



Epilogue

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The polar regions are an integral and rapidly changing part of the Earth system. Humankind's future environment, well-being and sustainable development require that we comprehensively understand and observe polar systems and processes and the changes that are already upon us. The message of IPY is loud and clear: what happens in the polar regions affects the rest of the world and concerns us all.

(The State of Polar Research, 2009, p. 12)

A product of the 50-year cycle of its parent initiatives, IPY 2007–2008 could not have happened at a more opportune time. It was shaped by three developments during the preceding decade: (1) scientific and public anxiety about rapid climate and global environmental change, which was having a faster and larger effect in the polar regions than elsewhere; (2) the successful experiences of many multi-disciplinary science programs of the 1990s and early 2000s (WCRP, IGBP, ACIA and others); and (3) widespread longing for a seminal new initiative to re-energize the polar science community, international organizations, and agencies in charge of planning, funding, and capacity building in polar research 50 years after the very successful IGY 1957–1958. These and other factors conjoined in 2001–2002, at the very time when polar scientists started talking about how to celebrate the 50th anniversary of IGY 1957–1958. Those early talks about a commemorative 'IGY+50' event quickly evolved into planning for a new Polar Year. The rest is history.

IPY 2007–2008, whose actual chronology started in 2001–2002, developed into what some have called the largest internationally coordinated planetary research effort of the past 50 years. It marshaled the intellectual resources of thousands of scientists from an unprecedented number of fields and from more than sixty nations. It has already advanced our understanding of the complexities of the polar regions and of the range of global linkages, geophysical, biological, and societal, of polar processes. IPY 2007–

2008 also generated a widely anticipated 'pulse' (momentum) in the form of substantial new funding for polar research and monitoring programs, new observational and analysis technologies, integrated system-level approaches, and a remarkably broadened circle of stakeholders in polar science. By the official closing date of June 2010, the field had been rejuvenated by almost a decade of planning, organization and implementation of IPY, as well as by the entry of many new players. Also, the general public had been kept much more abreast about the significance of polar scientific and environmental research than ever since the years of IGY 1957–1958. These and other developments were covered in the preceding chapters of this book.

Co-sponsored by ICSU and WMO, IPY 2007–2008 helped establish a set of new research and organizational paradigms that may have a lasting legacy of their own. It added powerful support to the societal need for polar science (public perception of rapid change in the polar regions) and showed the value of integrative polar studies. It solidified a new trans-disciplinary format for future research that now includes biology, social sciences, human health and community studies, in addition to meteorology, glaciology, oceanography, geophysics, geology and other classical polar research fields. Also, IPY helped restore a healthier geographical balance within the field of polar research that was once heavily dominated by Arctic explorations and was later skewed towards Antarctica in the IGY/post-IGY era. The most visible evidence for

that is the strengthened collaboration between the leading regional players, such as SCAR and IASC, Arctic Council and ATCM, and the launch of many bipolar projects, conferences, and research activities by international and national polar programs.

An urgent need for further polar research

IPY 2007–2008 has demonstrated the benefits of an enhanced level of support for polar research into the future, as well as the need to establish and sustain comprehensive long-term polar observing systems for rapidly changing polar environments. The pressing need for further polar research continues to motivate strong public engagement in the issues related to the polar regions. This feeds into national and international commitments to funding and operational support for polar science, ongoing data stewardship and the recruitment of promising young researchers who are needed to carry the work forward.

As outlined in the earlier assessment produced by the IPY Joint Committee (*The State of Polar Research 2009*), the following research challenges will have great societal relevance and urgency beyond IPY 2007–2008 (Allison et al., 2009):

- Rapid climate change in the Arctic and in parts of the Antarctic
- Diminishing snow and ice worldwide (sea ice, glaciers, ice sheets, snow cover, permafrost)
- The contribution of the great ice sheets to sea-level rise and the role of subglacial environments in controlling ice-sheet dynamics
- Global climate impacts of changes to ocean circulation
- Loss of biodiversity and changing ecosystem patterns and ranges
- Methane release to the atmosphere from melting permafrost
- Improved projections and forecasts from integrated coupled climate and weather models
- Global transport of pollution and contamination to the polar regions and consequent impacts on environments, humans, and ecosystems
- Health and well-being of Arctic residents and Arctic communities.

These topics headed the agenda of IPY 2007–2008

and of many other contemporary initiatives of the ‘IPY era.’ They are certain to dominate polar research and public attention into the next decade and beyond.

Unfinished Tasks

From early 2005 and until summer 2010, the ICSU-WMO Joint Committee (JC) for IPY and the International Programme Office (IPO), in accordance with their Terms of Reference, acted as leaders in the IPY implementation process. They were widely viewed by the polar science community as stewards of the IPY collaborative spirit and legacy. That status was granted to them for a good reason. The JC served for five years as the key authority in steering the IPY program, as caretaker of the IPY scientific goals, and as the symbol of IPY inter-disciplinarity, openness, and international appeal. The IPO earned across-the-board acclaim for reaching out to national IPY committees and individual project teams, for relentless public promotion of IPY and for resolute support of the younger cohorts of polar researchers. In these and other regards, both bodies followed in the footsteps of their predecessors, the International Polar Commission in IPY-1, Commission for the Polar Year in IPY-2, and CSAGI and IGY Secretariat in IGY 1957–1958.

As early as 2006, and very actively since 2007, both JC and IPO addressed the questions of the legacy of IPY and how to secure the long-term impact of IPY research, data and public programs after the official IPY period of 2007–2009. Unfortunately, the JC was dissolved in June 2010 and the IPO was terminated in September 2010. Comparisons with early Polar Years are illuminating. The International Polar Commission, the steering body of IPY-1, remained in being for eight years after the observational period was completed in 1883. In IPY-2, the Commission for the Polar Year was fully active for six years after observations ended in 1933 and continued at a lower level during the first years of World War II. It was eventually succeeded by an IPY Liquidation Committee that worked for five more years, until 1950. After IGY 1957–1958, most of the observational activities were extended through 1959 as the ‘International Geophysical Cooperation.’ Various successor bodies (*Special Committee for Inter-Union Cooperation in Geophysics*, *Comité Internationale de Géophysique* (CIG), and CIG Terminating Group)

worked for twelve years past the original term of IGY. No such luxury was granted to IPY 2007–2008, as the mandate of both the Joint Committee and the International Programme Office was limited to five years, from late 2004 till the end of 2009 (the two bodies were eventually extended by ICSU and WMO for additional six and 12 months, respectively).

Though no official successors to the JC and IPO have been nominated at the time of this writing, several bodies created before and during the IPY era are likely to continue some of the ‘unfinished tasks’ of the JC and IPO. In July 2008, WMO has established the Executive Council Panel on Polar Observations, Research, and

Services, which has among its tasks to secure the IPY legacy in coordination with other international organizations. ICSU has initiated the Polar Information Commons to continue to improve the management of polar data. The international Group on Earth Observations has adopted the recommendations of SCAR, WCRP and the IPY cryosphere programme for a Cryosphere Observing System, which is now embedded within the Global Earth Observing System of Systems (GEOSS). The two polar bodies of ICSU, IASC and SCAR, have jointly established the Bipolar Action Group (BipAG) to consider how best to implement the legacies of IPY and are contributing to such activities

Table E-1: What Does It Take to Complete IPY? (Numbers indicate years after the end of the official observational period)

Tasks	IPY-1	IPY-2	IGY	IPY 2007–2008
Main steering body service after the end of observational period	+8	+9	+1	+1
Successor Group	No	+16 (Liquidation Committee)	+13 (CIG/Publication Group)	No ???
Summary Report	No	+26 (1959)	No	+2 (2011)
Final Event/Conference	+8 (Small-size meeting, 1891)	No	+5 (International symposium, 1963; several smaller venues)	+1 (2010 Oslo Science Conference, 2300 participants)
Publication of Proceedings and/or Minutes	Yes	Yes (partly)	Yes	??? (Online; partly in the JC Report)
Centralized archive	Yes (St. Petersburg)	Yes (Copenhagen)	Yes (in several places)	Yes (SPRI, Cambridge)
Bibliography	No	+18	+13	??? (To be compiled by SPRI and AINA)
Publication Series	Yes (22 vols.)	No	Yes (Annals of IGY, 48 vols.)	Yes/Partly (Started by Springer in 2009, 4 vols. published, several planned)
Central Depository of Data/Records	Yes (St. Petersburg)	Yes (Copenhagen)	Yes (Several World Data Centers)	???
Free Data Access	Yes (In published volumes)	Yes (Via main archives in Copenhagen)	Yes Via World Data Centers	??? (In progress)
Individual Project Reports	Yes (Via published national volumes)	No (Via individual publications only)	No	Yes (In monographs, papers, and submissions to the JC Report)
National Reports	Yes (Via published expedition volumes)	No (General bibliography only)	Yes (Individual nations only)	Yes/Partly Several already prepared; more activities still feasible

as the Sustaining Arctic Observing Network (SAON) and the Southern Ocean Observing System (SOOS). These and other bodies are working to secure certain components of IPY legacy. The continuous growth of APECS, now co-sponsored by SCAR and IASC is one key legacy of the IPY. On the horizon, though as yet only dimly perceived, is the possible implementation of an International Polar Decade (IPD). These various legacy initiatives will be inextricably linked to IPY 2007–2008, much as SCAR and the Antarctic Treaty System are linked to IGY 1957–1958.

Launching an IPY took six to seven years in the four known cases, IPY-1, IPY-2, IGY, and IPY 2007–2008 (*Part 1*). Completing an IPY and securing its legacy is a similarly extended process. It comprises several components and to judge from previous IPY's (Table E-1) it requires dedicated leadership and continuing effort over many years. The data collected have to be systematically processed and the results ideally need to be published under a *standardized template* (series, proceedings), as was done in IPY-1 and IGY, as well as in numerous individual publications. To ensure their lasting use, these publications should be monitored and thematically organized in an overall *IPY bibliography* (as in IPY-2 and IGY). Original data and documents related to IPY planning and implementation need to be stored in established *centralized depositories or archives* (as in IPY-1, IPY-2, and IGY) or, better, copied and made accessible through *data centers* (as in IGY). National activities need to be summarized in *national IPY reports* (as in IPY-1 and IGY), and major field and disciplinary advances need to be promoted via *summary overviews* (as in IGY). Such disciplinary summaries and major results of individual IPY efforts then have to be shared with the larger science community at high-profile *workshops and conferences* (as after IGY), and in *overview books* (as after IGY) that may be published years or even decades later (as in IPY-1 and IPY-2).

In IPY 2007–2008, the JC and IPO knew beforehand that their days after 2009 would be numbered and took decisive actions early. The discussion about how the legacies of IPY 2007–2008 should be secured and by whom, was launched at the JC-6 meeting in October 2007. For the JC-7 meeting in July 2008, David Carlson, the IPO Director, prepared a 16-page road map, 'IPO IPY Planning Document – 2008 and

Beyond.' It outlined prospective actions and partners in securing IPY legacies in science and science funding, data management, observations, logistics, international cooperation, the next generation of polar researchers, public and political networks and other critical fields. As the resources available to JC and IPO were very limited, it was agreed (at JC-7 and also at JC-8 in February 2009) that many of those responsibilities would be naturally taken over by other groups following the end of IPY, without centralized planning and oversight by the JC and IPO. At the JC-8 meeting in February 2009, it became clear that several important legacy tasks remained beyond the reach of JC and IPO. They included the launch of the JC-supervised *IPY Proceedings/publication series*, the collection of the final reports from 230 individual IPY projects, the enforcement of a uniform data-management and data-sharing policy for endorsed IPY projects, and the commission and compilation of the national IPY committees' overviews of their activities during 2005–2009.

With no prospect of the continuing oversight, the JC-8 meeting opted for three paths to be pursued in the remaining months: production of the JC 'summary' volume on IPY planning and operations during 2001–2010; preparation of an overview paper on IPY science achievements for major professional journal/s; and active contribution to the planning of the IPY 'Open Science Conference' in Oslo in June 2010. The latter was successfully accomplished in collaboration with the Norwegian Research Council and the Conference Secretariat, making the Oslo 2010 meeting the largest-ever gathering in the history of polar sciences. None of the early IPYs had enjoyed such a remarkable and highly visible closure event. By eventually embracing both an overview of IPY activities and 'science achievements' papers from many IPY fields, the present JC summary volume has also grown far beyond the initial scope envisioned in 2009. Of course, the full analysis of the material collected in IPY 2007–2008 will take several more years and the overall footprint of IPY may become more visible with time. Nevertheless, the Joint Committee views this current summary volume as its farewell input to the IPY process and as a symbolic 'passing of the baton' to those who will explore IPY legacies in the years ahead. It would be ideal if, as the sponsors of IPY 2007–2008,

both ICSU and WMO, and their subsidiary bodies could develop some mechanism for regular reporting on progress with the implementation of the various aspects of the IPY legacy over the next several years. The forthcoming 2012 IPY Conference in Montreal may become a major milestone in this process.

Conclusion

We strongly believe that IPY 2007–2008 fulfilled the expectations of its organizers and its many enthusiastic participants and supporters. The envisioned two-year pulse in research and public activities from March 2007 to March 2009, both in the Arctic and Antarctic, became an exciting milestone in the history of polar science and once-in-a-lifetime experience for thousands of researchers, students, educators, polar residents and many more people worldwide. The overall time impact of IPY covers almost a full decade from 2001 to 2010 and is certain to continue as the IPY project data are processed, analyzed, published, and discussed at workshops and conferences. The prospective launch of the International Polar Decade may successfully extend the IPY momentum and create an entire 'IPY generation' in polar research, observation and science training.

IPY 2007–2008 advanced the ability of polar scientists to meet many of the major challenges of the

polar regions—environmental, societal, educational—and contributed to the theoretical and organizational strengthening of polar research. It created a strong legacy in our understanding of polar processes and of their global linkages. As envisioned by IPY organizers, large-scale baseline data sets were established in many fields, against which future change can be assessed. Novel and enhanced observing systems were launched that will eventually produce long-term benefits to many stakeholders, including polar residents and indigenous people. Last, but not least, IPY 2007–2008 trained a new generation of scientists and leaders who are determined to carry this legacy into the future.

The IPY momentum helped bridge disciplines and fields, teamed scientists and polar residents in cooperative research, and related educators and the general public to the issues of polar regions – as had been long advocated. The broad international effort of IPY contributed to a new level of inter-disciplinarity and to multi-faceted visions of polar regions and processes. It increased cooperation between scientists, organizations, and nations in the generation of knowledge and lessons for the sustainable use of our planet. It will be for future generations to preserve these legacies of IPY 2007–2008 and to ensure their lasting contributions to polar science, to the study of Earth's polar regions and to society at large.

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