

[Corpus Linguistics in the South](#)

*Corpus Linguistics Applied: Corpora, Discourse and
Contemporary Social Issues*

Queen Mary, University of London: 11/02/12

**Hotting Up or Cooling Down –
the Discourse of Climate Change**

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Acknowledgements

- **To my co-researchers:** Dr Reiner Grundmann; and Dr Mike Scott
- **To our initial funders:** ACORN (the Aston Corpus Network, 2007-8); and CSI (the Aston Centre for Sustainability and Innovation, 2010-2012)

Abstract

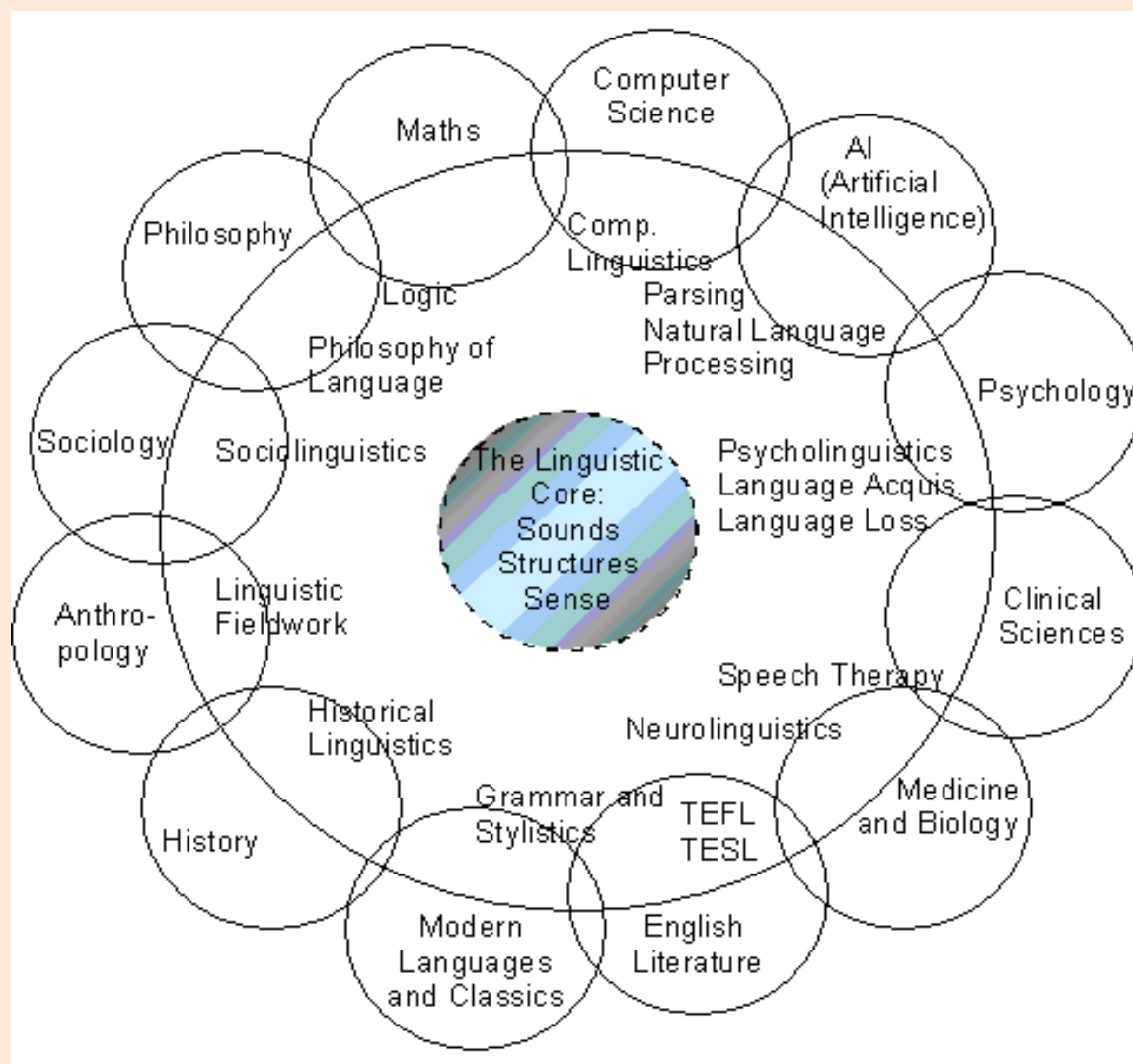
- The **physical sciences** present us with both observed and hypothetical scenarios.
- **Human beings decide which of these scenarios to take seriously, and how to respond to them.**
- The **social sciences** seek to understand the social processes by which human beings make such decisions.
- Increasingly, social scientists are accepting the importance of the **discourses** on the scenarios in reflecting some aspects of the social processes.
- **Critical discourse analysts** are now being joined by **corpus linguists** in examining the discourses.
- This talk will use a **corpus linguistics approach** to look at a group of scenarios that has emerged prominently in recent decades (climate change and its actual and potential effects on our planet) and the discourses reflecting human attitudes to the presentation, evaluation, and decision-making processes that have been initiated by these scenarios.

OVERVIEW

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1. INTRODUCTION

CLIMATE CHANGE: 'real world' discourses and academic disciplines



From Smith, N. V. (2002) How to be the centre of the universe. In *Language, Bananas and Bonobos: Linguistic Problems, Puzzles and Polemics*. Oxford: Blackwell [<http://www.llas.ac.uk/resources/gpg/98>]

Sociological background

- **“Comparative media analyses”**
 - **issue attention cycle** (Downs 1972; Trumbo 1996)
 - **differences between nations** (Brossard & McComas 2004; Grundmann 2007)
 - **sources of information and journalistic norms** (Boykoff & Boykoff 2004; Carvalho & Burgess 2005).
- **Problem: research was highly selective:** focus on quality print media; limited in timeframe and scope; very few countries/languages examined

Novel approach: corpus

- Use **wider range of publications** (not only quality media) [from Nexis UK database]
- Add **quantitative** analyses (to mainly qualitative previous research)
- Use **corpus-based** techniques (**linguistic focus:** lexical and discursive structures)
- Examine changes across **longer timespan** (1980-2008)
- Look at **wider range of nations/languages**

The Discourse of Climate Change project at Aston University

Phase 1: 2007-09: MEDIA

- **NEWSPAPERS** 1980-2008
- *greenhouse gases, global warming, climate change*
- Raw Data
- English (USA, UK), French and German
- c. 600,000 articles
- c. 400 million words
- 6 Masters students, RG & RK; LSS

Phase 2: 2010-12: + BUSINESS

- **+YEARS:** 2008-2010
- **+TOPIC:** *energy security*
- Data Cleanup
- **+RANGE:** Brazil (Portuguese), India (English), etc
- **+BUSINESS: CORPORATE SUSTAINABILITY REPORTS**
- **+TOOL:** Keywords
- 2 PhD students, 1 Visiting Academic; RG, MS, & RK; LSS, ABS, External Partners

2. RAW CORPUS SIZE AND SOURCES

RAW CORPUS SIZE: 599,361 articles; 413,503,821 words

Country	No of words	No of articles	No of publications	No of newspapers
US	221,765,811	271,056	1560	326; since 1980s
UK	97,218,030	161,495	663	253; since late 1980s, Daily/Sunday Telegraph since 2000
FR	64,205,728	107,090	183	48; Le Monde since 1987, Liberation since 2000
GE	30,314,252	59,720	166	21; 1 since late 1980s, 7 from 1990s, 13 after 2000

Problem of uneven sources in Nexis

- Nexis acquired rights to different publications at different points in time
- We need to look more closely at the possible impacts this may have had on the research, and make adjustments (eg create separate subcorpus for each publication, by month/year) in future studies based on this corpus

3. SEARCH TERMS

Choosing 'search terms'

...to capture a 'discourse'

- terms **identified by previous research** such as Boykoff (2007); Brossard et al. (2004); Carvalho and Burgess (2005); Grundmann (2007)
- **Authors** used their **intuition** to think of additional terms for German and English
- **French colleagues** were consulted for French terms...
- ...and suggested **dictionaries**, so we looked at Oxford-Hachette (1994), Oxford-Hachette Concise (1998) and Collins-Robert (2005) bilingual dictionaries (but this yielded a larger range of terms)
- We **searched internet engines** for all these terms (and selected the top 4 for French)
- their selection appeared later to be **justified by their broadly similar occurrence rates within the Nexis data**
- **...BUT one additional term found in frequency lists: *Klimaschutz***

[Grundmann & Krishnamurthy (2010) *The Discourse of Climate Change: A Corpus-based Approach*, <http://cadaad.net/journal> Vol 4 (2): 125 – 146]

Search terms: intuition, internet and Nexis

Search Term	Google Search	Nexis	
climate change	73%	39% (USA)	55% (UK)
global warming	24%	57% (USA)	42% (UK)
greenhouse effect	3%	5% (USA)	3% (UK)
Klimawandel	70%	70%	
Treibhauseffekt	10%	6%	
globale Erwärmung	8%	5%	
Klimakatastrophe	12%	19%	
réchauffement climatique	36%	16%	
effet de serre	32%	28%	
changement climatique	26%	39%	
réchauffement de la planète	6%	16%	

SEARCH TERMS:

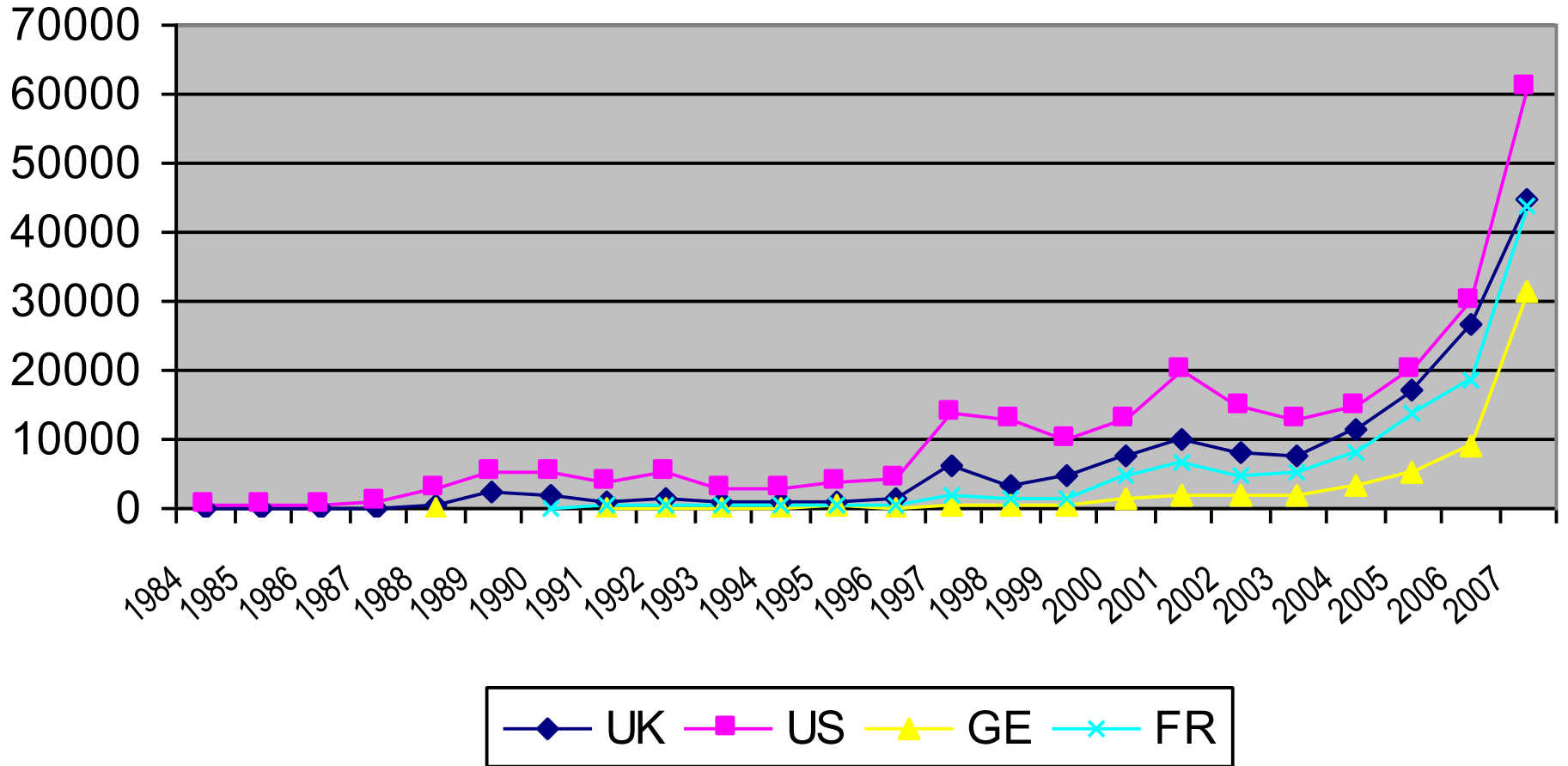
English articles: 1980-2007

Source	Search term	No of Articles	Wordcounts (Unix wc)	Avge length (words)
US News (Excluding Newswires)	global warming	153,525	129,185,798	841
US News (Excluding Newswires)	climate change	104,842	82,111,766	783
US News (Excluding Newswires)	greenhouse effect	12,689	10,468,247	824
US News (Excluding Newswires)	SUBTOTALS	271,056	221,765,811	818
UK newspapers	climate change	88,036	50,729,324	576
UK newspapers	global warming	68,608	42,967,535	626
UK newspapers	greenhouse effect	4,851	3,521,171	726
UK newspapers	SUBTOTALS	161,495	97,218,030	602

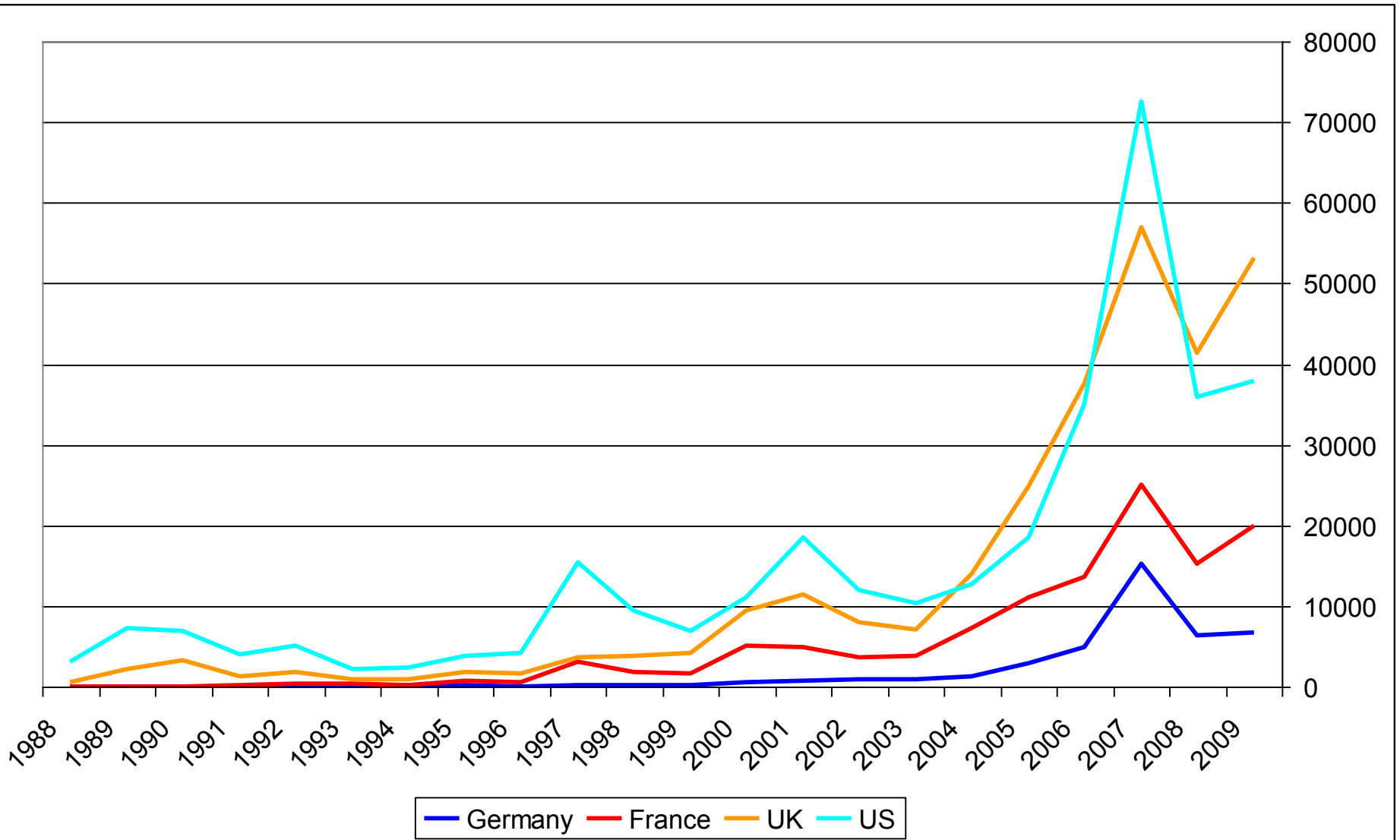
4. DISTRIBUTION OF DATA ACROSS TIME

Number of articles: 1984-2007

Number of articles / news items



Number of articles 1988-2009



5. DISTRIBUTION OF SEARCH TERMS ACROSS TIME

English: USA, 1988-2009

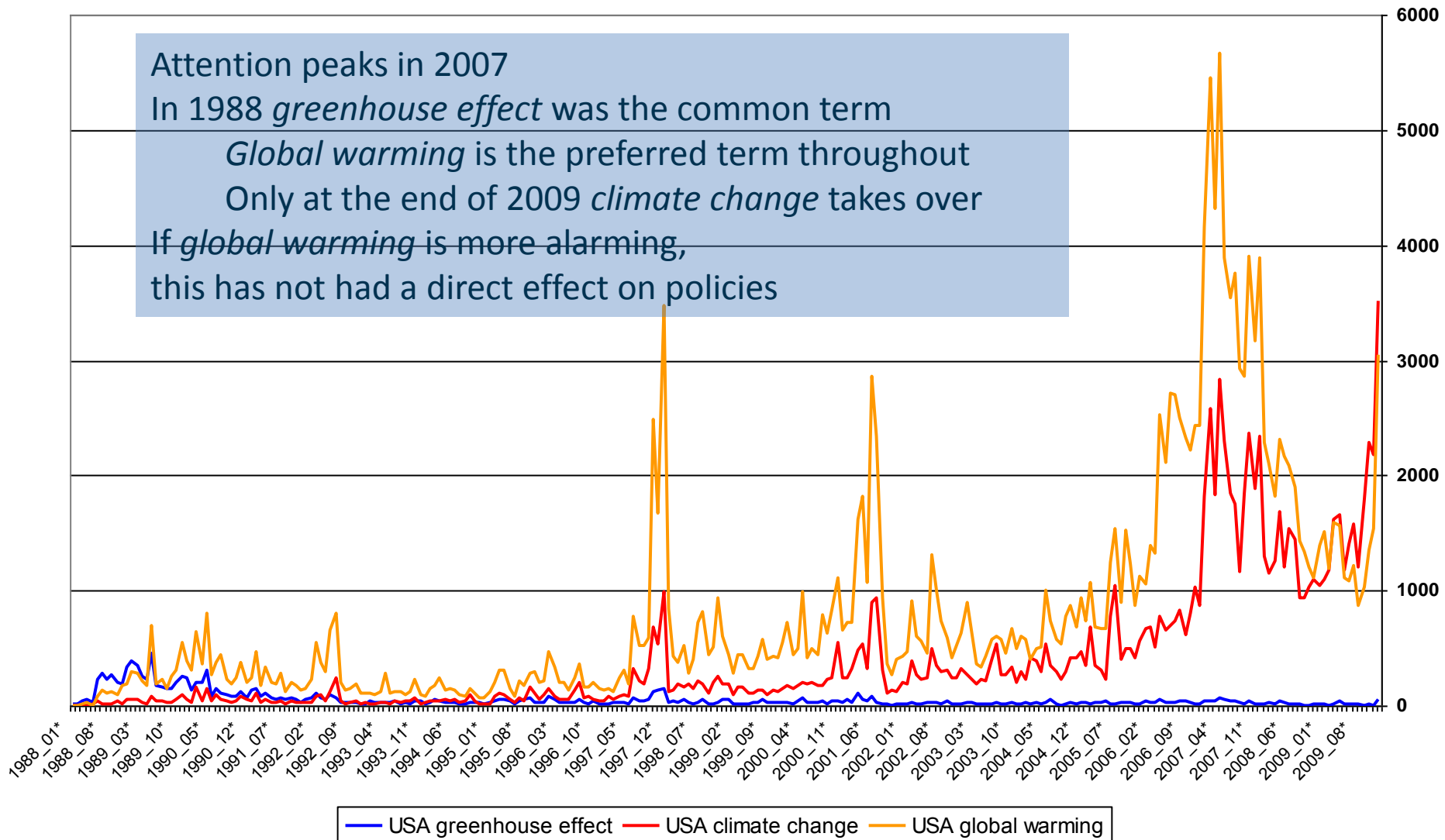
Attention peaks in 2007

In 1988 *greenhouse effect* was the common term

Global warming is the preferred term throughout

Only at the end of 2009 *climate change* takes over

If *global warming* is more alarming,
this has not had a direct effect on policies



Earliest articles: USA

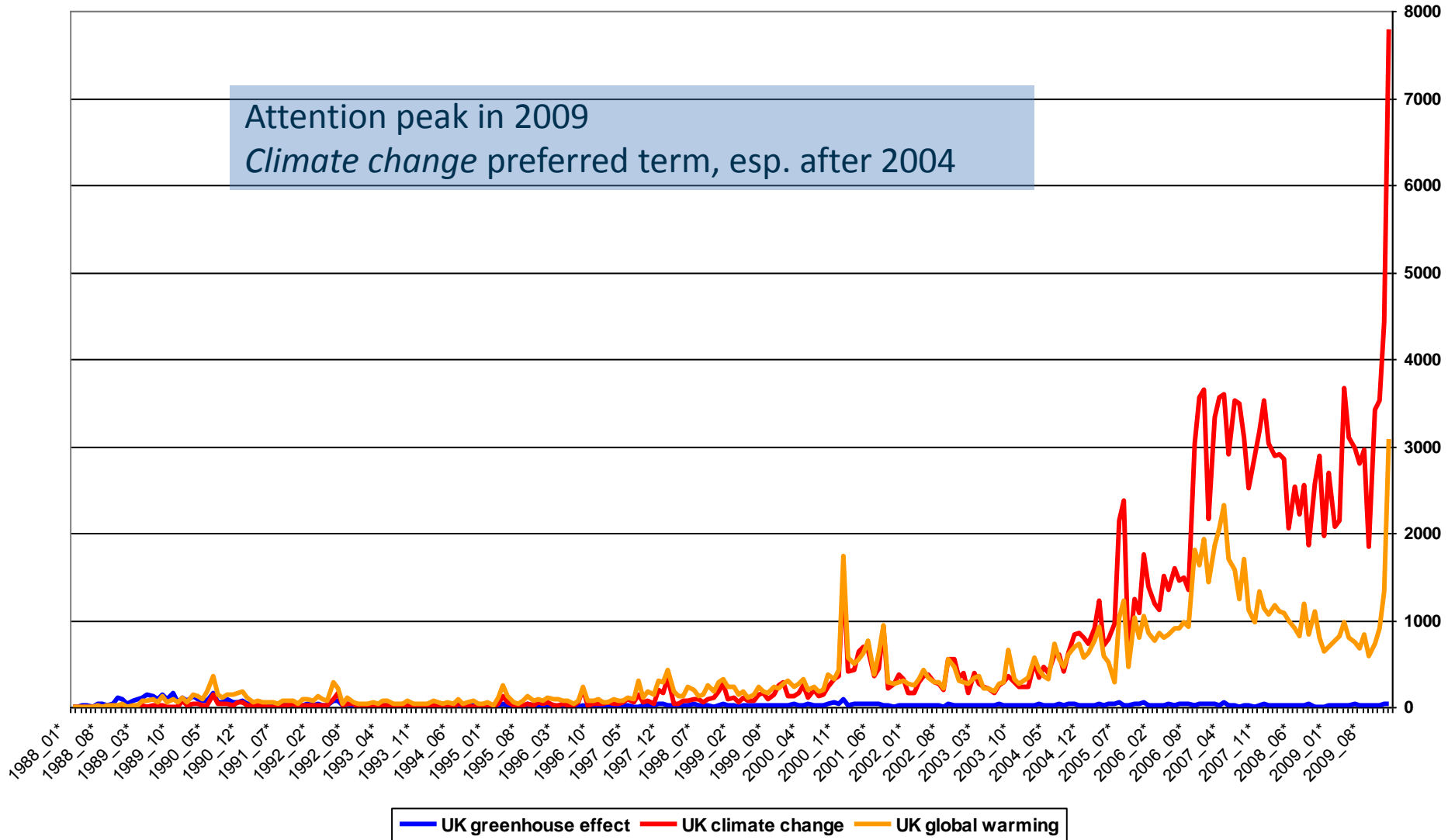
- *greenhouse effect: 2 Aug 1970 [scare quotes]*
 - New York Times: *Study indicates effect of increasing quantities of carbon dioxide in atmosphere (believed to raise temperatures by 'greenhouse effect') has resulted in little climate change in this century*
- *climate change: 24 Jul 1983 [historical]*
 - New York Times: *Normally a population of mammals has a sufficiently wide range of genetic traits so that if disease, climate change or another factor threatens the species, some individuals will be equipped to cope with it.*
- *global warming: 21 Oct 1983 [hypothetical]*
 - New York Times: *If a global warming of about 3 or 4 degree centigrade were to occur over the next hundred years, it is likely that there would be a global sea-level rise of about 60 centimeters, in comparison with the rise of about 15 centimeters over the last century.*

Political reasons for changes in terms in USA?

- **Republican strategist Frank Luntz**
- New York Mayors: Rudy Giuliani 1993-2001, and Bloomberg since 2001
- ‘war in Iraq’ > ‘War on Terror’
- ‘estate tax’ > ‘death tax’ (= inheritance tax in UK) > huge shift in public opinion
- New York Times (2 March 2003)
 - claimed that ‘the terms “global warming” and “environmentalist” had largely disappeared by late last summer’. The terms appeared in a number of President Bush's speeches in 2001, but now the White House fairly consistently uses “climate change” and “conservationist”.
 - says **Luntz urged ‘that the term “climate change” be used instead of “global warming”, because ‘while global warming has catastrophic communications attached to it, climate change sounds a more controllable and less emotional challenge’**
- 2007 New York Times Best Seller ["Words That Work: It's Not What You Say, It's What People Hear.](#)

English: UK, 1988-2009

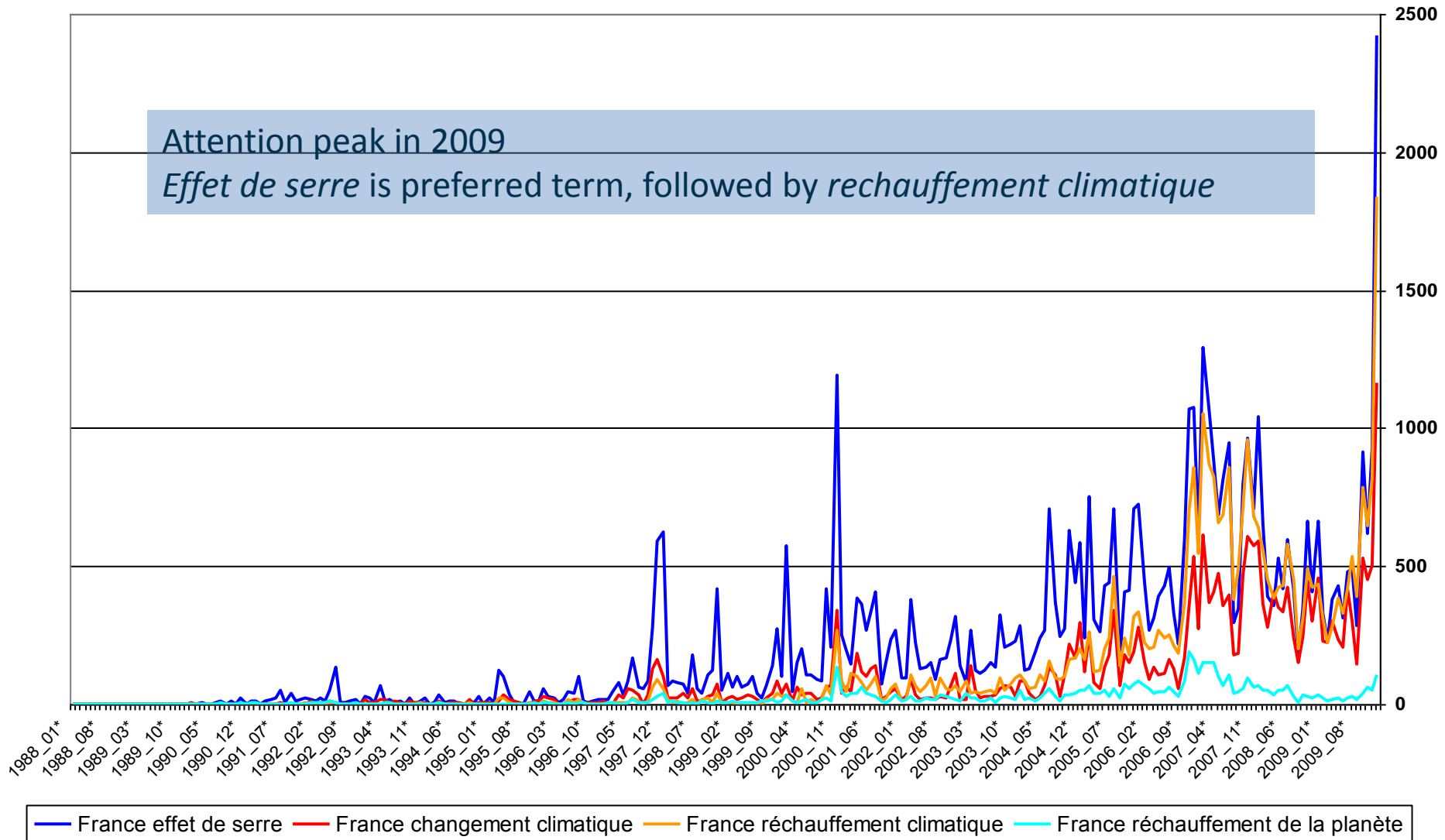
Attention peak in 2009
Climate change preferred term, esp. after 2004



French, 1988-2009

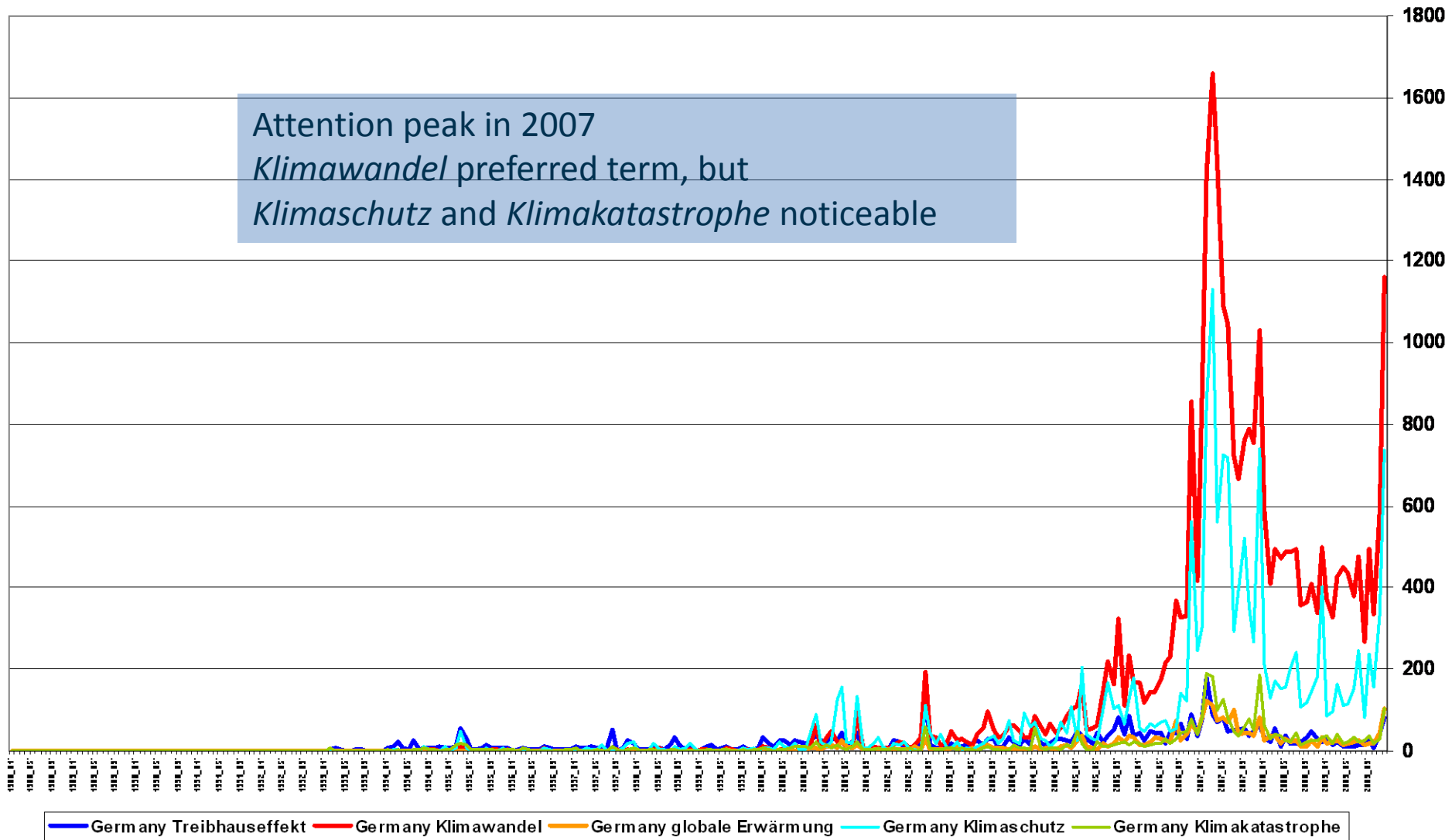
Attention peak in 2009

Effet de serre is preferred term, followed by *rechauffement climatique*



German, 1988-2009

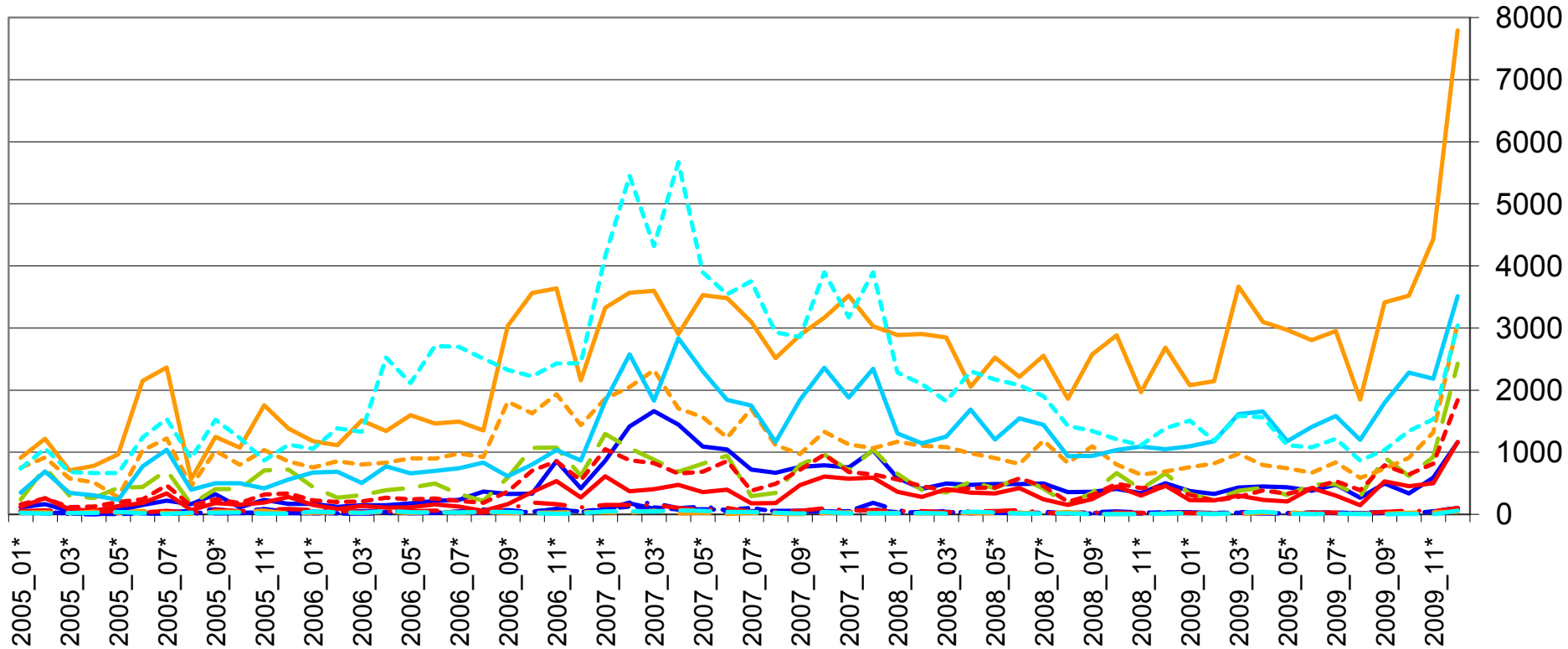
Attention peak in 2007
Klimawandel preferred term, but
Klimaschutz and *Klimakatastrophe* noticeable



1986:



SEARCH TERMS: MONTHLY VARIATIONS 2005-2009



6. WORD FREQUENCY

Note: COLOUR CODING (by sociological colleagues)

- **blue** = science frames
- **yellow** = political frames
- **red** = action-related words
- **purple** = morally charged words
- words were categorised intuitively
- These correspond roughly to Entman's (1993) definition of framing as comprising: problem definition, causal interpretation, treatment/recommendation and moral evaluation.
- Some words might belong to more than one frame (eg science/politics: *cause, planet, global, Erde, planète, percent, environment, etc*). **We have left cells containing ambivalent words uncoloured**

(edited) FREQUENCY lists – CONTENT WORDS ONLY: ENGLISH

US	UK	US	UK	US	UK
<i>climate change</i>		<i>global warming</i>		<i>greenhouse effect</i>	
climate	climate	global	global	global	greenhouse
new	change	warming	warming	warming	effect
warming	energy	new	new	greenhouse	years
energy	new	energy	climate	new	energy
change	people	people	people	years	global
years	years	years	years	carbon	new
emissions	mr	president	change	effect	carbon
environmental	global	state	world	climate	world
state	world	bush	energy	energy	climate
people	us	climate	last	dioxide	per
percent	government	environmental	pg	environmental	warming
states	carbon	time	type	scientists	people
president	pg	world	mr	percent	dioxide
greenhouse	emissions	percent		world	change
carbon	uk	states		people	us
world	environment	emissions		time	time

(edited) FREQUENCY lists – CONTENT WORDS ONLY: FRENCH and GERMAN

FR-cc	FR-es	FR-rp	FR-rc	GE-kw	GE-ge	GE-te	GE-kk
pays	effet	pays	climatique	prozent	prozent	prozent	klimakatastrophe
français	gaz	réchauffement	réchauffement	klimawandel	jahren	jahren	welt
effet	pays	climatique	pays	jahren	klimawandel	treibhauseffekt	jahren
france	serre	france	français	deutschland	usa	menschen	prozent
gaz	émissions	effet	france	usa	welt	erde	deutschland
environnement	français	émissions	effet	klimaschutz	menschen	welt	menschen
climatique	france	gaz	gaz		erwärmung		usa
émissions	environnement	serre	monde		grad		
serre	énergie	environnement	émissions		deutschland		
énergie	développement	climat	environnement				
développement	climatique	monde	deux				
monde	kyoto	énergie	ans				
deux	monde	deux	serre				
kyoto	deux	développement	développement				
réchauffement	protocole	kyoto	président				
changement	ans	ans	climat				
presse	etats-unis	protocole	énergie				
climat	climat	etats-unis	etats-unis				

7. COLLOCATION

(edited) **COLLOCATION lists – ENGLISH**: content word collocates (+/-5 words)

US-cc: <i>change</i>	UK-cc: <i>change</i>	US-gw: <i>warming</i>	UK-gw: <i>warming</i>	US-ge: <i>greenhouse</i>	UK-ge: <i>greenhouse</i>
change	change	warming	warming	greenhouse	greenhouse
climate	climate	global	global	effect	effect
global	global	climate	climate	gases	gases
panel	tackle	scientists	effects	gas	gas
intergovernmental	levy	greenhouse	change	emissions	emissions
warming	tackling	treaty	caused	warming	carbon
energy	effects	cause	threat	carbon	global
effects	impact	emissions	world	global	warming
research	energy	gases	emissions	dioxide	dioxide
international	action	pollution	tackle	reduce	atmosphere
kyoto	panel	effects	effect	atmosphere	caused
environmental	world	kyoto	pollution	scientists	reduce
issue	threat	reduce	combat	heat	runaway
report	issues	threat	carbon	caused	climate
nations	mr	contribute	scientists	ozone	contribute
scientists	combat	fight	impact	climate	ozone
policy	intergovernmental	trend	greenhouse	percent	cause
address	bill	energy	us	reducing	scientists
issues	help	issue	fight	rain	change
human	need	bush	due	contribute	causing
conference	people	real	Gases	known	world

(edited) **COLLOCATION lists** – FR / GE content word **collocates** (+/-5 words)

<i>changement</i>	<i>réchauffement</i>	<i>serre</i>	<i>réchauffement</i>	<i>Klimawandel</i>	<i>Erwärmung</i>	<i>Treibhaus-effekt</i>	<i>Klima-Katastrophe</i>
Changement	Réchauffement	serre	réchauffement	Kampf	Globale	Menschen	Drohende
climatique	climatique	effet	climatique	Menschen	Globalen	Kampf	Drohenden
contre	contre	gaz	contre	Folgen	Folgen	Kohlen-dioxid	Verhindern
lutte	lutte	contre	planète	Globalen	Grad	Prozent	Kampf
lutter	planète	lutte	lutte	Globale	Erde	Erde	Wort
conférence	lutter	ges	lutter	Diskussion	Kampf	Verantwortlich	Welt
effets	conséquences	réchauffement	planétaire	Deutschland	Globaler	Verstärkt	Jahres
onu	effets	pays	climat	Maßnahmen	Folge	Verursachen	Abzuwenden
unies	effet	effets	serre	Wissenschaft	Auswirkungen	Co2	Weltweiten
conséquences	serre	responsables	effet	Anpassung	Menschen	Ozonloch	Ende
nations	responsables	climatique	conséquences	Bedroht	Erdatmosphäre	Atmosphäre	Gore
face	climat	rapport	global		Atmosphäre	Beitrag	Globale
climat	global	co2	effets		Verantwortlich	Klimawandel	Folgen

Collocate analysis: rhetorical frames:

action, drama, morals

	UK	US	FR	GE
climate change	<i>action, tackle, combat, threat, catastrophic, fight, blame, responsible</i>	<i>action, threat, catastrophic, real, serious,</i>	<i>lutte, contre, adapter, risque, menace, combattre responsable,</i>	<i>Kampf, gegen, bedroht, stoppen, bremsen, verantwortlich, Schuld, Leiden</i>
global warming	<i>action, combat, fight, tackle, threat, serious, stop, dangers, blame</i>	<i>against, fight, threat, combat, help, blamed, responsible</i>	‘Rechauffement de la planete’— <i>lutte, contre</i>	‘Klimakatastrophe’— <i>gegen, drohende, verhindern, abwenden, Angst, Schuld, Opfer, retten</i>
greenhouse effect	<i>combat, responsible</i>	exclusive science frame*	‘Effet de serre’-- <i>lutte, contre, responsible</i>	<i>Kampf, menschengemacht, verantwortlich</i>
	* A ‘science frame’ contains words like <i>effects, causes, gases, studies, consequences, impacts, scientific.</i>			

8. KEYWORD ANALYSIS

Key word analysis 2005-2009

	US	UK	FR	GE
2005	Hurricane, Katrina, Blair, Gleneagles, Orleans, Tsunami, storms, poverty	Hurricane, Katrina, Blair, Gleneagles, Geldoff, Africa, nuclear, aid, poverty,	Katrina, Blair, Montreal, Gleneagles, Kyoto, Chirac, Venus, Bush, Tsunami	Katrina, Hurrikan, Gleneagles, Kyoto, Montreal, Orleans, muß, Venus, Naturkatastrophe
2006	cinema, theatre, comedy, film	Stern, Cameron, nuclear, energy	Nairobi, film, Stern, Gore, Schwarzenegger	Film, Nairobi, Gore, Schwarzenegger
2007	votes, poll, Edwards, Schwarzenegger, ethanol, green, bulbs	Bali, Brown, Gore, carbon, footprint, flights, Heathrow	Bali, Merkel, Sarkozy, Juppé, Gore, Heiligendamm, Allemande	Bali, Merkel, Gabriel, Gore, Heiligendamm, IPCC, Knut
2008	McCain, Obama, Palin, green, oil, drilling, energy, food, offshore	McCain, Obama, food, prices, crunch, oil, financial, downturn	McCain, Obama, crise, Poznan, alimentaire, biocarburants, Sarkozy	McCain, Obama, Biosprit, Finanzkrise, Palin, Poznan
2009	Obama, Copenhagen, stimulus, cap, health, care, bill, senate, Waxman, Markey	Copenhagen, Obama, recession, stimulus, deal, leaders, bankers, jobs, China, meat	Obama, Copenhagen, Chine, sommet, accord, financiere	Kopenhagen, Obama, Krise, Wirtschaftskrise, Klimagipfel, Finanzkrise

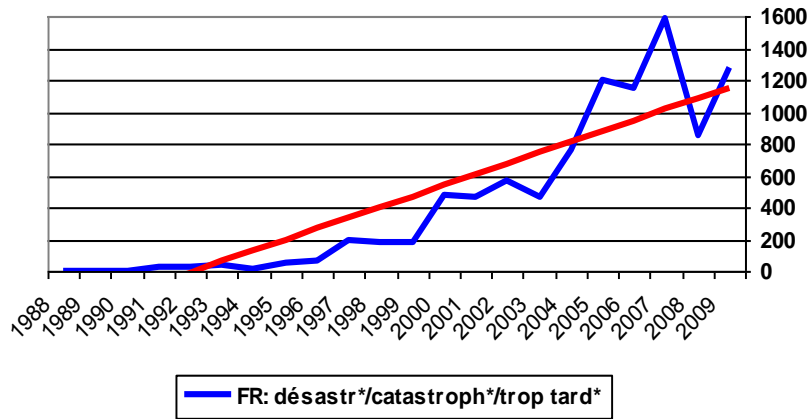
9. SOME INTERPRETATIONS OF THE DATA

Mapping increased media coverage to *Climate Change*-related events

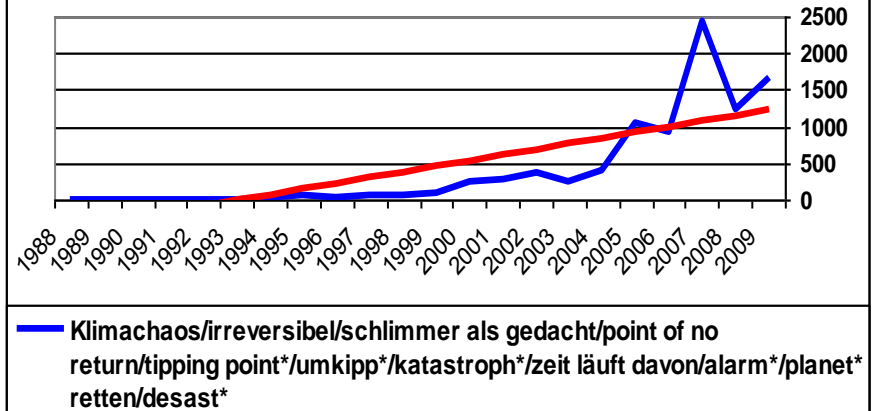
- **July 2005:** G8 Summit (Gleneagles, Scotland)
- **October 2006:** publication of UK '*Stern Review*' on the Economics of Climate Change
- **November 2006:** 12th Conference of United Nations Framework Convention on Climate Change (COP12, in Nairobi)
- **November 2006:** release of Al Gore's film *An Inconvenient Truth*
- **February 2007:** publication of *Fourth Assessment report of the IPCC*
- **October 2007:** Nobel Peace Prize to Al Gore and the IPCC announced

Alarmist discourse

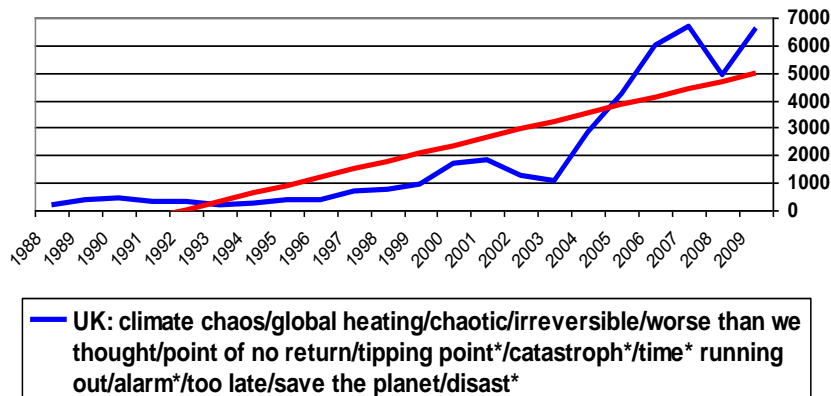
France alarmist discourse



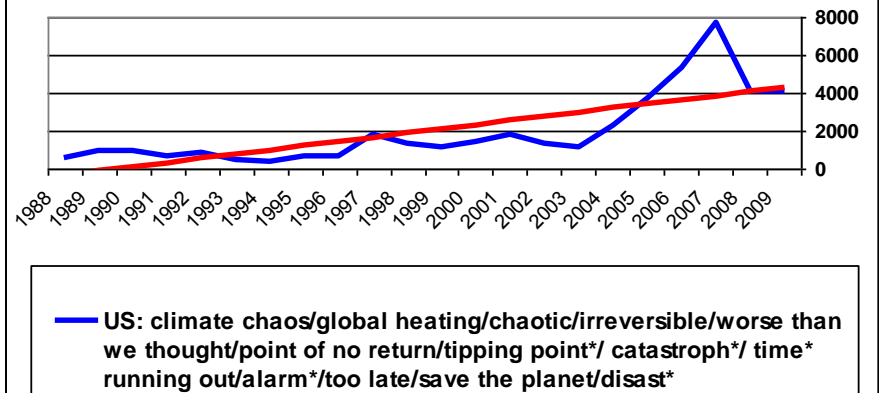
Germany alarmist discourse



UK alarmist discourse



US alarmist discourse



How Serious a Problem Is Global Warming?

	July 2006	Jan 2007	April 2008	Oct 2009
	%	%	%	%
Very serious	43	45	44	35
Somewhat serious	36	32	29	30
Not too serious	11	12	13	15
Not a problem	9	8	11	17
Don't know (Vol.)	<u>1</u>	<u>3</u>	<u>3</u>	<u>3</u>
	100	100	100	100

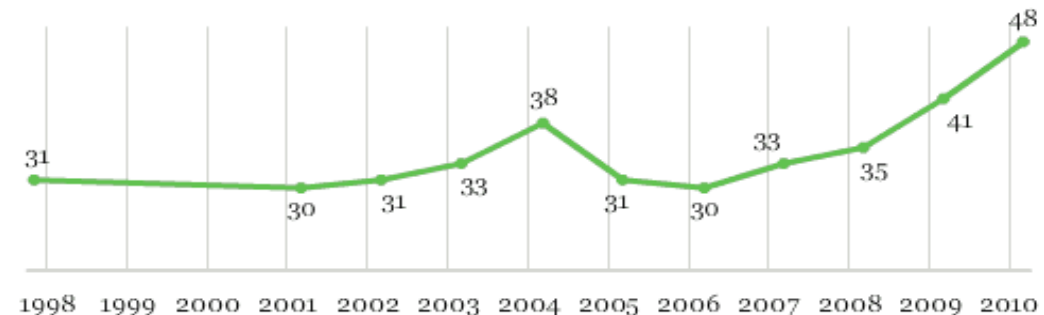
Q43. Figures may not add to 100% because of rounding.

The Pew Centre, Oct. 2009

Impact on public opinion?

Thinking about what is said in the news, in your view is the seriousness of global warming -- [ROTATED: generally exaggerated, generally correct, or is it generally underestimated]?

■ % Generally exaggerated



10. CONCLUSION

Conclusion

- Commonality across countries
 - rise in attention after 2005, with a strong alarmist rhetoric
 - Alarm peaks in 2007 but has little effect on public opinion or global politics
- Divergence across countries:
 - different frequency of key terms
 - US: “global warming”, UK: “climate change”, France: “effet de serre”, Germany: “Klimawandel”, “Klimakatastrophe”
 - Different global and domestic issues associated with climatic change
 - US least dramatizing and moralizing, GE most
- Media editors realize potential danger of dramatizing