



**Paul Hudson BSC (Hons), FR MET S**



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# CLIMATE CHANGE

in Yorkshire, Lincolnshire  
and the North Midlands

# CLIMATE CHANGE

The Earth is warming sharply





# CLIMATE CHANGE

The Earth is warming sharply

Vikings colonised Greenland  
during warm period



# CLIMATE CHANGE

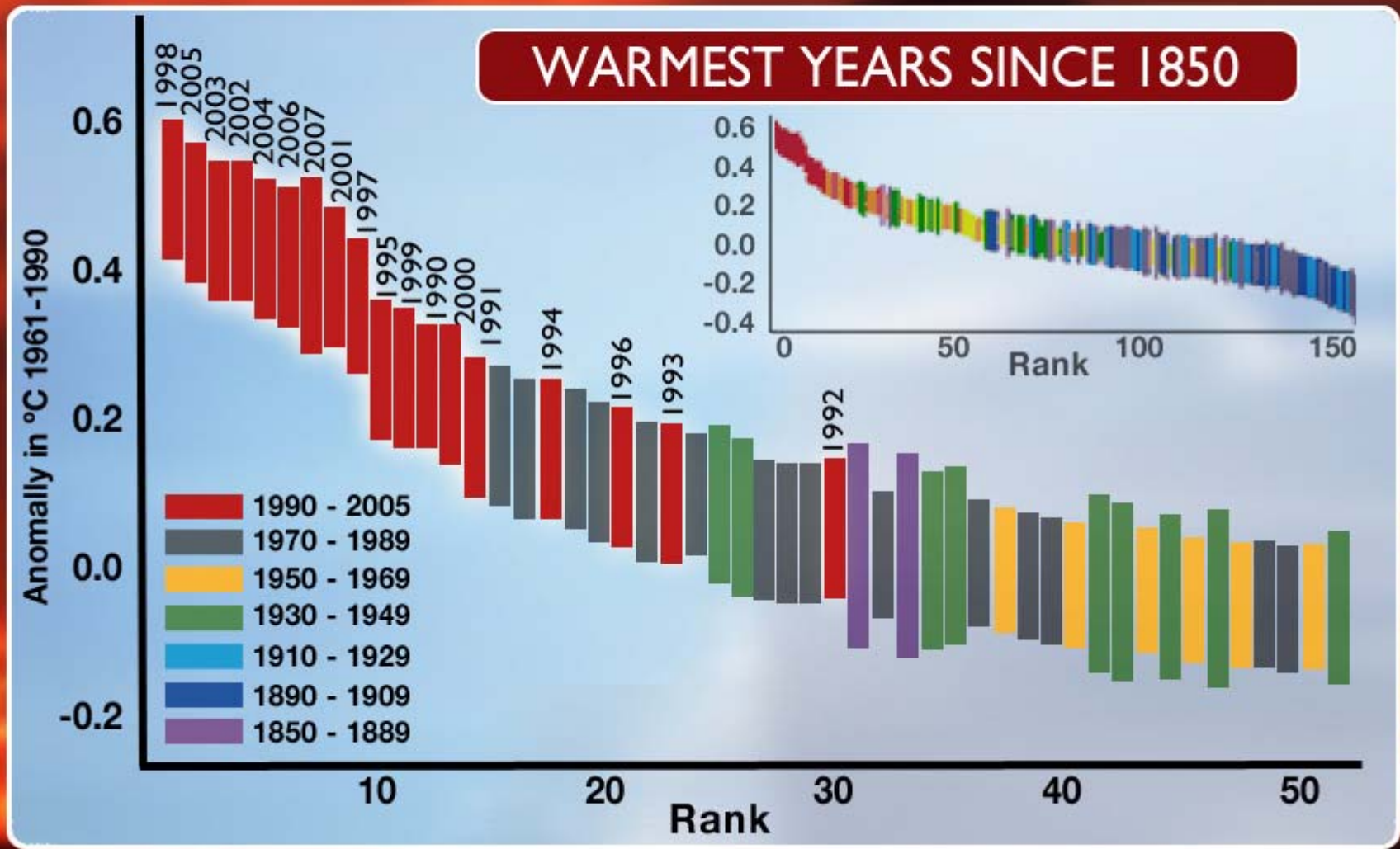


The Earth is warming sharply

Vikings colonised Greenland  
during warm period

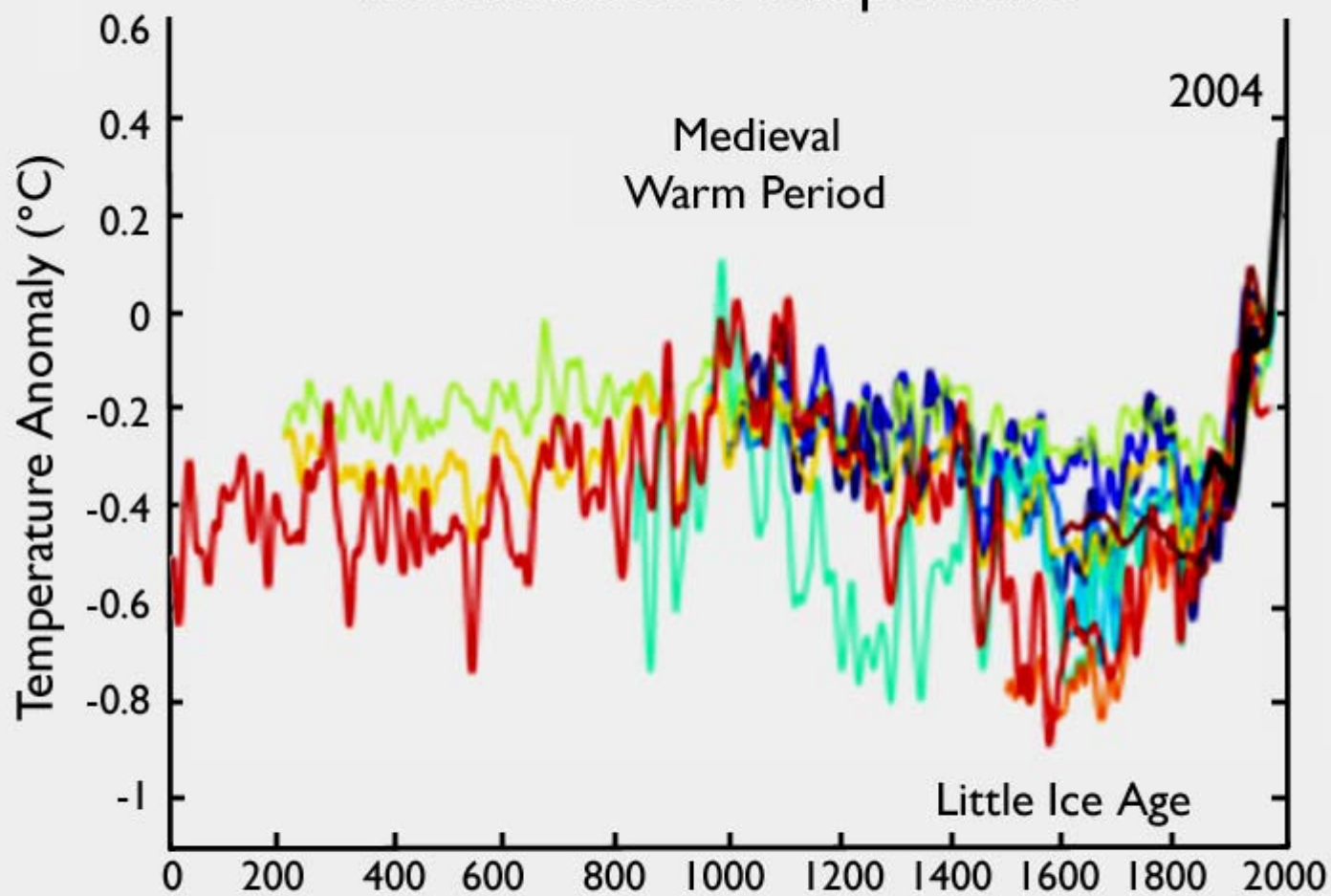
1400-1850AD - 'Little Ice Age'

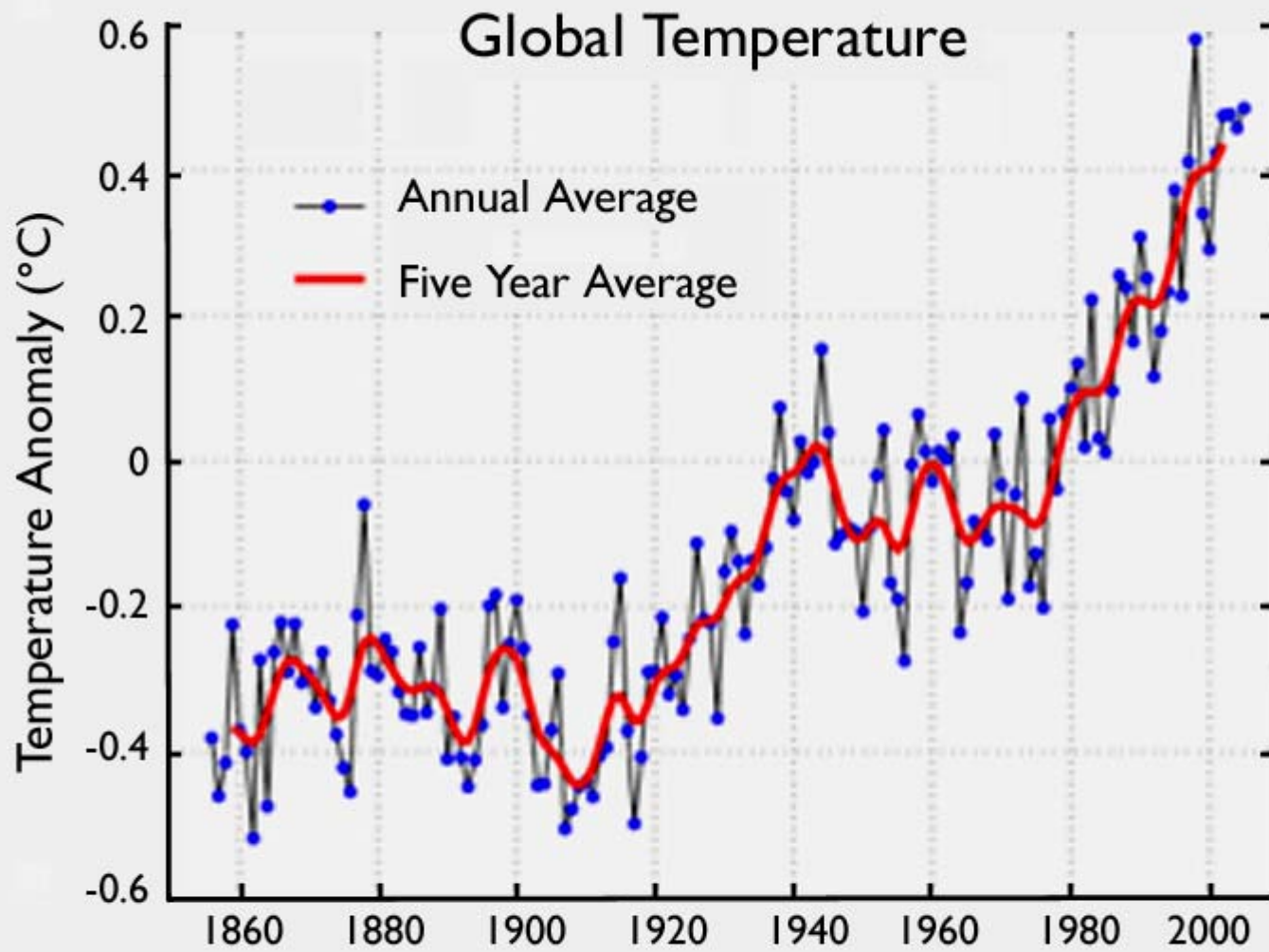
# CLIMATE CHANGE





# Reconstructed Temperature

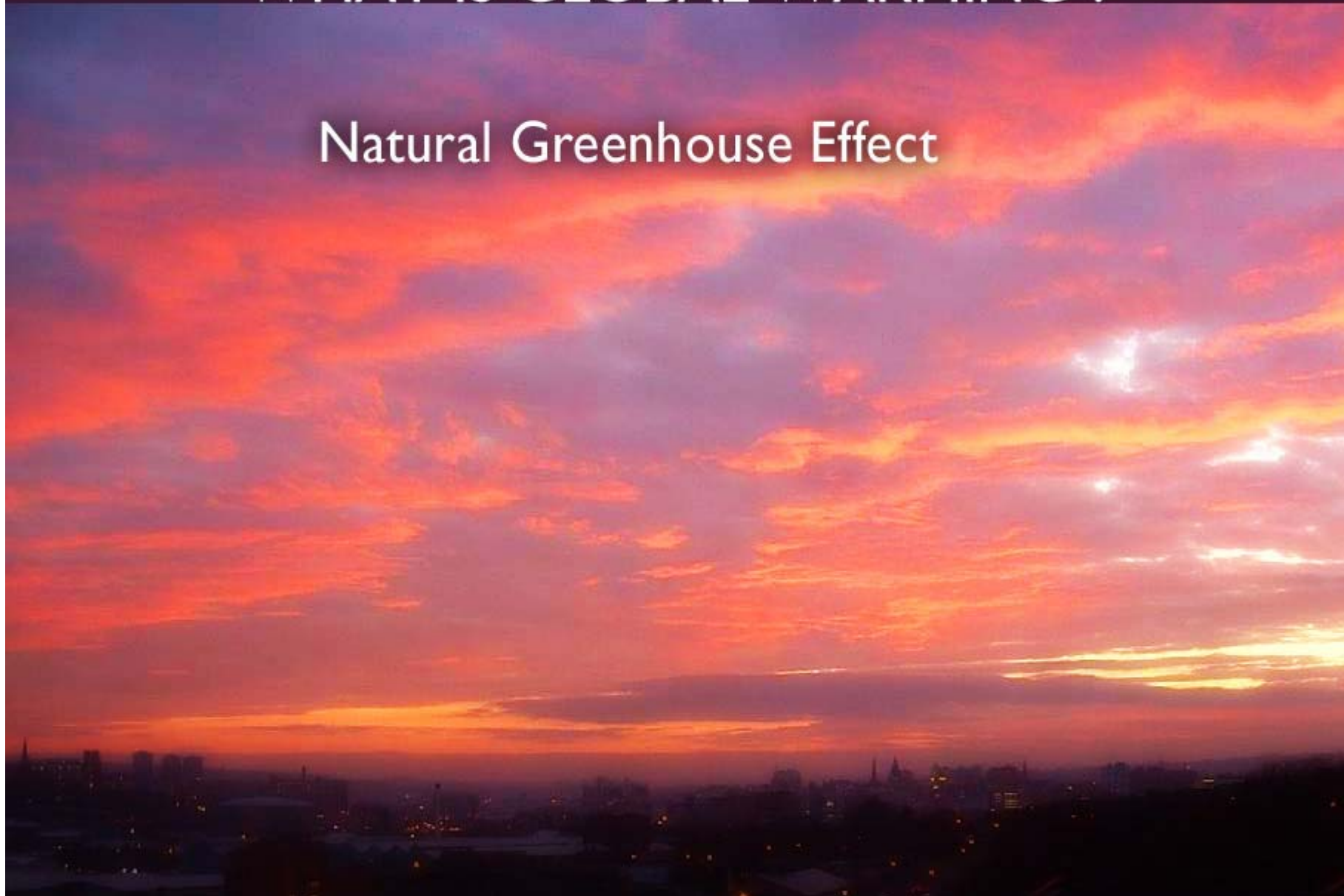






# WHAT IS GLOBAL WARMING ?

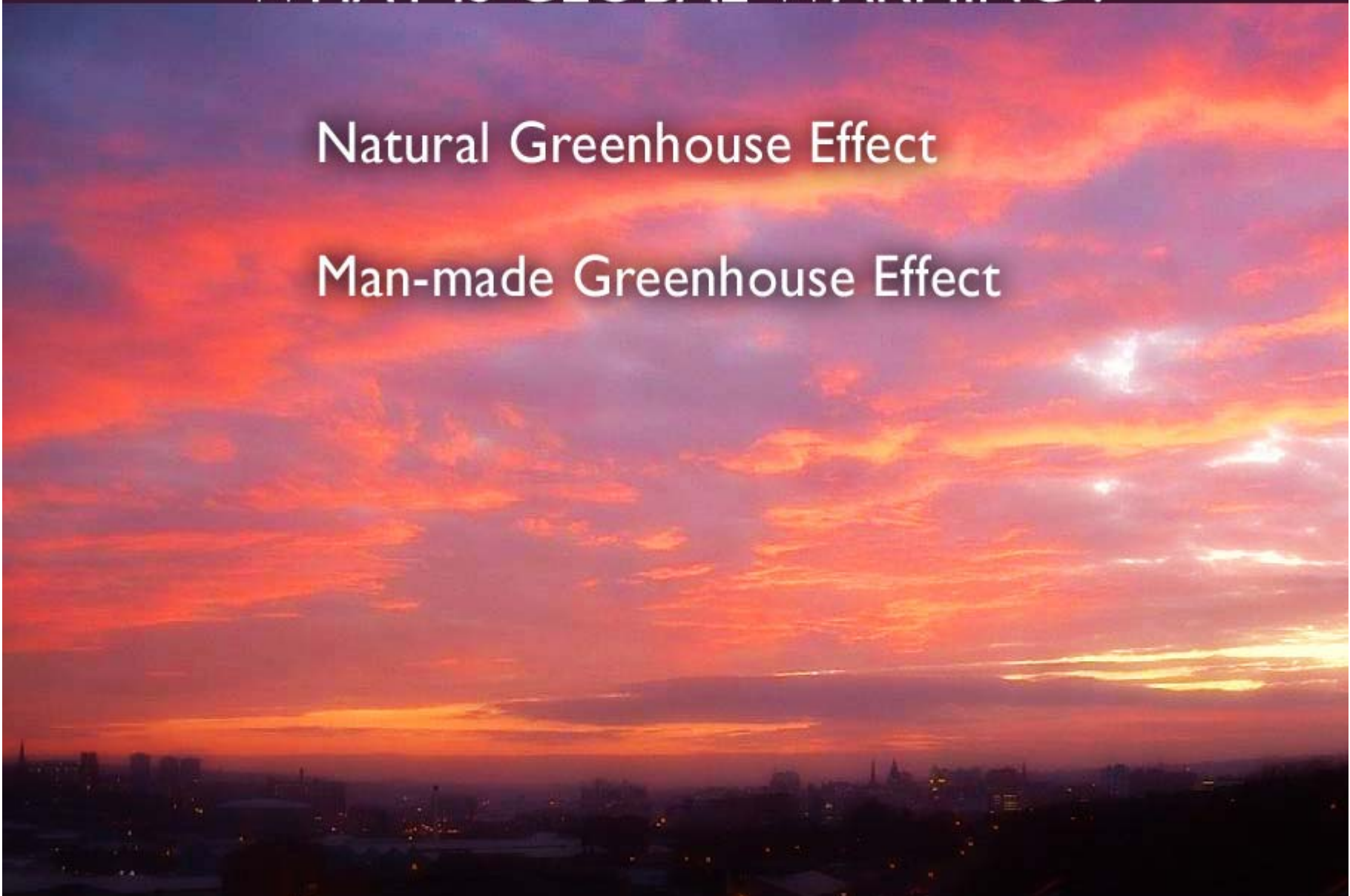
Natural Greenhouse Effect



# WHAT IS GLOBAL WARMING ?

Natural Greenhouse Effect

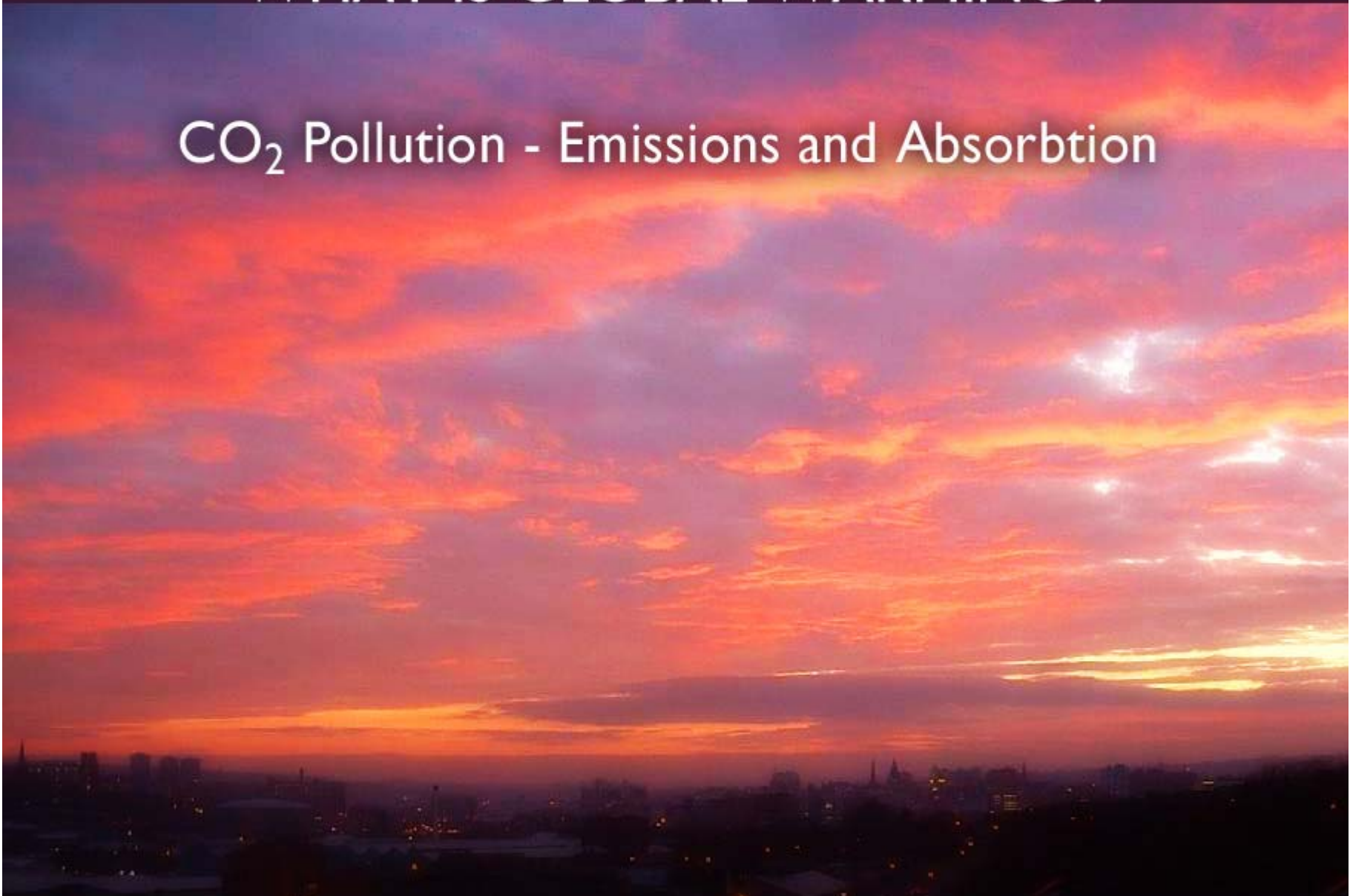
Man-made Greenhouse Effect





# WHAT IS GLOBAL WARMING ?

CO<sub>2</sub> Pollution - Emissions and Absorbption

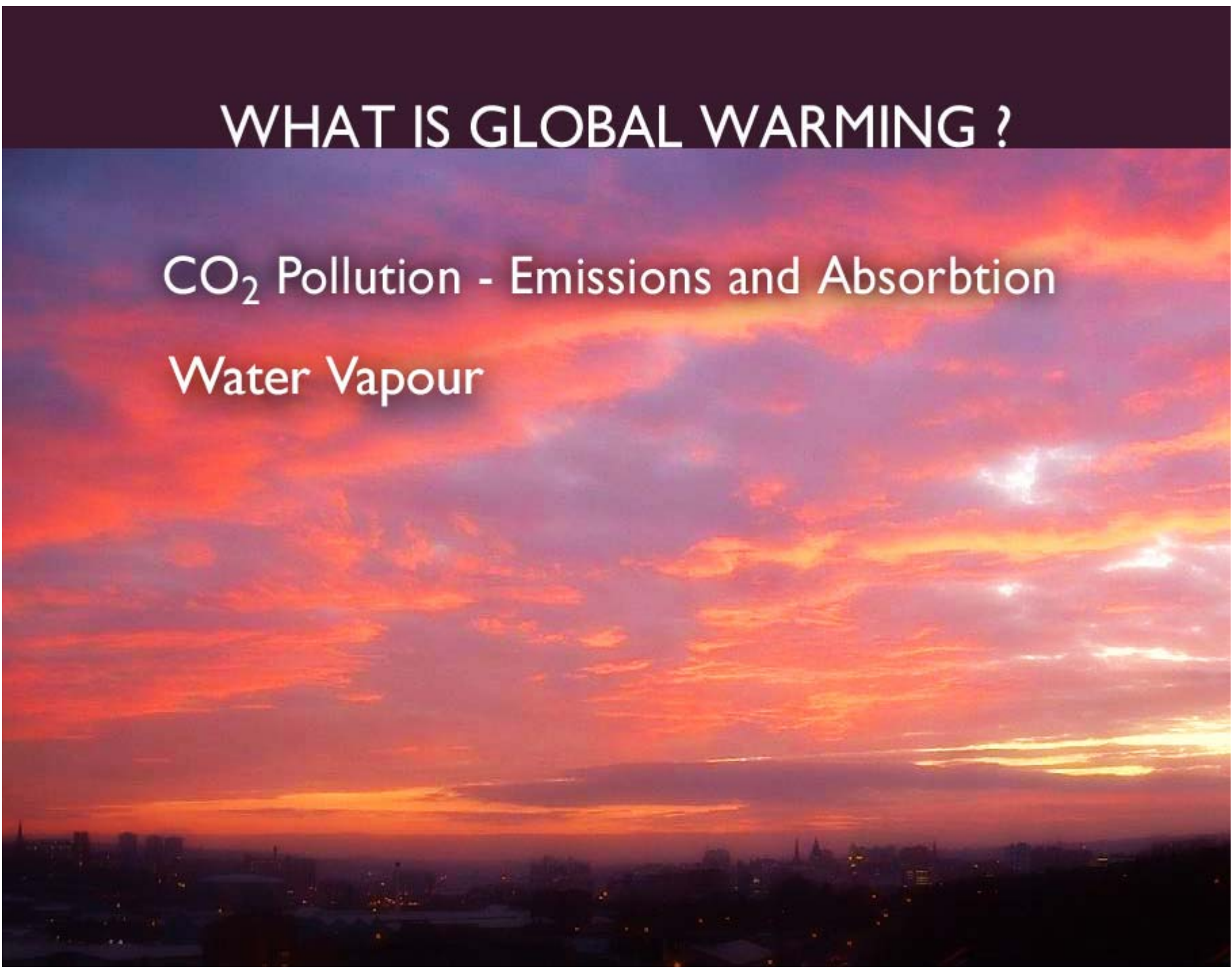




# WHAT IS GLOBAL WARMING ?

CO<sub>2</sub> Pollution - Emissions and Absorbption

Water Vapour



# WHAT IS GLOBAL WARMING ?

CO<sub>2</sub> Pollution - Emissions and Absorbtion

Water Vapour

Methane





# WHAT IS GLOBAL WARMING ?

CO<sub>2</sub> Pollution - Emissions and Absorbtion

Water Vapour

Methane

Ice cover





# MORE EXTREMES



# MORE EXTREMES

## WINTER RAINFALL

Low Emissions scenario



High Emissions scenario



2020s

2050s

2080s

Per cent Change





# MORE EXTREMES

## SUMMER RAINFALL

Low Emissions scenario



High Emissions scenario



Per cent Change



2020s

2050s

2080s



# MORE EXTREMES

## ANNUAL TEMPERATURE

Low Emissions scenario



High Emissions scenario



Change in °C



2020s

2050s

2080s

**MORE EXTREMES**

**FLOOD**





**MORE EXTREMES**

**FLOOD  
DROUGHT**





A dramatic, dark scene of a stormy sea with a stone bridge in the background. The sky is dark, and the water is turbulent with white-capped waves. The bridge, with its arches and a central tower, is partially obscured by the spray and mist of the storm. The overall mood is one of intense natural power and potential disaster.

**MORE EXTREMES**

**FLOOD  
DROUGHT  
RISING SEA LEVELS**

# MORE EXTREMES

The coastal floods of  
**1953**











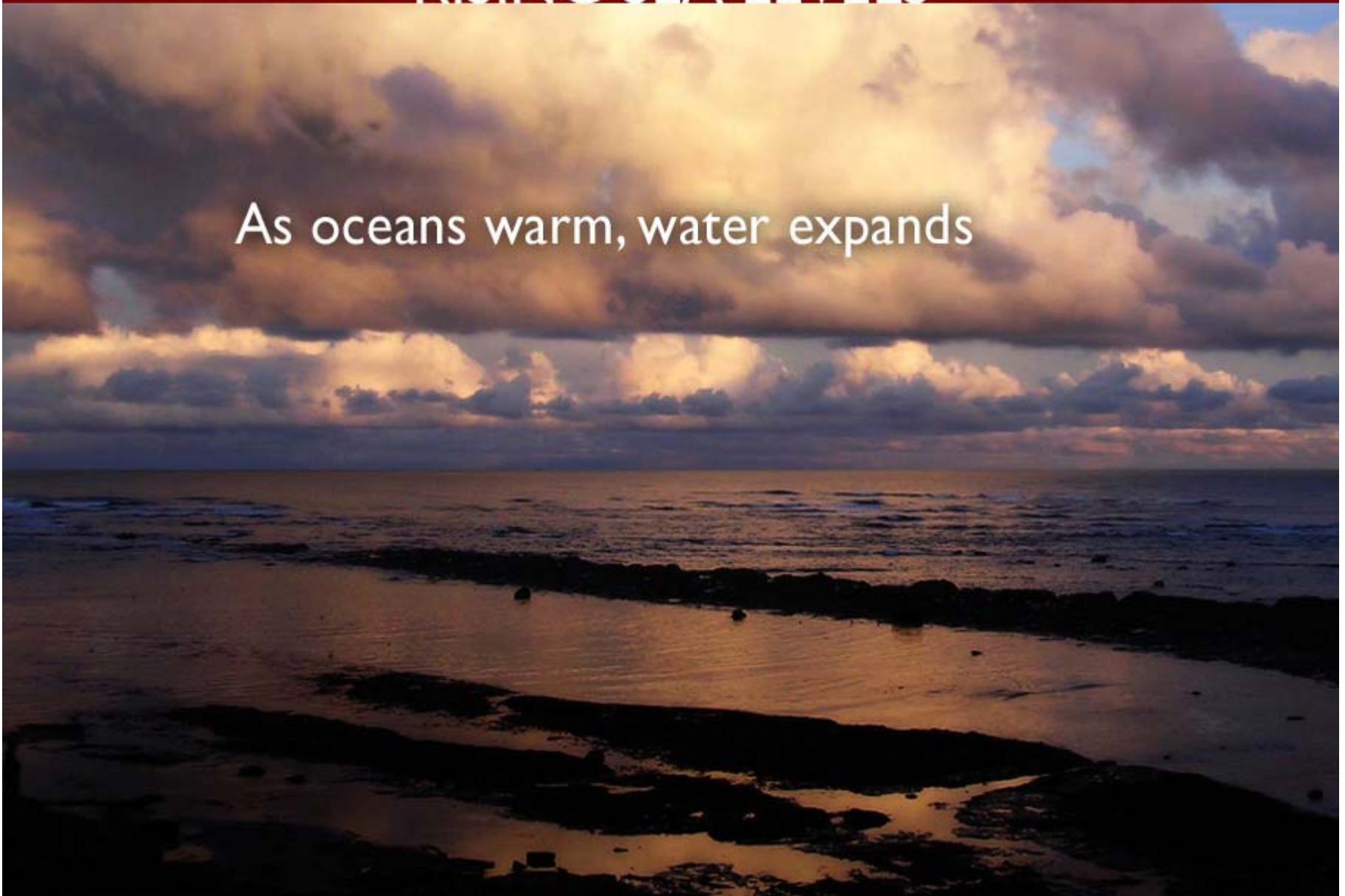
# RISING SEA LEVELS





# RISING SEA LEVELS

As oceans warm, water expands

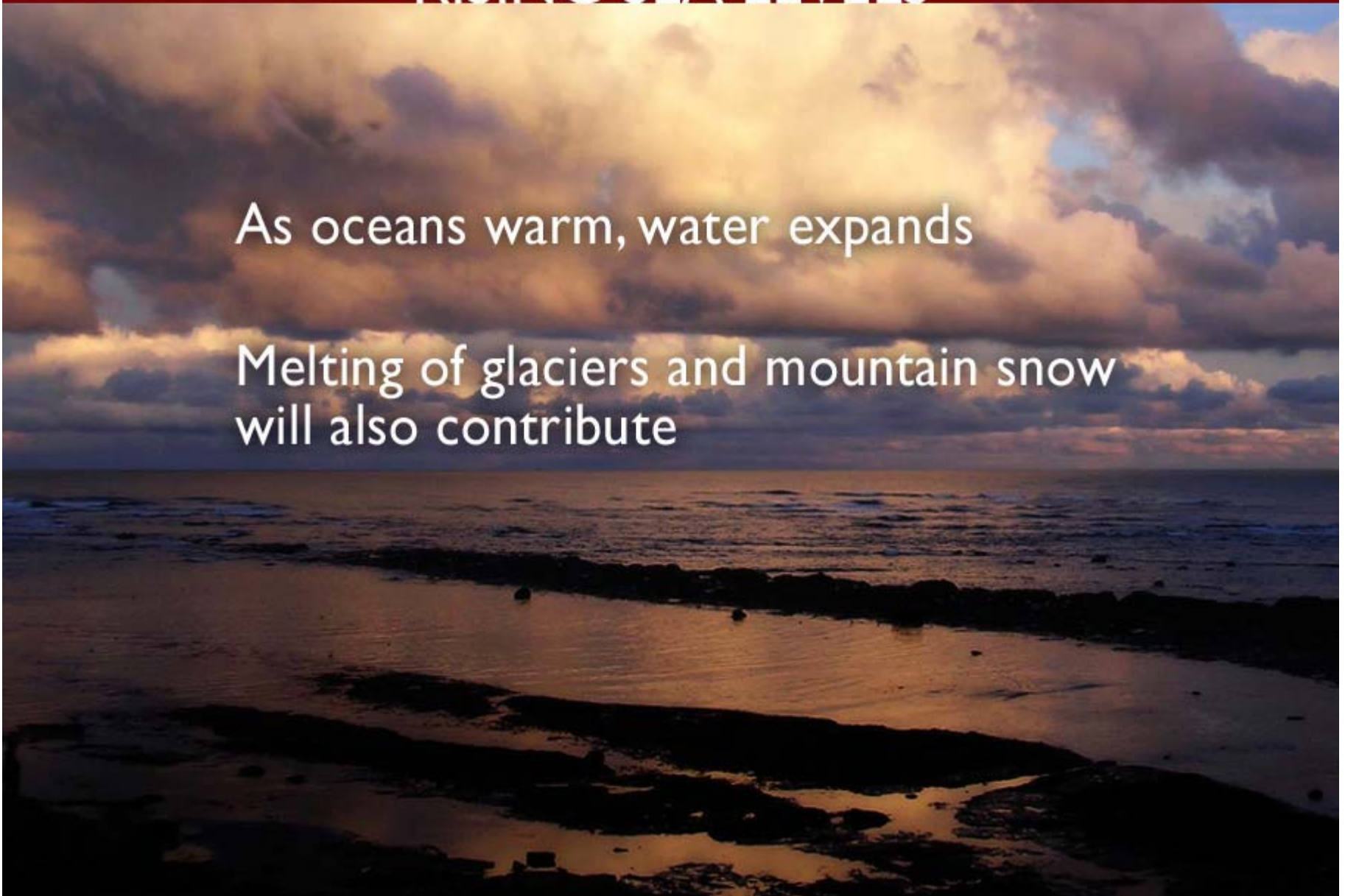




# RISING SEA LEVELS

As oceans warm, water expands

Melting of glaciers and mountain snow  
will also contribute



# RISING SEA LEVELS

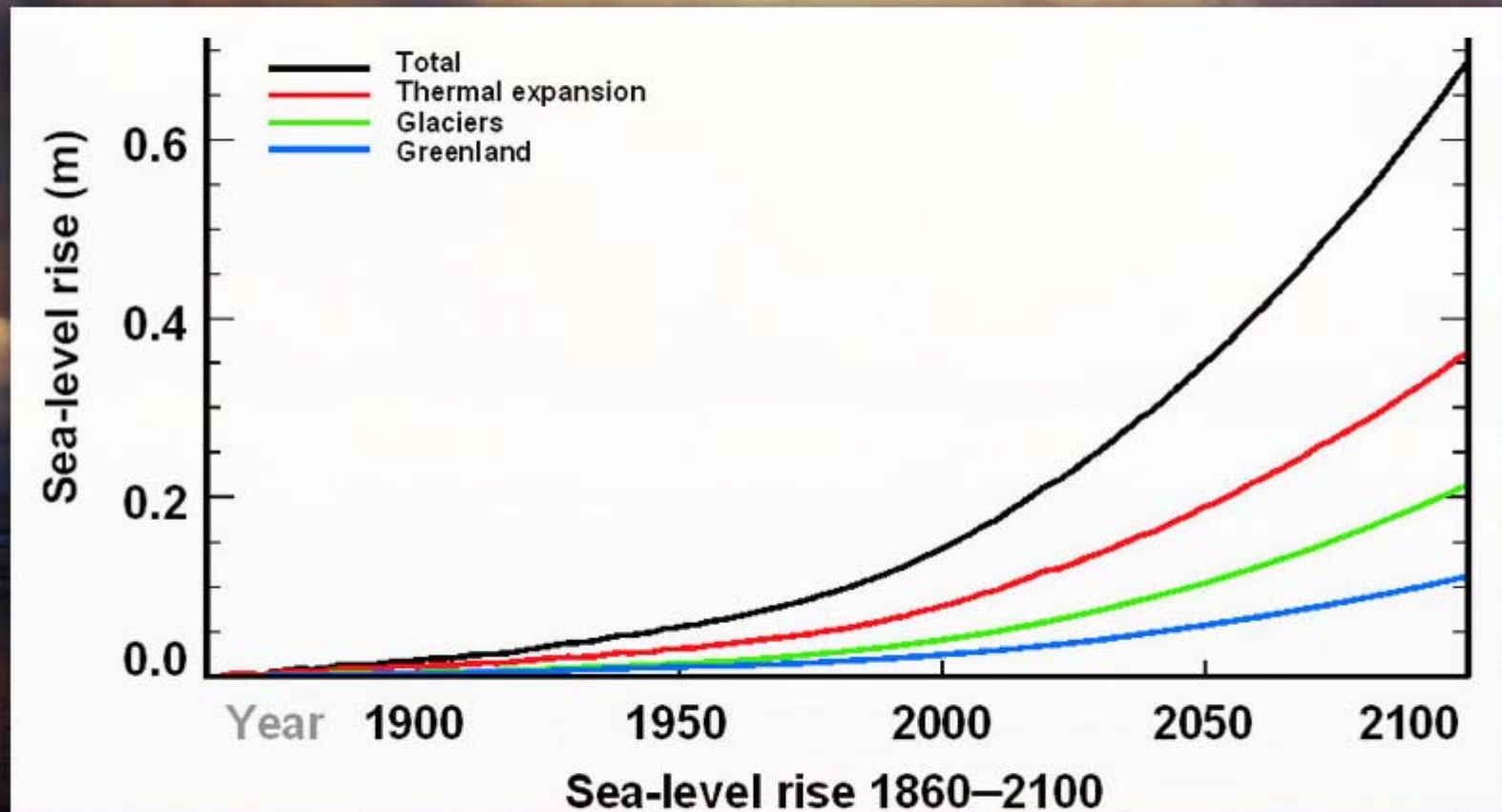
As oceans warm, water expands

Melting of glaciers and mountain snow  
will also contribute

Estimate is for a 50cm rise by 2100  
with a range of 15-95cm



# SEA LEVEL RISE and its COMPONENTS





# THE DROUGHT OF 1995



# THE DROUGHT OF 1995

Spring to Autumn

Rainfall amongst lowest ever recorded





# THE DROUGHT OF 1995

## Spring to Autumn

Rainfall amongst lowest ever recorded

Rainfall deficit can be expected once  
every 500 years



# MORE EXTREMES

The floods of  
**2000**





THE WEATHER WEEK Philip Eden

# You'll have to wait 500 years for so much rain

## More than 4ft fell in 12 months to March

REGULAR readers will be well aware of the records broken by the excessive rainfall which many parts of Britain have endured during the last 12 months.

We had, averaged over England and Wales, the wettest April since 1756, the wettest May since 1983, the wettest September since 1981, the wettest October since 1905, the wettest November since 1970, and the wettest March since 1988.

More rain fell during the autumn quarter than in any similar period since national rainfall records began in 1727 and 2000 was the wettest year since 1872.

Total rainfall during Sep-

hand. Taking a geographical average over England and Wales, the aggregate rainfall was 52.61in, compared with a long-term normal of 36.2in. Put another way, 45 per cent more rain than normal fell during that period.

A statistical analysis of all available records indicates that such a large excess can be expected once every 500 to 750 years on average, assuming that the rainfall climate of Britain is static.

There is no statistical evidence yet to support the view that Britain is becoming wetter or drier, nor, contrary to popular belief, is there yet any indication that the year-on-year variability in rainfall is changing or has changed

April last year have repeatedly occurred in southern counties of England, while some parts of Britain have recorded a deficit.

In London, a total of 39.19in was collected during the 12 months beginning April 1, 2000, compared with the normal of 24.02in, an excess of 63 per cent.

Rainfall was first systematically recorded in the capital in 1697 and this figure has never been approached before. At Herstmonceux, in East Sussex, 58.91in fell during the same period, more than double the normal amount. The statistical technique used to calculate the return period of such an aggregate goes off the scale.





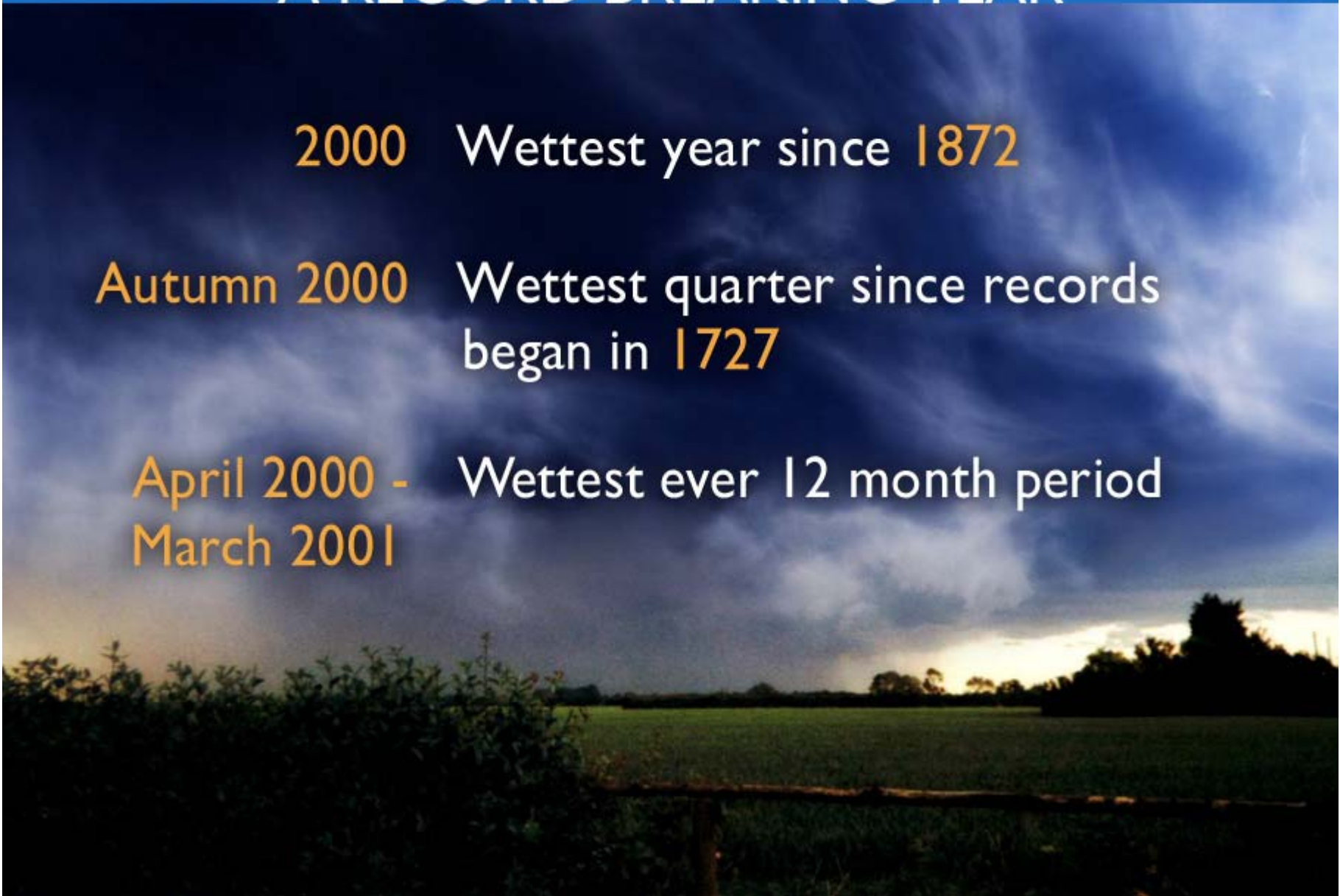


# A RECORD BREAKING YEAR

**2000** Wettest year since **1872**

**Autumn 2000** Wettest quarter since records began in **1727**

**April 2000 -  
March 2001** Wettest ever 12 month period



# A RECORD BREAKING YEAR

Rainfall excess can be expected  
once every **500 years**





# MORE RECENT EXTREMES

2004

A photograph of a sunset over a beach. The sun is low on the horizon, creating a bright glow and a reflection on the water. The sky is filled with soft, golden light. In the foreground, the wet sand of the beach is visible, reflecting the light. To the right, a dark silhouette of a cliff or headland is visible against the sky.















# MORE RECENT EXTREMES

# 2004

Wittering

July - Wettest month ever





# MORE RECENT EXTREMES

# 2004

Wittering

**July** - Wettest month ever

**August** - Beats July 2004 !

*282% of average rainfall*

1 in 500 year event according to Met Office analysis

# MORE RECENT EXTREMES

2004

August

Leuchars

Wettest on record

*331% of average rainfall*

1 in a 1000 year event



# EUROPEAN EXTREMES

2002

Widespread flooding -  
Danube rises to highest ever level



# EUROPEAN EXTREMES

2003

Unprecedented drought and heatwave

Danube falls to lowest ever level





# MORE RECENT EXTREMES

## 2006

July - Hottest month in UK since records began in 1659



# MORE RECENT EXTREMES

## 2006

July - Hottest month in UK since records began in 1659

Warmest Autumn on record





# MORE RECENT EXTREMES

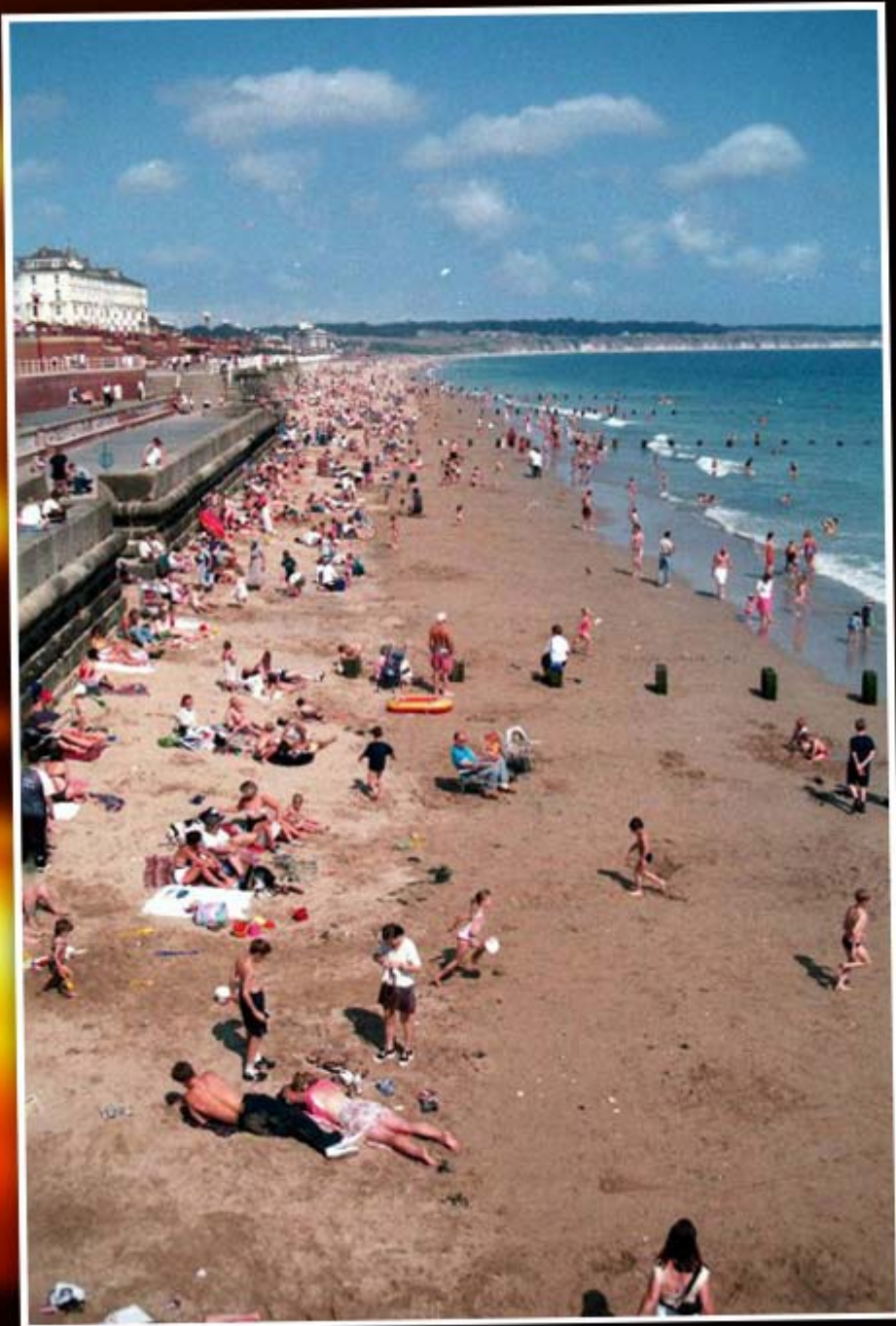
## 2006

July - Hottest month in UK since records began in 1659

Warmest Autumn on record

Warmest Year in the UK on record







# MORE RECENT EXTREMES

2007

April - warmest across the UK since records began in 1659

# MORE RECENT EXTREMES

2007

June - wettest month in Sheffield since records began in 1882





# MORE RECENT EXTREMES

2007

June - wettest month in Sheffield since records began in 1882

**225mm** in twelve days, the wettest summer period ever in Yorkshire



# MORE RECENT EXTREMES

2007

May to July - wettest period across the UK  
since records began in 1766



# MORE RECENT EXTREMES



# MORE RECENT EXTREMES





# MORE RECENT EXTREMES



# MORE RECENT EXTREMES

2008

January - Wettest since records began  
in 1947 at Church Fenton



# MORE RECENT EXTREMES

2008

January - Wettest since records began  
in 1947 at Church Fenton

February - Warmest early February  
since records began in 1935 at Bingley

A dramatic sunset over a cityscape. The sky is filled with dark, heavy clouds, with a bright orange and yellow glow from the setting sun breaking through on the right side. The city below is silhouetted against the dark sky, with numerous streetlights and building lights glowing. A prominent tall, dark tower is visible on the right side of the horizon.

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in Yorkshire, Lincolnshire  
and the North Midlands