



## Climate change is happening, we must act now

### Climate change and the oceans: scenarios for the future

Day 3 Marseille: Wednesday 22nd October 2008

**Moderator :** **Dominique Leglu**, Editor-in-Chief of France's Sciences et Avenir magazine

**Speakers :** **Veerabhadran Ramanathan**, Distinguished Professor of Climate and Atmospheric Sciences, Scripps Institution of Oceanography, USA.

**Richard Sempéré**, Research Director, CNRS (Centre National de la recherche Scientifique) and Head of the Centre d'Océanologie de Marseille, Laboratoire de Microbiologie, Géochimie et Ecologie Marines, France.

**Cindy Tuck**, Undersecretary for Environmental Protection, State of California, USA

"The level of the seas is the best indicator we have of climate change," stated Moderator Dominique Leglu, Editor-in-Chief of France's Sciences et Avenir magazine as she set the tone by explaining just how important a role the oceans play in regulating the earth's weather systems.

Leglu also read out a message from Aqqaluk Lynge, President of the Inuit Circumpolar Council, who had been scheduled to speak but could not attend. "Indigenous peoples are the most vulnerable in the world and live in the most vulnerable places where climate change is most dramatic," his message said.

It was then the turn of Veerabhadran Ramanathan, Distinguished Professor of Climate and Atmospheric Sciences at Scripps Institution of Oceanography in USA to explain just how bad things already were. "We have already put enough greenhouse gases into the atmosphere to heat up the planet by two and a half degrees Celsius," he explained. For the moment, global temperatures have not risen by that much because dust, dirt, smog and other particulate emissions in the atmosphere are casting a shadow over the earth and keeping temperatures down.

But if, as we need to, we improve air quality then existing greenhouse gases could trigger what he called "iconic events". These could include the melting of the Arctic ice cap or the Himalayan glaciers of the Hindu Kush, which are the sources of some of the world's biggest rivers.

Richard Sempéré, Research Director of France's CNRS (Centre National de la Recherche Scientifique) and Head of the Centre d'Océanologie de Marseille, Laboratoire de Microbiologie, Géochimie et Ecologie Marines, explained that rising global temperatures could have a serious effect on marine life. The main change would come in the upper levels of the ocean, he said. At present, most marine life



exists in a band of water that extends down for 100 metres or so from the surface. If the planet warms up, this zone could expand and remain warm for longer periods of time.

"We can expect to see a modification of the structure of species living in the ocean," he explained, adding that this could seriously alter the complex food chains and biodiversity systems that govern life in our seas.

Cindy Tuck, Undersecretary for Environmental Protection for the State of California in the USA attempted to explain that while the US is often criticized for not taking climate change seriously at a federal level, in her state – the most populous in the country – things were very different. Despite being a member of the same political party as US President George W. Bush, California Governor Arnold Schwarzenegger has introduced tough new environmental rules in the state, she explained. These included a binding commitment to reduce the state's greenhouse gas emissions to 1990 levels by 2020. California was also planning to introduce an emissions trading scheme that would oblige companies to progressively reduce their emissions, she added. "What this shows is that when it comes to issues like climate change, one person really can make a difference," she said. "Of course it helps when that person is called Arnold Schwarzenegger."

The debate touched on the issue of climate change skeptics, who argue that there is no clear proof of global warming. Ramanathan welcomed all serious scientific contributions to the debate and quickly dismissed such arguments. "We know that atmospheric CO<sub>2</sub> concentrations were around 270 parts per million in the 1880s. Today they are around 385 parts per million," he said. Similar rises had been recorded for the less well-known but far more damaging greenhouse gases methane and nitrogen oxides (NO<sub>x</sub>). NO<sub>x</sub> is around 300 times more dangerous than CO<sub>2</sub>, for example. Average temperatures had also risen far more quickly than ever recorded during the past 100 years, he added.

"Nothing would give me greater pleasure than to see our models proved wrong, because that would be good news for the planet. But what we are actually seeing tends to correspond with the worse case options of the models," Ramanathan said.

Sempéré also sought to pour cold water on the claims of the climate change skeptics. "Don't forget that around 95 percent of the global scientific community is now saying broadly the same things as Professor Ramanathan," he said.

And when it came to the specific question of the seas, Sempéré also had depressing news. "Even if we stabilized greenhouse gas emissions, we would not stop the atmosphere and the sea from continuing to heat up. The machine has been started and it is running out of control," he said.

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