



Weather and Climate – Past Present and Future

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Renfrewshire Feb 2010

- History
- Present day
- The Future – Climate change



Weather has defined us – it made us what we are.

The glass is falling hour by hour, the glass will fall forever,
But if you break the bloody glass, you won't hold up the weather.

Louis Macniece

Agincourt 1415



“Marching through the middle of the mud where they sank up to their knees.”

16th Century

- The Spanish Armada July 1588



Napoleon in Russia 1812





1854 formation of the Met Office

- Francis Beaufort
- Vice Admiral Robert Fitzroy
- Board of Trade
- 1st World War
- Air Ministry 1920
- 1st radio broadcast
- NWP & Richardson 1922
- Sutcliffe development theory





2nd World War D-Day



Group Captain Sir James
Martin Stagg

Forecasting for Overlord





Are we mad or what?

“The trouble with weather forecasting is that it’s right too often for us to ignore it and wrong too often for us to rely on”
(©Patrick Young)

“Isn’t it interesting that the same people who laugh at Science Fiction listen to weather forecasts and economists”

(©Kelvin Throop 111)

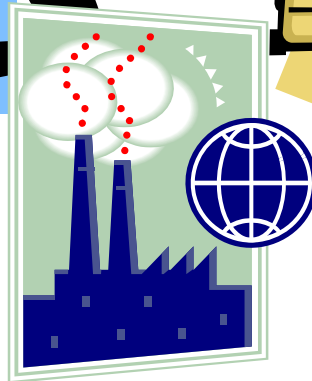


Weather Forecasters are Everywhere!





What have you done today?





Weather Matters



Effect

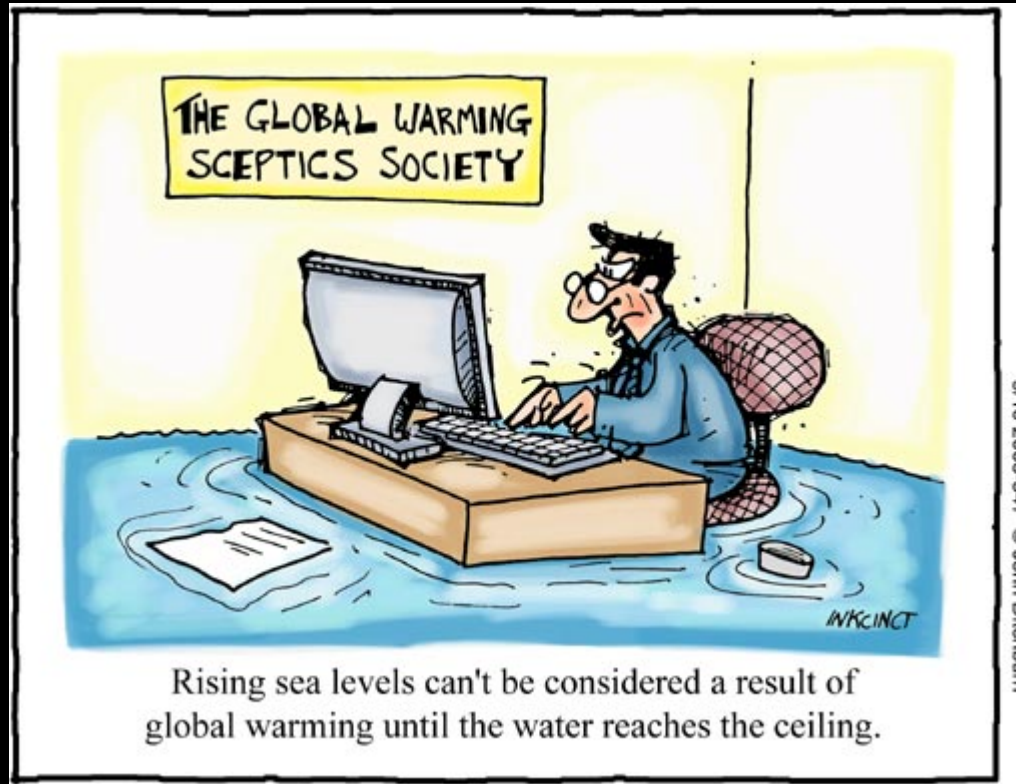
- Summer Temperatures
- Winter Temperatures
- Winter Rainfall
- Summer Rainfall
- Sea Level

Impact

- Energy Usage
- Energy Generation
- Water
- Agriculture
- Transport
- Built Heritage
- Flora & Fauna
- Health
- Flooding & Drought



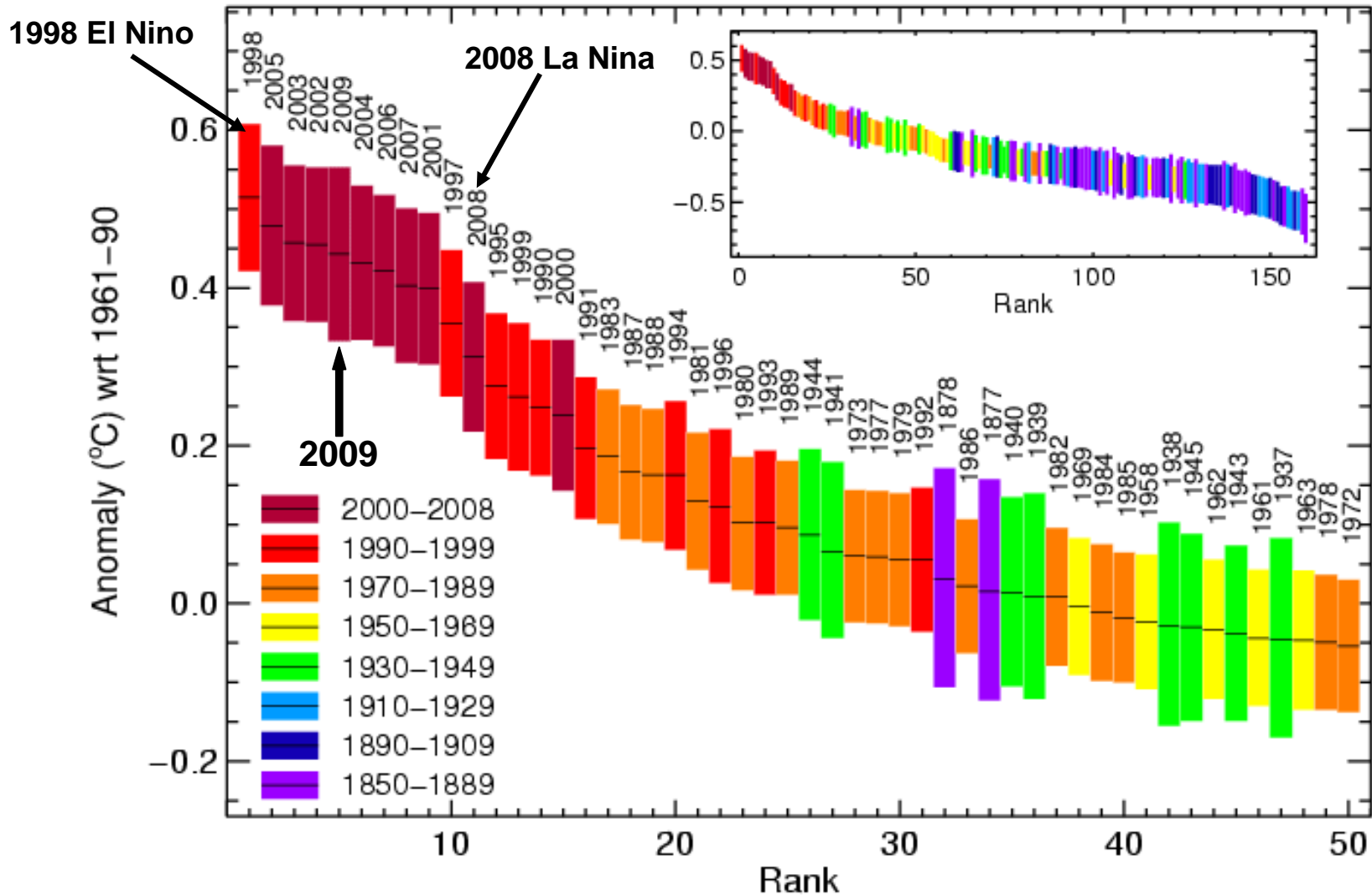
Sceptics





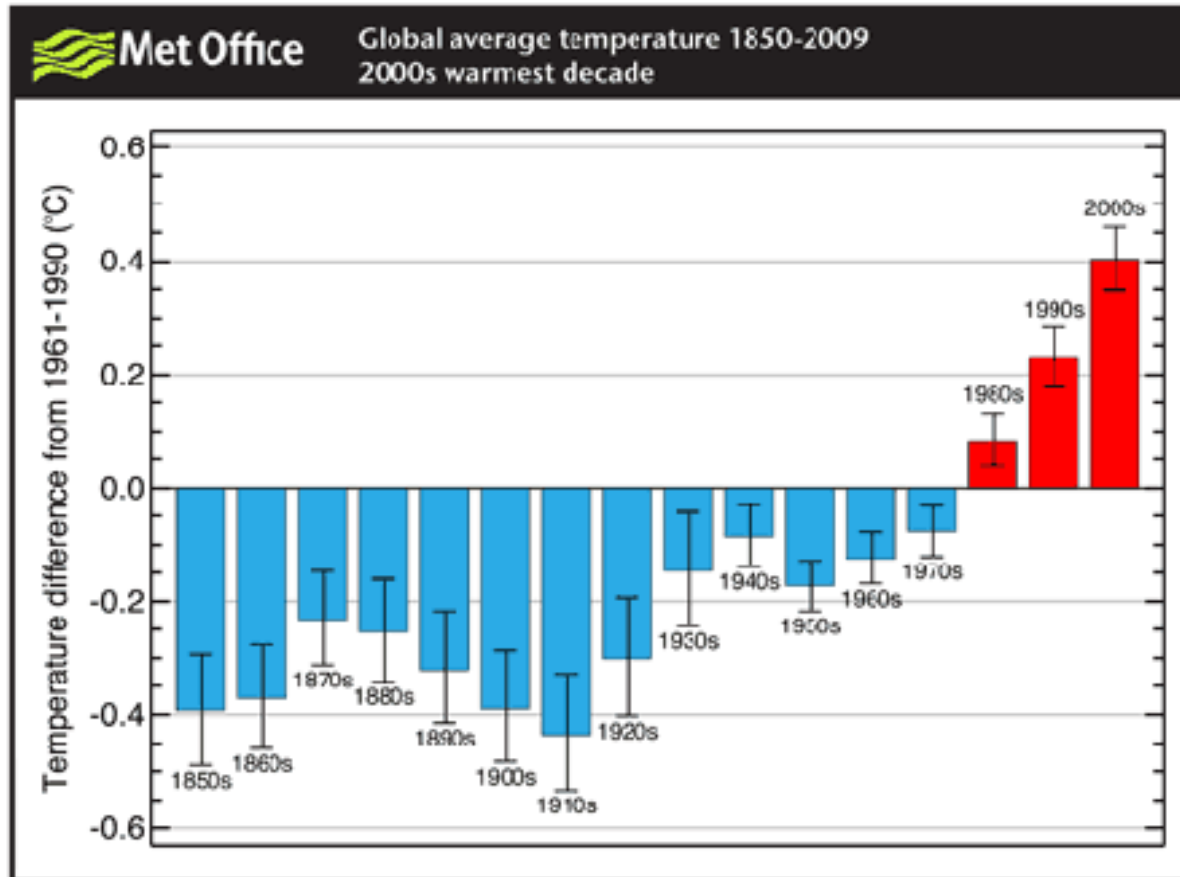
It has NOT been getting cooler

Global ranked temperatures

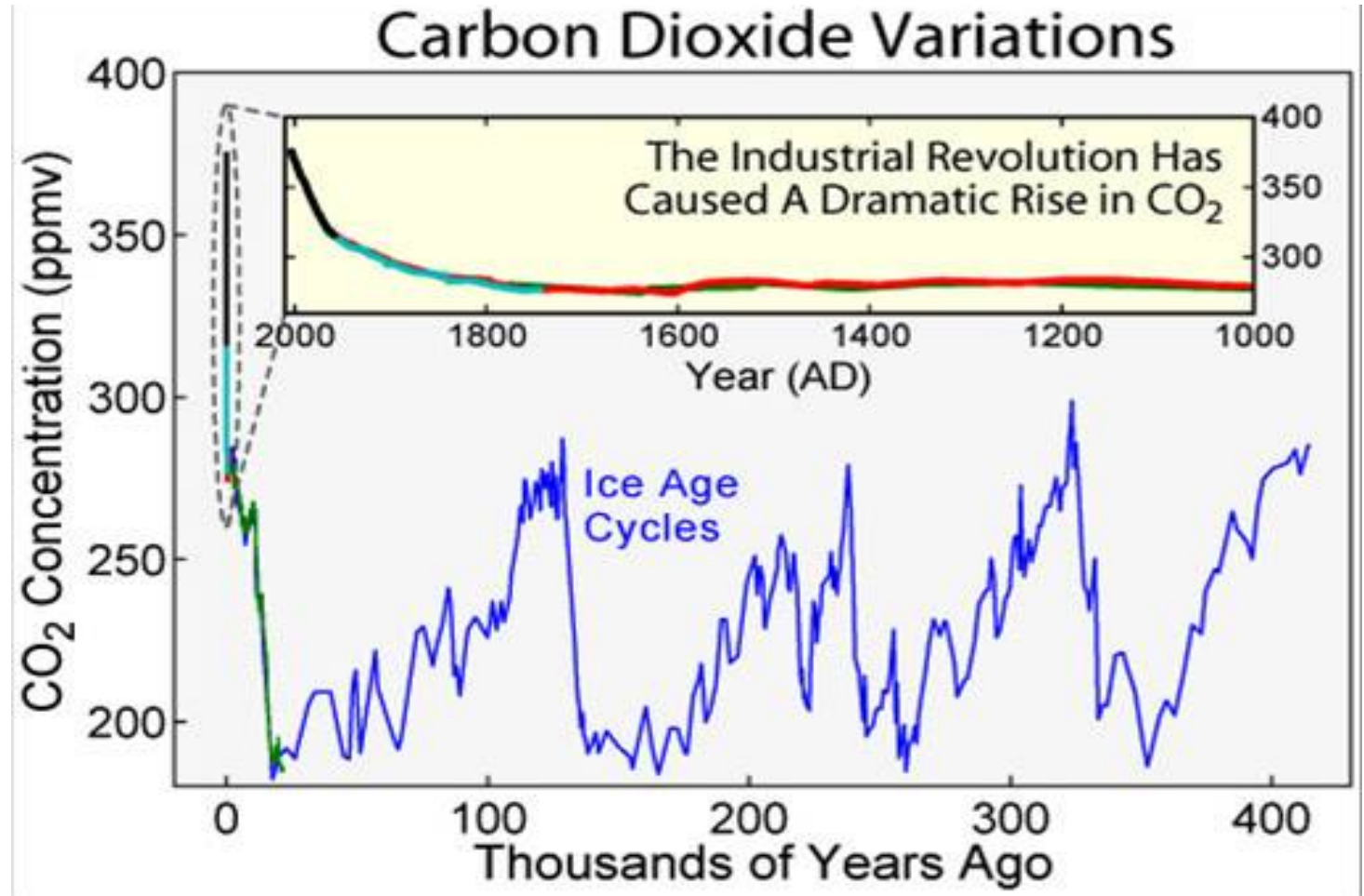




It has NOT been getting cooler

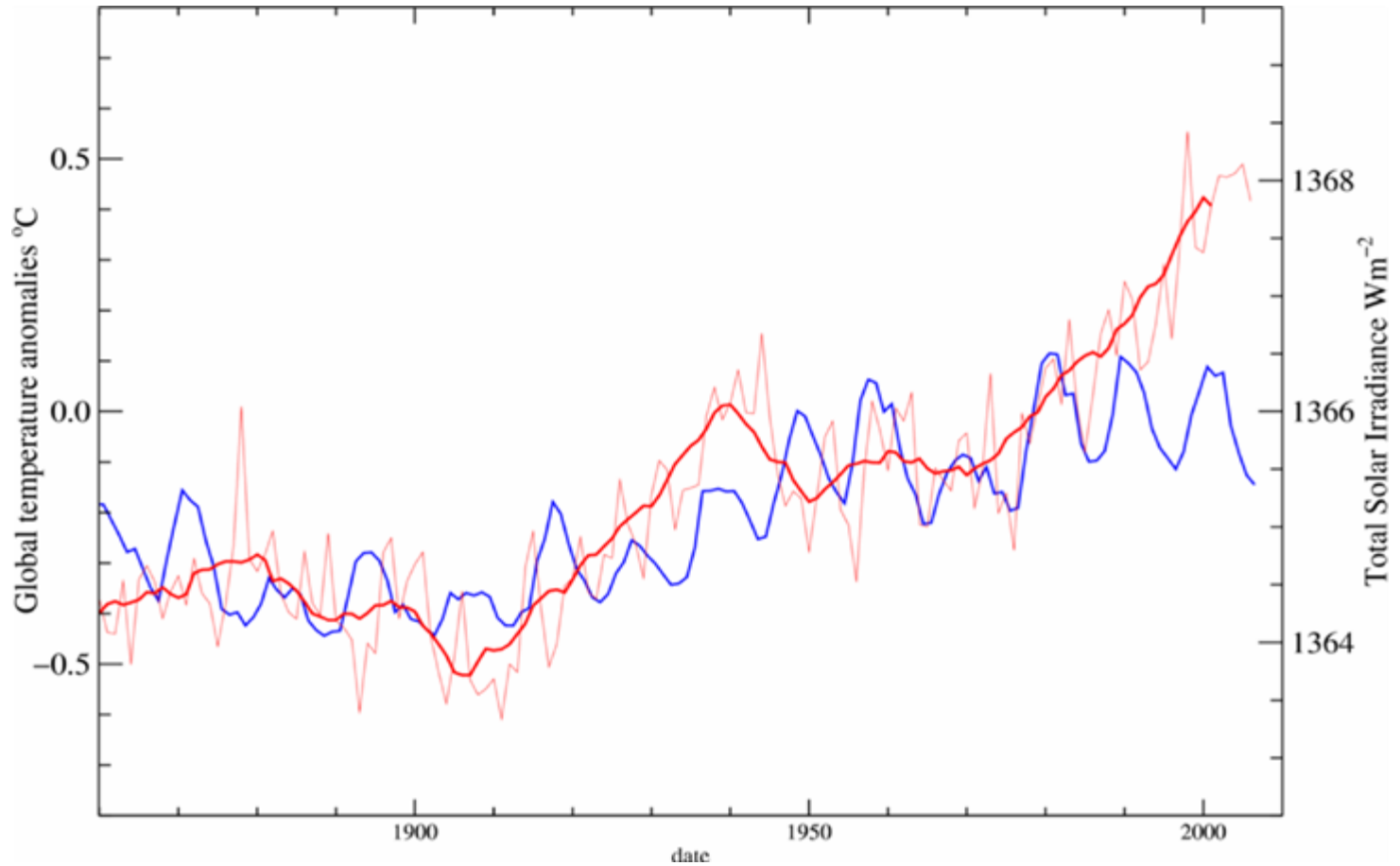


We've been here before - Not





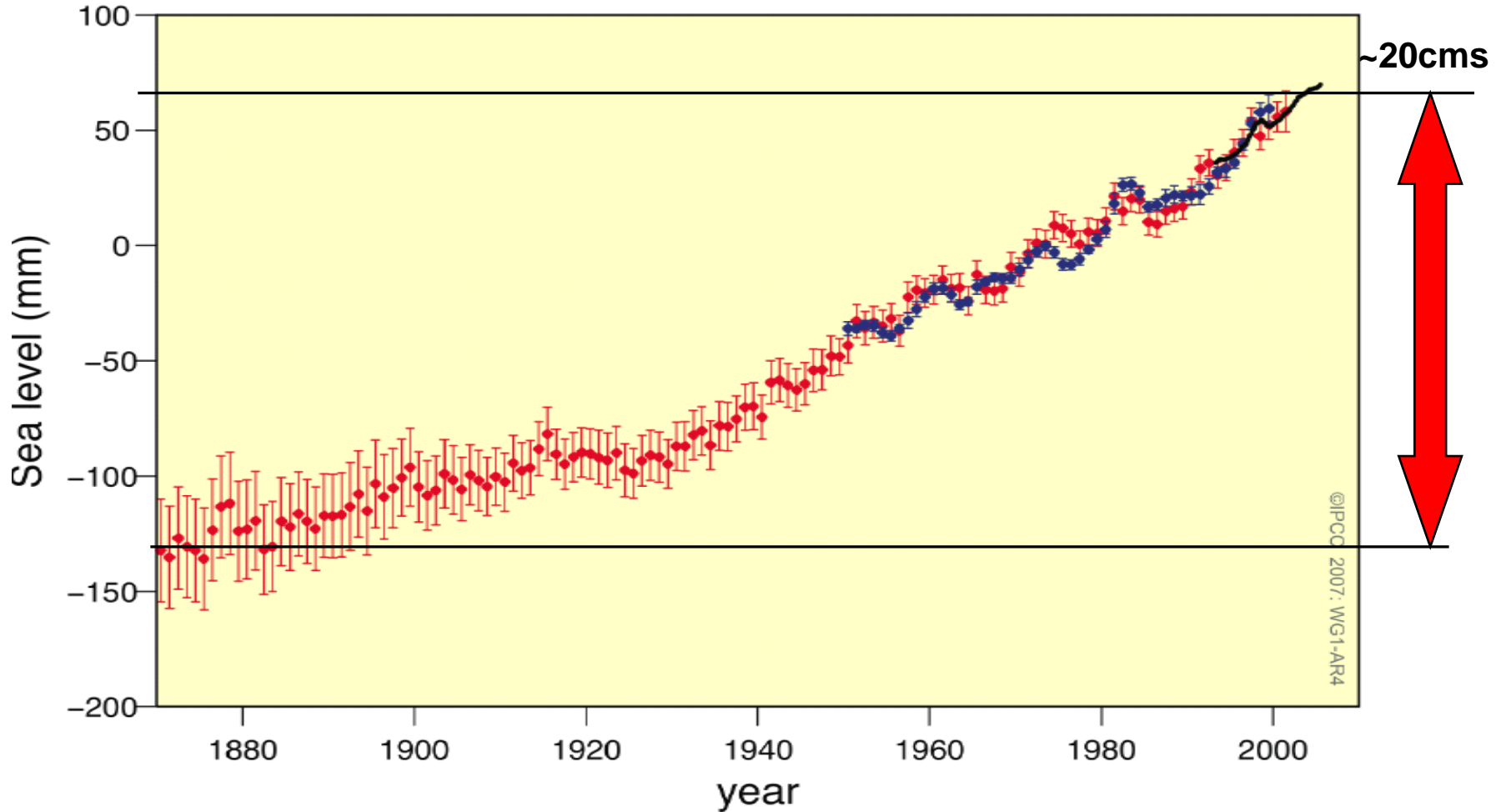
It ain't the Sun wot did it!!





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Sea Level Rise



The Future - Climate Change - Apocalyptic 4 Horseman





Met Office

Why it matters

“The effects of climate change is a bit like crystal ball gazing with some widespread and varying predictions for the future”.

ACPOS 2007



Why it matters

Kilbirnie 1st Aug 2008



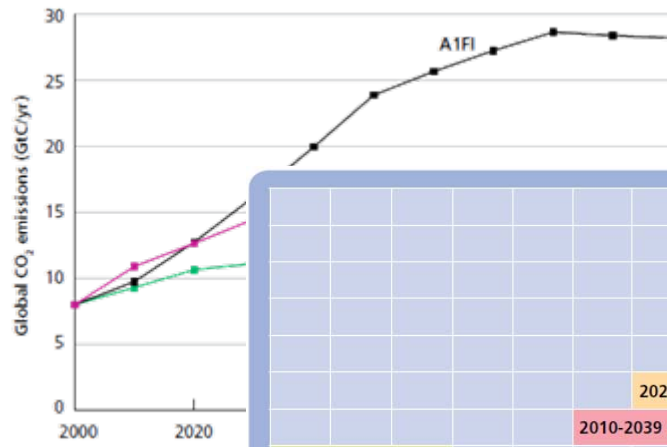


The Future UKCP09

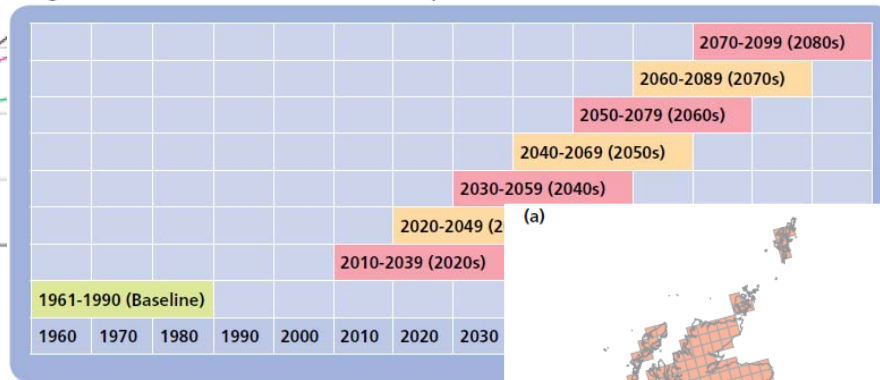
**UKCP09 is big. Really big.
You won't believe just how
vastly, hugely,
mindbogglingly big it is.**

*(with apologies to Douglas Adams
& Hitchikers Guide to the Galaxy)*

UKCP09

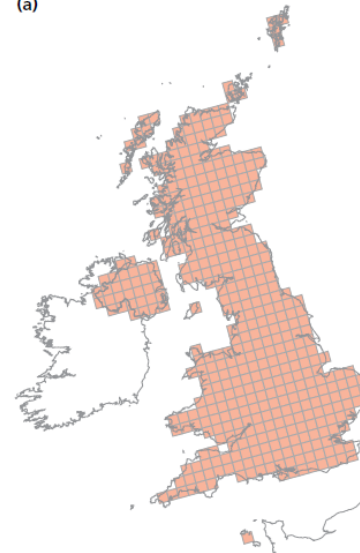


Three different emission scenarios



Seven different timeframes

25km grid, 16 admin regions, 23 river-basins and 9 marine regions





By the 2050s...

Not overly dependant on emissions

	Eastern Scotland	Northern Scotland	Western Scotland
Summer average temp	+ 2.3°C	+ 2.0°C	+ 2.4°C
Winter average temp	+ 1.7°C	+ 1.7°C	+ 1.9°C
Summer precipitation	- 12%	- 10%	- 12%
Winter precipitation	+ 10%	+ 13%	+ 15%



By the 2080s...

Rather more speculative and dependant how successful mitigation is

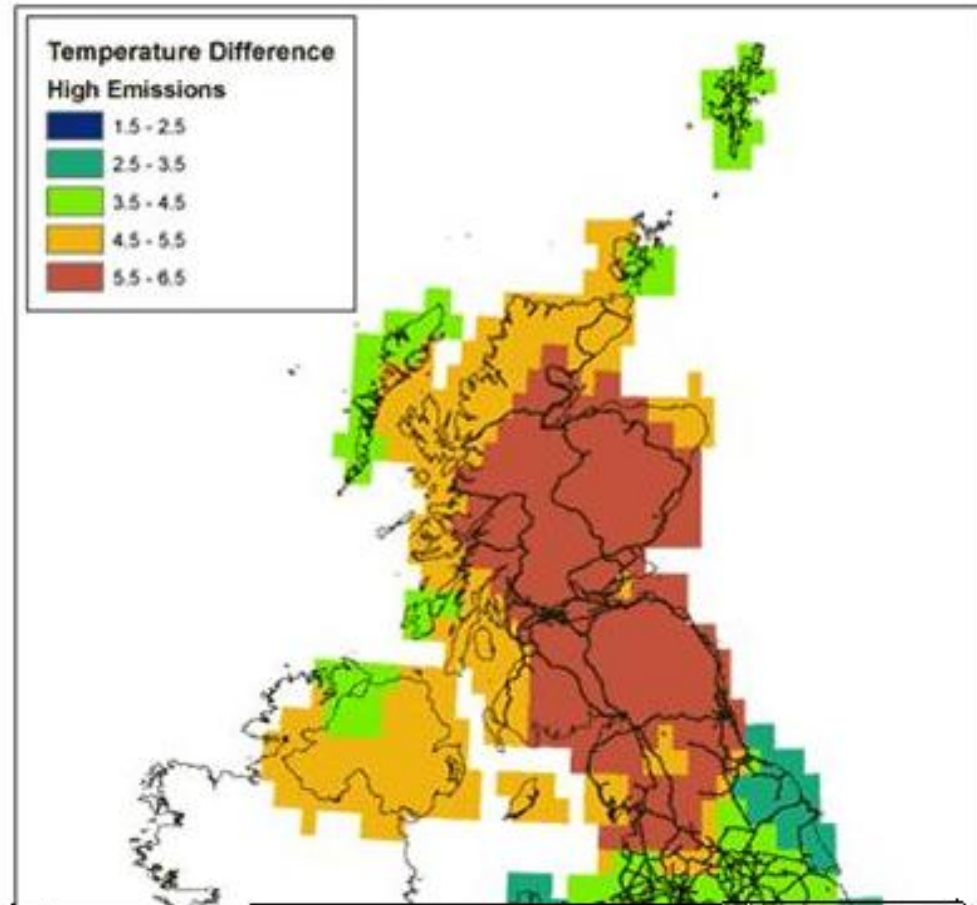
	Eastern Scotland	Northern Scotland	Western Scotland
Summer average temp	+ 3.5°C	+ 3.0°C	+ 3.5°C
Winter average temp	+ 2.3°C	+ 2.2°C	+ 2.6°C
Summer precipitation	- 16%	- 11%	- 15%
Winter precipitation	+ 12%	+ 17%	+ 21%



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UKCP09 Risks

- Temperature difference for the warmest day summer in the 2080s
- High Emissions Scenario



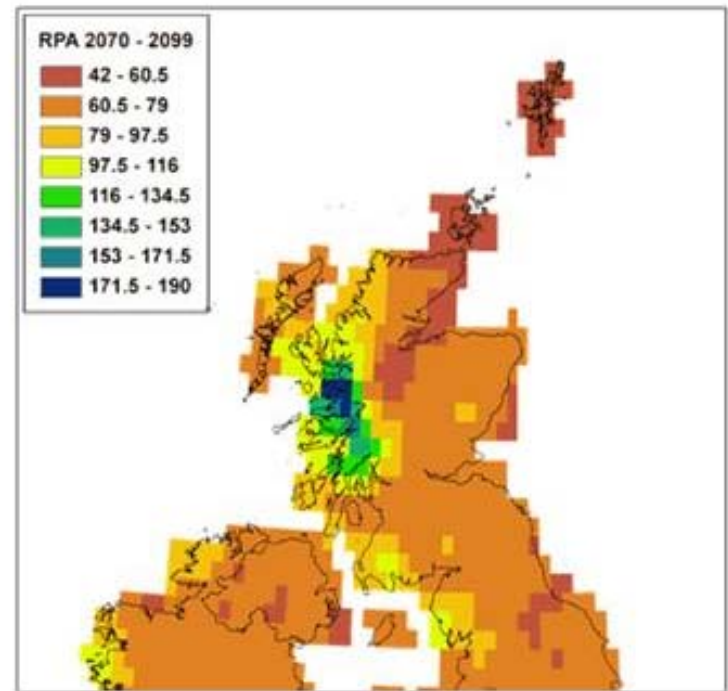
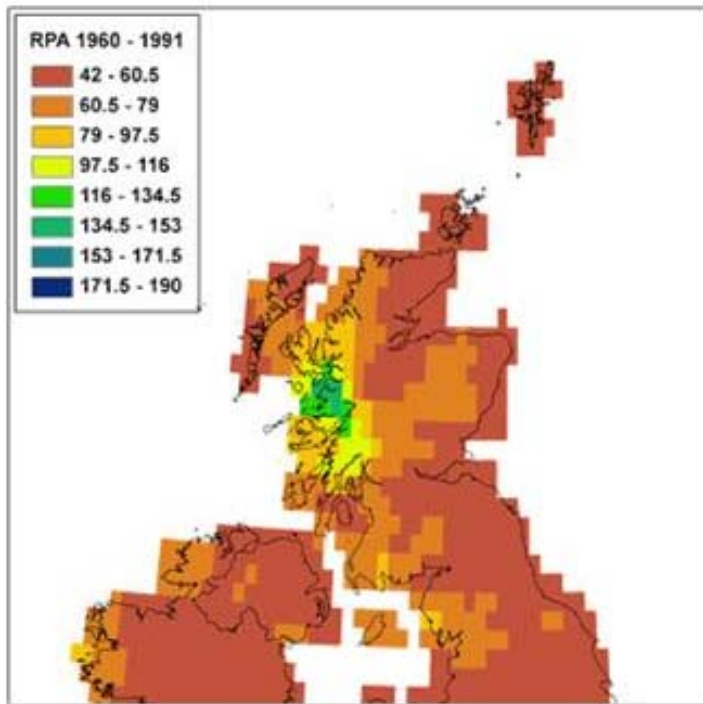
UKCP09 Risks

Total rainfall in an event with a 1 in 30 year return period

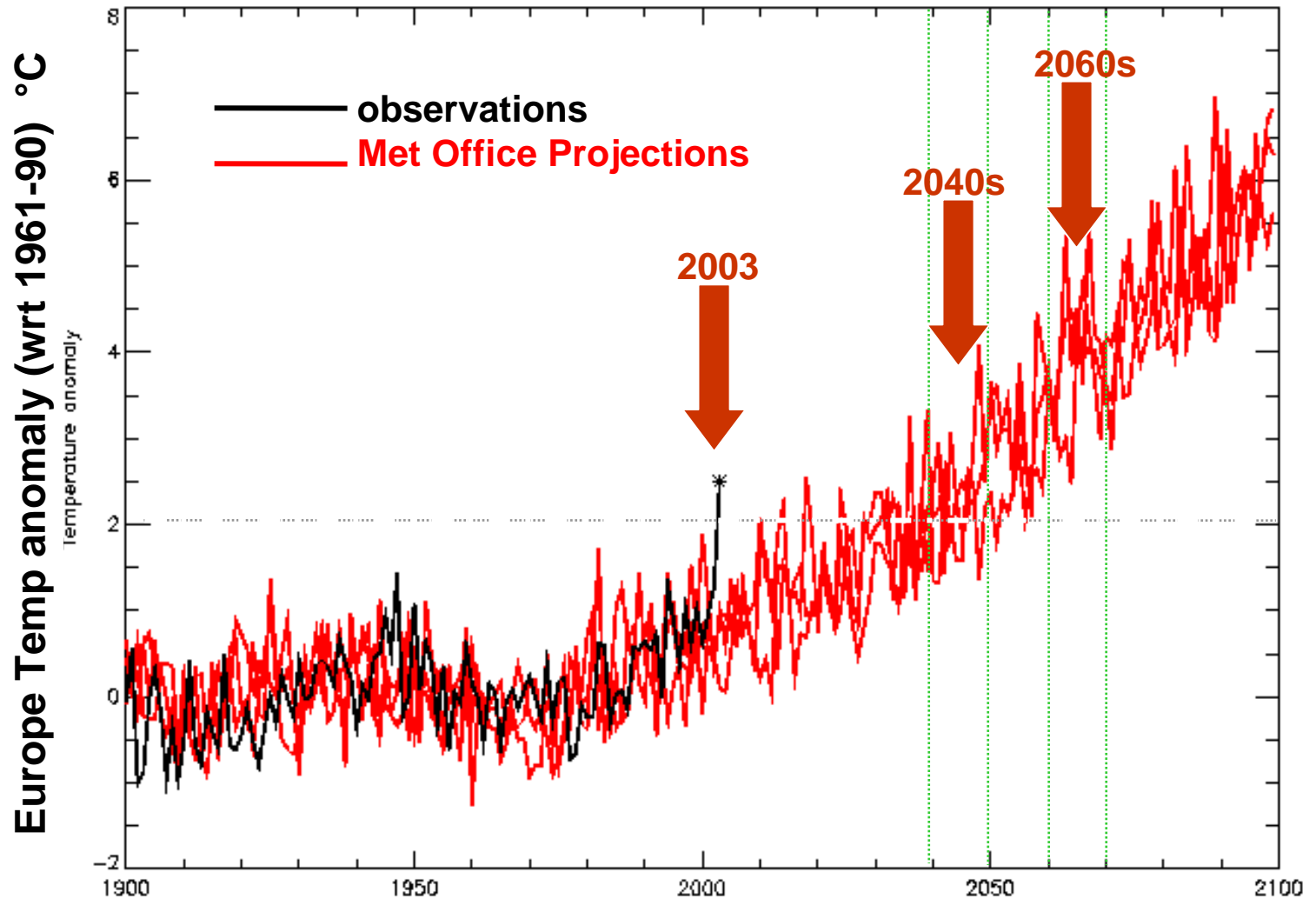
1980's

2080's

wetter
↓

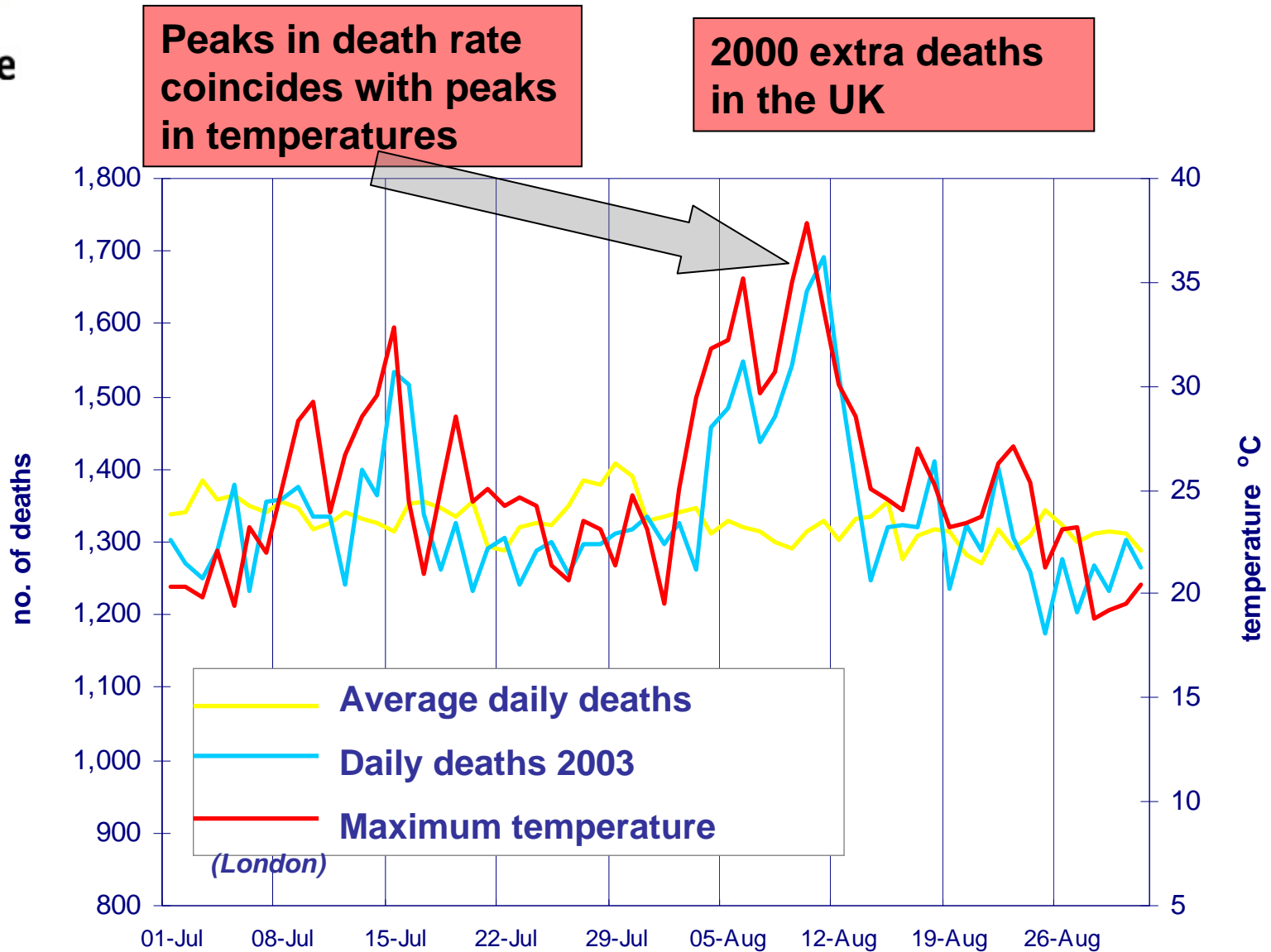


In the future





Deaths and Heatwaves - Summer 2003



UKCP09 Risks

- The sea level in Eastern Scot is expected to rise:

13.9 cm by 2050

24.4 cm by 2080

30.5 cm by 2095





Storm Surge & 02 v CP09

Port	Observed 50 yr RL (m)	UKCP09 50 yr RL		LGF 50 yr RL	
		(m)	Ratio to observed	(m)	Ratio to observed
Wick	1.11	1.02	0.92	0.91	0.82
Aberdeen	1.25	1.05	0.84	0.82	0.65
North Shields	1.66	1.12	0.67	0.96	0.58
Whitby	1.98	1.19	0.60	1.09	0.55
Immingham	2.14	1.60	0.75	1.52	0.71
Lowestoft	2.36	1.89	0.80	1.85	0.78
Felixstowe	2.50	2.01	0.80	2.05	0.82
Southend	2.91	2.82	0.97	2.36	0.82
Dover	1.77	1.60	0.91	1.44	0.81
Newlyn	1.02	0.70	0.69	0.65	0.64
Ilfracombe	1.49	1.20	0.80	0.88	0.59
Milford Haven	1.44	1.05	0.73	0.85	0.59
Holyhead	1.51	1.18	0.78	1.03	0.68
Heysham	3.16	2.32	0.73	1.60	0.50
Millport	1.72	1.70	0.99	1.34	0.78



Storm Surge & 02 v CP09

Port	Observed 50 yr RL (m)	UKCP09 50 yr RL		LGF 50 yr RL	
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Wick	1.11	1.02	0.92	0.91	0.82
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- Size of surge expected to occur on average about once in 50 yr is projected to change by less than 0.9 mm yr (not including relative mean sea level change)

- Cannot be clearly distinguished from natural variability.

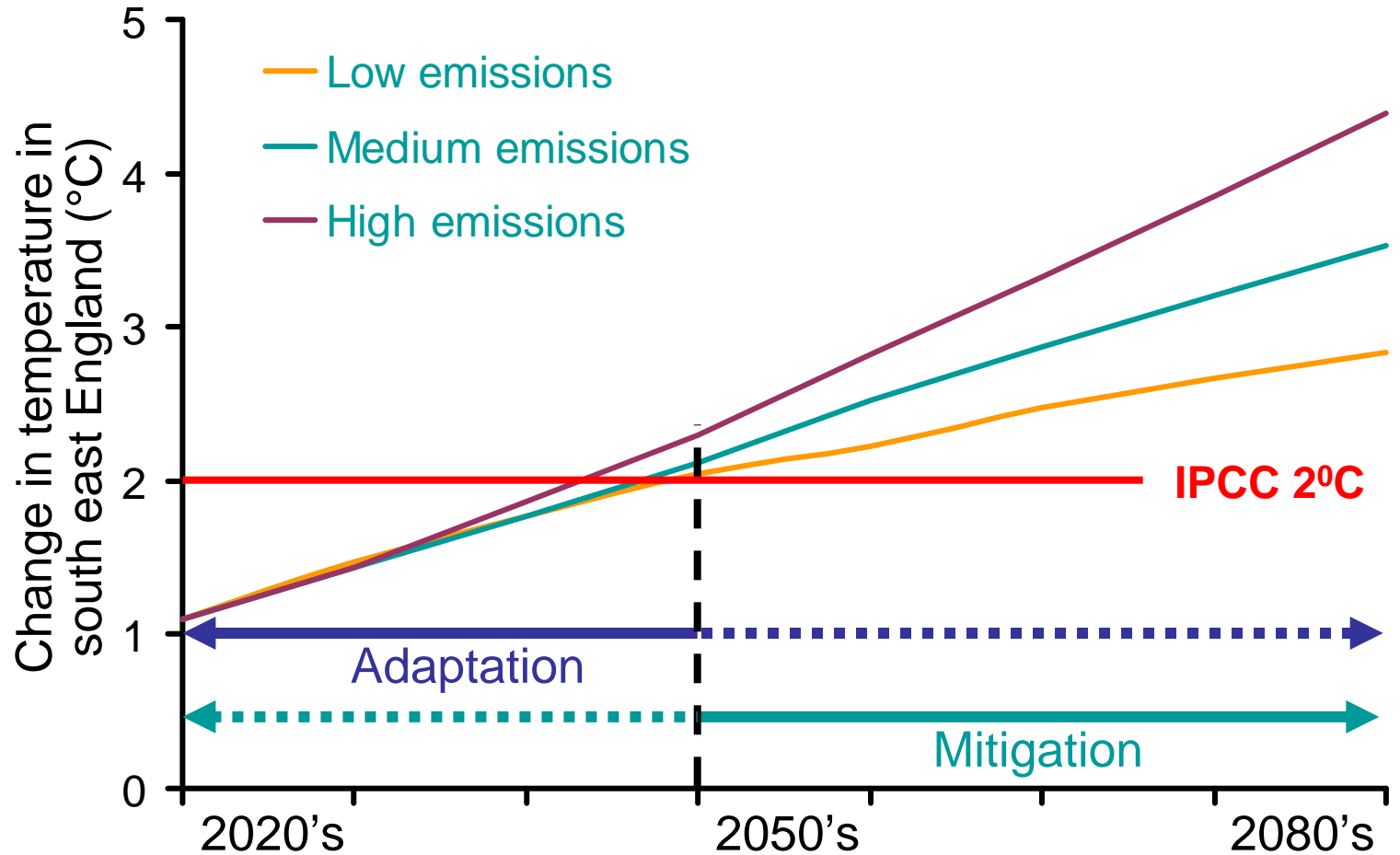
- This component much less important than implied by UKCIP02

- Hence H++ Scenario

Millport	1.72	1.70	0.99	1.34	0.78
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Adapting now, mitigating for the future?





STEP 1 – REQUIREMENTS

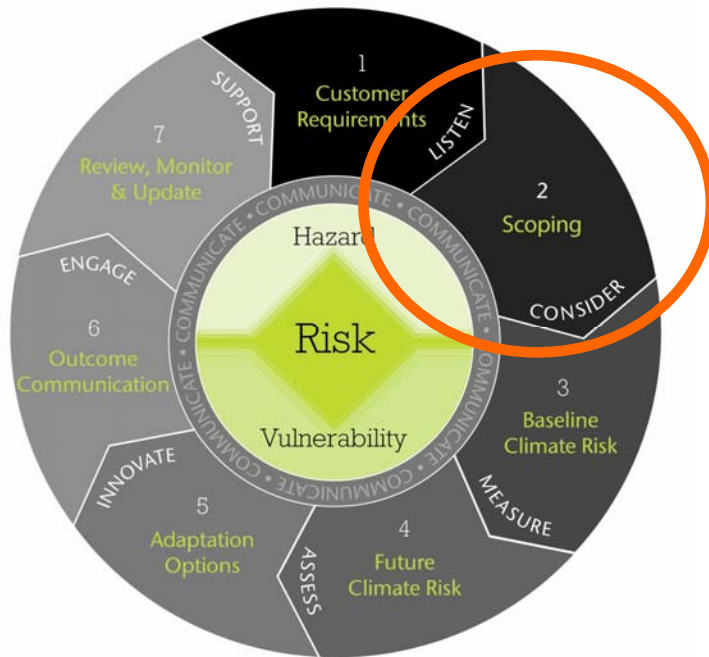


Aim:

To clearly identify the needs and objectives and the extent of the project, including the required outcomes and expectations.



STEP 2 –Scoping

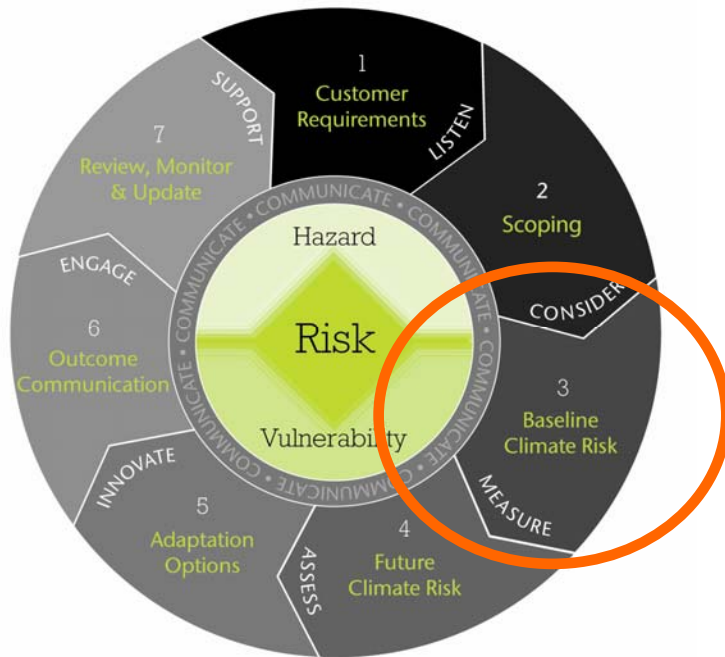


Aim:

To explore how available data sets can meet the key requirements.



STEP 3 – BASELINE CLIMATE RISK



Aim:

To assess the present risk due to the current weather and climate.



STEP 4 – FUTURE CLIMATE RISK

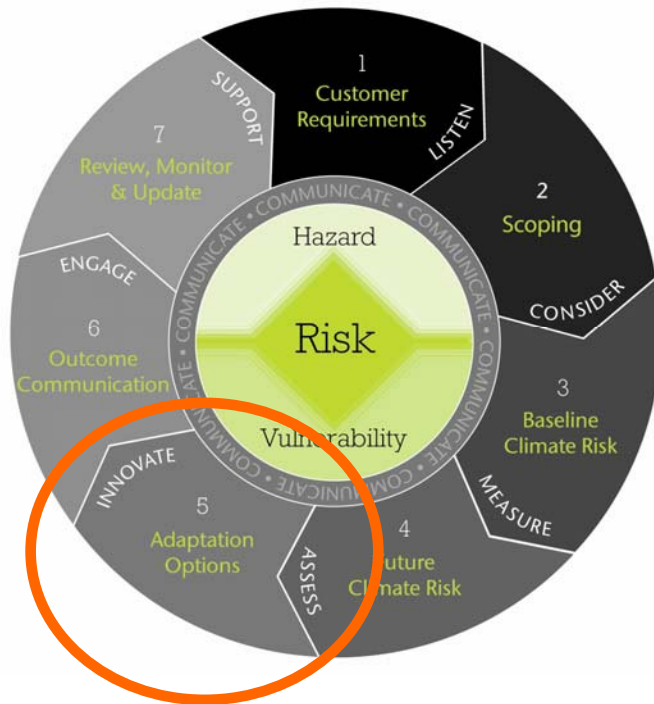


Aim:

To assess in detail how the key risks identified in step 1 are likely to change in the future.



STEP 5 – ADAPTATION OPTIONS



Aim:

To explore potential adaptation options associated with the key risks.

Note that although the Met Office can advise on the effectiveness of the owner/client will take the lead in identifying these options and exploring their feasibility.



STEP 6 – OUTCOME COMMUNICATION

Aim:

To communicate the project results and outcomes.





STEP 7 – REVIEW, MONITOR AND UPDATE

Aim:

To review that the assessment has met the requirements owner/client, and identify future steps to be taken





Weather Matters



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The Challenge

“The past is a foreign country, they do things differently there”

(L.P. Hartley)

So Must We

http://www.metoffice.gov.uk/climatechange/guide/ukcp/business_advice/