

**IAGA Division V Business Meeting**  
**8 July 2003, Tuesday, Sapporo, Japan**

**SUMMARY**

**1. Reports from the WG Business Meetings:**

**WG V-1** (H.-J Linthe for Jean Rasson):

- Standard registration of a new observatory (that is, assigning the IAGA 3-letter code) is now required through the WG V-1 and NGDC (WDC for SEG in Boulder, CO):
  - Send a proposed code to WDC-A Boulder (Susan McLean) and the IAGA WG V-OBS Chair with all necessary information.
  - The first letter of the code must correspond to the first letter of the observatory name.
  - The code will be approved as the first annual mean value will be calculated and provided to WDC.
  - Division V recommends the observatory list of WG V-1 (based on the list of WDC-C1, BGS Edinburgh) as the IAGA official list. People who have their own lists should be asked to use links to the WG V.1 Web page.
  - Currently WG V-1 does not feel itself responsible for the fixing of codes for variometer stations.
- XIth IAGA Workshop on Geomagnetic Observatory Instruments, Data Acquisition and Processing will be held in Kakioka (Japan) on November 9-17, 2004.
- Belsk (Poland) invited the XIIth IAGA Workshop in 2006 in conjunction with the observatory's 50-year anniversary in 2006.
- The present WG Web site will be hosted further by the Royal Meteorological Institute of Belgium.

**WG V-2** (Ana Thomson for Toyo Kamei):

- Standard registration of a new observatory (that is, assigning the IAGA 3-letter code) is now required through the WG V-1 and NGDC (WDC for SEG in Boulder, CO) as described above (WG V-1).
- Task Force Group for the coding of variation station list is proposed under the chairship of Susan Mclean and members T. Iyemori, J. Rasson, and V. Papitashvili.
- The latest revision of the IAGA-2002 Geomagnetic Data Exchange Format is finally approved up to 1-minute resolution. The IAGA-2202 for 1-sec resolution data needs special attention.
- Rescue of Old Magnetograms to Digital Images - Task Force Group is established (Volodya Papitashvili, Tohru Araki, Toshi Iyemori, Nandini Nagarajan, S. Alex, and Juan José Curto)
- Noted that the IAGA Guide for Geomagnetic Indices is needed.

**WG V-3** (Alan Thomson):

- A list of Geomagnetic Variations Models and corresponding publications is now available from the WG Web site [http://www.nmh.ac.uk/iaga\\_wgv3.html](http://www.nmh.ac.uk/iaga_wgv3.html).
- Main Business: ISO standardization in the space environment. A report on a feasibility study by IAGA:
  - Context: the proposed standard – *why is it needed, what is proposed, who are the authors of the standard?* <http://alpha.sinp.msu.ru/iso/>
  - History of IAGA involvement 2001-2003 – *ISO WG4 meetings in Toulouse, Noordwijk, Houston, Tsukuba City -> IAGA questionnaires; discussions and reports to IAGA executive committee*

- Current status of ISO activity – *continues as a ‘Working Draft’ and will proceed to ‘Committee Draft’ vote - agreed in Japan, May 2003.* IAGA concerns (at least partially) addressed in new draft standard.
- What next for IAGA? – *options for executive committee*
- Full details (documents, reports and presentations) of IAGA involvement provided on WG V-3 website: <http://www.geomag.bgs.ac.uk/iaga/main.html>

**WG V-8** (Mioara Manda and Susan Macmillan):

- Vote to revise IGRF series of models – the 9th generation, comprising definitive MF coefficients for 1995.0 and 2000.0 and SV coefficients for 2000.0-2005.0
- Shift in terminology
- 9th generation IGRF
- 6 candidates for 1995.0, 5 for 2000.0, 7 for 2000.0-2005.0 (SV)
- 1995.0 – weighted mean (weights inversely proportional to mean RMS differences at Earth’s surface for each model when compared with all other models)
- 2000.0 – unweighted mean
- 2000.0-2005.0 – unweighted mean of 6 candidate models (IZM1 excl. and CM values to be for 2002.5 rather than 2000.0)
- 10th generation IGRF Task Force (Lowe/Langlais/Macmillan/Maus/Sabaka + Olsen/McLean)
- Spheroid recommended is WGS84, rather than IAU66
- IAGA Guide on modelling – not yet
- It is time to move away from the terms DGRF\*\*\*\*, IGRF\*\*\*\* and PGRF\*\*\*\* given the unusual circumstances with this year's generation of the IGRF which have come about because of the unprecedented amount of high-quality satellite data now available. These terms have always led to much confusion (inputs/outputs).

**WG V-9** (Monika Korte and Mita Rajaram):

- Presentation by Juha Korhonen on feasibility of World Magnetic Anomaly Map
- “World Magnetic Anomaly Map” task force (Juha Korhonen, Tiku Ravat, Stefan Maus, Colin Reeves):
  - to develop scope for work in order to get funding (from Colin Reeves presentation in GAV.04)
  - to address data access issues when data not in public domain
  - initial map based on existing public domain data
  - report on progress at IAGA 2005

**2. Chairmen brief report on the Division V activities in 1999-2003**

(V. Papitashvili and T. Iyemori)

**Scientific “outputs” and achievements:**

- The IGRF-2000 spherical harmonic coefficients were initially published through the WG V-8 Web site in November 1999. For the first time, the IGRF-2000, 8<sup>th</sup> Generation Model was then published in print before a new five-year geomagnetic epoch started – see a special issue of *Earth, Planets and Space*, 52, 1117-1233, 2000; Guest Editors: Mioara Manda, Susan Macmillan, and Frank Lowe.
- Thanks to successful operation of the Ørsted, CHAMP, and SAC-C satellites, the large amount of satellite magnetic survey data are currently available, improving our knowledge and understanding of the Earth’s magnetic field and in particular its secular variation as the data now covers 4.5 years (1999-2003). If the proposed SWARM satellite mission will be funded by ESA, then we would be able to accomplish a decadal survey of the secular variation.

- The new, Y2K compliant geomagnetic data exchange format IAGA-2002 was finally adopted by the worldwide geomagnetic community; the format was formally endorsed in Hanoi at the Joint IAGA-IASPEI Assembly (<http://www.ngdc.noaa.gov/IAGA/wg2/iagaformat.html>).
- A complete list of magnetic observatories (currently in operation or existed in the past) was prepared under the guidance of WG V-1. This list is co-shared with the World Data Center system; it is agreed that now IAGA (via Division V) will authorize assignment of the IAGA three-letter codes together with the WDC for Solar-Terrestrial Physics, located at the National Geophysical Data Center in Boulder, Colorado, U.S.A.
- In 2001, the Division V proposed a new project “Rescue of Old Analogue Magnetograms by Converting to Digital Images”. In 2002, this proposal was funded by the ICSU 2003 Grant Programme for US\$ 30,000. The rescue activity will be launched as the funded amount arrives to IAGA in mid-2003. The operation will take place in WDCs for Geomagnetism in Kyoto (Japan) focusing on converting mainly pre-IGY analogue magnetograms to digital images. It is planned that the Russian and Indian World Data Centers will be major players in this project.
- A new Polar Cap Magnetic Activity Index (PC) was recommended to IAGA in Birmingham (August 1999) and formally endorsed in Hanoi (August 2001). The formal endorsement was made on a condition that the existing two separate definitions of a quiet level for the index derivation (e.g., for the PC North at DMI, Denmark, and for the PC South at AARI, Russia) will be resolved creating a basis for the unified definition and procedure. Unfortunately, the resolution has not been achieved because of the AARI’s position that their method is superior than the one used at DMI. Therefore, Division V suggests suspending the PC index from the use as an IAGA index, returning the index into the research area. We suggest the WG V-2 on Geomagnetic Data and Indices to form a Task Form Group with a goal to assess the existing methodology at both institutions and make the final recommendations to IAGA in Toulouse (2005).

#### **Significant involvement in scientific meetings and/or workshops:**

- European Repeat Station Workshop, Niemegek, Germany, February 2003 (organised by Mioara Mandea (WG V-8 and Monika Korte (WG V-9).
- Through Division V, IAGA sponsored two Workshops on Geomagnetic Observatory Instruments, Data Acquisition and Processing; The IX<sup>th</sup> Workshop was held at the Hurbanovo Magnetic Observatory in Slovakia, June 12-18, 2000, and the X<sup>th</sup> Workshop – at the Hermanus Magnetic Observatory in South Africa, 15-24 April 2002. About 100 participants from 30 countries attended the Workshop in Hurbanovo; 40 delegates from 24 countries attended the Workshop in Hermanus.
- More than 50 scientific and technical papers presented at the IX<sup>th</sup> Workshop in Hurbanovo were published in the Proceedings of Slovakian Geophysical Institute – see a special issue of *Contributions to Geophysics and Geodesy, Vol. 31, No. 1, 2001*.
- Special Issue of *Physics of the Earth and Planetary Interiors* on the Magnetic Field Modeling (Eds. Mioara Mandea and Richard Holme) from the contributions to the IAGA session in Hanoi “Main Magnetic Field and Secular Variation Modeling at Earth’s Surface and Core-Mantle Boundary”.
- After the Symposium at the IUGG General Assembly in Birmingham, the Division V Chair co-edited a special issue of the Journal of Atmospheric and Solar-Terrestrial Physics – see *B. T. Tsurutani, V. O. Papitashvili, J. Lastovicka, and Ya. I. Feldstein, Interplanetary medium and geophysical phenomena during geomagnetic storms, J. Atmos. Solar-Terr. Phys., 63, No. 5, 387, 2001*.

#### **Joint work or involvement with other bodies, e.g., SEDI, COSPAR, SCAR:**

- WG V-8 works in close contact with SEDI (e.g., individual contributions to the SEDI meeting in California, July 2002).
- Division V scientists actively participated in the First CHAMP Science Meeting (GFZ, Potsdam, Germany, January 2002) and 4<sup>th</sup> Ørsted International Science Team Meeting (Copenhagen, Denmark, September 2002).
- WG V-3 was invited by the ISO WG-4 to assess a necessity of the magnetospheric field model standardization.
- In September 2002, the IAGA EC appointed Vladimir Papitashvili as an IAGA Representative to SCAR.

### **Looking forward, what are the major science issues are likely to influence the Division V scientific programme for Sapporo and beyond?**

In response to the IUGG “State of the Planet” initiative, the Division V proposes IAGA focusing on the following major themes:

- 1. Dynamics of the Earth’s Interior and Geomagnetic Dynamo**
- 2. Electrodynamics and Plasmadynamics in Geospace Environment**
- 3. Solar Forcing on Climate Changes**
- 4. Solar-Planetary Relationships and Space Weather**

An advent of affordable super-computers allows modeling the Earth’s interior and geomagnetic dynamo addressing the historical development of the planet. The geospace environment can also be modeled now through the powerful magnetohydrodynamic codes, allowing simulation of the entire chain of events - from the solar corona to the solar wind-magnetosphere-ionosphere interaction. Global warming becomes an important issue. The solar forcing on climate changes is an outstanding question of the global climate research and IAGA should be apart of that studies. At last, IAGA should more actively encourage research on how the life and technological systems are protected by the very existence of the geomagnetic field. It can be guessed that without this shield, the Earth’s ionosphere and upper atmosphere may quickly deteriorate from the significant impact of charged particles from space.

We note that the solar-planetary relations are covered by neither International Astronomical Union nor IAGA; it is worth to consider if this issue is in the scope of the IAGA Division V activities.

We suggest the following theme as one of the focuses for Division V activities in the 2004-2007 Quadrennium: **A promotion of collaboration among World Data Centers, INTERMAGNET, magnetic observatories and project-based geomagnetic observation groups.** Abundance and diversity of currently available, spatially distributed geomagnetic databases has created an urgent need for more close collaboration among the organizations, observatories and institutions. Division V should work to promote the collaboration, aiming on easier access to distributed geomagnetic databases.

### **Practical Organizational Matters for Division V**

A plan for the Division V restructuring has been developed with a goal to make our working groups “leaner, focused, and in action”. It is proposed to reduce the number of Working Groups to three groups, focusing their activities on the major scientific objectives important for the IAGA response on the current and emerging scientific and societal needs:

#### **WG V-OBS Working Group on Geomagnetic Observation**

- WG V-1: Geomagnetic Observatories, Instruments and Standards
- WG V-7: Earth and Planetary Magnetic Survey Satellites (Instruments and Standards)
- WG V-9: Magnetic Anomalies (Instruments and Standards)

#### **WG V-DAT Working Group on Geomagnetic Data and Indices**

- WG V-7: Earth and Planetary Magnetic Survey Satellites (Data and Maps)
- WG V-2: Geomagnetic Data, Indices and Applications
- WG V-9: Magnetic Anomalies (Land and Sea Data and Global Digital Map)
- Interaction with World Data Center System

**WG V-MOD Working Group on Geomagnetic Field Modeling**

- WG V-8: Analysis of Global and Regional Geomagnetic Fields and Secular Variation
- WG V-9: Magnetic Anomalies (Crustal Field Modeling)
- WG V-3: Analysis and Modeling of Geomagnetic Field Variations (External Fields and the Earth's magnetosphere)

**4. Division V Resolutions for IAGA**

**1. Magnetic repeat station surveys: cooperation and standardization**

**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.

**2. Provision of data for geomagnetic indices**

**IAGA,**

**recognising**

the increasing importance of providing “quick-look”, provisional, and definitive IAGA 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.

**3. International Decade of Potential-Field Research**

**IAGA,**

**considering**

IAGA 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,

**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.

#### **4. Geomagnetic observations in Greenland**

**IAGA,**

**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.

#### **5. Cooperation and sharing in polar geospace research (together with Div. II and III)**

**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,

**recognizing 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 the magnetospheric and ionospheric electrodynamic 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.

#### **5. Proposed Symposia for the IAGA Scientific Assembly, Toulouse, France, 2005**

**Title:** Magnetic Observatories: Measurements, Quality Analysis, and Data Dissemination

**Conveners:** Pieter Kotze (South Africa), Pavel Hejda (Czech Rep) Susan Macmillan (UK), Mioara Manda (France)

**Duration:** One full day:

- Modern observatory instrumentation, data collection and measurement practices
- Processing of data, analyses and interpretation of results

**Scope:** High-quality data from magnetic observatories and repeat stations are crucial to the understanding of the time-evolution of the geomagnetic field. This symposium aims to bring together those who

are involved in all aspects of data collection as well as those researchers analysing and interpreting these measurements. New contributions on magnetic observatory instrumentation, data collection and measurement practices, as well as the scientific evaluation of these observations will be especially welcomed.

**Title:** Indices and Algorithms for Detecting Geomagnetic and Space Weather Events

**Conveners:** M. Kunitake (Japan), J. J. Curto (Spain), E. Clarke (U.K.), R. Lukianova (Russia)

**Duration:** One full day

**Scope:** Scientific studies and applications of space weather may be triggered by specific events in the heliosphere and magnetosphere, for example, as measured or seen in geomagnetic data. In this session we solicit papers that describe methods and algorithms that provide automated recognition of space weather events in geomagnetic data and indices address issues of accuracy and reliability. We also welcome papers on the wider use of indices within geomagnetic community.

**Title:** Geomagnetism and Geospace Climatology (joint with Div. III)

**Conveners:** A. Thomson (U.K., Div. V), K.-H. Glassmeier (Germany, Div. III) M. Nose (Japan; Div. V)

**Duration:** One full day

**Scope:** Geomagnetic data have been measured at observatories over 150 years with good accuracy. These data may give some insight into long term processes operating in geospace. Papers are solicited that address long term variability in geospace.

**Title:** High resolution marine magnetics: new techniques and experiments

**Conveners :** Jérôme Dymont (Institut de Physique du Globe, 4 place Jussieu, 75005 Paris, France; Tel. +33 1 44 27 28 21; Fax +33 1 44 27 99 69; e-mail [jdy@ipgp.jussieu.fr](mailto:jdy@ipgp.jussieu.fr))

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**Scope:** All contributions addressing recent advances in marine magnetics are welcome. Presentations of new techniques, including a variety of newly developed instruments (sea-surface or deep-sea operated, scalar or vector) and the methods required to interpret their data are encouraged. Results of recent experiments designed to investigate, among others, the magnetic structure and properties of the oceanic crust, the magnetic signature of faults and hydrothermal activity, the magnetization of seamounts, the time variations of the geomagnetic field, the high resolution dating of the seafloor, would be particularly appreciated. Marine magnetic studies about continental margins or in shallow water environments are also very welcome.

**Title:** Magnetic anomalies at low latitudes

**Conveners:** Mita Rajaram, CDC Lead;

**Co-Convenor:** (ICDC, Africa/Brazil). Murali Could you please find the address of Rigoti (check with Padilha) or a lady scientist Naomi from SaoPaulo.

**Duration:** 0.5 day

**Scope:** Analysis of magnetic data has been complicated by the changing inclination of the main geomagnetic field. Interpretational tools developed for the analysis of high latitude magnetic anomalies are not directly applicable to low-latitudes; the analysis of low latitude magnetic anomalies needs special attention. Papers dealing with magnetic anomaly map generation, analysis and interpretation of low latitude and equatorial regions are sought. Papers dealing with magnetic anomalies derived from ground

based, aeromagnetic, satellite based or marine magnetic data are welcome.  
(Note: modified on Nov.20,2003 based on the information from Mita)

**Title:** World Magnetic Anomaly Map: anomaly definition and calculation

**Convenors:** Juha V. Korhonen (Geological Survey of Finland, P.O.Box 96FIN-02151 Espoo, Finland; Tel. +358 20 550 2275; Fax +358 20 550 12; e-mail [juha.korhonen@gsf.fi](mailto:juha.korhonen@gsf.fi)), Dhananjay Ravat (Department of Geology, Southern Illinois University C'dale, Carbondale, IL 62901-4324; Tel: (618) 453-7352; Fax: (618) 453-7393; E-mail: [ravat@geo.siu.edu](mailto:ravat@geo.siu.edu))

**Duration:** 0.5 day

**Scope:** The first edition of global digital magnetic anomaly map is aimed to represent such component of the Earth's magnetic field that is caused by the ferrimagnetic uppermost part of the lithosphere, as if it were observed a few km above the Earth's surface. The anomalies are supposed to be calculated using as similar principles as possible everywhere. Further, the definition and anomaly calculation should allow transforming the digital map to another system in future. Well knowing the difficulties caused by temporal variation of the recorded magnetic field and great heterogeneity in quality of available data sets the Task Force of WDMAM invites papers to present anomaly definitions and practical calculation methods for major data sets. Poster presentations are invited to display major anomaly sets reduced and compiled by controlled methods.

(added December 1<sup>st</sup>, 2003)

**Title:** International Decade for Geopotential Research: Advances in understanding the geomagnetic field

**Convenors:** B. Langlais (France), K. Whaler (UK); S. Maus (Germany), P. Stauning (Denmark)

**Duration:** Two full days

**Scope:** The 'Decade of Geopotential Research', inaugurated with the launch of Ørsted and Sunsat in February of 1999, is an international effort to promote and coordinate a continuous monitoring of the geopotential (magnetic and gravity) field variability in the near-Earth environment. Following 20 years without satellite magnetic coverage, the first seven years of the 'Decade of Geopotential Research' have provided the geomagnetic community with a wealth of high quality data from several near-Earth satellites. Combined with ground based data, this has opened numerous opportunities for studies ranging from core flow, mantle conductivity, lithospheric composition and ocean flow to the dynamics of ionospheric and magnetospheric currents. Contributions to these topics and the new satellite missions are solicited for this session

**Title:** Geodynamo: Theories, Observations, and Experiments

**Convenors:** Ibrahim Eltayeb (WG 1.1 Lead), Gauthier Hulot (WG1-4 and SEDI), Philippe Cardin (WG 1.1), Richard Holme (Div. V)

**Duration:** Two full days

**Scope:**

- The theory and simulation of the Geodynamo (possibly of other telluric dynamos)
- Observations of the past and present geomagnetic field, that put workable constraints on geodynamo theory
- Experiments addressing physical processes important for the geodynamo

**Title:** Investigations of the deep mantle using long period EM data from observatories, cables, long period MT data and satellites

**Convenors:** Pascal Tarits, H. Utada (Div. I), Nils Olsen (Div. V)

**Duration:** 0.5 day

**Scope:**



**Title:** Uses and Applications of Geomagnetic Filed Models

**Conveners:** Frank Lowes (UK), Peggy Shei (USA)

**Duration:** 0.5 day

**Scope:** The aim of this symposium is to bring together users and geomagnetic field modeller for the purpose of fostering better interaction and mutual understanding between these two groups. What do users want from the model of the internal and external geomagnetic field? What problems do users have in applying models for their specific needs? We welcome examples of specific applications by users from both the internal and external field communities.

**Title:** Geospace Dynamics: Conjugate and Interhemispheric Polar Studies

**Conveners:** Robert Clauer (U.S.A.; WG on Polar Research, Lead), Mervyn Freeman (U.K.; Div. III), Hisao Yamagishi (Japan, Div. II), Slava Pilipenko (Russia; Div. V)

**Duration:** One full day

**Scope:** Unique opportunities will exist between 2003-2005 that enable investigations of similarities and differences between the polar regions through the analysis of simultaneous conjugate measurements, either between hemispheres or between ground and space based instruments. The northern and southern polar regions each have unique physical characteristics that must be considered in a fully coupled, global, dynamic geospace system. For example, the separation of geomagnetic and rotation poles, magnetic field strength, and conductivity structures are different in the two polar regions. Research that contrasts and/or considers the coupled, interhemispheric, global system are invited. Observational, theoretical and computer simulation investigations are encouraged to participate in this symposium.

### **IGA Division Leadership 2003-2007**

#### ***Division V***

Chair: Toshihiko Iyemori (Japan);

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#### **WG V-OBS: Geomagnetic Observation**

Chair: Hans-Jochim Linthe (Germany);

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### **WG V-DAT: Geomagnetic Data and Indices**

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### **WG V-MOD: Geomagnetic Field Modelling**

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