Why are "Climate Change" and "Global Warming" not the same thing?

Number 8/7

Fact Sheet

Climate Change

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Some definitions

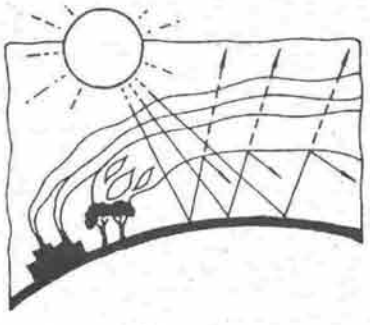
People often confuse "climate change", "global warming" and "the enhanced greenhouse effect" as the same. They are not the same thing! Why?

- **climate change** is related to **energy**.
- **global warming** is related to **temperature**.
- the **enhanced greenhouse effect** is related to **energy and temperature**, and the GHGs play a vital role in the balance between incoming and outgoing energy and ozone depletion.

Recent scientific debate centres on whether the climate is changing in response to GHG emissions or not, and failure of climate models to predict warming has often lead to scientists saying there is really no problem! The issue not now whether or not climate change is a problem, but rather how climate change will develop, what will its effects be and how these effects are best detected.

The role of GHGs

Man-made GHGs emissions disturb the earth's energy equilibrium and climate must adjust to absorb the extra energy trapped by man-made GHGs. Doubling concentrations of long-life GHGs would reduce the rate of energy earth released back to space by about 2%. If taken over the entire earth surface, the imbalance between incoming and outgoing energy equals about three million tons of oil burnt every minute.



Climate change

There is a strong link between infra-red radiation and temperature, and this suggests that the lower atmosphere will probably be warmer. However, this is not the only possible change nor the most important one, as radiation is not the only way energy is transported the lower atmosphere.

There is also a complex web of interacting processes such as convection, evaporation, cloud formation and rainfall that control surface temperatures and maintain the energy balance. Unlike radiation, the response of these processes to GHG emissions is very difficult to predict.

Global warming

Global warming is a symptom of climate change and not the problem in itself. It is important not to confuse the "symptom" with the "disease".

The fundamental problem is that human activity is affecting the energy balance by changing the way the atmosphere absorbs and emits energy. Effects of this change include sea level rise and changes in rainfall and soil moisture which may take place well before there is detectable warming in the atmosphere.

Enhanced greenhouse effect

With the enhanced greenhouse effect the energy source of the climate system is altered, and some factor(s) must change to absorb the "shock". Climate models show that the most significant change will be global warming. If a scientist argues that the warming is not as large or fast as models predict it is not a suggestion that the problem of climate change should be ignored.

Rather, this symptom, global average temperature, may be unreliable compared with what we know already as the air's radiative properties are changing and climatic effects of this change are profound.

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