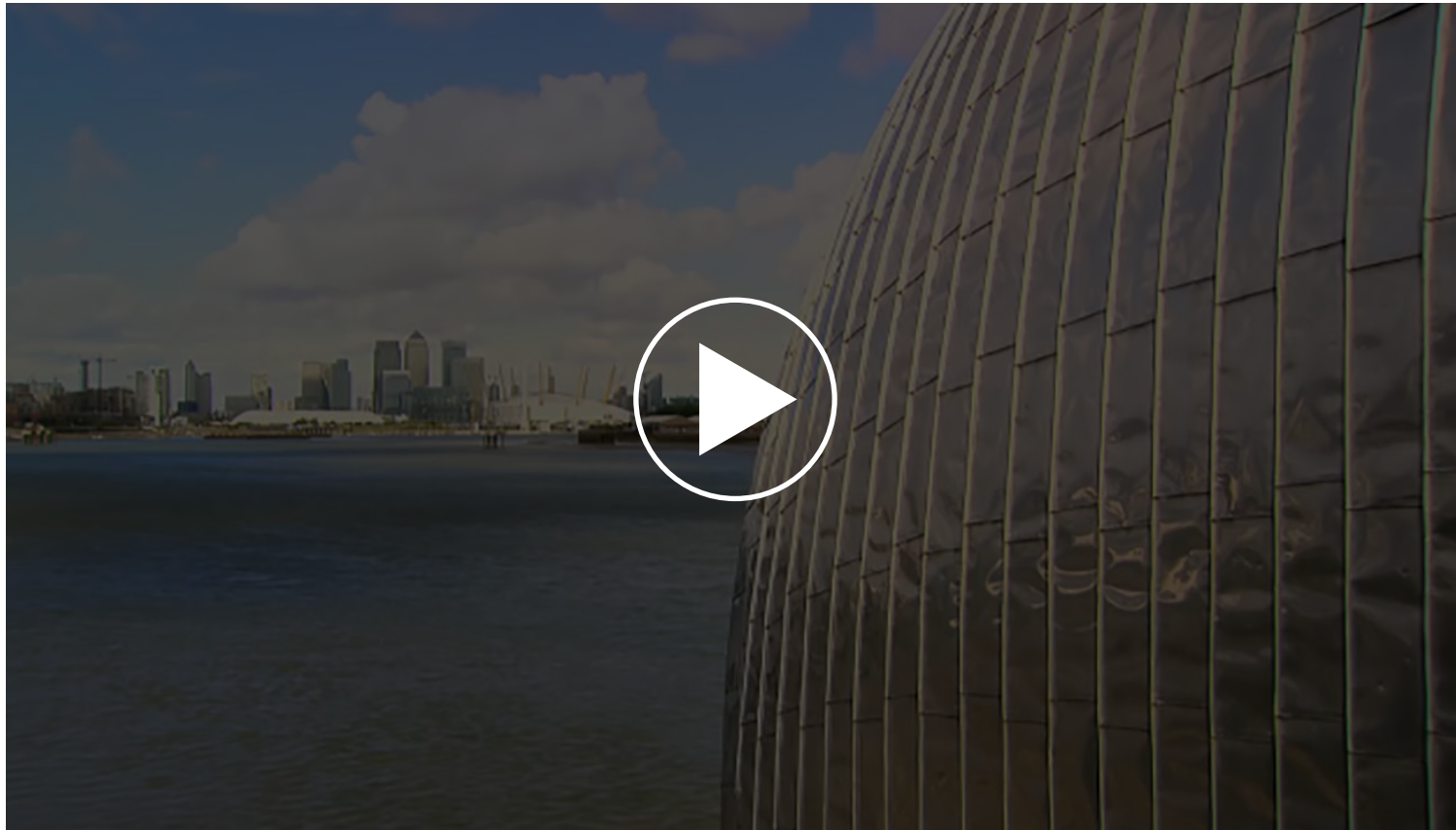


# HOW IS OUR CLIMATE CHANGING?

# CLIMATE CHANGE IS HAPPENING RIGHT NOW!



**CLICK TO PLAY**

Video opens in YouTube

# WHAT IS CLIMATE CHANGE?

**What is the difference between the two?**

## **WEATHER**

is the day to day localised conditions, which have great variability (especially here in the UK).

# WHAT IS CLIMATE CHANGE?

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## CLIMATE

is the long-term weather patterns for an area.

# WHAT IS CLIMATE CHANGE?

## **What is climate change?**

Throughout the history of the Earth, our climate has varied due to natural processes. However, in the last 150 years, our climate has begun to warm rapidly due to human activities.

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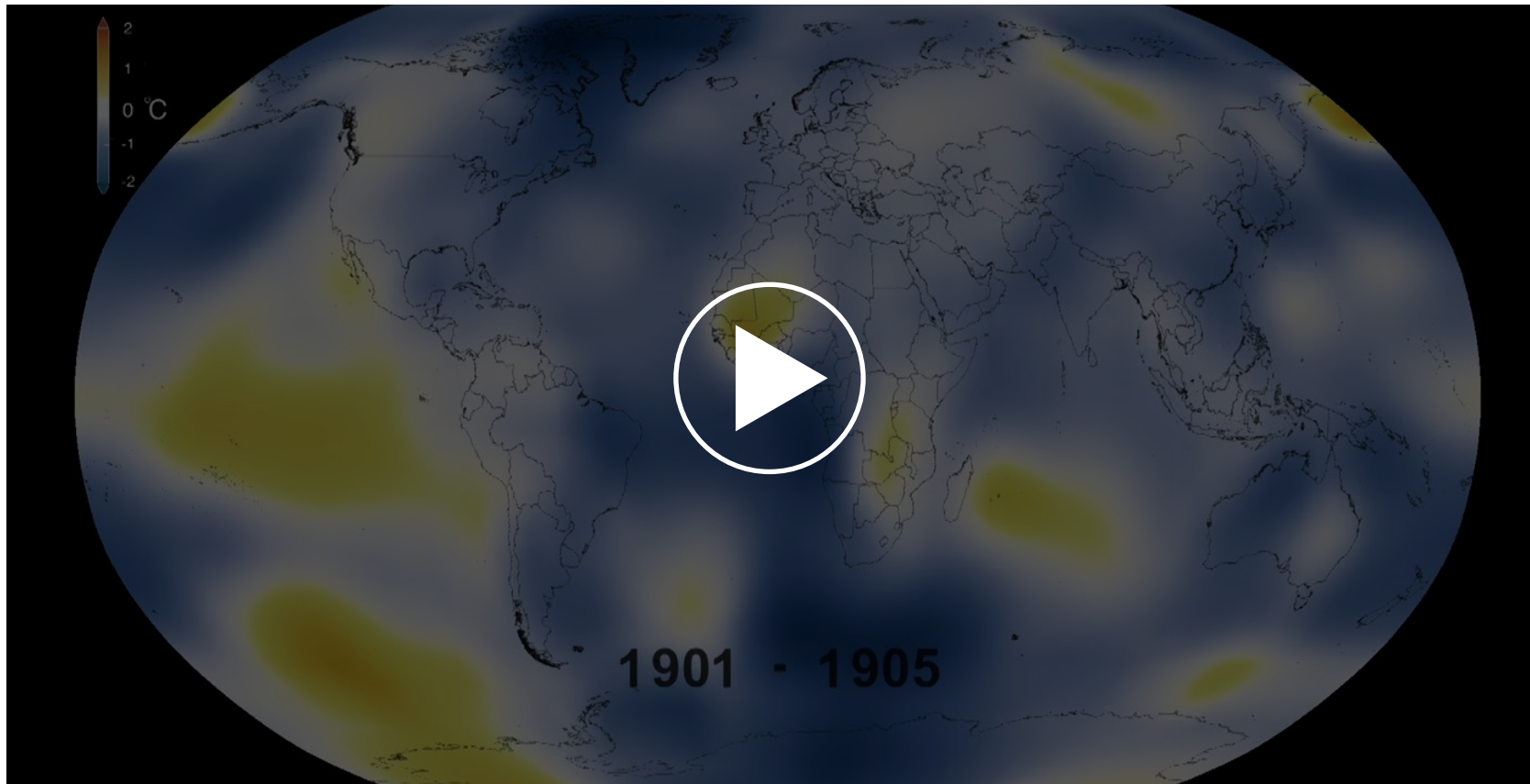
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This is known as **climate change**.

Currently, our climate is warming at a rate faster than ecosystems can adapt.

# WHAT IS CLIMATE CHANGE?

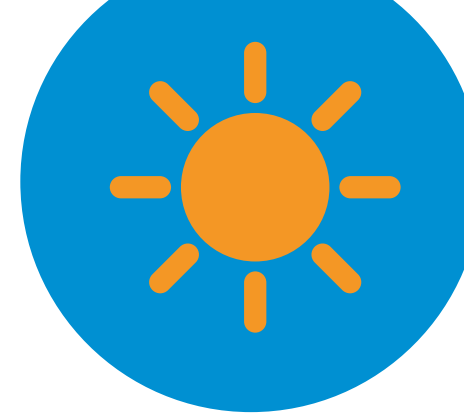


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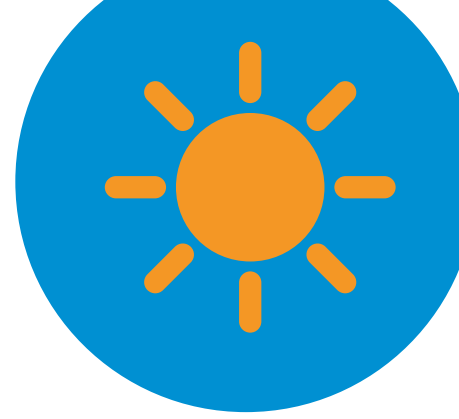


# FACTORS AFFECTING CLIMATE



**The sun is the key driver for our climate**

# FACTORS AFFECTING CLIMATE

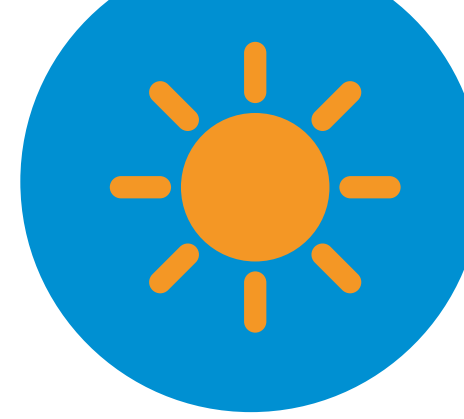


## **The sun is the key driver for our climate**

When sunlight hits the Earth's atmosphere, the sun's radiation energy is partly:

- Absorbed by the atmosphere

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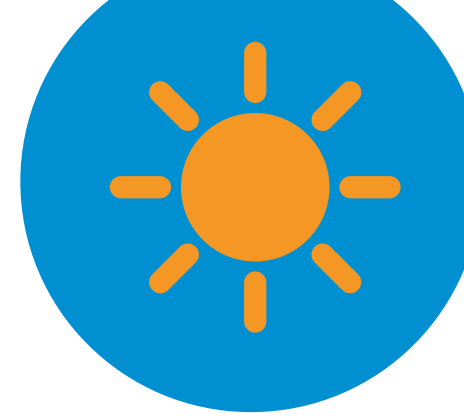


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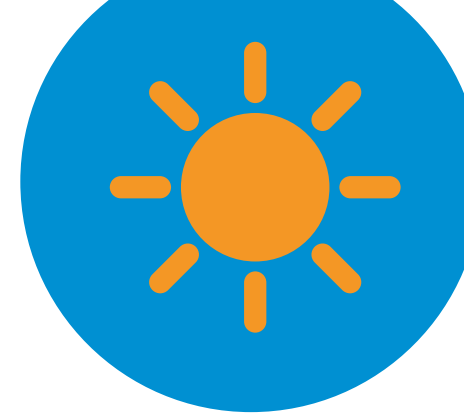


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The resulting transfer of this heat energy is responsible for changes in the Earth's climate.

# FACTORS AFFECTING CLIMATE



**Local climate varies due to the following influences:**

- latitude

# FACTORS AFFECTING CLIMATE



**Local climate varies due to the following influences:**

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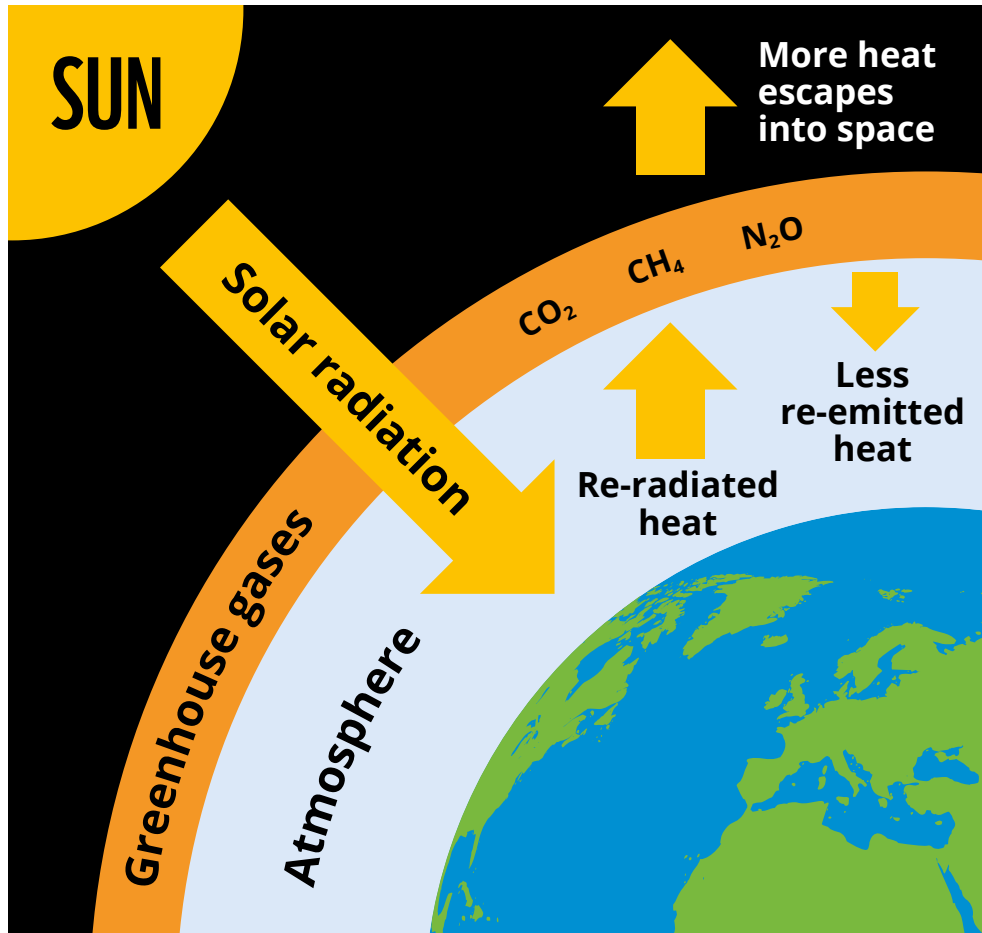


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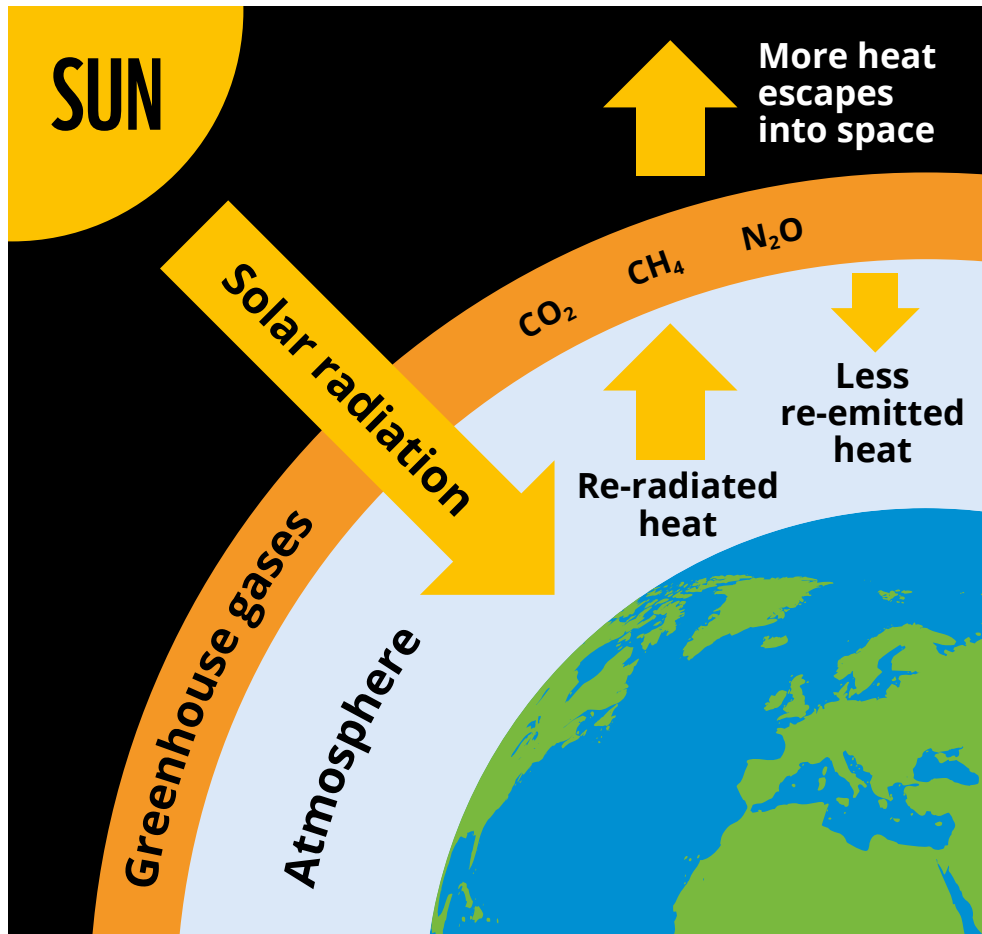
These influences can either amplify or reduce the direct impact of climate change depending on where you live.

# THE GREENHOUSE EFFECT

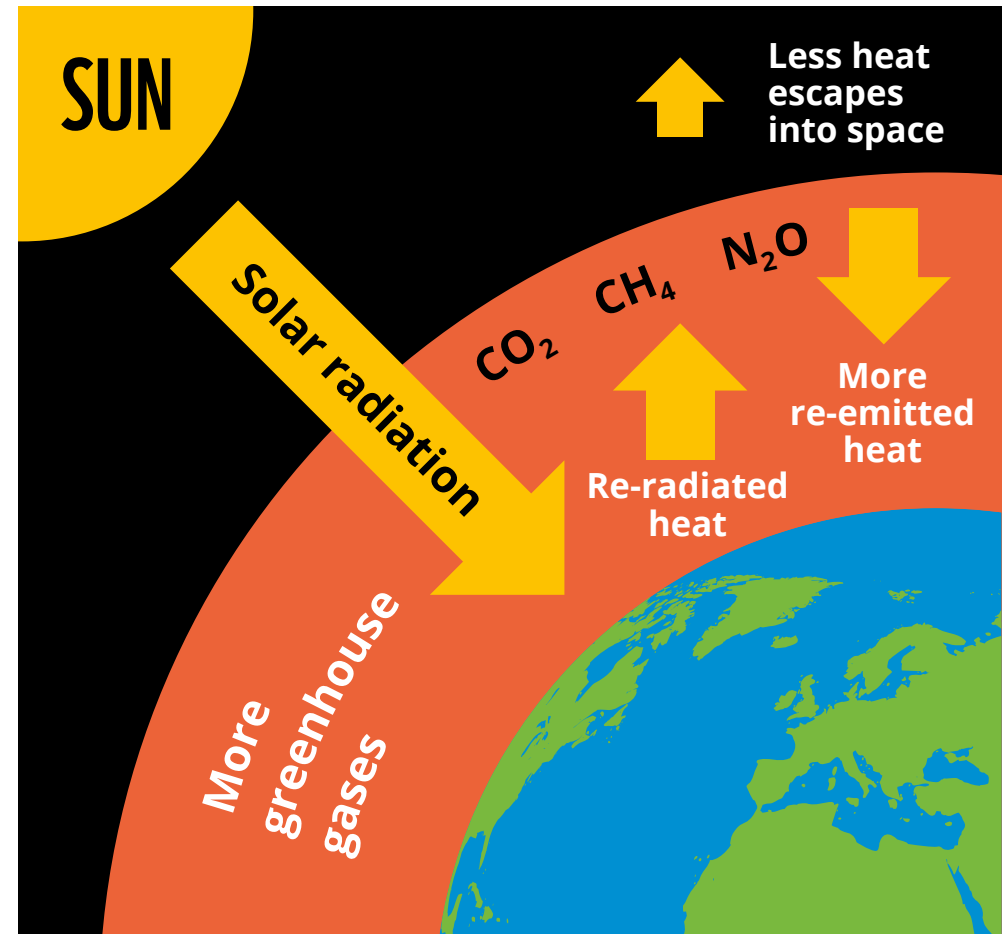


**NATURAL  
GREENHOUSE EFFECT**

# THE GREENHOUSE EFFECT



**NATURAL  
GREENHOUSE EFFECT**



**INCREASED GLOBAL WARMING  
CAUSED BY HUMAN ACTIVITY**

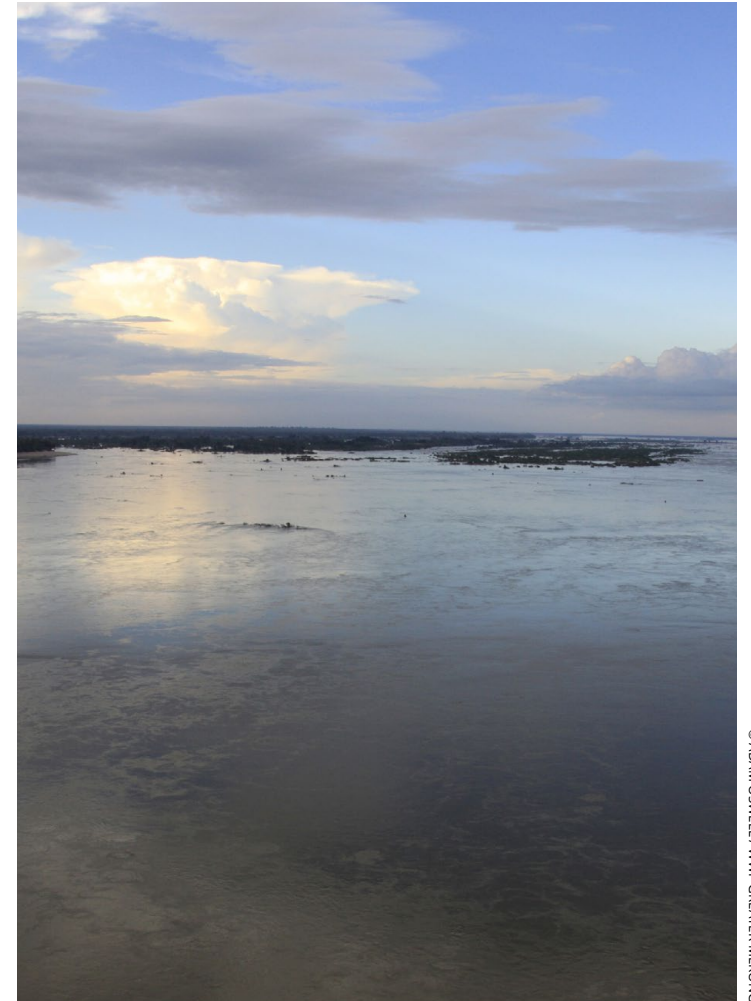
# GREENHOUSES GASES AND THEIR ORIGINS

Click a gas to explore further

# GREENHOUSES GASES AND THEIR ORIGINS

## Water vapour (H<sub>2</sub>O)

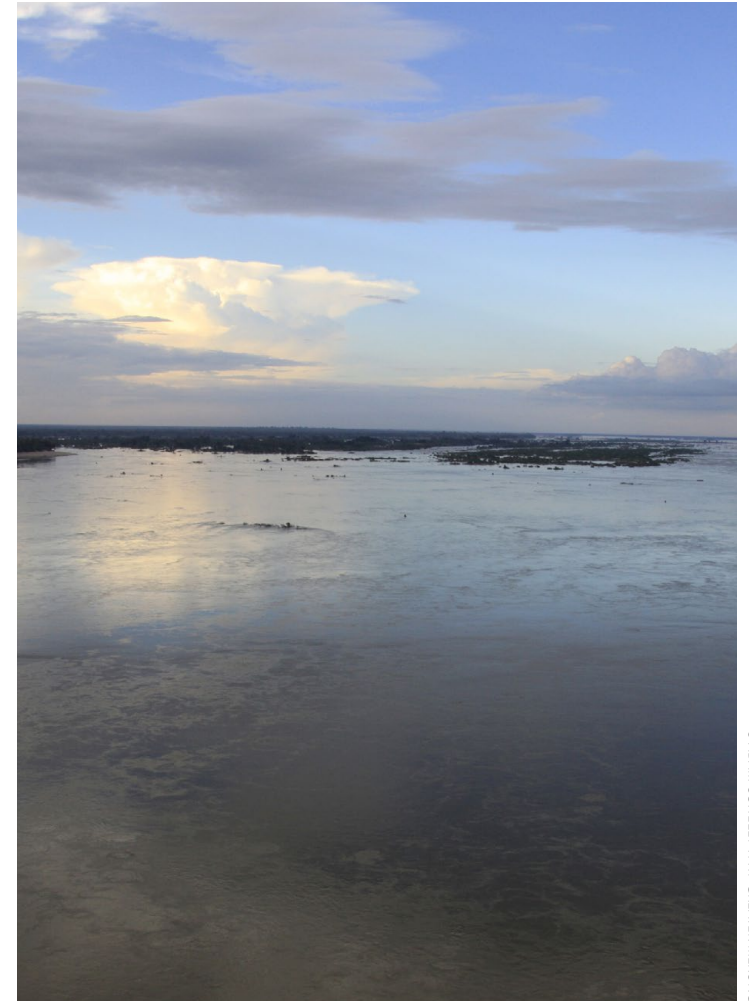
- Biggest contributor to the 'natural greenhouse effect' and varies the most in the atmosphere.



# GREENHOUSES GASES AND THEIR ORIGINS

## Water vapour (H<sub>2</sub>O)

- Biggest contributor to the 'natural greenhouse effect' and varies the most in the atmosphere.
- Human activities have little impact on the level of water vapour in the atmosphere.





# GREENHOUSES GASES AND THEIR ORIGINS

## Methane (CH<sub>4</sub>)

- Naturally generated during decomposition of organic matter. It is also produced by animals and released by natural gas deposits.

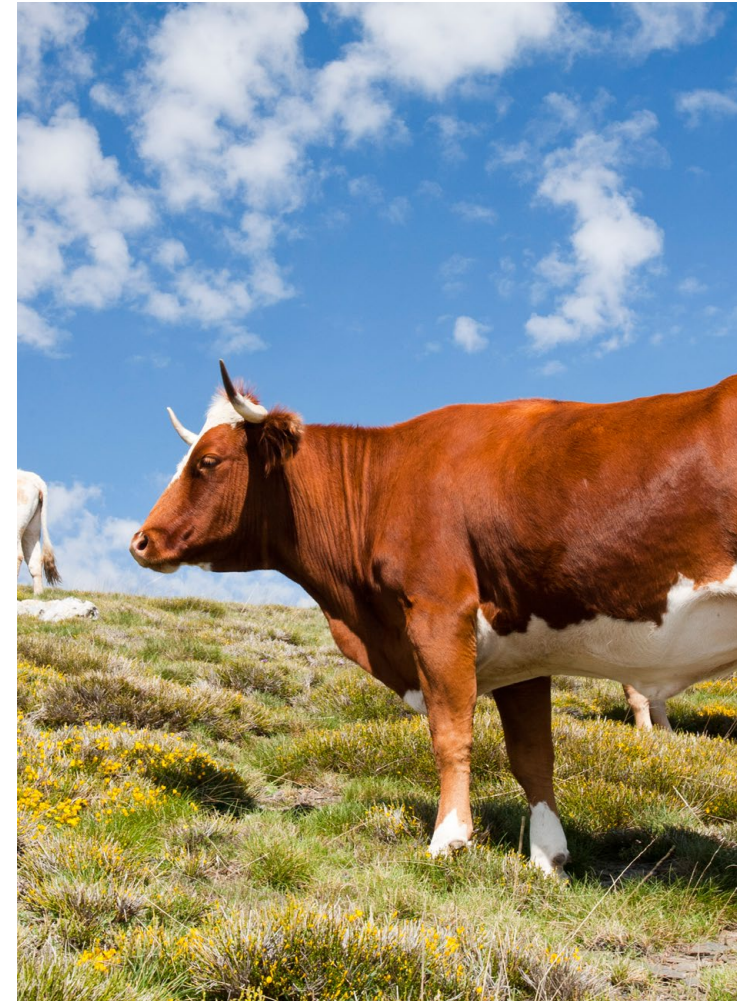


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# GREENHOUSES GASES AND THEIR ORIGINS

## Methane (CH<sub>4</sub>)

- Naturally generated during decomposition of organic matter. It is also produced by animals and released by natural gas deposits.
- Human activities like dairy and beef cattle farming, burning of fossil fuels and drilling for natural gas significantly add to the level of methane in the atmosphere.



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# GREENHOUSE GASES AND THEIR ORIGINS

## Nitrous oxide ( $\text{NO}_2$ )

- Makes up a tiny percentage of the total greenhouse gas content of our atmosphere compared to  $\text{CO}_2$ .



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# GREENHOUSE GASES AND THEIR ORIGINS

## Nitrous oxide (NO<sub>2</sub>)

- Makes up a tiny percentage of the total greenhouse gas content of our atmosphere compared to CO<sub>2</sub>.
- Mainly produced by human activities such as burning fossil fuels and wood, sewage treatment and the widespread use of nitrogen-based fertilisers.



© GLOBAL WARMING IMAGES / WWF

# GREENHOUSE GASES AND THEIR ORIGINS

## Carbon dioxide (CO<sub>2</sub>)

- Probably the most important of the greenhouse gases as it accounts for the largest proportion of the 'trace gases' (a trace gas is a gas which makes up less than 1% by volume of the Earth's atmosphere).



# GREENHOUSE GASES AND THEIR ORIGINS

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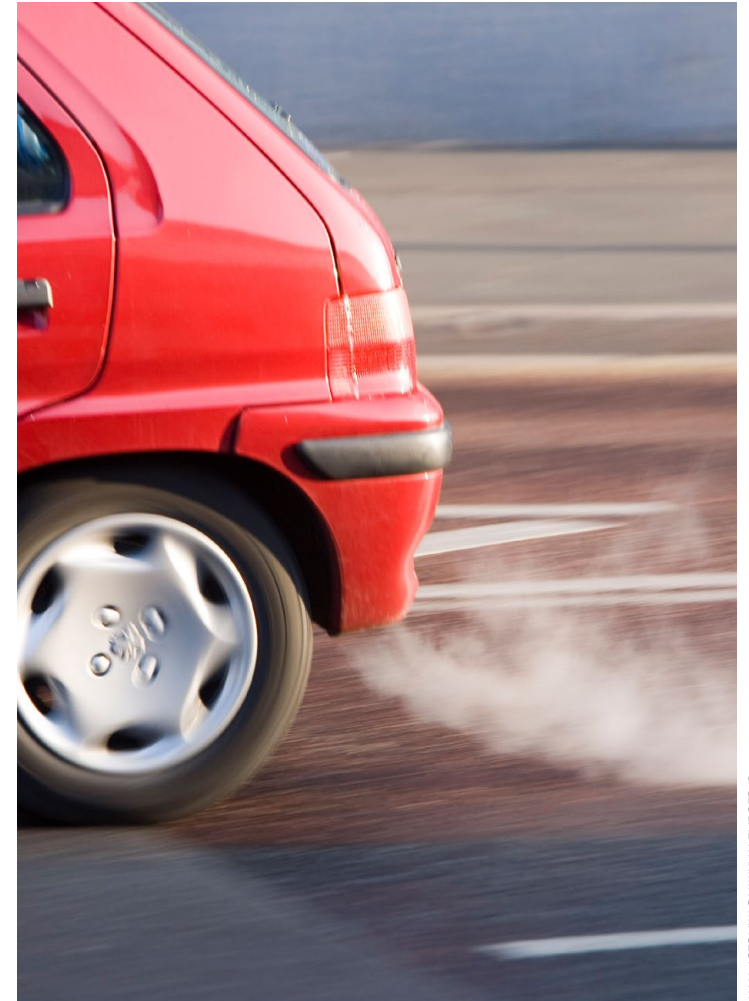
- Probably the most important of the greenhouse gases as it accounts for the largest proportion of the 'trace gases' (a trace gas is a gas which makes up less than 1% by volume of the Earth's atmosphere).
- Carbon dioxide is the gas responsible for around 76% of global greenhouse gas emissions.



# GREENHOUSES GASES AND THEIR ORIGINS

## Carbon dioxide (CO<sub>2</sub>)

- It can be removed from the atmosphere through planting trees and reforestation.



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# GREENHOUSE GASES AND THEIR ORIGINS

## Carbon dioxide (CO<sub>2</sub>)

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- Produced by the natural processes of respiration (breathing) and decay, but without human activity this output would be balanced by nature and reabsorbed by trees and the oceans.





# GREENHOUSES GASES AND THEIR ORIGINS

## Carbon dioxide (CO<sub>2</sub>)

- Most human activity results in the release of carbon dioxide - especially burning fossil fuels, deforestation, heating our homes and running our cars.



# GREENHOUSE GASES AND THEIR ORIGINS

## The 'F' gases

These gases contribute directly to climate change. They include:

- Hydrofluorocarbons (HFCs) – found in air conditioners and fridges.



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Human activities cause the 'F' gases to be released into the atmosphere.



# GREENHOUSE GASES AND THEIR ORIGINS

## Sulphur dioxide (SO<sub>2</sub>)

- All human activities that involve the burning of fossil fuels release sulphur dioxide into the atmosphere.



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# GREENHOUSE GASES AND THEIR ORIGINS

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- It is also produced naturally by volcanoes.



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# MEASURING CLIMATE CHANGE

**The main climate change indicator is temperature.**

There are four main records of global temperature at the Earth's surface:

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**Met Office**

UK Met Office



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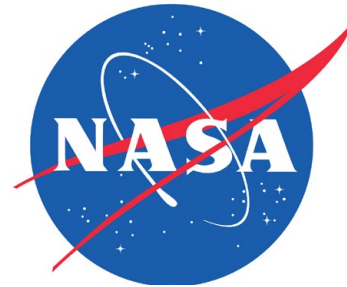
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NASA

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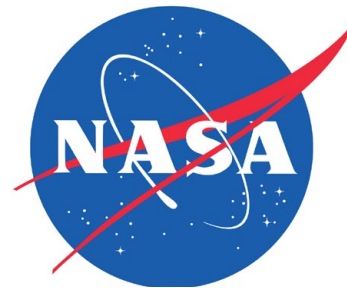
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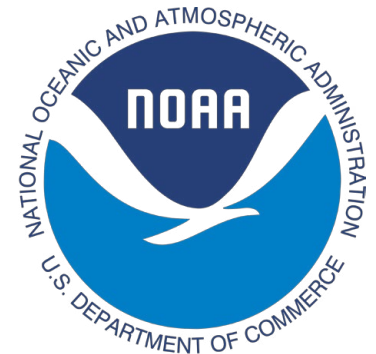
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NASA



US National  
Oceanic and  
Atmospheric  
Administration  
(NOAA)

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Temperature data from across the globe is combined in order to monitor climate change and trends:

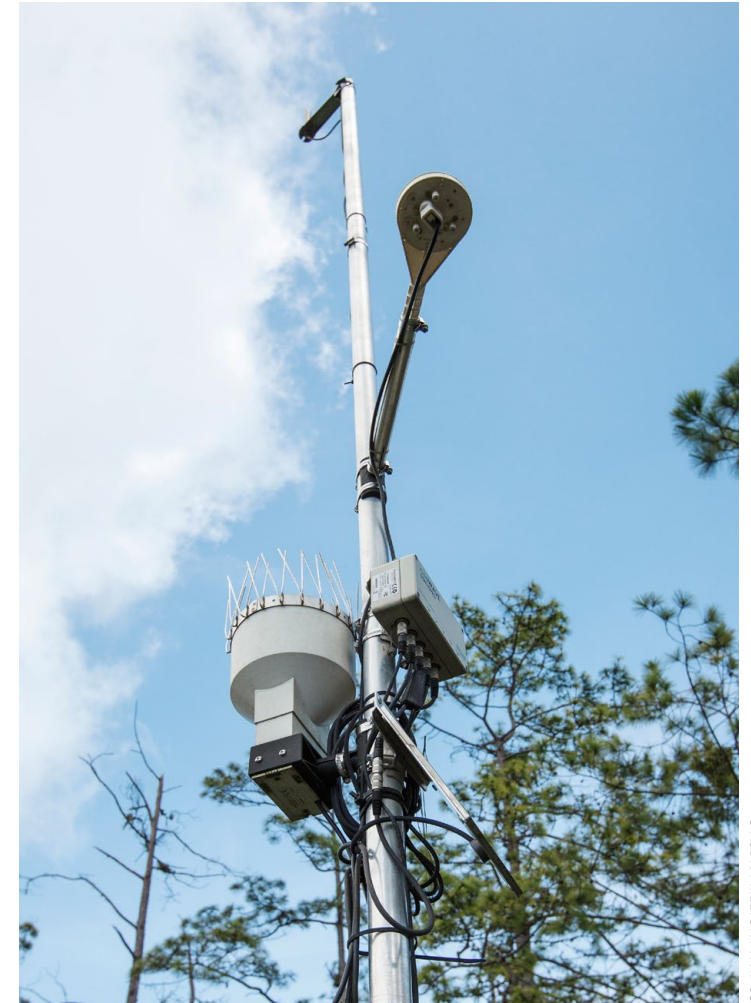


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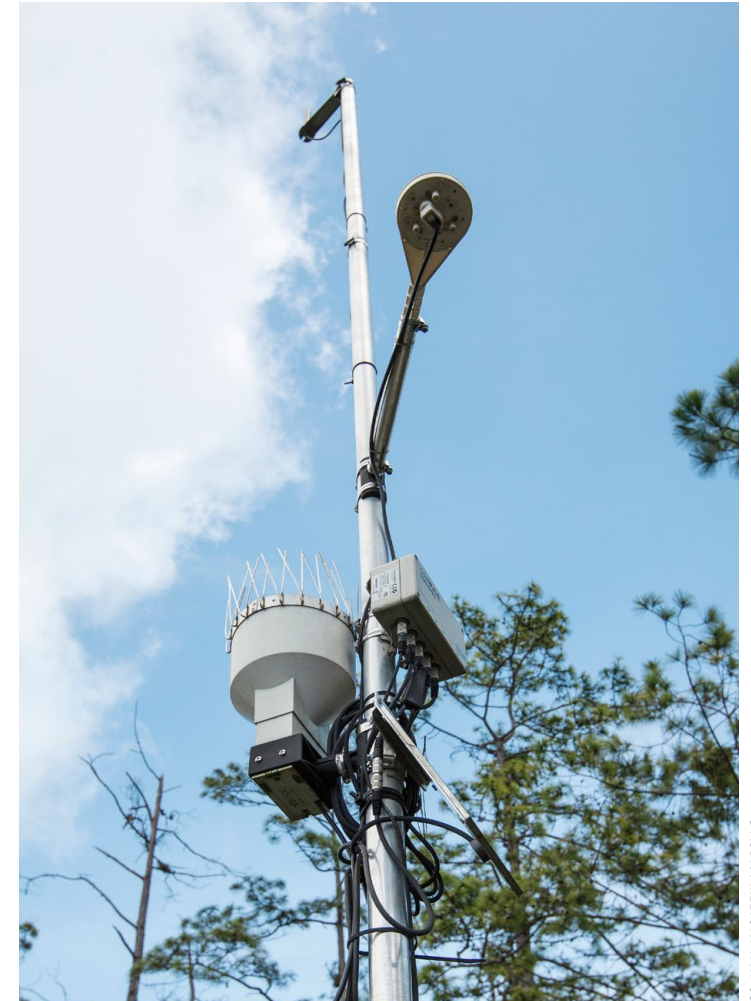
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- measurements taken at over 5,000 land-based weather stations, over 1,200 free-floating buoys, as well as from ships.
- satellites measure temperature changes in the lower atmosphere (troposphere).

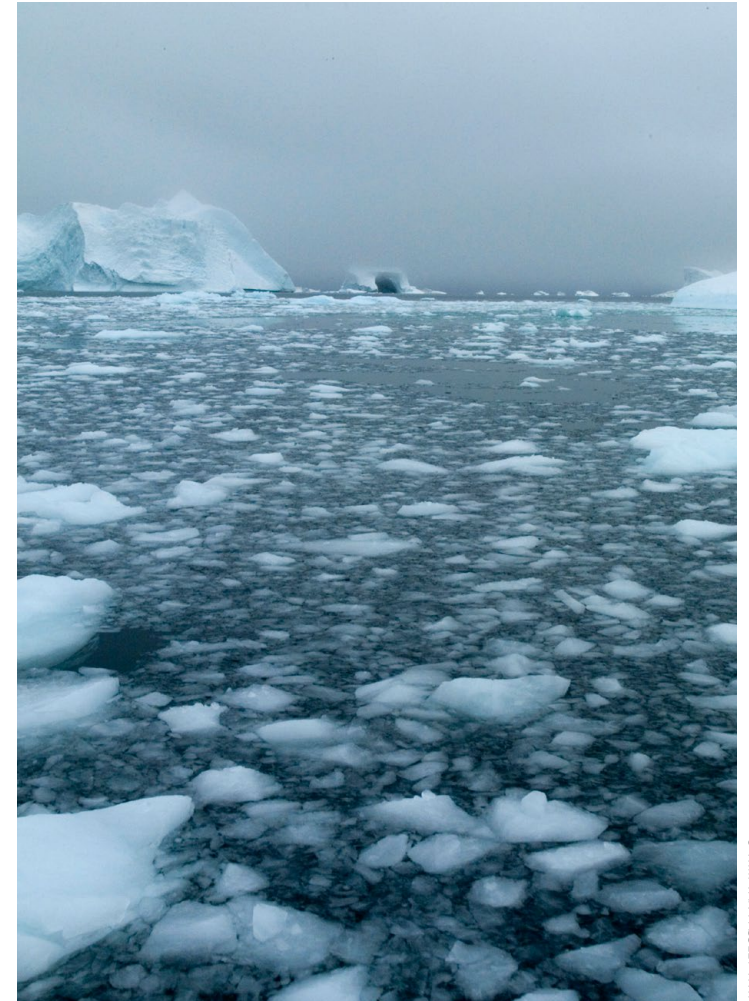


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# MEASURING CLIMATE CHANGE

**Other measures of climate change include:**

- sea level rises

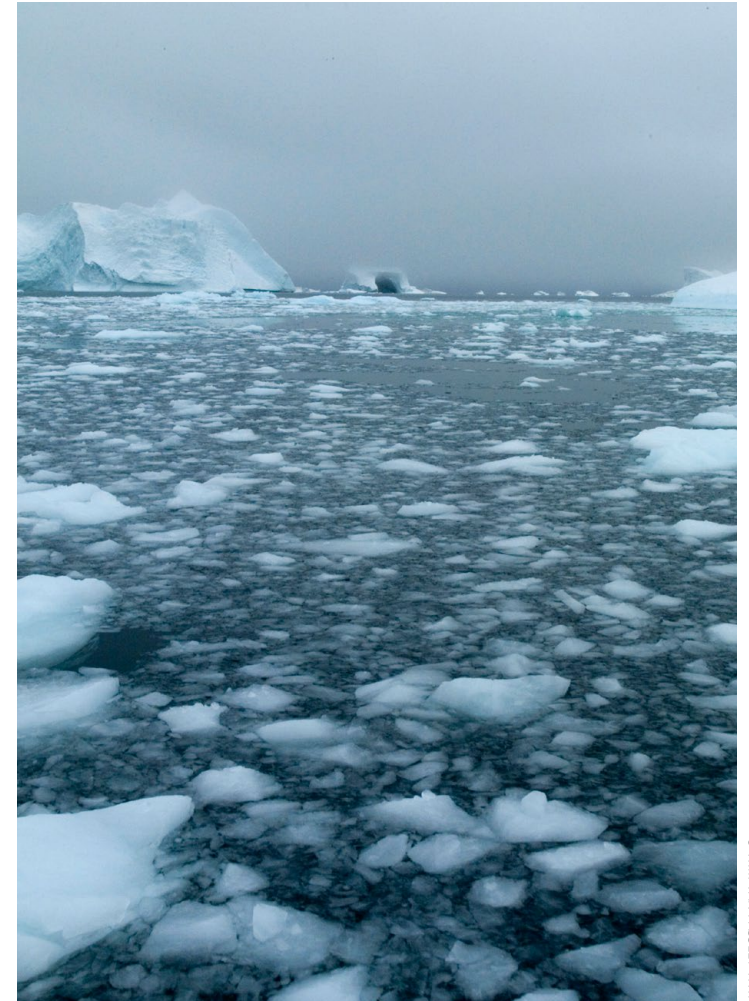


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# MEASURING CLIMATE CHANGE

**Other measures of climate change include:**

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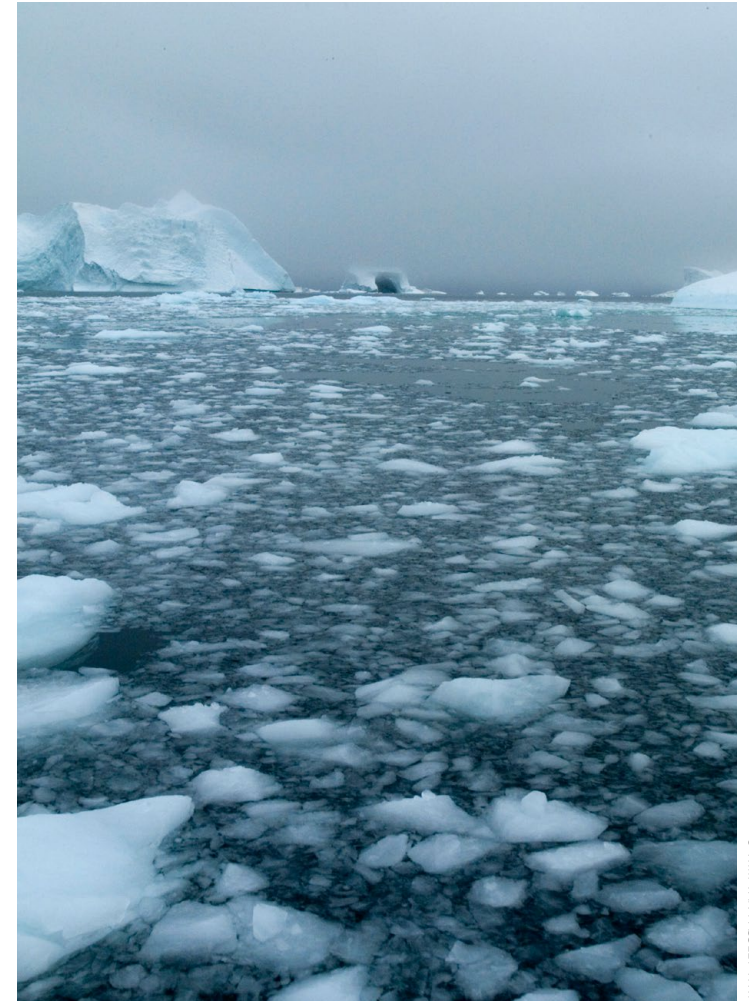
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# MEASURING CLIMATE CHANGE

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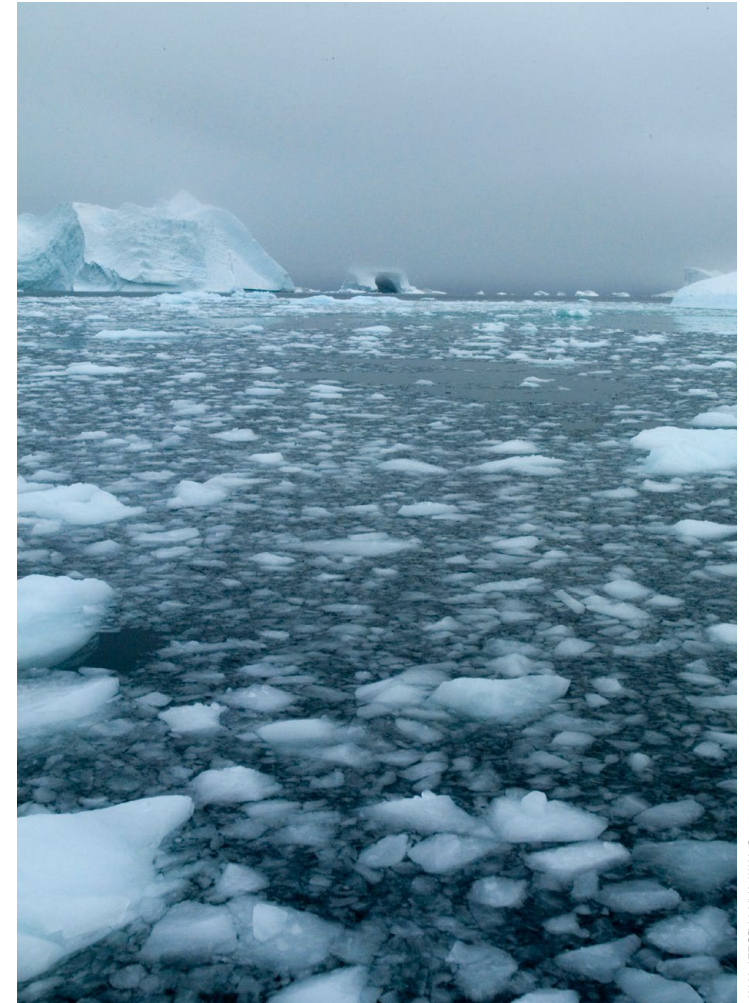


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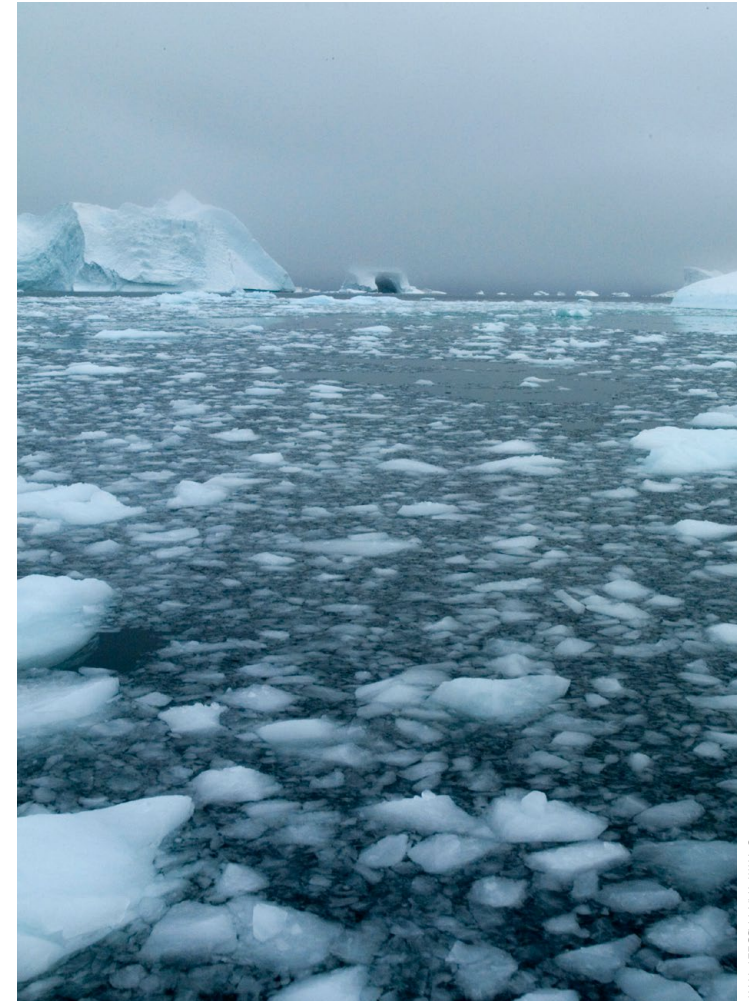
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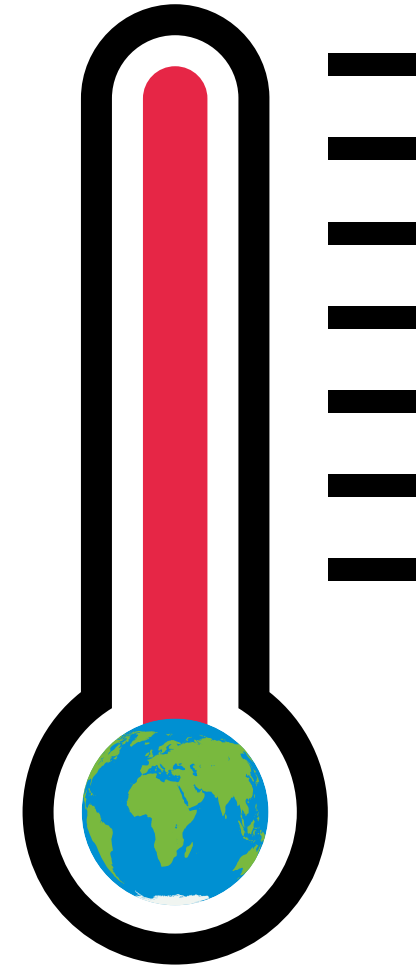
- sea level rises
- retreat of Arctic sea ice
- shifts in rainfall patterns consistent with those expected in a warming world
- increases in atmospheric humidity in the lower atmosphere
- increases in the number of incidences of extreme weather, such as heavy rainstorms and heatwaves.



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# MEASURING CLIMATE CHANGE

All of these different measurements have helped to provide evidence that the Earth's climate is warming.



# BE A CLIMATE CHANGE EXPLORER

In groups, you will be investigating the evidence for climate change from the Ice Age to the present day. Use the resources provided to explore extreme weather, changing sea levels, and how different parts of the world are impacted by these changes.



# CLIMATE CHANGE AFFECTS US ALL



**CLICK TO PLAY**

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