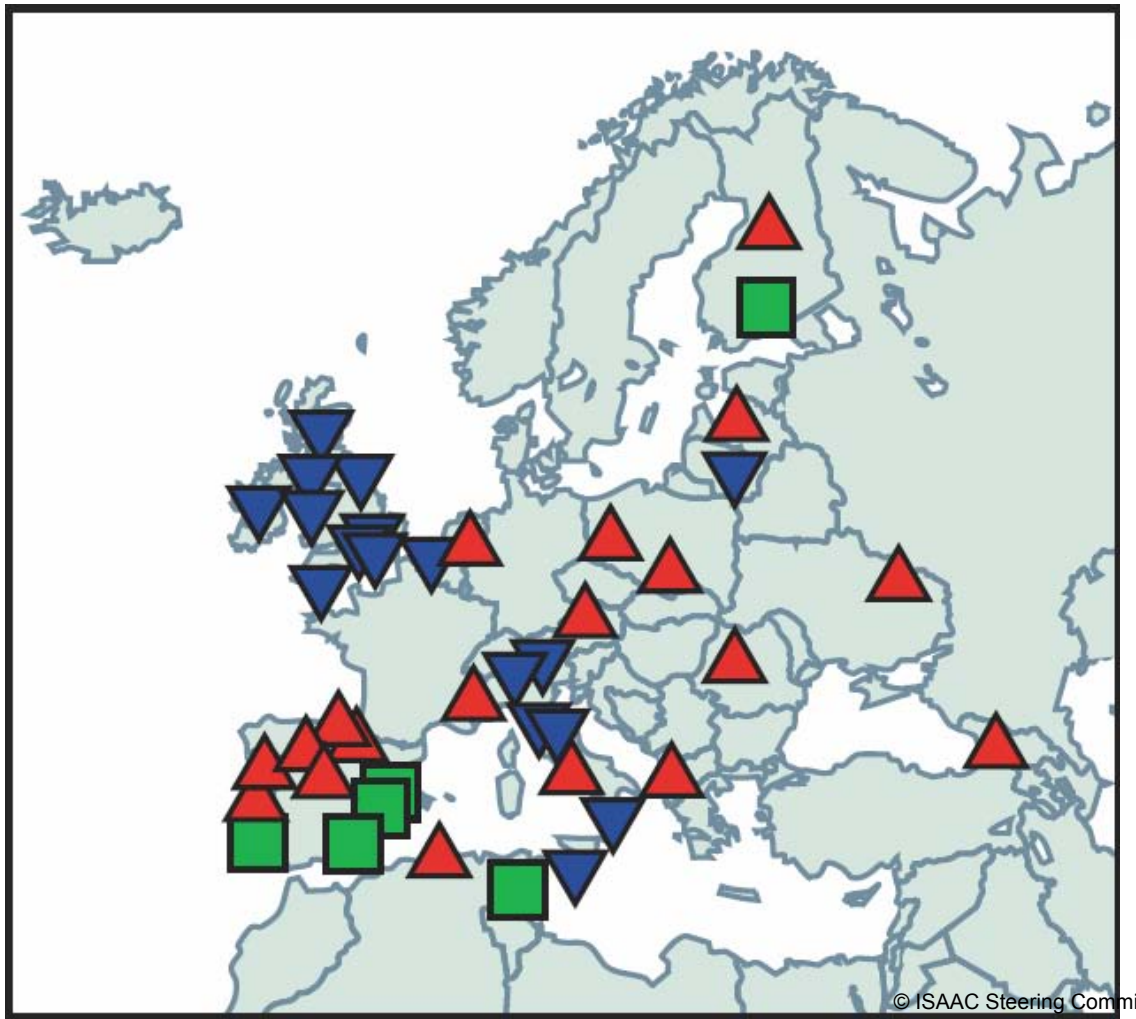
Worldwide time trends in the prevalence of symptoms of asthma, allergic rhinoconjunctivitis, and eczema in childhood: ISAAC Phases One and Three repeat multicountry cross-sectional surveys

M Innes Asher, Stephen Montefort, Bengt Björkstén, Christopher K W Lai, David P Strachan, Stephan K Weiland, Hywel Williams, and the ISAAC Phase Three Study Group*

Lancet 2006



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Concluding remarks

- Climate change MAY have measureable effects on respiratory health
- Estimates of current and future impact of climate change on respiratory health VERY dependent on assumptions
- Climate change is NOT currently a major determinant of respiratory health
- More research is needed to improve the empirical database for making assessments of respiratory health impact of climate change

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Thank you for your attention !

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