

## **SCAR/IASC Open Science Conference**

**St. Petersburg, Russia**

**July 8th - 11th, 2008**

### **Session 5.7 Polar History and Institutionalization of Polar Research**

#### **The International Polar Years**

**Session Description:** Polar research has a long tradition starting in the 16<sup>th</sup> century in the Arctic with the search for a Northwest and Northeast Passage and turning to Antarctica in the 18<sup>th</sup> century in search for the postulated terra australis incognita. Economical reasons, whaling, geographical discoveries, scientific investigations, politics or adventure had been driving forces of the exploration in the Far North and Far South. Organizations like the precursor of the World Meteorological Organization and the International Geographical Congress were the first bodies to support a temporal international experiment in the Arctic during the first international Polar Year (1882-1883) for ground based meteorological and magnetic observations. and the investigation of the unknown Antarctic continent (1901-1904) respectively. The Belgian attempt to set up an international polar organization in the first decade of the 20<sup>th</sup> century failed, because polar research was not yet institutionalized on a national basis and the outbreak of World War I. The International Society for the Exploration of the Arctic Regions by Means of Aircraft (Aeroarctic, 1924-1939) can be regarded as first international polar organization consisting of national committees and various committees within a scientific board. Among other aspects the need for weather information of the upper air for future air travel triggered the 2<sup>nd</sup> International Polar Year (1932-1933), which also focussed on the Arctic. World War II interrupted polar research of single countries, while The United States organized High Jump. the biggest expeditions ever undertaken. Finally the wish to investigate the High Atmosphere led to the exploration of Antarctica with a network of stations around the continent as already recommended at the turn of the century. The organization of the International Geophysical Year together with the political negotiations between Argentine, Great Britain and Chile led to the Antarctic Treaty and the foundation of SCAR. The scientific, cultural and political background of polar research since the 19<sup>th</sup> century will be the main focus of the session.

# **HISTORICAL CHANGES IN POLAR RESEARCH - SEEN THROUGH THE LENS OF THE FOUR IPYS**

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125 years ago the First IPY focused on the Arctic with long time series on variation of earth magnetic, auroral, meteorological phenomena. IPY2 continued this approach, driven in part by an hypotheses on physical processes in the atmosphere above the Earth's surface. IGY 1957/58 signified expansion of the processal approach to include the upper atmosphere and Antarctica. Big Science spelled planning, priority setting, team work, specialized funding bodies and committees. Military interests were contained and translated into scientific competition and cooperation. Science gained a double face, on the one side understanding geophysical processes, on the other sublimation of politics in science –a continuation of politics (by other means), with the best of science giving some countries (Consultative Parties) a strong voice in Antarctic regime governance. IPY4 builds on a rich heritage, broadens horizons, and accents interdisciplinary efforts, including social and cultural sciences, plus protection of the planetary environment. New technologies facilitate a systemic approach (e.g., Earth system science). Interaction of science and politics continues. The paper reviews broad changes in scope of polar research, funding, technology, logistics, and institutions, as well as individual, national and supranational motives.

**WORLD FIRST COMPLEX OPTICAL INSTRUMENTAL OBSERVATIONS OF  
AURORA IN THE ARCTIC IN 1899-1900 CARRIED OUT BY JOSEF SYKORA**

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The report presents data and analysis of visual, photographic and spectral auroral data, obtained by Russian astronomer J. Sykora at Spitsbergen in 1899-1900 winter season and concerns of auroral studies history. These seem to be the first instrumental recordings of auroral spectra in the Arctic and some emissions discovery has a world priority. There were done second world photos of Aurora in the Arctic at all and the first ones in Spitsbergen. The results of the expedition are discussed from the modern point of view. Description of equipment and methods that have been used by Sykora are presented. There were used both photographic and spectral devices with registration by photographic plates and special methods of their development and enhancement. Statistical analysis was done on the basis of the expedition reports and diaries shows that by means of Sykora data it was possible to discover the auroral oval. Analysis of the photographic samples and instant sketches of aurora demonstrated typical auroral forms outlines as they are described in modern time. Spectral plates exposed during several hours under auroral lights permit to reveal not only main auroral emissions but several other unidentified weak emissions, which were rediscovered years later. Authors thank RGNF grant 08-01-4310 3 a/c.

# **TRANS-ARCTIC AIR-ROUTES, THE 2ND INTERNATIONAL POLAR YEAR (1932-1933) AND THE INVOLVEMENT OF THE GERMAN SCIENCE COMMUNITY**

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After the first World War trans-Arctic air-routes for airships from Europe to Tokyo or San Francisco appeared to emerge as the fastest means of transportation between these regions. An airship expedition of the International Society for the Exploration of the Arctic by Means of Aircraft (Aeroarctic) was designed to prove the feasibility of a high latitude route. When the issue of meteorological stations in the Arctic was tabled in a special committee of the Aeroarctic in 1926, Leonid Breitfuß, a German Russian living in Berlin, proposed the repetition of the International Polar Year (1882-1883). The new international campaign however ought to have a broader geographical base and continue during a longer observing period than before. Meteorologist Johannes Georgi from the German Maritime Observatory at Hamburg, as well as his superior Viceadmiral Dominik took part in the discussions. Towards the end of 1927 Dominik officially suggested the International Meteorological Committee that a second International Polar Year be organised. This led to the set up of a Commission for the Polar Year 1932-1933. Parallel to this the member of the Aeroarctic, Alfred Wegener, was urged to participate in the airship expedition which was being planned for the year 1930. Wegener declined, preferring at that time to prepare his own expedition to Greenland (1930-31). He also refused to incorporate his plan of an aerological cross section over Greenland along 72°N in the new Polar Year. Consequently, in the end there were three strictly separated endeavours, all of them supported by the same German science community. Altogether the various persons involved gained a lot of insight in the planning of national as well as international expeditions and meteorological experiences. Unfortunately this experience did not lead to an institutionalisation of polar research in Germany at a precarious time in history when national socialist ideas began to influence the science community.

## **US ANTARCTIC SCIENCE, 1946-1959**

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This paper will examine US contributions to Antarctic science between 1946 and 1959 with a particular focus on research in the Antarctic Peninsula region. During this period the Antarctic Peninsula was the subject of a bitter sovereignty dispute between Great Britain, Argentina, and Chile. The United States was the only other country to conduct research within this contested region, firstly with the Finn Ronne expedition of 1947-48, and secondly with the construction of Ellsworth Station and the South Pole Station during the IGY. US scientific activities served as a practical demonstration of their traditional policy of non-recognition of Antarctic claims. But the work of US scientists was also important in its own right, and in many ways the scale of the US contribution to the IGY eclipsed the work of all other countries except the Soviet Union. This paper will build on previous papers that I have presented at the SCAR history of science workshops on Argentine, Chilean, and British Antarctic science over the same period. It will examine the dynamic interaction of science, the environment, and politics in the lead up to the signature of the Antarctic Treaty of 1959. The paper will conclude that the political context of US Antarctic Science shaped the nature of the scientific work, and that the scientific work shaped US Antarctic policymaking.

**SCIENCE AND THE PEOPLE ON THE POLES – US - SOVIET EXCHANGE  
PROGRAM**

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In the beginning of IGY at September 1955 during the Brussels IGY meeting it was decided that Geographic South Pole would be occupied by US scientists and Geomagnetic South Pole would be occupied by Soviet scientists. The first US plane to land at the South Pole arrived on Oct.31, 1956 and the first Russian snow train arrived in the vicinity of the Geomagnetic South Pole on Dec.16, 1957 to establish Vostok station. The distance between South Pole and Vostok is 1253 km and these were the first two permanent stations inland on the Antarctic ice sheet. During IGY there were active exchange programs between many different national expeditions. The most interesting was the exchange program between the USA and the USSR which started in 1957. As South Pole station and Vostok station were unique in every respect the exchange program was very active. In 1964 a full set of joint US-USSR experimental programs were established at Vostok, including communications (tropospheric scattering), micropulsations, VLF phenomena, and glaciology. Between 1964 and 1986 there was a continuing American involvement and several American scientists wintered at Vostok. On the Soviet side each year an exchange scientist conducted a program at one of the American bases in different disciplines such as meteorology, geophysics, glaciology, and geology. Mostly they wintered at McMurdo, but five exchange scientists wintered at the South Pole: Dr.P.Astakhov (1967), A.Zaitsev (1977), R.Galkin (1978), Yu.Latov (1982). In addition in period 1991-1994 joint atmospheric radar experiment was conducted between Obninsk and Boulder, and Dr. N.Makarov spent the winterover at Pole in 1995. In this paper we discuss the results of scientific research conducted by American and Soviet scientist in the framework of the exchange programs at South Pole and Vostok. We also focus on the human aspects of exchange program which play an important role in the development of cooperation. Every season many flags flew over South Pole and Vostok Stations testifying to the peaceful use of Antarctica under the Antarctic Treaty – the world’s most harmonious international relations at the site of the world’s most hostile climate where men of the world can live and work in complete reconciliation and brotherhood.

**REINVENTING POLITICS AND SCIENCE IN THE POLES: IPY HISTORY AND  
THE GOVERNANCE OF SCIENCE IN POST-WESTPHALIA**

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Over the course of the last decade it has become widely recognized that global politics and traditional assumptions of state sovereignty are in a period of transformation. While significant energy has been dedicated to understanding this shift, polar science programmes are one particular tradition which have received limited examination with respect to global political transformation and, more specifically, with regard to shifting ideas of scientific inquiry and theoretical assumptions concerning natural resource development over time. The IPY is one such polar programme which has the potential to help illuminate better understandings of the ongoing and contextual relationship between science and politics. Since the first International Polar Year, the global political context has transformed markedly including a transformation of the role and perceived relevance of the polar regions in global politics. This paper will focus the politics of science through the IPY as a tradition of international science cooperation. Questions include what constitutes appropriate science? How has the authority over knowledge changed through IPY history? How does the increase in non-state actors' affect the creation and control over the flow of knowledge? Who has sovereignty over Arctic scientific knowledge and how does the International Polar Year reflect shifting power and authority of this knowledge over time?