

Editorial | Climate change – Facts, Uncertainties and Myths

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Clemenceau, the prime minister of France in the final stages of World War I, is reported to have said, “War is much too serious a thing to be left to the military”. Along these lines, one might say that “Climate change is much too serious to be left to climate scientists”. The point being that the views of technical specialists may be very important when a nation’s future is at stake, but that a purely technical perspective is too limited to decide on the best course of action. Leaving the issue of climate change, or war for that matter, solely to politicians is not wise either. Far too much is at stake for humanity as a whole to either accept uncritically or, alternatively, reject out-of-hand the doomsday message in Al Gore’s *An inconvenient truth*. This movie presents a dramatic view of the potential impact of climate change on our environment and hence human society. One of the risks Al Gore highlights is the risk of low-lying coastal regions such as the Netherlands being flooded if global warming causes the polar ice caps to melt. A key issue for the Dutch nation is, therefore, how to respond to global warming and rising sea levels. Should we respond by reducing our greenhouse-gas emissions to mitigate global warming or, alternatively, by raising the heights of our dikes to withstand a possible sea-level rise, or should we do both? If we opt to raise the dikes, a key question will be by how much and what assumptions should we use to substantiate our calculations. If we opt to reduce our CO₂ emissions in order to slow down global warming, we explicitly accept that the climate change observed is, beyond reasonable doubt, attributable to the burning of fossil fuels and that reducing our emissions will be effective within a reasonable time frame. In both cases, we need to understand the underlying scientific theories if we are to take a sensible decision.

Whilst I believe that Al Gore rightly received the Nobel Prize for successfully putting climate change high on the political agenda, his movie contains many scientifically questionable statements. Action plans to mitigate the effects of climate change need, however, to be based on sound science as any plan based on flawed assumptions is unlikely to achieve its objectives. This is where the KNGMG (Royal Geological and Mining Society of the Netherlands) comes into the picture. As a professional society, the KNGMG can play a role in the scientific and public debates about climate change and global warming. As geologists we can add a unique perspective to this debate: the perspective of geological time. Whereas directly measured climate records cover a period of a few hundred years at best, the geological records of past climates cover thousands to many millions of years. Understanding what happened in the geological past can help us to predict future climates.

KNGMG is organising the ‘Climate Change: Facts, Uncertainties and Myths’ conference, which has been timed to fit in with the International Year of Planet Earth, in cooperation with the Royal Institute of Engineers (KIVI) and the Royal Geographical Society of the Netherlands (KNAG).

The conference programme brings together contributions by astronomers, biologists, climatologists, geologists, geophysicists, meteorologists, physicists and, last but not least, philosophers. In *Climate change – Facts and uncertainties* (Komen, 2008) Gerbrand Komen summarises our current scientific understanding of climate change, including an overview of robust scientific findings and some as yet major uncertainties. In *CO₂ and temperature through geological time: what does the geological record tell us about forcing processes* (Sluijs & Brinkhuis, 2008) Appy Sluijs takes us back 55.5 million years to the Paleocene-Eocene Thermal Maximum (PETM), which was a geologically brief (170,000 years) episode of globally elevated temperatures. This PETM event may serve as a possible analogue for a run-away greenhouse climate. In *Climate change during the Holocene period: main driving forces and uncertainties* Jürg Beer discusses the geologically recent past. Although the Holocene lasted only 10,000 years it should be realised that the instrumental climate records cover only the last 200 years of this period. In *The sun as a climate-change engine: process, evidence and uncertainties* (De Jager, 2008) Kees de Jager discusses the impact of the Sun’s highly variable magnetic field on the climate on Earth. One of the phenomena he discusses is sunspot activity. From that perspective, the recent global warming is not exceptional. In *Effects of ice-melt induced gravity changes and solid earth deformation in the Netherlands* (Vermeersen, 2008) Bert Vermeersen looks into the effects of sea-level rise that would be experienced in the Netherlands following a melting of the Greenland or Antarctic ice caps. Changes in the gravity field caused by an ice cap melting can be as important a control on local sea-level rise as the mass of ice that has actually melted. In *Detecting anthropogenic effects in the observational evidence of climate change* (Von Storch, 2008) Hans von Storch stresses the need for scientific precision in our reasoning when we consider climate change. Detecting climate change is one thing, reliably establishing its cause is another! In *The practice of climate simulation and its social and political context* (Petersen, 2008) Arthur Petersen discusses the view that all

climate models relied on by scientists to analyse climate change are inherent simplifications of reality, while the modelling approaches used by climate modellers are inevitably driven by their individual perspectives of what is important. His conclusion is that climate modellers must be clear and open about their assumptions. Last but not least, the conference includes the inaugural address of Nanne Weber, Professor of Climate Modelling and Analysis at the Faculty of Geosciences of Utrecht University (Weber, 2008). In this inaugural lecture, which was translated specifically for inclusion in these proceedings, she presents an expert's *tour de horizon* on the topic of climate change.

As guest editor it has been my pleasure to have a preview of the papers submitted by the conference speakers. I should like to take this opportunity to thank the authors and also the reviewers of the various papers for delivering their contributions under pretty tight deadlines and for being patient with me.

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Guest Editor

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