



Europe and International Polar Year 2007 * 2008

International Polar Year 2007-2008

International Polar Year (IPY) 2007-2008 is the largest coordinated international scientific effort for 50 years. With more than 200 Arctic and Antarctic projects, IPY harnesses the skills of 50,000 people – including scientists, students and support staff – from more than 60 nations.

Europe is playing a vital role in IPY. And IPY is crucial for Europe. The polar regions are highly relevant to Europe and European citizens. At a time when climate change is being debated at the highest political levels, and its social and economic effects are being felt in many European countries, polar research has never been more important.

IPY will broaden and deepen our understanding of how the world works, and leave in its wake a legacy – not only of observing networks and international partnerships – but also of a new generation of inspired and informed young scientists and citizens.

"The polar regions are vital arenas for science, foreign policy, trade, energy and security. International Polar Year is a once in a lifetime opportunity for Europe to deepen and broaden international partnerships and create trust and mutual understanding through political and scientific dialogue"

Carlo-Alberto Ricci, European Polar Board



"International Polar Year is addressing crucial issues at a crucial time. If you want to understand how the Earth works, you must understand the polar regions. That's why IPY's polar science has a global impact "

Dr Dave Carlson, IPY International Programme Office

Polar Science – Global Impact

International Polar Year 2007-2008

The genesis of IPY is simple: three times over the past 125 years, researchers from around the world worked together in a concentrated burst of polar science and exploration. The most recent, the International Geophysical Year of 1957–1958, celebrates its 50th anniversary in 2007 – a fitting time to undertake another polar year.

IPY is timely for other reasons. Climate change is our greatest global challenge. Rising to the challenge depends on international action based on the best international science. The poles are crucial components of the Earth's climate system, but they are also sensitive barometers of environmental change. As the Earth warms, the polar regions warm most rapidly. Polar science is crucial to understanding how our world works – as well as our impact upon it.

Although remote and inhospitable, the poles are Earth's most powerful natural laboratories. Locked in the ice are climate records stretching back a million years, while the high, dry Antarctic plateau gives astronomers a clearer view of the universe than from anywhere else on the planet.

Using everything from satellites to automated underwater vehicles to gather data, scientists involved in IPY will be able to paint an extraordinary picture

of the state of the Earth's land, sea and air at the start of the 21st century. Together, they will broaden and deepen our understanding of how the world works. And by focusing on crucial issues at a critical time, they will help deliver a quantum leap forward in knowledge.

Most importantly they will leave in their wake a legacy, not only of observing networks and international partnerships, but also of a new generation of inspired and informed young scientists and citizens – a legacy that should have profound implications for the future of the planet.

IPY is a programme of the International Council for Science and the World Meteorological Organization and is sponsored by many organisations worldwide including the European Polar Board (EPB).



A Brief History of IPY

Three times over the past 125 years, scientists from around the world have joined forces to participate in a concentrated burst of polar science and exploration. Each represented a landmark in international scientific cooperation and extended our knowledge of the polar regions and their global significance.

Inspired by Austrian explorer Carl Weyprecht, the **First International Polar Year 1882-1883** involved the first coordinated international expeditions to the polar regions ever undertaken and set a precedent for international cooperation in science. Fifty years later, the **Second International Polar Year 1932-1933** established 40 permanent observation stations in the Arctic. But it was the **International Geophysical Year 1957-1958** that succeeded in translating this scientific cooperation into a scientific bonanza.

From the discovery of the Van Allen radiation belts to the launch of Sputnik – the world's first artificial satellite – IGY produced a quantum leap forward in our understanding of the Earth and led to an increased level of research that continues to the present. It produced unprecedented exploration and discoveries in many fields of research, and fundamentally changed how science is conducted in the polar regions.

IGY also had a major impact on the geopolitical scene, paving the way for the Antarctic Treaty – an international agreement designating Antarctica as a continent for peace and science.

Fifty years on, technological developments such as Earth observation satellites, autonomous vehicles and molecular biology techniques offer enormous opportunities for a further quantum step upwards in our understanding of polar systems.

But **International Polar Year 2007-2008** is about people, as well as scientific data. Through more than 50 education and outreach projects, IPY will inspire a new generation of young scientists and engage the public in genuine dialogue about polar science, climate change and the future of our planet.

"The strong European contribution to International Polar Year is an outstanding example of how countries can work together in pursuit of extraordinary political, scientific and social outcomes that will be crucial for the next generation "

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" The polar regions are sensitive barometers of climate change, and we value their biodiversity. Their health is vital to the well-being of the Earth's systems and its inhabitants" Antarctic Treaty Consultative Meeting XXIX

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Europe's Role at the Poles

European nations have been involved in polar science and exploration for more than two centuries, and are playing a major role in International Polar Year 2007-2008. More than two dozen European nations are taking part in IPY, between them investing around € 200 million in most of IPY's 228 projects.

International cooperation is a hallmark of polar science. Without this cooperation, operating safely and successfully in the most extreme environments on Earth is impossible.

Working together, and with other international partners, European nations make a major contribution to answering pressing global scientific questions. In 2004, for example, scientists taking part in the European Project for Ice Coring in Antarctica (EPICA) extracted a three-kilometre long ice core from a remote site at Dome C, high on East Antarctica's plateau. Locked in the ice core is a record of the Earth's climate stretching back 900,000 years – by far the oldest continuous climate record obtained from ice cores so far.

Research and technology in the polar regions are crucial to understanding how our world works, especially in relation to climate change. Polar ice cores contain unique archives of what Earth's climate was like in the past, and the poles are sensitive barometers of climate change. Over the next 50 years, areas of the Arctic are predicted to warm twice as much as the global average. European polar scientists are monitoring this change and using the data to better predict what our climate will be like in the coming decades.

Without this data, European governments will be unable to make the correct political decisions about how best to address climate change and mitigate its impact on European economies and people.

The polar regions are important for Europe in other ways. As well as helping scientists understand climate change, the Arctic is also important politically and strategically. The polar environment is sensitive and vulnerable to human disturbance, yet there is growing interest in exploiting the Arctic's oil, gas and other natural resources. Europe is playing an active role in ensuring the sustainability of any such development in the Arctic.



Europe, IPY and Polar Science

International Polar Year is an intensive and internationally-coordinated campaign of cutting edge research and observations in the polar regions. From March 2007 to March 2009 – the time frame needed to complete a year-long cycle of research at both poles – scientists will gather data that will provide a unique snapshot of the state of our planet at the beginning of the 21st century.

As well as being an international effort, IPY is a truly interdisciplinary programme. Interdisciplinary work is fundamental to building global understanding. By linking researchers, IPY allows them to answer questions beyond the scope of individual disciplines. Throughout IPY, European scientists from all disciplines – including biologists, geologists, chemists, oceanographers, space, computer and social scientists – will work together on IPY projects.

Despite covering a vast range of topics and specialities, all IPY projects confront challenging science issues driven by the need to understand the rapid changes occurring in polar regions. Four key issues stand out:

★ The effects of climate change are being felt most strongly in the polar regions. Arctic sea ice cover is shrinking, threatening polar bears and other species. Around the Antarctic Peninsula too, sea ice is decreasing, taking with it the shelter needed by krill – the food on which the whales, seals and birds of the Southern Ocean depend.

- ★ Changes at the poles affect us all. Warming of the polar regions is changing wind systems and ocean currents. And changes in large ice sheets will cause sea levels to rise, threatening large areas of low-lying land in Europe and beyond.
- ★ More than four million people live in the Arctic. These communities face changes to their environment and the resources on which they depend – changes that are happening faster and on a larger scale than these communities can cope with.
- ★ The polar regions are places of wonder and even at the beginning of the 21st century remain largely physically and intellectually unexplored. They are unique laboratories, and IPY offers a unique opportunity to make exciting new discoveries, visit unseen places, develop new concepts and theories, and set the stage for future scientific advances.

IPY is an unprecedented opportunity to set the European polar research agenda for coming decades. By enhancing relationships with international partners, IPY will deliver a step change in understanding and visibility of the polar regions among the European public and politicians.





"The European Polar Board enables the countries who invest in polar research programmes to develop common strategies and approaches. IPY will be a unique opportunity to launch a wave of science diplomacy around the globe for the benefit of Europe's citizens"

Dr Paul Egerton, European Polar Board - European Polar Consortium

The ESF European Polar Board is composed of the directors and managers of European polar programmes and is concerned with strategic and scientific priorities in the polar regions and developing common approaches. EPB engages with government agencies, the European institutions and international organisations to develop mechanisms for enhanced coordination of European polar research programmes and supporting research facilities.

The European member countries* of the Board manage and operate 25 Antarctic research stations, 22 Arctic research stations, 31 research vessels and 26 aircraft engaged in supporting science in both polar regions. (* Including the Russian Federation.)

The European Polar Board, which is part of the European Science Foundation, has been instrumental in developing contributions to IPY at the European level through coordination of initiatives in science, education and outreach. Actions have focused on interacting with agencies, encouraging schools, teachers and science centres to be involved in the IPY as a once-in-a-lifetime opportunity. The scientific Standing Committees and Expert Boards of the ESF have signaled their strong contribution and support to IPY in the domains of space, marine, life sciences, humanities, social and medical sciences. The interdisciplinary nature of science carried out during IPY will result in new approaches to answer critical scientific questions.

Europe and IPY science:

European contributions to International Polar Year will attempt to answer some of the most important scientific "super" questions that are facing our planet:

- ★ What is the current stability of the ice caps and polar oceans? Are there tipping points in the Earth system and what will be the full costs of climate change?
- ★ What are the new scientific frontiers for Europe's technology and innovation?
- ★ The link between European societies and the polar regions: what are the perceptions, aspirations and implications?
- \star Who are the next generation of scientists and leaders for polar science?

European Science Foundation European Polar Board



Polar Science in Society

The changes that are occuring in the polar regions are becoming more visible to European citizens and relevant to their daily lives.

Research on ice cores, in the polar oceans, in the polar atmosphere and amongst the populations that live and work in the polar regions, help us to address the socio-economic issues arising from modification of climate, impacts on ecosystems and societies.

The European Union is strongly committed to understanding the challenges that face our world and region during the decades to come.

International Polar Year provides a perfect opportunity to address these key issues, especially from a European perspective. The European Polar Board has led the way on opening up Education, Outreach and Communication (EOC) activities in Europe.

Three priorities for EOC have been identified for the IPY period.

- ★ European Educational Gateway and Basecamp
 a teachers and schools programme for IPY
- ★ Networking media and communication officers in the different polar institutes of Europe
- \star The next generation and the polar regions

During IPY emphasis will be placed on the importance of outreach and communication to the general public to describe the scientific endeavours and how these can be injected into the educational sphere and curriculum in European schools and universities. It is essential that young people are engaged and able to understand the importance of the polar regions for their own future.

The expected legacy of IPY will be an enhanced public engagement and awareness of the driving forces behind climate modification, the impacts upon our society and the implications for future generations.

The European Polar Board will continue to address "Science in Society" and its direct relevance to policy development and public opinion.

The polar regions are closer to Europe than you think...



The European Science Foundation (ESF) provides a platform for its Member Organisations to advance European research and explore new directions for research at the European level. Established in 1974 as an independent non-governmental organisation, the ESF currently serves 75 Member Organisations across 30 countries.

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