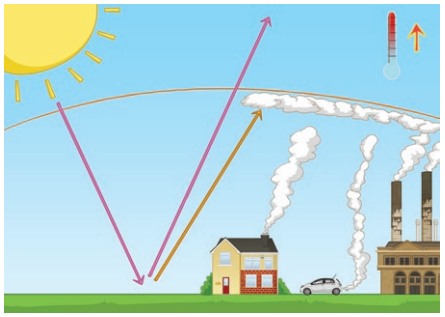
The Challenge of Natural Hazards **Climate Change**

- Natural hazards pose major risks to people and property.
- Natural hazards are natural processes which cause damage, injury and death.
- Meteorology hazards are caused by the weather and climate.
- Different factors affect hazard risk including the severity of the natural hazard, the ability of a place to cope with the hazard and the likelihood that a hazard will occur.

Climate Change

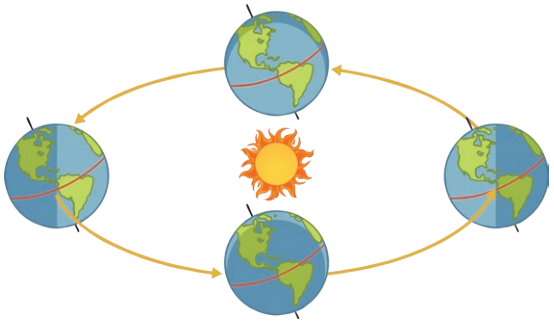
- Significant change in the Earth's climate over time is called climate change.
- The quaternary period (the last 2.6 million years) has seen many cold (glacial) periods and warmer (inter-glacial) periods.
- The last glacial period was 15 000 years ago and since then Earth's climate has been warming up.



Possible Causes of Climate Change

Natural Causes

- Volcanic activity – volcanic ash can block out/reflect the Sun's rays and cause the Earth to cool down (e.g. 1991 Mount Pinatubo eruption).
- Solar output – the Sun's solar output varies. Some scientists believe this might affect global climate.
- Orbital variation – the way the Earth orbits the Sun varies over time. This may have caused global climate change.



Human Activities

Many scientists believe an enhanced greenhouse effect is responsible for global warming. They believe that various human activities have caused this including:

- Burning fossil fuels (coal, oil, gas) – this releases CO_2 (a greenhouse gas).
- Farming – cattle and flooding rice paddy fields emit methane (a greenhouse gas).
- Deforestation – chopping down trees mean that they cannot absorb CO_2. Burning trees also releases more CO_2.

Evidence of Climate Change

Tree Rings

- Tree rings provide evidence of climate change for the last 10 000 years.
- Each year trees grow a new ring. During warm periods the ring is thicker.
- A thin tree ring represents poor growing conditions.

Glaciers

- Glaciers can indicate climate change over millions of years.
- Moraines mark the extent of ice sheets during glacial periods. Materials in these moraines can be dated.
- Data from satellites reveal that since 2009 the land ice sheets in Greenland and Antarctica have seen an acceleration of ice mass loss.

Pollen Analysis

- The 'shell' of pollen resists decay.
- The type of pollen found in different layers of sediment show variations in plant communities which could indicate what the climate was like when the sediment was deposited.

Ice Cores

- Scientists can take cores from ice sheets.
- Each year a new layer of ice builds up.
- The gases trapped in different layers of ice can be analysed. They can reveal what the temperatures were when the ice was formed.

Keywords

adaptation, climate change, mitigation, orbital changes, Quaternary period

Effects of Climate Change

Effects on the Environment

- Melting glaciers and ice sheets could cause sea levels to rise.
- Melting sea ice is reducing polar habitats.
- Flooding of low-lying areas as a result of sea-levels rising. This could lead to species extinction due to habitat loss, e.g. the natural habitat of the tiger (mangrove forests of India and Bangladesh) are at risk of flooding.
- Precipitation patterns are changing which will affect crop yields.
- Increased temperatures could lead to species extinction, e.g. the orange-spotted filefish (which lives off the Japanese coast) faces extinction.
- Increased sea temperatures cause coral bleaching, destroying their habitat.

Effects on People

- More extreme weather, e.g. the 2017 hurricane season.
- Reduced crop yields could cause an increase in malnutrition and death.
- Melting ice could lead to the flooding of low lying areas.
- Migration and overcrowding due to loss of land.
- Increased heat could cause death.
- New diseases/migration of diseases to new areas, e.g. Anopheles mosquitoes could move further into temperate latitudes, increasing the incidence of malaria.
- Water shortages could lead to political tensions, especially between countries competing for water.

Managing Climate Change

Mitigation Strategies (Reduce the Causes of Climate Change)

- Alternative energy production – using renewable energy instead of fossil fuels.
- Carbon capture – Carbon Capture and Storage (CCS) traps, transports and stores CO_2.
- Planting trees – increases the amount of CO_2 absorbed form the atmosphere.
- International agreements – the Kyoto Agreement was signed by most countries in the world. They agreed to monitor and reduce greenhouse gas emissions.

Adaptation (Responding to Change)

- Change agricultural systems – plant different crops/use biotechnology to ensure crop success, e.g. grapes can now be grown in Southern England.
- Managing water supply – water meters could discourage wasting water. Also, rainwater can be collected and used.