

**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 the annual IAGA Newsletter as usual contains information about the preparation for the next assembly, reports on Division, Commission and further IAGA activities, workshops and meetings and some general information about IAGA. However, we all know that nothing has been as usual this year, after the COVID-19

pandemic started. Whole countries more or less came to a standstill, borders were closed, international travel became largely impossible. Scientific interaction by conferences and personal meetings had to be cancelled. This affected several IAGA-sponsored Workshops, and you can read in section 5 which ones were cancelled, postponed or turned into virtual events. For a long time we tried to stay optimistic that the Joint IAGA-IASPEI Assembly planned for August 2021 in Hyderabad, India, could be held as a normal personal meeting, but eventually we had to realize that this seems highly unlikely. After several discussions among the two associations and the local organisers we decided to hold the assembly as a fully virtual meeting on the planned dates. Although it will not be the same experience as personal interaction, let's see it as an opportunity to reduce carbon footprint and to more readily include researchers who might not be able to attend a personal meeting. Read more about the current state of preparations for the 2021 Joint IAGA-IASPEI Assembly in section 2. On the positive side, our Divisions, Commissions and Working Groups have been active despite the adverse circumstances. Two new working groups formed within IAGA Division III, one of them joint with Division II. Some of our early career scientists are actively engaging in social media activities to keep IAGA attractive for the next generations of scientists, and we were approached by the International Association of Physics Students (IAPS) for collaboration. You will find more information on Division and other IAGA activities in sections 4 and 6. This issue of IAGA News also contains information about deceased scientists from our fields (section 9). The reader is also referred to the [IAGA website](#)<sup>1</sup> for more on IAGA and for updates between the annual Newsletters.

I sincerely hope this Newsletter finds you all in good health and you can maintain a positive scientific spirit despite the

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difficult global situation. I hope to see many of you virtually at the 2021 Joint IAGA-IASPEI Assembly and as soon as the pandemic is over in person at one or the other IAGA workshop or meeting.

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

Monika Korte  
Secretary-General

## 1 Message from the President

I sincerely hope that this message finds you and your loved ones in good health. We are in the midst of a global health crisis, the coronavirus pandemic, which has impacted us all. I truly hope that you are remaining safe and taking all necessary precautions.



We often say “a geomagnetic field varies in space and time”. These two properties – space and time – are fundamentals of our own existence, and have been dramatically affected. Consider our experiences of space: our mobility has become severely restricted – reduced to jogging or walking one to a few kilometers around our homes. Perhaps less obviously, the lockdown has also affected our experiences of time – the most important feature being a feeling of being stuck in the present, combined with the inability to plan ahead. We currently don’t know when we can see our loved ones again, or when we can go on holiday, or when we as geoscientists can meet. More severely, many of us don’t know when we will go back to work. In the midst of this crisis, it is hard to imagine a future that looks different from the present.

“Corona time” in fact consists of many different times, such as the “time of lockdown”, “quarantine time”, and “home office time”. We have learned to inhabit these new times, even in our community. We know that the IAGA activities cover a wide scope of topics and methodologies, including – notably – field measurements and laboratory studies. Data collection, data analysis, as well as education and outreach activities rely also on fieldwork and laboratory access. Moreover, our role as professors and supervisors for PhDs or post-docs has had to adapt rapidly

to this changing environment. In particular, we have had to consider options for preserving the lines of communication with our students in the absence of face-to-face teaching, and to seek out effective online equivalents.

The IAGA Executive Committee has had “virtual” meetings to discuss the way forward for our association. The Executive Committee members have realized that we need to anticipate disruptions to travel and hereafter to face-to-face meetings, conferences, and workshops – at least for the foreseeable future. Some meetings have been postponed, and others moved to the virtual world. However, I do feel that full virtual meetings cannot offer the same exchange, experience, and opportunities. Participation in science is a motivation to attend a conference, but we must admit that it is not the only reason to attend. The ability to travel physically to a different location, to reunite with friends and colleagues, and to make new contacts is equally significant for many of us. Even more importantly, early-career researchers need to build their own networks via these in-person meetings, to interact with and receive feedback from more experienced scientists – and also to enjoy the atmosphere that a meeting can provide, away from their office and home country. I know that virtual meetings have not yet come close to overturning the traditional conference formats, so I hope to see our early-career researchers and discuss these issues, and many others, together during the next IAGA conferences. In 2021, we shall organize the Joint Scientific Assembly 2021 of two Associations: the International Union of Geodesy and Geophysics: IAGA and IASPEI (the International Association of Seismology and Physics of the Earth’s Interior), which is to be “hosted” by the CSIR National Geophysical Research Institute (CSIR-NGRI) in Hyderabad, India. This meeting serves many roles beyond the science that is presented in lectures and poster sessions. The administrative business of our association is conducted there: it serves as the site of our decision-making and – more importantly – as a place to connect people from around the world in person. Unfortunately, the latter attribute is exactly what we are now required to avoid at all costs, and we need to consider this very seriously. I fervently hope that by the time the IAGA-IASPEI meeting comes upon us, the era of COVID will have passed. The meeting organizers had needed, nevertheless, to consider all possible options, and finally the meeting will be in a virtual setup. Though we may not know precisely when we can gather again physically, we should try to take heart in the knowledge that that day shall inevitably arrive. In the meantime, I hope that all of our members stay safe and healthy – that they continue to adapt to our increasingly online world, but also find the time to enjoy “undigitized” life.

Mioara Mandea  
President

## 2 Preparation for the IAGA-IASPEI Joint Assembly 2021, Hyderabad, India

The preparations for the IAGA-IASPEI Joint Assembly, to be held from August 22 - 27, 2021 in Hyderabad, India were in full swing when the COVID-19 pandemic hit the world. IAGA and IASPEI Secretary Generals Monika Korte and Johannes Schweitzer had just visited the hosts and local organisers (LOC) of CSIR-NGRI from February 4 - 6, 2020. We inspected the modern conference centre and several of the foreseen hotels and accommodation options in the vicinity and found them all to be of very good international standard. We experienced the new, excellent metro line and discussed the plans of the LOC for shuttle bus transportation. Last but not least we identified beautiful locations for the associations dinners. Not long after we returned from India with very positive impressions about the preparations for the Joint Assembly the first wave of the pandemic struck. Over the past months we kept up the hope for as long as possible to be able to conduct a normal meeting in summer 2021. When requirements to finalize contracts forced us to take a decision in November it unfortunately was clear that a large meeting with strong international attendance still seemed unlikely for August 2021. After several online meetings and many discussions within and among the two executive committees and the LOC the decision was taken to

hold the meeting in fully virtual form on the originally foreseen dates. In foresight the LOC had already started to explore the options. Organising a virtual meeting is a new experience and a learning process for all of us. We are trying to learn from other meetings and we will all do our best to create an event to foster scientific exchange and networking as close as possible to a personal meeting.

The second circular about the joint assembly, which includes the list of proposed sessions, has been published a few weeks ago. In my opinion the IAGA and IASPEI communities managed to suggest an attractive program. I thank all conveners for their efforts so far. I hope many of you will take the opportunity to present their work and get updated on the latest results of others even though it has to be without direct personal interaction this time. Please visit the [assembly website](#)<sup>2</sup>, where you can find both circulars and updates on the preparations for the IAGA-IASPEI Joint Assembly. Full session descriptions will be published there soon, and the abstract submission will open early next year.

Monika Korte  
Secretary-General

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## 3 Preparation for the 5<sup>th</sup> IAGA School

The 5<sup>th</sup> IAGA School is planned for August 16-20, 2021, just before the IAGA-IASPEI Joint Assembly. The School was normally planned to take place in Hyderabad, India, but due to the pandemic situation it also will be fully virtual this time. Lecturers for the IAGA School were recruited through recommendations of the division chairs. We thank the six lecturers who already agreed on serving at the IAGA school.

The application for the IAGA School participants has closed as usual by the end of Oktober 2020. We have received more than 50 applications from all over the world. The virtual format would al-

low for a larger participation than the 20 that IAGA usually sponsored for personal attendance. However, we still consider the aspect of the students getting to know each other an important aspect of the IAGA School so that we still limit the number of participants. However, we consider making recordings of the lectures temporarily available to all (PhD) students participating in the IAGA-IASPEI Joint Assembly. The selection process is finished and the selected participants will be informed by the end of the year.

Barbara Leichter, ICEO Chair  
Monika Korte, Secretary-General

## 4 Division Activities

Here we report on some of the Division and Commission activities.

### 4.1 Division I

Division I activities this year mostly focused to prepare the sessions for IAGA-IASPEI 2021 in Hyderabad.

One conference of interest to the community was affected by the pandemic, and this is the 17<sup>th</sup> Symposium of SEDI, the Study of Earth's Deep Interior, a Committee of IUGG. It was planned to be held in Taipei, Taiwan. The scientific questions and problems of interest to SEDI include the geomagnetic dynamo and secular variation, paleomagnetism and the evolution of the Earth's deep interior, composition, structure and dynamics of the outer core, dynamo energetics, structure of the inner core, core cooling and the core-mantle boundary region, core-mantle boundary shape, coupling and the rotation of the Earth, lower mantle: structure, convection and plumes, nature and location of deep geochemical reservoirs, etc.. The meeting has been postponed to 2022. Nevertheless, a SEDI2020 online streaming platform held from October 1<sup>st</sup> to 31<sup>st</sup> and shared latest results in Deep Earth science.

Jan Simkanin  
Division I Chair

### 4.2 Division II

There was significant reduction in activities in 2020. Most of the numerous workshops that had been planned for 2020 were affected by the pandemic, as reported in section 5. As other activity, the Joint Division II/Division III Working Group GeDAWG on Geospace Data Assimilation was established in 2020. Chair/co-Chair are Larry Kepko, NASA Goddard Space Flight Center, USA, and Claudia Borries, German Aerospace Center, Germany.

Christoph Jacobi  
Division II Chair

### 4.3 Division III

In Division III, two new working groups were (re-) established this year. One of them, the Geospace

Data Assimilation Working Group GeDAWG, is joint with Division II, see above. The other one is the WG on ULF waves, chaired by Jayashree Bulusu, CSIR National Geophysical Research Institute, India, and Peter Chi, University of California Los Angeles, USA.

### 4.4 Division IV

Division IV activities this year mostly focused on the preparation of sessions for IAGA-IASPEI 2021 in Hyderabad.

### 4.5 Division V

A major task of Division V is the derivation of the International Geomagnetic Reference Field.

The International Geomagnetic Reference Field (IGRF) is a numerical model specifying the large-scale internal time-varying portion of the Earth's magnetic field on or above the planet's surface. It is updated every five years by an international team of research scientists under the auspices of the International Association of Geomagnetism and Aeronomy (IAGA) Working Group V-MOD. The IGRF is produced from observations collected by satellites, ground magnetic observatories, and dedicated magnetic surveys, and spans 1900 to the present. It is widely used by researchers in studies of space weather, electric current flow in Earth's upper atmosphere, and local magnetic anomalies beneath the planet's surface. It is also used by commercial organizations and private individuals as a means to provide orientation information (for example in satellite attitude determination or solar panel orientation).

Fifteen international teams provided candidate models for the 13<sup>th</sup> generation of IGRF (IGRF-13). These candidate models were evaluated by an international task force of geomagnetic field modeling experts, who combined the candidates into the final IGRF-13, which was released publicly in December 2019. A forthcoming special issue in *Earth, Planets, Space* will contain research articles on (1) the individual candi-

date models, (2) the evaluation procedures used to construct the final IGRF-13, and (3) a summary of [IGRF-13 and the final set of model coefficients](#)<sup>3</sup>.

Patrick Alken  
IGRF-13 Task Force Chair  
IAGA V-MOD Working Group Chair

## 4.6 Division VI

The Division Committee (DC) had a virtual meeting on the 12<sup>th</sup> of December. It was split up in two meetings to better accommodate the different time zones. The meeting was well attended and once the minutes are ready, they will be made available through the EMIW web page. The 25<sup>th</sup> EM Induction Workshop in Turkey was postponed from 2020 to 2022 due to the Covid-19 pandemic. The subsequent EM Induction Workshop in Japan is now postponed to 2024. This has had some immediate consequences on the terms of DC members, chair and co-chair, as the handover will be at the next workshop. The terms of the DC members that originally would have been replaced at the 25<sup>th</sup> EM Induction Workshop were also extended so that the elections can run during our next meeting in 2022. Finally, the full membership requirement to attend one of the last three business meetings at the EMIW or IAGA/IUGG assemblies have also been extended from an 8-year to a 10-year time frame to accommodate these circumstances.

Before the pandemic started, Division VI had elected a new DC member from the region of North America. Two positions are still vacant according to a balanced regional representation: Europe (without Germany, Poland, Russia, and Spain) and Asia (without China, India, and Japan). The countries in brackets are excluded according to the bylaws of Division VI, which do not allow two voting DC members from the same country.

Anna Kelbert  
Div. VI EC liaison person

## 4.7 Interdivisional Commission on History

### Digitization of magnetic satellite data

The Geophysical Center of the Russian Academy of Sciences performed a digitization of the IZMIRAN catalogues containing historical data of magnetic satellite missions Kosmos-49 (1964) and Kosmos-321 (1970). Totally 17300 measured values are available for Kosmos-49 mission, covering homogeneously 75 % of the Earth's surface between 49° north and south latitude. About 5000 measured values are available for Kosmos-321 mission, covering homogeneously 94 % of the Earth's surface between 71° north and south latitude. The mission of Kosmos-26 and Kosmos-49 confirmed the possibility of using Earth's magnetic field data for determination of spacecraft orientation. The obtained geomagnetic data justified the evidence of propagation of magnetic anomalies, associated with the structure and tectonics of the Earth's crust, to the heights of low-orbiting satellites. In 2020, these results were presented to the scientific community in the ESSD data paper "[Early Soviet satellite magnetic field measurements in the years 1964 and 1970](#)" by [Krasnoperov R.](#), [Peregoudov D.](#), [Lukianova R.](#), [Soloviev A.](#), [Dzeboev B.](#)<sup>4</sup>. The value of the presented data is emphasized by the fact that older and publicly available global satellite data on the Earth's magnetic field in digital form for that period are rare and hard to acquire.

### Digitization of K indices from 41 geomagnetic observatories

The K index is one of the oldest universal indices of geomagnetic activity that is still being widely used. The multidecadal practice of its application makes it an indispensable source of information for retrospective and historical analysis of solar-terrestrial interaction for nearly eight Solar cycles. Most significantly, while studying the historical geomagnetic data, K index datasheets are in most cases more convenient for automated analysis than the analogue magnetograms. The World Data Center for Solar-Terrestrial Physics (Moscow, Russia) collected and digitized the results of the K index determination at 41 geomagnetic observatories of the former USSR for the pe-

riod from July 1957 to early 1990s. This unique historical data collection is valuable for retrospective analysis and studying geomagnetic events in the past as well as for data validation or forecasting. This data collection is now available from the [PANGEA data archive](#)<sup>5</sup>.

#### **“Preservation of Old Data” project**

In 2020, the World Data Centers for Solid Earth Physics and Solar-Terrestrial Physics (Moscow, Russia) continued the work on the “Preservation of Old Data” project, aimed at digitizing analog data from observatories into electronic documents by in-line scanning. The data of the 8 ionospheric stations (43,500 documents) were transferred to a digital form. This includes the results of a vertical sounding of the ionosphere (tables and graphs of hourly mean values of the ionospheric parameters), measurements of absorption, ionospheric winds, atmospheric radio noise, parameters of electronic density of the ionosphere. Digital documents have been verified and edited. For the data in PDF format, the catalog and metadata have been compiled, a data archive has been formed and published on the [website of the WDC in Russia and Ukraine](#)<sup>6</sup>. The data archive for the hourly average values of the elements of the geomagnetic field, recorded by the former USSR observatories from 1957 to the beginning of the 90s, that had been previously fully scanned and translated into PDF files, has undergone verification process and editing. In 2020, 82 annual datasets of 4 observatories were checked, edited and added to the archive. Currently the time tables of the 26 observatories containing hourly average values of the elements of the geomagnetic field are ready and located in the [WDC archive](#)<sup>7</sup>.

#### **Review of the International Geophysical Year 1957**

A thorough insight into the International Geophysical Year (IGY) project from a 60-year later

perspective has been depicted by Y. Lyubovtseva, A. Gvishiani, A. Soloviev et al. in “[Sixtieth anniversary of the International Geophysical Year \(1957–2017\) - contribution of the Soviet Union](#)” published in the [History of Geo- and Space Sciences journal](#)<sup>8</sup>. The IGY was the most significant international scientific event in geophysical sciences in the history of mankind. This was the largest international experiment that brought together about 300 000 scientists from 67 countries. Well-planned activity of national and international committees was organized for the first time.

Anatoly Soloviev  
ICH Commission Chair

#### **4.8 Interdivisional Commission on Education and Outreach**

A large part of the work of the ICEO was dedicated to the preparation of the 5<sup>th</sup> IAGA School, see section 3 above.

In addition, ICEO, mainly the two co-chairs Jayashree Bulusu and Carlo Laj, are organizing a GIFT Workshop (WS): Geoscience Information for Teachers (GIFT). It has the title ‘Understanding the Changing Earth’ and will be held from 19-21 August 2021, also just before the IAGA-IASPEI Joint Assembly. We have produced a fleyer for advertising the GIFT WS which can be found at the [conference website](#)<sup>9</sup>.

For a better visibility of IAGA, ICEO has been expanding their outreach and education by the formation of social media accounts on Twitter, Instagram and Facebook (see also section 10.6). The team, headed by Tereza Kamenikova and Hannah Rogers, is very active and therefore we established a new Working group within ICEO named “Social Media”.

Barbara Leichter  
ICEO Commission Chair

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

### 9<sup>th</sup> VERSIM

The 9<sup>th</sup> VLF/ELF Remote Sensing of Ionospheres and Magnetospheres Workshop (VERSIM 2020) was held successfully as a virtual meeting during the week of 16 – 20 November 2020, which had been rescheduled from the original meeting (23 – 27 March 2020 in Uji Campus, Kyoto University, Japan) cancelled due to the COVID-19 pandemic. We had 59 invited oral papers and 83 poster papers presented during 10 sessions consisting of morning sessions (9 - 12 am JST) and evening sessions (9 - 12 pm JST) with 174 registered participants from 20 countries. Oral papers were presented with the Zoom system, and all participants could ask questions directly or through the Chat function. In each talk presented through the Zoom system, a timer appeared showing that “0:00 - 18:00 for talk and 18:00 - 21:00 for QA”, and the speaker’s video was highlighted next to the shared Power Point. Poster papers were presented in the two parallel sessions of Zoom and Poster Gallery on the conference website, and free discussion in a virtual poster room of the SpatialChat system. In each Zoom poster session a series of speeches consisting of short oral presentations were given with a timer showing “00:00 - 02:00 for talk and 02:00 - 05:00 for QA”. All sessions were recorded, and the videos were kept online until the end of 2020. We selected two Outstanding Poster Awards (OPA) out of 16 papers by early career scientists (within 7 years after Ph.D) and three Excellent Poster Presentation Awards (EPPA) out of 23 student papers. The OPA were given to Claudia Martinez-Calderon and Dedong Wang, and the EPPA were given to Man Hua, Miroslav Hanzelka, and Ruoxian Zhou. We have also nominated Man Hua as a candidate for the IAGA YS award. On the last day of the workshop, we had the business meeting of the VERSIM working group, and we decided unanimously to continue our activity. It was announced that the 10<sup>th</sup> VERSIM Workshop will be held in Sodankyla, Finland, September 2022.

Yoshiharu Omura

Chair of the Local Organizing Committee of VERSIM 2020

### 8<sup>th</sup> IAGA/ ICMA/ SCOSTEP

Due to the COVID-19 pandemic the 8<sup>th</sup> IAGA/ ICMA/ SCOSTEP Workshop on Vertical Coupling in the Atmosphere-Ionosphere System, planned to be held from 6 – 10 July 2020 in Sopron, Hungary, has been postponed to summer 2022 in the same place. Information will be provided on the [workshop website](#)<sup>10</sup>. This workshop is usually a biannual event providing the opportunity to discuss and exchange new findings in the field of vertical coupling processes in the Earth’s atmosphere covering dynamical, electrodynamic, and chemical processes that drive coupling events between the neutral atmosphere, the ionosphere, and the magnetosphere.

### VIII Brazilian Symposium on Space Geophysics and Aeronomy

This Symposium, previously scheduled for May 2020, was postponed to 22-26 March 2021 and will be held in a virtual format. Information is available on the [symposium website](#)<sup>11</sup>.

### 11<sup>th</sup> workshop “Long-term changes and trends in the atmosphere”

This main biennial activity of IAGA WG II.F was planned for late May 2020 in Helsinki, Finland. It was first postponed to September 2020 and then again to May 2021 (again in Helsinki) due to Covid-19 troubles and problems. The abstract submission has been stopped and the registration will remain closed until early 2021. The SOC and LOC continue to monitor the situation. Information is available on the [website of the workshop](#)<sup>12</sup>

### 8<sup>th</sup> International HEPPA-SOLARIS

This meeting has been postponed to June 2021, as announced on the [website of the meeting](#)<sup>13</sup>.

This meeting, originally planned in 23-29 August 2020 in Trakoscan, Croatia, was postponed to 28

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## **6 Other IAGA Activities**

### **6.1 EC activities**

IAGA EC activities in 2020 were coordinated by several e-mail discussions and teleconferences. The main activity was the preparation of the IAGA-IASPEI Joint Assembly 2021, in particular regarding the situation and options in view of the COVID-19 pandemic (see section 2).

The EC was approached by the International Association of Physics Students (IAPS) and four IAGA EC members represented IAGA at a virtual conference organised by the IAPS (see details below). More future interactions between IAGA and IAPS are planned.

### **6.2 International Association of Physics Students (IAPS)**

IAPS is a non-profit, non-governmental organisation run entirely for and by physics students from around the world. With a spirit of mutual understanding and equality, our goal is to achieve global collaboration among physics students. As an umbrella organisation, we support both local groups at universities and national Physics student societies in promoting transnational cooperation on scientific, social and cultural issues.

Since the birth of the organisation 33 years ago, motivated by an interest in creating a global student community that could contribute both to the personal and professional growth of its members and to a sense of collective cooperation towards shared goals of scientific development, IAPS has grown to being present in over 50 countries, including 20 national organisations in 4 continents. Throughout each year, IAPS activity takes several forms, with major yearly IAPS events like the International Conference of Physics Students

(ICPS) and the Physics League Across Numerous Countries for Kick-ass Students (PLANCKS), and member-organised events like Lights of Tuscany and P4P with the support of IAPS grants, in outreach efforts to middle-school, high-school students or the general public on IAPS School Day and International Day of Light and in volunteer groups that are the operational structure of IAPS.

Following the aims of the association, and with the specific circumstances of the pandemic forcing IAPS and its members to cancel physical events, the Executive Committee moved ahead with organising, along with some members of its Working Groups, a series of online sessions around Physics topics and advocacy and outreach related sessions, which we named IAPS @ a distance. Included in that series was a session on Geomagnetism and Aeronomy, for which we contacted the International Association of Geomagnetism and Aeronomy. We were excited to receive a positive reply from IAGA Secretary-General, Monika Korte.

With four IAGA representatives attending the session on August 28<sup>th</sup>, moderated by a member of IAPS National Committee India, the first hour of the event was dedicated to initial talks on IAGA by Dr. Eduard Petrovsky, on Paleomagnetism by Dr. Ricardo Trindade, on Geomagnetism by Dr. Kusumita Arora and on Aeronomy by Dr. Andrew Yau.

After those interesting and compelling presentations, the moderator started by asking some questions directly related to the presentations, followed by asking the speakers a bit more about IAGA and its activity, with comments and questions from the audience watching live also being addressed. After about an hour, the ses-

sion ended with the sense that more activities on Geomagnetism, Aeronomy and Paleomagnetism would be important for students to be aware of the diversity of topics within the fields and consider pursuing them in their professional careers. As a first experience in online activities directly organised by the IAPS EC, this was a step forward, not only in providing an opportunity for IAPS affiliated students to gain experience in moderating sessions like this and investigating about the related topics, but also in connecting with many Physics-related associations, unions and societies such as IAGA, with whom establishing links and

collaborations, and organising joint events and projects is fundamental for the academic, personal, professional and social development of students of Physics-related areas. We look forward to deepening the ties with IAGA and having many more like-activities in the future, hopefully with increased participation for a more direct interaction between students and researchers or professors already practicing their knowledge and expertise in Physics.

Duarte João da Costa Graça  
President  
International Association of Physics Students

## 7 SCOSTEP Liaison Report: Highlights of Activities

The Scientific Committee on Solar-Terrestrial Physics (SCOSTEP), being a thematic body of the International Science Council (ISC), runs long-term interdisciplinary scientific programs related to solar-terrestrial physics research, promotes efficient exchange of data and information, develops and sustains student interest in Sun-Earth connection including Visiting Scholar Program, helps organize international symposia, space science schools, and capacity building activities. The participating bodies of SCOSTEP include IAGA/IUGG, IAMAS/IUGG, COSPAR, URSI, WDS, IAU, IUPAP and SCAR.

A new initiative of SCOSTEP – Predictability of the Solar-Terrestrial COupling (PRESTO) - was launched in 2020. PRESTO is a science program that seeks to improve the understanding of energy flow in the integrated Sun-Earth system on time scales from a few hours to centuries through promoting international collaborative efforts. PRESTO is comprised of 3 pillars:

1. Sun, Interplanetary Space and Geospace;
2. Space Weather and the Earth's Atmosphere;
3. Solar Activity and Its Influence on the Climate of the Earth System. To some extent,

PRESTO is a heritage of the previous long-term programs VarSITI and CAUSES.

The PRESTO's topics are close to several divisions of IAGA and provide a new opportunity to build bridges between them. This year, despite the covid-related restrictions, the energies of the many groups and individuals involved in the activities of both scientific bodies, IAGA and SCOSTEP, have continued to power the progress in solar-terrestrial physics. In response to the current difficulties of hosting meetings in person, SCOSTEP-PRESTO is hosting online seminars to deliver the latest scientific topics and review presentations. The recordings of the first 4 seminars are now available. The Newsletters are published regularly and also available on the web. The deadline for Grant proposals for Campaigns and Meetings to be held in 2021 is extended to December 31, 2020.

To strengthen our community, to join and develop the dynamic scientific program, SCOSTEP welcomes new members. More information can be found on the new [SCOSTEP website](#)<sup>14</sup>.

Renata Lukianova  
Representative of IAGA at SCOSTEP

## 8 Swarm mission – probing the geomagnetic field

The Swarm low-Earth-orbiting mission, launched in November 2013, is the fourth of the Earth Explorer missions of the European Space Agency, and the first constellation mission for Earth Observation. The three Swarm satellites are performing well, and the orbital geometry of the constellation evolves in line with expectations. The following is the current status and future status of the constellation: in 2018 Swarm B was perpendicular to the lower A/C pair and in 2021 Swarm B will be counter-rotating to the lower A/C pair every 47 minutes. Currently, all with three platform and payload units active. In November 2017, the mission was granted a four-year extension to 2021. In March 2018, the CASSIOPE/ e-POP mission was formally integrated into the Swarm Constellation as the fourth element (Swarm-Echo) under ESA's Earthnet Third Party Mission Programme. Scientific studies based on Swarm data span a wide range of spatial and temporal scales, from the long-term variations of the core dynamo, through the induction processes in the mantle and oceans, the detailed mapping of the lithospheric field, to the small-scale ionospheric events. Important 2020 Swarm-related events are:

- Numerous talks on scientific achievements obtained with Swarm data were presented at the international meetings as EGU and AGU (virtual mode).
- Swarm observations are the main data source in elaborating the IGRF-13 (International Geomagnetic Reference Field). The IGRF-13 model coefficients are now avail-

able on the [website of the IAGA V-MOD working group](#)<sup>15</sup> and Earth, Planets and Space produces a special issue titled “International Geomagnetic Reference Field - The Thirteenth Generation”<sup>16</sup>.

- The 10<sup>th</sup> Swarm Data Quality Workshop (SDQW10) was held on-line 5-9 October 2020. This year, the workshop was focused more on Swarm product and quality aspects than on science applications. The SDQW10 hosted seven sessions during which more than 50 talks and several demos on VirES and VRE were presented. More than 150 participants from Europe, Canada, USA and China contributed to the great success of this first on-line workshop, with some 80 participants per session (+ WEBINAR). A strong contribution of the China Seismo-Electromagnetic Satellite team needs to be noted, as well as the various inputs from Slack channels and discussions. Clearly, the workshop has enhanced the multi-mission synergies by combining the Swarm measurements with those taken by the Canadian Cassiope mission and/or the China Seismo-Electromagnetic Satellite, and by reprocessing and calibrating the platform magnetometer data from other missions, such as CryoSat-2. The finalization of the “Swarm DQW10 Summary and Recommendation report” is on-going.

Mioara Mandea  
CNES

## 9 In Memorium

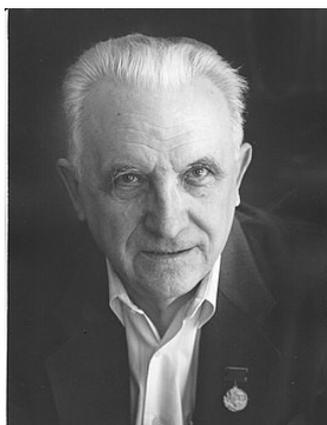
### Ken Creer

Ken Creer, one of the pioneers of palaeomagnetism applied to plate tectonics, and of experimental rock magnetism, died in Edinburgh on Wednesday, 19<sup>th</sup> August, aged 95. He was Professor of Geophysics at University of Edinburgh between 1973 and 1993, and stayed active for many years after his retirement. He worked with scientists around the world, especially from South America, and he is credited with having developed palaeomagnetism there. Amongst many accolades, he was awarded the Fleming Medal of the American Geophysical Union and the Gold Medal of the Royal Astronomical Society, was a Fellow of the American Geophysical Union and the Royal Society of Edinburgh, and was elected a member of Academia Europaea.



Kathryn A Whaler  
University of Edinburgh

### Vladimir Dmitriev (1935 - 2020)



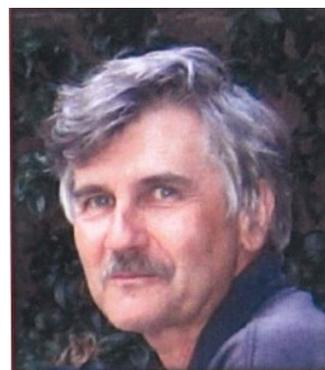
On November 24, 2020, after a long illness died our colleague and teacher, Professor of Moscow State University Vladimir Dmitriev, a brilliant scientist and student of A.N. Tikhonov. His impact on the development of methods for solving direct and inverse problems in geophysics and electro-dynamics can hardly be overestimated. The range of his scientific interests was unusually wide and in addition to electro-dynamics it extended to other areas of geophysics and mathematical physics.

For over 50 years he delivered lectures on key courses “Differential Equations”, “Mathematical Modeling” and “Inverse Problem in Geophysics” in Moscow State University. More than 40 PhD theses have been defended under his supervision. Alongside with Profs. Mark Berdichesky and Leonid. Vanyan, Vladimir Dmitriev is considered to be the founder of the Soviet and then Russian school of geoelectrics. We condole with his family, friends and colleagues.

Nick Palshin (on behalf of the Russian EM community)  
Shirshov Institute of Oceanology, RAS

### Peter Hopgood (1949 - 2020)

It is with sadness that I report on the death of our friend and colleague Dr Peter Hopgood on 01 November 2020 in Canberra, Australia. Peter was an ionospheric physicist by training and completed his doctorate research on atmospheric air-glow at Melbourne's La Trobe university in 1976.



At that time La Trobe was a newly established university and Peter was among the inaugural intake of students. After completing his university studies Peter re-located to Canberra to undertake atmospheric studies with Dr Kurt Lambeck at the Research School of Earth Science, Australian National University. He then worked on modelling the Earth's response to electromagnetic signals in the Metalliferous and Airborne section at the Bureau of Mineral Resources, Geology and Geophysics. In 1982 he transferred to BMR's geomagnetism program where he worked until retirement in 2008. During his career Peter managed the Canberra geomagnetic observatory, undertook countless instrument and compass calibrations and oversaw many upgrades and improvements throughout the Australian geomagnetic observatory network. He led the geomagnetism program until 2005 and was integral in the establishment of the geomagnetic observatories at Charters Towers (CTA), Learmonth (LRM)

and Gingin (GNG). For more than 20 years his data processing algorithms and software were at the heart of Australia's geomagnetic processing and data dissemination system. Another of Peter's major contributions was the task of compiling and distributing the annual Australian Geomagnetism Reports from 1993 to 2005, and its monthly predecessor from 1982. Peter authored a variety of scientific papers, encyclopaedia entries, newspaper articles, radio and TV interviews and was an active IAGA member contributing, amongst other things, to developing automatic methods for K-index scaling. His work on developing a real-time magnetic total intensity variability map of the Australian continent remains an invaluable tool for magnetic surveying and research. He was a dedicated cyclist and bicycle commuted to the office almost every day throughout his entire career and continued his love of cycling into retirement. Peter provided quiet, confident scientific leadership and mentored a generation of Australian geomagnetic observatory scientists. Peter passed away after a period of illness and is survived by his wife Elizabeth, children Paul, Christina and grand-daughter Lydia. He will be much missed and remembered by everyone who worked with him.

Andrew Lewis  
Geoscience Australia

## Jozef Hus (1942 – 2020)

With deep sadness we announce that our former department head and dear colleague Prof. em. Jozef Jan Edward Hus passed away after severe and short illness in early February 2020.



After finishing studies in condensed matter physics at Ghent University (Belgium) in 1963, Jozef became an assistant at the Royal Meteorological Institute of Belgium and developed with Prof. A. De Vuyst a method for absolute measurements of all geomagnetic field elements using a proton magnetometer. Wishing to extend the record of geomagnetic field observations to past times, Jozef began to set up his own laboratory

and started to develop instruments for palaeomagnetic research. He received his PhD from the Free University of Brussels in 1981.

A short sojourn in Prof. E. Thellier's Laboratory of Geomagnetism at Saint-Maur-de-Fossés (Paris, France) in 1965, raised Jozef's interest in archaeomagnetism. He formed a solid basis for the detailed establishment of reference curves for declination and inclination for Belgium. Jozef was known for studying burnt archaeological materials used to record the Earth's magnetic field, as well as for the study of effects that influence accurate field registration in archaeological materials, such as magnetic refraction and magnetic anisotropy. During his career, Jozef promoted archaeomagnetism as a valuable dating tool and strengthened the cooperation with the archaeological community in Belgium and beyond.

Jozef investigated loess/palaeosol deposits in Belgium, south-east Europe, central and eastern Asia and contributed to magnetostratigraphic dating and to a better understanding of the magnetisation process in these sediments. He was one of the first to mention that different post-detrital remanence lock-in conditions could account for the inconsistently observed stratigraphic position of the Matuyama-Brunhes boundary in Chinese loess. Analysing magnetic mineral content and texture of loess and palaeosols Jozef found that both lithologic units contain mainly the same magnetic mineral types, but that soil magnetic minerals were much more oxidised and of smaller grain sizes than those in loess. He found also that the primary sedimentary fabric is in general only moderately modified in the soils. Jozef investigated also magnetic properties of weathering products and showed particularly that siderite alters when in contact with air and forms haematite.

Jozef has always been searching for new applications of magnetic methods and aimed at collaboration with scientists from different research areas such as geochemistry, geology, archaeology and physics. Numerous transdisciplinary publications and research projects resulted from this activity. Besides his lecturing duties at the Free University of Brussels, he shared his experience by teaching young scientists such as for instance at the International Post-Graduate Training course on Fundamental and Applied Quaternary Geology

and became a leading member of the European Research Training network Archaeomagnetic Applications for the Rescue of Cultural Heritage. Even after retirement Jozef remained active and supported and promoted our archaeomagnetic research.

Jozef, you will be missed for your competence, collegiality, patience and warm personality. We bow deeply to you and always remember you as passionate scientist, patient mentor and true comrade on the endless pathway of science.

Simo Spassov

Geophysical Centre, Royal Meteorological Institute of Belgium

### Jerzy Jankowski (1933 - 2020)

With deep regret we inform that Prof. Jerzy Jankowski passed away on 18 August 2020. He was a brilliant researcher in geophysics and geomagnetism, full member of the Polish Academy of Sciences, a foreign member of the Finnish Academy



of Science and Literature, a foreign member of the Hungarian Academy of Sciences, and other numerous Polish and foreign scientific associations. Prof. J. Jankowski was born in Wloclawek, Poland, on 22 Sep 1933. Much of his childhood and youth fell under the period of war and occupation. At that time he lived with his mother and two sisters in Warsaw in very difficult conditions. He made a living for himself since he has been 17 years old. After studying Mathematics and Physics at the University of Warsaw, he started to work at Department of Geophysics of the Polish Academy of Sciences in 1956. From the very beginning he was involved in the matter of moving geomagnetic observations from Swider (close to Warsaw) to Belsk and in rebuilding of Hel Observatory which had been completely destroyed in military operations during WW II. Re-opening geomagnetic observatories was the most important task at that time, especially in the context of the International Geophysical Year in 1957/58. He was engaged in geomagnetic

observations until the end of his professional career. On his initiative there have been established geomagnetic observatories at Hornsund (Polish Polar Station in Svalbard) and Arctowski Station (Antarctica). Jerzy Jankowski brought the Polish geomagnetic observatories from the old analog photographic recording system to the INTERMAGNET era. At the beginning of the digital era there arose the urgent need for computer calculations of geomagnetic K indices. Prof. J. Jankowski developed such an algorithm with a group of assistants, which has been accepted by IAGA and now is used in dozens of INTERMAGNET observatories. For us, people involved in geomagnetic observations, he is well known as co-author of the fundamental work „IAGA Guide for Magnetic Measurements and Observatory Practice”. As a leader of his working group he actively participated in development of devices for geomagnetic field measurements and recording. He used to have the idea for and be the initiator of building a new apparatus, and then he supervised its construction. These devices were used both in geophysical observatories and field research, especially in geomagnetic and magnetotelluric deep soundings. Also on his initiative there were developed several types of proton magnetometers, and their metrological parameters were on an international level at that time. However, his main research interest was the deep geological structure of the Earth investigated by electromagnetic induction techniques. He belonged to the pioneers of such studies and contributed to the creation of a new research method – geomagnetic soundings. The working group led by the Professor developed modern processing techniques for data obtained from geomagnetic and magnetotelluric soundings, including conductivity modeling. His work substantially contributed to a good geological reconnaissance of the nature of the Carpathian electric conductivity anomaly, to give just one example. Professor Jankowski was able to reconcile scientific work with organizational activities, his organizational achievements were equally impressive as scientific. For over 30 years he was Director of the Institute of Geophysics Polish Ac. of Sc. (1974-2004). He was chairman or member of a number of committees or councils related to Earth science. We have lost an outstanding scientist who set new research directions and inspired others to scientific work.

For us, geophysicists and geologists, it is a great loss. He will remain in our memories as a man of generous heart and great intellect, noble and wise, loyal and honest to others, a very good organizer and leader, a great friend. He will be missed very much by all of us. He is survived by his wife Wiesława and son Michał, he will be remembered for his devotion to his family.

Colleagues from Polish geomagnetic observatories and Magnetism Department of the Institute of Geophysics PAS

## Leó Kristjánsson

Our friend and colleague, Leó Kristjánsson passed away on Friday 13<sup>th</sup> March. He was 76 years old. Leó had been fighting myelofibrosis (an uncommon type of bone marrow cancer) for the past two years. With a suppressed immune system, an infection led to his death.



Leó pioneered research on the palaeomagnetism of the basaltic lava sequences of Iceland and the surrounding region, with applications to stratigraphy and the analysis of directions and NRM's in terms of variations in the geomagnetic field over the past 15 million years. For his contribution to this field he was elected an AGU fellow in 2002.

Leó authored or co-authored over 90 papers in peer-reviewed journals on geoscience in paleomagnetism, volcanic stratigraphy, and magnetic surveys. Leó also wrote historical papers on research and teaching of natural sciences in Iceland and the role played by Iceland spar crystals in the development of international science during the interval 1780-1930. His magnum opus on this topic was completed shortly before his death. He also authored numerous reports, popular-science articles, bibliographies, book reviews, papers on topics in science education and science history, etc., mostly in Icelandic.

Being an outstanding scientist and a generous friend, Leó will be sorely missed.

Maxwell Brown and Bryndís Brandsdóttir  
Institute of Earth Sciences, University of Iceland

## Hiroshi Maeda (1919 - 2020)

Hiroshi Maeda, a Kyoto University professor emeritus, passed away on 26<sup>th</sup> August, 2020 at 100 years old. He is well known for his research on ionospheric dynamo and its effects on the plasmas in the upper ionosphere with the electric field generated by the dynamo process.



He was born in 1919 in Kyoto prefecture and graduated Kyoto University. He started his academic career in 1955 at Kyoto University as a research associate and he received his Ph.D. in 1957 from Graduate School of Science, Kyoto University. He joined the Geophysical Institute, Kyoto University in 1960 as an Associate Professor and was promoted to a Professor in 1968. After he retired from Kyoto University in 1983, he moved to Kyoto University for Foreign Studies as a professor and stay in the position until 1991. He was a president of SGEPSS (Society of Geomagnetism and Earth, Planetary and Space Sciences) for 1977-1978. The IAGA held its Second General Scientific Assembly in Kyoto, Japan, on 9-21 September 1973, and Prof. Maeda worked for the assembly as one of the secretaries of the LOC. In the IAGA community, he served as a Co-Chair of Working Group V-7 (Collection and Dissemination of Data) since 1974, and he was also a Co-Chair of WG V-5 (Geophysical Indices) for 1983 - 1987. He was an IAGA/IUGG representative on the WDC Panel of ICSU for 1978 - 1985. He also served as a Finance Committee member of IAGA in 1978. He volunteered for managing the World Data Center C2 for Geomagnetism which was initially located in the University Library since 1957. In 1977, the Data Analysis Center for Geomagnetism and Space Magnetism (DACGSM), which operates the World Data Center, was established in the Graduate School of Science, Kyoto University and he was the first director of the DACGSM. In late 1970s, because of a funding cut, it became difficult for the NOAA/NGDC in Boulder to derive the AE indices. They asked possible derivation in Kyoto, and he accepted to take over the

derivation. He published more than 80 papers in international journals and 5 Japanese books for students and general public. He was interested in not only space science but also biology, and he wrote a book entitled "Do organisms feel magnetism?" (in Japanese). After he left academic society, he enjoyed his life, for example, taking photographs by joining a photo club.

Toshihiko Iyemori  
Kyoto University

## Franco Mariani (1927-2020)

Born in Rome on July 23, 1927, Franco Mariani graduated in physics at the University of Rome in 1949. In this University, he was assistant professor and lecturer in Earth Physics for many years. FROM 1970, he was full professor, first at the University of L'Aquila, as chair in Terrestrial Physics, then (1976) at the University of Rome "La Sapienza", as chair in Geomagnetism, lastly (1982) at the University of Rome Tor Vergata, as chair in Geomagnetism and Terrestrial Physics.



From 1979 he was a corresponding member and from 1985 he was a National Member of the Accademia Nazionale dei Lincei. He was also Chairman of the Committee for Physical Sciences of the Consiglio Nazionale delle Ricerche (CNR). Together with Guido Pizzella and Alberto Egidi, Mariani was a pioneer and protagonist of the development of Space Physics in Italy. Many Italian scientists have found in Mariani a point of reference and great attention to the younger generations.

Mariani initially devoted himself to the study of the properties of the ionosphere, following the Sun-Earth interactions and the study of the interplanetary medium. He had a long scientific collaboration with the Laboratory of Extraterrestrial Physics at NASA/Goddard Space Flight Center, directed by Norman F. Ness, initially for Pioneer 6, 7 and 8 measurements; then, Mariani and Ness were the PI of the magnetic field

experiment on board of the Helios1 and Helios 2 spacecraft, aimed at measuring the interplanetary magnetic field up to heliocentric distances of 0.3 AU. Franco was then involved in several other space activities (such as the Tethered Satellite System 1, TSS-1, WIND, etc.). His research activity concerned the study of low energy particle radiation (up to hundreds of keV) and, more extensively, the solar wind and interplanetary magnetic field. Research in these fields was carried out by Franco Mariani in collaboration with colleagues such as Sergio Cantarano, Bruno Bavassano and Umberto Villante, mainly through the analysis of the magnetic structures of the solar wind based on the measurements recorded by the Helios satellites. Mariani has systematically collaborated with the Interplanetary Physics team at IFSI (Istituto di Fisica dello Spazio Interplanetario, IFSI, currently IAPS, originally at CNR, then transferred to Istituto Nazionale di Astrofisica, INAF), with which he studied also the interaction of the solar wind with the Earth's magnetic field and the mechanisms of the propagation of solar wind stresses on the magnetosphere and ionosphere.

Franco Mariani served IAGA as National Correspondent for a long time. He died of a heart attack on April 23, 2020.

Umberto Villante  
University of L'Aquila

## Dan Pomeroy (1943 - 2020)

With true sadness, we have to inform you that the inventor of the paleomagnetic drill and orientor, Dan Pomeroy, has lost his battle to cancer on November 17 this year. Dan was a beloved husband, brother, father, friend, mentor, good neighbor, inventor, businessman, designer, motorcycle enthusiast, master toolmaker, machinist, and problem solver. Some of us, Earth Scientists, knew him personally. Many of us have used a Pomeroy drill. Undoubtedly, all of us have seen



empty core holes left by Dan's drills all over the globe. Number of scientific papers published and theses defended, owing to samples collected with Pomeroy's drills? Countless. Dan's drills were used for rock and ice core drilling, for saving lives after the Oklahoma City bombing, to extract a kid from a locked bank's vault...

Dan was loved for his kindness, generosity, humor, lightness of being and desire to be of service. He constantly sought to improve the lives of others by solving problems and lending a hand to those in need. With each action and job completed, Dan made the world a better place; he improved the functionality of all of the projects and products that he worked on. His joy, work ethic, accepting nature, and kindness will always live in our hearts. His grieving wife and extended family hope that you will remember him by: Being joyful, mentoring others, solving problems, being of use, and always generously paying kindness forward. These are the values that Dan lived, embrace them and live in love.

#### Postscript

Cancer and an initial slow recognition of the disease ravaged Dan's body. If you or your loved ones experience mystifying symptoms and seek medical help, we encouraged you to be persistent and not accept dismissive care. Advocate for yourself and insist upon more aggressive testing if the medical establishment does not take your symptoms and concerns seriously. A slow diagnosis is of no help.

If an illness progresses beyond treatment, don't be afraid to enter into hospice care. Yes, it is heartbreaking to acknowledge the true impact of an illness, but if it is obvious, we have found hospice care to be a huge support and relief.

Vladislav Powerman  
Russian Academy of Sciences

#### Ravil A. Rakhmatulin (1947 - 2020)

It is with deep sorrow that I announce the death of Dr. Ravil Rakhmatulin on November 20, 2020 at the age of 73 in Irkutsk, Russia, after a short but serious illness. Ravil graduated from Irkutsk State University in 1970 and began his career at the Siberian Institute of Terrestrial Magnetism

and Radio Wave Propagation (now the Institute of Solar-Terrestrial Physics) as a research trainee. From 1973 to 2003, he took an active part in all high-latitude experiments organized by the Institute in the north of Eastern Siberia, analyzed and summarized observational data obtained during the expeditions. Ravil Rakhmatulin was engaged in fundamental and applied research on geomagnetic variations. He obtained important scientific results on the relationship between magnetic and auroral phenomena in the polar regions of Earth, studying irregular wave processes as a fine structure of magnetospheric disturbances. In 2011, R. Rakhmatulin received a doctorate in physics and mathematics. In 1995, Ravil headed the Integrated Magneto-Ionospheric Observatory (IMIO), which unites several stations and observatories such as Irkutsk Magnetic Observatory (Patrony), Uzur Magneto-Telluric Observatory, Mondy Geomagnetic Pulsation Station, Norilsk Complex Magneto-Ionospheric Station. He initiated the renovation of the experimental base of all IMIO stations and observatories; under his supervision, Irkutsk Magnetic Observatory became the first Russian observatory to join the global INTERMAGNET network.



Ravil will forever remain in the memory of his colleagues as a talented scientist, skillful and competent leader, a reliable comrade and a man of great sympathetic soul.

Alexander Potapov  
Institute of Solar-Terrestrial Physics SB RAS, Irkutsk, Russia

#### Alan Stuart Rodger (1951 - 2020)

Alan Stuart Rodger was not just a brilliant and generous space and environmental scientist, he was a brilliant and generous manager, facilitator, mentor and educator.

He grew up sharing a tiny Edinburgh bedroom with older brother Richard, now a Professor in Urban History. As Richard has commented, that taught both boys how to compromise, how to

get along, how to compete but never cheat, because you had to live with the consequences if you did. After gaining a degree from Manchester University, he was hired by British Antarctic Survey as a technician to maintain their ionosondes “down south”. Alan acquired the nickname “Florence” with the other workers at the Antarctic bases during a two-year tour of duty there. This was probably, in part, an affectionate jibe at his rock-star, shoulder-length, curly hair but also came from the way he cared for a very badly injured colleague when they were cut off in the Argentine Islands station without a doctor. The affectionate nickname (a reference to the famous nurse and medical campaigner Florence Nightingale) stuck for the rest of his life because of his remarkable caring nature.



The literature record tells how Alan made great contributions to our understanding of how the ionospheric mid-latitude trough forms, of what signatures of magnetopause reconnection look like, of how polar cap ionization patches are formed. But this is only a very small part

of the story. Alan was always massively generous with his ideas and insights – a great many of the best publications in space science really originated from discussions with Alan who sowed ideas and concepts in the minds of so many of us. The young ionosonde technician had become a massively important space scientist on the world stage and a wise elder statesman who would always offer help, advice, ideas and encouragement.

Alan spotted talent and nurtured it, not just with recognition and praise but by challenging it to get better – and he did this, not just for colleagues in his beloved BAS in Cambridge, but for others like myself in other labs in the UK and for young scientists all over the world. I first met him at my first ever conference as a PhD student and he showed such kindness and interest and introduced me to other scientists who could help. The number of us with similar memories are legion and we learned that was the way that we should behave when our turn came round. We also learned

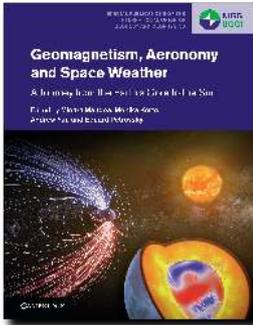
from him that we had to be prepared to speak truth to power, as he never allowed reality to be subjugated to status nor reputation.

The inability to compromise is often mistaken for strength in the modern world, but Alan understood compromise and how it works and this made him a deft and skilful negotiator. He was always completely trusted by both sides. From a less skilled and less amiable person, his honesty could have seemed brutal, but it was always constructive and kindly and it was clear for all to see. He became a vital part of the international SuperDARN radar collaboration, contributing science, knowledge of radio systems, political wisdom and, of course, a great deal of tuition and encouragement for the young scientists of all nationalities who came onto the world stage because of the project. His insatiable interest in a wide range of science and his ability to read, understand and assimilate huge numbers of scientific papers made him a brilliant editor of the American Geophysical Union’s *Journal of Geophysical Research: Space Physics* and a brilliant Head of Science Strategy for BAS. In that context, Antarctica is a sensitive indicator of the effects of climate change and Alan’s insight and wisdom extended into all areas of environmental science and the challenges it faces because of climate change. Alan fought a long battle with various cancers and although they took his life away in the end, they never defeated or diminished him in any way. He maintained his love for his family, for science, for the game of cricket, and for life in general; and he kept his faith in the future that new generations of scientists will secure. Most IAGA scientists will not be aware of how he brought his passion and skill to school education, serving in many capacities in the Cambridgeshire area. I remember him once telling me he’d take along a complete set of Antarctic survival clothing – including the socks, boots and snow shoes – to give talks in schools, and ask the headteacher to dress up and try to walk around in it, which would have the schoolkids in stitches of laughter. And there’s the element that I will never forget beyond all others: he had the most infectious and explosive of laughs – it would transform his face and bring laughter to all who heard it. Alan made science fun.

Mike Lockwood  
University of Reading

## 10 General information about IAGA

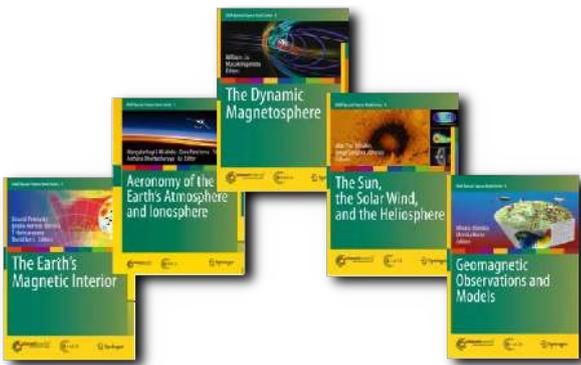
### 10.1 Book: Geomagnetism, Aeronomy and Space Weather



On the occasion of the IUGG centennial in 2019 IAGA published a book with Cambridge University Press providing a comprehensive overview of the IAGA fields of research. The volume, edited by M. Manda, M. Korte, A. Yau and E. Petrovsky and entitled “Geomagnetism, Aeronomy and Space Weather – A Journey from Earth’s Core to the Sun” was published in November 2019.

### 10.2 IAGA books series

A series of five books, representing the five IAGA Divisions, provides a comprehensive overview over all fields of IAGA science, including the state of the art at the time of writing (~2010). The books are written and edited by experts in their fields. Published by Springer, the income from the books supported scientists to attend the IAGA Scientific Assembly in Sopron.



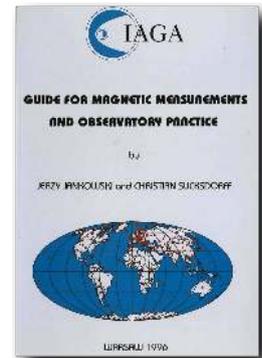
### 10.3 IAGA Guides

IAGA has published four practical guides to observation. These are available as pdf documents from the [IAGA web site](#), or they may be ordered from the IAGA Secretary General.

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

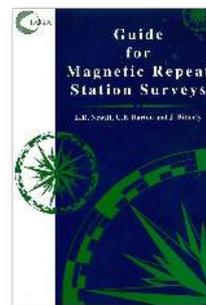
by J. Jankowski and C. Sucksdorff, 1996, 232 pages, ISBN: 0-9650686-2-5; Price: USD 50.

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.

#### IAGA Guide to Observing Noctilucent Clouds

by M. Gadsden and P. Parviainen, 1995, ISBN: 0-9650686-0-9; Price: USD 25.

This manual and instruction book was written by a group of active researchers, both professional and amateur. There

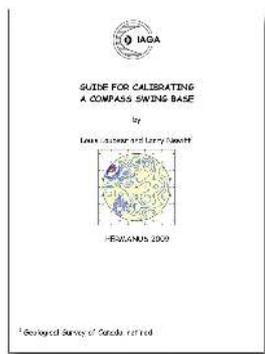


are chapters giving practical advice for taking visual observations, photographing the clouds with film or with video equipment. A summary of observations from space is included, as well as comments on the connection between noctilucent clouds, seen from the ground, and the polar mesospheric clouds that 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”.

#### IAGA Guide for Calibrating a Compass Swing Base

by L. Loubser and L.R. Newitt, 2009, 35 pages, available only as Electronic version (PDF).

In this guide a general description of a compass swing base calibration procedure is presented which was developed at the Hermanus Magnetic Observatory. The procedure is based on the use of DI flux magnetometers as these types of magnetometers are widely in use. Although there are also other methods in use the 'DI-method' should be seen as an IAGA recommendation.



#### 10.4 IAGA History

A special issue of the open access journal History of Geo- and Space Sciences (HGSS) was published on the occasion of the IUGG centennial in 2019. It contains articles about the history of IUGG and its eight associations. The IAGA contribution is authored by M. Manda and E. Petrovsky, entitled “IAGA: A major role in under-

standing our magnetic planet” (Hist. Geo Space. Sci., 10, 163–172<sup>17</sup>).

#### 10.5 IAGA website

Information on IAGA can be found at: <http://www.iaga-aiga.org>

#### 10.6 IAGA turns 1 on social media!

IAGA has been expanding their outreach and education by the formation of social media accounts on Twitter, Instagram and Facebook. This has been relatively successful, and we currently have 128 followers on twitter, 556 on Instagram and 254 on Facebook. A team, headed up by Tereza Kamenikova and Hannah Rogers, have been hard at work compiling job opportunities, new research, interesting blogs, and other relevant announcements from email lists to advertise these across the community. Moving forward, this is becoming a new working group who is looking for more members to join. The aim of this group is to reach the wide breadth of IAGA to continue to promote opportunities and material but also generate short videos, easily accessible blog posts and other content. As such, WE NEED YOUR HELP! If you would like to either 1) join the working group or 2) promote your lab/research/opportunities, please get in touch at [socialmedia@iaga-aiga.org](mailto:socialmedia@iaga-aiga.org). We are particularly interested in reaching out to early career scientists, anyone with a passion to promote the work of IAGA to the public and other scientists, and those from a wide range of backgrounds and subject interests.

Tereza Kameniková, Charles University Prague  
Hannah Rogers, University of Edinburgh

-  [www.facebook.com/IAGAandAIGA/](https://www.facebook.com/IAGAandAIGA/)
-  [www.twitter.com/IAGA\\_\\_AIGA](https://www.twitter.com/IAGA__AIGA)
-  [www.instagram.com/iaga\\_aiga/](https://www.instagram.com/iaga_aiga/)

## 10.7 IAGA contact

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

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### URLs linked in the text

- <sup>1</sup><http://www.iaga-aiga.org/>
- <sup>2</sup><http://iaga-iaspei-india2021.in/>
- <sup>3</sup><https://earth-planets-space.springeropen.com/igrf13>
- <sup>4</sup><https://doi.org/10.5194/essd-12-555-2020>
- <sup>5</sup><https://doi.org/10.1594/PANGAEA.922233>
- <sup>6</sup>[http://www.wdcb.ru/stp/data/ionosphere\\_3/](http://www.wdcb.ru/stp/data/ionosphere_3/)
- <sup>7</sup>[http://www.wdcb.ru/stp/data/magn\\_hour.val/](http://www.wdcb.ru/stp/data/magn_hour.val/)
- <sup>8</sup><https://doi.org/10.5194/hgss-11-157-2020>
- <sup>9</sup><http://iaga-iaspei-india2021.in/>
- <sup>10</sup><http://vcais2020sopron.ggki.hu/>
- <sup>11</sup><https://www.univap.br/universidade/instituto-de-pesquisa/agenda-e-eventos/sbgea-simfast-en.html>
- <sup>12</sup><http://trends2020.fmi.fi/>
- <sup>13</sup><https://heppasolaris2020.w.uib.no/>
- <sup>14</sup><https://scostep.org/>
- <sup>15</sup><https://www.ngdc.noaa.gov/IAGA/vmod/igrf.html>
- <sup>16</sup><https://earth-planets-space.springeropen.com/igrf13>
- <sup>17</sup><https://doi.org/10.5194/hgss-10-163-2019>

### Imprint

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