

**IAGA, the International Association of Geomagnetism and Aeronomy,**  
is the premier international scientific association promoting the study of terrestrial and planetary magnetism and space physics

## Foreword



This issue of IAGA News contains information about the IAGA activities over the year 2014, with a forward look at preparations for the the 26<sup>th</sup> General Assembly of the International Union of Geodesy and Geophysics (IUGG)

which will be held in Prague, Czech Republic, from the 22<sup>nd</sup> of June to the 2<sup>nd</sup> of July 2015.

This issue also contains reports on IAGA activities of different kinds and provides information about recently deceased IAGA scientists. In its present form, IAGA News contains only brief summaries of different activities and topics; the reader is referred to the IAGA website ([www.iugg.org/IAGA](http://www.iugg.org/IAGA)) for more details. Information on activities at Division level can be found on each Division's website.

IAGA News is distributed – in its electronic form – to the National Correspondents in the Member Countries, to all IAGA officers and to scientists who have attended recent IAGA assemblies. Please feel free to distribute IAGA news around, especially to national policy makers and leaders, whose decisions can affect the activities of IAGA scientists.

Mioara Mandaia  
(Secretary-General)

## Contents

<b>1</b>	<b>Message from the President</b>	<b>2</b>
<b>2</b>	<b>2014 International Award at the AGU Fall Meeting</b>	<b>3</b>
<b>3</b>	<b>Preparation for the the 26<sup>th</sup> General Assembly of IUGG</b>	<b>3</b>
3.1	Welcome Word . . . . .	3
3.2	Union Lectures . . . . .	3
<b>4</b>	<b>The 12<sup>th</sup> Generation International Geomagnetic Reference Field</b>	<b>4</b>
<b>5</b>	<b>Swarm 4<sup>th</sup> Data Quality Workshop</b>	<b>4</b>
<b>6</b>	<b>Reports on Meetings: IAGA-Sponsored or of IAGA interest</b>	<b>6</b>
6.1	6 <sup>th</sup> VLF/ELF Remote Sensing of Ionospheres and Magnetospheres Workshop	6
6.2	5 <sup>th</sup> International High Energy Particle Precipitation in the Atmosphere (HEPPA) Workshop in conjunction with SPARC/SOLARIS-HEPPA . . . . .	7
6.3	8 <sup>th</sup> Workshop on Long-Term Changes and Trends in the Atmosphere . . . . .	8
6.4	40 <sup>th</sup> Scientific Assembly of the Committee on Space Research . . . . .	9
6.5	22 <sup>nd</sup> EM Induction Workshop . . . . .	9
6.6	5 <sup>th</sup> IAGA/ICMA/CAWSES Workshop on Vertical Coupling in the Atmosphere/Ionosphere System . . . . .	10
6.7	14 <sup>th</sup> Castle Meetings Workshop . . . . .	11
6.8	XVI <sup>th</sup> IAGA Workshop on Geomagnetic Observatory Instruments, Data Acquisition and Processing . . . . .	12
<b>7</b>	<b>In Memorium</b>	<b>13</b>
<b>8</b>	<b>General information about IAGA</b>	<b>18</b>
8.1	IAGA books series published by Springer	18
8.2	IAGA website . . . . .	19
8.3	IAGA contact . . . . .	19

### IAGA on the Web

Information on IAGA is regularly updated at the IAGA site:

<http://www.iugg.org/IAGA/>

## 1 Message from the President



As usual, there has been a good range of IAGA-supported meetings and workshops this year, about which there is more information later in this Newsletter. Of particular note was the IAGA Observatory Workshop, jointly organised by the National

Geophysical Research Institute, Hyderabad and Indian Institute of Geomagnetism, Mumbai, and held at Hyderabad Magnetic Observatory on the occasion of its Golden Jubilee, which was marked by a series of Special Sessions. It is wonderful to be able to recognise and celebrate the effort that goes into maintaining a high-quality, long-running observatory.

Plans are well in hand for next year's IUGG General Assembly in Prague. Our own Eduard Petrovsky has been working tirelessly as Programme Committee Chair, along with Mioara Manda and the Secretaries-General of the other Associations, to ensure we have a successful meeting. Associated with it we will have our second IAGA Summer School, based on the outstanding success of the first that was organised primarily by Eduard Petrovsky in Mérida. I would like to thank in advance all those who have agreed to give up their time to contribute to the second Summer School.

We continue to work on a variety of initiatives, such as the proposal for an Inter-Association Commission on Space Weather. With the ever increasing dependence of society on technologies that are potentially affected by space weather, it is an area where our science has demonstrable impact.

IUGG has instituted a set of new awards, and IAGA has successfully nominated for an Early Career Scientist award. We await the results of the others. The presentations will take place in Prague, as will those for our own awards. Please look out for the opportunities to celebrate the achievements of these scientists, and consider suggesting names for both IUGG and IAGA

awards in the future.

Within IUGG Executive Committee there has been a lot of discussion about the relative merits of national and individual membership of the Union. There are advantages and disadvantages of any model for membership, but what is clear is that we need to maintain the commitment of our national adhering bodies to the Union and its Associations without adversely affecting scientists from non-adhering countries. Financial pressures have caused several countries to request a move to Associate Membership status, which impacts on the funds available to support our activities. The Associations already have different rules for membership, and there is no suggestion that we should move to a uniform system. However, I think it would be useful for us to discuss the issue, to provide advice to the President for when the matter is next raised at Union level.

A number of organisations with related aims to IUGG have requested Affiliate Membership, such as the International Association for Mathematical Geosciences and the American Geosciences Institute. This provides the opportunity for future joint meetings to take advantage of the synergies.

IUGG's 'parent' body ICSU has been busy with a number of initiatives where the Union and hence its Associations have been asked to nominate potential representatives. Examples include the Africa Future Earth Committee and the Committee on Freedom and Responsibility in the conduct of Science. We have also input to an ICSU questionnaire on Disaster Risk Reduction, where space weather is an important consideration.

This will be my last Newsletter message as President. It has been my privilege to serve you for the last three and a half years or so, ably supported by the Executive Committee, especially the Secretary-General. All the best for 2015, and I look forward to seeing as many of you as are able to attend in Prague next summer

Kathryn Whaler  
(President)

## 2 2014 International Award at the AGU Fall Meeting

Mioara Manda received the 2014 International Award at the AGU Fall Meeting Honors Ceremony, held on 17 December 2014 in San Francisco, California. This award recognizes



”outstanding contribution to furthering the Earth and space sciences and using science for the benefit of society in developing nations.” The citation for Mioara Manda’s International Award: ”For her prominent service to the international community and for her deep commitment to participation of scientists from less developed countries.”

Please join me in congratulating Mioara on this award.

Eduard Petrovský  
IAGA vice-president

## 3 Preparation for the the 26<sup>th</sup> General Assembly of IUGG

### Time and Place

The 26<sup>th</sup> General Assembly of the International Union of Geodesy and Geophysics (IUGG) is fast approaching. This event will be held in Prague, Czech Republic, from the 22<sup>nd</sup> of June to the 2<sup>nd</sup> of July 2015. Please visit the IUGG2015 website for the latest news:

<http://www.iugg2015prague.com>

**Local Organising Committee** The Local Organising Committee (LOC) is chaired by Vladimir Cermak and includes Petr Holota, Eduard Petrovsky, Jano Simkanin, Vladimir Cermak, Marta Tuckova, Iva Pelanova, Vladislav Babuska, Vladislav Rapprich, Marcela Svanberkova, and Jaroslava Plomerova.

The address of the IUGG 2015 Prague Secretariat is:

Prague Congress Centre  
5. kvetna 65  
140 00 Prague 4  
Czech Republic  
Tel.: +420 261 174 305  
Fax: +420 261 174 307  
Website: [www.c-in.eu](http://www.c-in.eu)  
E-mail: [info@iugg2015prague.com](mailto:info@iugg2015prague.com)

The IAGA Scientific Program is available on <http://www.iugg2015prague.com/iaga-symposia.htm>

### 3.1 Welcome Word

We are very much pleased to announce that the scientific program of the 26<sup>th</sup> IUGG General Assembly provides exciting opportunities for presenting your latest results related to almost all disciplines of Earth and space sciences. The program structure offers excellent opportunities for exchange of information among researchers from various fields. Nine Union lectures, presented by renowned experts from all the IUGG associations, go together with solicited talks in 11 Union symposia, one of them being devoted entirely to early career scientists. Next, altogether 30 joint inter-association symposia are the core of the interdisciplinary program, bringing together contributions from the eight associations of IUGG. Finally, the program of formal presentations is completed by almost 200 symposia and workshops of individual associations. Last but not least, three open panel discussions, dealing with topics such as scientific knowledge in the digital arena, science for climate services, etc., are planned. In addition to the scientific symposia, IUGG-2015 offers a wide range of trips and excursions and an exhibition by publishers and producers. We believe that the combined program, along with the exciting venue of Prague, will attract many scientists from all around the world.

Eduard Petrovský  
Chair, Scientific Program Committee

### 3.2 Union Lectures

#### Wednesday, 14 June

**10:30 IUGG:** Yuan T. Lee (1986 Nobel Prize Winner in Chemistry), Academy Sinica, Taipei, China

*Transformation of Human Society for Sustainable Future*

**11:00 IAGA:** Janet Kozyra, University of Michigan, USA

**11:30 IAHS:** Dominic Mazvimavi, University of the Western Cape, South Africa

### Friday, 26 June

**10:30 IACS:** Jonathan Gregory, University of Reading and Met Office, UK

*Sea Level Change in the Anthropocene*

**11:00 IASPEI:** Raul Madariaga, ENS, Paris, France

*Earthquake Dynamics and Seismic Radiation*

**11:30 IAVCEI:** Thomas Casadevall, USGS, USA

### Monday, 29 June

**10:30 IAG:** Harald Schuh, GFZ, Potsdam, Germany  
*Contributions of Geodesy to Monitoring Natural Hazards and Global Change*

**11:00 IAMAS:** Laura Gallardo Klenner, Universidad de Chile, Santiago, Chile

**11:30 IAPSO:** Nicolas Gruber, ETH Zürich, Switzerland

## 4 The 12<sup>th</sup> Generation International Geomagnetic Reference Field

IAGA has released the 12<sup>th</sup> International Geomagnetic Reference Field — the latest version of a standard mathematical description of the Earth's main magnetic field, widely used in studies of the Earth's deep interior, its lithosphere, and ionosphere and magnetosphere. The coefficients for this degree/order 13 field model were finalized by an IAGA task force in December 2014. The IGRF is the product of a collaborative effort between magnetic field modellers and institutes involved in collecting and disseminating geomagnetic field data from satellites, as well from observatories and surveys around the world.

The 12<sup>th</sup> IGRF coefficients were computed from candidate sets of coefficients produced by the participating members of IAGA Working Group V-MOD. Their institutes and the many organisations involved in operating magnetic satellites, observatories, magnetic survey programmes and World Data Centers and Data Services are to be thanked for their continuing support of the IGRF model.

More information on:

<http://www.ngdc.noaa.gov/IAGA/vmod/igrf.html>

## 5 Swarm 4<sup>th</sup> Data Quality Workshop

Potsdam, Germany, 2-5 December, 2014



One year ago, on 22 November 2013, Swarm was launched and started its highly successful mapping of the Earth's magnetic field, electric field and other geophysical parameters.

Since then, the 3<sup>rd</sup> Swarm Science Meeting took place in Copenhagen in June 2014, key results have been published and scientists have been working at full pace for the consolidation of the instrument calibration and characterisation. Just recently, the Swarm 4<sup>th</sup> Data Quality Workshop was organised from 2<sup>nd</sup> to 5<sup>th</sup> December at GFZ in Potsdam. This event brought together the Cal/Val community, key experts and principal investigators. The meeting was very effective for sharing and discussing the latest achievements by the different teams, and also to define and coordinate the future steps of the calibration and product validation efforts.

During this meeting, the Swarm Initial magnetic Field Model (SIFM) was also presented. This model confirms that Swarm indeed provides by far the best-ever measurements of the Earth's magnetic field. Although the satellites are currently orbiting at a relatively high altitude, the mission is already outperforming its predecessors, even without full use of the vector gradient measurement technique. This is very promising and it confirms that Swarm is well placed to set new scientific standards in the coming years.

Of course the various scientific communities are

also facing some challenging tasks. The most noteworthy topics under investigations are the analysis of the Absolute Scalar Magnetometer (ASM) - Vector Fluxgate Magnetometer (VFM) scalar residuals, the temperature calibration of the Accelerometer (ACC) data, the Thermal Ion Imager (TII) non-permanent degradation effects and the recent loss of the ASM on Swarm Charlie.

With regards to VFM-ASM scalar residual (i.e. the difference – after calibration – between the field intensity measured by the ASM and the norm of the vector field measured by the VFM) a dedicated investigation team has been focusing on the characterisation of the disturbance field. Three independent models show consistent results and identify that the residuals are related to Sun illumination under specific illumination geometries. The ultimate aim remains twofold: first, to unambiguously conclude on the nature of the residuals, and second, to arrive at a correction model that can be applied to the data. The objective is to introduce this validated model into the operational chain by mid 2015.

The performance issues concerning the ACC instruments are also being thoroughly tackled by industry and scientists. The measurements are systematically affected by temperature variations in the vicinity of the sensor and its electronics. Correction models to convert the measurements into surface force (geophysical) acceleration values are being investigated. Furthermore, ways to limit the ACC temperature excursions based on potential thermal control means are being explored.

On all Electric Field Instruments (EFIs) the TIIs are affected by non-permanent image quality degradation. The cause is thought to originate from contamination of the Micro-Channel Plate and from moisture in the phosphor screen. A proposed remedy consists of 'scrubbing' both elements under high voltages. Such in-orbit burn-in is nearly completed on Charlie, demonstrating its effectiveness: a significant improvement in the image quality of the TII is clearly observed. Alpha and Bravo are currently at the beginning of their scrubbing process. This is therefore very positive and data will be soon made available to the whole user community in order to initiate the full plasma data explanation.

As previously mentioned, the ASM-A (the nomi-

nal unit) on Charlie stopped generating data on 5 November, while the redundant ASM-B unit has been inoperable since commissioning. Several attempts to re-start the instrument under various environmental conditions have failed. ESA and CNES are carefully analysing the situation. In the event that the ASM capability on Charlie is permanently lost, some preliminary tests are showing that the VFM data could be calibrated and monitored using the ASM on the nearby Alpha satellite. First results in doing so are encouraging, even for the computation of high-degree crustal magnetic fields. The main concern for the future of the Swarm mission is therefore to ensure that the remaining ASM capability is retained.

Overall, the mission data calibration and validation efforts are progressing well. It deserves mention that the Cal/Val of a mission with three satellites and seven instruments on each satellite remains a sizeable effort, involving around a hundred people altogether.

Furthermore, it is worth highlighting the enthusiastic uptake of Swarm data products by the ionospheric and auroral physics communities. These are both areas of earth and space physics that have hitherto hardly been addressed by ESA Earth observation activities. A special issue of Geophysical Research Letters (GRL) focusing on initial mission results is under preparation and it will feature a significant number of contributions in this area.

Within the context of the ESA Support To Science Element (STSE), a number of activities related to Swarm are also on-going. First of all, an invitation to tender (ITT) called Swarm+ was released to provide an opportunity to the science community to develop studies beyond the main objectives of Swarm. Secondly, a science meeting with the topic "3D-Earth" took place in Barcelona last autumn. This consultation meeting brought together 35 invited solid-Earth scientists (seismologists, magnetic and gravity field specialists and Earth modellers) to help define the areas of interest for the intended STSE study on "3D-Earth", which will focus initially on the lithosphere and upper mantle.

This update presents the positive status of the mission and the encouraging outlook for the future exploitation of its data. Together with IAGA, we celebrate Swarm's first birthday and wish the

trio of satellites a long and healthy life in the service of science.

Rune Floberghagen, Giuseppe Ottaviani  
ESA

## 6 Reports on Meetings: IAGA-Sponsored or of IAGA interest

### 6.1 6<sup>th</sup> VLF/ELF Remote Sensing of Ionospheres and Magnetospheres Workshop

Dunedin, New Zealand, 20-23 January, 2014

The 6<sup>th</sup> workshop of the URSI/IAGA Joint Working Group on VLF/ELF Remote Sensing of the Ionosphere and Magnetosphere (VERSIM) took place in Dunedin, New Zealand, on 20-23 January 2014. The workshop was organized by the Department of Physics, University of Otago. More details can be found on the workshop website ([http://www.physics.otago.ac.nz/versim/VERSIM\\_workshop\\_Dunedin\\_2014.html](http://www.physics.otago.ac.nz/versim/VERSIM_workshop_Dunedin_2014.html)). The scientific sponsorship and financial support for this workshop was provided by the International Association of Geomagnetism and Aeronomy (IAGA), the Union Radio-Scientifique Internationale (URSI), and the United States Air Force Office of Scientific Research, Asian Office of Aerospace Research and Development (AFOSR/AOARD).



The Scientific Programme Committee consisted of Craig J. Rodger (University of Otago, Dunedin, New Zealand), János Lichtenberger (Eötvös University, Budapest, Hungary), Jacob Bortnik (University of California, Los Angeles, USA), Jyrki Manninen (Sodankylä Geophysical Observatory, Sodankylä, Finland), Yoshiharu Omura (Kyoto University, Kyoto, Japan), David Shklyar (Institute of Space Research, Moscow, Russia), Ondřej Santolík (Institute of Atmospheric Physics

and Charles University, Prague, Czech Republic) and Jean-Pierre Raulin (Mackenzie Presbyterian University, São Paulo, Brazil). The Local Organising Committee consisted of staff from the Physics Department, University of Otago, including Neil R. Thomson, Ian Whittaker, Aaron Hendry, Kathy Cresswell-Moorcock, and Jason Neal. It was chaired by Craig J. Rodger, with János Lichtenberger as a non-local advisory member.

The workshop attracted 35 participants from 14 countries, ranging from New Zealand to Finland (ordered by latitude) including 10 students/early career researchers (aged under 35) from 7 countries. The list of participants and scientific programme can be downloaded from the conference website.

58 abstracts were received. They are listed online in the Abstract and Programme Book on the conference website. The Scientific Programme Committee organised these into 3.5 days of oral sessions consisting of 46 presentations (including 6 invited presentations) and a poster session with 12 posters.

VERSIM workshops are now a strong feature of the VERSIM community, and are well supported by the membership with many very strong presentations. We were particularly excited to have participation of so many colleagues from the United States and India at the 2014 workshop. Our invited speakers covered the following topics: Initial results from the electric and magnetic field instrument suite and integrated science (EMFISIS) on the Van Allen probes (Craig Kletzing, USA), Generation Mechanism of Whistler-Mode Chorus Emissions (Yoshiharu Omura, Japan), Height and sharpness of the ceiling of the Earth-ionosphere waveguide (Neil Thomson, New Zealand), Measurements and implications of the source altitude of terrestrial gamma-ray flashes (Steven Cummer, USA), Energetic electron precipitation from inside and outside of the plasmasphere during space weather events (Mark Clilverd, UK), and The physics of lightning-induced electron precipitation (LEP) (Michael Rycroft, UK). There were a number of cutting edge presentations, including frequent use of observations from NASA's Van Allen probes, the first observations of Transient Luminous Emissions in India, evidence of anti-matter produced in lightning discharges, and a link be-

tween whistler-mode wave electron precipitation and polar surface climate.

IAGA provided support to our meeting. This was primarily used to support the registration and accommodation costs of participants from developing countries. IAGA also allowed the workshops Scientific Programme Committee to nominate a young scientist who contributed the best paper to be put forward for an IAGA Young Scientist Award. After some difficult decision-making Israel Silber of Tel-Aviv University (Israel) was selected, after his presentation "Links between Mesopause Temperatures and Ground Based VLF Narrowband Radio Signals".

Two bids were received to host the next workshop, from the Indian Institute of Geomagnetism putting forward Mumbai and the South African National Space Agency putting forward Hermanus. These colleagues are now preparing additional information on their offers, such that a final decision can be made as to the location and timing of the 7<sup>th</sup> VERSIM Workshop.

Craig J. Rodger  
On behalf of the Scientific Committee

## **6.2 5<sup>th</sup> International High Energy Particle Precipitation in the Atmosphere (HEPPA) Workshop in conjunction with SPARC/SOLARIS-HEPPA**

**Baden-Baden, Germany, May 5–9, 2014**

The 5<sup>th</sup> HEPPA/SOLARIS-2014 workshop was the latest meeting in a series which started in 2008 in Helsinki, Finland, and subsequently took place in Granada, Spain (2011), and in Boulder, Colorado, USA (2009 and 2012). Since 2012, the workshop has been organized in conjunction with the SPARC/SOLARIS-HEPPA community. The theme of the workshop was the mechanisms by which energetic particles and solar irradiance affect the atmosphere and climate. The topics covered were: variability of energetic particle precipitation and solar irradiance; uncertainties in their measurements; observed and modelled impacts of solar forcing on the atmosphere (thermosphere to surface) and climate; and predictions for future scenarios under a weakening sun. One of the scientific highlights was the finding that the impact of energetic particle precipitation on regional North Atlantic climate can be

similar in magnitude to solar irradiance forcing, leading to the conclusion that energetic particle precipitation cannot be ignored any longer in climate modelling. The controversy around solar spectral irradiance measurements cannot be considered solved at the current time. Predictions for climate development under a potential future solar minimum revealed only minor impact on surface temperature that cannot compensate for the temperature increase due to greenhouse gas emissions.

HEPPA/SOLARIS-2014 was attended by 72 participants. During the first three days, the contributions were presented as posters, while the topics were introduced by twelve 30/45-min overview talks given by invited speakers. Topics for the poster sessions were: A) Solar and Particle Variability (4 posters); B) Solar and Particle Effects on the Stratosphere and Above (18 posters); C) Solar and Particle Effects on the Troposphere and Climate (7 posters); D) Atmosphere and Ocean/Atmosphere Coupling (6 posters); E) Tools for Assessing Solar and Particle Influences (new or improved measurements, models, etc) (14 posters). In order to provide enough time for poster presentations and related discussions, 3 hours each day were allocated for the poster sessions. The last two days were dedicated to an overview of on-going international activities and projects, and working meetings of the SPARC/SOLARIS-HEPPA working groups (SolarMIP and HEPPA-II). There was also substantial discussion about future work and the outstanding questions in the field. An upcoming data gap of middle/upper atmosphere observation was identified due to the lack of planned limb sounding missions.

Participants were from 13 countries: 10 from USA, 8 from UK, 8 from Finland, 6 from Sweden, 5 from Norway, 2 from Spain, 3 from Switzerland, 1 from Russia, 1 from Japan, 1 from Georgia, 1 from France, 2 from Greece, and 24 from Germany. In total, 8 young scientists presented their scientific work and were eligible for the IAGA Young Scientist Award. One of the young scientists, Rémi Thiéblemont from GEOMAR, Kiel, Germany, was nominated for the IAGA young scientist award.

The generous sponsoring of the HEPPA/SOLARIS-2014 workshop by IAGA

helped to organize a lively and exciting meeting and brought together the communities of solar irradiance and energetic particle impact on the atmosphere. The next HEPPA/SOLARIS meeting will be held in about two years in Helsinki, Finland, while the SPARC/SOLARIS-HEPPA working group will meet in fall 2015 in Boulder, Colorado, USA.

Gabriele Stiller  
On behalf of the Scientific Committee

### 6.3 8<sup>th</sup> Workshop on Long-Term Changes and Trends in the Atmosphere

Cambridge, United Kingdom, 28-31 July, 2014

The 8<sup>th</sup> International Workshop on “Long-Term Changes and Trends in the Atmosphere” was held in Cambridge, United Kingdom, from 28 to 31 July 2014. The workshop was sponsored by British Antarctic Survey, IAGA, SCOSTEP and the Royal Astronomical Society and was hosted by the British Antarctic Survey at Clare College in central Cambridge. It is the latest in a successful series of workshops that have occurred biennially since 1999 (with one 3-year gap). The workshop focuses on studies that seek to quantify and understand long-term changes occurring at all levels within the coupled atmospheric system from a variety of drivers (e.g. greenhouse gases, solar activity, changes in the Earth’s magnetic field).

We welcomed 49 scientists from Canada, USA, India, Georgia, UK, Germany, Russia, Czech Republic and Finland. This included a number of experts to give tutorials/invited talks and several early career scientists, including scientists from developing nations. 10 scientists were identified as early career.

The full scientific program is online ([http://www.antarctica.ac.uk/about\\_bas/events/trends2014/](http://www.antarctica.ac.uk/about_bas/events/trends2014/)). We received 43 abstracts: 13 solicited as invited or tutorial talks; 23 contributed presentations with seven designated as posters. The workshop was sorted into three sessions: 1. Climate Science Theory and Methodology, 2. Lower and Middle Atmosphere, 3. Thermosphere and Ionosphere. The first of these sessions was introduced to provide new perspectives and drive new thinking within the Trends community. The Abstract

booklet will be provided via the website and a special combined issue of JGR-Space Physics and JGR-Atmospheres is being planned.

Highlights included new analysis by J. Emmert of satellite drag data showing a weaker solar cycle modulation of the observed downward trend in thermospheric densities. Curiously, the latest model simulations presented by S. Solomon show the opposite, with models now predicting larger than observed density decreases during solar minimum. Two presentations featured modeling results under a future scenario with a grand solar minimum. H. Lewis presented simulations where the reduction in thermospheric densities in the absence of a solar cycle led to a dramatic increase in the population of space debris. The increase is accelerated under a scenario where greenhouse gases continue to rise. A. Maycock compared climate model simulations extending to the end of the current century with reductions in solar irradiance that might occur should the Sun enter a prolonged grand solar minimum. While the global mean temperature continues to increase with little difference between the simulations, the North Atlantic region shows statistically significant changes under a reduced solar forcing. Several presentations featured analysis of TIMED-SABER observations (J.-H. Yee, M. Mlynckzak, D. Marsh) which now span 13 years, allowing determination of the response of mesosphere and lower thermosphere temperature and composition response to a combination of forcing from the Sun and greenhouse gas increases. E. Dawkins (who is nominated as the young scientist with the best paper) and J.Plane simulated variability of mesospheric metal layers, revealing that the long-term temperature and composition changes in the background atmosphere lead to metal layer changes that depend strongly on the metal simulated.

IAGA support was used to support the attendance of an early career scientist from a developing nation, covering their registration fee and accommodation costs at Clare College, Cambridge. The remainder of the money was put towards reducing the registration fees of the other early career scientists to widen participation as much as possible. In total IAGA supported attendance for 5 early career scientists and scientists from underdeveloped nations.

The location of the next workshop is still under discussion, but a proposal has been put forward which is being considered.

Andrew J. Kavanagh  
On behalf of the Scientific Committee

## 6.4 40<sup>th</sup> Scientific Assembly of the Committee on Space Research

**Moscow, Russia, 2-10 August, 2014**

The 40<sup>th</sup> Scientific Assembly of the Committee on Space Research was organized in Moscow, Russia from 2<sup>nd</sup> to 10<sup>th</sup> August 2014. The supporting organizations for COSPAR 2014 were the Russian Academy of Sciences, Lomonosov Moscow State University, the Moscow Government, the Ministry of Education and Science of the Russian Federation, the Federal Space Agency, the Skobel'tsyn Institute of Nuclear Physics, the Space Research Institute (IKI), and LSR Group and Dauria Aerospace. The venue for the Assembly was Lomonosov Moscow State University.

According to figures supplied by the entity in charge of processing submissions, 4470 abstracts were submitted by 3563 authors for the 117 events comprising the core Moscow scientific program. A total of 2349 scientists, students, exhibitors, and press participated in the 2014 Assembly. This figure is composed as follows: 2047 full participants, 121 students, 58 exhibitors, and 123 representatives of the press. In addition, 64 participated as accompanying persons.

In addition to the core scientific program of 117 scientific events, a number of special events enlivened the Assembly including eight interdisciplinary scientific lectures, one of which was a presentation of the COSPAR "Roadmap towards Advanced Space Weather Science to Protect Society's Technological Infrastructure" and a 'hot topic' scientific round table on "Exoplanet Exploration and the Future of Space Propulsion." Participants and the public were also invited to attend two general lectures, one on "The role of basic science and space researches in the M.V. Lomonosov Moscow State University" delivered by Academician V.A. Sadovnichii, Rector of Moscow State University, and one on the "Extreme State of Matter on the Earth and in Space"

given by Academician Vladimir E. Fortov, President of Russian Academy of Sciences.

A large number of organizations, including international scientific unions and committees, inter-governmental entities, national space agencies, and private companies, sponsored many of the congress' scientific events or the Assembly scientific program in its entirety. COSPAR gratefully acknowledges the sponsorship of these organizations and in particular the financial support for needy participants provided by many of them, including IAGA.

The program book and abstracts for COSPAR 2014 may be found at <http://www.cospar-assembly.org> under menu options "Scientific Programs" and "Downloads."

*COSPAR Secretariat*

## 6.5 22<sup>nd</sup> EM Induction Workshop

**Weimar, Germany, 24-30 August, 2014**

The main Workshop was held over seven days, from 24<sup>th</sup> – 30<sup>th</sup> August, 2014 in Weimar, Germany. The venue for the meeting was the congress centrum neue weimarhalle, located close to the city center of Weimar.



The city of Weimar in the German state of Thuringia, about two hours southwest of Berlin, is a cultural gem. Home to cultural giants from Goethe to Bach and the founding place of the Bauhaus movement, it boasts in total 13 UNESCO World Heritage buildings as well as several palaces and great gardens.

The main event was attended by 400 people from 43 countries: 232 full delegates, 13 retired, 132 students (total: 377 delegates), and 23 accompanying persons. 301 participants were male, 99

female. The total number of abstracts received was 371. The abstracts were made available to the participants of the workshop via the web site of the conference ([www.emiw2014.de](http://www.emiw2014.de)).

The scientific programme was organized by the Program Committee of the Working Group. The Program Committee consisted of I. Ferguson (Chair, Canada), O. Ritter (Co-chair, Germany), H. Brasse (Germany), M. Miensopust (Germany), N. Palshin (Russian Federation), G. Heinson (Australia), G. EL Qady (Egypt), K. Baba (Japan), Y. Ogawa (Japan), Yuguo Li (China), P. Queralt (Spain), W. Siripunvaraporn (Thailand), A. Pommier (USA), S. Hautot (France), E. Candansayer (Turkey), and M. Bologna (Brazil). Sessions were grouped into six general themes, covering a wide range of EM research:

1. Instrumentation, Sources, and Data Processing (Conveners: Yasuo Ogawa, Heinrich Brasse, Alexey Kuvshinov, Paul Bedrosian)
2. Rock resistivity (Conveners: Oliver Ritter, Ian Ferguson, Jana Börner, Makoto Uyeshima)
3. Theory, Modelling, and Inversion (Conveners: Emin Candansayar, Yuguo Li, Kiyoshi Baba, Weerachai Siripunvaraporn, Max Moorkamp)
4. Exploration and Monitoring (Conveners: Marion Miensopust, Gad El-Qady, Graham Heinson, Katrin Schwalenberg, Phil Wannamaker)
5. Tectonics (Conveners: Pilar Queralt, Sophie Hautot, Mauricio Bologna, Heinrich Brasse, Bulent Tank, Kasturi Naganjaneyulu)
6. Global and Planetary Induction (Conveners: Nick Palshin, Hisayoshi Shimizu)

These general themes were then subdivided into more specific topics.

As for the previous Workshops, the organizers of the 22<sup>nd</sup> EMIW provided significant financial support for a number of participants who wanted to contribute to the Workshop but had insufficient funds to cover travel and participation costs. Not all applicants could be supported as resources were limited. Decisions were made by the Financial Support Committee of the Working Group and priority was given to (i) applicants authoring a presentation (either oral or poster), (ii) students and postdocs/junior scientists since they typically have less access to other sources of funding, (iii) applicants, who have not received funding for one of the previous (three) workshops.

Oliver Ritter  
Chair of the Organizing Committee

## 6.6 5<sup>th</sup> IAGA/ICMA/CAWSES Workshop on Vertical Coupling in the Atmosphere/Ionosphere System

**Antalya, Turkey, August 11-15, 2014**

The 5<sup>th</sup> IAGA/ICMA/CAWSES Workshop on "Vertical Coupling in the Atmosphere/Ionosphere System" was held in the Akdeniz University in Antalya, Turkey, August 11-15, 2014. The meeting was attended by a total of 60 senior and young scientists from 12 countries. During 5 days of the workshop the participants presented 60 papers, of which 11 were solicited presentations. The meeting was open to graduate students from Akdeniz University.

This traditional meeting brought together research experts from both the middle and upper neutral atmosphere and ionosphere communities in order to present their work and assess/debate ongoing issues relating to the theoretical, modelling and observational aspects of all kinds of processes which transfer energy and momentum from the lower atmosphere to the upper atmosphere and ionosphere and vice versa. This workshop solicited papers dealing with experiments, observations, modelling, and data analyses that describe the effects of atmospheric coupling processes within the atmosphere-ionosphere system. The aim of this workshop was not only to address the physics behind the forcing mechanisms that originate in the lower atmosphere and play an important role in the upper atmosphere and ionosphere, but also to show the solutions of some of the problems which were only formulated during the 4<sup>th</sup> IAGA/ICMA/SCOSTEP Workshop held three years ago in Prague, Czech Republic.

The programme focussed on various aspects and topics of neutral dynamics as well as ionospheric electrodynamics and plasma physics. These included mainly:

1. Coupling processes in the middle atmosphere / Coupling through planetary waves, mean flows and temperature variability
  - Gravity wave and tidal forcing of the middle atmosphere
  - The role of dynamics, solar variability and greenhouse gasses on the chemical structure and feedback processes
  - Role of stratospheric warming

## 2. Coupling processes in the atmosphere / ionosphere system

- Dynamical forcing of the ionosphere from below
- Electrodynamic coupling and plasma instabilities; the role of electrical processes in the coupling.

For the first time, atmospheric coupling processes induced by solar activity variations have been included in the focus of the workshop. While four days of the workshop were dedicated to contributions related to wave-induced coupling processes in the atmosphere, the last day of the workshop accommodated presentations primarily focusing on solar physics and variability.

This meeting provided an excellent opportunity for the research communities to interact in a supplementary manner in reviewing and debating the progress to date in the field of the upper atmosphere-ionosphere and come up with suggestions and ideas for further research on the vertical coupling of the atmosphere-ionosphere system. Interaction between scientists from atmospheric, space and solar physics has been found to be very fruitful in terms of initiating further discussions of research and open questions.

Financial contributions to the workshop were made by the following organisations: International Association of Geomagnetism and Aeronomy (IAGA), International Commission on the Middle Atmosphere (ICMA), and Scientific Committee on Solar-Terrestrial Physics (SCOSTEP). These grants together with other financial supports from ICMA and SCOSTEP were used to offer waiving the conference fee of 28 participants, from them 23 participants accepted. Among the supported scientists, there were 9 young scientists and 6 invited speakers.

The participants of the workshop have been invited to submit their research results to the workshop special issue of the *Journal of Atmospheric and Solar-Terrestrial Physics* in Fall 2014. The team of Guest Editors includes: Petra Koucká Knížová (Czech Republic), Katya Georgieva (Bulgaria), Erdal Yigit (USA) and William Ward (Canada).

Dr. Petra Koucká Knížová  
Chair of the Organizing Committee

## 6.7 14<sup>th</sup> Castle Meetings Workshop

Évora, Portugal, 31 August - 6 September, 2014



Between 31<sup>st</sup> of August and 6<sup>th</sup> of September, the biennial Castle Meeting took place for the first time outside the former Czechoslovakia, running this time in Portugal (City of Évora – UNESCO heritage). The meeting maintained the atmosphere and character developed during the last 26 years, promoting the discussion and sharing of actual scientific knowledge in paleomagnetism, archeomagnetism, magnetostratigraphy or environmental magnetism and physical principles of rock magnetism.

This event was attended by a total of 114 participants from 27 countries from all the inhabited continents. 16 of the participants had the status of PhD students. Student presentations were evaluated by a board of 5 experienced researchers, covering all subject fields of the meeting. Posters and oral presentations were evaluated equally. At the official closing ceremony, 5 students got a Certificate of Excellence for outstanding student presentation. They are Michael Volk (Munich, Germany), Monika Kumari (Zurich, Switzerland), Patrick Arneitz (Wien, Austria), Maria Mendakiewicz (Zabrze, Poland) and Elisa Maria Sánchez (Burgos, Spain). Maria Mendakiewicz from the Polish Academy of Sciences (Zabrze, Poland) is nominated for the IAGA Young Student Award for her presentation entitled “Technogenic magnetic particles in soils as an evidence of historical human activity”. The board members emphasized and appreciated that the performance of all the student was at a very high level.

The scientific program consisted of several blocks of oral presentations, each of them consisting of 5-6 talks, and one day of poster session. The ses-

sions were chaired by two chair-persons, one of them being usually a PhD student. 63 talks were given and during the poster sessions, 53 posters were presented. Five invited speakers, Miguel Miranda (Lisbon, Portugal), Pedro Madureira (Évora, Portugal), Julie Carlut (Paris, France), Adrian Muxworthy (London, Great Britain) and Rob Van der Voo (Michigan, USA), presented their works on actual and future key subjects of research. The VI MAGIBER workshop took place during the meeting. This workshop aims to share the expertise within the "paleomagnetic" community of Iberia.

In addition to the scientific program, two half-day tours of the region were undertaken. One of the tours included an excursion to Monsaraz (ancient Portuguese village) and boat trip on the Alqueva Dam. The second tour included a visit to vineyards followed by the final dinner and taste of wines of the Alentejo region at the Rocim winery. In one of the evenings a vocal concert of medieval music was organized under the sponsorship of the Direcção Regional da Cultura do Alentejo at the Salvador Church (Évora).

The two days before the meeting (29 and 30<sup>th</sup> of August), a short course on magnetic susceptibility for PhD students was organised for the first time in the history of these meetings. 17 participants attended the course (mostly young students). The lectures were given by Dr. Ann Hirt (Zurich, Switzerland), Dr. Eduard Petrovsky (Prague, Czech Republic), Dr. Frantisek Hrouda (Brno, Czech Republic) and Dr. Martin Chadima (Brno, Czech Republic). The sponsorship of AGICO Ltd. (Brno, Czech Republic) is highly appreciated.

IAGA financial support was provided to five participants from Greece, Slovakia, Ukraine, Indonesia and Poland. Financial support, provided by the sponsors listed below, is highly appreciated, and contributed significantly to the success of the meeting.

I would like to emphasize the hard work of the colleagues Célia Lee, Ana Sousa, Maria João Ângelo, Ana Lopes, Francisco Almeida and Marta Neres from Instituto Dom Luiz, as well as of Eduard Petrovsky from the Institute of Geophysics ASCR in Prague, Czech Republic. Their contribution was essential to the success of this meeting. It is also important to highlight the collaboration

with local and national Portuguese institutions, namely, the Secretaria de Estado da Cultura (governmental agency for culture). This national agency participated as our partner for the local news release and preparation of social/cultural activities. I stress here the names of Dr. Rafael Alfenim and Dra Ana Paula Amendoeira. Moreover, the collaboration of Elvas, Reguengos de Monsaraz and Évora Municipalities in the organization of social/cultural program has to be acknowledged as well.

The next, 15<sup>th</sup> meeting will be held in 2016 in Belgium. Out of 2 bids (Belgium and Croatia) presented at the meeting, the Belgian proposal got the higher number of votes. We are looking forward the next fruitful and successful meeting.

Pedro Manuel Fernandes Silva  
Chair of the Organizing Committee

## 6.8 XVI<sup>th</sup> IAGA Workshop on Geomagnetic Observatory Instruments, Data Acquisition and Processing

Hyderabad, India, 7-16 October, 2014



The XVI<sup>th</sup> IAGA Workshop on Geomagnetic Observatory Instruments, Data Acquisition and Processing, 2014 was jointly organized by the National Geophysical Research Institute (CSIR-NGRI) and the Indian Institute of Geomagnetism (IIG), Mumbai, India ([http://www.ngri.org.in/iaga13\\_14/](http://www.ngri.org.in/iaga13_14/)). The Workshop was organized at the CSIR-NGRI in Hyderabad during 7-16 October 2014.

The Scientific Session was formally inaugurated by Prof. Harsh Gupta, President IUGG on the morning of 13<sup>th</sup> October, 2014. During this event, at the conclusion of fifty years of the Observatory, the Chief Guest also conducted the ceremonial felicitation of founder members of the Hyderabad Magnetic Observatory.

A total of eighty delegates from thirty-odd countries participated in the Workshop. Additionally there were about twenty invited speakers from India and fifteen dignitaries bringing the total participants to one hundred and fifteen.

During the Measurement Sessions 42 observers used 28 instruments on 7 pillars; 173 observations were made. The AUTODIF was installed on one pillar throughout the duration. Specialised Training Sessions were organised including lectures, demonstrations and practice and were attended by twelve trainees and several observers. For the scientific sessions about 86 abstracts were received, which were translated into 45 oral presentations and 35 poster presentations.

The Scientific Sessions were as follows:

- Golden Jubilee of HYB & Long data series: Adjustments and Shifts
- MAGNIO project - networking the magnetic community in the Northern Indian ocean region
- Observatory Instruments and Techniques
- Observatory Data Acquisition and Processing
- Scientific Applications of Observatory data
- Repeat stations, Results of Measurement sessions, Azimuth Determination
- Magnetic observatories of the future and Observatory networks and IAGA's supporting role.

The highlights of the scientific sessions included the development of new instruments and measurement techniques to arrive at stable baselines. The variety of applications of geomagnetic data right from co-seismic signals, signatures of tsunamis to ionospheric and magnetospheric effects were the other significant highlights. The launch of the new program MAGNIO with an aim to bring the magnetic community of the Northern Indian Ocean region together were the third. A strong suggestion was made to have a page on the division V website where observers could post queries, obtain codes and short articles. There is a clear need to include more structured training during the Workshop where processing and baseline determination could be practiced.

Success of a Workshop depends on participation. To encourage this, grants in various forms were provided to 15 delegates from different countries. The IAGA grant was utilized for registration waiver of two delegates and for travel grants

to two delegates from Sri Lanka and Syria. The Workshop was also supported by the host Institutes NGRI and IIG, and agencies from India like the Ministry of Earth Science (MoES), Department of Science & Technology (DST), Council of Scientific & Industrial Research (CSIR), Indian National Center for Ocean Information Services (INCOIS), and Indian National Science Academy (INSA).

It was declared during the Inaugural function on 13<sup>th</sup> October 2014 that the XVII<sup>th</sup> IAGA Workshop would be held in Dourbes Observatory, Belgium in 2016.

Kusumita Arora  
Chair of the Organizing Committee

## 7 In Memorium

### Edward Irving (1927 – 2014)



Edward "Ted" Irving, noted for his research on paleomagnetism, passed away on 25 February 2014, at the age of 86, in Saanichton, British Columbia, Canada. Ted was born in Colne, Lancashire, where he attended

the Colne Grammar School. In 1945, he was drafted and sent to the Middle East (Palestine). After his return from this service, he attended Cambridge University, from where he graduated in 1951, and became a graduate student of Keith Runcorn.

The Research School of Earth Science at the Australian National University (ANU) was being formed by John Jaeger at that time, and he asked Ted to join him there in conducting research on paleomagnetism. This led to Ted moving to Australia to set up a paleomagnetism laboratory at ANU.

My first meeting with Ted was in 1957 in Newcastle on Tyne, U.K., where I was a student of Runcorn. Ted had arrived there to complete a series of papers on the results obtained from his earlier collaborations with Ken Creer, Runcorn,

and other colleagues at Cambridge. He produced the first polar wandering curves in collaboration with Creer and Runcorn. He was able to demonstrate that magnetic directions could be preserved in red sandstones for long periods of time in his study of the pre-Cambrian Torredonian sandstone of Scotland. Ted had also documented reversals of the Earth's magnetic field. However, in spite of these major breakthroughs, he did not succeed in passing his Ph.D. exam. Later, Edward Bullard asked Ted to submit the book on paleomagnetism that he had written in 1964 for a D.Sc. instead. I spent 1960 working with Ted, when I received a Fulbright grant to study with him in Australia. That was the time when he was writing the first book in English on paleomagnetism. I wrote four papers with Ted, between 1957 and 2000.

Even before the development of the theory of plate tectonics, Ted was interested in crustal mobility. He, along with collaborators at Cambridge, used the new data from paleomagnetism within the framework of the dipole field hypothesis and the statistics developed by Sir Ronald Fisher to support the hypothesis of continental drift. A large part of Ted's career was spent on research on this idea and on investigation of pre-Cambrian polar wander of rocks from the Canadian Shield. Following the plate tectonics revolution, he took up investigation of the magnetic properties of ocean floor basalts. He was always ready to argue about science and was a fierce competitor. After spending a decade at ANU he joined the research branch of the Canadian Geological Survey. Later, he returned to England as a professor of geophysics at Leeds University. However, due to lack of support from the Department of Sponsored Research, he returned to Canada to conduct research on microplate motion along the Pacific border of Canada, at the Pacific Geoscience Center. He had an outstanding research record of 205 papers.

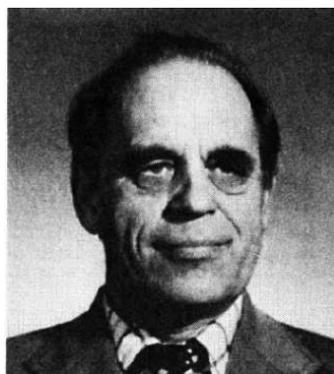
He became a Fellow of the Royal Society of Canada in 1973, and in 1979 a Fellow of the Royal Society of London. In 1998 he became a foreign member of the U.S. National Academy of Sciences. Many awards and medals were bestowed on him, which include the Walter H. Bucher Medal from AGU and the Logan Medal from the Geological Society of Canada in 1979, the Wilson Medal from the Canadian Geophysical Union in

1984, the Alfred Wegener Medal from the European Geosciences Union in 1995, the Day Medal from the Geological Society of America in 1997, and the Wollaston Medal from the Geological Society of London in 2005. The Canadian government honoured him by making him a member of the Order of Canada in 2003.

Ted was an avid gardener and until recently tended a garden covering about 1.3 acres. He had published papers on the distribution of rhododendron across Europe and America. Ted will be dearly missed by his friends and colleagues.

Neil Donald Opdyke  
Department of Geological Sciences, University of Florida,  
Gainesville

### Alexei Khramov (1927 – 2014)



Alexei Khramov was one of the great pioneers of the discipline of paleomagnetism and the father of the science of magnetostratigraphy. He died in St Petersburg on 26 January 2014 at the age of 86. In

1951 he joined VNIGRI, the All-Russia Petroleum Research Exploration Institute of the Ministry of Geology in Leningrad. Geologists were having great difficulty correlating non-fossiliferous oil-bearing strata in Turkmenia and he was able successfully to make these correlations using magnetic reversal stratigraphy. This was the first application of magnetostratigraphy anywhere. After this success paleomagnetism became established under Khramov at VNIGRI and he became the founder of the Russian school of paleomagnetism. By 1956 Khramov had obtained the general picture that Late Carboniferous and Permian data consisted virtually exclusively of reversely magnetized rocks – the late Paleozoic Reversed Superchron of today.

In 1958 he wrote the first book (in Russian) that was exclusively on the subject of paleomagnetism and its applications in geology. Arrangements were made by Ted Irving in Australia to have Khramov's book translated into English as *Paleomagnetism and Stratigraphic Correlation*. This is

one of the great classics of geophysics and showed Khramov to be well ahead of his western counterparts. He was the first to suggest the possibility of a strict correlation of volcanic and sedimentary rocks and the creation of a single geochronological paleomagnetic time scale for the whole Earth. The vast body of field data on which Khramov's conclusions were based clearly influenced the early work on polarity time scales of Cox, Doell and Dalrymple in the United States and McDougall and Tarling in Australia in the early 1960s.

In 1967 Khramov was already publishing his third book entitled *Paleomagnetism: Principles, Methods and Geological Applications*. This was soon after the first book in English on paleomagnetism was published by Ted Irving in 1964. His fifth book *Paleomagnetology* was published and translated into English in 1987. His final book *Magnetostratigraphy and its Significance in Geology* was published in 1997.

Khramov had already identified himself as an outspoken member of the very small community of Soviet proponents of continental drift based on paleomagnetic data (in his first book of 1958). Because Soviet scientists were having trouble publishing papers on paleomagnetism in Soviet journals, his colleagues throughout the Soviet Union asked him to prepare regular summary catalogues of paleomagnetic data and to act as overall compiler, editor and referee of all data produced in the Soviet Union. All data would thus be 'published' in these catalogues under Khramov's expert guidance and leadership. Thus Soviet paleomagnetism had its standards raised to the ones he imposed through his catalogues. By 2000 Khramov had effectively supervised and refereed about one third of the entire global data set in paleomagnetism. He was the first to realise the significance of data from Europe and Asia showing the Ural Mountains represented the site of a collision between these former separated continents and that Asia itself was made up of numerous accreted blocks resulting from plate tectonics. The importance of paleomagnetism to geology was finally recognised in 1989 when his group was upgraded into the Department of Paleomagnetism and Past Reconstructions.

Alexei Khramov published more than 300 scientific papers and his work has been widely recognized with the award of the Bucher Medal by

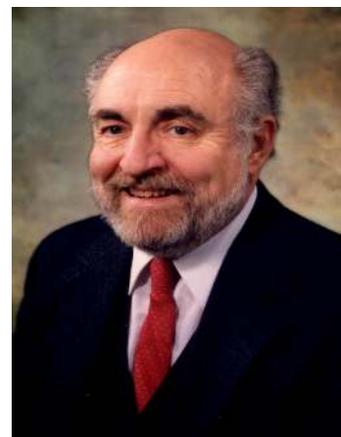
the American Geophysical Union in 1993 and the joint award with Ted Irving of the Alfred Wegener Medal by the European Geosciences Union in 1995. He was a Member of the Russian Academy of Natural Sciences. In 2000 he was given the Russian Federation National Award in Science and Engineering and became an Honored Scientist of the Russian Federation in 2006.

Always smiling and willing to assist colleagues, he was one of the great geophysicists of the 20<sup>th</sup> century.

Michael W. McElhinny  
Port Macquarie NSW, Australia

### **Robert D. Hunsucker (1930 – 2014)**

Robert D. Hunsucker passed away peacefully on 9 January 2014 with family in Minnesota. He was 83 and was preceded in death by his first wife Judith. An authority on radio propagation, radio sensing of the ionosphere, and the effects of atmospheric gravity waves (AGWs) on the ionosphere, he authored over 150 research papers, a text on radio remote sensing, and coauthored a text on the high-latitude ionosphere. He served as associate editor for the journal *Radio Science* from 1992-1994 and was Editor-in-Chief from 1995-2002.



Robert became fascinated with radio at an early age, becoming a licensed radio amateur in high school. He obtained degrees in Electrical Engineering and Physics from Oregon State, and spent time in the US Navy and Naval Reserve, where he experienced radio operations at a variety of latitudes throughout the Pacific. He joined the Geophysical Institute in Fairbanks, Alaska in 1958 as a Research Associate studying high-latitude propagation and worked with luminaries in the field such as Sydney Chapman. While working with groups pioneering new observational techniques in Alaska, Robert became particularly interested in high-latitude space weather effects on radio propagation.

In 1964, he joined the Central Radio Propagation Laboratory in Boulder, CO and earned his Ph.D. at the University of Colorado in 1969, and was involved in backscatter research and early investigations of over-the-horizon (OTH) radar.

Robert returned to the University of Alaska and Geophysical Institute in 1971, where he pursued a variety of radio propagation and ionospheric research projects, often flying his own small plane to remote arctic field sites. He was instrumental in the establishment and success of the Chatanika incoherent scatter radar, which provided important comparative measurements with sounding rocket flights from the nearby Poker Flat Research Range. He continued using the radar after it was moved to Greenland, where it was part of the Worldwide Atmospheric Gravity wave Study (WAGS) in the mid-1980s that he coordinated; he authored an invited paper on the sources of gravity waves for *Nature* in 1987. He organized six international conferences through the Geophysical Institute and the Naval Postgraduate School, including NATO AGARD conferences on radio propagation.

After retiring from the University of Alaska in 1988, Robert remained active in AGW and radio propagation research, and was elected a Fellow of the IEEE and of the AAAS. He relocated to Klamath Falls, OR in 1995. At the time of his death, he was assisting with a detailed analysis of archived ionograms from the 1950s.

In addition to his devotion to ionospheric research, his many students and colleagues will remember Robert as a man of faith and humor, often inserting quips from Walt Kelly's *Pogo* into his informal talks. His love for radio, space weather, and the far north never diminished, and he wrote numerous articles on these subjects for popular magazines and newsletters, remarking that even after decades of work in the field, "radio is still magic." He is survived by his wife Phyllis, daughters Edith, Jeanne, and Cynthia, fourteen grandchildren, and six great-grandchildren. Robert was buried with military honors at Willamette National Cemetery in Portland Oregon on February 14, 2014, followed by a memorial gathering at Hinson Baptist Church.

Donald D. Rice  
Space Environment Corporation  
221 N Gateway Drive, Suite A  
Providence Utah 84332

## Louis A. Frank (1939 – 2014)

Dr. Louis A. Frank, Professor Emeritus of Physics & Astronomy from the University of Iowa died on May 16, 2014. He was born in Chicago, IL and graduated from high school in Fort Madison, Iowa. He enjoyed nurturing trees and wildlife as well as automobiles. His passion in life was science.

Dr. Frank was a Professor of Physics at The University of Iowa, where he had been a member of the faculty since 1964. His first professional research activities occurred in 1958 when he assisted Professor Van Allen in the calibration of the first U. S. lunar probes, Pioneers 3 and 4, as an undergraduate student. Since then he had been an experimenter, co-investigator, or principal investigator for instruments on forty-two spacecrafts. Dr. Frank was the principal investigator for the auroral imaging instruments for the



Dynamics Explorer Mission, the plasma instrumentation for the Galileo Mission to Jupiter, the U. S. plasma instrumentation for the Japanese Geotail spacecraft, and the camera for visible wavelengths for the Polar spacecraft of the International Solar Terrestrial Physics (ISTP) Program. His publications encompassed such topics as the first direct measurements of the terrestrial ring current and of the polar cusp, the current systems in Earth's magnetotail, the plasma tori at Jupiter and at Saturn, and global imaging of Earth's auroral zones and atmosphere. His research interests were directed toward magnetospheric plasmas in the vicinity of Earth, wave-plasma instabilities, active experiments in the ionosphere, interpretation of auroral images in terms of global convection and current systems, the Jovian magnetosphere and its relationship with the Galilean satellites, computed tomography, geocoronal hydrogen, comets, and optics. He served on various NASA and NAS/NRC committees and as a Fellow of the American Physical Society, a member of

the American Astronomical Society, American Association for the Advancement of Science and the International Academy of Astronautics. He was a Fellow of the American Geophysical Union and a recipient of the National Space Act Award.

The above obituary is taken from the memorial services website at: <http://hosting-3320.tributes.com/obituary/show/Louis-A.-Frank-101356914>

## Johannes Kultima



Upon arrival at Tähtelä, Sodankylä, as a novice student of natural sciences I could not see what kind of father figure I met when I very first time shook hands with Johannes Kultima at the observatory. I was advised beforehand that I

might also find Uula in him, a colourful and original person.

Actually Uula always took newly arriving young scientists under his wings and taught them that you can't compromise on the quality of scientific work: observations need to be properly prepared and carefully executed because every observation of nature is unique. He was a true Observer of the Stars: an astronomer by education, who honed, with his own hands, the 1-meter telescope lens at Tuorla observatory, Turku. After he came to Sodankylä he carried out with great care the observation of Earth's polar motion during every cloudless night using a zenith telescope. He missed only two clear nights during 15 years of observations.

After satellites began to measure Earth's precise motion, Uula was responsible for geomagnetic observations, which he continued with the same strict attitude to scientific precision. Even the frames of spectacles need to be selected carefully for observations. Magnetic field observations are still done in iron-free buildings. Once someone passed the geomagnetic observatory close-by on skies, and on the next day Uula diplomatically brought up the magnetic properties of the ski bindings and effects on the observations. He

had linked the disturbance in the observations to tracks left by the skis at the magnetic observatory.

Basic geomagnetic observatory data, by themselves, rarely bring out new scientific results and publications, but they offer high-quality, validated observations for the global scientific community. Uula's observations are unique measurements of nature at the time, and as such they stand as invaluable material for researchers.

Uula was a team spirit builder. Without him, we would not go to pick berries in autumn, have a play about the history of science or have a snow football game. He liked pupils and had a talent to awaken the curiosity of children about phenomena of nature. He arranged for observatory scientists to tour the schools of Lapland and tell facts about the northern lights and space research. He also came up with the idea of courses on these topics to be taught at the local upper secondary school. Uula was very interested in history and wrote popular articles, among others, about the stories of the Sami night sky and Star of Bethlehem.

Often Uula solved practical problems with finesse – and humour. Without him many things would have remained unresolved, like transport across 40 km of wilderness to the remote cabin of Porojärvi for a couple of weeks of scientific measurements. There, in the middle of nowhere, far from other people, he took care of matters in his own, unique calmness, and we couldn't have been there without him. During those measurement campaigns we learnt that when Uula sleeps, all is well!

Even after retirement he still proofed texts, digitised his old polar motion observations and visited kindergartens to tell about space. After having taught the art of magnetic measurements to the next generation, he loved to join measurement trips to the various magnetometer stations just to lend a hand even until October 2014.

Now Uula is sleeping. We are not quite sure if all is well. The Observer of the Stars left for his last journey unexpectedly, and too soon. We will continue his work reminiscing his teachings, which remain as fond and vivid memories.

Thank you, Uula

Esa Turunen and the Staff of  
Sodankylä Geophysical Observatory

## Igor Tunyi (1939 – 2014)

On 9 December 2014, in the age of 65, our Slovak colleague Igor Tunyi passed away after a long and severe illness. He graduated from the Faculty of Mathematics and Physics, Charles University in Prague in 1973. From August 1973 he worked in various positions and



functions at the Geophysical Institute of Slovak Academy of Sciences in Bratislava, being its director from 1997 to 2005. An exception was only a short period in the years 1980-84, when he was a leading specialist for geophysics and exploration of oil and gas at the Slovak Geological Institute in Bratislava. Between 2005 and 2011 he was a member of the Presidium of the Slovak Academy of Sciences. Although he never had ambitions to become a leading expert, his research was rather variable, covering geomagnetic field, paleomagnetism of the Western Carpathians, magnetic properties of Antarctic meteorites and rocks, archeomagnetic research of archaeological artefacts, research based on historical mining maps. He was also involved in magnetics for military and civil aviation, and dealt with the study of precursors of ground movement and modelling the magnetic field pulsations. Igor co-authored more than 30 scientific paper in impacted journals, many of them in collaboration with colleagues from the neighbouring countries (e.g., E. Marton from Hungary, J. Grabowski and M. Jelenska from Poland). He definitely contributed to geomagnetic research in Slovakia, as also evinced by 6 chapters in Slovak books and a Slovak monograph. Igor was always ready to help his colleagues in Slovakia and neighbouring countries with research. Last but not least, we lost a very nice friend and hospitable organizer of international meetings, who hosted 6 out of 14 Castle Meetings on Paleo, Rock and Environmental Magnetism.

Eduard Petrovský  
Institute of Geophysics ASCR

## 8 General information about IAGA

### 8.1 IAGA books series published by Springer

One of the most important achievements of IAGA during the last years was to publish, with Springer, a series of five books, representing results obtained by the IAGA five Divisions over recent years.

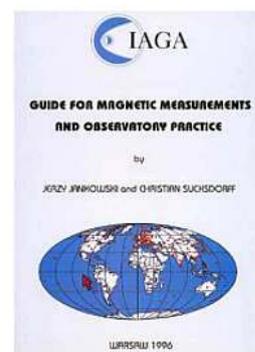


IAGA has published four practical guides to observation. These may be ordered from the Secretary-General and they are also available at the IAGA web site.

#### IAGA Guide for Magnetic Measurements and Observatory Practice

by J. Jankowski and C. Sucksdorff, 1996, 232 pages, ISBN: 0-9650686-2-5; Price: USD 50.

This Guide provides comprehensive information about how to organize and run a magnetic observatory and make magnetic measurements.

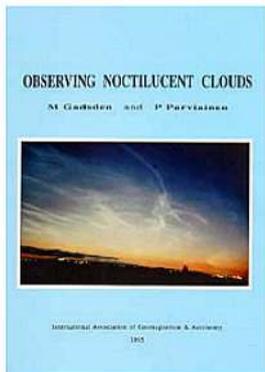


The main topics are:

- A brief description of the magnetic field of the Earth
- Selection of observatory sites and layout
- Magnetometers
- Absolute magnetic measurements
- Recording of magnetic variations
- Data processing

- Testing and calibrating instruments

### IAGA Guide for Magnetic Repeat Station Survey



by L.R. Newitt, C.E. Barton, and J. Bitterly, 1997, 120 pages, ISBN: 0-9650686-1-7; Price: USD 25.

This Guide provides a comprehensive description of the theoretical basis, operational details, and instrumentation for making magnetic repeat station

survey measurements.

This manual and instruction book was written by a group of active researchers, both professional and amateur. There are chapters giving practical advice for taking visual observations, photographing the clouds with film or with video equipment. A summary of observations from space is included, as well as comments on the connection between noctilucent clouds, seen from the ground, and the polar mesospheric clouds that so far have been measured only from orbit. Noctilucent clouds are seen in the summer months, shining in the poleward sky at night-time. Measurements show that the clouds are higher than any others. Lying at a height of 80-85 kilometres,

the clouds mark a boundary between meteorology and space physics. This book is beautifully illustrated with photographs, and will help everyone recognize and appreciate these “sailors in the summer night”.

This guide is out of print but it is available at the web site using the link [ONC](#). (Prices do not include shipping and handling.)

### 8.2 IAGA website

Information on IAGA can be found at: <http://www.iugg.org/IAGA>

### 8.3 IAGA contact

The Secretary-General is the main point of contact for all matters concerning IAGA:

**Mioara Manda**

CNES

Direction de la Stratégie et des Programmes  
2, Place Maurice Quentin  
75039 Paris Cedex 01  
France

email: [iaga\\_sg@gfz-potsdam.de](mailto:iaga_sg@gfz-potsdam.de)

#### Imprint

Executive Editor: M. Manda (CNES)

Layout by L<sup>A</sup>T<sub>E</sub>X & A. Jordan (GFZ German Research Centre for Geosciences)