



The UK and International Polar Year
2007–2008



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Climate change is a serious global threat. The latest report by the Intergovernmental Panel on Climate Change predicts that global temperatures will rise by between 1.8°C and 4°C by the end of this century. The Stern Review warns that without rapid international action, the world's economies will face major consequences.

There is little doubt of the scale and nature of the problem, but major uncertainties exist regarding the contribution of the polar regions to climate change. International Polar Year (IPY) 2007–2008 – the largest coordinated international scientific effort for 50 years – includes a major effort to obtain a clearer understanding of our future climate.

Involving 50,000 people from 63 nations in more than 200 Arctic and Antarctic projects, IPY will broaden and deepen our understanding of how the world works, and leave in its wake a legacy of enhanced observing networks, international partnerships, and a new generation of inspired and informed young scientists and citizens.

The UK is playing a vital role in IPY. Some 65 UK institutions – including 40 universities, research council institutes, government departments, museums and science centres – are taking part in around 120 IPY projects.

According to Sir David King, the UK government's chief scientific adviser: "Climate change is the greatest global challenge of our time. Only with concerted international action based on the best international science can we meet this challenge. There is still much work to be done in assessing the impact of climate change, and understanding the conditions at the Earth's poles is fundamental to this. I am therefore very pleased that the UK is to play a leading role in International Polar Year." "The Natural Environment Research Council's investment in Arctic research and the British Antarctic Survey's involvement in over 50 international science programmes will make major contributions towards this truly global effort. In addition, around 40 of the UK's universities and several Research Council institutes are planning a wide range of International Polar Year projects and activities. I heartily commend this initiative and wish every participant a very successful International Polar Year."



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► Sir David King, Chief Scientific Adviser to HM Government

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British Antarctic Survey / www.photo.antarctica.ac.uk

IPY: Polar Science – Global Impact

International Polar Year (IPY) 2007–2008 is the largest coordinated international scientific effort for 50 years. From ice sheets and space science to Arctic communities and the creatures of the Southern Ocean, IPY includes more than 200 Arctic and Antarctic projects and harnesses the skills of 50,000 people – including scientists, students and support staff – from 63 nations.

The genesis of IPY is simple: three times over the past 125 years, scientists 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. 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 enhanced 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 sponsored by the International Council for Science and the World Meteorological Organization.



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, Director of the IPY International Programme Office

British Antarctic Survey / www.photo.antarctica.ac.uk



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 (IGY) 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 huge 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.

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 Earth system scientists and engage the public in genuine dialogue about polar science, climate change and the future of our planet.



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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

► Carlo-Alberto Ricci, Chairman of the European Polar Board

The UK's Role at the Poles

The UK has been a leader in polar science and exploration for more than two centuries, and is playing a major role in International Polar Year (IPY) 2007–2008.

As well as leaving an outstanding legacy of scientific research and discovery, International Geophysical Year 1957–1958 also paved the way for the Antarctic Treaty. One of the world's most successful international agreements, the Antarctic Treaty designated Antarctica as a continent for peace and science, and the UK was among its first signatories.

At the other end of the planet, the Arctic Council – a unique intergovernmental forum – exists to address the common concerns and challenges faced by the Arctic states.

In the UK, the Foreign & Commonwealth Office Polar Regions Unit takes a leading role in international polar affairs. It is responsible for the administration of the Antarctic Treaty, and the UK's role in the Arctic Council.

Scientists from around 30 countries now undertake research in the Antarctic. British Antarctic Survey (BAS) is the UK's national Antarctic operator, and has for the past 60 years been responsible for most of the UK's scientific research in Antarctica.

Part of the Natural Environment Research Council (NERC), BAS operates five research stations, two Royal Research Ships and five aircraft in and around Antarctica. NERC also operates an Arctic research centre – managed by BAS – at Ny-Ålesund on Spitsbergen, and is funding the IPY International Programme Office, based at BAS.

International collaboration is a hallmark of polar science. Without this cooperation, operating safely and successfully in the most extreme environments on Earth is impossible. The UK is collaborating with around 50 other countries during IPY, and by fostering new partnerships, IPY will enable scientists to achieve together what would be impossible alone.

The world-class science that the UK undertakes in the polar regions is an essential part of evidence-based policy making. Without this data, politicians and policy makers in the UK and Europe will be unable to make the correct political decisions about how best to address climate change and mitigate its impact on the economy and people of the UK and beyond.



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We want to leave a legacy of new knowledge, new systems and new understanding of the climate. We want International Polar Year to be a truly inspirational event

► Professor Chris Rapley, Director of British Antarctic Survey and President of the Scientific Committee on Antarctic Research

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The UK, IPY and Polar Science

International Polar Year (IPY) 2007–2008 is an intensive and internationally-coordinated campaign of cutting edge research and observations in the polar regions. During IPY, scientists will gather data that will provide a unique snapshot of the state of key regions our planet at the beginning of the 21st century.

As well as being an international effort, IPY is a truly interdisciplinary programme. By linking researchers, IPY allows them to answer questions beyond the scope of individual disciplines.

Throughout IPY, scientists from all disciplines – including biologists, geologists, chemists, oceanographers, space, computer and social scientists – will work together on IPY projects.

IPY projects cover a vast range of science, and all confront challenging issues driven by the need to understand the rapid changes occurring in polar regions. Four key “urgencies” 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 worldwide.

► 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 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 public and politicians.



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



IPY: Leaving a Lasting Legacy

The frozen wastes of the polar regions have fired the public imagination for generations. Scott and Shackleton, *Endurance* and *Discovery*, are names that occupy a special place in the British psyche. Polar bears and penguins – the iconic wildlife of the Arctic and Antarctic – continue to captivate young and old alike.

Because of the poles' power for teaching and learning, education and outreach are integral to International Polar Year (IPY) 2007–2008. Only by inspiring and informing a new generation of young scientists and citizens will IPY leave a truly lasting legacy, raising awareness of the polar regions and translating IPY's global science into action.

One quarter of IPY projects focus on education and outreach, offering teachers, students and the public an extraordinary range of opportunities to be part of the largest coordinated international scientific effort for 50 years:

► The beauty and symmetry of snowflakes have long fascinated both children and scientists. During IPY, wherever snow falls, school children can join NASA's Global Snowflake Network. By collecting and classifying snowflakes, children will discover the relationships between climate, temperature and weather. And by sharing their

findings with the network, their snowflakes will become part of a major scientific resource, allowing scientists to understand more about the world's weather.

► Since 1999, Students on Ice has enabled more than 500 students from over 25 countries to participate in polar expeditions. During IPY, Students on Ice is organising nine special IPY Arctic and Antarctic expeditions. Involving teams of leading scientists and educators, these expeditions will help inspire the next generation of polar researchers and raise awareness about global environmental issues.

► Ice Station Antarctica – a new blockbuster exhibition at the Natural History Museum in London – is one of the highlights of IPY. Developed in partnership with British Antarctic Survey, the exhibition opens in May 2007 before touring worldwide from 2008. Families will get to grips with a variety of exciting Antarctic challenges (under the guidance of the Base Commander), from coping in sub-zero temperatures and riding a skidoo to collecting ice cores. They'll meet Antarctic wildlife, experience some of the extreme nature of the continent and explore the skills it takes to work in, and care for, this frozen frontier.



Antarctic research has never been more important or relevant to the rest of the world. As one of the two world regions being affected most by global warming, it is crucial for our understanding of what effect human activity has on the world around us

► Lord Astor of Hever

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IPY Highlights

Details of all IPY projects are available at www.ipy.org. Here are some of the highlights ...

SALE-UNITED: Nineteen institutions from seven countries will explore the Antarctic's subglacial lakes. Working at Ellsworth, Concordia and Vostock using aircraft-based instruments, rock and novel ice drilling techniques, SALE-UNITED will for the first time reveal what life exists in the water accumulated over millions of years under Antarctica's ice sheets.

AGAP: Discovered during International Geophysical Year 1957–1958, Antarctica's Gamburtsev Mountains extend for 1,200 km and rise to heights of over 3,000 m. But these mountains have never been seen by humans because they are covered by 600m of ice. Using aircraft and field expeditions, scientists from 28 institutions in seven countries will shed new light on the origins of the Antarctic ice sheet and its role in future climate change.

IPICS: Ice cores offer a uniquely record of past changes in climate and atmospheric composition, helping scientists understand climate change and man's impact upon it. But there is much left to discover. During IPY, IPICS will start a core to bedrock in Greenland that will reveal how the climate and ice sheet responded during the last warm interglacial period on Earth.

CENSUS OF ANTARCTIC MARINE LIFE: Driven by the need to know more about the distribution and abundance of Antarctic marine life and how it will be affected by climate change, scientists from 30 countries and 50 institutions will collate data on Antarctica's marine biodiversity, providing a rare opportunity to document the life of the one of the world's least-known ocean environments.

REINDEER HERDERS WITHOUT WOMEN: Inclusion of social sciences marks International Polar Year 2007-2008 out from previous polar years. Reindeer herding and hunting in Russia is practised in a number of different ways, including male-only herding groups. This fascinating project explores how living for long periods without women and in extreme environmental conditions affects male society and psychology.

ASTROPOLES: The polar regions are among the finest places on Earth for frontline astronomy. This 15-nation project will assess astronomical conditions at four polar sites – Dome A and Dome C in Antarctica, and Summit Station and Ellesmere Island in the Arctic – providing a baseline to assess what astronomical facilities could be built in the polar regions, and the science they could tackle.



As climate change has a greater political priority, and as we decide on how we will react to the threat of global warming, the extent and accuracy of scientific data is crucial. Research is needed to make sure that our responses are accurately targeted, sufficiently robust and, above all, effective

► Lord Triesman of Tottenham

International Polar Year (IPY) 2007–2008 is organised by the IPY Joint Committee. The IPY International Programme Office is based at British Antarctic Survey and funded by the Natural Environment Research Council.

The UK National Committee for IPY 2007-2008 is one of 30 committees worldwide coordinating, promoting and developing funding initiatives for IPY 2007-2008.

The UK National Committee for IPY is run with financial assistance from the Royal Society

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The Royal Society is heavily involved in climate change issues. Further information on its work in this area is available from <http://www.royalsoc.ac.uk/landing.asp?id=1278>

You can find out more about International Polar Year 2007–2008 – and how you can get involved – by contacting:

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Further information on IPY is available at: www.ipy.org and www.antarctica.ac.uk and www.nerc.ac.uk

Written by Becky Allen



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