

IL006 Challenges of Climate Change

Seminar 2

Getting to grips with the science

Please mull over the following questions. We will discuss (hopefully, most of) them in the seminar.

1. A global warming advocate tells you that the Earth is now warmer than it has ever been. Is that correct?
2. Two people argue about why Venus is so much warmer than the Earth. The first argues that it's because Venus is closer to the Sun, so it absorbs more solar energy. The second argues that it's because Venus has a thick, greenhouse-gas-rich atmosphere. Which person is right, and why is the other one wrong?
3. A letter to the editor of the *Austin-American-Statesman*, published on December 23, 2009, asks this question: "The trillion-dollar question that Copenhagen has not answered [is this]: Because carbon dioxide molecules are all identical, why is it that carbon dioxide from carbonated beverages, pets, cattle, farm animals, and humans, dry ice, fireplaces, charcoal grills, campfires, wildfires, alcohol and ethanol is good, and carbon dioxide from fossil fuel is bad? Can anyone in the United States answer this question?". What's your answer?
4. Your aunt asks you how we know that humans are responsible for the increase in atmospheric CO₂. Couldn't it be due to volcanoes? Or could it be coming from plants? What do you tell her?
5. Explain why water-vapour changes are considered a feedback and not a forcing.
6. Critique this statement: "It is clear that it was warmer around 1000 AD, during the Medieval Warm Period, than it is today. Therefore, humans cannot be causing today's warming." Assuming that the claim that the Medieval Warm Period is warmer than today is correct (it may be, but it's debatable), explain whether this argument is correct.
7. Given fixed n (number of layers) and α (albedo), how does the temperature of a planet vary with r , the distance between the planet and the star?
8. Assume that the Earth has warmed by 5°C since the last ice age, and the change in radiative forcing over that time was +6.7 W/m². On this basis, calculate the climate sensitivity.
9. Watch this interview with Johnny Ball, a leading climate change sceptic:
<https://youtu.be/qfnlJ6j02mw>.
What do you agree with? What do you disagree with?