

History of Antarctic research

A challenge for SCAR

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Am giving this talk on behalf of the SCAR History Action Group.

To fully appreciate the roughly 120 years of development in polar research, we must begin by looking back to the very beginning and examine the events that lead to the formation of SCAR, and this working group.

Slide 1

The desire to organise polar research had been voiced rather early on, first by the austro-hungarian lieutenant Karl Weyprecht in 1875. Weyprecht had just returned from a polar expedition where he commanded one of the research vessels when in January 1875 at the Academy of Sciences in Vienna, he expressed his ideas to establish an international collaboration to obtain a number of simultaneous observations, extending over the time period of about a year, at various locations around the Arctic. The concept was presented again in September of the same year at the 4th Meeting of the Association of German Naturalists and Physicists at Gratz. 2 years later, a detailed program was prepared and submitted to the International Meteorological Congress (IMC). When the IMC met in 1879 in Rome, they recognized the importance of the proposal.

In October 1879, the 1st International Polar Conference (IPC) met in Hamburg, Germany. It was determined that a minimum of eight arctic stations was needed, to obtain observations of at least one-year duration. The Conference also established the IPC with representatives from Austria, Hungary, Denmark, France, Germany, The Netherlands, Norway, Russia, and Sweden. Dr. Georg von Neumayer of Hamburg was elected the Commissions first president. In July 1880 the 2nd IPC met at Berne, Switzerland, where Italy joined the commission with a representative. Successive meetings were held in St Petersburg and the United States joined the group, and a program of observations was adopted.

Slide 2

The First International Polar year began on Aug 1, 1882 and continued for 13 months to Sep 1, 1883. Scientific results and observational data were published in the Bulletin of the International Polar Commission. In 1884 and 1891 the 4th and 5th Polar Conferences were convened. Weyprecht however did not live to see the culmination of his grand concept. He passed away in 1881.

Slide 3

Some data obtained from the 1st IPY

Slide 4

Earth magnetic field data that requires improvement

Slide 5

In 1927 Dr. J Georgi at Deutsche Seewarte in Hamburg suggested that a Second International Polar Year be conducted on the fiftieth anniversary of the first IPY. A proposal was submitted to the International Meteorological Committee, and then forwarded to Reseau Mondial and Polar Meteorology. In June 1928 an informal organizational meeting was held in London to discuss plans for the event. Finally, in 1929 the Meteorological Conference of Directors in Copenhagen endorsed the plan for the cooperative study of magnetic, auroral and meteorological phenomena.

Also in 1929 the International Cloud Commission passed a resolution for an international year for clouds coinciding with the Polar Year. The Commission for the Polar Year 1932-1933 was appointed to prepare detailed plans for the observations to be made and the methods for making them. A collaboration was established between the Commission for the Polar Year and the International Union of Geodesy and Geophysics.

Finally, in August 1930 the first meeting of the Commission for the Polar Year took place in Leningrad, to further refine proposals for the Polar Year. In Dec 1930 at a meeting in London the Commission prepared a detailed report containing proposals for research programs in meteorology, terrestrial magnetism, atmospheric electricity, aurora, and aerology. At a subsequent meeting in September 1931 the Commission for the Polar Year, despite being urged to delay due to poor economic conditions worldwide, decided to not delay the Polar Year program. On 1 Aug 1932 the Second International Polar Year began and continued until 1 Sep 1933.

The Commission introduced the concept of "International Days" The scientific objective was to study phenomena on the largest possible scale with simultaneous observations, same as the previous polar year. The most significant new development that affected how the program was conducted was the advent of radio communication.

Slide 6

19 nations participated in the second IPY and sent off expeditions into the arctic and subarctic. There were no stations being maintained in the southern hemisphere at that time, and Germany, due to the distressed economic situation, could not afford to send any expeditions. Instead, German scientists participated with Russian expeditions. Max Grotewahl built a station with private funds in southern Greenland, but it produced only very little scientific data.

Slide 7

In 1950, a proposal for the International Geophysical Year, 25 years after the Second Polar Year, was brought before the Mixed Commission on the Ionosphere, which endorsed it. The Mixed Commission on the Ionosphere was formed by the International Council of Scientific Unions (ICSU) under the sponsorship of the International Union for Scientific Radio with the cooperation of the International Astronomical Union and the International Union for Geodesy and Geophysics (IUGG). The IUGG drew up a tentative program, and adopted a resolution to transmit

it to the International Council of Scientific Unions (ICSU), which sponsored the event. All bodies endorsed the proposal by 1951.

World Days (typically 3 days per month) were planned as part of the IGY. During these periods special programs of research focused on short-timescale events or special events (e.g. during the times of meteor showers) were carried out.

During times when the Sun was especially active on a day not designated as a World Day, alerts were issued. These could be followed by the declaration of Special World Intervals that followed alerts. These could be called with 8 hr notice. Rocket and balloon launches might take place, and other programs of study might be intensified. World Meteorological Intervals consisted of 10 consecutive days, four times a year, usually near the beginning of seasons for intensive study, rocket campaigns, etc. Data was collected at three centers (US, Europe, and Soviet Union) and made available to all nations. Although representatives of 46 countries originally agreed to participate in the IGY, by the close of the activity, 67 countries had become involved.

The IGY was a tremendous success. The newly developed space-flight capability was used to discover and explore Earth's radiation belts, to study the magnetosphere, and to provide the first observations of the emission from the Sun's corona. Public interest in the scientific results of the IGY was high. The IGY provided a forum and a backdrop for discussing the importance of geospace influences on Earth.

Slide 8

At the International Council of Scientific Unions (ICSU) Antarctic meeting held in Stockholm in September 1957 it was decided that there was need for further international organization of scientific activity in Antarctica, and that a committee should be set up for this purpose. Thus, the SCAR was brought to life, with initially 12 member states. Over the years, more and more nations have joined the committee. After a not surprisingly many decades lasting careful evaluation, Switzerland is the latest nation to have joined SCAR as a full member in October 2004.

Slide 9

The 50th anniversary of the International Geophysical Year is in 2007-2008. On this occasion an Action Group on the "History of the institutionalisation of Antarctic Research within SCAR" was established under the Delegate Committee on Standing Committees and Outreach of the Scientific Committee of Antarctic Research (SCAR) during the SCAR XXXIII Delegates Meeting at Bremerhaven in October 2004. It is the first international and interdisciplinary group devoted to the history of polar research.

Slide 10

The aim of this working group is to obtain insight into the evolution of Antarctic research and the emergence and development of institutions to co-ordinate, what was first called the Special Committee, and then Scientific Committee on Antarctic Research. We plan to study to what degree research in the Antarctic has been driven

by scientific criteria, and to what extent compromises were made in the light of political barriers, levels of technological development, logistical limitations, and environmental hazards.

In historical perspective, a review will be made of essential background factors at work, both scientific and non-scientific, when and why nations were moved to participate in the International Geophysical Year (IGY, 1957-1958) at the time of the Cold War. Pertinent in this respect are the different roles played by non-governmental scientific organisations as distinct from intergovernmental organisations or modes of international organisation. Additional socio-cultural and political background factors will be considered with regard to major nations that chose **not** to contribute to the IGY.

Traditionally, field science practised in remote geographical regions was either a byproduct of exploration or an activity exploited by economical interests or territorial claimants. An important aspect of the early international polar year initiatives in the past has been the requirement that expeditions and projects be driven by scientific research instead of exploration. This principle was reiterated in Belgium since 1905 by a number of internationally minded scientists. This was, when efforts were afoot to establish an international polar commission, a hybrid combination of inter-governmental and non-governmental scientific and other organizations. Although such a commission was actually founded, it had a very marginal influence on events and was soon eclipsed by the First World War.

In the course of the workshops we want to investigate the engagement in Antarctic research. What motivated an individual person or a given country to engage in Antarctic research? Did the motivation differ during different historical time periods? Is it possible to identify different types of role-models? The next step refers to the realisation of Antarctic research. How were research agendas set up and implemented? What kind of arguments were used to promote Antarctic research? What sort of funding was available, and did different modes of funding affect the character of an expedition and the way it was conducted? Co-operation was also very important in the context. When did co-operation for research pertaining to Antarctica occur, and what was the general orientation and scope? What were some of the obstacles associated with multi-lateral or international co-operation? Finally there had been leading figures in the context of different national settings and perspectives. We want to know, who were the persons that came to be recognised as leading figures in Antarctic research, and for what reasons? To what extent did some scientists emerge as diplomats within science, or beyond it in the international political arena? How were they regarded by their scientific colleagues, by politicians, and the media?

Slide 11

To answer these questions the 1st SCAR workshop on history of Antarctic Research took place at the Bavarian Academy of Science and Humanities in Munich on June 2nd – 3rd 2005. The Commission for Glaciology of the Bavarian Academy with its first scientific leader Dr. Oskar Reinwarth was involved in the preparatory phase of the construction of the Georg-von-Neumayer-Station and participated in many research projects funded by the Deutsche Forschungsgemeinschaft. On the occasion of the 25th anniversary of the establishment of this West German Antarctic station, a

workshop on the history of Antarctic research was held under supervision of the SCAR Action Group and the Commission for Glaciology.

Participants came from Australia, Chile, England, Germany, Holland, Sweden and USA. On the first day, Prof. Horst Hagedorn, chairman of the Commission of Glaciology, welcomed the participants on behalf of the Academy and gave a short introduction to the history of the Academy and the various projects going on. The scientific leader of the same commission, Ludwig Braun, addressed the tradition of Antarctic research at the commission in his welcome speech. Aant Elzinga (University of Göteborg) finally opened the workshop.

Each oral presentation had a time slot of 60 minutes allotted, there was ample time for detailed discussions. The posters were on display throughout the whole workshop. In total we had nine oral presentations and three posters.

Slide 12

The workshop started with Jorge Berguño from the Chilean Antarctic Institute (Santiago, Chile) on the dawn of Antarctic scientific consciousness from the Chilean point of view. He described how a sort of elite developed in Chile in co-operation with Antarctic expeditions and with Punta Arenas as focal point for supplies. Due to a very strong earthquake in 1905, the Chilean government was prompted to establish a seismological network instead of realising the planned first Chilean Antarctic expedition. During the discussion, it was pointed out that the International Polar Years (IPY) always took place during fundamental scientific peaks: 1st IPY (1882/83): Observation of the transit of Venus, 2nd IPY (1932/33): Investigation of the upper air, and 3rd IPY (International Geophysical Year, 1957/58): Satellites. Comments on Chileans Antarctic claims in comparison with the Antarctic Treaty System were also made.

The poster presentation of five minutes each followed right afterwards. Jason Davis, graduate student from the Department of Geography (Ohio State University, Columbus, OH, USA), explained the changes to Antarctic identity rhetoric as demonstrated by papers published in the National Geographic Magazine. David Michael Dodd from the Royal Society of Victoria / University of Melbourne (Melbourne, Australia) in absence had sent a short poster addressing the Australian context of the history of Antarctic research referring to the input of European scientists like Georg von Neumayer. During the 'Heroic Age' (until 1916) activities were centred on Australian Antarctic Territory and the Ross Dependency. It was followed by the Second Polar Year (1932/33, Mawson Years), the Third Polar Year (IGY, 1957/58, the Law Years) and Antarctic research in the modern era – the past 40 years. Finally Helmut Honik (Filchner Archive, Munich, Germany) and Cornelia Lüdecke presented a poster focussed on the Bavarian officer Wilhelm Filchner (1877-1957) leader of the second German Antarctic expedition to the south eastern part of the Weddell Sea. He wanted to investigate the connection of the western and eastern part of Antarctica: Is it land covered by snow or frozen water? Filchner's estate is placed in the Filchner-Archive of the Bavarian Academy of Sciences and Humanities. It holds diaries, correspondences, books, movies, pictures, and personal belongings.

Adrian Howkins from the University of Texas at Austin (Abington, USA) discussed Argentine scientific interests in Antarctica from 1946 to 1959. He divided this period

into three sections, which were closely connected with changes of government in Argentine: The military or navy period (1946-1951), Peron's period (1951-1956) with the foundation of the Instituto Antártico Argentino, and finally the time after 1956 with the impact of the International Geophysical Year (1957/58) and research in the so-called Argentine sector of the Antarctic Peninsula with respect to its occupation. Howkins investigated the organisational structure of Argentine Antarctic science, the nature of Argentine scientific research and the use made of Antarctic science in Argentine political rhetoric. Due to the discovery of fossils on the Peninsula which turned out to be identical to some that were found in the Argentine Andes, Argentine's claims in Antarctica was based on geographical continuity. In the discussion the peculiarity of the Falkland War which extended to 65 km north of the boundaries of the Antarctic Treaty System was highlighted. British and Argentine soldiers were fighting each other, while scientists from both countries were sitting at the same table discussing matters of Antarctic research. Nevertheless a politicalisation of Antarctic history was stated according to Francis Bacon's "Knowledge is power".

Antarctic veteran John C. Behrendt from the Institute of Arctic and Alpine Research (University of Colorado, USA) presented his view of the U.S. Antarctic Overseas geophysical-glaciological research program of the IGY (1957-58) from the perspective of a graduate student. He participated in the US program as an assistant seismologist on the Filchner Ice Traverse, where many crevasses were encountered. At the end of his talk, Behrendt underlined the fact that the highly demanded U.S. air program had resulted in an average death toll of 3.8 deaths/year from 1955-1961. In the discussion the special circumstances of the Cold War were emphasised. Everything was prepared for later territorial claims of the U.S., which to this date however have not materialized, because the UK forestalled the Antarctic Treaty. Since 1956 the US flag has been waving above the South Pole, where all claims except the Norwegian's meet. But today the U.S. needs the help of the Russian icebreaking cruise ships to resupply McMurdo, because the US Navy and Coast Guard are lacking the funds to maintain the fleet.

It was a pity that the Russian colleagues had withdrawn their participation, because of the business with Antarctic Treaty Consultative Members in Sweden at the same time. Their comments to the discussions would have been very valuable.

Reinhard Krause jumped in the time slot given to Lisbeth Lewander from the Department of Gender Studies (Göteborg, Sweden), who unfortunately had to cancel her participation on a very short notice for personal reasons. Nevertheless her planned contribution on the political dimensions of the Norwegian-British-Swedish Expedition (NBSX) to Antarctica 1949-52 will be included in the proceedings. Instead Reinhard Krause gave a paper on Georg von Neumayer (1826-1909) as pioneer of Antarctic research. Neumayer's permanent agitation in favour of a German Antarctic expedition since the late 1850s helped lead to the realisation of the first international Polar Year (1882/83), in which two German expeditions took part. One established a station in Cumberland Sound (Baffin Island) and one on the sub-Antarctic Island South Georgia to observe the transit of Venus at the same time.

Lüdecke added a short paper on the Belgian attempt to institutionalize polar research (1905-1915) and the German point of view, which gave insight in the failed initiative of an early polar organisation, to which Berguño and Elzinga referred to several times during their talks. Aant Elzinga from the Department of History of Ideas and Theory of

Science (University of Göteborg, Sweden) continued with his paper on the Swedish non-participation in the Antarctic leg of the IGY. He focussed on the personalities involved. It was interesting to see that prominent participants of the NBSX became rather influential in Antarctic research. But Sweden was not politically motivated and had no champions who came forward to push for activities in Antarctica during the IGY. In the discussion it was noted that Canada was represented in Antarctic research through members of various expeditions since Scott's Terra Nova expedition (1910-1913). In June 2005, Canada finally became a consultative member of the Antarctic Treaty.

Getting late in the day, one must wonder what's on their mind?

Slide 13

Slide 14

Most participants enjoyed the beautiful summer evening and took a short historic walk through the old parts of Munich passing by the Hofbräuhaus to stop at a typical Bavarian restaurant, where we could sit outside in the beer garden. Here, over one or more glasses of Munich beer, exciting stories from Antarctic expeditions mingled with new ideas of further workshops.

Slide 15

On day two, Peter Abbink (University of Groningen, Holland) gave a presentation on Antarctica in the 1980s as subject of international politics. Obviously this period had been most dynamic and turbulent in the history of the Antarctic Treaty System (ATS). The debate about the mineral regime intensified and the 'Question of Antarctica' became an annual consideration in the United Nations General Assembly. The support for the ATS increased in the 1980s and the ATS expanded rapidly. Besides the concern for the conservation of the Antarctic natural environment grew considerably. In the discussions on the renewal of the ATS including the decisions about the mineral regime and the environment, different types of legal systems had been involved: The German need for exact definitions and the Anglo-Saxon attitude of wait-and-see how things develop.

Johan van Bennekom, retired from Royal Netherlands Institute for Sea Research (Texel, The Netherlands), described the start of Dutch involvement in Antarctic research. In the mid-1960's, Dutch meteorologists were members of overwintering crews in three expeditions to the Belgian-Dutch Station "King Baudouin", situated on the Princess Ragnhild coast. After many years of lacking continuation the Dutch interest in Antarctic research grew again in the 1980s in context with the possible revision of the Antarctic Treaty. While governmental organisations were very much in favour of exploitation non governmental organisations in Holland played a major role focussing on the conservation of nature. Influential persons could help to reset Dutch Antarctic research through the hospitality of other countries to include Dutch scientists in their expeditions as it also happened with West German scientists after World War II. Instead, Holland will never raise money for a permanent station on the Antarctic continent. Instead, they try and establish a European station to be used by smaller countries like the Netherlands. This was keenly discussed by some Dutch scientists in Utrecht a few years ago, and it seems the French were also interested in such an endeavour.

Slide 16

Balthasar Indermuehle (myself) from the University of New South Wales, Australia, gave a fascinating Introduction on the History of Astrophysics in Antarctica. I identified three steps of development. The astrogeological era from the first discovery of a meteorite during the Mawson expedition (1911-1914) to the large scale meteorite finds in the 1960s, the high energy era with the dawn of cosmic ray physics in the 1950's, and the photon era since 1979 with the first optical research programs. Recent projects in high energy and sub millimetre astronomy are reaching for the Antarctic Plateau (Dome C and now Dome A) as the plateau turns out to be an ideal place for astronomical observations due to its high altitude and the atmospheric transparency in several regions of the electromagnetic spectrum only available in space otherwise.

See my Poster on the History of Astrophysics in Antarctica in front of Ballroom 1.

Astrophysics today is one of the most international, most active and collaborative antarctic science branches. So far, the largest built astronomical detector is at South Pole: AMANDA (Antarctic Muon and Neutrino Detector Array). It is a collaboration of scientists from 20 institutions and 6 nations. IceCube, the next generation AMANDA of one cubic kilometer in size, is currently being built by a consortium of 30 institutions and 9 nations.

It appears obvious that looking into the future challenges we astrophysicists are facing, that international collaboration to an even greater degree will be required: "big" science demands "big" collaborations, and SCAR can provide an excellent working frame to build, maintain and expand those connections.

The workshop finished with the last paper presented by Cornelia Lüdecke from the Centre for the History of Science, Mathematics and Technology (University of Hamburg, Germany) about the failed initiative of Karl Maria Herrligkoffer's private „German South Pole Expedition“ 1957/58. The paper was mainly based on newspaper clippings and pamphlets of the expedition. It is well known that West Germany had decided not to send an official expedition to Antarctica during the IGY. Instead in 1955, the physician and mountaineer K. M. Herrligkoffer (1916-1991) had started a campaign to realise a private expedition the Neuschwabenland, which had been discovered by the 3rd German Antarctic Expedition (1938/39). In 1953, Herrligkoffer had been subject of headlines because of his successful expedition to the top of Nanga Parbat as well as his style of leadership. Due to a lack of his (scientific) competence, the German Geographers Day at Hamburg recommended not to support his expedition. Besides, Wilhelm Filchner (1877-1957) was engaged by the scientific community to demand an agreement from Herrligkoffer about not including his expedition in the official frame of the IGY. Finally Herrligkoffer's plan was not realised, because he was not the right man at the right place.

At the end of the workshop plans were made for a new meeting in Chile which is now going to take place in September 2006.

The proceedings of the first SCAR workshop on the history of Antarctic research will be published in the Reports of Polar and Marine Research of the Alfred Wegener Institute in Bremerhaven (Germany).

Slide 17

Summing up the workshop it can be said that the mixture of PhD and graduate students, historians, Antarctic veterans, and historians of science, as well as profound experts of the Antarctic Treaty led to very lively and interesting discussions. Between single sessions nice coffee breaks right next to the conference room facilitated continuation of the discussions. During lunch breaks typical Bavarian dishes like “Leberkäs” with potato salad or “Weißwürstel” with pretzels were served at the same place.

I would like to end my presentation with a call to all scientists present, antarctic veterans and historians alike. The SCAR History Action Group is looking for your participation, not just in the upcoming workshop in Chile which already has a theme defined, but also for future workshops and to complete the history of Antarctic exploration and science.

Thank you