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Notes on the history of International Polar Years in Catalonia and Spain

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Abstract

On the occasion of the celebration of the current International Polar Year, this work presents a revision of the meaning and contributions of the three previous Polar Years, and the Catalan and Spanish contributions to previous editions. Although in the current edition there are scientific expeditions sent from the Iberian Peninsula to the Antarctic and the Arctic for the first time, participation in previous editions has not been insignificant, and has resulted in an improvement in Earth sciences in Catalonia and Spain.

Key words: Polar Years, International Geophysical Year, history of meteorology

1 Introduction

The International Polar Year (IPY) officially started in March 2007. This is not the First IPY; it is preceded by three previous experiences in the last 125 years. In addition, more and similar initiatives have been carried out during this period. On the one hand, there is the International Heliophysical Year (http://ihy2007.org) and the Electronic Geophysical Year (http://www.egy.org), which have both been held at the same time. On the other hand, the UN declared 2008 the International Year of Planet Earth (http://www.esfs.org). All of them are initiatives that pursue progress in different aspects of Earth sciences.

We can ask: where does the tradition of the Polar Year come from? Why is it held? What results have been obtained? Also, and from the point of view of the Iberian Peninsula, we can ask: what do they contribute to? What can we contribute to? What have we contributed to until now? Let us review this.

The Spanish official web of the current Polar Year (http://www.api-spain.es/), in its section about the national committee, says: "For historical reasons, Spain has never institutionally participated in previous International Polar Years. However, some Spanish researchers have participated in the International Geophysical Year, in programs developed by other countries or in non-polar areas". But this affirmation is not true on several points. It is true that, until the current edition, Spain never participated with its own programs developed in polar regions. Let us remember that the Spanish Antarctic base was not created until 1986. At first it was highly provisional, and before that there were no formal governmental polar research programs (the "National program in Antarctic research" was established in 1988). But it is also true that there was institutional participation in the two previous editions of Polar Years. Therefore, this article reviews the meaning and results of the previous Polar Years, and clarifies the Spanish participation in those editions.

We must add that there is a lot of information about the different Polar Years, but, in general, this information is not easy to access. Many of the publications related to this topic have been printed in small print runs and magazines that are now difficult to find. A significant part of the information hereby presented has been taken out of the first volume of the International Geophysical Year Annals (Annals, 1959), an impressive series of publications that gathers fifty volumes published between 1957 and 1970, which compile the results of that campaign, the immediate precedent of the current International Polar Year.

2 First International Polar Year. 1882-1883

In January 1875, Carl Weyprecht (1838-1881) proposed, in the Vienna Academy of Sciences, to make a coordinated study of the different regions of the North Pole. It was the first proposal of what would later be known as International Polar Year. And what was the reason for this proposal? At that time, the parts of the Earth located over the polar circles were mostly unknown areas, which were practically uncharted. The situation was the same in equatorial Africa. Therefore, Weyprecht, who had already directed polar expeditions and knew the scarcity in the existing knowledge, proposed to use polar expeditions for scientific research purposes that would be more than mere geographical explorations. He pointed out that the only way to obtain the desired results was through simultaneous and closely coordinated campaigns, which would allow for the simultaneous collection of data in the whole polar circle.

To better appreciate the contents of the proposal, we must note that at the beginning of the second half of the 19th Century, Meteorology had just started its modern development and the structures and organizations that still function nowadays had just begun to be implemented. In this sense, the first effective efforts to create a worldwide network of meteorological stations, or to provide assessment about devices, how to install them, observation timetables, and so on, were carried out in the 1872 meeting in Leipzig and in the 1873 meteorological congress in Vienna. This was where the International Meteorological Organization (IMO) was created, the first organization fully dedicated to worldwide coordination in meteorology. Therefore, the proposal was made based on a structure of world meteorological observations that was still in its early stages.

So why a campaign about polar meteorological observations? At that time, as mentioned, the standards of what would later become worldwide meteorological networks were just beginning to be defined. The first results obtained with the first forecasts made -mainly English experiences- using a significant quantity of data collected by telegraph were encouraging and, moreover, they already suggested that what happened in the Poles was important in order to define the weather in the center and North of Europe. Therefore, to extend the synoptic network to polar regions was considered interesting. Besides at that time it had already been observed that telegraphic networks (the same ones that allowed compiling meteorological data) were very noisy, and sometimes the connection between stations was impossible during the days with polar auroras. We note that at that time, and until 1919, when the International Association for Terrestrial Magnetism and Electricity (IATME) was created, terrestrial magnetism was considered a constituent part of meteorology. Due to that, the recording of the terrestrial magnetic field in polar latitudes was included among the goals of the campaign. Finally, the detailed observation of auroras, which were still very unexplored phenomena, was also part of it.

Figure 1. Picture of Carl Weyprecth (1838-1881), founder of the First International Polar Year.

The meteorological congress of the IMO celebrated in Rome in the spring of 1879 acknowledged the importance of the proposal defended by Weyprecht and formally adopted it. At the same time, a specific commission in charge of organizing the campaign was created. The commission held three meetings prior to the Polar Year, the "International Polar Conferences" (Hamburg, 1879; Bern, 1880; St. Petersburg, 1882). The goals and available means were defined at these conferences. This was not an easy task, as nations were reluctant to destine resources to a cooperation project that had never been tested before. On the other hand, there were many other things to think about for the first time; for instance the program of "compulsory" (in the official terminology it was called "necessary") and complementary observations (the ones that would be advisable) that all participants should fulfill, the hours that they should be done at, the methodology, etc. 12 countries joined the project: Denmark, France, Germany, the United Kingdom, Netherlands, Russia, Sweden, the United States of America, Austria-Hungary, Norway, Canada and Finland.

The International Polar Year started on August 1st 1882, and lasted till September 1st 1883. Weyprecht (Figure 1) had died one year before, so he could not see its execution.

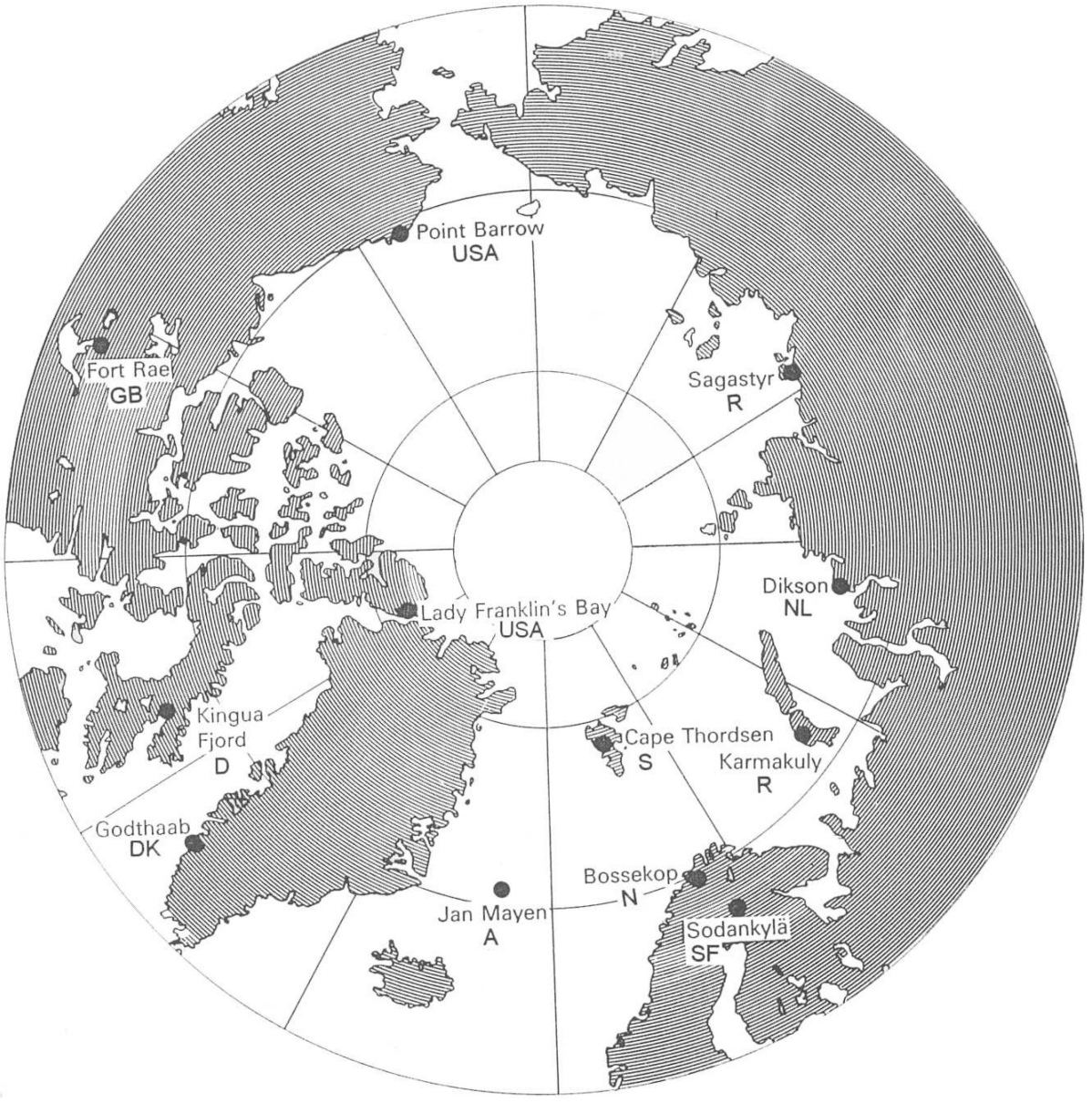

Figure 2. Distribution of the meteorological stations around the Arctic Circle during the First International Polar Year (Luedecke, 2004). USA: United States of America, R: Russia, DK: Denmark, A: Austria, N: Norway, NL: Netherlands, GB: Great Britain, D: Germany, S: Sweden, SF: Finland.

Twelve main stations were established (see Figure 2), with some secondary stations that depended on the main ones, in the Arctic area and two in the sub-Antarctic area (the means and knowledge of the time advised not to venture further than the Antarctic Circle).

Once the Polar Year was finished, in the spring of 1884, a scientific congress was held in Vienna to analyze its results. It was decided that participant countries were in charge of publishing detailed reports of the observations carried out. Almost all of them did, but nowadays it is difficult to find the published copies (nearly all of them were done in *grand luxe* editions for that time). Luckily, more recently a significant effort has been made in compiling all these books, and thus, most of them can now be found in the Internet (http://www.arctic.noaa.gov/aro/ipy-1/index.htm).

But the results were not as spectacular as expected, probably because the procedures and knowledge needed to take advantage of the data gathered were still not well developed. Another reason was that there was no global study carried out, only studies using national data were done. However, they helped to better define the characteristics of the Arctic climate, which was little known until then, and they were very important from a methodological point of view. Many of the procedures which are now generalized in meteorological observation were defined and/or tested during that campaign. Based on the knowledge acquired, new instrumentation was developed, which was better adapted to the register in polar areas, and this would become very useful in the future. As an example of the difficulties, the freezing of mercury in the thermometers is often mentioned in the reports of that time. On the other hand, the possibilities of the data obtained during that first campaign are still not exhausted, as shown in recent studies such as Wood and Overland (2006), where they use again the data collected 125 years ago in the light of current knowledge.

Regarding methodological results, a very important one was the establishment of "international days", a procedure extracted from the magnetic observation methodologies of Carl F. Gauss (1777-1855). These days are previously fixed dates, during which a special effort is made in incrementing the number of observations and observed parameters, which make it possible, therefore, to get much denser temporal series. This resource is still used today. Another one was the definition of a common methodology for the observation of auroras. Moreover, it is important to consider that that International Polar Year was the first international project coordinated and developed by the IMO, and it also served to define and try out the new possibilities for international meteorological cooperation.

3 Second International Polar Year. 1932-33

After the experience of the First Polar Year and a World War, with the subsequent refoundation of the IMO, in 1919, the first person who proposed a new International Polar Year -the second in history- was J. Georgi (1888-1972), disciple and collaborator of A. Wegener (1880-1930), who also had vast experience in polar studies. It was 1927, and what encouraged him to propose it was the observation of strong air currents between 10 and 15 km above the ground in the polar areas. Those were the first findings that years later would lead to the discovery of the *jet stream*. The idea was well received because good scientific results were foresaw. In addition to the specific motive, the development of air physics and meteorological prediction had proved the need for the availability of dense, simultaneous and tridimensional series. Therefore, a new Polar Year was a good opportunity to attain them. The IMO officially adopted it in the Copenhagen meeting in 1929 and the IUGG (International Union of Geodesy and Geophysics) did it in Stockholm in 1930. Therefore, both organizations would collaborate in its organization. They started to work on a program to be implemented in 1932-33, so it would commemorate the fiftieth anniversary of the Polar Year. In this occasion the number of participant countries reached forty-four.

The main goals were the improvement of meteorological forecasting in the whole hemisphere through the study of meteorological conditions in high latitudes. Following the line established in the First IPY, special efforts were devoted to the study of fast variations in the magnetic field, which are directly linked to the conditions of the ionosphere, and are of vital importance for radiocommunication, which was undergoing a period of great expansion at the time. To this end, guided by the accumulated experience of the First Polar Year and all the developments that took place (there were many of them, for instance key points such as the introduction of the front model), it was considered essential to design a program of reference stations in middle latitudes and equatorial latitudes, in addition to the polar stations, so the set of data obtained could be comparable everywhere.

In this case, the backbone of the whole organization was D. La Cour (1867-1942), from Denmark, who was the president of the organizing committee named by the IMO. With his dynamism and his ease in dealing with different institutions, he built a project that was more ambitious than the one fifty years earlier. When the project was in an advanced phase, the economic crisis of 1929 threatened its implementation. There were people who asked to postpone it for a few years; but as the preparations were so far advanced, it was advised to go ahead, even if this resulted in the reduction of some of the proposed programs. Therefore, the second International Polar Year officially started on August 1st 1932 and lasted until December 31st 1933. It actually lasted a year and a half. In this way Antarctic expeditions, which were much more important than fifty years before, even though they still did not evenly cover the whole area, were able to arrive to the designated places during the Antarctic summer and complete a whole year of observations at the same time as those made in the Arctic.

Once the problems of the economic crisis were overcome, after its implementation, the exploitation of the data obtained was then disrupted by the Second World War. In

order to facilitate a more global vision of the data and improve the system used in the First Polar Year, there was an attempt to centralize the data and make it accessible to any researcher. For this reason, copies of all the observations made in each area were gathered, including the recording bands in microfilm format in the Danish Meteorological Institute, where they can still be consulted today.

The Second World War not only affected the exploitation of the data accumulated during the campaign, but also, like the first war, directly affected the structure of the IMO. In 1950 the IMO became the World Meteorological Organization (WMO), an intergovernmental organization which was changing its structure from independent scientific association to one dependent on the member states. In 1946 the IMO, which was already in a transition period before being refunded as WMO, recognized the importance of the second Polar Year by nominating a commission of the Polar Year in charge of finishing all projects in progress at the time related to the Polar Year, suspended during the war, and finishing the data collecting. In the absence of La Cour, who died during the years of the World War, J. A. Fleming acted as president and V. Laursen, secretary of the commission, compiled all existing bibliography about that Polar Year (Laursen (comp.), 1951).

The main results of this campaign were the first compilation of daily hemispheric synoptic maps, and the generalization of the use of radiosondes to analyze the high atmosphere. Both projects received donations from the Rockefeller Foundation. In addition to the strictly meteorological objectives, it also served to consolidate the study of the ionosphere using ionosondes and the fast variations of the geomagnetic field using specially designed devices.

4 International Geophysical Year. 1957-58

The World War II led to significant development in meteorological services. New advances, such as the confirmation of the jet stream, and new issues appeared. On the other hand, the continuous improvement in radiocommunications kept calling for more accurate knowledge of the phenomena that occurred in the ionosphere and, in general, of all problems related with atmospheric electricity.

The proposal of a third Polar Year, which would allow for the relaunching of the research about many of these phenomena on a global scale and, simultaneously, rebuilding international scientific relations, severely affected by the war and subsequently divided, came up at an informal dinner at Silver Springs, Maryland. It was hosted by J. A. Van Allen (1914-2006) and attended by, among other guests, S. Chapman (1888-1970) and L. V. Berkner (1905-1967), at the time executive secretary of the *US Research and Development Board* (Korsmo, 2007). These two men proposed the idea of a third Polar Year. Also, they proposed 1957 to 58 for the next Polar Year, given that the previous one had taken place twenty-five years earlier and, most importantly, because it would coincide with a maximum of solar activity, important in all studies related to the ionosphere and atmospheric electricity in general.

However, it was not a good moment in political terms, as that was the year the Korean war began. A world divided in blocs was not promoting cooperation even among scientific institutions. At any rate, the impossible was done and an organization commission was constituted. The roles of the second year were reversed and the official initiative arose from the International Union of Geodesy and Geophysics, which made the proposal in 1951 and the WMO, recently constituted, officially joined it in 1953. Probably, the key to the success of the project was that it was proposed from the IUGG itself, a scientific association with autonomy, and not from the interstate organizations, where the project would have failed due to political problems. On the other hand, at the time meteorological services around the world, and the WMO itself, had most of their efforts focused on serving the needs of aviation and their respective national defenses, to the detriment of time dedicated to research that had characterized the early decades of the century. In addition to that, and due to progress in atmospheric knowledge, the new intense observation campaigns were not expected to have great results. Their sights were set on satellite observation and numeric prediction. The WMO joined the project resolutely anyway and collaborated in all aspects of interest. While preparing the new polar campaigns they found that, on certain topics, there was more of a need for knowledge about equatorial areas, scarcely studied at the time, than about the poles. Soon the observations chart that was to be made went beyond the "polar" and purely "meteorological" dimension, becoming a project to study the whole Earth from a scientific point of view. Due to this, the name of the International Geophysical Year (IGY) was already chosen in 1952 for the new edition of the Polar Year.

In order to organize it, the ICSU (International Council of Scientific Unions) created the so called Special Committee for the International Geophysical Year (CSAGI), led by Sidney Chapman. This committee organized four preparatory plenary meetings, in Brussels, Rome, Brussels again and the last one in Barcelona, as we will see shortly. It continued its activities after the IGY, in order to leave all data and results of the campaign organized.

The dimensions of this venture kept growing and finally there were more than 30.000 (in some places it is said there were 60.000) scientists and technicians involved in the project. When it came time for its implementation, on July 1st 1957 (it ended on December 31st 1958), more than 2.500 observatories of all kinds compiled data and sixty seven countries made an official committee to coordinate the tasks of the geophysical year, Spain among them.

This time the results reflected the efforts. The first artificial satellites were launched for the IGY, led by the famous Sputnik; the Van Allen Belts were discovered, and the dimensions and shape of the Earth were redefined. The active rifts in the bottom of the oceans were discovered (some years passed before discovering that they were part of the sutures

Figure 3. The IGY, already organized by the second half of the 20th Century, was more careful with its outward image and designed a logotype for the International Geophysical Year.

of the tectonic plates) and knowledge about oceanic currents was improved. The Antarctic area was intensively covered for the first time and the quantity of ice there was evaluated. On the other hand, and due to the reasons above mentioned, the results in the field of meteorology did not achieve the goals obtained in previous editions.

Given the experience of previous IPY, special attention was paid to making the acquired data accessible to all researchers who might need them. The World Data Centers (WDC) were created with the purpose of collecting, preserving and distributing geophysical data; they are still active today and they are one of the best contributions of the IGY to the progress in Earth knowledge (http://www.ngdc.noaa.gov/wdc/wdcmain.html). In fact, the WDC and the data distribution procedures developed by them have allowed and continue to allow a vast development in the Earth sciences.

Moreover, research efforts were not strictly limited to the data of the IGY and many activities continued in 1959, during the International Geophysical Cooperation Year, and further on in the International Year of Quiet Sun (IQSY), in 1964-65. In addition, a noteworthy and indirect result of the IGY, was the establishment of the Antarctic Treaty, something that should not be underestimated and goes way beyond the scientific field.

In short, the IGY is the most complex and ambitious action of international cooperation in research ever carried out in times of peace until today. This is the reason for its popularity during that period, now mostly forgotten, and similar to the popularity the space race would have years later. The two main superpowers, the USA and the USSR, did postal dissemination of the event and it was widely reported by the newspapers of the time (see Figure 3). For more information on this, see a recent article by Korsmo (2007) about the meaning of the IGY.

5 Catalan and Spanish participation in Polar Years

We cannot say that Catalan participation, and even Spanish participation was of key importance in the Polar Years, but it was not insignificant. It has increased, involving more and more researchers and institutions in each edition. To recover this contribution and value it fairly, we will attempt to clarify the main Catalan and Spanish contributions to this field.

5.1 First Polar Year

The First Polar Year hardly aroused any interest in this geographic area. A scientific magazine of the time, such as *Crònica Científica*, published in Barcelona, hardly dedicated any space to it. Actually, in its pages we find the news of the departure of some polar expeditions (ex. Vol. IV, p. 399, departure of the Norwegian expedition), but it was never related with a global project. On the other hand, there is no doubt that the information arrived to different official institutions. For instance, Antonio Aguilar and Cecilio Pujazón (see Figure 4), directors of the *Observatorio Astronómico de Madrid* (Madrid astronomical observatory) and the *Real Observatorio de San Fernando* (Royal observatory of San Fernando) respectively, both institutions with responsability in the field of meteorology, took part in the meteorological congress in Rome, in 1879. It was at this congress, as mentioned earlier, that the proposal to organize the Polar Year was approved.

In fact, there was a Catalan directly involved in its development, even if it was from far away. He was Benet Vinyes (1837-1893), the Jesuit director of the Observatory of the school of Belen, in Havana, Cuba. In this case, the Observatory of Belen participated as a reference station, where the same observations were done as in the polar stations, in order to make possible the subsequent comparison of simultaneously obtained data. For this reason, during the entire reference period hourly observations were done, and during the international days the observations were carried out every fifteen minutes and manually, even the ones with the magnetic instrumentation, due to the lack of register devices (Ramos Guadalupe, 2003).

5.2 Second Polar Year

In the second Polar Year we find more official and extensive participation. The existence of the *Servei Meteorològic de Catalunya* (Meteorological Service of Catalonia), member of the IMO, facilitated this participation. The possibility of a polar expedition was not suggested in Catalonia, but participation in the complementary projects designed to optimize results was. One of these complementary projects was the creation of mountain meteorological observatories. The idea behind this was to obtain data about high-level circulation. As a result, during a time when soundings were mainly done with non-instrumented free balloons and were scarce, the possibility of installing observatories in high places in low latitudes was suggested. They would act as points in the atmospheric stream that are undisturbed by the layer near the surface, and where it was possible to obtain a continuous register of atmospheric variables. In this sense, Eduard Fontserè, chief of the Meteorological Service of Catalonia, who also had first-hand information about the projects (he attended the IMO meeting in Copenhagen in 1929, where

Figure 4. Picture of the assistants to the meteorological congress in Rome in 1879, where the realization of the First Polar Year was approved. Weyprecht is the fourth on the right in the middle row, marked with an arrow. Aguilar is the third on the left in the first row and Pujazón is just behind him, standing. Both are marked with arrows.

the project was officially launched), saw the possibility of collaborating in the project with the installation of two mountain stations, one in Turó de l'Home and the other in Sant Jeroni, in Montserrat (Figure 5). The story of its installation and its first results can be found in the publication *Les Estacions de Muntanya* (1933) (Mountain stations) by Fontserè himself. The moment of its installation, however, was not the most suitable, given the recent change of the political regime in Spain and that the reestablished *Generalitat*, the government of Catalonia, was still provisional. Nevertheless, even with the fact that it was provisional, the *Generalitat* never had any doubts about the scientific and cultural interest of the project and supported it, making this participation a reality. Actually, the observatory in Turó de l'Home was considered to be a project with a more far reaching future, which had to become a research center; but the following events impeded this from happening. Even the analysis of the data during the first operational years of the observatory was halted by the civil war (Fontserè, 1950).

The *Observatori de l'Ebre* (Ebro Observatory) also participated in the tasks of the second Polar Year. In this case, it acted as a reference station for the recording of the geomagnetic field. For this reason, the organizing committee of the IPY provided the center with new fast magnetic registers, La Cour type, especially developed for the occasion, which have been operational until very recently, when they were switched for new digital devices (Puig, 1932; Batlló, 2005). A few days before the beginning of the observation period, in July 1932, La Cour himself brought these devices to the observatory and later visited Fontserè in Barcelona, in order to check the state of the preparations of the station in Turó de l'Home.

The *Institut d'Estudis Catalans* (Institute of Catalan Studies) also joined the IPY through the announcement of the "Enric de Larratea" award (which is still being called), with the special goal that year of awarding a research project on topics of the IPY. Unfortunately, the award remained void.

Finally, a third Spanish entity, the *Instituto Geográfico y Estadístico* (IGE) (Geographical and statistical institute), participated in the works of the IPY. In this case, as related by José Galbis (Ruiz Morales, 2005), the institute was responsible for the installation of a magnetic register station, with its enclosed meteorological station, in Equatorial Guinea. The person in charge of this operation was the geographer engineer Emilio Bonelli (1902-1962). Additionally, and within the objectives of the IPY, he reinforced all the observations in the Izaña observatory, as a mountain station, and the observations in high atmosphere.

At this point, thus, we must deny the affirmation made by the current Spanish committee for the Polar Year, mentioned in the first section, about Spain's non-institutional participation in previous editions. In the minutes of the meeting of the organizing commission of the Polar Year, held at Innsbruck in September 1931, besides detailing the preparations

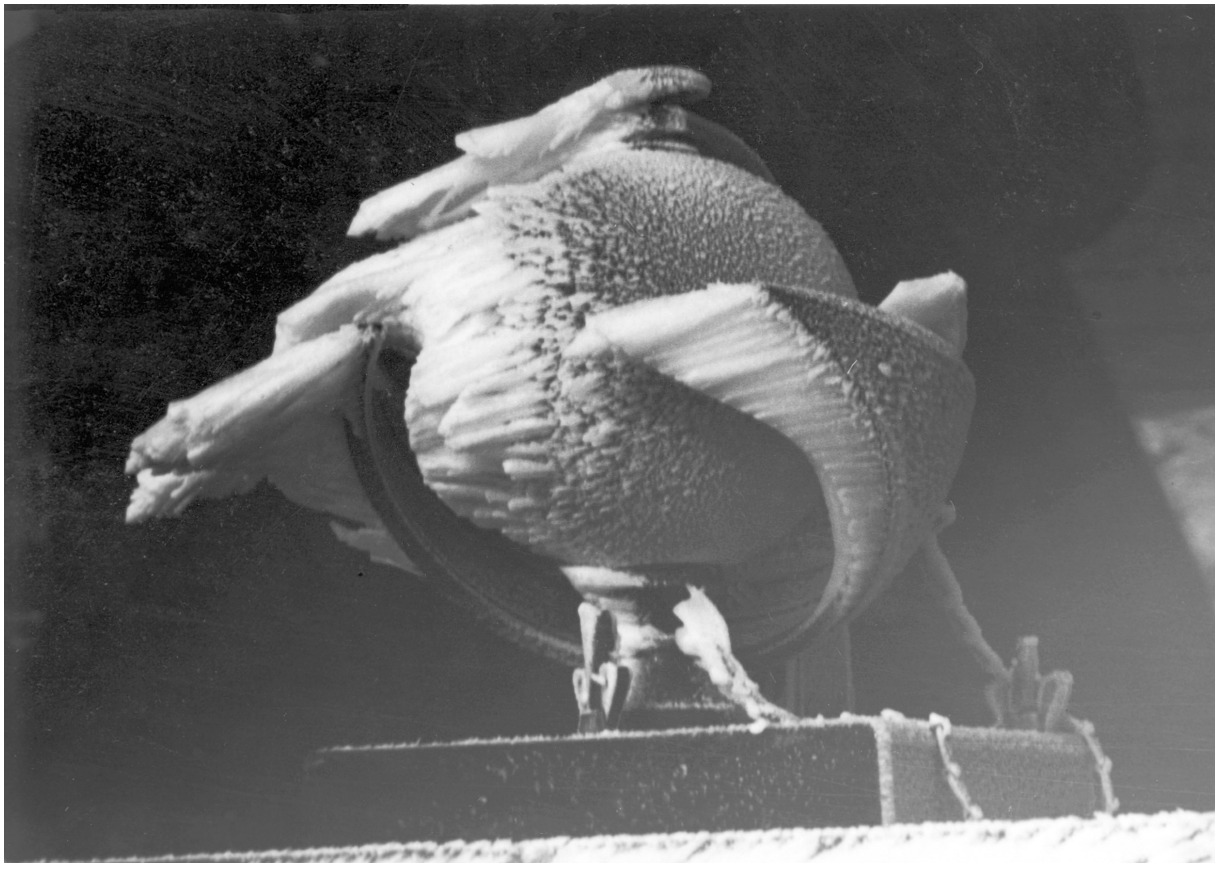

Figure 5. The Campbell heliograph in the observatory of Turó de l'Home after being affected by a freezing fog. This picture was used as a Christmas card by the Meteorological Service of Catalonia in 1933 (image from the batch of the old Meteorological Service of Catalonia, *Cartoteca de Catalunya*, ICC).

for different participants, the Spanish organization commission is described. It was made up of fifteen members, among them E. Fontserè and L. Rodès as well as E. Messeguer, at the time director of the SME (Spanish meteorological service), and it was presided by the director of the IGE. The participation of the IGE, and therefore of the SME, which was part of it, was officialized through a decree in the Gaceta de Madrid (1932) that, in its first article, said: "The *Instituto Geográfico, Catastral y Estadístico* will be in charge of organizing the international collaboration works in the Polar Year...". The decree was signed by the president of the republic, Niceto Alcalá-Zamora. Therefore, participation was completely official.

However, the little impact this participation had is odd. There are no special publications found of the SME or the IGE about this topic. Even the existence and composition of the Spanish organizing commission is only known by the minutes of the Innsbruck meeting, published outside the Iberian Peninsula; we have not found any mention of it in other forms or document. Instead, in the minutes of the different international congresses, we found how the respective Spanish delegations announced that they had carried out all assigned tasks. Probably, as we have already mentioned, the period of change in the country, with the new republic, was not the best moment to delve into the results. The bibliography of the IPY by Laursen (comp.) (1951) informs that the copy of magnetic records and manuscript summaries of the observations done in Guinea can be found in the library of Copenhagen. Moreover, he quotes a document by De Buen (1931) that presents a project of an oceanographic expedition to the Guinean gulf, but we have not heard that it was carried out.

5.3 International Geophysical Year

For the International Geophysical Year of 1957, given the political situation, there were no official Catalan institutions that could participate in it. This did not impede a Catalan institution, the *Observatori de l'Ebre* and, especially, its director in those days, the Jesuit Antoni Romañà (1900-1981) from playing an important role again.

During this occasion, a Spanish official commission was created at the highest level, to prepare and manage the programs and projects of the IGY. It was first presided by the admiral W. Benítez Inglott, director of the observatory of San Fernando, when he died, by the admiral Rafael Estrada, and

Figure 6. Picture of the participants in the CSAGI meeting in Barcelona. Romañà wears a cassock and stands on the right end. The picture was taken on the stairs of the Catalonia library (picture kept in the library of the *Observatori de l'Ebre*).

when the latter died, by J. J. de Jauregui. The project was widely known on a public level. Many snippets about various projects can be found in the press of that time. The IGY's Spanish commission itself organized a series of lectures in Madrid to spread the general objectives (Sans Huelin, 1955). A sign of the wide dissemination and popular knowledge of the IGY is that one of the Valencia falles of 1958 was dedicated to it (Català, 2003).

From a scientific point of view, there was not any Antarctic expedition, but there were in depth collaborations with other programs of the IGY. On the one hand, the *Instituto Geográfico y Estadístico* (geographical and statistical institute) built new magnetic observatories in Logroño, Tenerife and the island of Moka, in Equatorial Guinea (this time a permanent one) for the occasion, and the instrumentation of the existent geophysical observatories was also improved and increased (Batlló, 2005). On the other hand, seismology was also one of the intervention fields, and the instrumentation of all observatories was updated in order to improve its observation capacity (Batlló, 2004). We cannot find any trace of the SMN (National meteorological service) in the IGY campaigns, even though Francisco Morán (1901-1984) was part of the national committee. In this case, and as mentioned earlier when referring to the general meaning of the IGY, meteorology did not have the predominant role it had in previous editions and, although the WMO advised carrying out a special observation plan which covered the entire IGY period, not many special experiments were designed in these field and none in which the SMN was directly involved. Therefore, the participation of this institution was reduced to periodically carry out all special observations, without developing any special research project (M. Palomares, personal communication).

The *Observatori de l'Ebre*'s equipment was also considerably improved: the magnetic register was updated, a ionospheric sounder was installed -the first one in the Iberian Peninsula-, and a Lyot filter for solar observation was purchased (the astronomic observatory of Madrid was also equipped with this kind of instrument). Once again, an institutional involved at the highest level is demonstrated in the *Boletín Oficial del Estado* (official bulletin of the state), which published three laws during this period (BOE, 18 de Julio de 1956, 29 de Diciembre de 1956, 28 de Diciembre de 1957) that stipulated extraordinary credits for the institutions involved.

We note the task of human and international relations carried out from the *Observatori de l'Ebre*. Romañà, its director by then, who, since the beginning of his career, was

deeply connected with studies about magnetic field and was a member of several international organizations about it, was the secretary of the Spanish commission that organized the IGY. He took advantage of his position to offer to organize a meeting of the CSAGI in Barcelona. As a result, the last plenary preparatory meeting for the IGY took place in Barcelona, on September 10 - 15 1956. The local organizer of the meeting was Romañà, assisted by J. O. Cardús as secretary of the organization. The press of the time reported widely on the meeting and several other activities organized by the attendees of the congress.

The author of this study finds it strange that, given the domestic situation in Spain, the meeting of the CSAGI was held in Barcelona and not in Madrid. Aside from its scientific content, it was probably an event of international prestige, given that Spain was not admitted as a member of the UN until December 1955. The choice of Barcelona instead of Madrid could also be justified by the participation of delegates from Soviet bloc countries in the meeting (it was the first time after the Spanish Civil War that scientists from the Soviet Union visited Spain), obviously against the Franco regime. Thus Barcelona as the choice for the location of the meeting and the scientific prestige of the *Observatori de l'Ebre*, could better justify their presence in a country that was condemned by their governments.

The meeting was successful, and the different subcommissions did a good job in the organization of the preparatives for the IGY. As an anecdote, it was in Barcelona, on 11 September, that the Soviet delegation announced that they would participate in the satellite research program. One year later, on 4 October, the Sputnik was launched. Figure 6 shows the "group photograph" of the meeting.

6 Conclusions

This work reviews the motivation, goals and results of the three editions of the Polar Year prior to the current one. While editions one and two were mainly dedicated to meteorological studies, the third was mostly devoted to other fields of Earth physics. In relation to the impact of these initiatives in Catalan and Spanish meteorology, we have seen that since the second edition of the International Polar Year (1932-33), Spain has been involved in its organization at the highest institutional level. Until the current edition, no research projects have been developed in the Arctic waters or in the Antarctic. However, in the previous editions there was active participation with projects of less magnitude. We have also traced the presence of Catalan researchers in all editions of the Polar Year. At the end of the day, the results of these participations are not very spectacular. Most probably a part of the problem was the lack of institutional continuity. The political ups and downs of the 20th Century and the setback of the Spanish Civil War impeded the continuation of initiated projects.

It is clear, however, that the different International Polar Years has been useful to improve the observation networks and the instrumentation devoted to Earth sciences and to develop new projects that have enriched science in the Iberian Peninsula. We hope that this first analysis could be useful as a basis for other analyses that follow that provide solutions to some of the questions and delve deeper into the evaluation of the results.

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