

Q&A: CO₂-climate change link strengthens

Argus recently interviewed Reto Knutti, a professor at the Swiss Federal Institute of Technology in Zurich and a lead author of the Intergovernmental Panel on Climate Change's fifth assessment report (AR5). He spoke about the latest climate science findings, before the working group 1's contribution to the AR5 is released on 27 September. Edited highlights follow:

Has further scientific evidence emerged of climate change since the last Intergovernmental Panel on Climate Change (IPCC) report in 2007?

Yes, there is much more evidence of climate change. Even though warming has been less pronounced over the past decade, the last decade has been the warmest ever. So the long-term trend is certainly still positive. The sea level has increased, permafrost is thawing, extreme weather has increased in some instances, but not in others. Heat waves and hot days have increased. Cold weather has become less frequent. There have been more heavy precipitation events. But extreme events by definition are rare, so it is difficult to establish a trend.

Has evidence of the link between rising man-made greenhouse gases (GHG) and global warming grown stronger?

Yes, that observed link has got stronger. Our understanding of the physics and the scientific models have also improved, so we are more confident that most of the observed warming is due to greenhouse gasses.

How much stronger has the evidence become?

The question is how certain do you need to be? In 2007, the report concluded that most of the warming is very likely man made, which implied a 90pc probability. So do you really need more? If the risk is high, then maybe even a 50pc chance of something dangerous happening may be a problem. The evidence is overwhelming that fossil fuel is to blame.

But global warming has slowed over the past decade despite rising CO₂ emissions?

That is correct. It is quite clear that the surface warming in the last decade has been less pronounced. That has often been misinterpreted that climate change is not happening.

What could cause this slowdown in global warming?

First of all, surface temperature is only one component. Ocean heat content, sea level and Arctic sea ice have all continued to show changes. Secondly, we would not expect temperatures to go up every year, simply because of natural, short-term variations, such as in the Pacific. Then there are other influences. The deep ocean has been taking up a lot of heat in recent

years. There are changes in other gases, such as aerosols and black carbon [soot]. The sun has weakened over the last decade or so. In the long term, CO₂ is the main driver of the warming. But in the short term, there are natural fluctuations that should not be over-interpreted.

How likely is it that the earth's climate may not be as sensitive to CO₂ emissions as previously expected?

This is a possibility. It could be that temperatures are just not as sensitive as we thought, so the warming will not be as fast. But then other studies suggest that it may be more pronounced. So we do not know. But we do know that it is not going to be zero. Our estimate is that warming might be 10-20pc lower than predicted by scientific models. So it is not a question of if something will happen, but when. It simply means that we have a decade or two more to make our transition to an almost CO₂-free economy. But this time we have already lost by climate negotiations in the past 20 years not getting anywhere.

'Currently the dominant drivers in these discussions are political and economic concerns rather than long-term climate change'

How successful have attempts been to make climate forecasts more regionally specific?

Previous climate forecasts targeted the end of the 21st century. But policy decisions regarding infrastructure usually consider the next 10, perhaps 30-40 years. The other thing is that people want to know what is going to happen here, in one particular place. So it is logical to make predictions more local and more short term. But it is also scientifically harder. The smaller the scale, the more the local influences that need monitoring — and the component of natural variability gets large. So globally and in the long term, the slow CO₂-dominated temperature increase is obvious. But on a smaller scale, natural weather fluctuations are much larger and these are basically inherently unpredictable.

What do the latest climate science findings indicate about the future?

We do not need any further evidence that we need to reduce emissions. If we decide we want to avoid climate change and limit warming to 2°C, then the case for mitigation is very clear. But the 2°C target is partly based on value judgements, not physical arguments. If you look at policy discussions and climate negotiations, I am not sure governments and our society actually want to address the problem. We have in the past had the naive view that if you establish the scientific evidence that climate change is real and man made, then that will inevitably lead to action. But currently the dominant drivers in these discussions are political and economic concerns rather than long-term climate change.