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### End of the fourth International Polar Year

Symposium organized by the Collège de France and OPECST (the French parliamentary committee for the evaluation of scientific and technological choices, Senate and National Assembly (OPECST) 14-15 May 2009

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## END OF THE FOURTH INTERNATIONAL POLAR YEAR

Symposium organized by the Collège de France and OPECST (the French parliamentary committee for the evaluation of scientific and technological choices, Senate and National Assembly (OPECST) 14-15 May 2009



Professor Édouard Bard

The fourth International Polar Year (IPY) officially came to an end on 14 and 15 May 2009 with a symposium organized jointly by the Collège de France and OPECST (the French parliamentary committee for the evaluation of scientific and technological choices). Many scientists and political actors, invited by Professor Édouard Bard and Senator Christian Gaudin, emphasized the success of the IPY, including the creation of at least 200 international multidisciplinary research projects, entirely devoted to the study of the polar regions. The topics of the first day of the symposium, held at the Senate, were “Humans and their environment” and “Governance of the poles”. On the second day, held at the Collège de France, participants discussed the scientific progress resulting from the various projects initiated within the framework of the IPY. This progress concerns the understanding of changes in the physical environment of the polar zones, which are particularly

sensitive to current climate change, as well as their multiple consequences on polar biodiversity.

After an introduction by Pierre Corvol, Administrator of the Collège de France, in which he reminded the audience of his institution’s commitment, Claude Lorius (Chairman of the French Committee of the Academy of Science, for the organization of the fourth IPY) reviewed the history of the IPYs, pointing out the steps that it constituted in the advancement of the understanding of the polar regions. He mentioned his first trip to Antarctica in 1956, on the eve of the third IPY, when the magnetosphere was discovered and permanent observation stations were established there, along with the first continuous measurements of the concentration of carbon dioxide (CO<sub>2</sub>) in the atmosphere. In international politics this event facilitated the signing of the Antarctic Treaty in 1959, thanks to which this continent became a haven of peace devoted to science. Since then, extensive coring in Greenland and Antarctica has enabled scientists to study past and present climate change. The European Project for Ice Coring in Antarctica (EPICA), in which France is one of the main partners, has revealed that over the past 800,000 years, CO<sub>2</sub> concentrations have never been as high as they are now. Édouard Bard pointed out that, in parallel with the recent anthropogenic increase of CO<sub>2</sub>, the average global temperature has risen by 0.5°C since the 1970s, and that this increase has been the steepest in the polar regions. Studies of current, past and future climates show that the Arctic will be the most affected, with temperature increases that are double or even triple than those in the rest of the

world. Polar amplification has major consequences, especially on polar sea ice. As Thomas Stocker (Professor at Berne University and Co-Chairman of Group I of the IPCC, the Intergovernmental Panel on Climate Change) and Jean-Claude Gascard (Director of Research at LOCEAN, a climate and oceanographic laboratory) noted, the polar sea ice forms every winter. In the Arctic region, some of this ice remains frozen even in summer, sometimes for as long as ten years. Recent observations reveal a shrinking of the surface and thickness of this ice, particularly in 2007 and 2008. The Tara, a ship that was caught in Arctic ice, took only one year to reach the North Pole in 2006, whereas the Fram took three years to do a similar journey in 1894. At first “victims” of climate change, the polar regions will become its “actors”, for the disappearance of the polar sea ice triggers a disturbance of radiation levels and thus an amplification of global warming. Recent melting of the Arctic ice has been even faster than the IPCC’s worst forecasts. Another important consequence of polar amplification is a reduction of the mass of the ice cap in Greenland and the Antarctic, as revealed by altimetric and gravimetric satellite observations. Finally, the melting of the permafrost could release large



H.R.H. Prince Albert II of Monaco

quantities of carbon in the form of methane and carbon dioxide, thus exacerbating global warming.

One of the challenges of this IPY is to understand and forecast the amplitude of the polar regions' response to current climate change. Jérôme Chappellaz (Research Director at the LGGE, the Glaciology and Environmental Geophysics Laboratory of Grenoble) pointed out the contribution of the various coring projects in Antarctica and Greenland, and emphasized the need for international cooperation if they were to be successful. The IPY has thus made it possible to set up a project to compare the last two

glacial-interglacial transitions in the northern hemisphere. It has also made it possible to federate all the national spatial agencies that have contributed to the creation of a database of images of Greenland and the Antarctic. As Frederic Rémy (Director of Research at the LEGOS, the Spatial Oceanographic and Geophysics Research Laboratory of Toulouse) has shown, this coordination has led to the production of a snapshot of the polar regions.

Rollon Mouchel-Blaisot, Prefect of the French Terres Australes and Antarctic territory, opened the afternoon devoted to research on global biodiversity and its recent

evolution. Yvon le Maho (Director of Research at the IPHC, the Hubert Curien Multidisciplinary Research Institute in Strasbourg) illustrated the most recent research on marine birds in the polar regions, with particular attention to the penguins of Adélie Land. Françoise Gaill (Director of the CNRS Ecology and Environment Institute) presented an overview of the various research projects undertaken by French teams, especially on marine mammals whose movements are studied from the South Sea Islands to the Antarctic sea ice. Michael Stoddart (Scientific Director of the Australian Antarctic Division) noted that close to 9,000 marine



**Speakers:**

***Humans and its environment***

- Dr Claude Birraux
- Prof Jean-Claude Etienne
- Dr Christian Gaudin
- Dr Catherine Bréchignac
- Dr Michel Jarraud
- Prof Philippe Descola
- Prof Michèle Therrien
- Dr Sylvie Beyries
- Dr Bruno Goffé
- Mr Erik Orsenna
- Dr Jean Malaurie

***Polar politics and diplomacy***

- Mr Michel Rocard
- Dr Jean Jouzel
- Pr Jean-Yves Le Déaut
- Dr Gérard Jugie
- Dr Karl Erb

***Mrs Valérie Pécresse***

***Climate, ice and oceans: short- and long term evolutions***

- Prof Pierre Corvol
- Prof Édouard Bard
- Dr Claude Lorius
- Pr Thomas Stocker
- Dr Jérôme Chappellaz
- Dr Jean-Claude Gascard
- Dr Frédérique Rémy

***Global change and polar biodiversity***

- Mr Rollon Mouchel-Blaisot
- Dr Yvon le Maho
- Dr François Gaill
- Dr Michael Stoddart
- Prof Nigel Yoccoz
- Dr Yves Frenot
- H.R.H. Prince Albert II of Monaco
- Mr Jean-Louis Borloo



Dr Yvon Le Maho and Mr Rollon Mouchel-Blaisot, Prefect of the French Southern and Antarctic Lands

Mr Jean-Louis Borloo, French Minister of Ecology, Energy, Sustainable Development and Marine Affairs

species have been recorded in the Antarctic, but that this huge biodiversity has undergone change recently and that it is particularly sensitive to the consequences of increasing CO<sub>2</sub> levels: not only global warming but also the acidification of seawater, which alters the capacity of many kinds of plankton to form their calcareous shells. The focus then switched to the Arctic: Nigel Yoccoz (University of Tromsø in Norway) considered the vegetation and animals living on the continent (mammals such as reindeer, lemmings, red foxes and polar foxes, or birds such as snow geese and snowy owls). He explained that to detect environmental changes, it is necessary to have a sound understanding of interactions and competition between species, in the context of food chains that can lead to natural cycles. Research shows that these cycles can be highly sensitive to climatic changes. Yves Frénot (Deputy Director of the IPEV, the French Polar Institute) also spoke about a deterioration of the biodiversity of the sub-Antarctic and Antarctic regions. In parallel with the physical environmental changes, several sub-Antarctic islands like Kerguelen are experiencing the invasion of “exotic” species deliberately or

involuntarily introduced by humans. This colonization sometimes has disastrous and irreversible consequences on the indigenous fauna and flora. Tourism on the Antarctic Peninsula is also becoming a subject of concern, with a tenfold increase in the number of visits over the past decade. This tourism has to be controlled because it is bound to be the source of contamination by plant and animal species that do not yet exist in this fragile region.

In his closing speech, His Highness Prince Albert II of Monaco stressed just how fragile the polar regions are, and the extent to which scientists, policy-makers and the public need to pay close attention to them. The Prince had just returned from a long trip in which he had visited several scientific bases in Antarctica. Some excerpts of his film were shown as previews during the symposium. In his final speech, Mr. Jean-Louis Borloo, French Minister of Ecology, Energy, Sustainable Development and the Sea (MEEDDM), expressed his concern and emphasized the importance of this fourth IPY in the strengthening of international and especially European cooperation.

The various talks at the symposium showed that we have entered into a crucial period where the changes under way due to climate change are rapid and in some cases irreversible. The benefits of the IPY are already visible and will last for several years. ■

*Mélanie Baroni*, post-doctoral fellow  
*Guillemette Ménot*, Senior lecturer,  
Chair of Professor Édouard Bard



Dr Claude Lorius

Icebergs of the Illulissat Fjord, Jakobshavn Glacier (Greenland). © E. Bard