Most climatologists believe that human activities are now elevating the natural greenhouse effect by increasing concentrations of carbon dioxide from the burning of fossil fuels and changes in land use.

Greenhouse gases, such as carbon dioxide, act like a blanket, trapping heat in the earth's atmosphere and therefore increasing the temperature. Observations of global average temperatures dating back to 1861 indicate a clear warming trend. In particular, since 1975, they show a sustained rise over the past three decades.

Significantly, the worldleading Hadley Centre for Climate Change – part of the Met Office – which carries out climate research for the Government, has found that the observed warming trend can be matched only by including human-made factors.

Using sophisticated climate models run on some of the most powerful supercomputers, Met Office research can also provide vital information on how the future climate will look.

In the UK's case, climate will become:

- Warmer, with high summer temperatures becoming more frequent.
- Winters will become wetter and summers may become drier.
- Snowfall amounts will decrease.
- Intense rainfall events will become more frequent in the winter.
- Sea levels will continue to rise, with extreme rises occurring more frequently.

Ecosystems will need to adapt to the warming climate, and this in turn will lead to an overall environmental response to climate change. Some climate change impacts will be beneficial, some detrimental.

The interplay within and between the adapting ecosystems is highly complex. For example, the UK's forest and woodland may benefit from a longer growing season, but the reduced winter mortality of pests and increasing chances of alien pests will be detrimental to trees.

The impacts are not always obvious. Despite frost becoming less frequent due to the warming climate, leaves will appear on trees earlier in the year, increasing their chance of frost damage.

Although snowfall amounts are predicted to decrease, when it does snow in the warmer climate the snow will be wetter and so heavier, leading to more snow damage.

Tree species that populate our woodlands and forests today are a product of our current climate, and there are some important ancient woodlands that are already close to their climate limits; so current species may be threatened.

In a similar way, Scottish peatlands may not respond rapidly enough to the warming climate, leading to a northward march of their southern boundaries, perhaps quicker than the northern boundaries can expand. Afforestation operations will also put this peatland under threat as forest managers try to adapt to the changing climate. Slowly, but perhaps inevitably, this will lead to a change in land use and so to a changing landscape. This very change in land usage will also impact on the climate. Again, the interactions are complex.

Peatland areas act as a carbon store. As they shrink it will lead to a net increase in carbon being released to the atmosphere, thus adding to global warming.

The effect of climate change on our coastline is also becoming an increasing concern to many. Global sea levels are predicted to rise mainly due to the thermal expansion of the oceans – as water heats up, it expands. This longterm rise in sea levels will threaten low-lying areas of the UK, but it is the effect of storm surges that will have the biggest impact.

Storm surges are caused by low atmospheric pressure and strong winds, and lead to a temporary rise in sea level above that of the normal astronomical tide. When surges occur at the same time as high tide they can lead to devastating coastal flooding. In a stormier future climate these extreme sea-level events will become more frequent. In north-eastern England such extreme floods that currently happen about every 100 years are predicted to occur on average every seven years by the 2080s.

Met Office research in collaboration with the Proudman Oceanic Laboratory shows North Sea storm surges could be around one metre higher in the southern North Sea and Thames estuary by the 2080s, putting London's transport infrastructure and industry at risk.

It is not just the UK's coastline that will see increased risk of flooding.

Reductions in the transfer of water to the atmosphere by plants and trees, caused by increasing carbon dioxide, and more frequent heavy winter rainfall will impact on the water cycle.

This may lead to higher peak water flows through Britain's rivers perhaps beyond the current capacity of flood defences.

A warmer climate will lead to new opportunities for crop growers. Olive trees may prosper in southern counties of England, and south-facing slopes may be populated by vineyards, thus changing the agricultural landscape.

Rising temperatures will increase demand for crop irrigation at a time of dwindling water supplies, leading to conflicts in water resource management.

The natural environment has always adapted to naturally occurring climate change, but human activity may have accelerated climate change to such a rate that the environment may struggle to keep up. This situation will become more apparent over the remainder of the current century and will bring about changes to the UK's landscape. It will lead to fundamental changes in the way we manage, develop and interact with our surroundings.