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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). 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

Books for review are the responsibility of:

C.C Tscherning
University of Copenhagen
Dept. of Geophysics
Copenhagen, Denmark
Fax: +45 35365357
E-mail: cct@gef.ku.dk

General Announcements

ILRS News

The first 3-way simultaneous laser ranging to the Lunar Reconnaissance Orbiter (LRO) occurred Monday November 1st. NASA's Next Generation Satellite Laser Ranging Station (NGSLR) located at the Goddard Geophysical and Astronomical Observatory and operated by NASA GSFC, McDonald Laser Ranging System (MLRS) operated by the University of Texas, and the NASA Laser Ranging Station in Monument Peak California also operated by NASA GSFC, all successfully ranged to LRO during the same hour period. Analysis of the data will be performed by the LOLA Science Team. Simultaneous data allows more detailed comparison of the station biases, potentially permits a geometric solution of the spacecraft position, and provides a demonstration of what is possible for future planetary tracking using lasers.

The objective of LRO Laser Ranging (LRO-LR) system (<http://lrolr.gsfc.nasa.gov/>) is to enable the spacecraft to achieve its precision orbit determination requirement. The LR makes one-way range measurements via laser pulse time-of-flight from Earth to LRO, and determines the position of the spacecraft at a sub-meter level with respect to Earth and the center of mass of the Moon.

JAN MCGARRY
NASA Goddard Space Flight Center

Vacant position at Astronomical Institute, Faculty of Science, University of Bern

Applications are invited for a full professorship in Fundamental Astronomy/Space Geodesy including the Directorate of the Astronomical Institute,

opening August, 1, 2011, at the Astronomical Institute, University of Bern, Switzerland (<http://www.aiub.unibe.ch>). Candidates should have a strong research record in fundamental astronomy, e.g., **space geodesy** and **astrodynamics** in the broadest sense. Current research activities of the institute include space geodesy using GNSS and satellite laser ranging, gravity field determination and optical surveys for natural and artificial bodies in the solar system. Future research might be extended towards the study of the orbital and rotational motion of planets including their natural and artificial satellites, and to other planetary system bodies such as asteroids, and comets. The institute develops and operates the Zimmerwald Observatory. The successful candidate is expected to direct the institute's research activities, to attract external funding, and to actively participate in the teaching and supervision of Bachelor and Master students, as well as Ph.D. students.

The University of Bern particularly encourages women to apply for this position.

Applications including a curriculum vitae, a publication list, copies of the five most important publications, a brief outline of past and future research, and a list of external funds raised, should be sent either as a hard copy to Prof. S. Decurtins, Dean of the Faculty of Science, University of Bern, Sidlerstrasse 5. CH-3012 Bern, Switzerland, or as a single PDF-file via e-mail to: dekan@natdek.unibe.ch, by **31 January 2011**.

Meeting Announcements



2011 IAG General Assembly
at IUGG2011: “Earth on the Edge: Science for a Sustainable Planet”
Melbourne Convention and Exhibition Centre, Australia
 28th June – 7th July, 2011

- Registrations opened 16th August, 2010
- Early Bird Registration Deadline 11 April 2011
- Standard Registration Deadline 24 June 2011
- Abstract submission period 16th August, 2010 – 17th January, 2011
- Conference website now open: <http://www.iugg2011.com>
- Scientific program of symposia, workshops, fieldtrips, symposia convenors, plenary and keynote speakers already available on website

The IAG Scientific Program consists of the following program of symposia:

IAG ONLY SYMPOSIA (see website www.iugg2011.com under Scientific Program for symposia descriptions, convenors names and Keynote Speakers)

- G01** Reference Frames from Regional to Global Scales
- G02** Monitoring and Modelling of Mass Displacements by Geodetic Methods
- G03** Monitoring and Modelling Earth Rotation
- G04** Multisensor Systems for Engineering Geodesy
- G05** Geodetic Imaging Techniques
- G06** Towards a Unified World Height System
- G07** High Precision GNSS

IAG - JOINT ASSOCIATION SYMPOSIA (see website www.iugg2011.com under Scientific Program for symposia descriptions, convenors names and Keynote Speakers)

- J-G01** Space Geodesy-based Atmospheric Remote Sensing as a Synergistic Link between Geodesy and Meteorology
- J-G02** Application of Geodetic Techniques in Cryospheric Studies
- J-G03** History of Geosciences from Terrestrial to Spaceborne Observations
- J-G04** Structure and Deformation of Plate Interiors
- J-G05** Integrated Earth Observing Systems
- J-G06** Tectonic Geodesy and Earthquakes

The theme for **the** IUGG2011 conference at large is “*Earth on the Edge: Science for a Sustainable Planet*”. IUGG2011 will be the largest multi-disciplinary geophysical meeting to be held in Australia, and in excess of 3,000 delegates are expected to attend. In addition to the IAG specific program outlined above, the scientific program will address many of the environmental, sustainability and hazard issues facing the Earth, including climate change, extreme weather events, melting glaciers and ice-caps, rising sea-levels, water in arid countries, earthquake hazards and tsunamis, and volcanic hazards, processes and natural resources. It should thus be a fantastically stimulating conference.

The conference website is at <http://www.iugg2011.com>, with information about the conference, the scientific program of symposia, workshops and fieldtrips, and listings of the symposia convenors and Keynote Speakers. On-line registration for the conference opened on the website on 16th August, as well as for fieldtrips, social touring, and accommodation.

The call for on-line abstract submission has also now opened, with the deadline for abstract submission being **17th January, 2011**.

The Organising Committee of IUGG2011 looks forward to welcoming the international volcanology and geoscience community to the 2011 IAG and IUGG General Assembly in Melbourne.

RAY CAS
Chair, Joint Australia and New Zealand Organising Committee IUGG2011

IAG Sponsored Meetings

17th International Workshop on Laser Ranging and 23rd General Assembly of the International Laser Ranging Service

May 15-20, 2011, Bad Kötzing, Germany

URL: <http://www.fs.wetzell.de/veranstaltungen/slr/17thlaserworkshop/index.html>

EUREF 2011 Symposium

May 25-28, 2011, Chisinau, Republic of Moldova

URL: <http://www.euref-iag.net/>

XXV IUGG General Assembly

June 27 – July 8, 2011, Melbourne, Australia

URL: <http://www.iugg2011.com/>

2011 IAG General Assembly

at IUGG2011: “ Earth on the Edge: Science for a Sustainable Planet”

Melbourne Convention and Exhibition Centre, Australia

June 28 – July 7, 2011

The next IAG General Assembly will be held as part of the major IUGG2011 international conference at the new Melbourne Convention and Exhibition Centre from 28th June to 7th July, 2011. IUGG (or the International Union for Geodesy and Geophysics) is a collaborative grouping of eight scientific learned societies or associations. The conference website is now open at <http://www.iugg2011.com>. On-line registration for the conference opened on the website on 16th August.

IAG Related Meetings

AGU Fall Meeting

December 13-17, 2010, San Francisco, USA

URL: <http://www.agu.org>

Cryosat Validation Workshop

February 1-3, 2011, Frascati, Italy

URL: <http://www.cryosat2011.org/>

GEOProcessing 2011

February 23-28, 2011 - Gosier, Guadeloupe, France

The Third International Conference on Advanced Geographic Information Systems, Applications, and Services. The abstract submission deadline has been extended to October 15, 2010

URL: <http://www.iaia.org/conferences2011/GEOProcessing11.html>

EGU General Assembly 2011

April 3-8, 2011, Vienna, Austria

URL: <http://meetings.copernicus.org/>

JURSE 2011 - Joint Urban Remote Sensing Event (URBAN 2011 + URS 2011)

April 11-13, 2011, Munich, Germany

Contact: jurse2011@bv.tum.de

1st International Workshop on The Quality of Geodetic Observation and Monitoring Systems

April 13-15, 2011, Garching/Munich, Germany

URL: <http://www.gih.uni-hannover.de/qugoms2011>

Third Conference on Earth Observation for Global Changes (EOGC2011)

April 13-15, 2011, Munich, Germany

URL: <http://www.pf.bv.tum.de/eogc2011/>

1st International Workshop on The Quality of Geodetic Observation and Monitoring Systems

April 13-15, 2011, Garching/Munich, Germany

URL: <http://www.gih.uni-hannover.de/qugoms2011/>

SPACOMM 2011

April 17-22, 2011, Budapest, Hungary

The Third International Conference on Advances in Satellite and Space Communications

URL: <http://www.iaia.org/conferences2011/SPACOMM11.html>

Geoinformation for Disaster Management (Gi4DM)

May 3-8, 2011, Antalya, Turkey

URL: <http://www.gi4dm2011.org/>

7th International Symposium on Mobile Mapping Technology

June 13-16, 2011, Krakow, Poland

The Symposium MMT' 2011 will be held on 13 – 16 June 2011, in the Sheraton hotel Cracow, Poland. We strongly invite and encourage all professionals, researchers and academics, business and industry partners, students to participate in this important event. Science Chair: Dorota Grejner-Brzezinska.

The MMT2011 web site is up and running: <http://www.mmtcracow2011.pl/>.

TransNav 2011

June 15-17, 2011, Gdynia, Poland

URL: <http://transnav.am.gdynia.pl/>

SGEM 2011

June 19-25, 2011, Albena, Bulgaria

The 11th International Multidisciplinary Scientific Geo-Conference and Expo - SGEM 2011 (Surveying Geology & mining Ecology Management) will be held during the period 19 - 25 June 2011 at Albena sea-side and spa resort, Bulgaria. The SGEM GeoConference focuses on the latest findings and technologies in surveying geology and mining, ecology, and management, in order to contribute to the sustainable use of natural resources.

URL: <http://www.sgem.org/>

ISPRS - PIA11 Photogrammetric Images Analysis

October 5-7, 2011, Munich, Germany

URL: <http://www.pia11.tum.de/>

Reports

The Sixth ABLOS Conference: “Contentious Issues in UNCLOS – Surely Not?”

The 6th Conference of the IAG/IHO* Advisory Board on Scientific and Technical Aspects of the Law of the Sea (ABLOS) was held at the International Hydrographic Bureau, in the Principality of Monaco, on 25-27

October 2010. The purpose of this Conference was to draw together specialists from a variety of disciplines for a discussion of the challenges that arise when applying science and technology with due consideration of the juridical requirements of the UN Convention on the Law of the Sea (UNCLOS). The Conference was very successful attracting a capacity audience of 90 delegates from 28 countries with 28 papers being presented during 9 sessions. The Keynote address “The Relevance of Hydrography to UNCLOS; an Indonesian Perspective.” was delivered by Professor Hasjim Djalal of Indonesia. The sessions dealt with such topics as:

- The delimitation of the outer continental shelf
- Technical and legal issues concerning territorial sea baselines in a changing environment, due to sea level rise, or in cases of unstable coasts including ice-covered areas and river deltas
- The status of artificial islands and structures
- The judgements of the CLCS, and reactions by 3rd parties
- Trends in dispute resolution and negotiated settlements
- Problematic areas, such as the Arctic and South China Sea

Many of the papers submitted and presentations given during the Conference are available for download from the IHO web site www.iho.int > Committees > ABLOS > 6th Conference or via the following link: http://www.iho.int/mtg_docs/com_wg/ABLOS/ABLOS_Conf6/ABLOS_Conf6.htm.

* IAG: *International Association for Geodesy*; IHO: *International Hydrographic Organisation*



6th ABLOS Conference
IHB. Monaco - 25-28 October 2010

The Government of Monaco kindly hosted a reception for all delegates and accompanying persons in the Atrium of the Casino.

The 7th ABLOS Conference is planned to be held in Monaco in October 2012 and the IHB is investigating an alternative venue in order to meet the demand for an increased attendance. Further details will be made available in due course.

The Conference was preceded and followed by the 17th ABLOS Business Meeting which was held on the morning of 25 and the 28 October. The meeting elected Chris Carleton, IHO – UK, as the new Chair and Professor Sunil Bisnath, IAG – Canada, as Vice Chair. They assumed their positions following the closure of the meeting. The report of the 17th Business Meeting will be available from the ABLOS section of the IHO web site once it has been finalised by the ABLOS members. The 18th Business meeting will be held in Chile in October 2011.

CHRIS RIZOS

2010 SIRGAS General Meeting and Second IAG-PAIGH-SIRGAS School on Reference Systems *November 8 – 12, 2010, Lima, Peru*

SIRGAS (Sistema de Referencia Geocéntrico para las Américas) is the geocentric reference system for Latin America and the Caribbean, including a gravity field-related vertical reference system. It is the Sub-commission 1.3b (Regional Reference Frame for South and Central America) of the International Association of Geodesy (IAG) and a Working Group of the Cartographic Commission of the Pan American Institute for Geography and History (PAIGH). Activities, advances, and new challenges of SIRGAS are reported, discussed, and planned in the SIRGAS yearly meetings, which have been realized since 1993. The SIRGAS 2010 General Meeting was carried out together with the 42 Meeting of the PAIGH Directing Council, in November 11 and 12, in Lima, Peru. In the three days prior to the SIRGAS Meeting (November 8 - 10), the Second IAG-PAIGH-SIRGAS School on Reference Systems took place. This report summarizes these two events.



Second IAG-PAIGH-SIRGAS School on Reference Systems

The maintenance and use of SIRGAS as the reference frame in the countries of the region is oriented and supported by different capacity building activities, which provide fundamental concepts about the appropriate generation and application of geodetic data. These activities may be divided into two classes. The first one focuses on the establishment of SIRGAS Analysis Centres operated by Latin American institutions. It includes theoretical and computational education for the analysis of GNSS data following IAG standards, conventions, and methods. The second activity is mainly oriented to the users of SIRGAS as a reference frame, and comprises a theoretical course denominated IAG-PAIGH-SIRGAS School on Reference Systems. The first school took place in Bogotá (Colombia), from 13 to 17 July 2009, and was attended by 120 participants from 12 countries of Latin America and the Caribbean. The Second School was hosted by the Instituto Geográfico Nacional of Peru and took place from 8 to 10 November 2010, in Lima. It was attended by 112 participants from 13 countries and encompasses five topics:

- Types of coordinates, their definitions, relations and transformations;
- Geodetic reference systems and frames (ICRS/ICRF, ITRS/ITRF, regional and national densifications of ITRF);
- Determination of precise coordinates (station positions and velocities) using GNSS techniques, including network adjustment and alignment to ITRF;

- Vertical reference systems (geometrical and physical heights, reference surfaces, unification of heights systems);
- Definition, realization, and use of SIRGAS in practice and science.

The third IAG-PAIGH-SIRGAS School on Reference Systems will be carried out together with the SIRGAS 2011 General Meeting, in Heredia, Costa Rica.

SIRGAS 2010 General Meeting

The SIRGAS 2010 General Meeting was held in November 11 and 12, in Lima. It was attended by 89 participants and also hosted by the Instituto Geográfico Nacional of Peru. In 37 oral presentations and 13 posters, the following SIRGAS issues were presented:

- Densification and analysis of the SIRGAS continuously operating network (SIRGAS-CON);
- Impacts caused by the recent earthquakes on the SIRGAS reference frame;
- Studies of the atmosphere (ionosphere and troposphere) based on the SIRGAS infrastructure;
- Achievements related to the use of GNSS data in real time in the SIRGAS area;
- National reports about the SIRGAS activities in the Latin American and Caribbean countries;
- SIRGAS vertical reference system;
- Contribution of SIRGAS to GGOS (Global Geodetic Observing System).

Presentations and extended abstracts of the contributions are available at the SIRGAS web site (www.sirgas.org).

- Complementary to the scientific and technical contributions, the following reports were presented:
- SIRGAS President: main activities during the last year; changes in the Executive Committee; participation of SIRGAS in international working groups and meetings;
- SIRGAS Vice-President: availability and distribution of the SIRGAS products; SIRGAS in the Internet, maintenance of the SIRGAS web site; use of the SIRGAS products;
- SIRGAS Working Group I (Reference System): new experimental processing centres; new multi year solution for the SIRGAS-CON network; atmospheric studies based on the SIRGAS infrastructure (SIRGAS-ION); coming activities;
- SIRGAS Working Group II (Geocentric Datum): new national densifications of SIRGAS; Second IAG-PAIGH-SIRGAS School on Reference Systems; SIRGAS Real Time; coming activities;
- SIRGAS Working Group III (Vertical Datum): Towards geopotential numbers computation in a continental level, realization of the reference surface, coming activities.

The main conclusions and recommendations of the SIRGAS 2010 General Meeting are:

1. The present realization of SIRGAS is a network of more than 230 continuously operating stations covering Latin America and The Caribbean. The weekly analysis of this so-called SIRGAS-CON network is based on the combination of individual solutions including different clusters of stations and guarantying that each station is calculated by three processing centres. At present, there are seven SIRGAS official processing centres (CIMA Argentina, DGFI Germany, IBGE Brazil, IGAC Colombia, IGM Ecuador, LGFS/LUZ Venezuela, SGM Uruguay) and two experimental processing centres (IGN-Argentina, INEGI-Mexico). The evaluation of the individual solutions confirmed that all Processing Centres (official and experimental) satisfy the administrative and quality processing requirements defined in the SIRGAS guidelines. Their weekly solutions are at the same accuracy level with respect to each other and with respect to final weekly combinations. As a main conclusion, it was recommended that IGN-Argentina and INEGI-Mexico become official processing centres as soon as possible.
2. The combination of the individual solutions delivered by the SIRGAS processing centres is carried out by the SIRGAS combination centres (IBGE-Brazil, DGFI-Germany). After the SIRGAS 2009 General Meeting, the SIRGAS-WGI outlined a conventional strategy to define the geodetic datum within the SIRGAS-CON weekly combinations. This strategy is based on constraining the coordinates of selected ITRF stations to their positions calculated within the IGS weekly combinations (igsyyPwww.snx). The applied constraint corresponds to a weight inversely proportional to the internal variance of the GPS measurements. This procedure replaces the use of epoch station positions plus constant velocities as reference coordinates. It is applied by both SIRGAS combination centres since January 2010 and their results are practically identical. Until now, the final SIRGAS weekly coordinates are the combinations

computed by DGFI as IGS Regional Associate Analysis Centre for SIRGAS (IGS RNAAC SIR). The IBGE combinations provide redundancy and backup. After the evaluation carried out within the SIRGAS 2010 General Meeting, it was concluded that the IBGE combinations can also be made available to users as the final SIRGAS weekly coordinates.

3. The main SIRGAS-CON products (i.e. loosely constrained weekly solutions for the IGS polyhedron and weekly positions aligned to the ITRF) present a precision (internal consistency) of about $\pm 0,9$ mm in horizontal and $\pm 2,5$ mm in vertical positions, while the accuracy with respect to the ITRF (external consistency) is about $\pm 1,7$ mm for the horizontal and $\pm 3,7$ mm for the vertical component.
4. A new multi-annual solution, identified as SIR10P01, for the SIRGAS-CON network was released in July 2010. It encompasses all the weekly solutions provided by the SIRGAS analysis centres from January 2, 2000 (GPS week 1043) to June 5, 2010 (GPS week 1586) and refers to the ITRF2008 at epoch 2005,0. Positions and velocities for 183 SIRGAS-CON stations are included. Its precision was estimated to be $\sim \pm 0,5$ mm (horizontal) and $\sim \pm 0,9$ mm (vertical) for the station positions at the reference epoch, and $\sim \pm 0,2$ mm/a (horizontal) and $\sim \pm 0,4$ mm/a (vertical) for the linear velocities. A loosely constrained version of this solution was delivered as SIRGAS contribution to the IAG SC1.3 Working Group on Regional Dense Velocity Fields.
5. The availability of horizontal velocities in those regions which are not covered by SIRGAS-CON stations is strongly improved through the new Velocity Model for South America and the Caribbean (VEMOS 2009), which represents the continuous present-day deformation of the Earth crust in the SIRGAS region. It is based on nearly 500 velocity stations observed in 13 GPS projects. The overall precision of the point velocities is better than ± 1 mm/a in South-North and about $\pm 1,5$ mm/a in West-East direction.
6. Although the reliability of the estimated positions and velocities of the SIRGAS reference stations as well as its compatibility through time are guaranteed, it is necessary to give special care to the reference frame deformations caused by seismic events. It is well known that the western part of the SIRGAS region, i.e. the plate boundary zone between the Pacific, Cocos, and Nazca plates in the west and the North American, Caribbean, and South American plates in the east, is an extremely active seismic area. The frequent occurrence of earthquakes causes episodic station movements, which influence the long-term stability of the SIRGAS reference frame. For instance, the recent earthquake in Chile on 2010-02-27 moved 23 reference stations between 1 cm and 3 m to the west. The earthquake in Mexicali, Mexico (on 2010-04-04) caused a jump of 24 cm in the south-east direction of the station MEXI. To mitigate the impact of seismic events in the use of SIRGAS, it is necessary:
 - To improve the national reference frames by installing more continuously operating GNSS stations in order to precisely monitor eventual deformations;
 - The reference networks composed by non-continuously operating stations must be replaced as far as possible by continuously operating stations. If this is not possible, they have to be re-measured immediately after a strong seism;
 - The transformation between the pre-seismic and the post-seismic frame realizations must be based on a deformation model derived from discrete (weekly) station positions. Usual network transformations (e.g. similarity or affine) cannot be applied;
 - In stations not observed continuously, the post-seismic coordinate changes can be interpolated from the deformation model;
 - In precise positioning, users have to apply epoch (weekly or monthly) positions as reference coordinates instead of those derived from a reference epoch and (a sequence of) velocities.
7. Until now, the SIRGAS Analysis Centres process GPS data only. Since the number of GLONASS stations is increasing in the SIRGAS region, the SIRGAS-WGI initiates the routine processing of GLONASS observations on a weekly basis. All GLONASS stations will be analysed as an individual network, loosely constrained solutions of which will be combined with the similar solutions generated for the other SIRGAS-CON sub-networks.
8. The national reference frames of El Salvador and Bolivia were integrated into SIRGAS. The frame SIRGAS-ES2007.8 (SIRGAS El Salvador 2007.8) is composed by 35 stations observed in a GPS-campaign in 2007. Adjusted station positions refer to the IGS05, epoch 2007.8, and the datum definition is given by constraining the weekly coordinates of the SIRGAS-CON network at the observation epoch. The reference frame of Bolivia (Referencia Geodésico Nacional, MARGEN) comprises 17 GPS stations, 8 of those

continuously observing. The final coordinates are given in IGS05, epoch 2010.2. The analysis of both networks was carried out by DGFI using the Bernese Software.

9. The activities of the SIRGAS-WGII, in charge of supporting national initiatives oriented to the densification and use of SIRGAS in the Latin American and Caribbean countries, are concentrating on the incorporation of the continuously operating GNSS reference stations of Guatemala, Costa Rica, and Dominican Republic into SIRGAS.
10. The SIRGAS Real Time (SIRGAS-RT) project was established in the SIRGAS 2008 General Meeting (May 2008). Its main objective is to evaluate the possibility of providing near real time corrections for GNSS positioning based on the SIRGAS-CON stations. After two years, Argentina, Brazil, Uruguay, and Venezuela, who are applying the NTRIP tool, show significant advances in its use, and the SIRGAS-WGII will continue promoting the development of similar studies in other SIRGAS countries. The planned activities include a capacitation course of two weeks to provide expertise in the implementation and adequate use of the protocol NTRIP in the SIRGAS countries. This course will be supported by the Agencia Española de Cooperación Internacional together with the Instituto Geográfico Nacional de España.
11. The routine production of $vTEC$ maps for South America by the Universidad Nacional de la Plata (Argentina) as SIRGAS Ionosphere Analysis Centre provides control and improvement for different kind of projects such as the International Reference Ionosphere (IRI) over South America, positioning with single-frequency GPS receivers, and the feasibility of computing ionosphere corrections for a satellite based augmentation system (SBAS) for the region.
12. Regarding the definition and realization of a unified vertical reference system for SIRGAS, it has to be mentioned that the Latin American countries continue preparing the levelling data to be processed in a continent-wide adjustment. The SIRGAS-WGIII analyses at present geopotential numbers of Colombia, Venezuela, Brazil, Ecuador, Uruguay, Argentina, and Chile. Bolivia, Peru, and Paraguay will provide the corresponding data in the next future.

Thanks to a kind invitation of the Escuela de Topografía, Catastro y Geodesia of the Universidad Nacional, the SIRGAS 2011 General Meeting will be held in August 2010 in Heredia, Costa Rica. Prior to the meeting, the third IAG-IPGH-SIRGAS School on Reference Systems will also take place.

SIRGAS deeply acknowledges the financial support provided by IAG, PAIGH, and IUGG (International Union of Geodesy and Geophysics) for facilitating the attendance to the SIRGAS Meeting of many SIRGAS colleagues. In total 15 participants received grants for travel costs and daily expenses.

CLAUDIO BRUNINI
SIRGAS President

LAURA SÁNCHEZ
SIRGAS Vicepresident