



IAG Scientific Assembly 2013 Final Report

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Photographs: Elisabeth Gantz (GFZ), Sibylle Itzerott (GFZ), Ogarit Uhlmann (F&U confirm), Potsdam Tourist Service
For this report: GFZ Potsdam 2013

Instead of a preface: Days to remember

The IAG Scientific Assembly 2013 which was held on the occasion of the 150th anniversary of the IAG in co-operation with the Helmholtz Centre Potsdam – GFZ German Research Centre for Geosciences took place in Potsdam, Germany on September 1–6, 2013.

480 presentations given during 5 conference days in the very comfortable conference venue Dorint Hotel Potsdam plus a stimulating “History Day” – one afternoon at the GFZ on the Telegrafenberg – turned the assembly into days to remember.

533 delegates from 46 countries and 13 national and international sponsors made this assembly a great success.



“A constellation of geodesists” on the Dorint terrace – one of the great conference pics taken by GFZ photographer Elisabeth Gantz

1 Proposal for hosting the IAG Scientific Assembly 2013

IAG Scientific Assemblies are generally held mid-way during the period between two meetings of the IAG General Assembly, i.e., every four years and shall consist of a group of component meetings and/or a group of Scientific Symposia, held at the same time and place. The number of participants was in general between 300 and 500.

The IAG Bureau invites proposals for hosting these Scientific Assemblies. Those who are interested may discuss the possibility of submitting a proposal with their National Committee and/or Adhering Body and send it to the IAG Secretary General according to the given deadline. All proposals will be evaluated by the IAG Executive Committee; the final decision will always be made by the IAG Council.

List of former IAG Assemblies:

-  1982 Tokio, Japan,
-  1989 Edinburgh, UK,
-  1993 Beijing, China,
-  1997 Rio de Janeiro, Brazil,
-  2001 Budapest, Hungary,
-  2005 Cairns, Australia,
-  2009 Buenos Aires, Argentina.

For the IAG 2013 Assembly, four applications were received (for Prague, Czech Republic; Potsdam, Germany; Porto, Portugal; Istanbul, Turkey). Reinhard F. Hüttl, Spokesman of the GFZ Executive Board, submitted the German proposal, and Jürgen Müller, Director of the Institute for Geodesy at Leibniz University Hannover, presented it on behalf of the National Committee of Geodesy and Geophysics on July 6, 2011 to the IAG Council which was held during the IAG General Assembly at the IUGG General Assembly in Melbourne, Australia. In the subsequent election of the venue of the Scientific Assembly 2013, which was performed in two runs, a clear result was obtained to hold the IAG Scientific Assembly 2013 in Potsdam.

2 The Local Organizer – Helmholtz Centre Potsdam – GFZ German Research Centre for Geosciences

The German proposal for hosting the IAG Scientific Assembly 2013 relates to the 150 years anniversary of modern international geodesy and its roots in Potsdam and Berlin. This anniversary is a notable occasion for geodesy and for the first time an IAG Scientific Assembly could be held at a famous historical place in Germany.

Closely linked to this history is the name of Johann Jacob Baeyer. In 1861 Baeyer submitted the memorandum “Draft for a Central European Arc Measurement”, which was followed by a corresponding ministerial order by the Prussian king Wilhelm in the same year. Baeyer had the plan to “create a Central European arc measurement by homogenizing and connecting triangulations in those countries which lay between the same meridians like in Germany”. Already one year after Baeyer’s proposal, an arc measurement foundation conference with government representatives of Austria, Saxony and Prussia took place, which is regarded as the founding conference of IAG. So, Johann Jacob Baeyer is considered IAG’s first president. Also in 1862, practical consultations for executing the endeavour started with participants from Bavaria, Baden, Hanover, Saxony, Saxony-Gotha, Mecklenburg, Belgium, Italy, Switzerland, Austria, Sweden, Denmark, the Netherlands, Poland and Norway. In 1864 a “Central Bureau of European Arc Measurement” was established under

Baeyer's presidency in Berlin. During the following years, the maturing association developed into the European (1867), later into the International (1886) Arc Measurement. Until today, international geodesy is under the auspices of IUGG.




The significant role of Berlin and Potsdam in the history of geodesy is further marked by the foundation of the Royal Prussian Geodetic Institute, which was established upon Baeyer's proposal in Berlin in 1870. The institute moved into its own new building on the site of the Royal Prussian Observatories on the Telegraph Hill in Potsdam in 1891. To this day, the building is the domicile of the Department "Geodesy and Remote Sensing" of the German Research Centre for Geosciences GFZ. Cornerstones of geodesy like permanent geodetic-astronomical latitudinal measurements and time determination, absolute measurements of Earth gravitation, or the proof of tidal effects on the solid Earth are closely connected with the name of Potsdam.

Until today, the GFZ is still one of the most important geodetic institutions worldwide. The success is based on the development and operation of own satellite missions and participation in international satellite missions (e.g., GFZ-1, CHAMP, GRACE and GRACE-FO, GOCE) to determine the Earth's gravity field and its time-varying components. Out of this base a broad expertise developed for the comprehensive, geodetic-based use of global satellite navigation systems for different application areas in Earth sciences. Another key aspect is the work of linking geodetic monitoring data with numerical models for understanding and predicting the Earth system processes. In all these areas the scientists of GFZ rank among the world's leading scientists and shaped the development of international modern geodesy.

In 2012, the 150th anniversary of the birth of modern international geodesy, which started with the founding of the "Central European Arc Measurement" in Potsdam and Berlin, was marked. As geodetic work is strongly based on mathematical methods and also the "Year of Mathematics of Planet Earth" was celebrated in 2013, it definitely was a very good decision to celebrate this anniversary with a Scientific Assembly of the IAG in Potsdam in 2013.

Even though the meeting could not be carried out on the site of the traditional royal observatories, the "History Day" session on Wednesday afternoon provided the opportunity to visit the historic buildings. The participants got that way an impression of today's geodetic research at GFZ.

Besides, all topics during lecture sessions were introduced by talks on historic aspects of this topic, and last but not least the IAG 2013 "History Day" at GFZ on Wednesday started with three remarkable plenary lectures:

-  From a regional project to an international organization: The "Baeyer-Helmert Era" of the International Association of Geodesy (1862–1916) by *Wolfgang Torge*,
-  The years of the World Wars and aftermath (1917–1959) by *Claude Boucher*, and
-  The Space Age (1960–1990) by *Ivan I. Mueller*.

During the History Day, all delegates could enjoy guided tours across the science campus Albert Einstein on Telegrafenberg hill with all its buildings that are of great importance both to historic as well as to recent aspects of geo-sciences. One of the highlights was the opportunity to visit the GFZ exhibition "From Pendulum Measurements to the GRACE Mission" in the library of the science campus which was carefully and thoroughly prepared by GFZ colleagues on occasion of IAG's 150th anniversary.



Exhibition poster, designed by Grit Schwalbe, GFZ



On their way to Albert Einstein Tower, Telegrafenberg hill



Guided tours across Albert Einstein Science Campus and BBQ during the History Day

Last but not least, Ruth Neilan and her team prepared an “[Ignite IAG session](#)” on the occasion of the History Day with ad hoc presentations to the IAG 150th anniversary which was highly informative and amusing at the same time.

Potsdam itself is a city of superlatives regarding sightseeing, last but not least with its world famous castles and parks... which made it as conference destination even more attractive.



Sanssouci Castle



Cecilienhof Castle



New Palais

3 IAG 2013 Committees

Scientific organizing committee (SOC)

Chair of SOC: Chris Rizos, President of IAG







-  Tonie van Dam, President Commission 1
-  Urs Marti, President Commission 2
-  Richard Gross, President Commission 3
-  Dorota Grejner Brzezinska, President Commission 4
-  Nico Sneeuw, President Inter-Commission Committee on Theory (ICCT)
-  Hansjörg Kutterer, Chair of the Global Geodetic Observing System (GGOS)
-  Riccardo Barzaghi, Representative of International Services
-  Thomas Herring, Representative of International Services
-  Ruth Neilan, Representative of International Services

Local organizing committee (LOC)



Chair of LOC: Harald Schuh, Vice President of IAG, GFZ

Assembly Secretary: Hermann Drewes, IAG Secretary General, DGFI, Munich

GFZ, Potsdam:

-  Melany Bohm
-  Frank Flechtner
-  Christoph Förste
-  Katrin Gundrum
-  Sibylle Itzerott
-  Jens Wickert

F&U confirm, Leipzig:

-  Susanne Lange
-  Ogarit Uhlmann

F&U confirm, a PCO (Professional Congress Organiser) had been asked to support GFZ concerning organisational matters. That comprised e.g. the assembly website www.iag2013.org, abstract handling, assistance to all delegates, registration, and partly management of the social program. F&U confirm is a Leipzig PCO and a spin-off of the Helmholtz Centre for Environmental Research – UFZ and experienced in international conference management in Germany and Europe offering a reasonable cost-performance ratio.

4 Budget and finance

Summary

From conference fees, about € 144,000 were generated, from 13 exhibitors and sponsors, which could choose from certain sponsoring packages, € 13,450 altogether. For social events, the participants paid € 10,950. Thus the gross conference income amounted to € 168,500.

The overall conference expenses amounted to € 175,700. The difference in the budget was covered by GFZ.

We'd like to mention that the History Day, together with the historical exhibition, induced expenses of about € 24,000. This position was quasi "extra" because of the 150th anniversary and wouldn't have to be considered when calculating future assembly budgets.






IAG supported the assembly not only with grants to individuals: IAG supported the History Day and covered the expenses for food and beverages.

Registration and conference fee

Conference fee	Early Bird*	Standard**	On-Site
Regular	€ 370	€ 420	€ 500
IAG Members	€ 330	€ 380	€ 450
(PhD) Students	€ 250	€ 280	€ 330

* June 26, 2013 ** August 28, 2013



In the conference fee were included:

-  public transport ticket per delegate for the whole conference week,
-  conference materials (program brochure with 48 pages and an insert for the History Day, pen, mouse pad, advertising material),
-  coffee breaks,
-  Icebreaker party and
-  History Day.

Lunch was not inclusive. Non-expensive snacks were offered by Dorint hotel during lunchtime.

Also not included were the Assembly dinner and the excursion on Saturday. Both had been charged with € 40.

Methods of payment

-  289 delegates had paid with credit card before the conference started.
-  30 delegates had paid with credit card on-site in Potsdam, and 11 by filling in a hard copy of a credit card form due to technical difficulties caused by the company that provided the credit card device.

- 🌐 55 delegates paid cash on-site in Potsdam (for conference fee, or for additional conference dinner tickets for their spouses, etc.).
- 🌐 All the other delegates had chosen bank transfer as payment method.

Number and geographic distribution of delegates

533 and 5 accompanying persons did participate in the IAG 2013 Assembly. The distribution of payments was as it follows:

Delegates	Early Bird	Standard	On-Site
Regular	191	79	21
IAG Member	77	14	1
(PhD) Student	81	18	6

For those who were interested in participating in the History Day only rather than in the whole Assembly, the opportunity was offered to book a ticket for that only (€ 50; 14 delegates).

IAG 2013 welcomed 9 guests of honour that mainly attended the opening session on Monday only (no conference fee). Six members of the Local Organising Committee were also invited to participate without paying conference fee. IAG 2013 hosted 8 IAG travel awardees (no conference fee, only payment for social events). The exhibition booths were manned by 8 exhibitors (not at the same times, they took turns). Five accompanying persons took part mainly in the social program (not in the list of participants). Furthermore, there are 16 persons who registered but did neither pay nor show up finally, and 8 persons who had paid but were unfortunately not able to attend.

Abstract fee

At this point, we would like to make a brief comment on the method using an abstract handling fee for the procedure of abstract handling. Actually, it was introduced in order to “discipline” the authors to make them stick to their intention of presenting a scientific contribution at the assembly. However, to say it straight off: We cannot recommend it, it turned out to be both costly and time-consuming. The procedure was as it follows:

For each abstract, an abstract submission fee of € 40 should be paid.

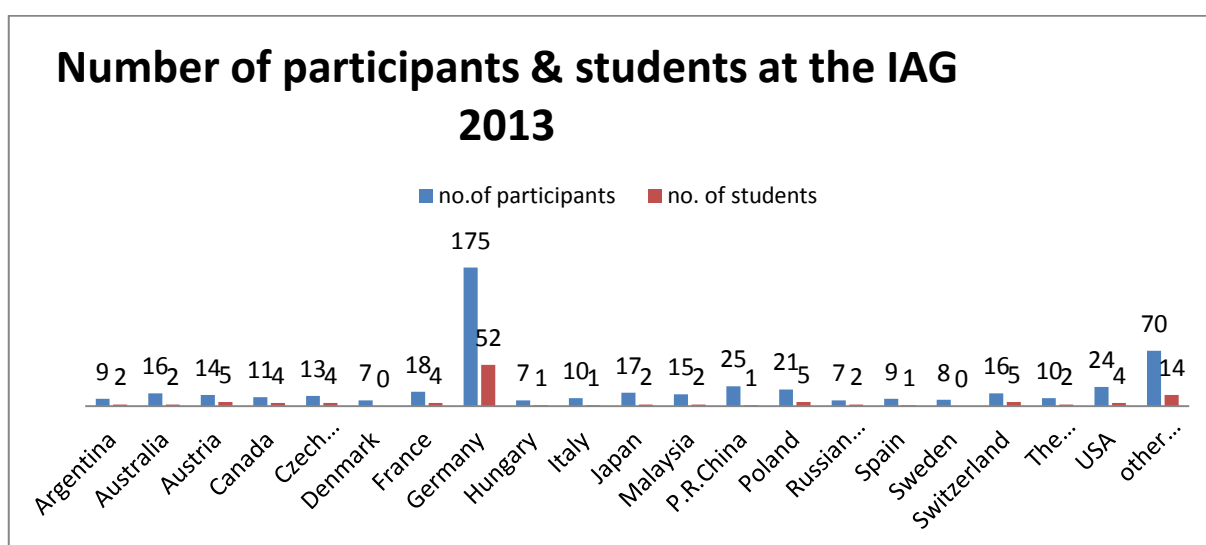
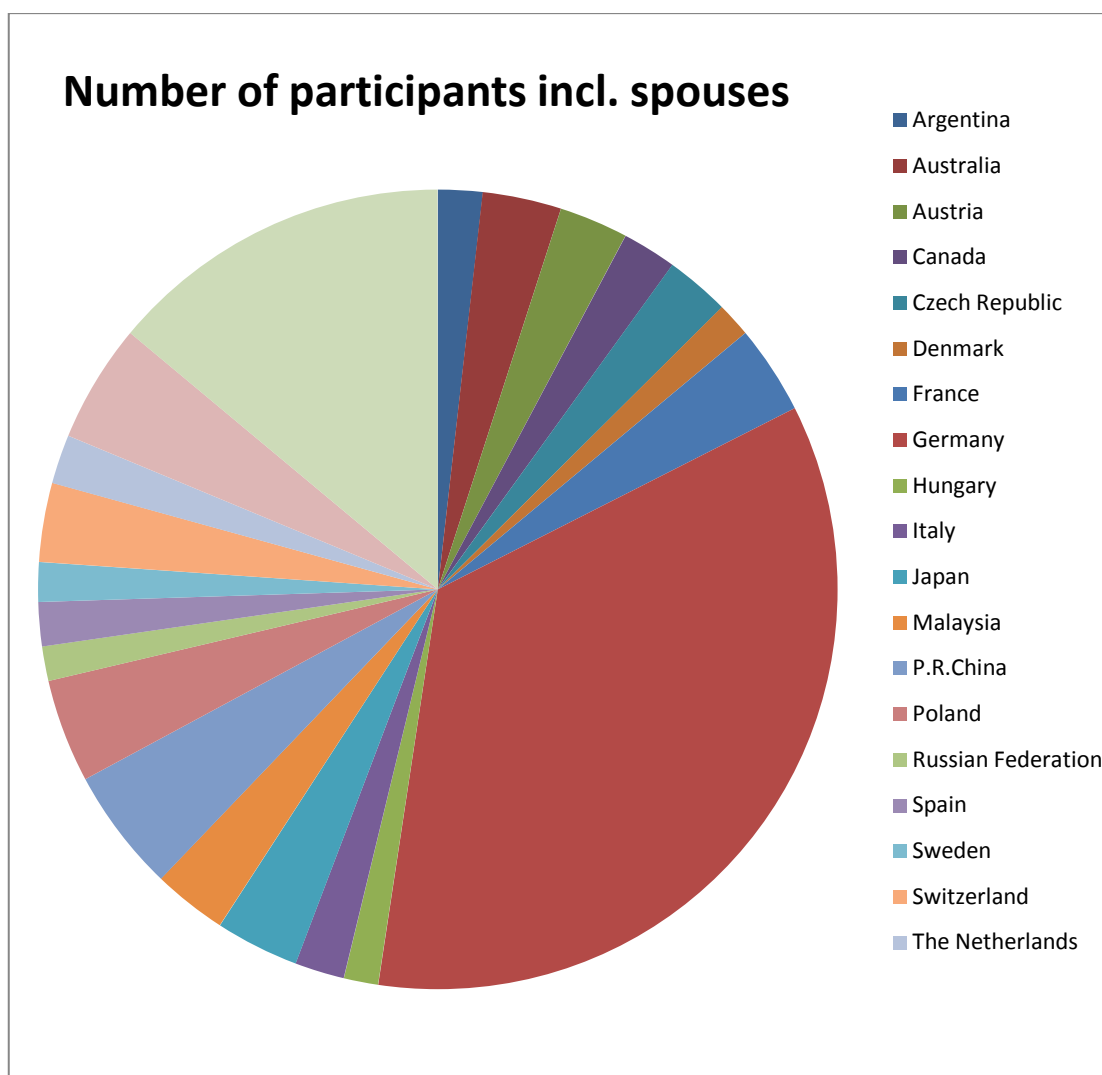
The abstract submission fee for the 1st abstract was charged against the conference fee later at the author’s registration. Further submission fees were neither refunded nor credited. There was also no refund of abstract fee in case that the abstract had not been accepted for presentation at the Assembly by the program committee. The deadline for payment of abstract submission fee was April 21st, 2013.

Payment of abstract submission fee and conference fee were two distinctive procedures. Abstracts were only sent to the scientific committee after the abstract submission fee arrived properly on the conference account.

However, the abstracts’ review started before all abstract fees were received. Finally, almost all authors paid their abstract fees but it took a lot of time, and we were very often facing difficulties concerning bank transfers and credit card payments (such as from South America or China). The abstract fee handling had been conducted by F&U confirm in close co-operation with the GFZ finance department.

5 Attending countries and their according numbers of delegates

Country (46)	No. of delegates	No. of students	No. of delegates incl. spouses
Argentina	9	2	9
Australia	16	2	17
Austria	14	5	14
Canada	11	4	12
Czech Republic	13	4	13
Denmark	7	0	7
France	18	4	18
Germany	175	52	200
Hungary	7	1	7
Italy	10	1	10
Japan	17	2	18
Malaysia	15	2	16
P.R. China	25	1	25
Poland	21	5	21
Russian Federation	7	2	7
Spain	9	1	9
Sweden	8	0	8
Switzerland	16	5	22
The Netherlands	10	2	10
USA	24	4	24
<i>Other Countries</i>	69	14	71
Sum	501	113	538
Other countries			
Greece	6	2	6
Luxembourg	6	3	6
New Zealand	5	1	5
Norway	5		6
Saudi Arabia	5		6
Turkey	5	2	5
Portugal	4		4
South Africa	4	1	4
UK	4		4
Brazil	3	1	3
Finland	3	1	3
Belgium	2		2
Chile	2		2
Estonia	2	2	2
Slovak Republic	2		2
Egypt	1	1	1
French Polynesia	1		1
Iceland	1		1
Indonesia	1		1
Latvia	1		1
Lithuania	1		1
Mexico	1		1
Mongolia	1		1
Peru	1		1
Serbia	1		1
Venezuela	1		1
Sum	69	14	71



Distribution diagrams (number of delegates / attending countries)

6 Marketing

Website

The IAG 2013 website at <http://www.iag2013.org> undoubtedly was the most important communication instrument. It always was kept up-to-date (about 60 updates). Layout, hosting, and maintenance were provided by F&U confirm, the content by the LOC. The colourful layout of the website was inspired by the colourful geoid image ("Potsdam Potato") used in the website header.

The website also offered a link to the IAG 2013 online registration that included the opportunity to pay by credit card. The abstract handling, however, was managed per e-mail.

The menu bar consisted of the items *Welcome, Publication (Abstracts formerly), Themes, Program, Committees, Register, Info, Venue, Sponsors, Hotels, Events (Icebreaker, Dinner, History Day, Excursion), Map Potsdam, Contact, and News.*

Numerous subpages were added according to the state of Assembly preparation.

The website will be active as long as it will be considered to be useful by the organizers.



Screenshots of the Assembly website
www.iag2013.org

Other marketing and communication means

About 10 mass e-mailings were sent mainly via exploders (first on October 17, 2012).

Besides, a so called "mini poster" (A4 landscape format) was designed and updated (as Call for Abstracts, etc.) and provided on the website for download. Additionally, the mini poster was attached to the mass mailings in its respective current version.

7 Conference venue Dorint Sanssouci Berlin / Potsdam

Address: Jägerallee 20, 14469 Potsdam, Germany.

Selection of conference venue: Because of the 150th anniversary and because of the – for European participants very convenient – location in the middle of Europe, a higher number of participants than the hitherto 300-500, up to 650, was considered likely beforehand. Large conference venues in Potsdam accommodate up to 500 participants only. The Dorint hotel is the only conference venue in Potsdam with capacities for up to 700 participants. The LOC was determined to avoid switching to nearby Berlin. So the Dorint was our - more or less - only, but as it turned out, excellent choice. First contacts to the Dorint hotel were made as early as April 2011.

The IAG 2013 Assembly made use of three lecture halls for parallel sessions that were disposed adjacent to each other. They were separated by removable folding walls so that a plenary room could be made available within 30 minutes.

One Dorint seminar room was used for splinter meetings (other splinter meetings were held at GFZ; however, at least one additional seminar room at Dorint for splinter meetings etc. would have been preferable). In this seminar room, the conference bags were packed, and it served as back office for the conference secretary, too.

The registration counter was situated in the hotel foyer. During conference hours, it was continuously manned by GFZ, student helpers and F&U confirm. In the foyer, also the poster exhibition with more than 200 posters (in two poster sessions that changed on Wednesday morning), the exhibition booths, and the catering area were situated close to each other – that guaranteed a good and lively atmosphere.



Coffee break at Dorint foyer

Student helpers

For technical assistance at the Dorint hotel, GFZ contracted 12 students of the Masters Program "Geodesy and Geoinformation Science" at Technical University Berlin, Department of Geodesy and Geoinformation Science. The group did a great job and was very helpful indeed. For future assemblies, we recommend to hire some wide awake, efficient and attentive master student helpers!

TUESDAY, 3 SEPTEMBER				
Time	Foyer			
08:00–09:00	Conference desk, help with check-in	Aum & Marc		
	Foyer (at Desk)	Lecture Hall 1	Lecture Hall 2	Lecture Hall 3
08:00–	Ramiro &	Aum (prep techn.)	Oladapo (prep techn.)	
09:00–	Maria	Noble (prep. techn.)	Felipe (prep. techn.)	
		Theme 2.4.4	GGOS Session	
09:00–	Ramiro	Aum (techn. assistance)	Oladapo (techn. assistance)	
10:30–		Noble (techn. assistance)	Felipe (techn. assistance)	
10:30–	Coffee & Posters:	Ramiro (prep techn.)	Murad (prep techn.)	Oladapo (prep techn.)
11:15–	Marc & Maria	Noble (prep. techn.)	Lu (prep. techn.)	Felipe (prep. techn.)
		Theme 2.4.5	Theme 5	Theme 6.2.3
11:15–	Maria	Ramiro (techn. assistance)	Murad (techn. assistance)	Oladapo (techn. assistance)
12:45–		Noble (techn. assistance)	Lu (techn. assistance)	Felipe (techn. assistance)
12:45–	Lunch:	Aum (prep techn.)	Elisabeth (prep techn.)	Prayag (prep techn.)
14:00–	Ramiro & Noble	Marc (prep. techn.)	Chetan (prep. techn.)	Maria (prep. techn.)
		Theme 2.4.6	Theme 5	Theme 6.3
14:00–	Murad	Aum (techn. assistance)	Elisabeth (techn. assistance)	Prayag (techn. assistance)
15:30–		Marc (techn. assistance)	Chetan (techn. assistance)	Maria (techn. assistance)
15:30–	Coffee & Posters:	Aum (prep techn.)	Elisabeth (prep techn.)	Prayag (prep techn.)
16:00–	Murad & Lu	Marc (prep. techn.)	Chetan (prep. techn.)	Maria (prep. techn.)
		Theme 2.2.1	Theme 5	Theme 6.1.2
16:00–	Lu	Aum (techn. assistance)	Elisabeth (techn. assistance)	Prayag (techn. assistance)
17:30–		Marc (techn. assistance)	Chetan (techn. assistance)	Maria (techn. assistance)
18:00–			IAG Council: Elisabeth & Chetan	

Helpers' staff plan example (Tue, Sep 3)



Our multinational master students helper team (only nine of altogether twelve were spontaneously available for a photo)

8 Themes

The following Assembly themes and their convenors were specified by the SOC.

Theme 1: Definition, Implementation and Scientific Applications of Reference Frames

Convenors: T van Dam, Z Altamimi, C Brunini, J Dawson, S Jin, J Torres

Reference systems and frames are of primary importance for many geoscience applications, for satellite navigation and many other geospatial applications. A precisely defined reference frame is needed for quantifying, e.g. Earth rotation and its gravity field, global and regional sea level variations, tectonic motion and deformation, post-glacial rebound, geocentre motion, large scale deformation due to earthquakes, local subsidence and crustal dislocations. The primary scope of this Theme is to address today's achievements regarding the theoretical concepts of reference systems, their practical implementation, the underlying limiting factors, future improvements to reference frame definition, and reference frame requirements in the geosciences and in society at large. Contributions are invited in the following topic areas:

1. Theory and realisation of global terrestrial reference systems.
2. Modelling standards and processing strategies for space geodetic techniques.
3. Interaction between the celestial and terrestrial reference frames.
4. Definition and establishment of vertical reference systems.
5. Regional reference frames.
6. Scientific, and other applications of terrestrial reference frames.

Theme 2: Gravity Field Determination and Applications

Convenors: U Marti, S Bettadpur, H Abd-Elmotaal, R Pail, L Sanchez, L Vitushkin, Y Wang, J Huang, X Deng, S Jin, A Eicker

Recent dedicated satellite gravity missions - especially GRACE and GOCE - are providing extremely high precision gravity field data. The derived new global geopotential models have greatly advanced our knowledge of the Earth's static and dynamic gravity field, which therefore improves the modelling of the geoid, ocean currents and the density structure of the Earth's interior and provides the possibility of unifying regional height systems around the world. These models derived from space gravity provide with unprecedented accuracy and resolution a unique opportunity to investigate mass transport associated with hydrology, oceans, cryosphere, atmosphere, solid earth and climate change. In order to maintain and improve gravity field monitoring also in the future, follow-on missions have to be developed. Terrestrial, shipborne and airborne absolute and relative gravity observations in combination with the satellite-derived models increase gravity field knowledge even further, and allow more specific regional and local studies. Contributions are invited in the following topic areas:

1. Actual and future satellite gravity missions.
2. Global gravity field models.
3. Satellite altimetry analysis and applications.
4. Regional gravity and geoid studies.
5. Mass transport studies.
6. Unification of height systems.

Theme 3: Observing, Understanding and Assessing Earth Hazards

Convenors: M Hashimoto, J Baez, M Cocco, T Dixon, I Doukas, W Lengert, J Freymueller

Mitigating the impact on human life and property of natural hazards such as earthquakes, volcanic eruptions, debris flows, landslides, land subsidence, tsunamis, floods, storm surges, hurricanes and extreme weather is an important task to which geodetic measurements can make fundamental contributions. GNSS and InSAR can be used to monitor the pre-eruptive deformation of volcanoes and the pre-seismic deformation of earthquake fault zones, aiding in the issuance of volcanic eruption and earthquake warnings. GNSS can also be used to rapidly estimate earthquake fault motion, aiding in the modelling of tsunami genesis and the issuance of tsunami warnings. Gravity measurements can be used to track mass motion within volcanic conduits; and gravity and altimetric measurements can be used to track floodwaters in river basins. Geodetic measurements are also essential for understanding the processes causing the hazard, for assessing the risks of the hazard, for monitoring the development of the hazard, for deciding whether or not to issue a warning, and to support rescue and damage assessment activities. Contributions are invited in the following topic areas:

1. Technologies and methodologies of hazard warning systems.
2. Geometric and gravimetric techniques in observing and assessing Earth hazards.
3. Current and future Earth hazard observing systems.
4. Regional and local case studies.
5. Innovative use of imaging systems such as Lidar and InSAR for Earth hazard studies.
6. The challenges of assessing hazard risk from geodetic (and other) observations.

Theme 4: Science and Applications of Earth Rotation and Dynamics

Convenors: R Gross, A Brzezinski, C Huang, SA Khan, S Pagiatakis, M Thomas, T Herring

The solid Earth is subject to a wide variety of forces including external forces due to the gravitational attraction of the Sun, Moon, and planets, surficial forces due to the action of the atmosphere, oceans, and water stored on land, and internal forces due to earthquakes and tectonic motions, mantle convection, and coupling between the mantle and both the fluid outer core and the solid inner core. The solid Earth responds to these forces by displacing its mass, causing changes in gravity, deforming its shape, and changing its rotation. Geodetic observing systems can measure these changes in gravity, shape, and rotation and can therefore be used to study both the forcing mechanisms themselves and the solid Earth's response to the forcing mechanisms. As a result, geodetic observing systems can be used to gain greater understanding of the dynamic Earth system and of the Earth's interior structure. This Theme will provide forums for discussing the geodetic observing systems used to measure changes in the Earth's shape and rotation, the characteristics of those measurements, and their interpretation in terms of the structure and dynamics of the Earth system. Contributions are invited in the following topic areas:

1. Geophysical interpretation of the nutations and precession of the Earth.
2. Long period variations in Earth rotation (including pre-space based measurements).
3. Fluid effects of Earth rotation variations.
4. Relationship between the Earth's gravity field and Earth rotation variations.
5. The accuracy of current measurement systems for polar motion, nutation, and LOD.
6. Near real-time Earth rotation measurements from satellite-based systems.

7. Relationship between dynamic and kinematic definitions of Earth rotation variations.
8. Relationship between different definitions for the rotational reference system.

Theme 5: Observation Systems and Services

Convenors: H Kutterer, R Barzaghi, S Bonvalot, U Hugentobler, B Luzum, R Neilan

Theoretical and methodological developments in geodesy have always been accompanied by actual observations of geodetic parameters. Today, continuously operating observing networks and systems are state-of-the-art. Nevertheless, depending on particular tasks, observing in campaigns can still be the best-practice solution. From its beginnings, the IAG has established services which contribute to science and society. An important breakthrough was achieved in the 1990s with the establishment of fully operational IAG services for modern space geodetic techniques, such as the IGS, the ILRS, IDS and the IVS. The definition and establishment of the Global Geodetic Observing System is the logical consequence of such an evolution. Geodetic observatories, and the complex data and analysis infrastructure underpinning the IAG services are the backbone of scientific work in many fields, and in support of geospatial activities in general. Contributions in this Theme are invited in the following topic areas:

1. Theory, methodology and application of observation networks, systems and services.
2. Present challenges for geodetic observatories.
3. Development of geodetic observation and data infrastructure.
4. State-of-the-art of the IAG services.
5. The Global Geodetic Observing System (GGOS).
6. Integrated analysis and combined products of geometry, gravity and Earth rotation.

Theme 6: Imaging & Positioning Techniques and Applications

Convenors: D Brzezinska, X Deng, A Kealy, G Retscher, C Toth, S Verhagen, P. Wielgosz, J Wang

Topics under this Theme relate to the new geodetic imaging technologies based on optical and radar sensors on the one hand, and various GNSS and non-GNSS positioning technologies on the other hand. Both classes of technologies are making profound contributions to the geosciences, the geospatial industry, and to society in general. This includes scientific issues and applications. Investigations into the development and implementation of geodetic imaging techniques include design, construction, characterisation, and installation of imaging sensors; testing and calibration; integrated platform guidance, navigation, direct georeferencing and integrated sensor orientation; algorithms for automated extraction of geospatial information; algorithms for integrating imaging techniques and RF-based technologies; real-time implementation of vision-based navigation algorithms; system architectures and algorithms for data fusion of multi-sensor systems; map/database aided positioning and navigation. GNSS related investigations continue into future multi-frequency, multi-constellation systems; availability performance for various architectures; integrity monitoring techniques; interoperability among augmentation systems; and compatibility, interoperability, constellation design & characteristics of new GNSSs; as well as a variety of applications issues such as the use of GNSS for PNT as well as remote sensing, and alternatives to GNSS in GNSS-challenged environments. Contributions in this Theme are invited in the following topic areas:

1. Imaging and RF sensor integration and modelling.
2. GNSS algorithms and methods.

3. Multi-constellation GNSS and emerging GNSS.
4. Alternatives and Backups to GNSS.
5. Modern PNT and its applications.
6. GNSS-based remote sensing, such as troposphere, ionosphere & reflectometry studies.

At the start of each theme, a plenary talk on a historic topic was given (30 min). A regular talk consisted of 15 min including discussion.

9 Abstracts, abstract handling & program



Six themes comprising 6–8 subthemes were specified by the SOC (please see themes above).

We asked for abstracts of 1 page in an open text format, preferably .doc, docx, or rtf. The template was available on the Assembly website. Each abstract was registered in the list of abstracts, and the receipt of every single abstract was confirmed per e-mail individually. The abstract handling was conducted by F&U confirm.

On October 17, 2012, the Call for Abstracts was sent via e-mail exploders, and at the same time it was made available on the assembly website (also by means of an A4 mini poster). Deadline for abstract submission and payment of abstract submission fee was April 21, 2013.

On December 20, 2012, a reminder was sent per e-mail to make sure that all geodesists have a Merry Holiday Season.

The Scientific Organizing Committee provided the following frame for presentations:

-  Oral presentations: 12 min lecture + 3 min of discussion in Thematic Sessions = 15 min for each speaker.
-  Poster presentations (poster unit size was A0 upright size, i.e., 84.1 x 118.9 cm / 33.1 x 46.8 inch. Material for mounting was provided.)







Altogether, 470 abstracts were received, 280 for talks and 190 for posters.

They were distributed as follows (numbers slightly rounded):

Talks	Posters	Waiting list
250	190	30

On the occasion of the 150th anniversary, all convenors were asked to invite a speaker for a session keynote of 30 min that reflects especially the history of the session theme.

Themes' distributions

-  Theme 1: 6 sessions → 15 % of all oral contributions
-  Theme 2: 17 sessions → 42 % of all oral contributions (one session had to take place in parallel; this theme also included abstracts of sub-theme 1.4.)
-  Theme 3: 6 sessions → 13 % of all oral contributions (5 x 30 min at the beginning of each session, only once a sub-theme spreads over 2 sessions.)
-  Theme 4: 2 sessions → 5 % of all oral contributions
-  Theme 5: 3 sessions → 7 % of all oral contributions (incl. plenary session GGOS with invited speakers only.)
-  Theme 6: 7 sessions → 13.5 % of all oral contributions

On the next page, please find the program overview.




At the beginning, no binding requirements were set so that all convenors had the chance to accept as many talks as they like. It was clear, however, that it will not be possible in the case of Theme 2 always to avoid parallel theme 2 sessions.

Abstracts review / Co-operation with convenors

All abstracts were sorted and their files named according to type (oral or poster), theme, and author. They were saved to a comprehensive list of abstracts (xls). A unique abstract identification number was assigned to each abstract in order to ease the communication as much as possible.

After the Call for Abstracts was closed, a mailing was sent to all main convenors of each theme (cc to their co-convenors) with the login data for a cloud with their abstracts and a theme-specific Excel list of abstracts.

F&U confirm asked them on the behalf of the LOC and SOC to

-  take at the beginning of each theme one historical lecture of 30 min into consideration;
-  indicate the form of presentation in a red column which was provided in the list (P for Poster, O for Oral and W for Waiting list);
-  Indicate in another red column named "Order of Presentations" the order of their lectures within their theme.

F&U confirm pointed out that it is likely that some talks will be cancelled. Therefore, a waiting list was introduced. These waiting list authors received the notification that they had been accepted for poster presentation but might become a lecture in case that a time slot gets available.

The convenors were also asked to send abstracts (which were regarded worthy to be reviewed) which did not fit in their theme to F&U confirm along with the abstract no. and – if possible – an alternative theme assignment. They were asked to label these abstracts as "Rejected" in their theme-specific list. These abstracts were forwarded to the SOC. The SOC tried to find a better fitted space for these abstracts.

Any other "rejected" abstract would have been rejected for the complete Assembly, but this case did not occur.

Preliminary IAG 2013 Assembly Program

Monday, 2 September

Time	Foyer	Lecture Hall 1	Lecture Hall 2	Lecture Hall 3
09:30-11:00		Theme 2.4.1		Theme 6.2.1
11:00-11:45	Coffee break and Poster Session: theme 2 (sub themes 2, 4 and 6), theme 5 and theme 6			
11:45-13:15		Theme 2.4.2	Theme 2.6.1	Theme 6.2.2
13:15-14:30	Lunch and Poster Session: theme 2 (sub themes 2, 4 and 6), theme 5 and theme 6			
14:30-16:00		Theme 2.4.3	Theme 2.6.2	Theme 6.4
16:00-16:30	Coffee break and Poster Session: theme 2 (sub themes 2, 4 and 6), theme 5 and theme 6			
16:30-18:00			Plenary Session: Opening	
18:00	Icebreaker at the conference venue DORINT			

Tuesday, 3 September

Time	Foyer	Lecture Hall 1	Lecture Hall 2	Lecture Hall 3
09:00-10:30		Theme 2.4.4	GGOS Session - Plenary Penal Discussion	
10:30-11:15	Coffee break and Poster Session: theme 2 (subthemes 2, 4 and 6), theme 5 and theme 6			
11:15-12:45		Theme 2.4.5	Theme 5.1	Theme 6.2.3
12:45-14:00	Lunch and Poster Session: theme 2 (subthemes 2, 4 and 6), theme 5 and theme 6			
14:00-15:30		Theme 2.4.6	Theme 5.2	Theme 6.3
15:30-16:00	Coffee break and Poster Session: theme 2 (sub themes 2, 4 and 6), theme 5 and theme 6			
16:00-17:30		Theme 2.2.1	Theme 5.3	Theme 6.1.1
18:00			IAG Council	

Wednesday, 4 September

Time	Foyer	Lecture Hall 1	Lecture Hall 2	Lecture Hall 3
09:00-10:30		Theme 2.2.2	Theme 4.1	Theme 6.1.2
10:30-11:15	Coffee break and Poster Session: theme 1, theme 2 (sub theme 1, 3, 5), theme 4, theme 3			
11:15-12:45		Theme 2.3.1	Theme 4.2	Theme 1.3
12:45-13:45	Lunch and Poster Session: theme 1, theme 2 (sub theme 1, 3, 5), theme 4, theme 3			
14:30	History Session at the GFZ (Telegrafenberg)			
17:30	Barbeque at the GFZ (Telegrafenberg)			
19:30	Ignite IAG with ad hoc pres. to the IAG 150th anniversary. R. Neilan & team at the GFZ (Telegrafenberg)			

Thursday, 5 September

Time	Foyer	Lecture Hall 1	Lecture Hall 2	Lecture Hall 3
09:00-10:30		Theme 2.5.1	Theme 3.1	Theme 1.5
10:30-11:15	Coffee break and Poster Session: theme 1, theme 2 (sub theme 1, 3, 5), theme 4, theme 3			
11:15-12:45		Theme 2.5.2	Theme 3.2	Theme 1.1a
12:45-14:00	Lunch and Poster Session: theme 1, theme 2 (sub theme 1, 3, 5), theme 4, theme 3			
14:00-15:30		Theme 2.5.3	Theme 3.3	Theme 1.1b
15:30-16:00	Coffee break and Poster Session: theme 1, theme 2 (sub theme 1, 3, 5), theme 4, theme 3			
16:00-17:30		Theme 2.1.1	Theme 3.4	Theme 1.2a
19:00	Conference Dinner: Havel Boat Tour			

Friday, 6 September

Time	Foyer	Lecture Hall 1	Lecture Hall 2	Lecture Hall 3
09:00-10:30		Theme 2.1.2	Theme 3.5	Theme 1.2b
10:30-11:15	Coffee break and Poster Session: theme 1, theme 2 (sub theme 1, 3, 5), theme 4, theme 3			
11:15-12:45		Theme 2.1.3	Theme 3.6	Theme 1.6
12:45-13:10	Snack Lunch / Refreshment			
13:10-14:05			Plenary Session: Closing	

Opening Session: Welcome Address, Words of Greetings from Invited Politicians and Sister Organisations

Themes

Theme 1:	Definition, Implementation and Scientific Applications of Reference Frames
Theme 2:	Gravity Field Determination and Applications
Theme 3:	Observing, Understanding and Assessing Earth Hazards
Theme 4:	Science and Applications of Earth Rotation and Dynamics
Theme 5:	Observation Systems and Services
Theme 6:	Imaging & Positioning Techniques

Time schedule

Notifications of acceptance (oral, poster, waiting list – there were no rejections) were sent individually to all authors on May 27, 2013. To minimize “program gaps”, all authors were informed that if their oral presentation(s) had not been confirmed by their registration and conference fee payment before June 30, 2013, their abstract(s) will automatically be changed into a poster. The subsequent payment behaviour was fairly satisfying which supports our belief that an abstract fee can be skipped.

On May 24, 2013, a program overview was sent to all convenors/reviewers. The reviewers were informed that it was planned to upload the program on the Assembly website on Friday, June 28, 2013, and to simultaneously send it to all authors.

Early bird payment and early bird registration ended on June 26, 2013.

Book of Abstracts

All abstracts were made available as PDF file in the book of abstracts (for download on the Assembly website). The book of abstracts was not printed; however, full text search is possible that way.

Presentations












The PowerPoint / pdf presentations of all authors of oral presentations who agree to this and who own the copyright of all content presented will be published as PDF portfolios on the Assembly website.

Publications

All abstracts accepted and presented at the Assembly (oral or poster) may be submitted as papers for publication in the official peer-reviewed *IAG Symposia Series* at Springer Publisher.

Manuscripts for possible publication in the proceedings have to be submitted for peer-review through the *IAG Symposia Editorial Manager* following the *INSTRUCTIONS FOR AUTHORS* supplied therein. Deadline for submission was October 15, 2013.

Splinter meetings

-  Joint Board of Geoinformation Societies (JBGIS)
-  GIAC Meeting
-  IAG Executive Committee
-  ILRS AWG
-  IAG Commission 1
-  IAG Sub-Commission 2.4d
-  IAG Council
-  Joint Commission 2 – IGFS Meeting
-  GGOS EC Meeting
-  Altimetry Round Table
-  IVS Directing Board

10 Social Program

Icebreaker Party

The Icebreaker Party took place at the conference venue Dorint Potsdam on Monday, September 2, 2013, 6 pm. Pretzels, finger food, fruits, and various beverages were served. Parallel to the icebreaker party, the conference registration continued.

The Icebreaker was included in the conference fee. For a more secure calculation, we, however, asked in the online registration tool nonetheless if participation in this event was intended. For accompanying persons who did not pay the conference fee, € 20 were charged.

History Day (see also Chapter 2)

The History Day took place at GFZ on Wednesday, September 4, 2013 (after the morning session).

The program was as follows:

14:30 Welcome by Harald Schuh, Introduction by Chris Rizos, Greetings of the Research Minister of the State of Brandenburg, Sabine Kunst, followed by three historic talks chaired by Hermann Drewes

16:30 Guided tours in groups to the historical facilities at Telegrafenberg (first group)

Guests not taking part in a guided tour had other options at this point: The geodetic exhibition “From pendulum measurements to the GRACE mission” could be visited, videos could be watched in the lecture hall, and drinks and small appetizers were already served at the BBQ site.

The exhibition containing a huge variety of fascinating historical devices and pieces of equipment as well as some noteworthy documents was located in the library of Telegrafenberg campus in building A 17, the former Prussian Royal Geodetic Observatory, accommodating today, besides the library, Department 1 »Geodesy and Remote Sensing« of GFZ. 16:30 Videos from previous IAG Assemblies (supplied by Christian Tscherning) 17:30 Barbecue celebration »150 Years IAG« (free food and drinks) and great live music

18:00 Guided tours in groups to the historical facilities at Telegrafenberg (second group)

19:30 [Ignite IAG](#) with ad hoc presentations to the IAG 150th anniversary | Ruth Neilan & her team

21:30 End of History Day

Shuttle busses were organized, and GFZ staff as well as student helpers coordinated the way from Dorint Hotel to the Science Campus Albert Einstein at Telegrafenberg.

The participation in the History Day was included in the registration fee for the assembly but for those who only attended the History Day (and not the whole assembly), € 50 were charged.



Different facets of the History Day

Assembly Dinner

The Conference Dinner took place on Thursday, September 5, 2013 (start: 7 pm), on board of the Panorama Ship “MS Sanssouci” (180 delegates did register beforehand during the online registration, eventually 230 did participate).

During the three hours evening cruise, the traces of former kings and queens of the Hohenzollern dynasty belonging to the UNESCO World Heritage were followed. The most beautiful sights in Potsdam and the southern area of Berlin could be seen lined up next to one another like a string of pearls along the banks of the river Havel: The Palace and Park Babelsberg, the tower “Fla-towturm” and the “Small Palace”, the Glienicke Park, the Palace on Peacock Island, the Church at Sacrow, the New Garden with the Marble Palace and Cecilienhof Castle, where the Potsdam Agreement was signed in the summer of 1945. Further highlights were the new Hans Otto Theatre and the famous Glienicke Bridge. On the tour the chef de cuisine offered a delicious buffet.

The price was € 40 per person, including dinner buffet and a limited number of drinks (beer or wine or soft drinks), because in case that a certain limit was reached (and we reached it before 10 pm), all participants were informed that they have to pay their drinks by themselves from this point.



IAG 2013 Assembly Dinner

Bus excursion to Berlin

The bus excursion took place on Saturday, September 7, 2013 (departure Dorint hotel: 9:00 h, return to Dorint hotel: ~14:30 h). We had 12 registrations and finally 9 participants only. However, we decided to organise this trip with a smaller bus, nevertheless.

From Potsdam, the bus took a route via the famous bridge Glienicker Brücke to Berlin-Wannsee. The tour covered lots of famous sights in West and East, historical and shiny new quarters, crowded hotspots and beautiful neighbourhoods, government, embassy and museum quarters, spiced up with interesting facts and curious background stories. At several points, participants could get off the bus to take a closer look.

The excursion could be booked during the online registration procedure (price: € 40).

11 Awards

The IAG Travel Award

Purpose: The award is established to assist young scientists from member countries to present results of their research at IAG meetings (assemblies, symposia, workshops, etc.).

Eligibility: The applicant must present results of his or her research at the meeting and must be 35 years of age or less at the date of the application. The application must be supported by at least one IAG Fellow or two Associates.

Type of awards: There are two awards, one for meetings in the applicant's own country, and the other for meetings outside the applicant's country. The first is called IAG National Travel Award and has a maximum financial value of US \$ 500. It is available for meetings in developing countries. The second is called IAG International Travel Award and has a maximum financial support of US \$ 1000. The amounts can occasionally be adjusted by the IAG Executive Committee. It was adjusted last in 2011.

Application procedure: Applicants are asked to send their application at least three months before the meeting to the IAG Secretary General. As a minimum, the application should contain: title, authors, and abstract of the paper to be presented, acceptance by the organising committee (if available), travel budget and sources of additional funding. The letter(s) of support (one IAG Fellow or two Associates) should be sent separately.

Selection procedure and criteria: Selection of applicants will be done by the IAG Bureau. It will be based on the paper to be presented, the letter(s) of support, and the applicant's ability to actually attend the meeting. Priority will be given to candidates from developing countries.

Additional benefits: The IAG will encourage the organizers of the meetings to waive the registration fees for all IAG Travel award winners.

IAG provided travel grants to eight delegates (listed below). Their registration fees were waived. Some of the awardees had paid abstract fees, they were refunded during the assembly. The LOC was not involved with the allocation of grants.

Name	First name	Institution	City	Country
Amjadiparvar	Babak	Department of Geomatics Engineering, University of Calgary	Calgary	Canada
Andrasik	Ewa	Fac. of Geodesy & Cartography, Warsaw Univ. of Technology	Warsaw	Poland
Ebauer	Konstantin	Space geodesy department, Institute of Astronomy, RAS	Moscow	Russia
Mohamed	Saleh Ahmed		Darmstadt	Germany
Odolinski	Robert	GNSS Research Centre, Curtin University of Technology	Perth	Australia
Sokolova	Yulia	Pulkovo Observatory	St Petersburg	Russia
Wang	Lin	Geophysics Lab, University of Luxembourg	Luxembourg	Luxembourg
Werlich	Renata	Federal University of Parana	Sao Jose dos Pinhais	Brazil

IAG 2013 Students' Best Talks & Best Posters Awards

There were public (PhD) students' best talks and best posters awards with attractive prizes (money and books; all books were sponsored by De Gruyter). All posters and talks did participate of which the first author was a (PhD) student.

The award ceremony took place during the closing session (with snack lunch) on Friday, Sep 6, 2013.

All participating talks were labelled in the conference brochure with an asterisk*, all participating posters were also marked that way and had in addition a coloured label on their poster boards so that they could be recognized easily.

All assembly delegates had an evaluation form in their conference bags to be returned to the conference desk at Dorint Hotel.

Best presentation awards

The first prize was granted to **Mathis Bloßfeld** (Deutsches Geodätisches Forschungsinstitut, Munich, DE) for the presentations entitled *"Epoch reference frames as short-term realizations of the ITRS – recent developments and challenges & Satellite Laser Ranging – a tool to realize GGOS?"*

The second prize was granted to **Liang Wenjing** (Deutsches Geodätisches Forschungsinstitut, Munich, DE) for the presentations entitled *"Combination of GNSS observations and electron density profiles from Radio Occultation data for the determination of a multi-scale regional ionosphere model."*

The third prize was granted to **Sara Bruni** (University of Bologna, DIFA, Dipartimento di Fisica e Astronomia, Italy) for the presentations entitled *"The STARS methodology for detecting discontinuities in GPS coordinates time series"*.

Best poster awards

The first prize was granted to **Krzysztof Sosnica** (Astronomical Institute, University of Bern, Switzerland) for the presentation entitled *"Time variable Earth's gravity field from SLR and GNSS satellites"*.

The second prize was granted to **Benedikt Soja** (Helmholtz Zentrum Potsdam, GeoForschungsZentrum GFZ, Potsdam, DE) for the presentation entitled *"Sun corona electron densities from VLBI and GIM data"*.






The third prize was granted to **Ulla Kallio** (Finnish Geodetic Institute, Finland) for the presentation entitled *"Daily based local ties"*.

12 Sponsors and exhibitors








Requests for sponsorship had been addressed to a number of companies in surveying and satellite technology, and to publishers as well. From these funds, e.g., the prizes for the best students posters and talks were donated.

The space for exhibitors at Dorint Hotel was very limited. Therefore, it was decided to offer sponsoring packages in addition to the opportunity to have a manned booth on-site.

This was our sponsoring catalogue:

-  We put your give-aways (pens, sweets, etc.) / your flyers, CDs etc. on a table EUR 250
-  We put your give-aways in our conference bags (pens, notepads, sweets, etc.): EUR 300
-  We put your flyers / CDs etc. in our conference bags: EUR 400
-  1 page in the IAG 2013 program / conference booklet: EUR 500
-  1/2 page in the IAG 2013 program / conference booklet: EUR 300

Please contact us in case that you are interested in sponsoring

-  a coffee break
-  a lunch break
-  the icebreaker party
-  the conference dinner
-  the conference program / conference booklet
-  public transport tickets
-  a conference app running on many platforms

Please let us also know if there are any further suggestions. Of course we will appreciate your commitment in our conference publications and on the conference website.

IAG 2013 had two exhibitors (Leica und Alberding) and 13 sponsors (including both exhibitors).

We cordially would like to thank our exhibitors and sponsors:



13 Contact

In case that there are any questions, please do not hesitate to get in contact:

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