



The Electronic Geophysical Year: a description

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Summary

An Electronic Geophysical¹ Year (*eGY*) initiative is being pursued for 2007-2008 to coincide with the 50-year anniversary of the highly successful International Geophysical Year (IGY, 1957-1958). By exploiting the power of modern communications and information management capabilities, *eGY* sets out to accomplish in 21st-Century terms what the IGY achieved by inspiring and coordinating scientific programs worldwide and the establishment of a global network of observatories and World Data Centres – namely open access by the world community to vastly better and more comprehensive information about the Earth and geospace.

eGY is an internationally-recognised resolve by the science community to achieve a step increase in making past, present, and future geoscientific data² readily, rapidly, conveniently, and openly available. *eGY* provides the international framework and a target for stimulating and coordinating activities to make this happen. *eGY* focuses on themes of electronic data location and access, permission and release of data, conversion of data into modern digital form, data preservation, capacity building, particularly in developing countries, and outreach. Promoting the development of a network of virtual observatories is a central feature of *eGY*.

eGY is an initiative of the International Union of Geodesy and Geophysics, driven by the International Association of Geomagnetism and Aeronomy.

For further information, visit: www.egy.org

Background

A key achievement of the 1957-1958 International Geophysical Year (IGY) was the establishment of a world-wide system of physical observatories and data centres. The access to data that this observational data framework provided triggered a leap forward in our understanding of the Earth and its space environment.

Two developments have brought us to the threshold of another revolution in the advancing of our understanding of the Earth and geospace. First, our ability to collect data has increased dramatically, with pervasive networks of observational stations on the ground, in the oceans, in the atmosphere, and in space. Second, modern digital communications and methodologies for information management provide us with an unprecedented ability to access and share information and processing capability.

These developments coincide with a heightened awareness by governments of the need for sustainable management of the finite natural resources of our planet, the importance of understanding the Earth as a complex system, and the central role that ready access to comprehensive information and knowledge

¹ The term *Geophysical* is used to harmonise with the "G" in IGY, but the term *Geoscientific* is really more appropriate as *eGY* spans all of the Earth Sciences and more.

² The term "*data*" is often used generically in this document to cover the data-information-knowledge continuum.

plays. This translates into a growing readiness to support so-called *e*-Science and grid infrastructures of computing resources.

An international resolve and coordinated effort by all nations spanning all geoscience disciplines will help us maximise the value to society of these developments and to share the benefits equally between all nations.

Vision

The contribution of Geoscience to the benefit of humanity in this century is given a forward impetus similar to that provided by the International Geophysical Year (IGY) fifty years ago.

Mission

The mission of eGY is to foster an international resolve, secure a mandate, and provide an international coordination framework to facilitate, inform, stimulate, encourage, and promote the following.

- Ready, open access to comprehensive data and services (e-Science)
- Establishment of virtual observatories throughout the geosciences
- Cooperation among bodies and programs to reduce duplication and encourage standards
- Data discovery/location: who holds, what, where, how; developing metadata
- Data release: securing access permission; active rather than passive release
- Data preservation: making old data accessible; preserving existing data
- Capacity building, especially bridging the electronic divide in developing countries
- Outreach: education, informing decision-makers, public awareness, environmental literacy.

*e*GY sets out to secure an international mandate and provide a cooperative environment to help revolutionise geophysical data availability and access worldwide, making use of the capabilities offered by modern digital communications and information management practices. As a key feature, *e*GY will facilitate in the establishment of *virtual observatories* that will complement in cyberspace the contribution from physical observatories.

Drivers

- Growth of data volumes, with higher space-time resolution
- Demand for real-time response
- Need for a multidisciplinary/multi-institutional approach to understanding the Earth-space system
- Data assimilation and integration requirements for modelling and knowledge development
- Availability of e-Science options
- The demonstrable benefits of universal (equal) access to data by everyone
- The benefits of cooperation and sharing across the many different programs and initiatives with common data stewardship requirements.
- The onus on the scientific community to impart the need for knowledge-based decision-making and the capability to deliver it.

Themes

Data Access

Promote a focussed and coordinated international approach to establishing information systems and Web Services that deliver ready, open access to comprehensive geoscientific data, embracing *e*-Science principles, and including the establishment of *virtual observatories*.

Data Discovery (Data Location)

Identify who has what data, where, and in what form; enhance metadata holdings and contribute to the establishment of better metadata standards.

Data Release

Encourage the release of data through lifting of access restrictions and cooperation in implementing access protocols (i.e., move towards active rather than passive release of data).

Data Preservation

Encourage the digitisation of old analog data; rescue old digital data at risk and convert to modern digital form with proper descriptors; help identify critical old data sets that need to be preserved; contribute to establishing an international framework and standards for storing data.

Data Integration and Knowledge Discovery

Support government needs for information sharing and integration; develop information systems that enable the identification and understanding of relationships

Capacity Building and Outreach

Boost the scope and output of scientific endeavours; raise awareness among scientists, decision-makers and the public; help develop opportunities for growth of science in countries in need.

These themes will provide a common link in the various “International Year” (I*Y) and other scientific activities already being planned around 2007-2008. They are also a feature of the *e-Science* and *GRID* initiatives that are gaining support as governments realise the importance of information for national development.

Operational Models

The following options are identified.

Model 1. Self-sufficiency. Obtain enough funds to be self-supporting and allow eGY to run its own programs and support projects that meet eGY objectives).

Model 2: Common theme. Many geoscientific initiatives, bodies, and reviews³ identify data and information requirements that share much in common. *eGY* serves as a common cross-cutting theme that can be used to help to coordinate activities, avoid duplication, encourage standardization, and reduce costs.

Illustration of model 2: Common Theme

Initiative/Body Theme	A	B	C	D	E
1	X	X	X	X	
2	X	X	X		X
3	X	X	X	X	X
Data & Information	X	X	X	X	X
5		X	X	X	X
6	X	X	X	X	
7	X		X	X	X

Model 3 : Parent. Find a parent or syndicate of parents who see sufficient benefit in eGY to merit taking over responsibility for eGY and hosting Secretariat. This would not remove the need for international participation.

Some combination of models 2 and 3 is the most likely outcome. Even if sufficient funds are secured to make “independent” Model 1 viable, the need to liaise with and provide a common theme for other

³ For example, IPY, IYPE, CAWSES, CODATA, ILWS, IGOS/GEO, WDCs

initiatives and bodies remains paramount. Model 1 is unlikely to be achieved, but can be pursued at little cost so is worth a try.

Infrastructure for eGY

eGY is currently being driven by the IUGG (IAGA)⁴ Task Group under the Chairmanship of Dan Baker. The following infrastructure is being established.

Executive - a small group of key players who are the main architects and drivers of eGY.

Secretariat (International Coordination Office) - to conduct eGY business; could be the parent's secretariat in Operational Model 3.

Scientific Advisory Committee - drawn from main partners and stakeholders - responsible for policy, planning, opportunity identification, scientific linkages

Regional/National/Program/Agency committees or representatives - to liaise, stimulate, and interact with national/regional initiatives in each particular constituency.

Working Groups - for particular eGY themes.

eGY Activities

Keeping people informed and providing people-networking opportunities are intrinsic to achieving eGY objectives. Thus the core activities for eGY are:

- Develop the website content and links – www.egy.org
- Produce an electronic newsletter, eGY News
- Organise meetings, workshops, and symposia
- Maintain a mail list service.

Communication steps:

- Expand the mandate for eGY: get formal ICSU and UNESCO endorsement; develop an eGY signatories procedure.
- Liaise with more international/national organisations and initiatives with eGY-related interests.
- Liaise with the bodies and initiatives responsible for standards and e-Science development
- Liaise with the Virtual Observatory community to establish how eGY can be used to promote participation and expansion of VOs.
- Stimulate and promote projects that target goals expressed in the eGY themes.

Operational steps:

- Secure funding; approach benefactors
- Establish a Secretariat / seek a parent (model 3).
- Establish a Steering Committee
- Establish regional/national offices or representatives
- Establish Working Groups and run workshops for eGY themes, e.g., establish a WG and run a workshop concerning strengthening data fabric in the geosciences – preferably using the WDC system (relates to ICSU objectives for data & information).

Endorsement and Partnership Status

eGY has endorsement from ICSU, IUGG, and IUGS through IUGG's Committee for IGY+50; SCOSTEP is a formal partner; SEG and the ICSU Panel for World Data Centres are major

⁴ IUGG: international Union of Geodesy and Geophysics; IAGA: international Association of Geomagnetism and Aeronomy.

participants. A full list of participants and signatories to eGY is contained in the document “*eGY_Participants.doc*”.

Attractions of eGY as an IGY+50 initiative

eGY objectives are in keeping with the spirit of the IGY because they embody the notions of international cooperation to achieve greater understanding of our Earth-Space environment through better use of observational data. eGY is a logical extension of IGY and embodies themes that are:

- **Interdisciplinary** – data sharing and data accessibility are common issues throughout ICSU; eGY, as a geophysical initiative, is particularly relevant to IUGG and IUGS. [Maybe the G should stand for *Geoscientific* to broaden the appeal]
- **Internationally inclusive** – eGY themes are inherently global and relevant to all countries regardless of whether they are rich or poor. eGY -type programs offer important research opportunities for developed and developing countries
- **Capacity Building** – developing countries can use the eGY infrastructure in ways most appropriate to their needs and at little cost to themselves
- **Timely** – *virtual observatories*, *e-Science*, and GRID approaches are emerging in many countries; they are attracting enthusiastic support from governments
- **Affordable** – The enabling technologies for eGY are already being developed elsewhere and can be accessed at no cost to ICSU/IUGG; we could expect to attract support for virtual observatories through participation in GRID-type initiatives that are already in place and well-funded
- **Conservative** – eGY helps locate, capture,, and secures data holding that may be at risk
- **Appealing** – eGY concepts, especially *virtual observatories*, are attractive to young scientists who demand fast, convenient access to comprehensive information; governments will be interested because of the relevance of eGY to their growing commitment to developing *e-Science* and GRID systems for information access.
- **Cost effective** – organising on a world-wide basis is efficient, allowing more science for less money
- **Achievable** – eGY can be achieved in the time available before 2007.

Further information

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- Visit www.egy.org

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