

**Report of August Meeting 2013
Royal Society of NSW
Southern Highlands Branch**

Climate Science Forum

Speakers:

Dr Michael Raupach, CSIRO Fellow; CSIRO Marine and
Atmospheric Research

Mr William Kininmonth, previously head of the National
Climate Centre

Moderator:

Dr Ken McCracken, foundation Director of the CSIRO
Office of Space Science and Applications

Topic:

**What are the main factors that affect global
temperature, and how do we know
how much is contributed by
each?**

**How reliable are the forecasts of global
warming?**

Presentations and Discussion:

Both speakers gave informative and detailed initial presentations.

Michael Raupach explained how the earth's climate has changed over the last century and a half, with the global average surface temperature increasing by about 0.8 deg C, and that it is very likely that greenhouse gas emissions (chiefly CO₂) from human activities are the main cause. He went on to explain the scientific basis for this statement, and gave specific figures for the contribution made by various man-made and natural factors. He explained also that although many of the climate mechanisms were well understood, nevertheless climate and climate models were highly complex, and there were still some uncertainties. In particular, he noted that the sensitivity of the

climate to CO₂ forcing was estimated at between 1.5 and 4.5 deg C per doubling of atmospheric CO₂ concentration. He warned that this rather large uncertainty could work in both directions, ie. that future climate change could be more modest or more severe.

William Kininmonth agreed that CO₂ did contribute to global warming, but went on to explain that the climate models did not make adequate allowance for the acceleration of the hydrological cycle with rising temperature, and hence that the models underestimate surface evaporation and overestimate the climate sensitivity to CO₂. He estimated that with proper allowance for the rate of evaporation, the climate sensitivity to CO₂ would be around 0.7 deg C per doubling of atmospheric CO₂ concentration. He also explained that the global climate is sensitive to ocean circulations, which are inadequately represented in the models. He then demonstrated how variations in tropical ocean circulation account for much of the recent global air temperature variations, and suggested that the recent rising temperature trend may in fact be just a multi-decadal oscillation.

There were then a number of questions, both from the audience and from questions that had been submitted, as requested, in advance of the forum. Some included figures from published papers, this adding greatly to the content and impact of the subsequent answers. Both speakers gave detailed answers, with some points of agreement and some points of disagreement. Both speakers are to be congratulated for a highly informative evening, and – in what is such a politically sensitive subject - for sticking rigorously to the actual science of climate.

Attendance was 73. A number of attendees expressed their appreciation for the high quality of the speakers and of their presentations. There were also requests for the speakers' presentation material to be made available. ***Both speakers agreed to this, and the material will be published on the branch website when it is received.***

Mike Jonas