

Introduction to this Special Section: eGY

The International Geophysical Year (IGY) represented a worldwide effort to explore our planet using the best science and technology available in 1957. The IGY was somewhat misnamed in that it actually ran 18 months with a 12-month extension called the International Geophysical Cooperation (IGC). The goals of IGY/IGC were simultaneous observations in 15 areas: aurora and airglow, cosmic rays, geomagnetism, glaciology, gravity, ionospheric physics, latitude and longitude determination, meteorology, oceanography, rocketry, satellites, seismology, solar activity, radioactivity of the atmosphere, and World Days. The IGY took place simultaneously with the launching of the first artificial Earth satellites, which inaugurated the “space age.” Over 70 countries collaborated and supported the development of plans for peaceful collection and exchange of geoscientific measurements, their interpretation, and understanding. Now, for IGY’s 50th Anniversary, more than 120 countries are collaborating in several “geophysical years” to collect data about the Earth and its relationship to the sun. The major initiatives include the International Polar Year (IPY), the International Heliophysical Year (IHY), the Electronic Geophysical Year (eGY), and the International Year of Planet Earth (IYPE). SEG has officially recognized these specific international science projects.

1957, 2007, 2057. IGY’s 50th anniversary is an opportunity for us to look back half a century and see where we have come from and to look at what others will say about what we are doing now when looking back from 2057. This special section, in keeping with that premise, provides a historical snapshot of some IGY events and addresses some current issues to consider as we plan the next 50 years.

My first (R. B.) and most enduring memory of IGY was the result of being punished for bad classroom behavior in the third grade. My father and I were to meet the teacher at school at 5:30 a.m. the next morning. It was October 1957 and it was cool and clear at 5:30 a.m. Behind the school was a hill which, in a month or two, would be a sledding mecca. The teacher walked my dad and I up near the top of the hill. No one spoke. I was handed a pair of binoculars, told to look northwest, opposite the sun, and what I saw I can still picture today—Sputnik.

I bring up that personal memory to put into perspective the wonderful technical resources which did not exist in 1957 but which are now available to us, in large part because of Sputnik and the interest in science that it generated. This issue will detail the significance of IGY on international progress and understanding of Earth processes. Many SEG members were immersed in IGY projects sponsored by industry, by government, by institutions and by universities. (See excerpts from GEOPHYSICS articles by Sorge and Lyons.)

The advances made in the past 50 years were possible because of a motivated world public and their desire to understand the Earth and improve the quality of life on Earth. The geoscientists of that time shared a common sense of cooperation for the betterment of all humankind.

The current efforts should produce even more data because today we have off-the-shelf electronics, jet aircraft, GPS, the Internet, and an internationally based corps of dedicated scientists/engineers. The eGY of 2007–2008 is a university, government, and industry program to facilitate the communications of Earth information so that we can all understand more. The eGY also recognizes that data must



Figure 1. (a) Just before the beginning of the IGY, a LIFE photographer took this photograph in the international IGY office at Brussels. The occasion was a meeting of the five-man Bureau of CSAGI, the special IGY international committee. E. Herbays (left) was present to advise the Bureau; he was treasurer of the International Council of Scientific Unions, a member of CSAGI, and its first convener. The others, from left to right, were V. V. Belousov (member), L. V. Berkner (vice-president), M. Nicolet (general secretary), J. Coulomb (member), and S. Chapman (president). (b) The IGY calendar included an extra month at each end of the actual IGY. Many IGY procedures underwent trials during June 1957. Numerous IGY observations were increased or extended on the regular World Days—three or four per month—whose dates are circled. World Days of special character—new moon, total eclipse, or unusual meteor activity—are indicated. Special weather observations were made during World Meteorological Intervals—each of 10 consecutive days in each quarter year; their dates are enclosed in boxes. These two images were scanned from a book by Chapman which chronicles many of the activities associated with the IGY.

be protected in different ways that range from proprietary to data stewardship to self-describing interoperative data standards to instant access to archived data and real-time data measurements.

In 1957, there were no cell phones or even touch-tone phones; you dialed a number (sometimes on a “party” line). The four-engine Super-G Constellation was the aircraft of choice for the transcontinental hop from New York to San Francisco (this included a stop in Chicago for refueling). Intercontinental travel was very time-consuming. Computers were well, the description of a computer in the 1957 *Encyclopedia Britannica* was “a mechanical computing device.”

SEG cooperation in the International Geophysical Year

At the suggestion of past president Paul Lyons and with the approval of the Executive Committee, the Public Relations Committee contacted the U.S. Chairman of the International Geophysical Year, Joseph Kaplan, and offered the assistance of the Society in carrying out a project of measuring the reflection time of reflections of the Mohorovicic layer on a world-wide basis. The U.S. International Geophysical Year Committee gladly accepted our offer, and since then communications have been carried on with members of the International Geophysical Year organization in regard to some of the details of the proposed project. There are a number of problems that need to be solved in connection with this project, and it is the recommendation of the Public Relations Committee that the Society appoint a special committee to vigorously prosecute this project so that all plans can be ready and associated problems solved at the beginning of the International Geophysical Year in July 1957. The Canadian Geophysical Society has offered to be the liaison between the Canadian Committee for the International Geophysical Year and the oil industry. They have received favorable response from Dr. Beals of the IGY, and details are being worked out. In addition to the above activities, a great number of requests for information have been received as a result of the mailing of the employment bulletins. The information requested has been furnished as much as possible, and we wish to acknowledge the valuable assistance that the SEG business office has rendered in this task. All of the above projects have been initiated and are being continued with the idea of creating an interest in geophysics among high school and college students and of spreading information about geophysics among those who are in a position to educate and influence science students. The Committee feels strongly that only through the successful dissemination of information about geophysics can our industry hope to alleviate the present shortage of qualified and technically trained personnel. Toward this end the Committee will continue its endeavor to achieve the desired results. It has been a privilege and a pleasure to serve the Society during this past year.

—BART W. SORGE
GEOPHYSICS, 1957

Report of the IGY Committee

At the outset of the International Geophysical Year, it was determined that the IGY Committee of SEG would cooperate in every way within its means to assist in the furtherance of the investigations being carried on. The committee is now in its second term. Aside from cooperative efforts to record seismically underground nuclear explosions, previously reported, the committee has set as its primary task the assembly of a gravity map of the world. The committee has actively solicited regional Bouguer maps and pendulum observations, and a file has been accumulated which is being posted on maps to be contoured with a ten-milligal interval. The characteristics of gravity in areas of complete control are to be applied to extend dotted contours in areas of sparse control. Magnetic data are also used to determine the probable distribution of contours. The greatest problem, of course, lies in the apparent random distribution of ever present intrabasement anomalies. Especially helpful are the world-wide traverses established by George P. Woollard; it is planned to tie the entire world map to these accurate bases. The map so constructed will at best be only a preliminary map. If the data from the IGY observations are available in time, it is planned to publish these maps in the forthcoming anniversary issue of *GEOPHYSICS*. It is hoped that such a map will provide an insight into fundamental problems of crustal structure and that they will assist exploration geophysicists in the world-wide search for minerals.

—PAUL L. LYONS, CHAIRMAN
GEOPHYSICS, 1958

SEG and eGY. The focus of eGY is e-science in the 21st century. It has at its core the understanding that universal access to data is the great leveler for humanity. Thanks to SEG's support, the eGY theme/logo may be used by the Society and local geophysical sections to promote events and initiatives community.

SEG members can take advantage of eGY events and related news stories to make the public aware of the benefits and promise of the geosciences. They were summarized by the SEG Executive Committee in 2005 in the following proclamation: "SEG, noting the approach of the 50-year anniversary in 2007 of the International Geophysical Year (IGY), which was outstandingly successful in advancing our knowledge of the Earth and geospace through the provision of comprehensive geoscientific observational data, noting the vast increase in observational data since the IGY, much of them available in near real-time, and the limitations on

progress posed by the ever-growing problems of data storage, maintenance and access, noting the unprecedented potential of modern information management methodologies, based on the Internet, to overcome these limitations through sharing of information, software, and hardware, and supports the adoption of 2007 as the Electronic Geophysical Year (eGY) to be used as a focus for providing ready access to geoscientific data and processing capability using the electronic means now at our disposal."

In 2003–2004, Brian Spies (then SEG first vice president) was instrumental in identifying and leading SEG's efforts to join the eGY initiative. Spies' imagination and forward thinking enabled discussions about future needs of the new Information Age and how exploration geophysicists

would manage the new tools available to them.

Spies, now Science Manager, Sydney Catchment Authority, explains, "It was clear from my involvement with

Several years ago my wife, Betty, and I were supervising McIntosh Hall. As we sat at the window eating our dinner one early spring day, we observed Dr. Chapman walking south across the campus with the characteristic British swinging of both arms. I have applauded this sort of "marching" ever since I observed the Aussies during World War II. Approximately twenty-five minutes later we observed Dr. Chapman retracing his steps, this time going north. I noticed that he was only swinging his right hand and arm. As he passed rather close to our window I noticed that he was holding several early spring flowers in his left hand. He had walked down to the south bluff of the campus and picked them to bring them home to his wife.

—C. J. KEIM, College, Alaska
Geophysical Institute, UAF

various SEG committees over the years, in particular the need of the SEG Research Committee to access and process large 3D data volumes, as well as with the early development of a Web presence for SEG, that large-scale exchange of data was crucial to the continued growth of our science and profession. Raw data is at the very foundation of the conceptual pyramid of data-> information-> knowledge-> wisdom. And unlike tangible property, data are not lost or diluted by sharing. On the contrary, the more data are shared, the more knowledge we have, and with bandwidths increasing at a rapid pace, the opportunities are limitless. The eGY seemed a logical extension of the whole concept of cooperative learning and advancement of science, and I was keen for SEG to be involved from the earliest stages. On a personal note, my exposure in high school to fundamental discoveries in marine science that resulted from the International Geophysical Year motivated me to pursue a career in geophysics. The eGY is the next logical step in discovery following in the footsteps of the IGY."

SEG and IYPE. SEG is an International Partner of the IYPE. This affiliation should help SEG increase its presence in countries, particularly "developing" countries other than the United States. Following is the 2007 SEG resolution: "Whereas the International Year of Planet Earth (IYPE) is a joint initiative by the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the International Union of Geological Sciences (IUGS), and whereas the SEG expects the exploration industry to benefit significantly from the activities of the IYPE as it will draw particular attention of our youth and excite them about the Earth sciences, and whereas the SEG has been invited to become an International Partner of the IYPE, therefore SEG accepts the invitation and joins others as an International Partner of the IYPE, and further SEG supports 2008 as the International Year of Planet Earth.

What you will find in this special section. We have interspersed short features about eGY and other "years" and anecdotes about real-life scientists. As a part of the efforts of the SEG 2007–2008 Electronic Geophysical Year Committee, we invite you to submit your experiences to TLE, or you may choose to participate in the IGY Gold Program (which is described in this special section). Either way, you will be giving more than you will realize to the future generations.

Since this special section is devoted to the eGY 2007–2008, we thought it would be fitting to solicit the articles by locating and identifying authors using only the Internet. We were successful and, to the best of our knowledge, this is the first time that a TLE special section includes only articles solicited via the Internet. You will note that several of these authors reside outside the U.S. They would have been very difficult to locate without the Internet's instant and far-reaching capability.

The articles cover a broad area, but are connected by the link between IGY and eGY. Some articles take a historical perspective while others focus on the latest techniques. We hope that this will impart to most readers a sense of where we were 50 years ago and where we are today.

CoBabe-Ammann et al., members of the eGY leadership and coordinators of working groups, explain the themes and objectives of the eGY initiative, the concept of virtual observatories, and access to real-time data.

Thompson, from NASA, describes the IGY Gold Program, hosted by the International Heliophysical Year

(IHY), which is honoring IGY participants.

Kelly, University of Alaska at Fairbanks, considers just a few accomplishments of Sydney Chapman, who played a major role in the IGY.

de Mulder, Norwegian geoscientist and Executive Director of IYPE, describes recent activities of that "year."

Dickson documents the continuing contributions of that scientific event which had such an impact on me—the successful launch of Sputnik. Information about the launch is, even 50 years later, still coming to light.

Cloutier, from Rice, describes how geoscience knowledge is being used to investigate other planets—a new area that may yield answers to our own history and future.

Korsmo, from the National Science Foundation, details the background, organization, and some achievements of the IGY.

Clark, of Energistics, discusses data standards related to the petroleum industry and suggests future directions.

Durant et al., from Michigan Technology Institute and McGill, explain the advantages and dynamics of electronic collaborative study which allows a very advanced college course to dramatically expand its student body.

Finally, Rebbert, from the Bruce Museum, shows some ways in which we can develop public awareness of and interest in the Earth sciences. TLE

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The official eGY logo.