

# THE FLUX LINE

## News of the Geomagnetism, Paleomagnetism and Electromagnetism Section of AGU

November 2016

### **Fall 2016 AGU Meeting Events!**

The GPE Section will have primary responsibility for 17 oral and 14 poster sessions at the 2016 Fall AGU meeting, December 12-16, in addition to secondary sessions. With so many sessions, GPE will have events every day of the week. See pages 12-14 for a synopsis of all primary GPE scientific sessions. Many thanks go out to all our session conveners. A special thanks goes out to Julie Bowles, GPE Secretary, who put together the GPE sessions for all of us. Julie points out that we need many OSPA judges for our student presentations. Please sign up to help us judge student presentations: (<http://ospa.agu.org/ospa/judges/>)

Mark your calendars for these special events:

- GPE Student Reception: Sunday, Dec. 11, 6-8 pm, at Jillian's, 175 4th St at the Metreon near the Moscone Center. This is a GPE-sponsored event to help students get to know each other and meet the GPE leadership. If you plan on attending please email Sarah Slotznick (sslotz@berkeley.edu).
- AGU Icebreaker: December 12, 2016: 6-8 pm, Moscone North, Hall D
- AGU Student Breakfast: Tuesday, Dec. 13 at 7 am, Marriott Salon 7-First come, first served. Look for the GPE table. (Ticketed event)
- Bullard Lecture: Tuesday at 5:00 pm *Exploring Earth's Magnetic Field using Satellites-from Oersted to Swarm*, Nils Olsen (see article later in this issue of Flux Line)
- GPE Business Meeting and Reception: Tuesday, 6:30 – 8:00 pm, San Francisco Marriott Marquis-Golden Gate C3
- AGU Honors Ceremony: Wednesday, 6-8 pm Moscone North, Hall E
- AGU Honors Banquet: Wednesday, 8:30 pm-midnight, Marriott Marquis, Salons 7-9, tickets required.

### **GPE Executive Committee**

The GPE Executive Committee currently includes the following people:

President: Andy Jackson

President-Elect: Laurie Brown

Past President: Richard Gordon

Secretary: Julie Bowles

GP Webmaster: Katerina Petronotis

Student Representative: Sarah Slotznick

Early Career Representative: Kerry Key

Flux Line Editor: Ken Kodama

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### **Positions on the GPE Executive Committee**

The GPE Executive Committee is an eight-person committee providing discussion, feedback, and suggestions concerning GPE activities, procedures, and governance. Membership includes the elected GPE officers (President, President-Elect, Past President, and Secretary) as well as several appointed positions, with terms of office running for two years (2017-2018). The section website manager and the Fluxline editor are two such positions. Two other positions, for which we are now soliciting volunteers, are the student representative and the early career representative, as outlined below:

**Student Rep:** This position should be a graduate student pursuing research in a subject covered by GPE, and expecting to be a student for the next two years. Traditionally the student rep, with help from the rest of the executive committee, organizes the GPE student mixer at the Fall meeting.

**Early Career Rep:** This position is for a GPE member who is in the first ten years of employment in a GPE field including academia, industry, or government agencies.

If you are interested in either of these positions, please send a short paragraph of interest, with your current position/situation to Laurie Brown by November 25, 2016 (lbrown@geo.umass.edu).

### **GPE Community Access**

As a result of our name change, your favorite information portals have been renamed:

The GPE web site is now: <http://geopaleoelectromagnetism.agu.org/>  
and we would welcome updates to our entries on Laboratories, Software, Education, and other information.

We also welcome photos or other fun and interesting information on our Facebook page: <https://www.facebook.com/AGUGeoPaleoElectroMagnetism>

### **President's Remarks**

Andrew Jackson

As I come to the end of my term of office I take this opportunity to look back and reflect on the last two years. By far the most important structural change for our section was its

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realignment by way of its change of name. I believe this reflects accurately the breadth of our membership. This is amply illustrated by this year's Bullard Lecturer, whose interests certainly encompass both the G and the E in our name. I'd like to thank the membership for their engagement in the consultation process, which was by no means straightforward, and I would particularly like to take this opportunity to thank all members of the Executive Committee, who put in many hours on the Section's behalf to ensure that the correct solution was found. I look forward to the passing of the Section Helmet to Laurie Brown, the incoming president, at the forthcoming Business Meeting at AGU. I hope to see many of you there. I'd like to thank all the participants in the recent elections for offering their candidature for the service of GPE.

### **The Workings of AGU — Part II**

Andrew Jackson

In the last newsletter I discussed some of the workings of AGU, in particular how, despite best efforts, Council can find itself powerless on issues. The two aspects I mentioned last time were the RFID debacle and the change in Abstract submission protocols; both decisions have been subsequently reversed. I made the point that as your elected representatives, the President and Vice President often have very little ability to influence at high level. I also promised that I would discuss some of the issues that are ongoing at AGU.

Many of you will be aware that there is a plan to renew AGU's headquarters in Washington DC. Built in 1994 through an 11 million USD Bond issue (payable over 30 years), the decision has been made to renovate and extend the headquarters. The infrastructure and services in this 22 year old building are said to be at the end of their useful life. The plan is to create a building that is "net zero" and which has the highest environmental credentials.

In 1993 the creation of Headquarters was a matter for the decision of Council, which gave the go-ahead; in contrast, this is no longer a matter handled by Council but by the Board. The decision has been made to go ahead with renovation but the final decision point will be at the Winter Board meeting 2016 when they will fix the design and agree on a price. There is a surprisingly small amount of time from that point, as staff move-out is planned for February 2017! Again, Council has been informed at a low level. The original nominal price that has been shared with Council is between 9 and 13 million USD. However, sources close to the CEO suggest that the number to be agreed will be closer to 30-40 million USD, but this is just a guess. Whether this represents a sensible plan is a matter for the reader to decide. You can read about the plans at <http://building.agu.org/>. If you have comments, you can always contact CEO Christine McEntee at [CMcEntee@agu.org](mailto:CMcEntee@agu.org)

Amongst other matters being handled by Council's myriad Task Forces, planning is underway for AGU's Centenary Celebrations in 1919; and the Affiliation and Engagement Task Force is presently reporting back.

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### **ExxonMobil's Sponsorship**

Andrew Jackson

At its meeting on 23rd September, AGU's Board reconfirmed its decision to continue its association with ExxonMobil, accepting *en route* the 35,000 USD of sponsorship that it receives. This decision was in response to a letter it received from 170 AGU members, asking for the organization to relinquish its association.

The 35,000 should be compared to the annual operating budget of AGU of over 36 million USD. AGU Headquarters has been under pressure to review its decision from many quarters; these included letters from House Representative Lieu and Senator Whitehouse. AGU concluded in April 2016 that it is not possible for it to determine unequivocally whether ExxonMobil is participating in misinformation about science currently, either directly or indirectly, and that AGU's acceptance of sponsorship of the 2015 Student Breakfast does not constitute a threat to AGU's reputation.

Subsequent to this, AGU hired a communications company called Glover Park Group to assess possible reputational damage as a result of the continued association, and reaffirmed its decision. Perhaps you have an opinion on the donation, which is small compared to AGU's reserves in the bank of over 90 million USD; again, if so you can make your views known by a variety of means: by emailing [CMcEntee@agu.org](mailto:CMcEntee@agu.org), by commenting on the webpage at <http://fromtheprow.agu.org/update-agu-board-maintains-decision-regarding-exxonmobil/> or by reading the document that raised the issue originally at <https://assets.documentcloud.org/documents/2803702/AGU-Report-Final-20160325.pdf>

### **2016 Bullard Lecturer: Nils Olsen**



This year's Bullard Lecture will be given by Prof. Nils Olsen of the Danish Technical University.

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Nils Olsen has interests in many areas of geomagnetism, from studies of electromagnetic induction, models of the crustal field to high fidelity models of the internal magnetic field's evolution. He is a co-author of the CHAOS series of magnetic models.

Nils Olsen has been strongly involved in exploring the Earth's magnetic field from space. He is PI for internal magnetic field research of the Danish satellite Ørsted, and has been deeply involved with the space missions CHAMP, SAC-C and Swarm. He will give the lecture entitled Exploring Earth's Magnetic Field Using Satellites - *From Oersted to Swarm* on Tuesday 13th December at 17.00.

### **In Memorium: Prof. Raymond Hide CBE FRS**



We are sad to record the passing of one of the giants of our field: Raymond Hide passed away on the 5th September 2016 at age 87. Raymond, known to his friends as Spike, was a geophysicist of the highest calibre, beginning his scientific career in the 1950s working with Sir Patrick Blackett and Keith Runcorn at the University of Manchester. As an undergraduate he worked on the coal mine experiments designed to confirm or refute the notion that the magnetic field was an intrinsically linked to the Earth's rotation. At Cambridge he designed and studied the rotating annulus experiment that caught the imagination of geophysicists and meteorologists alike. This experiment studied the influence of convection in the presence of rotation and demonstrated the likelihood of wave motion in the core.

Amongst the numerous contributions made by Raymond over the course of his career, we can highlight his theoretical work on MHD waves in the core, his interest in core-mantle interactions and studies of the length-of-day on both short and long timescales, as well as planetary atmospheres and nonlinear dynamics. Sometimes Raymond's creative ideas courted controversy, and he was often willing to contribute to spirited arguments. Amongst the posts held by Raymond were Research Associate in Astrophysics, University of Chicago; Senior Research Fellow, Atomic Energy Research Establishment, Harwell; Lecturer in Physics, King's College, University of Durham; Professor of Geophysics and Physics, MIT ; Founder and Director of Geophysical

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Fluid Dynamics Laboratory at the Met Office, Bracknell, and Professor of Physics, University of Oxford

Raymond was a member of the Geomagnetism and Palaeomagnetism section and was made a Fellow in 1967. He was awarded AGU's highest honour, the Bowie medal, for unselfish cooperation in research, in 1997.

Raymond was the recipient of many other accolades, for example being a member of the Pontifical Academy until his death. He held the unique distinction of being the only person to have held both the presidencies of the Royal Meteorological Society and the Royal Astronomical Society. From the former he was awarded the Symons Gold Medal in 2002 and from the latter the Gold Medal in 1989. He was made a Fellow of the Royal Society in 1971, and was awarded the Hughes Medal of the Royal Society in 1998.

He worked tirelessly for the promotion of geophysics and meteorology until his retirement at the turn of the millennium. He was especially supportive of the careers of young scientists. His friends will miss his infectious enthusiasm for understanding the dynamics of planets and the deep Earth.

**Postcards from the Field:** Horse getting in boat. Ilua, Greenland



photo credit: K.P. Kodama. Aug 2016

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## Rob Coe wins John Adam Fleming Medal



Rob Coe, emeritus professor in the Department of Earth & Planetary Sciences, University of California Santa Cruz has received the AGU's John Adam Fleming Medal for 2016. This medal is given annually to one honoree in recognition of "original research and technical leadership in geomagnetism, atmospheric electricity, aeronomy, space physics, and/or related sciences. Rob has been cited for his "outstanding contribution to the development of paleointensity methodology and scientific achievements in tectonophysics and geodynamo research." Rob has a long history of research into a wide range of paleomagnetic and geomagnetic subjects, bridging the fields of rock magnetism, paleomagnetism, and geodynamo modeling. His accomplishments include setting the course for the modern field of geomagnetic paleointensity studies and developing the methodologies that are still widely in use today; detailed and pioneering studies in magnetic polarity reversals and excursions; bridging the gap between paleomagnetic observations and geodynamo simulation, and making such simulations accessible to a much broader audience; and paleomagnetic applications to tectonics that led to new ideas about how large-scale continental collisions occur. Rob has been widely cited for his integrity and tenacity in moving towards what is true.

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Rob will be honored during the Honor Ceremony on Wednesday evening, December 14 from 6:00 to 8:00pm in Moscone North, Hall E. The ceremony and following reception are open to all.

### **Ron Shaar to receive William Gilbert Award**



Dr. Ron Shaar, Senior Lecturer at The Freddy & Nadine Herrmann Institute of Earth Sciences, Hebrew University of Jerusalem, will receive the William Gilbert Award from GPE at the Fall AGU meeting. The William Gilbert Award is given annually to one honoree from the GPE membership in recognition of outstanding and unselfish work in any field broadly related to magnetism; in even years preference is given to young scientists defined as 36 years or younger or 5 years or less from their Ph.D. Ron has made significant contributions to the study of geomagnetic paleointensity, expanding the selection of research materials, identifying large and rapid changes in geomagnetic field strength, and investigating remanence acquisition and stability. He has shared his work with the community and provided open-access cross-platform software for determining and quantifying paleointensity measurements. The award will be presented at the GPE business meeting/reception on Tuesday evening, December 13; please join us to celebrate the 2016 Gilbert Awardee.



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## **New 2016 AGU Fellow for GPE**



2016 AGU Fellows were announced this summer, and we are delighted to report that Dr. Steven Constable, Professor of Geophysics, Scripps Institute of Oceanography is the newest GPE member to be honored with Fellowship. He will be officially recognized at the AGU Honors Ceremony at the Fall Meeting, occurring on Wednesday evening, December 14 from 6:00 to 8:00pm in Moscone North, Hall E. The ceremony and following reception are open to all.

Steve is internationally known for his research in electromagnetic studies, where he has long played a fundamental role in the development of both passive and active EM methods, with particular emphasis on subsurface imaging of the marine environment. His early development of inversion methods are still used extensively in EM studies as well as finding applications in many other areas of Geophysics. Steve presented the 2015 Bullard Lecture entitled “Water and Electricity Do Mix: Studying Plates, Petroleum, and Permafrost Using Marine Electromagnetism” at the Fall meeting. He was additionally honored this year by the Society for Exploration Geophysicists with the Reginald Fessenden Award for technical contributions to exploration geophysics and a Distinguished Lecturer position for SEG/AAPG.

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## 2016 Election of GPE section officers



The President's Helmet will be carried forth by *Laurie Brown* in January.

Our newly elected President-elect is:

*Catherine Johnson*, University of British Columbia, Vancouver

The duties of secretary will be performed by our newly elected GPE Secretary:

*France Lagroix*, IPGP, Paris

### GPE Travel Grant Awardees

*Congratulations to GPE's travel grant awardees:*

Alexis Urbalejo-University of Colorado at Boulder

Asra Ismail-CUNY City College

Kritel Izquierdo-University of Maryland College Park

Mao Okuda-Hokkaido University

Mercedes Belica-University of Western Australia

### Thanks again to 2G Enterprises!

Once again, 2G Enterprises has underwritten part of the cost of our 2016 GP Business Meeting and Reception on Tuesday, December 13<sup>th</sup> starting at about 6:30 pm. 2G is a long-time supporter of our Section. Their support is very much appreciated by GPE members and officers alike.

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### News from the GPE Community

#### **GPE Community Member Recognition outside AGU**

*This is a new item for Fluxline and we welcome news of GPE members being recognized by the Earth science community outside of AGU.*

Gary Acton and Suzanne McEnroe were both recognized as Fellows by the Geological Society of America at the most recent GSA meeting in September.

#### **Rotation of the Iberian Peninsula-50<sup>th</sup> anniversary**

Josep M. Pares

Almost fifty years have elapsed since Rob Van der Voo (University of Michigan) used paleomagnetism to document the rotation of Spain. His 1967 paper was a landmark and became essential reading for paleomagnetists and geologists interested in the kinematics of Iberia and the Alpine realm in general. On the occasion of the thirtieth anniversary of the paleomagnetic evidence for the rotation of the Iberian Peninsula, the MagIber group, through the Geological Society of Spain (SGE), invited Rob Van der Voo to give a lecture in Huelva (Spain) to celebrate this important event. MagIber is a working group of Spanish and Portuguese scientists that was born to foster the interaction of researchers interested in paleomagnetism and rock magnetism. MagIber meets every two years, and this year it overlapped with the SGE in September. The Iberian community of rock- and paleomagnetists was very fortunate to have Rob visit - what better location than in the rotated Iberian Peninsula?

#### **MagIC Workshop**

Nick Jarboe

We invite you to attend the 2017 MagIC Workshop from the 24th to the 27th of January, 2017 hosted at the Scripps Institution of Oceanography in La Jolla, California. Registration is now open (<https://earthref.org/cgi-bin/erml-c0-introduction.cgi?event=MAGIC>). Two full days of talks will be followed by a day of working with the MagIC database and a one day hackathon of the PmagPy paleomagnetic software suite. Feel free to come for just the talks or stay for the whole event. Present your own research at a poster session that will be held on the evening of the 24th. Discounted hotel reservations are available. See the workshop website (<https://earthref.org/events/MAGIC/2017/>) for the speaker schedule and all the other details. Students and others who wish to learn how to upload data into the MagIC database are especially encouraged to attend the workshop.

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### MagIC New Data Model

Nick Jarboe

The MagIC Database Team announces the beta release of a new data model. While switching the database from Oracle to MongoDB (the new database is much faster and the software is open source), we took the opportunity to change the MagIC Data Model to a more orderly, hierarchical system. The 2.5 version of the data model has multiple tables dealing with the same type of data (i.e., `er_sites` and `pmag_sites` tables), the 3.0 version of the data model has only one table per level, far fewer columns, and most remaining column names remain the same. For a summary description of the new structure, see after the signature line. We welcome comments and suggestions on the new data model:

<https://docs.google.com/spreadsheets/d/1eEAuFYDKNQxcl8xgSA8PA9WZF9t2GtjNqqdRY33tdQ0>

If columns are missing that are necessary to store your data, please let us know and we can add them. The new MagIC Data Model and website will be going live before AGU. Look for an announcement of the beta release of the MagIC website and the switch over to the new data model. All datasets in MagIC at the time of the switch will be converted into the new data model by us.

## GPE Sessions-2016 Fall AGU Meeting

*GPE sessions (plus sessions co-organized with GPE)*

### *Monday, Dec. 12*

<i>Time</i>	<i>Session</i>	<i>Title</i>	<i>Location</i>
8:00 – 10:00	DI11B	The Dynamics and Evolution of the Interacting Core and Mantle: Insights From Paleomagnetic Data, Simulations and Experiments I	MS303
10:20 – 12:20	GP12A	PL-O Coupling: Connecting Planetary Lithospheres to Outer Cores I	MS309
1:40 – 6:00	DI13A	The Dynamics and Evolution of the Interacting Core and Mantle: Insights From Paleomagnetic Data, Simulations and Experiments II Posters	Poster Hall
1:40 – 3:40	GP13A	Planetary Magnetism and Paleomagnetism I	MS302
4:00 – 6:00	GP14C	Full Geomagnetic Field Variation in the Past: New Palaeomagnetic Data from Archaeological Artefacts, Lava Flows and Sedimentary Records I	MS302

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### ***Tuesday, Dec. 13***

<i>Time</i>	<i>Session</i>	<i>Title</i>	<i>Location</i>
10:20 – 12:20	GP22A	Fundamental Mineral and Rock Magnetism I	MS302
1:40 – 6:00	GP23A	Full Geomagnetic Field Variation in the Past: New Palaeomagnetic Data from Archaeological Artefacts, Lava Flows and Sedimentary Records II Posters	Poster Hall
1:40 – 6:00	GP23C	Planetary Magnetism and Paleomagnetism II Posters	Poster Hall
1:40 – 6:00	GP23B	PL-O Coupling: Connecting Planetary Lithospheres to Outer Cores II Posters	Poster Hall
1:40 – 3:40	GP23D	Geomagnetically Induced Currents (GIC) and Geomagnetic Perturbations: Space Weather and Ground Effects I	MS304
4:00 – 5:00	GP24E	Geomagnetically Induced Currents (GIC) and Geomagnetic Perturbations: Space Weather and Ground Effects II	MS104
5:00 – 6:00	GP24A	Bullard Lecture: Nils Olsen, <i>Exploring Earth's Magnetic Field Using Satellites - From Oersted to Swarm</i>	MS104

### ***Wednesday, Dec. 14***

<i>Time</i>	<i>Session</i>	<i>Title</i>	<i>Location</i>
8:00 – 12:20	GP31A	Fundamental Mineral and Rock Magnetism II Posters	Poster Hall
8:00 – 12:20	GP31B	General Contributions in Geomagnetism, Paleomagnetism, and Electromagnetism Posters	Poster Hall
8:00 – 12:20	GP31C	Geomagnetically Induced Currents (GIC) and Geomagnetic Perturbations: Space Weather and Ground Effects III Posters	Poster Hall
8:00 – 10:00	GP31D	Magnetic Mysteries : From the Origin of the Hawaiian Emperor Bend to the Source of Marine Magnetic Anomalies I	MS302
8:00 – 10:00	NS31B	Frontiers of Uncertainty Estimation in Geophysical Inversion I	MW3024
1:40 – 3:40	GP33A	Imaging the Crust Using Magnetic, Gravity and Electromagnetic Methods I	MS302
4:00 – 6:00	GP34A	Imaging the Crust Using Magnetic, Gravity and Electromagnetic Methods II	MS302

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### ***Thursday, Dec. 15***

<i>Time</i>	<i>Session</i>	<i>Title</i>	<i>Location</i>
8:00 – 12:20	NS41A	Frontiers of Uncertainty Estimation in Geophysical Inversion II Posters	Poster Hall
8:00 – 10:00	GP41A	All Things Electromagnetic I	MS302
10:20 – 12:20	GP42A	All Things Electromagnetic II	MS302
1:40 – 6:00	GP43A	Imaging the Crust Using Magnetic, Gravity and Electromagnetic Methods III Posters	Poster Hall
1:40 – 6:00	GP43B	Magnetic Methods and New Developments in Magnetostratigraphy to Assign Chronology of Geological Processes II Posters	Poster Hall
1:40 – 6:00	GP43C	Magnetic Mysteries : From the Origin of the Hawaiian Emperor Bend to the Source of Marine Magnetic Anomalies II Poster	Poster Hall
1:40 – 3:40	GP43D	Recent Advances in Environmental and Biogeomagnetism I	MS302

### ***Friday, Dec. 16***

<i>Time</i>	<i>Session</i>	<i>Title</i>	<i>Location</i>
8:00 – 12:20	GP51A	All Things Electromagnetic III Posters	Poster Hall
8:00 – 12:20	GP51B	Electromagnetic Imaging of Natural and Engineered Fracture Systems Posters	Poster Hall
8:00 – 12:20	GP51C	Recent Advances in Environmental and Biogeomagnetism II Poster	Poster Hall
8:00 – 12:20	NH51C	Pre-earthquake Processes: An Interdisciplinary Approach to Earthquake Prediction Studies I Posters	Poster Hall
8:00 – 10:00	GP51D	Magnetic Methods and New Developments in Magnetostratigraphy to Assign Chronology of Geological Processes I	MS302
4:00 – 6:00	NH54B	Pre-earthquake Processes: An Interdisciplinary Approach to Earthquake Prediction Studies II	MS302