

# Resolutions 1963 – 2021

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## **IAGA-IASPEI Joint Scientific Assembly**

Hyderabad (virtual), August 2021

These resolutions will be published in IAGA News No. 58 in December 2021.

### **Resolution No. 1 (2021): Historical data rescue**

The International Association of Geomagnetism and Aeronomy (IAGA)

#### **Considering**

- the need for access to historical data in Earth sciences, and
- the risk of loss of large volumes of historical data;

#### **Noting**

- that many scientific communities face significant challenges in digitizing historical data, and
- important historical data have already been irretrievably lost;

#### **Recognizing**

- the interdisciplinary consensus that all Earth science data should be accessible to the scientific community;

#### **Urges**

- the scientific community to identify, digitize, archive and make accessible all Earth science data, and
- the International Science Council, UNESCO, WMO and other relevant international bodies to support national authorities in efforts to identify, digitize, archive and make accessible all Earth science data.

### **Resolution No. 2 (2021): Polar Cap (PC) index**

The International Association of Geomagnetism and Aeronomy (IAGA)

#### **Noting**

- that polar cap magnetic activity is not yet described by existing IAGA geomagnetic indices;

#### **Considering**

- that the Polar Cap (PC) index constitutes a quantitative estimate of geomagnetic activity at polar latitudes and serves as a proxy for energy that enters into the magnetosphere during solar wind-magnetosphere coupling;

#### **Emphasising**

- that the usefulness of such an index is dependent on having a continuous data series;

#### **Recognising**

- that the PC index is derived in partnership between the Arctic and Antarctic Research Institute (AARI, Russian Federation) and the National Space Institute, Technical University of Denmark (DTU, Denmark);

#### **Recommends**

- use of the PC index by the international scientific community, and

#### **Urges**

- that all possible efforts be made to maintain continuous operation of all geomagnetic observatories contributing to the PC index.

[Note 1: Renewal of Resolution No.4 (1997) after a long-term dispute about the method to derive the PC index has been settled in 2013]

[Note 2: Amendment of Resolution No. 3 (2013) for the purpose of clarification. The words “in its near real time and definitive forms” have been removed. “Note” has been renamed to “Note 1” and the words “in 2013” added to Note 1]

### **Resolution No. 3 (2021): Resolution of Thanks**

The International Association of Geomagnetism and Aeronomy (IAGA)

#### **Noting**

- the successful scientific outcomes, organisation and excellent atmosphere of the IAGA-IASPEI Joint Scientific Assembly, and

#### **Appreciating**

- the enormous amount of work required to organise this first virtual meeting, which should have been held in physical form in Hyderabad, India,

#### **Expresses**

- its deep gratitude to the Local Organisers and the staff in India, in particular our main contact person Kusumita Arora, CSIR-NGRI, Hyderabad, for their hard work and unfailing courtesy, helpfulness, enthusiasm and energy, which have made the Joint Scientific Assembly a great success.

## **27<sup>th</sup> IUGG General Assembly Montreal (Canada), July 2019**

These resolutions are published in IAGA News No. 56 in December 2019.

### **Resolution No. 1 (2019): World Data Center SILSO and the international sunspot number**

The International Association of Geomagnetism and Aeronomy (IAGA)

#### **Recognising**

- The importance of the long-running international sunspot number in an increasing number of studies into Solar Activity and related studies into Space Weather, Space Climate and Global Change in the Earth environment,

#### **Noting**

- The leadership role of the World Data Center SILSO (Sunspot Index and Long-term Solar Observations) in the production, collection, preservation and dissemination of the international sunspot number over several decades,

#### **Urges**

- Funding agencies to make every possible effort to continue the operation of the WDC-SILSO and the production of the International Sunspot Number in a long-term sustainable manner.

### **Resolution No. 2 (2019): Space Weather and the ESA Lagrange Mission**

The International Association of Geomagnetism and Aeronomy (IAGA)

#### **Recognising**

- Recent international efforts by COSPAR and other organisations and researchers to determine the potentially severe societal and economic impact of space weather
- The expressed need of organisations and agencies, including the UN Committee on the Peaceful Uses of Outer Space (COPUOUS), for improved space weather forecasting, mitigation and preparedness across a wide range of environments, which include near-Earth space, the ionosphere, the upper atmosphere and on the ground,

#### **Noting**

- The activities of agencies and individuals over recent years to define and develop space weather monitoring platforms off the Sun-Earth line, to provide significant improvement in our knowledge of the evolution of conditions at the Sun and in the corona, and the in situ properties of the solar wind and interplanetary magnetic field,

#### **Expresses**

- Deep appreciation of the work of the European Space Agency (ESA) in developing the Lagrange project to monitor the terrestrial environment from the L5 Lagrange point, and

#### **Urges**

- ESA, together with collaborating institutes and agencies, to make every effort to support the implementation of the Lagrange project at the earliest opportunity.

### **Resolution No. 3 (2019): Magnetotelluric survey data**

The International Association of Geomagnetism and Aeronomy (IAGA)

#### **Considering**

- The importance of geoelectric field monitoring and forecasting for mitigation of geomagnetic hazards to ground-based technological conductors such as electrical power transmission networks
- The potential societal impact of severe geoelectric fields on ground-based infrastructure
- The challenges of long-term wide-spread direct monitoring of geoelectric fields

#### **Noting**

- The critical importance of magnetotelluric data in indirect estimation of geoelectric fields from well-established geomagnetic field measurements including from geomagnetic observatories and variometer networks, and the added value of magnetotelluric data in imaging and understanding geophysical imprints

#### **Endorses**

- National magnetotelluric survey initiatives, and

#### **Urges**

- Funding agencies to support continued acquisition of magnetotelluric survey data and efforts in historical magnetotelluric data recovery, and

#### **Encourages**

- Governments and the international magnetotelluric community to endorse open data sharing practices for magnetotelluric time series and data products, particularly magnetotelluric impedances and related transfer functions.

### **Resolution No. 4 (2019): Importance of the Rapid Magnetic Variation Service and the lists of Sudden Commencements (SC) and Solar Flare Effects (SFE)**

The International Association of Geomagnetism and Aeronomy (IAGA)



## **Recognising**

- The outstanding importance of the SC (sudden commencement) and SFE (solar flare effect) data in geomagnetic, ionospheric, space weather, and space climate research

## **Noting**

- That in accordance with IAGA Resolution No. 6 at the XVI IUGG General Assembly (1975), and Resolution No. 8 at the 8<sup>th</sup> IAGA Scientific Assembly (1997), the institute of "Ebro Observatory" is responsible for the collection and preparation of the SC and SFE lists as part of its Rapid Magnetic Variation Service

## **Expresses**

- Deep appreciation for the work performed to date by Ebro Observatory, and

## **Urges**

- Funding agencies to make every possible effort to continue the long-term production of SC and SFE lists for the Rapid Magnetic Variation Service by Ebro Observatory.

## **IAPSO - IAMAS - IAGA joint Assembly Cape Town (South Africa), August / September 2017**

See *IAGA News*, December 2018, No. 55.

### **Resolution No. 1 (2017): Magnetic satellite mission constellation**

The International Association of Geomagnetism and Aeronomy (IAGA)

#### **Considering**

- the interests of the scientific community in observing with the highest accuracy and resolution the numerous components of the Earth's magnetic field to investigate the fundamental processes and hazards affecting the Earth system, from the deep Earth to space
- that the Earth's magnetic field is one of the fundamental global change variables of our planet

#### **Acknowledging**

- the extensive expertise acquired within the international scientific community in analysing data from dedicated Low Earth Orbiting magnetic satellite missions like Oersted, CHAMP and Swarm continuously over the last 20 years, and the considerable success of these missions

#### **Stressing**

- the need for permanent long-term measurement of the magnetic field for understanding its generation, forecasting its evolution, and for space weather applications
- the possibility of further enhancing the science return and the technological applications of the on-going Swarm constellation by considering the addition of new satellites, such as nanosatellites

#### **Urges**

- international and national institutions, agencies and governmental bodies in charge of supporting Earth and space science research to make all efforts to extend support for current missions and to catalyse and implement new magnetic field satellite missions that would respond to the aforementioned need for continued and improved observation.

### **Resolution No. 2 (2017): USGS Geomagnetism Program and Magnetic Observatories**

The International Association of Geomagnetism and Aeronomy (IAGA)

## Considering

- the value of continuity in high-quality, ground-based magnetic observations to increase our knowledge of Earth dynamics and space weather,
- the importance of such observations and related research in monitoring, modeling and forecasting extreme space weather events that could potentially disrupt the world,
- the critical importance of such observations in developing global reference models such as the International Geomagnetic Reference Field, used in navigation (airborne, marine), satellite orientation, directional drilling and numerous other applications,

## Noting

- that the United States presidential budget for Fiscal Year 2018 has proposed to eliminate the USGS Geomagnetism program,
- that most countries with advanced economies support an observational, research-based geomagnetism program,

## Urges

- the United States government to continue funding permanent, ground-based magnetic observations in the United States and its territories, as well as observation-based research in geomagnetism.

### Resolution No. 3 (2017): Resolution of thanks

IAGA, **noting** the successful scientific outcomes, organisation and excellent atmosphere of the IAPSO-IAMAS-IAGA Joint Scientific Assembly in Cape Town, and **appreciating** the enormous amount of work required to organise the meeting **expresses** its deep gratitude to the members of the Local Organising Committee and the staff, led by Isabelle Ansoerge, for their hard work and unfailing courtesy, helpfulness, enthusiasm and energy, which have made the Assembly a great success.

## 12<sup>th</sup> IAGA Scientific Assembly Merida (Mexico), August 2013

See IAGA News, December 2011, No. 50, p.7-9.

### Resolution No. 1 (2013): Paleo- and rock magnetic databases

IAGA, **recognising** the importance of large palaeomagnetic, rock magnetic and related data sets for addressing problems in global geomagnetism, stratigraphy and tectonics, **noting** the major effort that has gone into generating such databases **appreciates** the ongoing effort in maintaining and developing the databases by IAGA and MAGIC volunteers, and **urges** the continuation, further development and updating of the databases.

### Resolution No. 2 (2013): Magnetometer networks

IAGA, **recognising** the importance of global observations of magnetospheric and ionospheric phenomena by ground-based magnetometer networks, and the contributions by the “Ultra Large Terrestrial International Magnetometer Array (ULTIMA)” consortium in facilitating collaboration among ground-based magnetometer networks and in enabling observations on a global scale, **endorses** the international coordination of ground-based magnetometer networks, **urges** funding agencies to contribute to the continuing operation of magnetometer networks, and **encourages** other international organisations to support such efforts.

### **Resolution No. 3 (2013): Polar Cap (PC) index**

AGA, **noting** that polar cap magnetic activity is not yet described by existing IAGA geomagnetic indices, **considering** that the Polar Cap (PC) index constitutes a quantitative estimate of geomagnetic activity at polar latitudes and serves as a proxy for energy that enters into the magnetosphere during solar wind-magnetosphere coupling, **emphasising** that the usefulness of such an index is dependent on having a continuous data series, **recognising** that the PC index is derived in partnership between the Arctic and Antarctic Research Institute (AARI, Russian Federation) and the National Space Institute, Technical University of Denmark (DTU, Denmark) **recommends** use of the PC index by the international scientific community in its near-real time and definitive forms, and **urges** that all possible efforts be made to maintain continuous operation of all geomagnetic observatories contributing to the PC index.

*[Note: Renewal of Resolution No. 4 (1997) after a long-term dispute about the method to derive the PC index has been settled]*

### **Resolution No. 4 (2013): Visas for scientists to attend international conferences**

AGA, **noting with concern** issues with transit visas for scientists travelling to participate in this Scientific Assembly **urges** relevant authorities to facilitate transit for those travelling to international scientific events.

### **Resolution No. 5 (2013): Resolution of thanks**

AGA, **noting** the successful scientific outcomes, organisation and excellent atmosphere of the IAGA Scientific Assembly in Merida, and **appreciating** the enormous amount of work required to organise the meeting **expresses** its deep gratitude to the members of the Local Organising Committee and the staff, led by Harald Böhnelt, for their hard work and unfailing courtesy, helpfulness, enthusiasm and energy, which have made the Assembly a great success.

## **XXV IUGG General Assembly Melbourne (Australia), July 2011**

See [IAGA News, December 2011, No. 48, p.5-6.](#)

### **Resolution No. 1 (2011): Magnetic satellite missions**

AGA, **considering** the value of continuity in magnetic satellite missions to increase our knowledge of Earth dynamics; **noting** that no successor to ESA's Swarm mission yet exists; **urges** the development of missions by national and international agencies to fill this void for the period 2016 onwards.

### **Resolution No. 2 (2011): Free access to experimental facilities**

AGA, **considering** the significance of experimental data necessary for understanding the magnetic field and magnetic properties of Earth and Earth-related materials; **noting** the increasing demands on technical performance of up-to-date experimental facilities, and associated cost increases; **acknowledges** the scientific value of open and free access to sophisticated experimental facilities offered by certain research institutions.

### **Resolution No. 3 (2011): Dst observatories**

IAGA, **noting** the importance of the Dst index for various applications including geomagnetic field modeling, space-weather and -climate studies and detection of local anomalous variations, **recognizing** that the absolute accuracy of the data from the contributing observatories, Kakioka, Honolulu, San Juan, Hermanus and Alibag, is essential, **recommends** that all agencies operating these geomagnetic observatories continue to support both absolute and variation measurements to maintain the required level of accuracy.

### **Resolution No. 4 (2011): De-classifying magnetic anomaly data**

IAGA, **considering** the importance of homogenous magnetic anomaly data coverage for global geological studies, **urges** the owners of airborne and marine magnetic anomaly data sets, in particular from equatorial areas and the southern hemisphere, to release them into the public domain as soon as possible.

*Note: Resolution No. 5 (1993): De-classifying magnetic survey data*

## **11<sup>th</sup> IAGA Scientific Assembly Sopron (Hungary), 2009**

See [IAGA News, December 2009, No. 46, p. 4-6.](#)

### **Resolution No. 1 (2009): Software**

IAGA, **noting** that

- the Association has played a prominent role in data management through its leadership of the Electronic Geophysical Year, and that IUGG has formed a new organization to support data management,
- nevertheless some other aspects of scientific research in the IAGA disciplines are still hindered by the scarcity of software in the public domain,

**recognizing** that

- despite increasing pressures on scientific budgets, there is a need to provide support for research in developing countries and encourage new collaborations,
- it is central to IAGA's charter to promote international science by encouraging world-wide open access to the means for pursuing research,
- the necessary means include scientific software, in particular for modelling and for simulating physical processes (where excellent examples exist already in some areas of IAGA science), and for theoretical research,

**resolves** to

- through the URSI/IAGA Joint Working Group on VLF/ELF Remote Sensing of the Ionosphere and Magnetosphere (VERSIM), take an initiative similar to those already taken in data management, aimed at making software for data analysis, modeling, simulation and theoretical research more freely available to the scientific community,
- investigate
  - the need for large-scale open-access software,
  - how its development could be funded,
- for smaller items of software, create a public space on the IAGA website, where researchers can freely upload their code and download the code of their colleagues, and that this section of the

website be also used as a portal by which larger items of software can be listed and described, and links to them provided.

### **Resolution No. 2 (2009): Radiation belt studies**

IAGA, **noting** that

- multiple nations are currently expending significant efforts developing spacecraft missions and related programmes to study the energisation, transport and loss of radiation belt particles,
- the radiation belts represent a high priority scientific target at the forefront of IAGA interests,
- the effects of the radiation belts are a significant space weather operational concern for space-faring societies and nations,
- co-ordinated global scale multi-point measurements combined with theoretical modelling are required to reach science closure in resolving the dominant processes which control radiation belt dynamics,

**resolves**

- that member nations of IAGA co-operate and collaborate to the maximum extent possible in their aggressive pursuit of observational and modelling programs for radiation belt studies, and
- to assume a leading scientific role in international coordination in pursuit of radiation belt science through symposia, special sessions, and working group activities so that maximum benefits are derived from current, planned and future satellite missions and programs.

### **Resolution No. 3 (2009): LANL energetic particle database**

IAGA, **noting** that

- for more than 20 years the Los Alamos National Laboratory (LANL) has supported prompt public access to its data base of energetic particle flux observations by geostationary LANL spacecraft;
- this data base, together with ground measurements, has been widely used by the international scientific community in the studies of plasma dynamics in the ring current and radiation belts as well as for monitoring substorms;
- open access to this valuable data base was stopped in 2008,

and **taking into account** that

- these regular observations provide the best long-term homogeneous data base of energetic particle fluxes in the inner magnetosphere available to the scientific community; and
- scientific return of a number of current and forthcoming scientific campaigns and projects would be significantly enhanced by adding the LANL energetic particle observations,

**expresses great concern** at this development and **resolves** to urge LANL to restore promptly public access by the scientific community to the observations of energetic particle fluxes from geostationary LANL spacecraft.

### **Resolution No. 4 (2009): Geomagnetic Observatories**

IAGA, **recognising**

- the importance of long time series of high quality geomagnetic observatory observations in characterizing the geomagnetic field,
- the combination of a global geomagnetic observatory network and modern satellite missions in optimizing progress in geomagnetism science, including greater understanding of the 'Earth system' and more accurate mapping and prediction of geomagnetic field changes and space weather

conditions,

**notes** that many geomagnetic observatories continue to have uncertain futures, and therefore **urges** national agencies to ensure the continued operation of magnetic observatories during the lifetime of the ESA Swarm satellite mission and beyond.

#### **Resolution No. 5 (2009): Quasi-definitive magnetic observatory data**

IAGA, **recognising** the importance of prompt baseline-corrected observatory data for the production of geomagnetic indices and geomagnetic models such as the IGRF, **noting** that several individual users and groups of users, such as the Mission Advisory Group of the upcoming ESA Swarm satellite mission, have expressed their interest in and need for such data, **encourages** magnetic observatories to produce baseline-corrected quasi-definitive data shortly after their acquisition.

#### **Resolution No. 6 (2009): SC/SI/SSC determination**

IAGA, **recognising** the importance of the list of storm sudden commencements (SSC), continuous since 1868, to the worldwide scientific community, **appreciating** the efforts of the Ebro, Spain magnetic observatory in regularly maintaining and circulating the up-to-date list of events, **noting**

- that the definitions of storm commencements (SC), sudden impulses (SI), and SSC have changed over time, reflecting better understanding of physical processes and changes in instruments and working practices,
- that a new method, relying on quantitative criteria for SC/SI/SSC determination, has been proposed by the Ebro team and published by J. J. Curto, T. Araki, and L. F. Alberca (Evolution of the concept of Sudden Storm Commencements and their operative identification, Earth Planets Space, 59, I-XII, 2007), and is to be described in a revised IAGA Guide for Geomagnetic Indices,
- that this method is well-defined and reproducible and that it produces data that are consistent with data produced using the existing method developed by P.N. Mayaud,

**endorses** the use of this new method as the basis for the future determination of SC/SI/SSC, and **calls for** Ebro observatory to adopt the method in providing its list of published events.

#### **Resolution No. 7 (2009): Importance of metadata preservation**

IAGA, **recognising** the importance of metadata in supporting geophysical studies, **appreciates** the support given by ICSU to recent efforts in the generation, preservation and dissemination of metadata to ensure the future usability of these data for interdisciplinary studies of the planet and its environment, and **urges** that similar provision of metadata worldwide be supported by relevant agencies.

#### **Resolution No. 8 (2009): Resolution of thanks**

IAGA, **noting** the scientific success and excellent organisation of the IAGA Scientific Assembly in Sopron, and, **appreciating** the enormous amount of work required to organise the meeting **expresses its deep gratitude** to the members of the Local Organising Committee, led by László Szarka, for their unfailing courtesy, helpfulness, enthusiasm and energy, making the Assembly such an outstanding success.

## XXIV IUGG General Assembly Perugia (Italy), July 2007

See IAGA News, December 2007, No. 44, p. 5.

*IAGA approved resolutions, proposed to and accepted by IUGG in Perugia, July 2007*

### Resolution (2007): Ionospheric monitoring satellite missions

IUGG, **noting** the ability of low Earth orbiting satellites to provide spatial and temporal monitoring of the topside ionosphere and to define the near-Earth environment, and **recognizing** that an extended time series of satellite observations of magnetic/electric fields and of plasmas in the Earth's ionosphere are crucial for a wide spectrum of geoscience and space science studies, and **understanding** that the DEMETER mission will end in 2008, **welcomes** plans by several nations to launch ionospheric monitoring satellite missions, among them the unique equatorial orbiting Italian Space Agency satellite ESPERIA.

### Resolution (2007): eGY Resolution

IUGG, **noting** the ability of modern information and communications technologies to revolutionise the science and management of data and information,  
**noting** the growing recognition of the need for, and the benefits of a science information commons,  
**noting** that 2007-2008 is the 50-year anniversary of the International Geophysical Year, which pioneered the concept of international cooperation and sharing of data and information about the Earth for the common good,  
**encourages** scientists and their scientific bodies worldwide to use the occasion of the Electronic Geophysical Year, 2007-2008 to undertake activities to improve data access, data preservation, data discovery, data release, and education and outreach, to reduce the digital divide, and to sign the eGY Declaration for an Earth and Space Science Information Commons.

### Resolution (2007): Declaration for an Earth and Space Science Information Commons

IUGG, **recognising** the importance of long-time series of Earth's science data supporting global change studies and the objectives of the International Years **appreciates** the support given by ICSU to recent efforts to rescue valuable historical data, and, **urges** that similar rescue and data retrieval activities be supported by relevant agencies.

## 10<sup>th</sup> IAGA Scientific Assembly Toulouse (France), July 2005

See IAGA News, December 2005, No. 42, p. 4-5.

### Resolution No. 1 (2005): Open access to scientific data

IAGA, **considering** the major effort that has gone into generating a vast amount of extremely diverse primary data, and, **noting** that archiving and maintaining databases makes precious legacy data accessible for future generations through open, web-based interfaces **commends** initiatives to disclose these data by means of databases available to the scientific community and the general public, and, **urges** relevant agencies to give high priority to such activities.



## **Resolution No. 2 (2005): Data rescue**

IAGA, **recognising** the importance of long time series of geomagnetic data **appreciates** the support given by ICSU to recent efforts to rescue valuable magnetograms, and, **urges** that similar rescue and data retrieval activities be supported by relevant agencies.

## **Resolution No. 3 (2005): International Decade of Geopotential Field Research: availability of data and models**

IAGA, **noting** the success of the International Decade of Geopotential-Field Research and the important contribution made by the European Space Agency, ESA, in deciding to launch the Swarm geomagnetic mission in 2009 as a continuation of the presently-operating magnetic survey satellites, and, **considering** IUGG Resolution 1, passed in 1999, urging governmental and international agencies to sustain and improve national and international geodetic and geophysical monitoring systems, and promoting the free and unrestricted transfer of data, **strongly encourages** space agencies, institutions and funding organisations to support initiatives to improve the availability of, and access to, science data and models in order to maximise the scientific return from these missions.

## **Resolution No. 4 (2005): Continuity and rapid production of auroral electrojet indices**

IAGA, **noting** that

- scientific progress in understanding magnetospheric and ionospheric dynamics is adversely affected by the unavailability of the definitive auroral electrojet indices for years beginning in 1995, and,
- the international community is anticipating active cooperation with NASA THEMIS mission which addresses physical processes monitored by these indices

**urges**

- relevant national funding agencies, research institutions and scientific investigators to invite participation from the international science community to assist in constructing recent auroral electrojet indices, and,
- implementing a system to achieve timely production of the auroral electrojet indices, not later than the start of NASA THEMIS mission prime phase (autumn 2006).

## **Resolution No. 5 (2005): International Year initiatives celebrating the IGY**

IAGA, **noting** the success of the International Geophysical Year (IGY) in 1957/8 and the resultant dramatic advances in science relevant to IAGA, and, **recognising** that IAGA has established the electronic Geophysical Year, which should lead to more open access to data, the development of virtual observatories, and digitised versions of analogue data, **endorses** the other complementary international programmes celebrating the IGY: the International Year of Planet Earth (IYPE), the International Heliophysical Year (IHY), the International Polar Year (IPY), and Climate and Weather of the Sun-Earth System (CAWSES), and, **urges** these related international programmes to work closely with IAGA and eGY to achieve the objectives of each programme.

## **Resolution No. 6 (2005): Geomagnetic observations in Russia**

IAGA, **recognising**

- the importance of global coverage and timely delivery of magnetometer data for production of the auroral electrojet indices, and,
- the success of current Russia-Japan-US collaborative efforts to operate magnetometers at Russian stations located in the auroral zone, and the associated near-real-time data transmission system,

**endorses** this international collaboration

**urges** funding agencies to provide adequate support for the collaboration, and,

**encourages** other international organisations to support this effort.

### **Resolution No. 7 (2005): Maintenance of ground-based observatories to support magnetospheric/ionospheric dynamics research**

IAGA, **recognising** that

- continued progress in basic magnetospheric/ionospheric physics research increasingly depends on globally distributed ground-based observations of aurora, ionospheric parameters, and magnetic fields,
- operating observatories is one of the most effective ways in which scientists in the developing world can contribute significantly to the progress of basic science and thereby promote international cooperation in basic geoscience research, and,

**noting** that modern technological infrastructures are adversely impacted by the space environment, particularly during geomagnetic storms,

**urges**

- national funding agencies to continue support for ground observatories providing data to characterise the magnetosphere/ionosphere system,
- scientists and national funding agencies to promote and support cooperation in sharing data from these observatories for open use by the international scientific community.

### **Resolution No. 8 (2005): Resolution of thanks**

IAGA, **noting** the scientific success and excellent organisation of the IAGA/ICMA Scientific Assembly in Toulouse, and, **appreciating** the enormous amount of work required to organise the meeting **expresses** its deep gratitude to the members of the Local Organising Committee, led by Michel Blanc and Roland Schlich, for their efforts to make the Assembly such an outstanding success.

## **XXIII IUGG General Assembly**

**Sapporo (Japan), July 2003**

### **Resolution No. 1 (2003): Cooperation and Sharing In Polar Geospace Research**

IAGA, **noting**

- the achievements of the previous International Polar and Geophysical Years,
- that the polar regions are ideal for remote sensing of the Geospace environment,
- that ICSU has endorsed a new International Polar Year programme,

**recognising** that

- global studies of Geospace require extensive networks of instruments in both hemispheres to address key science problems as included in the SCAR ICESTAR initiative,
- the northern hemisphere is well instrumented for Geospace research, extensions are planned to the international SuperDARN HF radar network, new technology is now available,

- there will be excellent conjunctions between Antarctica and several satellites (e.g., THEMIS, POLAR, and IMAGE),

#### **recommends**

- all agencies working in Antarctica coordinate measurements of magnetospheric and ionospheric electrodynamics through the expansion and integration of instrument networks, especially those including autonomous instruments such as the Antarctic International Magnetometer NETWORK (AIMNET), and
- all countries cooperate to provide ready and free access to hardware, software, and all data to maximise the value and success of international collaboration.

### **Resolution No. 2 (2003): 'International Year' and eGY initiatives**

#### IAGA, **noting**

- the achievements of the IGY in 1957 launched a dramatic advance in Geospace science and understanding,
- that several International Year concepts are under discussion, including the International Helio-physical Year (IHY) and the International Year of Planet Earth (IYPE),
- that the cutting edge science in IAGA depends on coordinated data characterising the global solar and terrestrial systems,

**recognising** that it is central to IAGA's charter to promote international science by encouraging world-wide open access to real-time data, existing data bases, and digitised versions of analogue data,

**endorses** the intent of CAWSES (Climate and Weather of the Sun-Earth System) and 'International Year' activities, and

#### **urges** that

- such activities be coordinated to maximise their collective effectiveness under an overarching umbrella concept, and
- data archival activities be emphasised under an electronic Geophysical Year (eGY) initiative and maintained thereafter to promote world-wide electronic access to data.

### **Resolution No. 3 (2003): Radiation belt research and society**

#### IAGA, **recognising** that

- we are approaching the 50<sup>th</sup> anniversary of the discovery of the Van Allen radiation belts,
- the radiation belts continue to represent a major space weather hazard to humans and human technology in near-Earth Space,
- many scientific questions remain about how radiation belt particles are accelerated and ultimately are lost,
- several nations and agencies have spacecraft operating in Earth-orbit that can measure radiation belt properties,

**urges** funding agencies of the world to continue to support investigation of physical processes, and the collection, analysis, and preservation of related data obtained via spacecraft in order to assure that models and forecasting tools continue to meet the demands of society.

### **Resolution No. 4 (2003): Magnetic repeat station surveys: cooperation and standardisation**

IAGA, **recognising** the importance of data from magnetic repeat stations for modelling the geomagnetic field, **noting** the success of the European initiative for standardising networks of repeat stations and

achieving uniform station density and common repetition intervals, **encourages** countries in all regions to undertake magnetic repeat station surveys and to cooperate with neighbouring countries in order to develop regional and international standardisation.

#### **Resolution No. 5 (2003): Provision of data for geomagnetic indices**

IGA, **recognising** the increasing importance of providing "quick-look", provisional, and definitive IGA geomagnetic indices to the worldwide scientific community, **appreciating** the efforts of the contributing network of geomagnetic observatories and their funding agencies in supporting this activity, **noting** that some geomagnetic observatories have difficulties in routinely providing timely data to the institutions that derive these indices, **urges** contributing observatories and their funding agencies to continue producing high-quality and timely data on a routine basis.

#### **Resolution No. 6 (2003): International Decade of Potential-Field Research**

IGA, **considering** IGA Resolution No.1 passed in 1997 concerning the declaration of the International Decade of Geopotential-Field Research, and IUGG Resolution No.1 passed in 1999 concerning Integrated Global Earth Monitoring Systems, **thanks** the bodies involved in launching and operating magnetic survey satellites (including Ørsted, CHAMP, SAC-C, and FEDSAT) and distributing their data to the worldwide scientific community, and **strongly encourages** all institutions and funding organisations to continue this work in order to achieve a better understanding of the Earth's dynamical core, mantle, crust, ionosphere, and magnetosphere.

#### **Resolution No. 7 (2003): Geomagnetic observations in Greenland**

IGA, **considering** the importance of geomagnetic field monitoring in polar regions for modelling the internal sources as well as for studies of solar-terrestrial physics and related space weather phenomena, **noting** the high value of long-running, high-quality geomagnetic observations in Greenland, **acknowledges** the outstanding long-term efforts by the Danish Meteorological Institute, and **encourages** that every effort be made to ensure that high-quality geomagnetic observations are maintained in Greenland in the future.

#### **Resolution No. 8 (2003): Developing countries in equatorial and low-latitude research**

IGA, **considering** the importance of atmospheric and ionospheric processes at equatorial and low latitudes in the context of global studies of Sun-Earth relationships, and **recognising** that new observational facilities have become operational in many developing countries, **recommends** that research using these facilities and ground-based, ocean-based, and space-based instruments be carried out in close collaboration with scientists in the developing countries so as to promote their participation and technology transfer.

#### **Resolution No. 9 (2003): Ionosphere observations**

IGA, **considering** the importance of determining long-term trends in the ionosphere in order to reveal the impact of anthropogenic influences (mainly the greenhouse effect) on the upper atmosphere as a tool for early detection of global change in the Earth system, **recognising** the primary role of long-term ionospheric measurements by the global ionosonde network (since the 1950s) for long-term trend determination, **emphasises** the importance of maintaining measurements by the global network

of ionosondes, and **urges** bodies running ground-based ionosonde measurements to continue conducting measurements on the internationally agreed regular basis and make the results available for international data exchange and to the system of World Data Centres.

## 9<sup>th</sup> IAGA Scientific Assembly Hanoi (Vietnam), August 2001

### Resolution No. 1 (2001): International Decade of Geopotential Field

IAGA, **recognising** the efforts recently made by various national space agencies to acquire high-precision global measurements of the Earth's magnetic field from space to initiate the present International Decade of Geopotential Field Research, **welcoming** the resulting significant advances in our ability to model and understand the Earth's magnetic field and its time variations, and **noting** the scientific value of continuing high-resolution geomagnetic measurements over the whole globe during this decade, **urges** major space agencies to give high-precision mapping of the geomagnetic field in space and time a high scientific priority.

### Resolution No. 2 (2001): Satellites and magnetic observatories

IAGA, **welcoming** the recent success of satellites for mapping the Earth's magnetic field, **recognising** that geomagnetic observatories provide essential ground-based support for satellite surveys, that satellite and observatories fulfil complementary roles, and that important scientific and technical application requirements can only be met by magnetic observatories, **emphasises** that the importance of maintaining a global network of geomagnetic observatories is increased rather than diminished by the availability of satellite magnetic survey data.

### Resolution of thanks (2001)

IAGA, **welcoming** the outstanding success and superb organisation of the 1st IAGA-IASPEI Joint Scientific Assembly at Hanoi, and **recognising** the enormous amount of work required to organise such as meeting, **expresses** its deep gratitude to the Local Organisers for their tireless efforts to make the Assembly such an outstanding success.

## XXII IUGG General Assembly Birmingham (UK), August 1999

See IAGA News, December 1999, No. 39, p. 17-19.

### Resolution No. 1 (1999): IGY + 50 collaboration

IAGA, **considering** the scientific success of the International Geophysical Year (IGY) 1957/8 and the long term benefits of the actions taken at that time, and **recognising** that these benefits resulted from international co-operation and co-ordination, and **noting** that many current scientific programmes are directed towards studies of the physics and dynamics of the solar-terrestrial and solar-planetary systems, **recommends** that national and international agencies support efforts and initiatives to develop collaborative programmes in these areas during the period 2003-2008 to mark the 50th anniversary of the IGY and to act as a springboard for future research.

### **Resolution No. 2 (1999): Magnetic observatories in Russia**

IGA, **recognising** the efforts made by various agencies to install digital magnetometers in Russia at Dixon, Tixie Bay, and Cape Chelyuskin observatories and to rapidly transmit data for production of the AE index, but **noting** the closure of Cape Wellen observatory in the eastern part of Siberia in 1996, **urges** that action is taken to start suitable magnetic observations at Pebek or a nearby site as soon as possible.

### **Resolution No. 3 (1999): Lunping Geomagnetic Observatory**

IGA, **noting** that Lunping Geomagnetic Observatory in Taiwan, which achieved INTERMAGNET standards in 1995, is in danger of closure, and **noting** the importance of the geomagnetic and sunspot number observations made in South-East Asia at Lunping, which have been made available to the scientific community through the World Data Centers since the early 1960's, **requests** that the Academy located in Taipei (China/Taipei) urge the appropriate agency to continue to operate Lunping Observatory until an appropriate period of parallel observations has been completed.

### **Resolution No. 4 (1999): Space weather monitoring**

IGA, **recognising** the importance of monitoring ionising radiation (EUV and soft X-ray) for investigating the physics of the upper atmosphere and for space weather forecasting, **recommends** that support is given to the creation of a permanent space patrol for monitoring radiations.

*[Note: a similar Resolution has been passed by COSPAR and URSI]*

### **Resolution No. 5 (1999): WIPO and free access to databases**

IGA, **noting** that legislative measures have been taken or presently are in preparation by its member countries to implement a sui generis right for the legal protection of databases, or to pass equivalent laws, and **noting** that the World Intellectual Property Organisation is attempting to put forward an international treaty to protect the owners or the creators of databases, and **recognising** the vital importance of securing free access to databases for the progress of scientific research and for the promotion of education in science, **urges** National Committees to take the initiative in their respective countries to ensure free access to databases created for or by scientific activities and to advise, if necessary, appropriate authorities to take legislative action to ensure free access policies for scientific databases.

### **8<sup>th</sup> IAGA Scientific Assembly Uppsala (Sweden), August 1997**

See IAGA News, December 1997, No. 37, p.17-22.

### **Resolution of thanks (1997): (Resolutions Committee)**

IGA, **welcoming** the great success and superb organisation of its 8th Scientific Assembly at Uppsala, and **recognising** the enormous amount of work required to organise such a meeting, expresses its deep gratitude to the Local Organisers for their tireless efforts to make the Assembly such an outstanding success.

### **Resolution No. 1 (1997): International Decade for Geopotential Field Research (Division V)**

IAGA, **noting** the ability of satellites to provide unparalleled spatial and temporal coverage of observations of the Earth's magnetic and gravity fields, and **recognising** the revolutionary contribution that an extended time-series of such observations would make to a wide spectrum of geoscientific and space science studies, and **welcoming** the present plans by several nations to launch potential-field satellites within the next 5 years, **considers** that now is a favourable time for an international effort to promote and coordinate satellite surveys to achieve, for the first time, continuous monitoring of geopotential field variability in the near-Earth environment, and **recommends** that an International Decade for Geopotential-Field Research be declared to provide an international focus for such efforts.

### **Resolution No. 2 (1997): Polar gravity and magnetics (Divisions IV and V)**

IAGA, **recognising** the importance of obtaining world-wide coverage of gravity and magnetic data, and **recognising** the technical difficulties of routing satellites over regions close to the geographic poles, **urges** the community to consider using conventional land, marine, and airborne methods for completing gravity and magnetic anomaly coverage in polar regions.

### **Resolution No. 3 (1997): Magnetic anomaly data (Division V)**

IAGA, **considering** the importance of magnetic anomaly mapping for global geological and tectonic interpretation, and **noting** the existence of numerous sets of low-level airborne and marine magnetic anomaly data and the rapid progress being made in retaining and compiling existing data, **regrets** that many data sets remain classified or confidential, even after they have outlived the original purpose of acquisition, and **urges** the custodians of such data sets to release them (or non-sensitive versions of them) into the public domain as soon as possible.

### **Resolution No. 4 (1997): PC Index (Divisions III and V)**

IAGA, **noting** the effectiveness of the Polar Cap (PC) geomagnetic activity index for prompt characterisation of the magnetosphere, and **recognising** the great contribution of the Arctic and Antarctic Research Institute (AARI) and Danish Meteorological Institute (DMI) in producing and testing the preliminary PC index time series since 1977, emphasises that the usefulness of such an index is dependent on having a continuous data series and **urges** that all possible effort be made to maintain continuous operation of the stations contributing to this index, and to provide the PC-index to the international scientific community in near-real time via satellite data links.

### **Resolution No. 5 (1997): Naming of indices (Division V)**

IAGA, **recognising** the value of preserving the uniqueness of the official IAGA indices, and **noting** that estimated values of these indices produced by independent agencies for operational use are becoming confused with the official indices, **urges** the producers of the estimated indices to clearly label them with "est" at the end of each index name to distinguish them from the official IAGA indices.

### **Resolution No. 6 (1997): Indices thanks (Division V)**

IAGA, **recognising** the importance of geomagnetic activity indices for characterisation and prediction of a wide range of geomagnetic phenomena, and **noting** the particular value of long time-series of such



indices, **thanks** the staff of observing stations that contribute data, the organisations that produce, disseminate, and publish indices and the national funding agencies that support these activities.

#### **Resolution No. 7 (1997): Revisiting early palaeomagnetism sites (Division I)**

IAGA, **recognising** the valuable contribution of early palaeomagnetic studies of lavas for describing the palaeosecular variation of the geomagnetic field and the present need for high-quality data of this type for understanding time-averaged field behaviour in the Earth's core, and **noting** that early palaeomagnetic studies used methods that have since been superseded, **recommends** that attention be given to repeating early studies on important sections using modern methods.

#### **Resolution No. 8 (1997): Ebre, SSC and SFE support (Division II)**

IAGA, **recognising** the outstanding contribution of the Ebre Observatory in providing long time series of data on geomagnetism, ionospheric physics, seismology, meteorology, and solar activity, and the ever-increasing need for continuing these long series of data for present and future studies such as those related to Global Change, and **noting** that, in accordance with IAGA Resolution no 6 at the IUGG General Assembly 1975, Ebre Observatory is responsible for the collection and preparation of ssc and sfe data for publication in IAGA Bulletin No. 32, **expresses** deep appreciation for the work performed by the Observatory, and **recommends** that every possible effort be made to continue operation of Ebre Observatory and production of ssc and sfe data.

#### **Resolution No. 9 (1997): Preservation of historical materials (IDC History)**

IAGA, **recognising** the scientific value and cultural interest in the history of geomagnetism and aeronomy, and **being concerned** about the risk of documents, instruments, and equipment of historical significance becoming lost or discarded, **urges** that institutions, laboratories, and individuals in possession of historically important materials make every effort to identify and conserve such materials.

### **XXI IUGG General Assembly Boulder (USA), 1995**

See [IAGA News, December 1995, No. 34.](#)

#### **Resolution No. 1 (1995): Low-latitude research programs**

IAGA, **recognising** the success of observations made during the IEEY (International Equatorial Electrojet Year) project, 1991-1994, with the collaboration of member countries and support from ORSTOM, CEA, CETP, CNET/Telecom, French Ministry of Cooperation, University of Abidjan, PAIGH, and others, and **noting** IEEY's direct contribution to the basic understanding of electrodynamics in the Earth's environmental space, **urges** that related geomagnetic and aeronomic research programs be maintained or extended at low-latitude sites in the coming decades, with the continued support from member countries and sponsors concerned.

*[CEA = Atomic Energy Commission; CETP = Center for Terrestrial and Planetary Environments; CNET = National Center for Telecommunications Study; ORSTOM = French Institute for the Development of Cooperation in Scientific Research; PAIGH = Pan-American Institute of Geography and History.]*

## **Resolution No. 2 (1995): Solar-cycle variation of the middle atmosphere**

IAGA, **recognising** the fundamental need for better understanding of the solar-cycle variation of the middle atmosphere for accurate estimation of anthropogenic changes, **recommends** that an increased commitment be made by national and international agencies to support an enhanced level of research into this problem.

## **Resolution No. 3 (1995): International database for rock magnetism**

IAGA, **recognising** that rock magnetic property data provide an essential framework for palaeomagnetic research and for the interpretation of crustal magnetic studies, and **noting** that existing accumulations of data are large, diverse, and dispersed, **urges** the establishment of an international database for rock magnetism.

## **Resolution No. 4 (1995): Digital magnetic anomaly map and database**

IAGA, **considering** the rapid progress currently being made in retrieving and compiling existing low-level airborne and marine magnetic anomaly data over large continental and oceanic areas, and **noting** the importance of magnetic anomaly data for geological and tectonic mapping of the Earth's crust, **urges** the compilation and publication of a digital magnetic anomaly map and database of the entire world (land and sea).

## **Resolution No. 5 (1995): Field-survey work and production of new charts**

IAGA, **recognising** the importance of field-surveys and charts for describing the surface magnetic field of the Earth, and **noting** that charts should be updated at least every 10 year to take into account the secular change of the geomagnetic field, **encourages** the relevant agencies from different countries to continue to support field-survey work and the production of new charts for epoch 2000 AD.

## **Resolution No. 6 (1995): Dst and AE indices**

IAGA, **noting** the need for the AE and Dst Indices by the international scientific community for studies of solar-terrestrial physics, and **recognising** the great contribution of World Data Center C2 for Geomagnetism, Kyoto in producing the Dst and AE Indices, **expresses** deep appreciation for the work performed by this Data Center in producing the AE and Dst Indices, and **urges** that priority be given to deriving a near-real time AE Index by accelerating the acquisition of Russian geomagnetic data through transmission by satellite.

## **Resolution No. 7 (1995): Geomagnetic observation in Russia for the AE indices**

IAGA, **noting** the importance of data from the four Russian geomagnetic observatories, Dixon, Tixie Bay, Cape Chelyuskin, and Cape Wellen, in the derivation of the AE Index, which plays an important role in investigations of the solar-terrestrial environment, and **recognising** that the present delay in the derivation of the AE Index is caused by difficulties of digitisation of analogue data and the lack of rapid transmission of the Russian data, **urges** that priority be given to deriving a near-real time AE Index by accelerating the responsible Russian agencies and related organisations overseas to cooperate in the maintenance of the four observatories, installation of digital magnetometers at those observatories, and improvement of transmission.

### **Resolution No. 8 (1995): Continuous operation of geomagnetic observatories**

IAGA, **recognising** the central role of geomagnetic observatory data in the study and applications of all geomagnetic phenomena, and **noting** the great value of long, continuous runs of observatory data, **thanks** the individuals, host institutions, and national funding agencies whose commitments contribute to the continuing operation of geomagnetic observatories worldwide, and **encourages** them to maintain their efforts.

### **Resolution No. 9 (1995): Ocean-bottom magnetic observations**

IAGA, **considering** the need to improve secular variation modelling by the addition of ocean-bottom magnetic observatories to obtain a balanced global coverage, and **noting** the high cost and long time needed to develop an ocean-bottom magnetic observatory prototype, **urges** support of research programs aimed at the design, deployment, and running of ocean-bottom magnetic observatories.

### **Resolution No.10 (1995): Measurements and estimation of the IMF**

IAGA, **noting** the considerable interest in the effects of the Interplanetary Magnetic Field (IMF) on the geomagnetic field, and **noting** recent advances in measurement and data transfer in near-real time, **encourages** interested institutes to continue their work in the development of indices and similar parameters to describe IMF structure using ground-based and satellite measurements.

### **Resolution No.11 (1995): High-accuracy geomagnetic survey satellites**

IAGA, **noting** that 15 years have passed since the last high-accuracy vector geomagnetic survey from low-Earth orbit, and **recognising** that continued accurate measurements of the geomagnetic field and its variations with time are crucial for our understanding of the Earth, **urges** the support of on-going missions and the initiation of new efforts to construct satellites capable of measuring accurately the vector geomagnetic field.

### **Resolution No.12 (1995): Support for data centres**

IAGA, **noting** the explosive increase in the amount of data in geomagnetism and solar-terrestrial physics, and **recognising** the fundamental importance of the construction of accessible databases, **urges** further support for data centres to acquire the facilities and personnel necessary for efficient data exchange in this new situation.

## **7<sup>th</sup> IAGA Scientific Assembly** **Buenos Aires (Argentina), 1993**

See [IAGA News, December 1993, No. 32.](#)

### **Resolution No. 1 (1993): Global database for palaeo- and archaeomagnetism (Division I)**

The IAGA, **recognising** the importance of large palaeomagnetic and related data sets for addressing problems in global geomagnetism, stratigraphy and tectonics, **noting** the large investment of research

funds in data acquisition, **recommends** that high priority be given to establishment, accessibility and maintenance of global databases for palaeomagnetism, archaeomagnetism and rock magnetism.

### **Resolution No. 2 (1993): AGONET Data Analysis Facility (Division II and III)**

The IAGA, welcomes the plan for Italy to host and fund a data analysis facility in Frascati for the Antarctic Geospace Observatory Network (AGONET), and **urges** national Antarctica expeditions and interested scientists within the Antarctica community to support the AGONET Data Analysis Facility (ADAP) by providing data sets to it and by participating in its activities.

### **Resolution No. 3 (1993): ULYSSES extended mission (Division IV)**

The IAGA, **noting** that contributions of the ULYSSES mission beyond its preliminary phase will provide unique scientific information, including observations of the Sun's polar regions during the next solar maximum, and **recognises** that these scientific contributions would be greatly enhanced by the availability of simultaneous solar observations by newer missions, especially CORONAS and SOHO, **urges** space agencies to provide support for the ULYSSES Extended Mission.

### **Resolution No. 4 (1993): Magnetic anomaly map of Antarctica (Division V)**

The IAGA, **noting** the international interest in Antarctica geology because of Antarctica's central position in Gondwanaland, resulting in a large number of geophysical surveys in Antarctica, and **noting** the success of collaborative efforts in making a map and digital database of magnetic anomalies for the Arctic region, **recommends** that all countries carrying out research in Antarctica of relevance to geomagnetism cooperate with the IAGA Working Group V.9 subcommittee on magnetic anomalies of the polar regions for the production of a database for a magnetic anomaly map of Antarctica and its surrounding oceans.

### **Resolution No. 5 (1993): De-classifying magnetic survey data (Division V)**

The IAGA, **noting** that many magnetic surveys that have been carried out by both military and civilian authorities, **urges** that all institutions holding classified magnetic data consider de-classifying those data that may contribute to international geoscientific research.

### **Resolution No. 6 (1993): Providing resources to magnetic observatories (Division V)**

The IAGA, **noting** the contribution made by magnetic observatories to long-term environmental monitoring, to fundamental research and to ground-based and satellite surveys and experiments, and **noting** also the extensive commercial and governmental use of geomagnetic models and indices derived from magnetic observatory data, **urges** relevant organisations, agencies, and member countries, to provide the resources to maintain continuity of synoptic magnetic observations and to adopt modern digital instruments.

### **Resolution No. 7 (1993): High-accuracy magnetic observation by satellites and observatory network (Division V)**

The IAGA, **noting** that a proper understanding of many aspects of the geomagnetic field requires continuous, high-accuracy, high-resolution long-term data of the type provided by the MAGSAT satellite

of 1979/1980, supported by a well-distributed and modern geomagnetic observatory network, **recommends** that all the relevant organisations, agencies and member countries provide all possible support to ensure that (1) a continuous sequence of MAGSAT-quality vector-magnetic satellites, such as the proposed UNIMAG, OERSTED, GAMES and DMSP/POGS satellite series, is operated for at least the next solar cycle (22 years), and (2) the current geomagnetic observatory network be maintained, and upgraded where necessary, and its coverage be extended into ocean areas.

#### **Resolution No. 8 (1993): International program covering the full solar cycle 23 (Division III)**

The IAGA, **noting** that SCOSTEP is at present **considering** future programs of international cooperation in solar-terrestrial physics, and **noting** that previous programs have emphasised the study of intervals which are short compared with the eleven-year period of a solar cycle, **recommends** that consideration should be given to an international program covering the full solar cycle 23.

#### **Resolution No. 9 (1993): Extension of the IEEY program (Commission for Developing Countries)**

The IAGA, **recognises** the efforts of various countries participating in the International Equatorial Electrojet Year (IEEY), and **noting** the importance of installing further observational equipment in some remote stations, extends the IEEY program until the end of 1994, and **recommends** that participating countries continue their support.

#### **Resolution No.10 (1993): Thanks to the LOC (IAGA)**

The IAGA, having spent a profitable and enjoyable number of days in Assembly, **noting** that there have been stimulating scientific sessions and responses by the delegates, **thanks** the Local Organising Committee (Chairman: Juan F Vilas) for the unfailing courtesy, helpfulness, enthusiasm and energy that has given IAGA scientists a memorable Assembly.

### **XX IUGG General Assembly Vienna (Austria), 1991**

See IAGA News, December 1991, No. 30.

#### **Resolution No. 1 (1991): Global observation network and data exchange**

The IAGA, **recognising** that global geophysical and geodetic studies are essential to understand the Earth system, and are urgently needed to elucidate many aspects of Global Change; **recognising** that the Mission to Planet Earth is to be a joint mission, relying heavily on international cooperation, and that measurements made at the surface of the planet are an integral and essential part of this mission; **noting** that

1. technological advances have recently led to significant improvements in geodetic and geophysical instrumentation and data acquisition systems, both on land and at the bottom of the oceans,
2. collection, analysis and international exchange of digital geodetic and geophysical data sets is now possible on a global scale,
3. scientists from IAGA and several other IUGG associations (IAG, IASPEI, IAPSO) are actively deploying global geophysical and geodetic networks, such as IRS/GSN, GEOSCOPE, INTERMAGNET, VLBI, IGS,

4. considerable economies of scale, and substantial scientific benefits can be derived from co-located measurements using different techniques;

**recommends** that relevant organisations, agencies and member countries

1. should review the services under their control, as well as the deployment of global networks supporting them, and should co-located as many of these instruments as is practical, provided that the performance of all instruments is not compromised,
2. should encourage the implementation of multi-disciplinary global digital data collection and data information systems which should proceed in parallel with the deployment of instrument networks, and
3. should improve methods for rapid international exchange of global data sets.

### **Resolution No. 2 (1991): Support to geomagnetic observatories facing problems**

IAGA **emphasising** the importance of maintaining the global network of magnetic observatories as the primary basis for investigating geomagnetic phenomena and updating geomagnetic reference field information, **noting** that many key observatories in developing countries have inadequate support and are facing imminent closure, and **recognising** that organisations in the developed countries are the main users of observatory data world-wide, **recommends** that those organisations in the developed countries that run magnetic observatory programs should each adopt one or more observatories facing problems and provide the necessary assistance and training to ensure continuing operation at a satisfactory standard, and that government funding agencies should consider this as a routine part of their international obligation to developing countries.

### **Resolution No. 3 (1991): Ocean bottom installations using submarine cables**

IAGA **recognising** the importance of an observation network in the oceans, and the almost total lack of ocean bottom installations, and **noting** that telephone companies will soon be retiring their submarine cables requests of these telephone companies that they keep these submarine cables open for scientific research, and **urges** funding agencies to facilitate this action by providing financial support for the installation and operation of ocean-bottom observing systems that use these cables.

### **Resolution No. 4 (1991): Continuity of Antarctic programs for ISTP/GGS period**

IAGA **recognising** that the ISTP/GGS program will become operational in the 1992-1995 time frame with the expected launch of GEOTAIL, WIND and POLAR spacecraft, together with other major magnetospheric and atmospheric spacecraft missions such as UARS, INTERBALL, CLUSTER and APEX, **urges** that nations conducting upper atmospheric and space physics research from Antarctica make every effort to ensure continuity of their programs during this period.

*Explanation of acronyms provided by President Gendrin:*

ISTP/GGS Programme International Soleil-Terre/Satellite Global pour les Geosciences

GEOTAIL Japanese satellite in ISTP for the study of the magnetospheric tail

WIND US satellite in the solar wind (ISTP/GGS)

POLAR US polar orbiter (ISTP/GGS)

UARS Upper Atmosphere Research Satellite

INTERBALL USSR/International pair of spacecraft for the study of the magnetosphere (one in polar orbit, the other in the tail)

CLUSTER Four ESA/NASA satellites (ISTP)



### **Resolution No. 5 (1991): Global observation network of UV spectra**

IAGA **recognising** the need to understand the UV radiation environment and the processes that control it, including the changes in total column ozone, and to investigate the response of the biosphere, **recommends** that national funding agencies support the establishment of a global observation network to determine the present day distribution of UV spectra at the Earth's surface and to detect long term (decade) trends, based upon standardised algorithms and instrument calibration.

### **Resolution No. 6 (1991): Solar FUV/EUV observation by satellites**

IAGA, **noting** the central importance of solar spectral far ultraviolet (FUV) and extreme ultraviolet (EUV) fluxes to studies of the Earth's thermosphere, ionosphere and mesosphere and **recognising** the limitations of available indices in the specification of spectral fluxes for quantitative studies, **recommends** that international and inter-agency cooperative efforts be initiated to provide for future space-borne, long-term solar FUV/EUV spectral flux measurements.

### **Resolution No. 7 (1991): Incoherent scatter radars in the polar cap region for space missions**

IAGA **noting** that plans for incoherent scatter radars in the polar cap region are already far advanced, and **recognising** that such observations are required in support of several spacecraft programs, in particular CLUSTER, **recommends** to all concerned National Agencies that such radars be installed and tested so that they are operational in time for relevant space missions.

### **Resolution No. 8 (1991): Equator-S satellite**

IAGA **noting** that the Equator spacecraft to survey the equatorial regions of the magnetosphere was an indispensable part of the synergistic aspects of the original GGS program, as originally developed by the scientific community acting through the various advisory and selection committees, views with concern that this spacecraft was removed from the well-balanced program for other than scientific reasons and the attempts to recover this science have not yet finally materialised, **recommends** that the latest attempt to do so with a small scale (Equator-S):satellite be pursued

- to fill the obvious gap in the GGS program
- and to demonstrate the possibilities of carrying out fruitful science with moderate resources.

### **Resolution No. 9 (1991): Participation in ACCORD project**

IAGA **noting** that our understanding of solar activity is often too limited to predict such processes as solar flares and geomagnetic storms and their influence on the Earth; **stresses** the necessity for outer-atmospheric observations of the Sun and solar-terrestrial interactions processes; **recommends** that appropriate national agencies in each country facilitate participation in the spacecraft project ACCORD (spacecraft APEX and CORONAS, 1992-1995) in conjunction with ground-based, balloon and rocket experiments, and invites SCOSTEP and COSPAR to participate in the project.



### **Resolution No.10 (1991): Establishment of national networks of magnetic repeat stations**

IAGA **recognising** the importance of magnetic repeat station observations for determining the geomagnetic secular variation in regions without magnetic observatories, and **noting** that an accurate knowledge of the secular change of the geomagnetic field is essential for updating global and regional magnetic survey data sets, **urges** that national networks of magnetic repeat stations be established, maintained and operated at the highest possible level of accuracy, and that all magnetic repeat station survey data be sent promptly to World Data Center-A, using the format recommended by IAGA.

### **Resolution No.11 (1991): Federation of institutes for geomagnetic observatories**

IAGA **recognising** the importance of continued long-term monitoring of the geomagnetic field for scientific, industrial and other purposes, **noting** that many key observatories throughout the world have inadequate support and are under threat of closure, **encourages** the creation of a federation of those institutes operating magnetic observatories, working closely with IAGA, that will strengthen and coordinate their efforts,

- by maintaining standards set by IAGA
- by working towards an improved distribution of observatories
- by establishing and coordinating by-lateral or multilateral assistance programs among participating institutes
- by actively pursuing all sources of funding.

### **Resolution No.12 (1991): ARISTOTELES satellite mission**

IAGA **recognising** that time scales of directly observable geomagnetic main field changes range from years to centuries and that measurement of changes over the entire range of periods is crucial for the study of properties of the Earth's core and lower mantle and of the coupling between the two; **recognising** that high resolution measurements of the geomagnetic anomaly field can provide significant information about the lithosphere and its tectonic structure in a detail never before achieved and that the acquisition of satellite magnetic field data of high accuracy is a crucial part of such measurements and **noting** that twelve years have passed since the acquisition of suitable satellite magnetic field data, **urges** most strongly ESA and NASA that they give their plans for the ARISTOTELES mission a high priority.

### **Resolution No.13 (1991): Real-time monitoring of the solar wind**

IAGA **noting** that advanced technological systems (especially electric power distribution and radio communications) are increasingly sensitive to natural variations in the Earth's magnetic field, magnetosphere and ionosphere, and **noting** that considerable progress has been made in quantitative understanding of the physical relations between solar wind parameters and the responses in geophysical parameters, **recommends** that the solar wind plasma and interplanetary magnetic field parameters be monitored upstream of the Earth in near real-time, and that the data be distributed internationally to anticipate possible terrestrial responses to severe solar wind fluctuations.

### **Resolution No.14 (1991): Support to the IEEY**

IAGA **noting** the imminent initiation of the International Equatorial Electrojet Year (IEEY): September 1991 to March 1993, **recognising** the great importance of this program for understanding the Earth's near space environment in the equatorial region, strongly controlled by the geomagnetic field and

ionosphere-atmosphere dynamics, **urges** all the member countries concerned to support the participating organisations and scientists.

## **6<sup>th</sup> IAGA Scientific Assembly** **Exeter (UK), 1989**

See IAGA News, March 1990, No. 28.

### **Resolution No. 1 (1989): Support to research in Antarctica through SCAR**

IAGA, **recognising** that a high power ELF/VLF radio transmitter sited on the thick west Antarctic ice with complementary instrumentation is an efficient way of studying not only nonlinear wave-wave and wave-particle interactions in the magnetosphere but also the precipitation of charged particles into the upper atmosphere **urges** concerned nations operating through the ICSU Scientific Committee on Antarctic Research to collaborate by designing, constructing, and resource sharing and by operating an international station in Antarctica to use the unique features of Antarctica for further scientific research in this field.

### **Resolution No. 2 (1989): Solar variability effects and downward coupling process**

IAGA, **recognising** the need to distinguish between natural and anthropogenic changes in the atmosphere, so that early signs of the latter can be more accurately evaluated and **noting** that there is a growing effort in the understanding of solar variability effects in the middle atmosphere, on short term, interannual and decade time scales and **recognising** that there is now evidence for solar variability effects in the lower stratosphere, **recommends** more intensive studies of atmospheric responses to solar activity and downward coupling processes to be carried out as one of the IAGA contributions to the goals of the IGBP in conjunction with IAMAP.

### **Resolution No. 3 (1989): Reconsideration of instruments on the SOHO payload**

IAGA, **noting** that the magnetic and solar wind measurements contribute an indispensable part of the synergistic aspects of SOHO/CLUSTER which are jointly considered as the cornerstone mission in solar-terrestrial physics views with concern the decision by the managing authorities of the agencies involved to remove the magnetometer and solar wind instruments from the SOHO payload and **recommends** that this decision be reconsidered.

### **Resolution No. 4 (1989): Support to observations in Antarctica**

IAGA, **recognising** that key developments in the understanding of the coupled ionosphere magnetosphere and solar wind system will come from the integration of in situ satellite observations and measurements from spatially related networks of ground observatories and **recognising** that Antarctica provides a unique platform upon which to deploy an optimum network of ground observatories from which to deploy unmanned experimental facilities in Antarctica, **urges** national administrations through the ICSU Scientific Committee for Antarctica Research to support the development of an optimum international network of observatories

1. by coordinating the siting of new unmanned and manned facilities with existing facilities to optimise the spatial coverage;

2. by ensuring that, as a minimum, measurements of the geomagnetic field and of the absorption of cosmic noise by the riometer technique be made at each site under their control; and
3. by establishing an international database of these basic measurements to be freely available to all contributing nations.

#### **Resolution No. 5 (1989): Magnetic anomaly map of the Arctic regions**

IAGA, **noting** the great number of magnetic surveys that have been carried out to obtain information about the Arctic lithosphere and **noting** the considerable international interest in Arctic geology because of its contribution to the enhancement of our understanding of the tectonic evolution of the northern continents and oceans **recommends** that all countries having geoscience research interests in the Arctic contribute to the production of a magnetic anomaly map of the Arctic regions.

#### **Resolution No. 6 (1989): Reconsideration of closure of geomagnetic observatory**

IAGA, **recognising** that reliable data from geomagnetic observatories in all parts the world are important for geomagnetic science and also for the development of technologies and **noting** that some observatories are experiencing considerable difficulties in securing funding and maintaining operation strongly **urges** the responsible institutes to work with the IAGA to develop alternative solutions prior to taking a final decision to close an observatory.

#### **Resolution No. 7 (1989): Real-time geomagnetic data for the Dst and AE indices**

IAGA, **noting** the importance of making the Dst and AE magnetic indices available to the scientific community as promptly as possible and **recognising** that the production of these indices on short time scales can be greatly assisted by transmitting data via satellite links **recommends** the use of such a system and **encourages** those magnetic observatories providing data to the World Data Center C2 for Geomagnetism for the calculation of these indices to use real-time data transmission systems such as that planned under the INTERMAGNET project.

#### **Resolution No. 8 (1989): Appreciation of Dst and AE derivation**

IAGA, **noting** the contributions made by the World Data Center C2 for Geomagnetism in the production and distribution of the Dst and AE indices and **recognising** their immense value to the scientific community expresses deep appreciation of the effort being made by the World Data Center C2 for Geomagnetism, Kyoto, and **requests** the Center to continue these important activities.

#### **Resolution No. 9 (1989): Appreciation of ISGI activities**

IAGA, **noting** the value to the scientific community of high quality reliable geomagnetic indices and **recognising** the unique role of the International Service of Geomagnetic Indices (ISGI) in the derivation, publication, and dissemination of these indices expresses deep appreciation of the efforts made by the Institut de Physique du Globe de Paris and the Center de Recherches en Physique de l'Environnement in editing ISGI monthly bulletins and assuring the publication of IAGA Bulletin No. 32 series and strongly **recommends** the Federation of Astronomical and Geophysical Data Analysis Services to continue their support to the ISGI.

### **Resolution No.10 (1989): High accuracy geomagnetic field observation by satellites**

IAGA, **recognising** that time scales of directly observable geomagnetic main field changes range from years to centuries and that measurement of changes over the entire range of periods is crucial for the study of properties of the Earth's core and lower mantle and of the coupling between the two; **recognising** that high resolution measurements of the geomagnetic anomaly field can provide significant information about the lithosphere and its tectonic structure in a detail never before achieved; **recognising** that the acquisition of satellite magnetic field data of high accuracy is a crucial part of such measurements and **noting** that ten years have passed since the acquisition of suitable satellite magnetic field data **urges** again most strongly that plans for satellite measurements of the geomagnetic field at both low altitude and of long duration be given the highest priority for implementation.

### **Resolution No.11 (1989): Promotion of the IEEY**

IAGA, **recognising** the importance of the Equatorial electrojet in geomagnetism, upper atmosphere dynamics and ionospheric processes, **noting** the fact that the equatorial electrojet encompasses geographic regions of many developing countries, designates the period September 1991-March 1993 as the International Equatorial Electrojet Year (IEEY), during which intensive and coordinated campaigns on the equatorial electrojet and related aeronomic phenomena should be conducted using a variety of observational techniques at low latitudes, and **urges** all concerned scientific communities to participate actively in this programme.

### **Resolution No.12 (1989): Thanks to LOC**

IAGA, **considering** in particular the short notice for the organisation of this Assembly, **places on record** its sincere gratitude to the Royal Society of London and to the University of Exeter for inviting the Association to hold its Assembly in what have proved to be almost ideal surroundings and thanks the Local Organising Committee, under the chairmanship of Professor David Southwood, and in particular Dr Roy Jady and his assistant Mrs. Marilyn Webb for their heroic efforts in achieving a successful outcome.

## **IXX IUGG General Assembly Vancouver (Canada), 1987**

See [IAGA News, December 1987, No. 26](#).

### **Resolution No. 1 (1987): Establishment of SEDI and numerical modelling of geodynamo**

IAGA, **welcoming** the establishment of the Study of the Earth's Deep Interior (SEDI) and **recognising** that the origin of the Earth's magnetic field is a fundamental, unsolved problem, **recommends** that a concerted international co-operative effort be supported to develop numerical methods of modelling the geomagnetic dynamo.

### **Resolution No. 2 (1987): International coordination for palaeomagnetic database**

IAGA, **recognising** the importance of palaeomagnetic data for studies of the tectonic history of the Earth and for understanding the geomagnetic field area and **noting** the lack of any international co-ordination in preserving and compiling such data, **urges** support for the compilation of both regional and

global databases and for international workshops to coordinate the merging of such databases in order to facilitate use of palaeomagnetic data by research workers.

### **Resolution No. 3 (1987): Continuous monitoring of Earth's ionised environment**

IAGA, **recognising** the importance of monitoring factors governing the Earth's ionised environment over periods as long as the 11 year solar cycle and in particular **noting** the recently established ability to monitor ion composition in near-Earth space and **noting** the diminishing number of spacecraft flight opportunities, **urges** those agencies with active spacecraft to make a concerted effort to continue tracking them and acquiring data from them.

### **Resolution No. 4 (1987): Continuous measurement of solar wind parameters**

IAGA, **recognising** the importance of the interplanetary magnetic field and plasma field and plasma parameters which are fundamental for energy input into the magnetosphere and provide the driving energy for many of the phenomena studied by IAGA scientists, **recommends** to the countries engaged in space experiments that efforts be made to assure the continuous measurements of the interplanetary magnetic field and plasma parameters and the timely dissemination of these data on a world-wide basis.

### **Resolution No. 5 (1987): High-accuracy magnetic field measurement by satellites**

IAGA, **recognising** that seven years have passed since the acquisition of satellite magnetic field data suitable for high accuracy modelling of the Earth's main field and **recognising** that such data are crucial for study of the properties of the Earth's core and lower mantle and of the coupling between the two and **noting** that attempts to use satellite data of lesser quality have not been satisfactory, **urges** most strongly the national and international space agencies to give the highest priority to missions using the best possible magnetometers and attitude control.

### **Resolution No. 6 (1987): Data management and exchange in solar-terrestrial physics**

IAGA, **recognising** the importance of the World Data Centers to the scientific community, notes with satisfaction, the steps taken by the ICSU Panel on World Data Centers toward revision of the Guide to International Data Exchange and the publication of Part 1 of the new Guide to the World Data Center System and **encourages** timely input to future sections of the new Guide covering solar-terrestrial phenomena and **urges** organisers of new solar-terrestrial programs to ensure that provisions for data management and exchange are included in their plans within the guidelines of the new Guide and ICSU policy.

### **Resolution No. 7 (1987): Continuous geomagnetic and ionospheric observations**

IAGA, **noting** the high value which has to be given to long time series of geomagnetic and ionospheric observations, which have made great contributions to our present understanding of the Earth and its environment, **recognising** that in the current economic climate in many countries many such activities are being cut back and **noting** that particular examples of this are provided by the Witteveen Geomagnetic Observatory in the Netherlands, and by the long chain of ionospheric observatories which stretches from Raratonga, through New Zealand and Campbell Islands, to Scott Base in Antarctica, **urges** all member countries to maintain uninterrupted observations.

## **Resolution No. 8 (1987): Thanks to LOC**

IAGA participants of this 1987 Vancouver Assembly take part in expressing their deep appreciation to their Canadian colleagues in the Local Organising Committee under the leadership of Professor R. D. Russell, with Professor R. Armstrong in support, for their excellent arrangements and hospitality ensuring great success and enjoyment of this Assembly. IAGA also thanks Professors D. McEwen and T. Watanabe for their representation of IAGA in the preparatory work by the Canadian National Committee for IUGG and the Local Organising Committee.

## **Resolution No. 9 (1987): Scheduling of IAGA symposia**

IAGA, **noting**

- 1) the increased volume of scientific works which must be discussed by the scientists of the Association, in relation with the international programs of experiment and/or observations,
- 2) the reduced amount of time allocated to Association symposia during Union General Assemblies because of the existence of many Union activities,
- 3) the conflict which sometimes exists between Union and Association symposia held simultaneously,
- 4) the lower attendance of IAGA scientists at General Assemblies, as compared with the attendance at Scientific Assemblies apparently on account of these constraints,

**requests** that the number of Inter-Association symposia be reduced (7 to 10 at maximum) and that the convenors of such symposia act in close contact with, and under the supervision of, the Associations involved.

## **Resolution No.10 (1987): Assembly in 1989 at University of Exeter**

IAGA, **recalling** the unfortunate circumstances of its withdrawal from the planned Scientific Assembly in 1989 in Oslo, and the consequent need to find a new invitation in another country for an Assembly in 1989 and **noting** the generous invitation from the British National Committee through the Council of the Royal Society of London, and the University and City of Exeter, accepts this invitation with pleasure and resolves to convey its warm thanks to the Royal Society of London and its particular appreciation of the prompt and effective action taken by Professor D. J. Southwood and Mr C. R. Argent in arranging for that invitation.

## **IUGG Resolutions (1987)**

### **Resolution (1987): Free circulation of scientists**

IUGG, **noting**

- (i) that Canada had accepted that the Union General Assembly be held in this country in 1987 approximately four years in advance and
- (ii) that approximately six months before the Assembly, Canada placed severe difficulties in the procedure that South African bona fide scientists had to follow, requiring them to appear personally at a Canadian Embassy outside South Africa to obtain their visas and
- (iii) that the actions described in (ii) are tantamount to discrimination against certain groups of bona fide scientists, in direct conflict with the International Council of Scientific Union (ICSU) rules relating to the free circulation of scientists

**expresses** its great concern to the Canadian government and to ICSU about this discrimination and further **recommends** that ICSU insists that governments which propose and/or accept that scientific



assemblies of ICSU bodies be held in their country do not introduce new difficulties in the procedures which are necessary for obtaining visas by bona fide scientists of every country, after such proposal and/or acceptance has been made.

### **Resolution (1987): Upper atmosphere and geomagnetic observations in low latitude regions**

IUGG, **noting** that a useful suggestion by the Interdivisional Commission on Developing Countries of IAGA has been made for a concentrated study (at least during 1989-1990) of equatorial aeronomy and geomagnetism, greatly influenced by equatorial electrojet effects, contributing essentially to

- (i) encouragement of low latitude countries to complement the existing research programs in the middle and high latitude regions, and
- (ii) improved understanding of coupling between the Earth's immediate environmental space and the upper atmosphere, in particular of the specific and exclusively equatorial confined phenomena

**recommends** member countries

- (i) to initiate and support experiments on upper atmosphere and geomagnetism in low latitude regions at different longitudes over the world,
- (ii) to provide some cost-effective or available instruments to low latitude countries willing to participate in these global geophysical studies,
- (iii) to collaborate with the Interdivisional Commission on Developing Countries of IAGA for matters concerning the detailed plans and practical arrangements of this study.

### **5<sup>th</sup> IAGA Scientific Assembly Prague (Czech Republic), 1985**

See IAGA News, November 1985, No. 24.

### **Resolution No. 1 (1985): Continuation of magnetic field satellites and associated ground measurements**

IAGA, **recognising** the great improvement of our knowledge of the geomagnetic field because of the availability of MAGSAT data, **noting** that additional such satellites are essential for disciplines such as magnetospheric and ionospheric physics, magnetic exploration of the crust and studies of the Earth's core, **endorses** the recommendations of the International Working group on Magnetic Field Satellites, and **urges** again that a continuing program of satellite vector measurements of the geomagnetic field be initiated in the near future, and that the associated ground measurements which are needed for absolute reference and for modelling the main field be continued and, if possible, expanded.

### **Resolution No. 2 (1985): Continuous solar wind data acquisition from IMP-8 spacecraft**

IAGA, **understanding** that the coupling between the solar wind, the magnetosphere, the ionosphere and the thermosphere requires knowledge of solar wind parameters, since these provide the input to the system, **expresses** its appreciation of the recent efforts by ESA and NASA to extend the usefulness of the IMP-8 spacecraft by acquiring data from Redoux (Belgium), and strongly **urges** all responsible agencies to cooperate in providing as complete a coverage as possible in the continuing acquisition of IMP-8 measurements and to consider the possibility of deploying new spacecraft to measure the crucial solar wind parameters.



### **Resolution No. 3 (1985): Support to international magnetotelluric observation projects**

IGAGA, **recognising** the success of seismic methods in elucidating structures in the lithosphere, arising from intensive international cooperation with uniform measuring equipment and processing techniques, and anticipating a similar success of electromagnetic induction methods under comparable conditions, **recommends** funding agencies to support projects associated with the International Lithosphere Program, such as the European Geotraverse Project, to support the creation of large pools of magnetotelluric equipment preferably with uniform specifications and to support projects that work towards standardisation in data exchange.

### **Resolution No. 4 (1985): International laboratory for numerical electromagnetic modelling**

IGAGA, **recognising** the importance of advanced and reliable interpretation of electromagnetic (EM) measurements for a better understanding of the structure, composition and tectonic development of the Earth, and **noting** the difficulties in developing reliable and effective computer programs for data processing, modelling and interpretation purposes and the lack of appropriate computing facilities in many institutions, **endorses** every effort, such as the creation of the International Laboratory of Numerical Electromagnetic Modelling (ILONEM), to provide means for developing, testing and comparing reliable programs and to provide computing and modelling services to scientists, especially those in developing countries.

### **Resolution No. 5 (1985): Continuation of St. Santin incoherent scatter radar**

Whereas global experiments to study the atmosphere - ionosphere- magnetosphere coupling have received considerable emphasis during the last few years and are expected to receive more emphasis in the future, IAGAGA is **concerned** to learn about the planned discontinuation of incoherent scatter measurements at St. Santin in 1986. Observations from St. Santin are particularly valuable in the context of global studies because St. Santin is the only mid latitude radar station in the European sector, and because measurements in the European sector and in the American and Asian sectors are required for separating local time and Universal Time effects. Accordingly, IAGAGA **recommends** that the responsible authorities in France examine every possible way to continue incoherent scatter operations of the St. Santin facility for special campaigns beyond 1986.

### **Resolution No. 6 (1985): Importance of Antarctic observation**

IGAGA, **noting** the importance of Antarctica as a unique area in which to observe a great variety of geophysical phenomena, which are essential for the understanding of the physics of atmospheric and near-Earth space processes, and **recognising** its particular suitability for international scientific cooperation, **recommends** that funding agencies continue to support existing experiments in Antarctica and implement new installations of equipment for studying the ionosphere, thermosphere, mesosphere, stratosphere and solid Earth in these regions by means of ground-based instruments, rockets and low altitude orbiting spacecraft.

### **Resolution No. 7 (1985): Continuous monitoring of solar and geomagnetic conditions**

IGAGA, **recognising** the essential role in support of numerous research programs of the long time- series of monitoring data describing solar and geomagnetic conditions provided by magnetic observatory records and the 10.7 cm solar radio flux observations, strongly **recommends** to funding agencies that efforts be

made to safeguard the future of these monitoring programs and the archiving and dissemination of their results

### **Resolution No. 8 (1985): Prompt report of geomagnetic observation for IAGA Bulletin No.32**

IAGA, **recognising** the importance of continued publication of definitive geomagnetic indices and of summary data on rapid geomagnetic activity in a timely manner, reasserting its policy of continued publication of the IAGA Bulletin No. 32 series, and **noting** that delays caused by a small number of observatories have a serious adverse effect on the usefulness of the whole network, **urges** the magnetic observatory to report activity and indices, and to return check lists, promptly to all permanent service centres which are involved in this process of publication.

### **Resolution No. 9 (1985): Promoting IAGA-related science under the LOME III Convention**

IAGA, **noting** that 65 countries belonging to the group of AFRICAN-CARIBBEAN-PACIFIC states have signed with the European Community a convention, known as the LOME III Convention, by which funds might be available to those countries in order to implement scientific experiments and to develop research, **urges** that this possibility be used for promoting IAGA-related science in these countries, thus leading among other benefits to a significant step towards a fully global coverage of geomagnetic and aeronomic phenomena, and **recommends** such programs to the European Community for funding under the Lome Convention.

## **XVIII IUGG General Assembly** **Hamburg (Germany), 1983**

See IAGA News, February 1984, No. 22.

### **Resolution of thanks (1983): Thanks to LOC**

IAGA is deeply **appreciative** of the organisation and efforts made by the Local Organising Committee of IUGG; in particular it commends the excellent arrangement by the Geomagnetism staff of the Deutsches Hydrographisches Institut (Dr. D. Voppel and his colleagues) to make our meeting effective and productive and to help make our stay in Hamburg pleasant and enjoyable.

### **Resolution No. 1 (1983): Derivation of AE indices by WDC-C2 for Geomagnetism, Kyoto**

IAGA **welcomes** the news that the World Data Center C2 for Geomagnetism in Kyoto (Japan) has completed the derivation of the Auroral Electrojet (AE) Indices for the International Magnetospheric Study Years 1978, 1979 and the first half of 1980; **congratulates** those responsible for this fruitful and important work involving international cooperation, looking forward to the continuing cooperation of the WDC-C2 for Geomagnetism with the Japanese National Institute of Polar Research and **recommends** strongly that observatories contributing the data for the AE-index do so in digital form as soon as is practical.

### **Resolution No. 2 (1983): Continuous observation of the solar wind**

LAGA **notes** the scientific importance of Interplanetary Medium data and **recommends** that such data continue to be recorded for onward transmission to the World Data Centers.

### **Resolution No. 3 (1983): Standardisation of computer-based techniques at WDCs**

LAGA **commends** the progress being made by the World Data Centers in developing computer-based techniques for data transmission and storage and **urges** the establishing of compatibility in both hardware and software, including the standardisation of data formats.

### **Resolution No. 4 (1983): Scaling technique of K by hand and by machine**

LAGA **recognising** that the quality of results from long time series depends on the accuracy and homogeneity of the data sets; notes that K-indices from different networks of observatories have been used for many years in deriving planetary activity indices  $A_p$ ,  $A_m$  and  $A_a$ , and that some observatories are now using digital recording systems and machine data reductions; and **recommends**

- (1) that routine derivation of K-indices continues by hand scaling according to the method proposed by Bartels (developed by Mayaud in IAGA Bulletin No. 21); and
- (2) that new machine derived indices be given distinctly different names to avoid confusion with existing indices.

### **Resolution No. 5 (1983): Low-altitude magnetic satellite after MAGSAT**

LAGA **recognising** the value of the MAGSAT global vector survey in defining the main magnetic field of 1980, the need for knowledge of the secular variation, its contribution to separating internal and external field variations, and the extreme usefulness of satellite observations of the magnetic field in delineating long-wavelength crustal anomalies and in producing magnetic charts; **urges** that another magnetic vector field satellite survey be carried out, most desirably at an altitude significantly lower than MAGSAT and preferably before 1990, and **notes** that a satellite such as the proposed Geopotential Research Mission of the USA would be excellent for the performance of these tasks.

### **Resolution No. 6 (1983): Geomagnetic data for IGRF1990**

LAGA will issue a revision of the International Geomagnetic Reference Field extending it from 1985 to 1990 and **recognising** the crucial importance of recent data on secular variation for the accuracy of the revision, **asks** geomagnetic program directors to make an extraordinary effort to transmit their most recent data related to secular variation, including magnetic observatory mean values for 1983 and repeat survey results, to the World Data Centers before July 1, 1984.

### **Resolution No. 7 (1983): Compilation of geomagnetic surveys**

LAGA **appreciates** the importance of long wavelength anomalies for the investigation of large-scale structures in the deeper parts of the Earth's crust and **recommends** the compilation of geomagnetic surveys of Europe and other regions in such a way as to allow the preparation of consistent anomaly maps.

## **Resolution No. 8 (1983): International program for quantitative investigations in STP**

LAGA **notes** the immense value to the scientific community of international programs for coordinated data acquisition, analysis and interpretation (e.g., IGY, IQSY, IMS, MAP, SMY) and **recognising** the importance, complexity and dynamic nature of the solar-terrestrial interaction, **urges** member nations to support and to participate in ICSU planning for international programs during the coming decade designed to acquire and to analyse widespread and well-coordinated data for quantitative investigations of the physical and chemical processes involved in the solar-terrestrial interactions.

## **4<sup>th</sup> IAGA Scientific Assembly Edinburgh (UK), 1981**

See IAGA News, December 1981, No. 20.

## **Resolution of thanks (1981): Thanks to LOC**

LAGA **expresses** its appreciation to The Royal Societies of London and Edinburgh and its sincere gratitude to the Local Organising Committee for the excellent hospitality, scientific meeting arrangements, the social programme and the weather which have produced a very enjoyable and fruitful assembly.

## **Resolution No. 1 (1981): Southern hemisphere incoherent scatter radar**

LAGA, **noting** that a proposal is to be made to URSI that a feasibility study should be made for a containerised Southern Hemisphere Incoherent Scatter Facility (SHISCAT) and **noting** that the scientific results obtainable with such a facility would be of great interest **recommends** that such a feasibility study be made and **requests** URSI to keep IAGA informed of progress in this project.

## **Resolution No. 2 (1981): Support to WDCs for continuous and upgraded activities**

LAGA, **noting** that the World Data Centers for Solar-Terrestrial Physics have, in the past, played a vital role in helping to provide IAGA scientists with primary and support data necessary for them to carry out their research effectively and **noting** that the success of the data analysis phases of the International Magnetospheric Study and the upcoming Middle Atmosphere Program are strongly dependent on the continued availability of the large data archives handled by the World Data Centers, strongly **recommends** that national agencies which house and support the World Data Centers do all in their power to ensure that the high standards of data archiving and dissemination achieved by these organisations in recent years are maintained and, if possible, upgraded over the coming decade.

## **Resolution No. 3 (1981): Support to the Reporter Reviews**

LAGA, **noting** that Reporter Reviews of the divisions of IAGA are considered to be an integral part of the process of alerting IAGA scientists to recent developments in their areas of research and further **noting** that the non-attendance of reporters in certain topic areas which they are assigned to cover leads to a gap in reporting results which extend over two years of development in the areas concerned, strongly **urges** that organisations at which the reporters are based do all in their power to ensure that reporters are given the resources which will permit them to prepare their reviews and to deliver them orally at the IAGA and IUGG General Assemblies.

#### **Resolution No. 4 (1981): Continuous operation of HELIOS-1 mission**

IAGA, **noting** that the new and unexpected results from the HELIOS-[1] mission as solar activity evolves and **noting** the excellent technical status of the payload and the spacecraft and **recognising** the unique capabilities of HELIOS-1 to study the interplanetary medium between 0.3 AU and 1.0 AU during the declining phase of the solar cycle **urges** the appropriate agencies in the FRG [Federal Republic of Germany, former West Germany] to ensure the continued support of mission operations and data analysis.

#### **Resolution No. 5 (1981): Continuation of Geomagnetic Observatory Paramaribo**

IAGA, **recognising** the need for geomagnetic data in the equatorial region of South America, **requests** that the Surinam authorities support the continuation of the Geomagnetic Observatory Paramaribo.

#### **Resolution No. 6 (1981): Support to Nairobi Geomagnetic Observatory**

IAGA, **recognising** the importance of Nairobi Geomagnetic Observatory as part of the East African contribution to international geophysical science, and **noting** the need for improving the quality of operation, **urges** the Kenya authorities to provide the necessary funds to rehabilitate and continue to maintain the observatory operation, with due regard to unified standards established for East African observatory and field survey needs.

#### **Resolution No. 7 (1981): Continuous operation of Nampula Geomagnetic Observatory**

IAGA, **recognising** with thanks the efforts of Mozambique authorities in maintaining the high standard of the Maputo Geomagnetic Observatory, and **noting** the improvement that the Nampula Geomagnetic Observatory will provide in filling a gap in the network of magnetic observatories, **recommends** the continuous operation of the Nampula Observatory.

#### **Resolution No. 8 (1981): Digital recording at AE stations and thanks to WDC-C2, Kyoto**

IAGA, **recognising** the immense value to the scientific community of the derivation and publication of auroral electrojet (AE) indices, **thanks** WDC-C2 (Kyoto, Japan) for producing AE in published form for the first half of 1978, and **urges** that WDC-C2 continue to produce AE indices; understanding that 6 of the 12 observatories whose records are used in deriving AE are now recording digitally, strongly **urges** that the remaining stations (Cape Wellen, Tixie Bay, Cape Chelyuskin, Dixon Island, Abisko, and Leirvogur) rapidly convert to digital recording magnetometers to facilitate the prompt production and publication of AE indices.

#### **Resolution No. 9 (1981): Global meteor radar network**

IAGA, **noting** that most radar meteor systems are now automated, **considering** the need for a more effective geographical distribution of radar meteor stations and **recognising** high degree of coordination necessary to undertake simultaneous world-wide observations **recommends** that

- (1) IAGA member countries be encouraged to support and extend the radio meteor network
- (2) international coordination be undertaken through a Global Meteor Observation System (GLOBMET) and that this coordination be effected in the immediate future through the Middle Atmosphere Program in SCOSTEP

- (3) a committee be formed within SCOSTEP with representatives from IAGA, IAMAP, IAU, and URSI to produce a GLOBMET planning document.

#### **Resolution No.10 (1981): Magnetic repeat surveys in developing countries**

IAGA, **recognising** the need for magnetic repeat surveys in developing countries which lack the equipment and expertise in these operations, **suggests** that consideration be given by these countries to obtaining assistance from agencies who have these facilities or from individuals who have the expertise.

#### **Resolution No.11 (1981): Workshops in magnetic operations**

IAGA, **recognises** the need for workshops in magnetic operations in the regions of developing countries to provide training of technicians for these operations and **urges** that countries in need of such training and appropriate international agencies join in support of these workshops.

#### **Resolution No.12 (1981): Low-altitude satellite survey of geomagnetic field**

IAGA, **recognising** the usefulness of Magsat satellite vector magnetic data in defining IGRF 1980, and **noting** the complexity of secular variation, **urges** that another such satellite survey be made; **recognising** the value of such data in mapping intermediate-wavelength anomalies attaches great importance to the acquisition of such data at an altitude less than 200 km.

#### **Resolution No.13 (1981): DGRF1965-75, PGRF1975, and IGRF1980**

IAGA, **recognising** the continuing need for an International Geomagnetic Reference Field, **recommends** that:

1. IGRF 1980 be used for the interval 1980 to 1985
2. DGRF 1965, DGRF 1970, and DGRF 1975 be used, with linear interpolation, for applications requiring definitive values for the interval 1965 to 1975
3. PGRF 1975 (i.e. DGRF 1975 and IGRF 1980 interpolated linearly) be used for the interval 1975 to 1980 until DGRF 1980 is produced.
4. This pattern be maintained in future updates.

*(In the above text, DGRF denotes a Definitive International Geomagnetic Reference Field, and PGRF a Provisional International Geomagnetic Reference Field. The values of spherical harmonic coefficients for DGRF 1965, DGRF 1970, DGRF 1975, and IGRF 1980 with secular variation terms for 1980-1985 are shown in this publication on page 101.)*

#### **Resolution No.14 (1981): Data bank of archaeomagnetic and palaeomagnetic records**

IAGA, **noting** the need to extend our knowledge of the geomagnetic secular variation beyond the limited range of historical and observatory records and **recognising** the large increase during the past decade in secular variation records from a world-wide network of sites obtained from archaeomagnetic studies and palaeomagnetic studies of sedimentary sequences, **urges** that a data bank be established, and subsequently transferred to a World Data Center to enable all workers to gain ready access to the available data.



## **Resolution No.15 (1981): Aeromagnetic surveys in Antarctic region**

IAGA, **recognising** the great contributions that detailed aeromagnetic surveys would make in understanding the structure and geological history of Antarctica and its surround oceanic areas, strongly **urges** member countries of SCAR to acquire such data from those regions.

## **XVII IUGG General Assembly Canberra (Australia), December 1979**

See [IAGA News, February 1980, No. 18.](#)

## **Resolution of thanks (1979): Thanks to LOC**

IAGA expresses its gratitude to those member countries that in recent years have hosted international conferences in the fields of IAGA's interest. IAGA expresses its deep appreciation to the Australian Academy of Sciences and to the Local Organising Committee for the quality of the arrangements and the hospitality shown to the participants that have led to productive and pleasant meetings in Canberra and Melbourne.

## **Resolution No. 1 (1979): Promotion of appointment of delegates to the IUGG Council**

IAGA, **noting** with satisfaction that there are many IUGG member countries carrying out strong scientific programs in IAGA disciplines thus providing a large and important scientific input to IAGA Scientific and General Assemblies, **recognising** that the most crucial financial decisions directly affecting the operations of IAGA as well as many programmatic decisions are in the purview of the IUGG Bureau, the IUGG Finance Committee and, ultimately, the IUGG Council, **encourages** the IAGA Adhering Bodies to promote within the IUGG National Committees to which they belong, the appointment of Delegates to the IUGG Council drawn from the disciplines of IAGA, so as to achieve a representation of IAGA interests in the Council, and ultimately in the IUGG Bureau and Finance Committee, that is commensurate with the actual volume of scientific and programmatic work carried out by this Association.

## **Resolution No. 2 (1979): IUGG endorsement of the new Constitution for SCOSTEP**

IAGA, **noting** that SCOSTEP was converted by ICSU into a Scientific Committee, and taking into account the continued strong interest and active participation of IAGA and IAMAP scientists in SCOSTEP programs such as MAP, the IMS Data Analysis phase, SMY, and Solar-Weather Relationships, **recommends** to IUGG endorsement of the new Constitution drafted for SCOSTEP, and provision of continued financial support to this Scientific Committee.

## **Resolution No. 3 (1979): Continued support to IMS SSC and IMSCIE**

IAGA **acknowledges** the major contributions to the success of the International Magnetospheric Study that have been made by the IMS Satellite Situation Center (SSC) and by the IMS Central Information Office (IMSCIE); **notes** that during the post-IMS period there will be a continuing need for an information flow of the type at the present being provided by the SSC and the IMSCIE Office; and **urges** SCOSTEP and its affiliated international bodies to persuade relevant national agencies and academies to provide continued support to these services during the next decade.



#### **Resolution No. 4 (1979): Inclusion of geophysical experiments on geosynchronous applications satellites**

LAGA, **recognising** the contributions that have been made in the past by experiments on geosynchronous applications satellites, **urges** that provision be made for the inclusion of coherent radio beacons and other equipment for geophysical experiments when such satellites are being planned.

#### **Resolution No. 5 (1979): Establishing global radar systems for M-I coupling study**

LAGA, **noting** the success of radar techniques in providing new information about the dynamic and spatial structure of electric fields, and the importance of such information for increasing the understanding both of the ionosphere-magnetosphere coupling and of global energy dissipation in the ionosphere through joule heating, **urges** that member nations collaborate in establishing radar systems in both hemispheres over as wide a longitude range as possible.

#### **Resolution No. 6 (1979): Global network of meteor wind radar for MAP**

LAGA, **noting** the progress which has been achieved in the investigation of dynamical processes in the upper atmosphere by means of the meteor radar method (especially under the auspices of the IAGA Global Radio Meteor Wind Studies Project (GRMWSP) ), and the progress in the development both of automated meteor radars and of mathematical simulation of meteor phenomena, and **noting** that the necessity of measuring mesopause dynamics on a global scale requires the comparison of data measure by different equipment using different analyses, **recommends**

- (i) that all groups which use the radio meteor method during the preliminary MAP period coordinate their efforts in the development of the global network of meteor wind radars, to include transportable radars;
- (ii) that other techniques (for example, incoherent scatter, partial reflection drifts and LF spaced receiver drifts) should be used in coordinated measurements;
- (iii) that the existing GRMWSP network carry out simultaneous observations during periods of particular meteorological significance, at least until completion of MAP; and
- (iv) that greater efforts be made to standardise equipment and analysis techniques, with particular emphasis on comparing results obtained using different observational techniques.

#### **Resolution No. 7 (1979): Cooperative project for geomagnetic secular variation study with sediments in lakes**

LAGA, **noting** that a comprehensive study along an east-west profile of geomagnetic secular variations recorded in sediments deposited since the last glaciation in lakes is likely to yield new data basic to our understanding of the origin of the geomagnetic field and that such a profile would be optimally located in the Eurasian and American continents, within a band of latitudes between 40 and 50 degrees N, **recommends** that National Bodies in the respective countries support the preparation of a cooperative project in which standardised techniques will be used.

#### **Resolution No. 8 (1979): Magnetic observations on Easter Island, around Pamatai and on Amsterdam Island**

LAGA, **considering** the importance of establishing and maintaining an adequate geographical distribution of magnetic observatories, **urges** the establishment of an observatory on Easter Island, appeals to

the authorities concerned to maintain an electromagnetic noise-free area around the Pamatai (Tahiti) observatory site, and the opening of a permanent magnetic observatory on Amsterdam Island.

#### **Resolution No. 9 (1979): Repeat geomagnetic observation on islands**

IAGA, **considering** the need for secular change data of the magnetic field from remote ocean areas and the possibility of achieving this by measurements at certain specified islands, **urges** the responsible authorities both to establish the following repeat stations and to re-observe at them at intervals of not more than 5 years: Atlantic Ocean: Ascencion, St. Helena, Cape Verde, Tristan da Cunha, Trindade Falkland, Gough, Bermuda; Pacific Ocean: Clipperton, Galapagos, Juan Fernandez, Line, Marquesas, Gambier, Austral, Marshalls, Carolines, Wake, Baker, Adak, Raoul, Auckland Island, Campbell, Snares, Coos, Fiji, Niue, Chatham, Bounty, Antipodes, Tonga, Solomons, Nauru, New Caledonia, New Hebrides; Indian Ocean: Heard, Diego Garcia, Seychelles, Maldives, Cocos, Christmas, Amsterdam Island.

#### **Resolution No.10 (1979): Supply of observatory magnetic data for MAGSAT project**

IAGA, **recognising** the value of the MAGSAT geomagnetic measurements, **urges** the continuing support of the geomagnetic observatories and measurements at repeat stations to maintain the high precision of world magnetic charts and **recommends** that, until the end of 1980, observatories send hourly values (preliminary values, if need be) to the World Data Centers not later than two months after the end of the recording period.

#### **Resolution No.11 (1979): Rapid-run magnetic recording**

IAGA, **recognising** the importance of rapid run magnetograms for global studies of ULF pulsations, **recommends** that observatories operating rapid-run magnetometers continue to do so, where possible increasing the sensitivity, and that other observatories initiate rapid-run recording.

#### **Resolution No.12 (1979): 10 seconds digital recording for 1 minute means of geomagnetic data**

IAGA, **draws attention** to the desirability of digital magnetic observatories using a sampling rate no slower than once every 10 seconds and **asks** these observatories to send these data to the World Data Centers as one-minute means (with clear identification of the method of averaging). These means should be centred on the minute (e.g. the first value within an hour is labelled 00h01m and is the mean calculated from 00h00m30s to 00h01m30s).

#### **Resolution No.13 (1979): Loan of standard QHMs**

IAGA, **considering** the need of some magnetic observatories to compare their horizontal intensity standard with the international standard and recalling the availability of the standard QHMs which are owned by IAGA and maintained by the Danish Meteorological Institute, **urges** the magnetic observatories to make use of this facility by requesting loan of the standard QHMs from that Institute.

### **Resolution No.14 (1979): Digital data for AE derivation**

IAGA, **recognising** the immense value to the scientific community of the publication of AE-indices by World Data Center A, **urges** all contributing northern hemisphere observatories to use digital recording and further **recommends** all World Data Centers to participate; particularly of importance is the digitisation of magnetograms by WDC-C2 (Kyoto, Japan).

### **Resolution No.15 (1979): Keeping standard of K-index scaling**

IAGA, **noting** that standards of K-index scaling can change, **urges** that each country appoint a qualified scientist to check regularly the K-index scalings at all the observatories within that country to maintain these standards and requests that Observatory Directors notify the Central Km-Bureau (Institut de Physique du Globe, Paris) of any changes of the Chief Observer at the Km Observatories to allow the Central Km-Bureau to be alert to detect possible systematic changes in K-scaling.

### **Resolution No.16 (1979): Compilation of magnetic anomaly map**

IAGA, **considering** the interest in global magnetic anomalies and that a certain number of countries have already completed maps on a scale of 1:2 500 000, **urges** the compilation of such maps within the next four years as a contribution to a global magnetic anomaly map.

### **Resolution No.17 (1979): Importance of basic research in geoscience**

IAGA, **recognising** the ever-increasing pressure upon geophysicists to provide fast returns in the form of practical applications of their research, draws attention to the fact that basic research motivated by intellectual curiosity is the most effective breeding ground for the long-term development of applications in resource exploration and exploitation, environmental protection, and new technologies; **urges** its member countries to provide continued strong support of basic research in the geosciences, and **encourages** them to embark in a concerted effort towards establishing an appropriate balance between the current opportunities offered in basic research and the long-term needs in applied fields and technology.

*[Remark: Resolution 2 adopted by IAMAP. Resolution 17 adopted also as an IUGG Resolution.]*

## **3<sup>rd</sup> IAGA Scientific Assembly** **Seattle (USA), 1977**

See [IAGA News No. 16, December 1977, p 52-60.](#)

### **Resolution No. 1 (1977): History of IAGA**

IAGA, **noting** that personal knowledge and written records of its creation, its early officers and its subsequent progress are being lost as time passes, **encourages** people with relevant information concerning the history of the Association to communicate it to the Interdivisional Commission on History, through the Secretary General.

### **Resolution No. 2 (1977): Global network of ionosonde**

AGA, **recognising** that ionosondes continue to have an important role to play in monitoring the Earth's environment, **recommends** that a global network of ionosondes should be maintained throughout the 1980's, and that efforts be continued to modernise the equipment in use and to open new observatories at locations essential for research, and **urges** that responsible authorities, before deciding to close an observatory, invite comment from the scientific community through the Ionospheric Network Advisory Group of U.R.S.I., on whether the observatory is of special importance.

### **Resolution No. 3 (1977): Support for rocket and balloon programmes**

AGA, **noting** that in providing vertical profiles of neutral and ionised constituents, sounding rockets and balloons have special roles to play both by virtue of the short time needed in deciding to launch and because of the inaccessibility of the atmosphere below 120 km to orbiting spacecraft, **recommends** that the present level of support for rocket and balloon programmes be maintained, with an appropriate increase in special circumstances such as solar eclipses.

### **Resolution No. 4 (1977): Continuous observation at Geomagnetic Meridian Project stations**

AGA, **notes** with satisfaction that the Working Group on the Geomagnetic Meridian Project (GMP) has completed its task, which is an important step forward in the study of magnetospheric disturbances, **thanks** the members of the Working Group for their efforts and **recommends** that National Bodies continue observations until 1979 for the International Magnetospheric Study at the places involved in the GMP.

### **Resolution No. 5 (1977): Long-term recording of geomagnetic pulsations in Northern Europe**

AGA, **recognising** the effort put forth in Northern Europe by the U. K., the U.S.S.R. and other countries for recording geomagnetic pulsations, **urges** the responsible authorities in those countries to collaborate in preparing a long-term project which will yield both accurate measures of the position and the form of the plasmasphere and information about the variability of the interplanetary medium characteristics.

### **Resolution No. 6 (1977): Electrical conductivity of the asthenosphere (ELAS) project**

AGA, **noting** that the asthenosphere plays an important role in geodynamics and in the study of electrical conductivity of the Earth and that this is interesting to Working Group 3 of Division I, **recommends** to National Adherents support for the creation of an ad hoc Committee to prepare a Programme for a project "Electrical Conductivity of the Asthenosphere" (ELAS) to concentrate effort during 1978-1985 on magnetic and magnetotelluric measurements and their comparison with heat flow and seismic measurements.

### **Resolution No. 7 (1977): Continued operation of traditional magnetic observation system**

AGA, **aware** of the desirability of obtaining digital records at all magnetic observatories but **noting** the importance of maintaining observatory standards for monitoring accurately the secular change, **recommends** continued operation of the traditional system at least until the digital system has been proven to be equal in performance.

### **Resolution No.8 (1977): Continued production of magnetograms**

LAGA, **aware** of the increasing use of digital recording magnetometers but **noting** the utility of the analogue records, in particular for submission to World Data Centres, **recommends** in addition to production of digital records, the continued production of analogue records, whether by traditional instruments or from digital data.

### **Resolution No.9 (1977): Continuity of secular change record at a change of geomagnetic observatory**

LAGA, **considering** that determining secular change and other magnetic parameters needs long-term operation of magnetic observatories but may require the movement of an observatory to a new site because of artificial disturbances, **recommends** that

- (i) repeat stations be set up near each observatory to preserve the secular change record in the event of a change of the observatory base reference,
- (ii) when it becomes obvious that an observatory should be moved, plans be made to operate instruments simultaneously at the old and the new sites for a period of at least one year.

### **Resolution No.10 (1977): Prompt data supply for magnetic charts to WDCs**

LAGA, **considering** that accurate magnetic charts are heavily dependent on the use of worldwide and up-to-date data, **urges** that vector survey data (land, sea and air), repeat station observations, observatory annual means, and low-level satellite data be sent to the World Data Centres as promptly as possible.

### **Resolution No.11 (1977): Conversion of magnetic records to microfilms by WDCs**

LAGA, **noting** that the staff of World Data Center A for Solar-Terrestrial Physics has made two extended trips during which magnetograms and hourly-value tables for submission to World Data Centres have been successfully microfilmed at magnetic observatories which had found it difficult to do this, **urges** that all the World Data Centres arrange such trips in order to make these data available to the scientific community.

### **Resolution No.12 (1977): Thanks to WDC-A (STP) for AE derivation**

LAGA, **thanks** World Data Center A for Solar-Terrestrial Physics for the yearly publication of AE- indices from 1966 up to, and including, 1974, and for the monthly publication of AE-indices which have been prepared specially for the International Magnetospheric Study, beginning with January 1976, and **urges**

- (i) contributing stations to maintain the rapid flow of magnetograms necessary for the production of these indices,
- (ii) other World Data Centres to participate in the digitisation required for the derivation of the indices, both for prompt use during the IMS and for publication in the IAGA Bulletin 32 series, and continues to urge the establishment of new magnetic observatories to improve the distribution, in both geomagnetic latitude and geomagnetic longitude, of the contributing stations.

### **Resolution No.13 (1977): Thanks to BAS for southern hemispheric magnetic observations**

IGA, **considering** the scarcity of magnetic observatories in the Southern Hemisphere and hence the importance of the British Antarctic Survey observatories for monitoring planetary magnetic activity and secular change, and also for studying Sq variations, magnetospheric phenomena and conjugate relationships, **thanks** the BAS for maintaining their observatories and **urges** that every effort be made to continue this service which is of importance to the scientific community.

### **Resolution No.14 (1977): Ground magnetic measurements for MAGSAT project**

IGA, **recognising** that optimum benefit from the planned geomagnetic survey by the satellite MAGSAT, expected to be launched in September 1979, can result only if accurate ground-based measurements are carried out at observatories and repeat stations, especially in the regions where they are sparse, in order to obtain improved information on the secular change of the geomagnetic field, **urges** its Member Countries to support such measurements.

### **Resolution No.15 (1977): A course, "Physics of the Earth", at ICTP, Trieste**

IGA, **welcomes** the introduction of a course, "Physics of the Earth", at the International Centre for Theoretical Physics, Trieste, and **suggests** that future courses at this Centre might include in addition practical training of personnel for geophysical observatories and surveys.

### **Resolution No.16 (1977): National magnetic anomaly maps with common scale and projection**

IGA, **considering** the interest of global magnetic anomalies, **urges** Member Countries to produce national magnetic anomaly maps to lead to the ultimate production of an international magnetic anomaly map using, for comparison, the same scale and the same projection as those of the world geological map.

### **Resolution No.17 (1977): Understandable discussion in English or French**

IGA, **recognising** that a prime purpose of its Assemblies should be to 'provide an opportunity, on an international basis, for discussion' (Art. 1 of the Statutes), **urges** chairmen or conveners of sessions to take care that speakers, in particular those whose native language is English or French, be understandable by Delegates from other Member Countries.

### **Resolution (1977): Welcome of participants from Taiwan**

IGA, **welcomes** the accession of the People's Republic of China to the Union; **regrets** the change in membership status of the Taiwan geophysical community; and **affirms** that the Association will continue to welcome members of the Taiwan scientific community as individual participants in the Assemblies of the Association in accordance with By-Law 16c.

## **XVI IUGG General Assembly Grenoble (France), 1975**

See IAGA News No. 14, 1975, p 3-14.

### **Resolution No. 1 (1975): Filming of magnetograms by visiting WDC representative**

IGA, **noting** that some observatories find it difficult to microfilm their magnetograms and hourly- value tables for submission to the World Data Center, **urges** the observatories concerned to offer their records to a visiting World Data Center representative for filming in order to make these data available to the scientific community.

### **Resolution No. 2 (1975): Discussion with IAGA on any proposed change of magnetic observatories**

IGA, **noting** the increasing importance of permanent magnetic observatory recordings to the understanding of many fundamental concepts in the geophysical sciences, in addition to their necessary contributions to practical applications, **urges** that any proposal to change the number and distribution of magnetic observatories be discussed with IAGA.

### **Resolution No. 3 (1975): Publication of aa indices in IAGA Bulletin 32**

IGA, **considering** that the three-hourly indices "aa" constitute a homogeneous series for quantitative estimation of geomagnetic activity beginning with the year 1868, **recommends** the yearly publication of the "aa" indices in place of the Ci-indices in the IAGA Bulletin 32 beginning with the data for the year 1975.

### **Resolution No. 4 (1975): In situ and polar cap indices for monitoring solar wind state**

IGA, **recognising** the importance of in situ indices that reflect the state of the solar wind for the Travelling Inter-planetary Phenomena Program of SCOSTEP planned in 1976, 1977, and 1978 and for the International Magnetospheric Study, **recommends** that those indices that are dependent on the existence of dedicated satellite coverage become available to the World Data Center, and that studies continue in order to improve the indices inferred from the interpretation of activity on polar-cap magnetograms, as long as final, in situ indices are not fully available.

### **Resolution No. 5 (1975): Thanks to the Observatorio del Ebro for their list of rapid variations**

IGA, **recognising** the importance of the lists of rapid variations prepared by the Observatorio del Ebro and published in IAGA, Bulletins 12 and 32 series for the development of the understanding of classification of these events, **thanks** the Observatory for its long service in this field.

### **Resolution No. 6 (1975): Sending the data for listing rapid variations to Observatorio del Ebro**

IGA, **recommends** that the publication of pulsations, bays, and s.i. be discontinued after reporting the data for 1974 and that the list of s.c.c., s.f.e., and unusual events continue to be provided by the Observatorio del Ebro for publication in the IAGA, Bulletins 32 and **recommends** that the present procedure should be supplemented by sending copies of magnetograms from selected low-latitude stations to del Ebro Observatory on request (sic)



### **Resolution No.7 (1975): Magnetograms for continuous and rapid AE derivation**

AGA, **noting** with satisfaction that AE-indices have now been prepared for the years 1966 through 1973 by World Data Center A for Solar-Terrestrial Physics, and **recognising** the need for even more rapid preparation of AE-indices during the International Magnetospheric Study, **urges** that the flow of magnetograms from contributing stations be even more rapid and **hopes** that other WDC's will assist in their digitisation to permit the routine derivation of AE-indices both for prompt use during the IMS and for publication in the IAGA, Bulletin 32 series. Furthermore, IAGA **urges** the establishment of new magnetic observatories to improve the distribution, in both geomagnetic latitude and longitude, of the contributing stations used for AE-indices.

### **Resolution No.8 (1975): Modernisation of ionosondes**

AGA, **recognising** the value of high-frequency radio soundings of the ionosphere by ionosondes and other sounding systems (drift, doppler, and angle-of-arrival), and **being aware**, that the world network of ionosonde stations now consist mainly of limited-purpose and aging instruments that are thus inadequate for IMS and aeronautical needs, **encourages** national plans toward the modernisation of ionosondes, particularly to introduce digitisation of all relevant echo data and to include new features in the equipment permitting efficient conversion of the data to geophysical parameters.

### **Resolution No.9 (1975): Governmental support for the WDCs**

AGA **recognises** the support provided by various national governments for the World Data Centers for their necessary services to the scientific community and **urges** these governments to continue this support.

### **Resolution No.10 (1975): World magnetic surveys by low-altitude satellite**

AGA, **recognising** that available surface data are not sufficient for the accurate definition of the main geomagnetic field, and **noting** that no satellite measurements useful for this purpose have been made since early 1971, and that none is definitively planned for the future, **urges** that world magnetic surveys by low-altitude satellite be conducted. Because of uncertainties in field models derived from scalar data alone, IAGA **recommends** that such surveys measure the field components with the appropriate accuracy. Furthermore, because of the critical importance of the secular variation in the definition of the main geomagnetic field. IAGA **urges** the prompt release of the data through the World Data Centers to the scientific community.

### **Resolution No.11 (1975): Archive of old reports and collections**

AGA, **recognising** that reports of many expeditions and important collections of older observations have not been adequately distributed, **recommends** that the preparing institutes or present holders of older archival material of this type be encouraged to provide information concerning their holdings to the World Data Centers, and the World Data Centers be encouraged to maintain bibliographies and catalogues of important monographs.

## **Resolution No.12 (1975): Thanks to General Secretary and continued publication of IAGA News**

IAGA **expresses** its thanks to the retiring General Secretary for creating and editing IAGA News, **urges** the continued publication of IAGA News and **recommends** its wide distribution to geophysical observatories as well as to research workers.

## **Resolution No.13 (1975): Middle Atmospheric Program (MAP)**

IAGA, **noting** the recent concern for the formulation of a comprehensive program of study of the middle atmosphere, essentially the stratosphere and mesosphere in relation with the lower ionosphere, and **recognising** that the present programs of GARP and IMS are not intended to provide such a study, **endorses** the concept of the Middle Atmospheric Program (MAP), formerly SESAME (Structure and Energetics of the Stratosphere and Mesosphere), as an interdisciplinary program at present under SCOSTEP, with global scope and the requirements of international cooperation, to which IAGA expects to make substantial scientific contributions.

## **Resolution No.14 (1975): IGRF1975**

IAGA **recommends** that, for the period 1975.0 to 1980.0, the original International Geomagnetic Reference Field (IGRF 1965) be replaced by IGRF 1975.

*[Note: Resolutions numbers 10 and 13 above were subsequently made into IUGG Resolutions. In addition, the following Resolution of interest to IAGA, was also passed as an IUGG Resolution.]*

## **IUGG Resolution No.14 (1975): Thanks to the CGPAIGH**

IUGG, **recognising** the support provided by the Commission on Geophysics of the Pan American Institute of Geography and History in a program of calibrating against international standards the instruments of the magnetic observatories in Mexico, Colombia, Peru, Bolivia, Chile and Brazil, IUGG **expresses its thanks** for the funds provided and the generous cooperation of the institutions and scientists involved.

## **2<sup>nd</sup> IAGA Scientific Assembly Kyoto (Japan), 1973**

See [IAGA News, September 1973, No. 12.](#)

## **Resolution of Thanks (1973): Thanks to LOC**

The International Association of Geomagnetism and Aeronomy wishes to express its warmest **thanks** to the Science Council of Japan for their invitation to hold the Second General Scientific Assembly in Kyoto. In particular, IAGA wishes to thank Honorary Chairman T Nagata, Chairman T Rikitake, Executive Secretaries N Fukushima, R Obayashi and H Maeda and the many able members of the Japanese Organizing Committee for the excellent preparations and arrangements they made for our meeting.

IAGA also wishes to **thank** especially Professor and Mrs. S Kato who led in the planning and organisation of a most pleasant and informative Ladies Program, and all the participants are grateful to the people of the beautiful city of Kyoto for their gracious hospitality.

### **Resolution No. 1 (1973): Attendance of elected IAGA officers and speakers at Assemblies**

IAGA, **considering** the importance of the systematic and orderly development of the sciences of Geomagnetism and Aeronomy, and the cost and manpower spent in organising related activities, **calls to the attention** of adhering bodies in participating countries the necessity of having elected and appointed IAGA officers and speakers attend the Assemblies in order to fulfill their responsibilities in the interest of efficiency and economy for all concerned. Therefore, IAGA **recommends** that if the adhering body finds that, for any reason, such an official of IAGA or invited speaker can not attend an Assembly, the adhering body should notify the General Secretary at least six months before the Assembly so that others can be invited or appointed to serve in order to avoid gaps in the programs and other work of the Association.

### **Resolution No. 2 (1973): Frequency range of artificial electromagnetic emissions**

IAGA, **recognising** the importance of the continued study of natural electromagnetic phenomena and the fact that man-made sources of electromagnetic energy continue to increase in a way that tends to obscure these natural phenomena, **recommends** that adhering countries make an effort to set aside reservations in which man-made sources of electromagnetic energy in the frequency range of interest to IAGA are excluded so as to preserve such areas in which natural electromagnetic phenomena can be studied in years to come.

### **Resolution No. 3 (1973): SI Units**

IAGA, **considering** that SI Units are achieving international recognition as a single standard for worldwide use, **recommends** adoption of SI Units in the field of geomagnetism. Specifically IAGA **recommends** that:

1. (a) Values of the geomagnetic "field" be expressed in terms of the magnetic induction B (SI Unit tesla = Weber/meter [squared])  
(b) If it is desired to express values in gamma, a note should be added stating that "one gamma is equal to one nanotesla".
2. (a) Values of "intensity of magnetisation" be expressed in terms of magnetisation M (SI Unit Ampere/meter).  
(b) If it is desired to express values in e.m.u., a note should be added stating that "one e.m.u. is equal to 1000 ampere/meter".
3. (a) Values of susceptibility be expressed as a ratio between magnetisation M and the magnetic field H.  
(b) If, during the transitional period, it is desired to use values of susceptibility in e.m.u., a note should be added stating that "[chi] SI is equal to 4 [pi] [chi] e.m.u.".

### **Resolution No. 4 (1973): Brightness of auroras**

IAGA, **considering** the progress in absolute auroral photometry and the theoretical understanding of the connection between N+2 IN band intensity and particle-energy input, **recommends** that in the future the brightness of auroras be reported whenever possible in terms of the intensity of the 4278 Angstrom N+2 band (preferably in conjunction with those of 5577 Angstrom and 6300 Angstrom [OI], 4861 Angstrom H-beta, and other features where appropriate). The use of International Brightness Coefficients should be strictly confined to the reporting of visual estimates.

### **Resolution No. 5 (1973): Joint working group with IUGS**

IAGA **noting** the existence of the sub-commission on magnetic stratigraphy within the International Union of Geological Sciences (IUGS) **requests** that the IUGS establish a joint working group with IAGA on this topic.

### **Resolution No. 6 (1973): Geomagnetic data obtained at temporary or variation stations**

IAGA **recommends** that records and data from temporary magnetic observatories or variation stations established for special problem-solving be offered to the WDCs when the records are considered to be of possible value to other scientists.

### **Resolution No. 7 (1973): Information to be contained on the microfilms sent to WDCs**

IAGA **recommends** that all observatories ensure that the microfilm sent to World Data Centers (WDCs) contain at least the information contained in a list to be provided by WDCs.

### **Resolution No. 8 (1973): Rapid flow of magnetograms from AE stations to WDC-A**

IAGA notes with satisfaction the recent derivation and publications of AE- indices from eleven stations, AE(11), for 1970 by World Data Center-A, **urges** that the rapid flow of magnetograms from these stations continue in order to permit the routine derivation of AE-indices in time for publication in the IAGA Bulletin No. 32-series. IAGA **encourages** the establishment of new magnetic observatories to improve the AE-index by filling longitudinal gaps in the distribution of the present AE(11)-stations.

### **Resolution No. 9 (1973): Micropulsation interval days**

IAGA **recommends** that the “micropulsation interval days” be suppressed from the International Geophysical Calendar because these days are not specifically used by the major part of the scientific community.

### **Resolution No.10 (1973): Use of the term “magnetic pulsation” or “pulsation”**

IAGA **recommends** the use of the term “magnetic pulsation” or simply “pulsation” instead of “micropulsation” for the following reasons:

- (a) The amplitude of pulsations is often large with respect to the main field in the outer magnetosphere.
- (b) The wavelength of pulsations may be large with respect to the size of the earth.

### **Resolution No.11 (1973): Pc6 and Pi3 pulsations**

IAGA **recommends** the addition of two classes of pulsations to the existing classifications: Pc6 for continuous pulsations with periods longer than 600 seconds and Pi3 for irregular pulsations with periods longer than 150 seconds.

### **Resolution No.12 (1973): All-sky cameras during the IMS**

IAGA, **considering** the great value of knowing the instantaneous global pattern of auroral precipitation in order to relate it to localised measurements in the magnetosphere, **recommends** that all countries having territories lying within auroral latitudes should, during the IMS, cooperate in operating enough all-sky cameras, and photometers where possible, to provide adequate coverage across all longitudes. **It is specifically recommended** that all-sky cameras be operated at all auroral magnetometer stations. IAGA further **recommends** that all countries having satellites in orbit with auroral detection capabilities at the time of the IMS, should endeavour to continue these measurements during the IMS.

### **Resolution No.13 (1973): Ground magnetometer chains during the IMS**

IAGA **notes** that the coming International Magnetospheric Study requires extensive chains of ground (magnetic) stations for use in conjunction with satellite measurements. The IAGA strongly **recommends** that its member nations fill gaps in the existing networks where these fall within their territories. Where feasible, IAGA **urges** data be gathered and distributed with minimum delay to aid in the coordination of ground, balloon, and rocket experiments.

### **Resolution No.14 (1973): Conjugate point and satellite observation for GMP program**

IAGA **notes** with satisfaction that, in accordance with IAGA Resolution 2 at the Moscow Assembly, an ad hoc working group for coordination of the Geomagnetic Meridian Project (GMP) program has been established and considerable progress has been made in setting up observing stations along the 105 and 145 degree geomagnetic meridians. In relation to the GMP program, IAGA **stresses** the need for conjugate point studies and for measurements by polar-orbiting satellites of magnetic and electric fields.

### **Resolution No.15 (1973): Geomagnetic observation in the southern hemisphere**

IAGA, **considering** the need for better models of variations of the geomagnetic field (in particular, secular changes, disturbances, and longitudinal changes in Sq and L) and **recognising** the dependence of such models on a suitable geographical distribution of the data, **urges** that every effort be made to improve the distribution and density of observatories in the southern hemisphere.

### **Resolution No.16 (1973): Repeat stations in remote regions and islands**

IAGA, **considering** the great need for improvement of knowledge of recent secular change, **recommends** a renewed effort to re-occupy repeat stations, particularly in remote regions and islands.

### **Resolution No.17 (1973): International project for a satellite magnetic survey**

IAGA, **recognising** that a global model of the geomagnetic field can be maintained accurately by periodic surveys that should include low-altitude satellite measurements of the vector components, and **noting** that the last survey (total field only) ended in 1971, **recommends** the establishment of an "International Project for a Satellite Magnetic Survey" with a steering committee to solicit support from appropriate National Committees.

### **Resolution No.18 (1973): IGRF1965 and 1975**

IAGA, **considering** that a need exists for a geomagnetic reference field satisfying at least some of several diverse requirements, **recommends** that the International Geomagnetic Reference Field 1965.0 (IGRF 1965.0) be retained as a standard until 1975.0 after which time it will be replaced by IGRF 1975.0. It is requested that all pertinent observational data be deposited in World Data Centers by 1 January 1975.

### **Resolution No.19 (1973): Speed for normal magnetographs**

IAGA **recommends** a recording speed for normal magnetographs of 20 mm/hour to provide uniformity of record format. New observatories are urged to obtain equipment for this recording speed and existing stations are urged to consider modification of present equipment.

### **Resolution No.20 (1973): IAGA's interest in the SESAME program**

IAGA, **having accepted** responsibilities for some topics in the Atmospheric Physics Programs proposed by SCOSTEP, **agrees** to name three representatives to the Steering Committee for Atmospheric Physics Programs, and **agrees** to assign responsibility for IAGA's interests in the SESAME (Structure and Energetics of the Stratosphere and Mesosphere) program to the proposed joint IAGA-IAMAP Working Group on Stratospheric and Mesospheric Processes.

### **Resolution No.21 (1973): Importance of data and records of observation in previous epochs**

IAGA, **recognising** that data and records of observations made in previous epochs will be of great importance in the study of the long-term variation of the aeronomical and geomagnetic aspects of the earth and its environment, IAGA **recommends** that each country take appropriate action to catalogue and to preserve such historically important data to advise the scientific community of their availability.

## **XV IUGG General Assembly Moscow (USSR), 1971**

See [IAGA News, August 1971, No. 10.](#)

### **Resolution of Thanks (1971): Thanks to LOC**

The International Association of Geomagnetism and Aeronomy **expresses** its warmest **thanks** to the Organizing Committee of the Soviet Academy of Sciences for the XV IUGG General Assembly. In particular it expresses **thanks** to Academician AP Vinogradov, President of the Organizing Committee; Professor VV Belousov, Vice President of the Organizing Committee; Dr BS Volvovsky, General Secretary of the Organizing Committee; Dr AD Powsner, General Secretary of the Geophysical Committees; Dr K Yu Zybin, who was responsible for Geomagnetism and Aeronomy arrangements, and to Mrs. NA Belousova for most interesting arrangements for the Ladies.

### **Resolution No. 1 (1971): IUGG endorsement to IMS program**

**Noting**, the COSPAR and IUCSTP decision taken at their Seattle meetings in May 1971 to support and approve the First Report of the IMS Special Study Group and to recommend that subsequent to the com-



pletion of its task with the issue of the Second Report, the present IMS Special Study Group be dissolved and replaced by an appropriate body, the IAGA **recommends** that IUGG **endorses** the principle of the proposed IMS program and set up a working group in IUGG to consider particularly the ground-based, rocket-borne and balloon-borne research programs which are closely related to the proposed IMS program.

*(Note: This Resolution was later passed by the IUGG as an official IUGG Resolution in a slightly modified form.)*

### **Resolution No. 2 (1971): Project Magnetic Meridian**

IAGA **confirms** Resolutions 6, 7 and 12 adopted at its 1969 Assembly in Madrid and **stresses** the great scientific importance of the project Geomagnetic Meridian for simultaneous ground observations along the geomagnetic meridians of 105 - 155 degrees and 140-150 degrees E and covering latitudes extending from the auroral zone to the equator. This project is planned for the 1973-75 period. IAGA also **recognising** the need for related satellite observations and strongly supports the launching of the geostationary satellite ATS-F, which will be positioned near-by geomagnetic meridian 100.5 degrees E.

### **Resolution No. 3 (1971): MONSEE program**

IAGA **strongly supports** the proposal of the IUCSTP to extend the multidisciplinary patrol observations of solar activity and related geophysical phenomena after the end of the IASY in 1971 as a special extended multidisciplinary IUCSTP project for monitoring of Sun-Earth Environment (MONSEE) at least through the next solar cycle. IAGA **recommends** the appropriate commissions take an active part in working out MONSEE programs.

### **Resolution No. 4 (1971): Analytical centre on secular variation**

The IAGA Assembly **accepts** with gratitude the proposal of IZMIRAN to organise and manage for IAGA an analytical centre on secular variation with the following functions:

- (1) Collection of data on secular variations from magnetic observatories and from repeat stations;
- (2) Publication of secular variation charts and tables of annual values of magnetic elements from magnetic observatories;
- (3) Spherical harmonic analysis of secular variation.

The Statue of this centre must be drafted by IZMIRAN with the help of the chairmen of Commissions I and II.

### **Resolution No. 5 (1971): Lunar tidal parameters**

**Considering** the great progress made in recent years in the determination of lunar tidal parameters in data for individual stations, IAGA **recommends** that in future work particular emphasis be placed on regional and global studies and on theoretical interpretation of the phenomena.

### **Resolution No. 6 (1971): Links between SGC and Australian institutions**

The IAGA, **on the basis** of Resolution No.8 adopted at Madrid in 1969, and **considering** that the Soviet institutions are ready to start geophysical observations (magnetic variations, VLF, ionospheric absorption, and vertical sounding) at several locations near Petropavlovsk and Topolovka, which are



conjugate to Canberra and Hobart, **recommends** that effective links be established between the Soviet Geophysical Committee and the appropriate Australian institutions to bring this program into operation.

#### **Resolution No. 7 (1971): Magnetograms at Colaba and Alibag since 1872**

**Considering** the great value of the century-long series of magnetograms collected since 1872 at the geomagnetic observatories of Colaba and Alibag (Bombay) to the international scientific community, IAGA **recommends** that arrangements be made through appropriate authorities of India i) for the preservation of all the original magnetograms by preparing a few microfilm copies and depositing them in Indian and International World Data Centers and ii) for appropriate scaling of the records of the period 1872-1924.

#### **Resolution No. 8 (1971): Project Geophysical Test Ground in the Antarctic**

IAGA **endorses** the project Geophysical Test Ground in the Antarctic scheduled for 1975 which is intended to:

- (1) Determine the locations and minimal number of stations required for analysis of the temporal and spatial distributions of high-latitude geophysical variations;
- (2) Investigate the effect of geophysical variations on the state of the lower atmosphere;
- (3) Continue the work associating geophysical variations in the polar cap with various parameters of the solar wind and the structure of the interplanetary magnetic field.

#### **Resolution No. 9 (1971): Arequipa observatory**

The IAGA, **recognising** the importance of observations from the southern hemisphere, particularly in the vicinity of the equatorial electrojet, notes with satisfaction the observations made at Arequipa and supplied to the World Data Centers, and **recommends** the continuation of this good work.

#### **Resolution No.10 (1971): Magnetic observation in the southern hemisphere**

The IAGA **considering** the need for recent data on a global scale, **recommends** the establishment of magnetic observatories in the region where the present coverage is sparse especially in the southern hemisphere, and strongly **urges** that existing observatories make their results available through transmission to the World Data Centers and prompt publication of yearbooks.

#### **Resolution No.11 (1971): Meteor drift studies**

IAGA **notes** with satisfaction the implementations of the recommendation, made at the XIV General Assembly, that meteor drift studies be extended to the equatorial expeditions of the Academy of Sciences of the USSR (1968-1970). IAGA **supports** the extension of this technique for investigating the global circulation in the upper atmosphere.

#### **Resolution No.12 (1971): Cooperation in meteor wind and ionospheric drift studies**

IAGA **welcomes** the developing regional cooperation in meteor wind and ionospheric drift studies, based on the work in the USSR, France and UK. IAGA **recommends** that this coordination be extended to other areas (USA, Australia, New Zealand, etc.)

### **Resolution No.13 (1971): Contents of the Bulletin No.12 series**

Reflecting the current needs of the scientific community, IAGA **recommends** that the following changes be made as soon practicable in the contents of the Bulletin No. 12 series:

- 1) To include, in addition to the planetary indices K<sub>p</sub> and its derivatives, the indices D<sub>st</sub>, AE, K<sub>m</sub>, K<sub>n</sub>, and K<sub>s</sub>.
- 2) To include data on magnetic storms, including reproductions of magnetograms for the H-component, reduced to the same time scale and comparable intensity scales, from 12 to 16 observatories for approximately ten storms each year.
- 3) To discontinue the publication of K-indices from individual observatories in the Bulletin; instead these K-indices be stored in magnetic tape wherever practicable in the World Data Centers.

### **Resolution No.14 (1971): Archaeomagnetic samples from Australia, Middle East and Africa**

IAGA **recommends** that every possible effort be made to obtain archaeomagnetic samples from the areas of Australia, Middle East, and Africa by well qualified workers.

### **Resolution No.15 (1971): Study of conductive layers in the depth range 20 to 100 km**

IAGA **stresses** the importance of the study of conductive layers in the intermediate depth range 20 to 100 km, especially in view of the relevance of such studies to partial melting in the upper mantle.

### **Resolution No.16 (1971): Deep soundings along east-west profile in Eurasia**

IAGA **supports** the collaboration of scientists making magnetotelluric and geomagnetic deep soundings along an extended east-west profile in Eurasia, the stations of which should be located with due regard to tectonic features.

### **Resolution No.17 (1971): Collaborative palaeomagnetic and radiometric dating research**

IAGA **recommends** urgently that member countries support collaborative palaeomagnetic and radiometric dating research for the purposes of: 1) determining the reversal time scale more accurately using rocks from all countries 2) obtaining more information about the fine structure of polarity events and polarity transitions.

### **Resolution No.18 (1971): Data from polar cap geomagnetic stations**

IAGA **asks** the stations: Resolute Bay, Thule and Vostok to provide the data on diurnal Z variations to IZMIRAN (USSR Academy of Sciences) for experimentally determining an index characterising the interplanetary field sector structure.

### **Resolution No.19 (1971): Coordinated rocket, satellite and incoherent radar programs**

IAGA **supports** the Resolution of XIV Plenary Meeting of COSPAR in which it was recommended to agencies supporting atmospheric research that the planning of coordinated rocket, satellite, and incoherent radar backscatter programs include simultaneous composition measurements with all available techniques for the purpose of cross-calibration and the obtaining of systematic data.

### **Resolution No.20 (1971): Coordinated measurements of the thermospheric parameters**

IAGA **recommends** coordinated measurements of the temperature, composition, and density of the thermosphere with different methods for improvement of the knowledge of the diurnal variations of structural parameters and of their dependencies on latitude.

### **Resolution No.21 (1971): Vector field measurement at repeat stations**

The IAGA **recognising** the shortage and poor distribution of present ground level data for evaluating geomagnetic secular change, **urges** all countries to measure the vector field at their repeat stations at least once in 10 years, more frequently in regions with special features (e.g. secular variation foci, tectonically anomalous areas, etc.) and, where appropriate, to set up repeat stations on the islands of the South Pacific and Atlantic Oceans and to report results promptly to World Data Centers or organisations that prepare world charts.

### **Resolution No.22 (1971): Surface magnetic survey**

The IAGA **recognising** that, even though the World Magnetic Survey is concluded, surface survey data are still needed in some areas and **urges** all countries to make suitable observations.

### **Resolution No.23 (1971): Continuation of vector surveys over marine areas**

The IAGA **recognising** the vital contribution of vector surveys over marine areas to our knowledge of the geomagnetic field and **urges** their continuation.

### **Resolution No.24 (1971): Low-altitude satellite survey**

The IAGA **recognising** the valuable contribution made by near-earth satellites and **recommends** a resurvey by low-level satellites not later than 1976.

### **Resolution No.25 (1971): IGRF**

The IAGA **recommends**

- (1) that the present International Geomagnetic Reference Field (IGRF) be retained until at least 1973.5
- (2) that future evaluations should always include an assessment of the IGRF and
- (3) that comparisons between observed and computed values should always include an assessment of the IGRF and
- (4) that results using other reference fields should also be compared with IGRF.

### **Resolution No.26 (1971): World Magnetic Archive**

The IAGA **recommends** that as a contribution to the World Magnetic Archive, numerical magnetic-observatory data, past and current, be put into machine-readable form whenever practicable for transmittal to a WDDC and that pre-IGY magnetograms and hourly-value tables be microfilmed for transmittal to a WDC.

## 1<sup>st</sup> IAGA Scientific Assembly Madrid (Spain), 1969

See IAGA News, September 1969, No. 8.

### Resolution of Thanks (1969): Thanks for Madrid assemblies

- A. The International Association of Seismology and Physics of the Earth's Interior and the International Association of Geomagnetism and Aeronomy express their warmest thanks to
- the Vice Minister of the Spanish Government
  - the Minister of Education and Science
  - the Minister of Information and Tourism
- for the personal interest which they have taken in the organisational problems of the two General Scientific Assemblies, and for the support which they have given to these assemblies in Madrid from the 1<sup>st</sup> to the 12<sup>th</sup> September 1969.
- B. The International Association of Seismology and Physics of the Earth's Interior and the International Association of Geomagnetism and Aeronomy warmly thank the Superior Council for Scientific Research and its President, Professor Lora-Tomayo for the direct support given to the organisation of the two general scientific assemblies by means of a secretariat which was highly effective from the start, as well as for their constant work which led to the harmonious development of these assemblies in Madrid from the 1<sup>st</sup> to the 12<sup>th</sup> September 1969.
- C. The International Association of Seismology and Physics of the Earth's Interior and the International Association of Geomagnetism and Aeronomy sincerely thank Admiral J. Garcia-Frias, Director of the Geographic Institute, and the other members of this Institute both for the excellent preparation of the two general scientific assemblies in Madrid from the 1<sup>st</sup> to the 12<sup>th</sup> September 1969, and for their active participation to the daily organisation of the scientific meetings.
- D. The International Association of Seismology and Physics of the Earth's Interior and the International Association of Geomagnetism and Aeronomy sincerely express their gratitude to the Rector of the University of Madrid and the Director of the Advanced Technical School for highway Engineering for the use of the University buildings and in particular for the use of the numerous facilities of the above mentioned school.
- E. The scientists participating in the General Scientific Assemblies of the International Association of Seismology and Physics of the Earth's Interior and the International Association of Geomagnetism and Aeronomy are happy to express to the Reverend Father Romana, S.J., President of the Organizing Committee and to all the members of his Committee, their gratitude for the exceptionally fine reception which they have received. They will keep a warm remembrance of it.
- F. The International Association of Seismology and Physics of the Earth's Interior and the International Association of Geomagnetism and Aeronomy express their warm thanks to the Mayor of Madrid for the reception which he gave for the participants to the Assemblies and their families in the Cecilio Rodriguez Gardens during these Assemblies in Madrid from the 1<sup>st</sup> to the 12<sup>th</sup> September 1969.
- G. The wives of the participants in the General Scientific Assemblies of the International Association of Seismology and Physics of the Earth's Interior and the International Association of Geomagnetism and Aeronomy are happy to express their gratitude to the ladies of the Spanish Committee for their daily attention and assistance, during the Madrid Congress. They join with their husbands and families in giving thanks, and also express gratitude for the excursion to Toledo and for the various receptions during the Assemblies.

### **Resolution No. 1 (1969): Continuous publication of magnetic observatory yearbook**

The IAGA, **recognising** the availability of many observatory results on microfilm, through the World Data Centers nevertheless **recommends** the continued publication of magnetic observatory yearbooks containing hourly values and important related data, as described in a recommendation of the Rome IATME 1954 Meeting (IATME Bulletin No. 15, p. 392).

### **Resolution No. 2 (1969): Continued derivation of the Dst, AE, Kn, Ks and Km indices**

The IAGA, **considering** that the indices Dst (equatorial ring current), AE (auroral electrojet) and Kn, Ks, Km (sempianetary indices for N- and S- hemispheres and their main value) have been determined for recent years and **recognising** that they provide new condensed information on the state of disturbances of the geophysical field **recommends** the continued determination of these indices and **urgently requests** those observatories which are selected for this purpose to send their data promptly in order to make possible regular and early monthly publications.

### **Resolution No. 3 first version (1969):**

*[see below for revised Resolution 3]*

The IAGA, **considering** the planetary and other derived magnetic indices from individual stations, and that more and more such indices are now available compiled from the data of individual stations, **recommends** (i) the discontinuation of the publication of C-indices for individual stations in the Bulletin, (ii) the investigation of the possibility that K-indices be put in machine-readable form and stored at a centre with facilities for the mechanical reproduction upon request, (iii) if (ii) is implemented then it is recommended that the discontinuation of the centralised publication of K-indices of individual stations be discontinued but that their K-indices be published in their own yearbooks and bulletins.

*[From IAGA News, November 1970, No. 9: "Dr Van Sabben has noted that the English version of Scientific Resolution No. 3, from the Madrid Scientific Assembly, as printed in IAGA News No. 8 and IAGA Bulletin No. 27, is not as explicit and clear as the French version. The Secretary recognises this discrepancy. The Resolution should read as follows:]*

### **Resolution No. 3 (1969): C and K-indices for individual stations**

The IAGA, **considering** the planetary and other derived magnetic indices are generally more important in scientific studies than indices from individual stations, and that more and more such indices are now available compiled from the data of individual stations, **recommends**

- (i) The discontinuation of the publication of C-indices for individual stations in the Bulletin,
- (ii) The investigation of the possibility that K-indices be put in machine-readable form and stored at a centre with facilities for the mechanical reproduction upon request,
- (iii) if (ii) is implemented then it is recommended that the discontinuation of the centralised publication of K-indices of individual stations be discontinued but that their K-indices be published in their own yearbooks and bulletins.

#### **Resolution No. 4 (1969): Magnetic observatories in Chile and Bolivia**

The IAGA, **noting** recommendation No. 8 made by the South American Meeting on Geomagnetism in Rio de Janeiro in January 1969, concerning desirable development of the network of magnetic observatories in South America, **gives its full support** to the recommendation that magnetic observatories be established or completed in the Republics of Chile and Bolivia.

*[This Resolution also reinforces Resolution No. 12 of the International Union of Geodesy and Geophysics made at the 1967 General Assembly concerning the establishment of a permanent magnetic observatory on the mainland of Chile.]*

#### **Resolution No. 5 (1969): Moca Observatory**

The IAGA, **recognising** the scientific importance of the Moca Observatory located near the geomagnetic equator, **requests** the authorities responsible for the station to take appropriate measures to insure uninterrupted operation of the station at the present scientific level.

#### **Resolution No. 6 (1969): Magnetic observatory on Crozet Island**

The IAGA, **recognising** the interest in completing the network of Southern observatories used for the determination of the Ks indices (see Resolution 2) **recommends** that a permanent magnetic observatory be established on Crozet Island by the responsible organisation.

#### **Resolution No. 7 (1969): Conjugate stations**

The IAGA, **considering** the scientific value of the experiments conducted at the conjugate stations of Kerguelen and Sogra for the study of dynamics and the structure of the magnetosphere and the need to reach a more precise definition of the conjugacy, **recommends** that two additional pairs of conjugate stations be put in operation at the following locations: Crozet and Pskov, Heard and Dologoschellie.

#### **Resolution No. 8 (1969): Observations in conjugate points located in Australia and USSR**

The IAGA, **considering** the interest which represents the organisation of multidisciplinary geophysical observations in conjugate points located in Australia and USSR, **requests** the appropriate Institution in these countries to take every possible measure to ensure this cooperation.

#### **Resolution No. 9 (1969): Conjugate observation at Great Whale River, Byrd Station and geostationary satellite**

The IAGA, **endorses** the continuing conjugate point program concerning geomagnetic field phenomena at Great Whale River, and Byrd Station, and **encourages** the efforts to locate a geostationary satellite with a sensitive magnetometer near the field line connecting these stations.

#### **Resolution No. 10 (1969): Observations in the East Africa**

The IAGA, **re-emphasises** the importance of electromagnetic induction studies in the accessible East African Rift System and **encourages** organisations with the capability to undertake this work to do

so in cooperation with interested African institutions. Both in this respect and for other reasons the continuation of the magnetic observations at Nairobi Observatory is highly desirable.

### **Resolution No.11 (1969): Magneto-telluric and depth sounding studies in West Africa**

The IAGA, **emphasises** its scientific interest in magneto-telluric and geomagnetic depth sounding studies in West Africa and **encourages** such work in the sedimentary basin of Senegal.

### **Resolution No.12 (1969): Coordinated magnetic observation of the equatorial electrojet**

The IAGA, **recognising** that interest in magnetic profiles across the equatorial electrojet presently in progress or planned for the near future, **recommends** that, during the next solar minimum, those institutions interested in this work coordinate their efforts to make simultaneous profiles at various suitable longitudes.

### **Resolution No.13 (1969): Study of the upper atmospheric structure**

The IAGA, **considering** the importance of obtaining a self consistent picture of distributions and variations of composition, density, temperature and winds in the upper atmosphere, and **noting** the recommendations of the 9th and 11th Working Groups of the IUCSTP concerning the study of the structure of the upper atmosphere. (Arising from the conference on cooperative solar terrestrial physics for the International Years of the Active Sun, London, January 1969), **recommends**

- a) That in combination or as an alternative to drag measurements, accelerometer and density gauge measurements be made on satellites with high eccentricity, to obtain density measurements with a single satellite over a large range of altitudes.
- b) That special efforts be made to obtain data for comparison of satellite measurements of diurnal density variation of ion temperature.
- c) Simultaneous measurements be made of composition by means of both mass spectrometers and monochrometers.
- d) (i) Measurements be made of composition, temperature and winds from 100 to 200 km in the winter polar region, where the sunlight has been cut off, and (ii) wind profiles be measured above 200 km to establish global circulation patterns and to test the concept of rotation of the upper atmosphere.
- e) That more coordinated ground based measurements of optical emissions from hydrogen and helium be made, and that high Resolution studies of OI6300 [Angstrom] for temperature and wind measurement be extended.
- f) Development of experiments for measurements of the eddy diffusion coefficient, especially in the height range 80 - 120 km.
- g) Extension of theoretical studies for construction of representative models describing composition, dynamics, the thermal regime and their interconnection.
- h) Extension of laboratory experiments for measuring rates of aeronomical reaction, including those determined by the minor components, and including those relevant to meteor processes, particularly atomic collision phenomena in the energy range 100-1000 eV.
- i) (i) That although there has recently been an increase in the network of meteor stations, there should be an extension of the network in high latitudes, and (ii) that when possible the meteor-wind stations be associated with existing rocket launching sites.
- j) That since there exist uncertainties in the interpretation of ionospheric drift measurements, and a means of calibration would in many cases enable these observations to become a useful source of wind information, radio meteor winds should be used to provide a comparison for this purpose, particularly with ionospheric-drift techniques that extend to lower heights and overlap the meteor region.



### **Resolution No.14 (1969): Planetary indices on micropulsations**

The IAGA, **considering** the importance for space studies to have systematised information on micropulsations occurring on a worldwide scale, **urges** the national research groups working on micropulsations to work out planetary indices based on the different existing types of micropulsations.

### **Resolution No.15 (1969): Derivation of AE and Dst indices by WDCs for Geomagnetism**

The IAGA, **considering** that the World Data Centers for Geomagnetism have the necessary magnetic observatory data in their archives, and **considering** the scientific need for the magnetic activity indices AE and Dst, **urges** the World Data Centers for Geomagnetism to undertake the computation of these indices.

### **Resolution No.16 (1969): Worldwide plasmopause monitoring**

The IAGA, **noting** the importance of mapping the plasma-pause on a continuous worldwide basis, and **noting** that achievement of such mapping will require basic research, technical development, and a high level of international cooperation, **encourages** its member countries to support cooperative studies of the problem of worldwide plasma-pause monitoring.

### **Resolution No.17 (1969): Quick release of routine data from satellites**

The IAGA, **considering** the value of satellite data that are of a routine monitoring nature, such as measurements of solar wind parameters, magnetospheric boundary crossings, local time variations of the magnetic field at the synchronous orbit, etc., for a synoptic patrol of the magnetosphere and the establishment of new indices, **recommends** that countries, institutions and scientists operating such satellites, in conjunction with the World Data Centers, establish a mechanism for the quick release of these routine data and their distribution in convenient format to the scientific community.

## **XIV IUGG General Assembly Switzerland, 1967**

See [IAGA News, October 1967, No. 6](#).

(The General Assembly was held in four cities; IAGA met in St. Gall)

### **IAGA Resolutions approved in St. Gall**

#### **Resolution No. 1 (1967): A standard magnetic observatory in South America**

The IAGA **recognising** the need for highest accuracy in magnetic observations, **recommends** the selection and establishment of a magnetic observatory in South America which will serve as a primary standard of accuracy and assist in the inter-comparison of instruments from other observatories.

#### **Resolution No. 2 (1967): Geomagnetic data in digital form**

The IAGA **considering** the great value for geomagnetic investigations of the output-data of magnetic observatory and the great advantage that would accrue from having these data in machine readable

form, **recommends** that magnetic observatories should, whenever possible, be modernised, and their read-outs be registered in digital form.

### **Resolution No. 3 (1967): Data collection for the World Magnetic Survey program**

The IAGA **considering** that all magnetic survey data are of great value for the compilation of world magnetic charts as well as regional and local charts, and that the organisations listed below customarily engage in the compilation of world magnetic charts:

1. Royal Greenwich Observatory
2. U.S. Coast and Geodetic Survey
3. Izmiran USSR

therefore **urgently requests** that all organisations which have conducted magnetic surveys under the World Magnetic Survey program in recent years, or which will make magnetic surveys in the future, send the survey data to one or more of the World Data Centers and/or to one or more of the three organisations named above. If the data are in the form of magnetic charts it is **recommended** to add, if available, digital data of the survey in question.

### **Resolution No. 4 (1967): Magnetic survey data from the years 1840–1900**

The IAGA **urges** all countries having in their archives magnetic survey data from the years 1840-1900 to transmit to the WDC's, in order of preference:

1. The data in machine-readable form or
2. Copies of publications or manuscripts, or
3. Bibliography.

### **Resolution No. 5 (1967): Promotion of magnetic surveys in areas of geophysical importance**

The IAGA **recognising** the recent progress in interpreting observed geomagnetic field anomalies in terms of crustal movement and reversals of the geomagnetic field, and **recognising** the excellent World Magnetic Survey data gathering facilities in many countries, **recommends** that the effort of national organisations be directed, when possible, towards magnetic surveys in areas (especially marine areas) of geophysical importance, those areas being identified by geophysicists acquainted with the interpretation of anomalies.

### **Resolution No. 6 (1967): Making all hourly value data available through the World Data Centers**

The IAGA **recommends** that to prevent unnecessary repetition of effort in the preparation of data for determinations of the main field, all mean hourly value data of the geomagnetic field elements be made available in a machine readable form through the World Data Centers.

### **Resolution No. 7 (1967): Secular-change observations on islands**

For the improvement of knowledge of secular variation in the regions of the Atlantic, Indian and Pacific Oceans, the IAGA **recommends** to the appropriate agencies the continuation and extension of effort toward secular-change determinations by repeat stations and observatories on islands.

### **Resolution No. 8 (1967): Establishment of World Digital Data Centers**

The IAGA **considering** the growing need for magnetic data in machine-readable form, **recommends** the establishment of several world digital data centres (WDDC) for Geomagnetism (USA, USSR, Great Britain, Japan), to receive, catalogue, and file magnetic data. These data shall then be supplied in standard formats on request to suitable institutions for scientific purposes by appropriate arrangements. The IAGA also **encourages** the WDCs to perform other functions as user demand indicates, so far as they are able. **It is further suggested** that a manual for operation of the WDCs be prepared.

### **Resolution No. 9 (1967): Automatically constructing ionospheric current charts**

The IAGA **recommends** an investigation of the feasibility of automatically constructing ionospheric current charts for any U.T. epoch, using mean hourly values from a well distributed group of magnetic observatories. After feasibility is proven the IAGA **recommends** that arrangements be made with a suitable agency to construct and publish such charts for 3 or 4 epochs each Greenwich day, as a routine procedure.

### **Resolution No.10 (1967): Recording of pulsations at geomagnetic observatories**

In view of the great importance of observations of pulsations for the investigation of processes in the magnetosphere, the IAGA **recommends** the recording of pulsations as one of the important tasks of permanent geomagnetic observatories.

### **Resolution No.11 (1967): Utilising equipment in temporary networks of stations**

The IAGA **taking into account** the growing necessity of magnetic observation on a dense network of stations in auroral and polar regions as well as at middle latitudes, around conjugate points, **recommends** that selected observatories and geophysical institutes unite their efforts in organising such international experiments utilising their equipment in temporary networks of stations

### **Resolution No.12 (1967): Publication of Kp index supplementary to the Kp index**

The IAGA **considering** the proposal of the Working Group on Magnetic Indices of Commission IV, concerning the elimination of solar flare effects in the computation of the Kp index, **endorses** the principle according to which, beginning 1 January 1968, an index Kp' should be derived from K' indices and published supplementary to the Kp index.

### **Resolution No.13 (1967): The Kn, Ks and Km indices**

The IAGA **considering** the proposal of the Working Group on Magnetic Indices of Commission IV concerning the characterisation of the magnetic activity in each hemisphere and on a worldwide scale by the new indices Kn, Ks and Km, **recommends** that the determination of these new indices be started on a trial basis with data beginning 1 January 1964, and **urges** the fullest possible collaboration on the part of the observatories whose K indices will be required for this determination.

#### **Resolution No.14 (1967): Low altitude satellites with absolute magnetometers**

The IAGA **recognising** that the study of the geomagnetic field requires comprehensive, and continuous, world-wide measurements and that the practicability of such observations by earth satellite has now been demonstrated, **recommends** that the appropriate agencies be requested to provide measurements by low altitude satellites recording data from absolute magnetometers. IAGA **recommends** at least two satellites at near polar inclinations, with their orbital plans at right angles, and a third spacecraft orbiting near the equator. IAGA further **recommends** that machine readable data from these orbiting magnetic observatories be made available to the World Data Center system in a timely way.

#### **Resolution No.15 (1967): Geostationary satellite for studying rapid magnetic variations**

The IAGA **recognising** the difficulty in understanding the nature of rapid magnetic variations within the magnetosphere from moving satellites and **recognising** the recent improvements in satellite technology, **recommends** that a suitable geostationary satellite be placed in orbit for studying these magnetic variations. Because of the great significance of this project to geomagneticians in many countries it is further proposed that the results be made immediately available to the international scientific community.

#### **Resolution No.16 (1967): Continuous acquisition of auroral data**

The IAGA **considering** the IQSY recommendations on the creation of a special Working Group on aurora inside the frame of IAGA, and on the formal requirement for the submission of auroral data to the WDCs be suspended after the IQSY, **asserts** that its Commission VI (Aurora) has the responsibility to initiate and coordinate international programmes within its subject and, while agreeing to the IQSY recommendation on the suspension of the formal requirement for the submission of data, strongly **recommends** that each country continues acquisition of data of value to large scale synoptic studies and that a listing of observation that have been undertaken be submitted annually to the WDCs.

#### **Resolution No.17 (1967): International effort in airglow observation**

The IAGA **recommends** that the international effort in airglow observation and in the distribution of information to the WDCs be maintained at a level at least similar to that during the IQSY.

#### **Resolution No.18 (1967): Additional airglow stations**

The IAGA **noting** that the geographical coverage of airglow stations is still unsatisfactory, **recommends** that additional stations be established; highest priority should be given to stations in middle Southern latitudes and in the vicinity of the magnetic invariant latitude poles. Cooperation should be developed within meridional chains of stations along four longitudinal sectors: Europe- Africa; Asia-Australia; North-South America; Siberia-India.

#### **Resolution No.19 (1967): Coordinated investigation of SAR-arcs**

The IAGA **recommends** that during the period of high solar activity, particular attention be paid to the phenomena of mid-latitude red area (SAR-arcs) and to the equatorial system of enhanced airglow emissions. Close coordination with radio investigations of the ionosphere, both from the ground and from space, is necessary.

### **Resolution No.20 (1967): Interpretation of emissions in the nightglow**

The IAGA **recommends** that an increased effort be made to achieve a satisfactory interpretation of OH, O<sub>2</sub> and Na emission in the nightglow.

### **Resolution No.21 (1967): Effort on airglow observations**

The IAGA **recommends** that increased effort be made on the following observational programs:

1. photometric detection of the 5200 Angstrom atomic nitrogen emission,
2. determination of rapid temperature variations from Doppler broadening of emission lines,
3. rocket-borne determinations of altitude profiles of airglow emission,
4. twilight measurements of atomic helium fluorescence and ionised nitrogen scattering.

### **Resolution No.22 (1967): Calibrations of airglow photometers**

The IAGA **recommends** that laboratories performing calibrations of airglow photometers take steps for comparison of photometric scales, preferably within the next twelve months.

### **Resolution No.23 (1967): Simultaneous observations with radio-meteor techniques**

The IAGA **notes** with satisfaction the extended use of radio-meteor techniques for the study of the upper atmosphere. Most existing measurements are made at middle latitudes. The IAGA therefore **draws attention** to the importance for synoptic studies of equatorial and high latitude measurements and, where possible, of simultaneous meteor wind, ionospheric drift, rocket release and other appropriate observations.

### **Resolution No.24 (1967): World-wide computer analysis of lunar effects**

The Joint IAGA-IAMAP Committee on Lunar Effects **considering** the lack of statistical significance, obtained so far, on studies of lunar variations in atmospheric, aeronomical and geomagnetic phenomena, and **further considering** that a wealth of past observations in these fields is available for improving such results, **recommends** that all possible measures be taken to commit to computer readable form past and present atmospheric, aeronomical and geomagnetic parameters in such a way as to facilitate the integration and correlation of that data so processed into world-wide computer analysis of lunar effects.

### **Resolution No.25 (1967): Meeting for coordinated magnetic survey in South America**

The IAGA **having noted** from the report of the World Magnetic Survey Mission in 1965 that plans are being considered for convening a regional meeting in South America, at which arrangements with the object of coordinating magnetic survey activities in the various South American countries could be discussed, **expresses** its great satisfaction with this initiative, and **urges** that the meeting be convened at an early date, in order to be of maximum benefit to the World Magnetic Survey and to future magnetic survey projects.

### **Resolution No.26 (1967): Repeat magnetic observation in Antarctic**

The IAGA **noting** with satisfaction the increased number of magnetic determinations in the Antarctic since the IGY but further **noting** that the number of magnetic stations now existing in the Antarctic cannot provide sufficient data for reducing these determinations to common epochs to be used for preparing Antarctic and world magnetic charts in the future, **recommends** that a network of regular repeat magnetic stations be organised in the Antarctic at a number of especially chosen places where the magnetic field has only small anomalies. The observations at the repeat stations should be repeated each five years. IAGA requests the help of SCAR in organising the repeat stations.

### **Resolution No.27 (1967): Opportunity for precise measurement of archaeomagnetic samples**

The IAGA **noting** the difficulty and expense of establishing and equipping a good archaeomagnetic laboratory, **recommends** that laboratories having good measuring facilities should provide opportunity for the measurement of archaeomagnetic samples collected in countries where such facilities are not available and training in the techniques of collection and measurement.

## **IUGG Resolutions**

*[Resolutions passed by IAGA at its meeting in St. Gall and later approved as IUGG Resolutions in Zürich. The Resolution numbers are the IUGG numbers.]*

### **Resolution No.11 (1967): Orcadas Island Observatory**

The International Union of Geodesy and Geophysics **recognising** the particular geographic situation of the Orcadas Island observatory and its importance within the observatory network of the Southern Hemisphere **appreciates** the efforts made by the Argentine Government during these latest years to complete the facilities and the scientific equipment of this magnetic station, and **expresses** the wish that the aid granted to the Orcadas observatory be continued and increased in order to permit a continuous participation of this observatory in the international cooperation required for the study of magnetic phenomena.

### **Resolution No.12 (1967): Magnetic observatory on the mainland of Chile**

The International Union of Geodesy and Geophysics **recognising** the value of establishing a permanent geomagnetic observatory on the mainland of Chile: 1) for contributing to the world network of permanent observatories, 2) for providing a base to which Chile's observatory on Easter Island and her surface magnetic survey activities could be referred, **recommends** that the appropriate authorities give all the support necessary to establish and maintain a permanent geomagnetic observatory at Peldehue, or at such other site on the mainland as is considered suitable.

### **Resolution No.13 (1967): Power line near the Huancayo Observatory**

The International Union of Geodesy and Geophysics **noting** with regret that a high voltage AC power line is planned near the Geophysical Observatory of Huancayo, which will adversely affect the quality of the data obtained, **noting** the fact that the observatory, which is situated in a unique position, has been operating since 1922, and that a heavy loss to international science would result, **urges** the authorities concerned to consider a re-routing of the power line so that the observatory remains undisturbed.



## Resolution No.14 (1967): The Active Sun Year (IASY)

The International Union of Geodesy and Geophysics, **considering** the recommendations of the Geophysics Research Board of the U.S. National Academy of Sciences, as transmitted by Dr. H. Friedman and of the Academy of Sciences of the USSR, as transmitted by NV Pushkov, and further **considering** the desires of the IAGA Commissions IV, V, VI, VII, and VIII to participate in the formulation and conduct of cooperative international programs for Solar-Terrestrial Physics, **supports** the organisation of an international cooperative program for the Active Sun Years, 1968-1970 (IASY), to be organised under the general direction of the Inter-union Commission for Solar-Terrestrial Physics, **urges** the IUCSTP to complete a draft program for the IASY as soon as possible, **offers the cooperation** of its interested Associations in the preparation of the program, and **recognises** the need for a general meeting organised by IUSTP at an early date to permit the appropriate working groups to finalise the details of the IASY projects.

## 4th UN Regional Cartographic Conference for Asia and the Far East Manila (Philippines), December 1964

See IAGA News, February 1965, No. 3.

*(Reported by GD Garland, General Secretary of IUGG to IAGA Secretary.)*

## Resolution (1964): Establishment of a regional magnetic observatory for calibration of magnetic surveying instruments

This Conference, **noting** the importance and necessity of calibrating at frequent intervals absolute magnetic instruments used by magnetic observatory in the region, further **noting** that absolute magnetic instruments in the region were not calibrated frequently enough under one standard, realising the importance of having values of the earth's magnetic field obtained in the same standard of measurement for use in studies of related sciences, **recognising** that the calibration of magnetic instruments in an existing observatory located within an accessible distance in this region is desirable from the viewpoint of economy, further **recognising** that this field of activity lies within the province of the International Union of Geodesy and Geophysics (IUGG), **invites** the IUGG consider establishment of such a calibration observatory in this region, consider that additional modern instruments and facilities for this proposed magnetic calibration observatory, if necessary, may be requested through United Nations' assistance.

## Resolution (1964): Working Group on Secular Variation

*[reported by VP Orlov]*

The working group on Secular Variation:

1. **points out** the importance of obtaining a reliable picture of SV distribution on a world-wide scale.
2. **gives the responsibility** to the reporter for the WG on Secular Variations to collect and publish the mean annual values at the magnetic observatories, and to report the main SV features periodically.
3. **emphasises** the significance of the detailed investigation of the SV time-changes and SV parts, due to the different sources.
4. **urges** the participating countries to organise archaeomagnetic investigations to get information on SV for historic times.
5. **notes** the importance of separate countries studying the SV local anomalies.



## **XIII IUGG General Assembly Berkeley (USA), 1963**

See IAGA News, December 1963, No. 1.

### **IAGA Resolutions**

The following Resolutions were approved by the IAGA at the XIII General Assembly of IUGG held at Berkeley, California, USA August 1963.

#### **Resolution No. 1 (1963): Organisation for solar and terrestrial physics**

The IAGA **requests** its Executive Committee to appoint a committee to study and discuss with other bodies within the framework of the ICSU most appropriate and suitable organisation of the broad and rapidly developing field of solar and terrestrial physics.

#### **Resolution No. 2 (1963): Indication of artificial disturbances on magnetograms**

The IAGA **recommends** that magnetic observatories mark on their magnetograms, and indicate in their publications the time at which artificial magnetic disturbances or other spurious effects are recorded.

#### **Resolution No. 3 (1963): Sending tables of K-indices to PSGI at De Bilt**

The IAGA **recommends** that observatories already measuring K-indices separately for three magnetic elements send tables of these data to the Permanent Service of Geomagnetic Indices at De Bilt. The publication of daily ranges may be discontinued.

#### **Resolution No. 4 (1963): K-index**

The IAGA **recommends**:

- a. that from the 1<sup>st</sup> of January, 1964, the Z-component will not be used for the measure of the three-hourly K-index, except by the standard K<sub>p</sub>-observatories, and
- b. that for new observatories, the lower limit for K = 9 should be chosen in consultation with the working group on magnetic activity indices of Commission No. 4.

#### **Resolution No. 5 (1963): R-index**

The IAGA **notes** that for some observatories in geomagnetic latitudes higher than about 65 degrees, an additional index will be available, namely an hourly R-index, indicating the absolute hourly range in each horizontal component expressed in tens of gamma. A circular concerning these data will be distributed soon to observatories wishing to take part in such a tentative scheme which is to start on January 1st, 1964

### **Resolution No. 6 (1963): Electromagnetic induction research and the Upper Mantle Project**

The IAGA **recommends** that extensive research on electromagnetic induction within the earth's interior in as many areas as possible be encouraged in connection with the Upper Mantle Project (UMP).

### **Resolution No. 7 (1963): Recommendations with particular reference to the Upper Mantle Project**

The IAGA **recommends** with particular reference to the Upper Mantle Project:

- a. that in view of the present ambiguity in separating ocean water effects from those produced by deep structures, magnetic observations and recordings at continental margins as well as at sea be encouraged,
- b. that magnetic and magneto-telluric measurements be encouraged in the most recently active tectonic zones, and in particular work on Tertiary rifts, be undertaken by responsible workers in this field, and
- c. that an attempt be made to correlate determinations of deep electric conductivity with the results of heat flow measurements.

### **Resolution No. 8 (1963): Coordinated palaeomagnetic researches**

The IAGA **recommends** that well coordinated palaeomagnetic researches should be encouraged in connection with the Upper Mantle Project.

### **Resolution No. 9 (1963): Nuclear Magnetometers for absolute measurement**

The IAGA **recommends** that all observatories use Nuclear Magnetometers for the measurement of absolute total intensity and components where possible.

### **Resolution No.10 (1963): Publication of full information on corrections**

The IAGA **recommends** that observatories finding corrections in their standard of intensity (for instance, when taking up nuclear magnetometer measurements) publish full information for the benefit of the users of the data.

### **Resolution No.11 (1963): Providing complete calibration data**

The IAGA **recommends** that all recording stations provide complete calibration data for the records and instruments - including curves for sensitivity and phase angles when those parameters vary with frequencies of oscillation.

### **Resolution No.12 (1963): Publication of the Dst on a regular basis**

The IAGA recognises that for the studies of the secular variations, magnetic storms, Sq, and other geomagnetic variations the determination of DST is of great importance and that in space research and in the studies of the relationships between geomagnetic variations and other geophysical phenomena, data giving the DST variation are frequently required. The IAGA, therefore, **recommends** the publication of the hourly values and a graphical representation of the equatorial Dst variation on a regular basis

with shortest possible delay from the time of observation and invites the cooperation of interested organisations.

### **Resolution No.13 (1963): Classification of pulsations**

On account of experimental knowledge obtained since the IGY, the IAGA recognises the need of improving the present classification of pulsations. Pulsations fall into two main classes: those of a regular, and mainly continuous character, and those with an irregular pattern. The first class, for which the name pc is retained, covers the whole range of pulsations (0.2-600 sec). This class is provisionally divided into five subgroups:

- pc 1: 0.2 to 5 sec
- pc 2: 5 to 10 sec
- pc 3: 10 to 45 sec
- pc 4: 45 to 150 sec
- pc 5: 150 to 600 sec

The second class of pulsations is characterised by their irregular form, their close connection with disturbances of the magnetic field and their correlation with upper atmospheric phenomena. This class provisionally is divided into two subgroups covering different frequency ranges:

- pi 1: 1 to 40 sec
- pi 2: (primarily pt) 40 to 150 sec

Observatories making such analyses are strongly **urged** to take into account the classification given above, which will be circulated with more details by the working group on Morphology of Rapid Variations of Commission No. 4.

### **Resolution No.14 (1963): Writing of histories in geomagnetism and aeronomy**

The IAGA Commission on History of Geomagnetism and Aeronomy **recognises** that a complete history of effort and progress will contribute to the further development of the sciences of geomagnetism and aeronomy and **encourages** the writing of adequate histories of different aspects of disciplines in geomagnetism and aeronomy.

### **IAGA-IAMAP Resolutions**

*[The following Resolutions, which originated in the IAGA-IAMAP Joint Committee on Lunar Effects, were favourably considered by both of the parent Associations at the XIII General Assembly held at Berkeley, California, 1963.]*

### **Resolution No. 1 (1963): Studies of lunar tidal effects**

The Joint Committee

- a) **noting** Professor Chapman's intention to devote himself again to lunar tidal studies, and
- b) **recognising** that the moon's tidal action (mainly but not entirely semi-diurnal) slightly perturbs the Earth's atmosphere - a dynamical system whose distribution and motions are complex, changing, and not fully known, affecting not only such meteorological variables as pressure, wind and temperature, but also geomagnetic, ionospheric and cosmic ray variables,
- c) **considers** that these various phenomena deserve enhanced study, and that such study would produce valuable and interesting results, especially because the field of lunar tidal acceleration acting on the

atmosphere is completely known, and simpler in its operation than the similarly large scale solar actions upon the atmosphere,

- d) **considers** that a theoretical and computational study of the dynamical aspects of the lunar atmospheric tide, and comparison with the observed meteorological effects, would add to our factual knowledge of the properties of the atmosphere,
- e) **recommends** such a dynamical study, and also, for comparison with theoretical and computed predictions of lunar tidal meteorological effects, a comprehensive effort to improve our observational knowledge of them by use of all suitable existing series of meteorological data,
- f) likewise **recommends** that the associated lunar geophysical effects be comprehensively studied by means of all suitable existing series of geomagnetic, ionospheric, earth-current and cosmic ray data, according to a systematic plan determined after careful examination of the most appropriate methods and tools of computation,
- g) further **recommends** global studies of these lunar geophysical variations, including the determination of the ionospheric electric current system that is associated with the lunar daily geomagnetic and earth-current variations.

### **Resolution No. 2 (1963): Adequate statistical analyses on lunar effects in geophysical phenomena**

The Joint Committee **recommends** that any type of studies on lunar effects in geophysical phenomena should be supplemented by adequate statistical analyses preferably performed by means of fine subdivision of available material into a sufficient number of groups.

### **Resolution No. 3 (1963): Stations in the Southern hemisphere for lunar geophysical effects**

The Joint Committee **recognising** the need for comprehensive studies of lunar geophysical effects in a global scale, and the necessity of a more complete and more homogeneous coverage of the Earth's surface, **recommends** that every effort should be made to extend lunar studies of geophysical effects to a greater number of middle and higher latitude stations in the Southern Hemisphere.

## **IUGG Resolutions**

*[The following Resolutions were passed by the IAGA and were later approved by the IUGG as Union Resolutions. The Resolution numbers are the official IUGG numbers.]*

### **Resolution No.18 (1963): The World Magnetic Survey (WMS) project**

The IUGG, **calling attention** to the fact that the World Magnetic Survey (WMS) is now being coordinated by the WMS Board of IAGA, **urges** all nations to participate in the WMS and to contribute observations in accordance with the various technical recommendations of IAGA as set forth in IUGG Monograph No. 11, "Instruction Manual for the WMS".

### **Resolution No.19 (1963): Aeromagnetic survey over northern European countries**

The IUGG **notes** with satisfaction the proposed Canadian-Swedish-Norwegian-Danish-Finnish- Icelandic cooperative plan for a detailed three-component aeromagnetic survey over Greenland, Iceland, the Norwegian Sea, Baltic Sea, Sweden, Norway, Denmark, and Finland, with flight lines spaced 35 km apart and

flown at an altitude of 3000 m, and highly **endorses** this planned program as an important contribution to the WMS.

#### **Resolution No.20 (1963): Aeromagnetic surveys for the WMS project**

The IUGG **recommends** that the possibility be investigated of securing observations from aeromagnetic surveys made for geophysical prospecting purposes, particularly in regions where a vector or absolute aeromagnetic survey is available as a reference, and **considers** that the detailed maps are not needed by only a sufficient number of observations useful to the WMS project, for example, observations spaced approximately 20 km apart.

#### **Resolution No.21 (1963): Extension of the WMS over oceanic areas**

The IUGG **notes** with satisfaction the work done by a number of countries conducting aeromagnetic measurements that contribute to the World Magnetic Survey, and **recommends** that efforts be made to extend greatly the coverage thus far obtained, over oceanic areas adjacent to the various countries as well as over the central portion of the oceanic basins, using, for example, longer range aircraft than currently employed.

#### **Resolution No.22 (1963): WMS data description**

The IUGG **reaffirms** the description given in IUGG Monograph No. 11, "Instruction Manual for the World Magnetic Survey" of the WMS data to be supplied, but wishes to stress the importance of supplying observed data and **recommends** that any derived values supplied be identified as such.

#### **Resolution No.23 (1963): Repeat station measurements during the IQSY in support of the WMS**

The IUGG **endorses** the recommendation of the CIG-IQSY Committee: "It is recommended that one special feature of the IQSY contribution to the land and ocean survey of the WMS should be provision of magnetic survey measurements at repeat stations through their re- occupation during the IQSY or at least within the 5 year period prior to the ending of the IQSY" and **urges**

- a) the intensification of repeat station surveys during the IQSY, in accordance with previous IAGA technical recommendations for repeat station observations and
- b) the listing of the kinds of repeat stations and the values secured during previous re-occupations useful to the WMS.

#### **Resolution No.24 (1963): Repeat station data for the WMS charts 1965.0**

The IUGG **recommends** that repeat station data from 1950 onwards be supplied to the World Data Centers as a contribution to the WMS, **recognizes** that earlier repeat station data may be supplied in addition if they are of sufficient accuracy to permit reduction to epoch 1965 with reliability commensurate with the standards set by IAGA for WMS, and considers that survey charts earlier than 1950 may be useful in the historical sequence leading to the WMS charts 1965.0.

### **Resolution No.25 (1963): Prompt supply of magnetic observatory data to World Data Centers**

The IUGG recognizes that the present time delay of one year or more in transmitting the magnetic variometer data to the World Data Centers presents serious difficulty in the rapid evaluation of the magnetic records, and **recommends** that the National Committees advise their observatories to transmit copies of magnetograms together with provisional base line and scale values to the World Data Centers as soon as possible after observation in accordance with the Resolution made by the IQSY Committee.

### **Resolution No.26 (1963): Recommendation for magnetic measurements in the Antarctic and the Indian Ocean**

The IUGG **considering** the observatory, repeat station and survey data now in the World Data Centers and available to the World Magnetic Survey project, and **recognising** that, in spite of the extensive program initiated during the IGY and subsequently carried forward under the auspices of SCAR, there are still significant gaps in magnetic coverage of the Antarctic continent and adjacent seas, and particularly of the southern Pacific, Atlantic and Indian Oceans, calls to the attention of SCAR:

- a) the desirability of urging the various national participants in the scientific program in the Antarctic to undertake in so far as possible extensive magnetic survey work in the Antarctic,
  - b) the valuable contributions to the WMS that are now being made by many expeditionary vessels through the use of towed total-field magnetometers and the desirability of increasing this work by the participation of even more countries so that coverage over the southern oceans can be extended,
- and **recommends** that this last point be communicated to SCOR, for referral to the Inter-Governmental Oceanographic Commission with particular regard to urging all countries participating in the International Indian Ocean Expedition to add towed magnetometers to their ship programs in the Indian Ocean.

### **Resolution No.27 (1963): Recommendations for satellite measurements for the WMS**

The IUGG **recommends** that measurements of the total magnetic force for the WMS from satellites below 1000 km altitude be conducted in such a manner that the absolute accuracy of measurement at each point is within 10 gammas without application of corrections for instrument drifts or satellite generated fields, **and** that the date and universal time of each measurement be specified to permit removal of time variations in the final analysis of survey measurements, and **recommends** particularly;

- a) that magnetometers of the nuclear or atomic resonance type be used
- b) that the latitude, longitude, and altitude coordinates of each measurement be known and specified to an accuracy of 1000 m in the horizontal plane and 250 m in the vertical direction, and
- c) that the magnetic field of the satellite be such that its contribution to the field at the magnetometer sensor be small and consistent with the absolute accuracy specified above.

### **Resolution No.28 (1963): Filling the gaps in a preliminary network of stations**

The IUGG, **considering** the importance of better understanding of the distribution in time of the onset of magnetic storms at the Earth's surface, and **noting** that the IAGA has chosen a preliminary network of stations having equipment with necessary precision and time control covering as far as possible all the regions of the ARh (8 in polar regions, 7 in middle latitudes and 4 in equatorial regions) and **noting** further the need to fill the gaps still existing in this preliminary network of stations with the necessary equipment:

- (a) **invites** the collaboration of Reykjavik Observatory,
- (b) **recommends** the installation of a permanent station in the region of Great Whale, Canada, and

(c) **would appreciate** the installation of quick-run equipment at Trelew, Zaria and Addis Ababa.

**Resolution No.29 (1963): Magnetic observations on islands in the Southern hemisphere**

The IUGG, **considering** the difficulties for Sq-studies in the Southern Hemisphere, **recommends** to the National Committees responsible for magnetic observations in islands of middle and tropical latitudes in the Atlantic, Pacific and Indian Oceans, the installation or reactivation of magnetic observatories in these regions, at least during the IQSY period.

**Resolution No.30 (1963): Regular operation at La Karavia Magnetic Observatory**

The IUGG **notes** with concern the breaks in the activities of the magnetic station at La Karavia (Elizabethville), which is of such a great importance in the African network of magnetic stations, and **wishes** that all possible effort be made in order that this observatory can resume its regular operation.