

FACTS ON CLIMATE CHANGE - ASSOC. PROF JEANETTE LINDSAY

Assoc. Professor Jeanette Lindsay brought some facts to a debate that has been characterised by heat and partisanship.

She opened by pointing out that we live in a closed finite system - there is no planet B. Humans are influencing the planet through industrial processes, which produce pollution, change the landscape and impact the biosphere.

The sun's heat impacts the earth through solar radiation and as we clear the landscape we effect its reflectivity.

We do need a greenhouse effect but we are increasing it to too high a level. The amount of CO₂ in the atmosphere has been continually increasing since measurement began in the 1950's. (During geological periods CO₂ has usually peaked about 280 parts per million.- it is now 393) And the overall temperature trend has been up since the late 1800's. Solar variability was partly responsible for the rise in temperatures in the early 20th Cent. but has had nothing to do with the increase since the 1970's. These increased temperatures are not distributed evenly across the planet. Many factors can lead to variability. Even the amount of rain can be a factor in determining temperature. Still, allowing for these underlying temperatures are increasing and we seeing greater extremes in variability. Oceans, which have an enormous capacity to absorb heat, are warming because they are increasingly trapping heat. But there is also variability in the absorption of heat amongst the oceans.

It is more complicated to detect a distinct trend in rainfall, or at least to explain it. In Australia it is becoming drier in the south east, wetter in the north west, drier in the south east; but it is not sure what is driving change in the north east. How unusual are the current conditions? A thousand years ago it was warmer in the northern hemisphere before declining into a little ice age. But by the year 2000 it was outside this range of variability.

Greenhouse gas concentrations remained pretty constant until about the year 1800 after which they increased rapidly up to 393 parts per million at present. Comparisons with the geological past (the last 400,000 years) when the warmer periods and colder periods were caused by changes in the earth's orbit around the sun show CO₂ concentrations did not rise above 300 during this period in the inter glacial periods.

Future Climate Scenarios Extrapolating the increases of the last 20 years to 2050, CO₂ levels would rise to 450 parts per million. This won't translate into immediate temperature change as there is a time lag. However with an increase in temperature of 2 degrees there is the likelihood of extended heatwaves.

The climate models look at low, medium and high emissions scenarios. Looking at 2025 and 2095, there will be no change to 2025 because what we have already done will determine what will happen then. But after that date what we

do now will impact the outcomes at the end of this century. High emissions could cause rises of 4 to 5 degrees by the end of the century.

For Australia, with high emissions through 2030, 2050 and 2070, there will be an increase of about 3 degrees which will effect where flora and fauna will be able to exist.

Sea levels would rise by 1.2 metres world wide which would cause widespread inundation.

The concern about a rise of 2 degrees in temperature is because science at the moment is not sure where the tipping points are and are not sure of the impact on the El Nino and La Nina weather patterns. The mineral supply which keeps the Amazon rainforest healthy blows across from North Africa. It is possible that this pattern could be affected by global warming.

The earth's elliptical orbit around the sun is not always totally regular as the sun can be off to one side of the ellipsis. And the tilt of the earth varies by up to 1 degree. These effect the amount of solar energy reaching the earth. When more solar radiation reaches the earth, temperature rises.

When ice is removed from the continents, they rise on the magna underneath which since 1850 has caused an increase in temperature of eight tenths of a degree.