



Supported by



In conjunction with



Climate, the 360° exhibition News – issues – artists' views

13 october 2015 > 20 march 2016

To coincide with the *United Nations Climate Change Conference* in Paris between 30 November and 11 December 2015, **Climate, the 360° exhibition**, takes a closer look at the issues raised by the increase in greenhouse gas emissions produced by human activity. It is based on a two-sided approach: scientific and journalistic on the one hand, and an artistic view on the other hand.



The melting of Greenland's ice sheet. © Kadir van Lohuizen / NOOR

This science news exhibition:

- > takes a document-based approach, providing visitors with landmarks;
- > engages scientists and members of civil society in debates on current issues;
- > provides access to the latest news and data flows on the geopolitical, economic, energy, environmental, technological and scientific aspects of climate change;
- > takes an in-depth look at the United Nations Climate Change Conference through role-play

sessions organised by 14 secondary school students from the Île-de-France region who will explore the challenges and mechanisms of the current round of negotiations;

> fosters interaction with visitors via an audio-visual device which collects their opinions on civic and practical issues raised by climate change.

Several original works will be featured in the art-centred display:

- > the winners of a competition launched by the Cité des sciences et de l'industrie on the theme of "The day Earth and its inhabitants solved the climate challenge" provide a forward-looking and imaginative vision of a changing world;
- > works by photographer Kadir van Lohuizen exploring the impact of rising sea levels on mankind, on display here in a large-scale format for the first time. Van Lohuizen has reported from every continent in the world with the support of the United Nations Environment Programme.



Panorama of the Science Actualités exhibition space (600 sq.m.), the venue for *Climate, the 360°* exhibition at the centre of the exhibition areas at the Cité des sciences © Olivier Boulanger

For travelling exhibitions, the content is available as downloadable files in French and English:

- > all graphic panels featured in the exhibition;
- > quiz, videos and audio files for interactive terminals; an app to display real-time climate monitoring indicators on a screen;
- > an animated film on climate change data to project onto a giant screen (data visualisation, in coproduction with Mundaneum de Mons);
- > filmed discussions between scientists and experts, for screening on terminals;
- > a panoramic film (projected onto three screens) by photographer Kadir van Lohuizen exploring “the impact of rising sea levels on mankind”;
- > audio-visual docudrama role-play on the 21st Climate Change Conference (COP21) by secondary school students for interactive terminals;
- > “The islands of the future” interactive game (for interactive terminals) about energy self-sufficiency on an island managed by visitors, and a comparison with five real islands around the world (coproduction with Arte, Seppia, Pictanovo);
- > one leaflet handed out to visitors: full exhibition texts.



Science images, news-in-brief and real-time climate change counters. The news wall in the Science Actualités section is dedicated to climate change news. © Olivier Boulanger



Text panels, photos, computer graphics, audio and video content, quizzes: the science presentation is displayed on rails. © Olivier Boulanger

Exhibition-related material

At the Cité des sciences et de l'industrie

- Displays in the *Solar Impulse* exhibition
- Reproduction of work on climate change by resident architects
 - “Cities and climate change” (facilitation for individuals and groups)
- A digital granular (sand pit) installation to address climatology
- Documentary resources on climate change in the Library

At the Palais de la découverte

- Presentation of part of the contents of *Climate, the 360°* exhibition

On the Internet

- Online version of the *Climate, the 360°* exhibition on cite-sciences.fr
- Broadcasting of 21 interviews in full with scientists and experts on universcience.tv

The exhibition's scientific focus



Bangladesh © Kadir van Lohuizen/NOOR



Island in the Kiribati archipelago (Pacific) © Kadir van Lohuizen/NOOR

Inauguration: 13 October 2015, for a period of five months (>20 march 2016)

To coincide with the United Nations Climate Change Conference in Paris between 30 November and 11 December 2015, *Climate, the 360°* exhibition takes a closer look at the issues raised by the increase in greenhouse gas emissions produced by human activity. Moreover this exhibition will allow a better understanding of the climatic system through the latest observations, stimulations and scientific research.

I - Diagnosis of warming and its initial consequences

Meteorological stations, tide gauges, floats drifting in the oceans and satellites are all used to monitor changes in the Earth's climate... and show us that the Earth is warming. This warming is already having observable consequences – for instance, the melting of the Arctic ice pack and the retreat of most continental glaciers. Is this something new in our planet's history? To answer that question, climatologists are examining all natural climate records in the environment: ice cores, cores of marine and lake sediments, rings in tree wood, coral reefs, grains of pollen and so on. Their conclusion is that different natural factors have increased the temperature of the Earth's climate in the past. It was heavily warmed by a strong greenhouse effect in the Eocene epoch 60 million years ago and then in the Pliocene epoch about 3 million years ago. However, the kind of warming observed over the last thirty years has never happened before in the past 1,500 years, particularly given its global nature and initial impacts.

II - The causes of climate warming and human responsibility

It is a fact that our planet's surface is warming, but why? Many factors influence the Earth's climate. Firstly, the Sun – the driving force behind the climate system – but also volcanic activity and the greenhouse effect. Certain greenhouse gases are naturally present in the atmosphere and trap heat on the Earth's surface, keeping the average temperature at +15°C when it would be -18°C without them. Since the Industrial Revolution, human activity (industry, energy, construction, transport, agriculture, deforestation, etc.) linked to very high population growth has also produced greenhouse gases which have joined those already present in the atmosphere. Despite the arguments of those who call themselves 'climate sceptics', climatologists are virtually 100% certain that human contribution to the greenhouse effect is responsible for most of the global warming observed since 1950.

III - Greenhouse gas emission scenarios and climate change

To understand how the climate system operates and predict future change, climate research centres are working on numerical models produced by computer programmes, which enable the simulation over space and time of 3D atmospheric and oceanic circulation, and all its characteristics (air and water temperature, winds, precipitation, humidity, etc.). Around forty of these models have been developed worldwide, two of them in France. They are still being improved, but they have already revealed the main trends, enabling scientists to reach a conclusion: if emissions of greenhouse gases related to human activities follow the present curve, we can expect warming up to four times faster over this century than in the last, and a rise in sea levels that could reach a metre by 2100, submerging certain regions of the world. Not to mention the destructive effects of more intense extreme weather events and the loss of ecosystems in the sea and on land. Only a drastic reduction of greenhouse gas emissions will enable warming to be limited to 2°C by the end of the century.

IV - Climate change: the world in search of solutions

So what can be done to combat climate change and mitigate or adapt to its impact? Internationally, in Europe and in France, are we really acquiring the means to reduce greenhouse gas emissions? What technological and industrial solutions are being studied? Should financial regulation processes be introduced, such as the very controversial 'carbon tax'? There is talk of energy and agricultural transition all over the world, but what form should it take? How can we avoid penalising developing nations? So many issues must be considered if the governments that participated in the Copenhagen Climate Change Conference sponsored by the UN in 2009 are to achieve their objective: to limit global warming related to human activity to 2°C by 2100 (compared to the pre-industrial level). To do this, at the end of 2015, they must reach a universal agreement on reducing greenhouse gas emissions to follow on when the Kyoto Protocol expires in 2020.

Scientists and experts involved in *Climate, the 360° exhibition* (filmed interviews available at the exhibition):

- Olivier Boucher, CNRS research director, Laboratoire de météorologie dynamique (LMD)
- Christophe Cassou, CERFACS-CNRS climatologist
- Catherine Chabaud, navigator, People's Climate March ambassador
- Wolfgang Cramer, CNRS research director, assistant scientific director of the Mediterranean Institute of Marine and Terrestrial Biodiversity and Ecology IMBE (IMBE, Aix-en-Provence)
- Ronan Dantec, climate spokesperson for the Global network of cities and local and regional governments, Senator for the Loire-Atlantique region
- Jean-Louis Etienne, doctor and explorer specialising in the Arctic and Antarctic
- Emmanuel Garnier, climate historian and teacher/researcher at the CNRS-Université de Caen, member of the Institut universitaire de France, professor of Climate and natural disaster history
- François Gemenne, Political Science researcher, University of Liège and Paris Institute of Political Studies, specialist in policies of adaptation to climate change
- Céline Guivarch, climate change and energy economist, Cired (International Environment and Development Research Centre)
- Nicolas Hulot, special envoy of the President of France for the protection of the planet, chair of the Fondation Nicolas Hulot pour la Nature et l'Homme
- Jean Jouzel, glaciologist and climatologist, vice-chair of the IPCC scientific committee
- Bruno Latour, sociologist and philosopher of sciences, professor at Sciences Po, organiser of the COP21 role-play with students from Sciences Po (post-Copenhagen and pre-Paris)
- Valérie Masson-Delmotte, paleoclimatologist, CEA research director (climate and environmental sciences laboratory, LSCE), scientific adviser to the exhibition
- Alix Mazounie, international policies manager (North-South relations) for the Réseau action climat France
- Hindou Oumarou Ibrahim, Coordinator of the Indigenous Women and Peoples Association of Chad
- Christian de Perthuis, associate professor of economics at the Université Paris-Dauphine, co-director of the Masters programme in energy, finance and carbon, scientific director of the chair for climate economy
- Shyama Ramani, professor at the United Nations university (Maastricht), specialist in economic development in India, founder of the NGO Friend in Need
- Teresa Ribera, director of the IDDRI (Institute for Sustainable Development and International Relations), former secretary of state for the environment in the Spanish government
- Sabrina Speich, professor at the ENS (Paris), department of Geosciences, specialist in oceans
- Achim Steiner, executive director of the UNEP (United Nations Environment Programme)
- Laurence Tubiana, ambassador responsible for climate change negotiations

Climate, the 360° exhibition is a Universcience production, designed and produced by Science Actualités, a team of science journalists from the Cité des sciences et de l'industrie, in partnership with the AJSPI (Association des journalistes scientifiques de la presse d'information).

Scientific adviser: Valérie Masson-Delmotte

Curators: Isabelle Bousquet and Alain Labouze

Contact for travelling exhibitions (International): Caroline Turré (caroline.turre@universcience.fr),

Contact for travelling exhibitions (France): Frédéric Desnoyers (frederic.desnoyers@universcience.fr),

Science Actualités contact: Barbara Vignaux (available content, technical aspects of travelling exhibitions, barbara.vignaux@universcience.fr)