



**IUGG**



**IAG AIG**  
International Association  
of Geodesy

# Newsletter

## May 2018

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The *IAG Newsletter* is under the editorial responsibility of the *Communication and Outreach Branch* (COB) of the IAG.

It is an open forum and contributors are welcome to send material (preferably in electronic form) to the IAG COB ([newsletter@iag-aig.org](mailto:newsletter@iag-aig.org)). These contributions should complement information sent by IAG officials or by IAG symposia organizers (reports and announcements). The *IAG Newsletter* is published monthly. It is available in different formats from the IAG new internet site: <http://www.iag-aig.org>

Each *IAG Newsletter* includes several of the following topics:

- I. news from the Bureau Members
- II. general information
- III. reports of IAG symposia
- IV. reports by commissions, special commissions or study groups
- V. symposia announcements
- VI. book reviews
- VII. fast bibliography

## General Announcements

### *Summary of the Sixth Meeting of the IAG EC 2015-2019*

**Place:** Vienna, Austria, Vienna University of Technology, Gusshausstr. 27-29

**Time:** Friday, 13 April 2018, 09:00 – 18:00

**Attendees** (voting): H. Schuh (IAG President), Z. Altamimi (IAG Vice President), H. Drewes (Secretary General), C. Rizos (IAG Immediate Past President), G. Blewitt (President of Commission 1), R. Pail (President of Commission 2), M. Hashimoto (President of Commission 3), M. Santos (President of Commission 4), P. Novák (President of ICC on Theory), R. Gross (Chair of GGOS), J. Adám (President of COB), R. Barzaghi, A. Nothnagel (Representatives of the Services), Y. Dang, C. Pacino (Members-at-Large)

**Attendee** (non-voting): F. Kuglitsch (IAG Assistant Secretary General, minute taker)

**Guest:** J. Kusche (Editor in Chief of the Journal of Geodesy)

**Regret:** R. Neilan (Representative of the Services)

### **Summary of Agenda Items:**

#### **1. Welcome and adoption of agenda**

The 6<sup>th</sup> IAG EC Meeting in the term 2015-2019 took place on 13 April 2018 on occasion of the EGU General Assembly 2018 at the Vienna University of Technology, Gusshausstr. 27-29 in Vienna, Austria. The agenda was distributed previously by email and was unanimously adopted.

*H. Schuh*, the President of the IAG, welcomed the members of the IAG Executive Committee (15 out of 16 voting members, 1 non-voting member and 1 guest) and introduced *Y. Dang* as a new IAG Member at Large and successor of *L. Combrinck*. The EC Members approved the minutes of the 5<sup>th</sup> IAG EC Meeting in the term 2015-2019, which took place on 30 July 2017 in Kobe, Japan.

#### **2. Reports of the Commissions 1, 3, 4**

*G. Blewitt* gave the presentation about **Commission 1** (Reference Frames). *He* reported about the work of the four Sub-commissions. *He* further mentioned the work done by the Joint Working Group 2.1 (Relativistic Geodesy) and noted that the next meetings on Reference Frames for Applications in Geosciences (REFAG) and the COSPAR Panel on Satellite Dynamics (PSD) will take place during the COSPAR Assembly in July 2018, in Pasadena, CA, USA. *He* noted that the Working Group 1.2.1 (Offset Detection in Geodetic Coordinate Time Series) was dissolved.

*M. Hashimoto* gave the presentation about **Commission 3** (Earth Rotation and Geodynamics). *He* reported about the work of the five Sub-commissions, and referred to the discussions with IASPEI and IAVCEI in Kobe 2017. *He* proposed dissolving Sub-commission 3.2 (Crustal Deformation) and forming a new Sub-commission 3.2 under the name Volcano Geodesy. The EC members agreed with this change. *H. Drewes* suggested including the work of the previous Sub-commission 3.2 into the Sub-commission 3.5. Both SC 3.2 and SC 3.5 could in future become joint Sub-commissions with IAVCEI and IASPEI, respectively. *He* noted that there would be a symposium on Seismo-Geodesy at the IUGG General Assembly 2019.

*M. Hashimoto* further reported about the work of the Joint Study Group 3.1 (Intercomparison of Gravity and Height Changes) and the Joint Working Group 3.1 (Theory of Earth Rotation and Validation). In addition, *he* noted that all Sub-commissions now have Working Groups and agreed on sending the names of the Working Groups to *H. Drewes* to be included in the update of the Geodesist's Handbook.

*Z. Altamimi* suggested establishing an Inter-commission project on Marine Geodesy. Later a Commission could be formed. The EC members agreed on establishing such an Inter-commission project and on nominating candidates of possible project members. *M. Hashimoto* agreed on taking the lead of this Inter-commission project.

*M. Santos* gave the presentation about **Commission 4** (Positioning and Applications). *He* reported about the work of the four Sub-commissions and discussed the preparations for the IUGG General Assembly 2019. *He* mentioned that the 2<sup>nd</sup>

Commission 4 Symposium shall be organized in summer 2020. In addition, *he* noted that the collaboration between Commission 4 and IGS should be strengthened, e.g., by establishing joint working groups.

### 3. Report of the Inter-Commission Committee on Theory

*P. Novák* gave the presentation about ICCT. *He* presented the 12 study groups within ICCT and mentioned that JSG0.22 (Definition of next generation terrestrial reference frames) was dissolved in Kobe, Japan, 2017, due to missing output. *He* mentioned that the next Hotine-Marussi Symposium, the major event organized by ICCT, will be organized from 18-22 June 2018, in Rome, Italy, and discussed the scientific program and responsible committees in detail.

*H. Schuh* mentioned that *Novel Technologies and Sensors* could become a new study group in ICCT in future. The EC members decided to write a proposal on establishing an Inter-commission project on Novel Technologies and Sensors and to find a chair.

### 4. Report of the Communication and Outreach Branch

*J. Adam* reported about current COB activities. *He* highlighted the IAG website, the IAG newsletter, GIM International, Social Media, and the UN GGIM WG (focus group on Outreach and Communication). *He* underlined the need to get regularly news/input for the IAG website, newsletter and social media.

### 5. Report of the GGOS

*R. Gross* gave the presentation about the **Global Geodetic Observing System (GGOS)**. *He* reported about the GGOS Structure, the first GGOS Affiliate (GGOS Working Group of Japan), the GGOS Coordinating Office and its new Manager of External Relations, the GGOS Bureau of Products & Standards and its definition of Essential Geodetic Variables, the roles of GGOS, the GGOS 2020 Book, and the GGOS 2018 Days in Tsukuba, Japan. *He* further noted that GGOS is searching for additional GGOS Affiliates and already reached out to SIRGAS, Korea and Spain. *H. Schuh* mentioned that further products such as the creation of a combined ionosphere map from various geodetic techniques could be solved by GGOS. *Y. Dang* suggested GGOS focusing on some hot topics such as earthquake studies in high-risk areas (e.g., Turkey, Japan, California). *H. Drewes* appreciated the increased scientific activities being realized by GGOS in the recent past beside the administrative work.

### 6. Report on the Journal of Geodesy

*J. Kusche* gave the presentation about the Journal of Geodesy. *He* reported about changes in the Editorial Board, major numbers and statistics of the Journal of Geodesy, Special Issues, the relationship with Springer Publishing, and the visibility on social media. The EC members, in principle, supported the introduction of Continued Article Publishing (CAP) offered by Springer to shorten the publication time as much as possible. However, it should be clarified whether it is possible to keep the special issues together in one publication. *J. Kusche* agreed on asking Springer Publishing about the special issues.

### 7. Status of the IAG Symposia Series

*H. Schuh* noted that *J. Freymueller*, Editor in Chief of the IAG Symposia Series, could not make it to Vienna this time, however, *he* sent an email on the status of the IAG Symposia Series. *H. Drewes* summarized that Springer had explained that it would not make sense to change the name of the IAG Symposia Series to IAG Topical Series, as it would cause major problems with indexing in Scopus and Web of Science of the recent and future volumes. Considering the few papers received for the Kobe Assembly 2017, *H. Schuh* was worried about the future of the IAG Symposia Series. *A. Nothnagel* noted that this could be a consequence of the very long publication process of the Series, that they are not open access, and that they were not indexed in the past. *J. Kusche* suggested getting papers of several pages before an assembly starts (like IAHS is doing). *H. Drewes* agreed on negotiating again with Springer Publishing about the open access of the Series. In the past, it was too expensive.

### 8. Reports of the Services

*R. Barzaghi* reported about recent activities of the following Services related to gravity:

- International Gravity Field Service (IGFS),
- International Gravimetric Bureau (BGI),
- International Service for the Geoid (ISG),
- International Geodynamics and Earth Tide Service (IGETS),

- International Center for Global Earth Models (ICGEM), and
- International Digital Elevation Model Service (IDEMS).

*He* also explained the status of the International Combination Service for Time-variable Gravity Field Solutions (COST-G) as a Product Center within the IGFS.

*H. Schuh* noted that the Service on the International Gravity Reference Frame (IGRF) was just established according to the IAG resolution no. 2 at the General Assembly in Prague 2015; and that the new ToR for the International Combination Service for Time-variable Gravity Field Solutions (COST-G) were received.

*A. Nothnagel* reported about recent activities of the following Services:

- International Earth Rotation and Reference Systems Service (IERS),
- International VLBI Service for Geodesy and Astrometry (IVS),
- Bureau International des Poids et Mesures (BIPM), and
- Permanent Service for Mean Sea Level (PSMSL).

*C. Rizos* suggested withholding the endorsement of ICRF3 since the cooperation between contributing entities has not been solved. *Z. Altamimi* mentioned that *he* wrote a document about ISO/ITRF. *He* agreed on circulating the document among the EC members.

No report was available from *R. Neilan*.

*C. Rizos* reported that the IGS Governing Board just met in Vienna and *A. Craddock* is now the director of the Central Bureau. The next IGS workshop will be organized in Wuhan, China, in November 2018.

## 9. Report of the Commission 2

*R. Pail* gave the presentation about **Commission 2**. *He* reported about science meetings and conferences (past & future), the organization of GGHS 2018 (jointly with IGFS), future gravity missions, and other Commission 2 activities. As an outcome from the IAG Workshop “Satellite Geodesy for Climate Studies” in September 2017, *he* noted that *Satellite Geodesy for Climate Studies* could become a future IAG project.

## 10. International Combination Service for Time-variable Gravity Field Solutions (COST-G)

*H. Schuh* discussed the draft ToR of the International Combination Service for Time-variable Gravity Field Solutions (COST-G). *He* mentioned that all the recommendations made by the EC in Kobe, Japan, 2017, have been considered. The EC members approved the draft ToR of the COST-G in principle allowing further suggestions for revision.

## 11. Reports of the Members-at-Large

*M. C. Pacino* gave the presentation about recent activities in South America. *She* reported about (i) the developments of the Absolute Gravimetric Network in South America (RGAAS), and (ii) SIRGAS, its Working Groups and meetings organized. *She* noted that SIRGAS is celebrating its 25<sup>th</sup> anniversary at the SIRGAS 2018 symposium in Aguascalientes, Mexico, in October 2018. The EC members thanked *H. Drewes* for all his contributions and enthusiasm making SIRGAS a great success for almost 25 years. *M. C. Pacino* further mentioned that *D. Blitzkow* from Brazil is now retired and should be contacted for data/metadata. *R. Barzaghi* offered contacting *D. Blitzkow* concerning these data.

*Y. Dang* gave the presentation about recent activities in Asia. *He* reported about Geodetic Activities in Asia in general, and the Chinese Geodetic Community in particular. Moreover, *he* presented some ideas for setting up regional IAG sub-organizations and a new IAG Commissions on Marine Geodesy. *H. Schuh* noted that the EC members just agreed on establishing an inter-commission project on Marine Geodesy. *He* recommended establishing Chinese and other Asian Affiliates to GGOS. *He* noted that it should be the aim of IAG not to revise the Statutes & By-Laws too often but rather to implement new entities with the existing structure of IAG. *He* recommended *Y. Dang* organizing international sessions (in English) at future Chinese Annual Geodetic General Assemblies in order to further strengthening the contact. *He* suggested *Y. Dang* asking his colleagues to propose topics for possible new Working Groups.

## 12. IAG strategy discussion

*H. Schuh* summarized the Strategy Discussion from Kobe, Japan, 2017. *He* noted that only little feedback has been received since and *he* asked the EC members to provide further comments. The newest version of the IAG strategy documents should be circulated soon. Topics such as *Marine Geodesy* and *Novel Technologies and Sensors* have already been implemented. *H. Drewes* mentioned that the final document should be presented to the Council on occasion

of the IUGG General Assembly in Montreal, Canada, July 2019. *He* proposed having the document ready at the next EC Meeting on occasion of the AGU Fall Meeting in Washington, DC, USA, in December 2018.

### **13. Status of the IUGG General Assembly, Montreal, Canada, 2019-07-08 ... 19**

*H. Drewes* presented the status of Union Lectures, Union Symposia, Joint Symposia, and IAG Symposia being prepared by the Scientific Program Committee for the IUGG General Assembly 2019 in Montreal, Canada. *He* noted that the final deadline for the description of the association symposia is on 15 May 2018, and urged the IUGG2019 symposia conveners to provide them by the end of April 2018.

### **14. (Joint) IAG Scientific Assembly 2021**

*H. Drewes* informed the EC members that *he* received an invitation from IAGA and IASPEI to join their planned Joint Scientific Assembly 2021 in Hyderabad, India. *He* explained that, for organizational reasons, it would in general be better to decide on the venue of the IAG Scientific Assemblies not at the previous IUGG General Assemblies (i.e., 2 years in advance) as in the past, but rather 3-4 years in advance. *He* therefore sent a Call for Bids for hosting the IAG Scientific Assembly 2021 to the IAG Council. By the deadline 12 April 2018, *he* received bids from India and China. The EC members decided to establish a *Site Evaluation Committee* which reviews the bids received and send a report and shortlist of suitable venues to *H. Drewes* by 15 June 2018. The Council should be asked for discussion and voting by 31 July 2018.

### **15. Revision of the IAG Statutes and Bylaws**

*C. Rizos* gave a presentation about the proposed changes to the IAG Statutes and By-Laws. *He* reported about proposed name changes, minor modifications that are necessary because of the IAG Strategy process and proposals for an IAG reform. *C. Rizos* offered asking the Adhering Bodies, National Delegates, Officers, Fellow and Members to get further suggestions for revision. *H. Schuh* mentioned that a final version of the proposed changes to the IAG Statutes and By-Laws should be ready by 30 November 2018, to discuss them at the next EC Meeting in December 2018. *H. Drewes* noted that only the Council could change the By-Laws.

### **16. Nomination procedure for officers 2019-2023**

*C. Rizos* gave a presentation about the nomination procedure and the proposed timeline for the IAG officers 2019-2023. *H. Schuh* suggested establishing a *Search Committee*, which contacts possible candidates for the IAG Secretary General and finally gives a recommendation to the Council. The *Search Committee* should be in close contact with the Nominating Committee. The EC members decided in favor of establishing such a *Committee* and approved the IAG Bureau Members and the Chair of the Nominating Committee as the members.

### **17. Report from IUGG and ICSU**

*F. Kuglitsch* reported about the status of the IUGG Member Countries, recent changes of the IUGG Statutes and By-Laws, new IUGG Liaison Officers, IUGG as an Observer Organization of the Intergovernmental Panel on Climate Change (IPCC), IUGG Meeting Support 2018-2019, Preparations and Deadline for the IUGG General Assembly 2019, the Scientific Assemblies 2021, and news from ICSU. *He* noted that the deadlines for submitting nominations for the IUGG Early Career Scientist Awardees, the IUGG Fellows, and the IUGG Gold Medalist are on 20 June, 20 September, and 20 October 2018, respectively.

### **18. Liaisons with international scientific and professional bodies**

*H. Drewes* discussed the list of IAG Representatives to Scientific Bodies available at <https://iag.dgfi.tum.de>. *He* invited the EC members to look at the list and make suggestions for changes, if any. *He* mentioned that *R. Gross* is the new IUGG Liaison Officer to GEO. *H. Schuh* noted that IGS should appoint a representative to ICG, which has to be nominated by GGOS.

### **19. IAG representatives to the Services**

*H. Drewes* mentioned that the EC elected *O. Titov* as the new IAG Representative to the IVS.

### **20. IAG sponsored meetings**

*H. Drewes* discussed the list of IAG sponsored meetings, the latest version of which can always be found at the IAG Office Homepage (<https://iag.dgfi.tum.de>).

## **21. Any other business**

*H. Schuh* mentioned that *he*, together with *Z. Altamimi*, just attended a meeting of UN-GGIM at the United Nations in Vienna, where the five Working Groups presented their results. UN-GGIM would like to finalize its Implementation Plan with the next 3 months. He noted that UN-GGIM wants to change the ToR of the Sub-committee of Geodesy. *Z. Altamimi* suggested writing a corrigendum to change the ToR again.

*H. Drewes* noted that IAG has currently more than 200 individual members, but only few student members. *He* urged the EC members to advertise IAG at their universities to get more student members.

*J. Adam* suggested adding a line on the IAG Membership Application Form, where it says “I agree that my data is stored internally”. This is necessary to follow an EU regulation getting effective in May 2018.

## **22. Next IAG EC meeting**

The EC members decided to hold the next IAG EC meetings (i) on occasion of the AGU Fall Meeting 2018 on Monday, 10 December 2018, in Washington, DC, USA, and (ii) on occasion of the IUGG General Assembly 2019 on Monday, 8 July 2019, in Montreal, Canada.

## **23. Adjournment**

*H. Schuh* thanked the participants for their contributions and closed the session at 18:30.

Respectfully submitted  
F. Kuglitsch, Assistant Secretary General  
H. Drewes, Secretary General

## *International Centre for Global Earth Models (ICGEM)*

E. Sinem Ince, Franz Barthelmes, and Sven Reissland GFZ Potsdam, Germany

<http://icgem.gfz-potsdam.de/home>

### **Overview**

The determination of the Earth's gravity field is one of the main tasks of geodesy. With the accurate satellite measurements as products of today's advancing technology, now it is possible to represent Earth's global gravity field and its variations with better spatial and temporal resolutions. The computation of geoid and other functionals of the gravity field from the model representation is not only interesting for geodesy or geodesist but also for other geosciences. Therefore, it is necessary to make the models publicly available and develop tools useful for both experts and young scientists and students.

With the International Gravity Field Service (IGFS)'s initiation and German Research Centre for Geosciences (GFZ)'s host and financial support, ICGEM service has been providing essential services to the community such as maintaining access to the global models as well as interactive calculation and visualization services for the gravity field functionals and their variations. The service has been extensively used and promises further developments. ICGEM is not committed to a specific target group but expands its user profile from university professors to undergraduate students in different disciplines, as well as scientists and engineers working in industry. With the user friendly discussion forum, ICGEM ensures reaching the users and respond their needs. ICGEM's structure is different than the other services if International Association of Geodesy (IAG) and the coordination and communication is made through the ICGEM's staff with input from international contributors.

### **The ICGEM service**

The 15 year old International Centre for Global Earth Models (ICGEM) service continues to collect and archive all existing static global gravity field models. By the nature of scientific developments in geodesy, now temporal gravity field models also have become part of the service as well as access to the recently developed topographic gravity field models is linked on the website. The ICGEM is fundamentally designed as a web-based service and includes the following components:

- collecting and long-term archiving of existing global gravity field models and solutions from dedicated time periods (e.g. monthly GRACE models) and making them available on the web in a standardized self-explanatory format
- the possibility to provide Digital Object Identifiers (DOI) to the models, i.e. to the dataset of coefficients
- the interactive visualization of the models (geoid undulations and gravity anomalies) and monthly GRACE models
- a web-interface to calculate gravity field functionals from the spherical harmonic models on freely selectable grids
- the theory and formulas of the calculation service in STR09/02 (downloadable)
- the ICGEM web-based discussion forum
- the comparison of the models in the spectral domain and wrt GNSS/levelling-derived geoid values
- the visualization of surface spherical harmonics as tutorial.

Since the beginning of the service, the user profile and expertise level have been widely expanded and daily number of computations reached up to about 300. In order for users to benefit the current ICGEM products and upcoming GRACE-FO mission products more efficiently, ICGEM has launched the new ICGEM website in May 2017 which has been designed to improve the users' experience with the service outcomes. The new service is more flexible from the point of administration and promises continuous improvement.

A snapshot of the 3D visualization of the well-known Potsdam potato presented in the new website is shown in Figure 1. The components of the new website are listed on the left hand-side of Figure 1. Despite the software behind the calculation service have been kept as are, some additional features in the interactive computation platform have been added (e.g., selection of the grid are shown Figure 2).

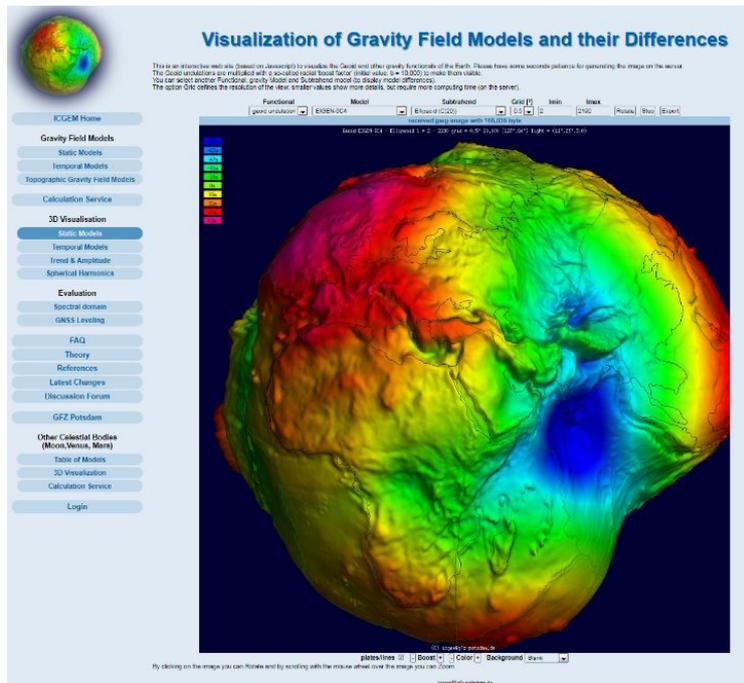


Figure 1: The Potsdam geoid computed from the combined model EIGEN-6C4 using ICGEM visualisation service.

## The calculation service

An improved user-friendly web-interface to calculate gravity field functionals from the spherical harmonic models on freely selectable grids, with respect to a reference system of the user's choice, is provided. The following functionals are available for gravity field model computations.

- pseudo height anomaly on the ellipsoid (or at arbitrary height over the ellipsoid)
- height anomaly (on the Earth's surface as defined)
- geoid height (height anomaly plus spherical shell approximation of the topography)
- gravity disturbance
- gravity disturbance in spherical approximation (at arbitrary height over the ellipsoid)
- gravity anomaly (classical and modern definition)
- gravity anomaly (in spherical approximation, at arbitrary height over the ellipsoid)
- simple Bouguer gravity anomaly
- gravity on the Earth's surface (including the centrifugal acceleration)
- gravity on the ellipsoid (or at arbitrary height over the ellipsoid, including the centrifugal acceleration)
- gravitation on the ellipsoid (or at arbitrary height over the ellipsoid, without centrifugal acceleration)
- potential on the ellipsoid (or at arbitrary height over the ellipsoid, without centrifugal potential)
- second derivative in spherical radius direction of the potential (at arbitrary height over the ellipsoid)
- equivalent water height (water column)

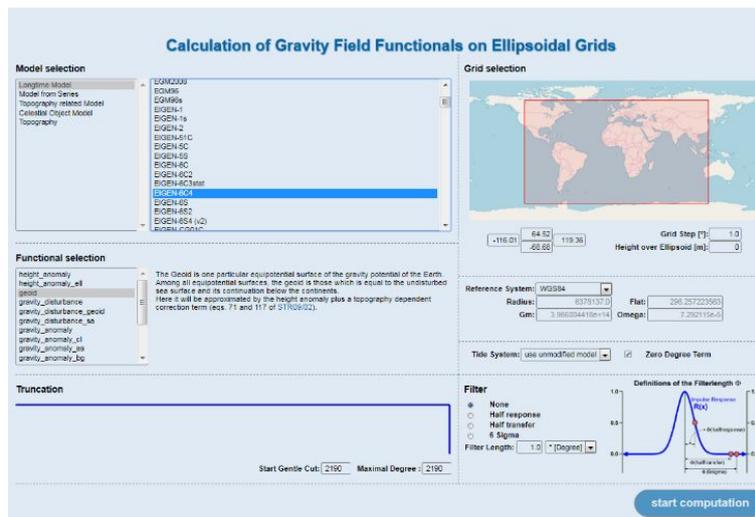


Figure 2: The calculation service in the new ICGEM website.

The calculated functional values are plotted using Generic Mapping Tools (GMT) which can be also downloaded (see Figure 3).

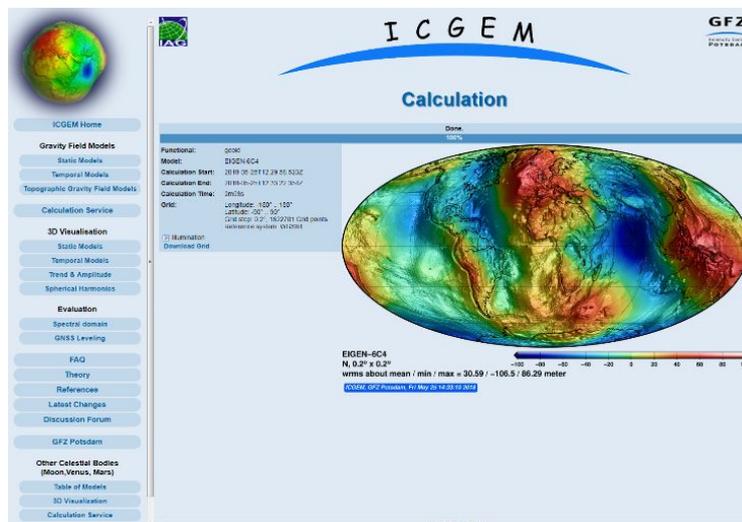


Figure 3: Global geoid computed using ICGEM Calculation service.

## Discussions and Future work

ICGEM continues to offer access to global gravity field models, derived products and tutorials freely. It is a platform for both the experts and young scientists and widely used in the research areas related to geodesy, geophysics and oceanography. ICGEM follows and is open to new developments and plans to offer new products in the future depending on users' interest and feasibility of (e.g. complete Bouguer gravity anomalies, point value calculations).

## ICGEM's Structure and Staff

The longtime director of the ICGEM service Franz Barthelmes retired on December 31st, 2017. The workload at the moment is shared between Elmas Sinem Ince and Sven Reissland. As of January 1<sup>st</sup>, Elmas Sinem Ince has been appointed as the new director of the ICGEM service.

### Contact:

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## Meeting Announcements

### *Meetings Calendar*

#### *IAG Sponsored Meetings*

##### *EUREF Symposium 2018*

*May 30 – June 1, 2018, Amsterdam, The Netherlands*

URL: <http://euref2018.nl>

##### *10<sup>th</sup> IVS General Meeting*

*June 3-8, 2018, Longyearbyen, Spitsbergen, Norway*

URL: <http://www.ivs2018.no>

##### *First Workshop on the International Geodynamics and Earth Tide Service (IGETS)*

*June 18-20, 2018, Potsdam, Germany*

URL: <http://isdg.gfz-potsdam.de/igets-data-base/igets-workshop-2018/>

##### *IX Hotine-Marussi Symposium on Mathematical Geodesy*

*June 18-22, 2018, Rome, Italy*

URL: <https://sites.google.com/uniroma1.it/hotinemarussi2018/>

##### *IAG Workshop on Hydrogeodesy*

*June 29-30, 2018, Wuhan, China*

URL: <http://hydrogeodesy2018.csp.escience.cn/>

##### *42nd COSPAR Scientific Assembly (with REFAG2018 and Panel on Satellite Dynamics)*

*July 14-22, 2018, Pasadena, CA, USA*

URL: <http://cospar2018.org/>

##### *8<sup>th</sup> UN-GGIM Session*

*August 1-3, 2018, New York, USA*

URL: <http://ggim.un.org/meetings/GGIM-committee/8th-Session/>

##### *IAU XXXth General Assembly*

*August 20-31, 2018, Vienna, Austria*

URL: <http://astronomy2018.univie.ac.at/>

##### *19th General Assembly of WEGENER*

*September 10-13, 2018, Grenoble, France*

URL: <https://wegener2018.sciencesconf.org>

##### *GGHS2018*

*September 17-21, 2018, Copenhagen, Denmark*

“Gravity, Geoid and Height Systems 2” Symposium, 2nd joint meeting of the International Gravity Field Service and Commission 2 of the IAG

URL: <http://www.space.dtu.dk/gghs2018>

##### *International DORIS Service (IDS) Workshop*

*September 24-29, 2018, Ponta Delgada, Azores*

URL: <https://iag.dgfi.tum.de/en/meetings-calendar/>

### GGOS Days 2018

October 2-4, 2018, Tsukuba, Japan

URL: <http://176.28.21.212/en/meetings/2018/ggos-days/general/>

### IGS 2018 Workshop

October 29 – November 2, 2018, Wuhan, China

URL: <https://iag.dgfi.tum.de/en/meetings-calendar/>

### 21<sup>st</sup> International Workshop on Laser Ranging

November 5-9, 2018, Canberra, Australia

URL: <http://www.iwlr2018.serc.org.au/>

### 27th IUGG General Assembly

July 8 – 17, 2019, Montreal, Canada

URL: <http://www.iugg.org/assemblies/>

## IGAG Related Meetings

### Scientific Congress of the National Geodesy and Geophysics Union of Turkey

May 30 – June 2, 2018, Izmir, Turkey

URL: <http://www.tujjbkongre2018.org/en/>

### AOGS 15<sup>th</sup> Annual Meeting

June 3-8, 2018, Hawaii, USA

URL: [http://www.asiaoceania.org/society/public.asp?view=up\\_coming](http://www.asiaoceania.org/society/public.asp?view=up_coming)

### Baltic Geodetic Congress 2018

June 21-23, 2018, Olsztyn, Poland

URL: <http://bgc2018.systemcoffee.pl>

### ESA/JRC International Summer School on GNSS 2018

July 16-27, 2018, Loipersdorf, Austria

URL: <https://www.esa-jrc-summer-school.org/>

### IX International Symposium "Metrology of Time and Space"

September 12-14, 2018, Mendeleev, Russia

URL: <http://www.vniifri.ru/index.php/en/news/conferences/741-sym9>

### ION GNSS+ 2018

September 24-28, 2018, Miami, Florida, USA

URL: <https://www.ion.org/gnss/>

### EVN Symposium and Users' Meeting

October 8-11, 2018, Granada, Spain

URL: <http://evnsymp2018.iaa.es/>

### IWGI2018

November 4-6, 2018, Shanghai, China

International Workshop on GNSS Ionosphere will be held on Nov. 4-6, 2018, Shanghai, China.

URL: <http://202.127.29.4/geodesy/iwgi2018>

### AGU 2018 Fall Meeting

December 10-14, 2018, Washington, D.C., USA

URL: <https://meetings.agu.org/>

EGU General Assembly 2019

*April 7-12 , 2019, Vienna, Austria*

URL: <http://www.egu2019.eu/>

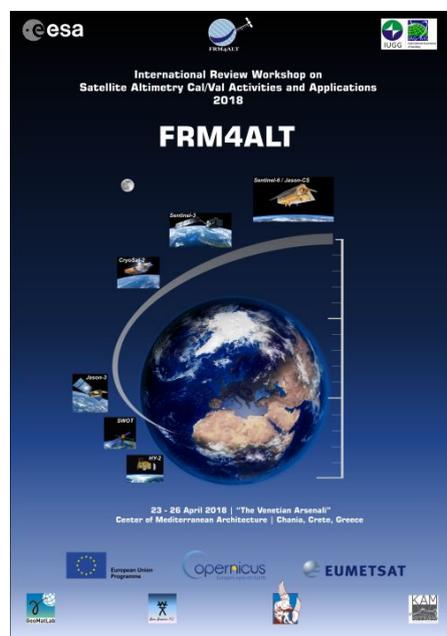
AOGS 16<sup>th</sup> Annual Meeting

*July 28 – August 2, 2019, Singapore, Singapore*

URL: [http://www.asiaoceania.org/society/public.asp?view=up\\_coming](http://www.asiaoceania.org/society/public.asp?view=up_coming)

## Reports

### Summary on the “International Review Workshop on Altimetry Cal/Val and Applications”



The “International Review Workshop on Satellite Altimetry Cal/Val Activities and Applications” has concluded its activities. It was held at the Venetian Arsenal, Center of Mediterranean Architecture, Chania, Crete, Greece 23-26 April, 2018. It has been sponsored by the European Space Agency, The International Association of Geodesy, EUMETSAT, and organized by the Technical University of Crete and Space Geomatica.

It has been an extremely successful International Meeting both in terms of its scientific content, international participation, in a beautiful setting which has been conducive to essential scientific collaboration. More than 70 participants from India, Taiwan, Australia, United Kingdom, Germany, France, Hungary, The Netherlands, Estonia, Italy, Spain, Portugal, The United States of America, Canada, Greece, Denmark, and China contributed to this event. Space Agencies and international organizations and Institutes, such as the European Space Agency, Eumetsat, NASA/Jet Propulsion Laboratory, Indian Space Research Organization, Centre national d'études spatiales [CNES, French Space Agency], National Physical Laboratory (United Kingdom), Metrology Labs (USA), European Reference Frames and Systems, the Danish Space Center, the International Association of Geodesy/International Union of Geodesy and Geophysics have been represented in this Meeting. All

present and future altimetry satellite missions, such as Sentinel-3, CryoSat-2, Sentinel-6/Jason-CS, SARAL/AltiKa, Jason, SWOT, Copernicus missions and HY-2, etc. had been the target of this event.

The aim of this International Review Workshop has been to present the latest research results in the field of satellite altimetry calibration and altimetry applications for monitoring ocean changes and for improving Earth observation in an objective, continuous, homogeneous and reliable manner, free of errors and biases, and tied from one altimetry mission to the next.





Presentations covered subjects, such as Fiducial Reference Measurements for Altimetry, Fundamental time systems for altimetry standardization, New missions of altimetry from the European Space Agency, NASA (USA), CNES (France), China, and ISRO (India) altimetry missions, Precise orbit determination, International trends in altimetry calibration, Estimation of uncertainties for satellite observations based upon metrology standards (speed of light, absolute time, etc.), Calibration of future satellite altimetry, the ESA Climate Change Initiative, the Changing environment, Polar region applications, modelling of bathymetry, geoid, sea level gravity, heights etc., by altimetry, etc.

The intention has been to support long-term monitoring of climate changes by understanding better environmental changes on world's oceans, terrestrial surface waters, but also on Arctic and Antarctic polar regions. The final outcome has been to establish and promote a scientific roadmap with procedures, protocols, guidelines, and best practices in an open and transparent way to be followed by any international group working on satellite altimetry to attain SI (Système international) traceability of their measurements, results and data products.

This International Cal/Val Review could not have been done without the support provided by The European Space Agency, Eumetsat, the International Association of Geodesy, The European Union and its Copernicus program, the Technical University of Crete, Space Geomatica and the Center of Mediterranean Architecture. We thank them all very much for giving us this great opportunity to make this Review Workshop on International Altimetry Cal/Val Activities and Applications a successful event.

Yours sincerely,

Stelios P. Mertikas,  
Dipl., M.Sc.E., Ph.D.,  
Professor and International Review Convenor

## Obituary

### *Camil Gemael (1922 - 2015)*



Brazilian geodesy still mourns the passing of Professor Camil Gemael. At the same time, we are grateful to his enormous contributions to geodetic research and education. It is difficult to find a Brazilian geodesist who has not been touched by Professor Gemael, directly as his student or supervision, or indirectly being taught or supervised by a former student or influenced by any one of his several lecture notes, and, more recently, by his books on Physical Geodesy, Space Geodesy, and Adjustment of Observations.

Professor Camil Gemael, Emeritus Professor at the Federal University of Paraná (UFPR), was born in Rio Negro, Paraná, Brazil, on November 13, 1922, and died in Curitiba on August 12, 2015 at the age of 93. Professor Gemael graduated in Civil Engineering UFPR in 1948. In 1947 he became teacher assistant and, in 1951, he accepted the position of lecturer of elementary geodesy and field astronomy at the School of Engineering. He obtained his doctorate at UFPR, for his recognized notorious knowledge and contributions to geodesy and geodetic astronomy. He reached the status of Full Professor in the Department of Geosciences at UFPR in 1969.

Throughout his life, Professor Gemael was avid in international collaboration. In 1959, he was postdoc at Ohio State University in the field of physical geodesy and in the same year he held an internship at Wisconsin University aiming to master methods and techniques of gravimetry. He also held an internship in 1960 in gravimetry at Columbia University. Later, in 1968, he took internships at the Institute Géographique National in Paris, working in the field of space geodesy, and, at the same year, at the International Bureau Gravimétrique in gravimetry. Throughout his career Professor Gemael fostered international interactions with the US, Germany, Canada, Belgium, France and the UK, including Brazil in the international scenario and becoming the main Brazilian reference in geodetic sciences.

Professor Gemael founded, in 1961, the Centre for Studies and Research in Geodesy of the UFPR School of Engineering, effectively adding geodesy to the university. This center was the heart of his dream leading to the foundation of the Graduate Program in Geodetic Sciences in 1972 (which included also Photogrammetry and Cartography). This graduate program was the pioneer in this area in Latin America, and since then highly qualified personnel has been formed at M.Sc. and Ph.D. levels. His students, by its multiplier effect, still enable the dissemination of Geodesy in Brazil, South America and even in Asia, from various institutes and schools. The availability of highly qualified geodesists and the infrastructure established by the Graduate Program in Geodetic Sciences led to the creation of the undergraduate program in Surveying and Cartographic Engineering, in 1975, at UFPR.

Professor Gemael was instrumental and pioneer in many geodetic activities in Brazil, such as the early scientific gravimetric surveys (leading to the national gravimetric network and the first-order gravimetric stations), compilation of several gravimetric maps (free-air and Bouguer iso-anomaly, topography-isostatic reduction in Pratt-Hayford and Airy-Heiskanen systems, and maps with iso-correction lines for the gravimetric factor), and establishment of National Absolute Gravimetric Network stations. He also contributed to gravimetric surveys in Antarctica with the installation of a Gravimetric Tide Station on King George Island. He contributed with the University of Bonn, the Royal Observatory of Belgium and the UK Proudman Observatory towards the installation and operation of the Earth Tides Permanent station of Curitiba, basis for deployment of more than twenty stations of "Trans World Tidal Gravity Profile (TWTGP)" in South America and the Caribbean. He was a promoter, along with the former US Defense Mapping Agency, of the first experiment in the southern hemisphere of geodetic and gravimetric surveys with integrated inertial platform with satellite positioning still in the early 1980s. Finally, he introduced the studies of ground subsidence near large hydroelectric dams in Brazil by means of geodetic auscultation;

What has been mentioned cannot effectively provide an exact dimension of this master and leader. The passing of Professor Camil Gemael is an irreplaceable loss. Let his life, accomplishments and dedication serve as inspiration to the new generations of geodesists, in Brazil and around the world.

MARCELO SANTOS, SILVIO DE FREITAS, DENIZAR BLITZKOW and EDSON MITISHITA