

# SIRGAS: The Geocentric Reference System for the Americas



*William Martínez*

*SIRGAS President*

Agencia Nacional de Minería, Bogotá, Colombia

*M. Virginia Mackern*

*SIRGAS Vice president*

Fac. de Ingeniería, UNCuyo, CONICET, UMaza. Mendoza, Argentina



*Victor Cioce*

*WG I President*

Centro de Procesamiento y Análisis GNSS SIRGAS de la Universidad del Zulia



*Roberto Pérez Rodino*

*WG II President*

Facultad de Ingeniería - Universidad de la República (UDELAR) Uruguay



*Silvio R.C. de Freitas*

*WG III President*

Universidade Federal do Paraná, Curitiba, PR, Brazil.



Created in 1993 during the International Conference for the Definition of a South American Geocentric Reference System held in Asuncion, Paraguay. It was promoted and supported by IAG, PAIGH and the former DMA, today National Geospatial-Intelligence Agency (NGA).

SIRGAS acronym (Geocentric Reference System for South America) was changed in 2001 to Geocentric Reference System for the Americas: the SIRGAS2000 GPS campaign was extended to North- and Central America.

The United Nations Organization, at its 7th Cartographic Conference for The Americas (New York, January 22 – 27, 2001), recommend to adopt SIRGAS as official reference system in all the American countries.

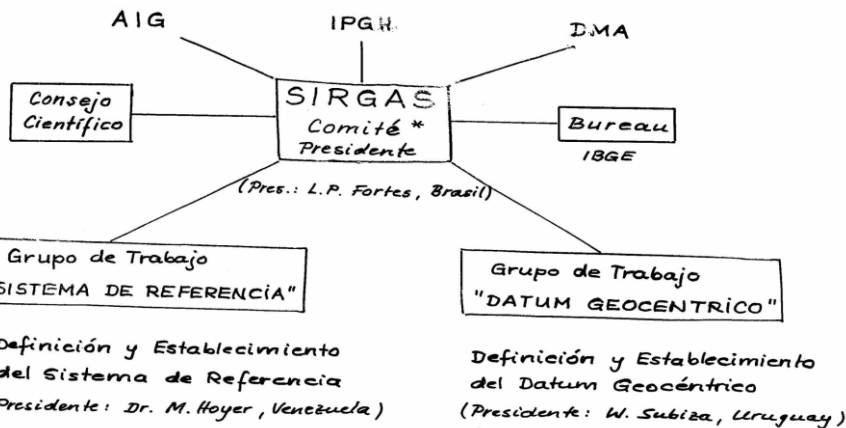


Asunción, 1993



Aguascalientes, 2018

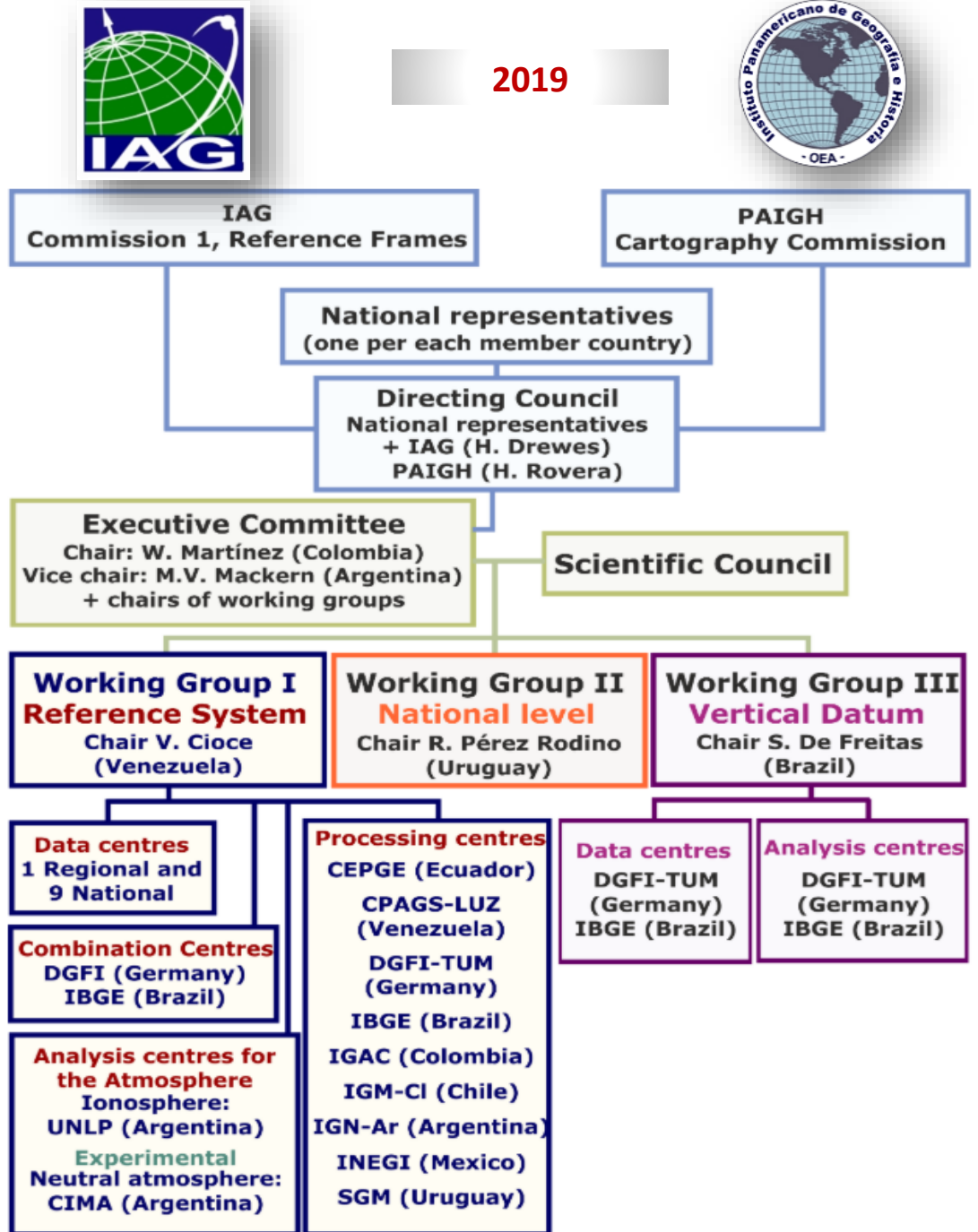
1993

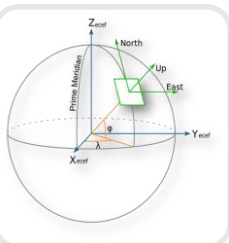


\* El comité se compone de un representante por país mas un representante de cada una de las organizaciones patrocinantes

**26 years of experience, work, cooperation**

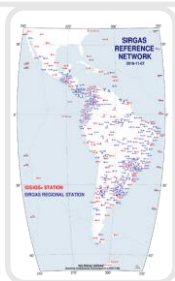
2019





Definition of a tridimensional geocentric reference system

**Adopted the conventions provided by IAG**



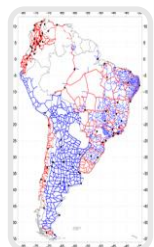
Realization and maintenance of a geocentric reference frame (network of stations with high-precise geocentric coordinates  $[X, Y, Z]$  and their variation with time  $[V_x, V_y, V_z]$ ).

**WORKING GROUP I**



Densification of the continental reference frame in the SIRGAS member countries, as well as the promotion and support of its utilization in practical and scientific applications

**WORKING GROUP II**

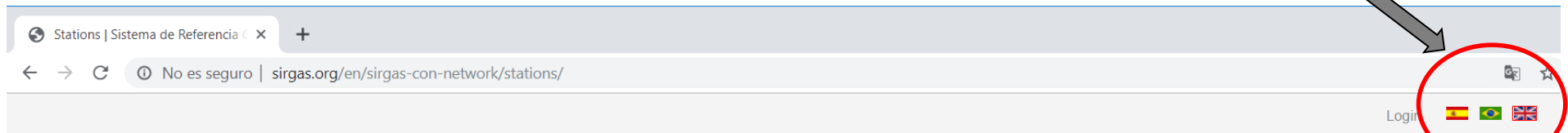


Definition and realization of a unified vertical reference system based on the consistent combination of physical and geometric heights, including the determination of the reference frame variations with time.

**WORKING GROUP III**

## SIRGAS geo-portal

All the information that we present today is in the web portal, [www.sirgas.org](http://www.sirgas.org) in spanish, in portugués and in english



Sistema de Referencia Geocéntrico para las Américas (SIRGAS)

News

Main menu

- Home
- Organization +
- SIRGAS reference system
- SIRGAS realizations +
- SIRGAS-CON network +
- Stations** ▾
- Station list
- Log files
- SIRGAS mail [↗](#)
- Data centres
- Maps
- Coordinates +
- Guidelines
- SIRGAS velocity model +
- SIRGAS ionospheric maps
- SIRGAS-RT

### SIRGAS Continuously Operating Stations



**Workshop for the implementation of the GGRF in Latin America** [↗](#)

Buenos Aires, Argentina  
September 16-20, 2019

**Symposium SIRGAS2019** [↗](#)

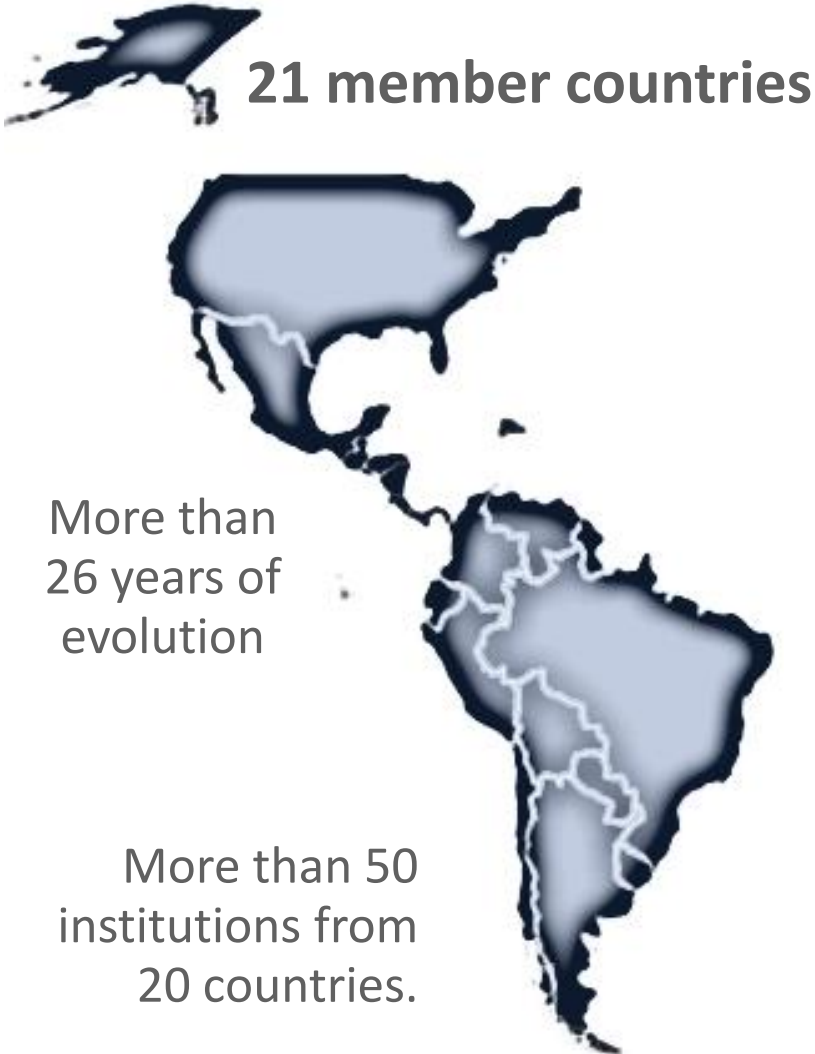
Rio de Janeiro, Brazil  
November 11-14, 2019

**SLR-Workshop** [↗](#)

Rio de Janeiro, Brazil  
November 6-8, 2019

- Argentina
- Bolivia
- Brazil
- Chile
- Colombia
- Costa Rica
- Dominican Republic
- Ecuador
- El Salvador
- French Guyana
- Guatemala
- Guyana
- Honduras
- México
- Nicaragua
- Panama
- Paraguay
- Peru
- United States
- Uruguay
- Venezuela

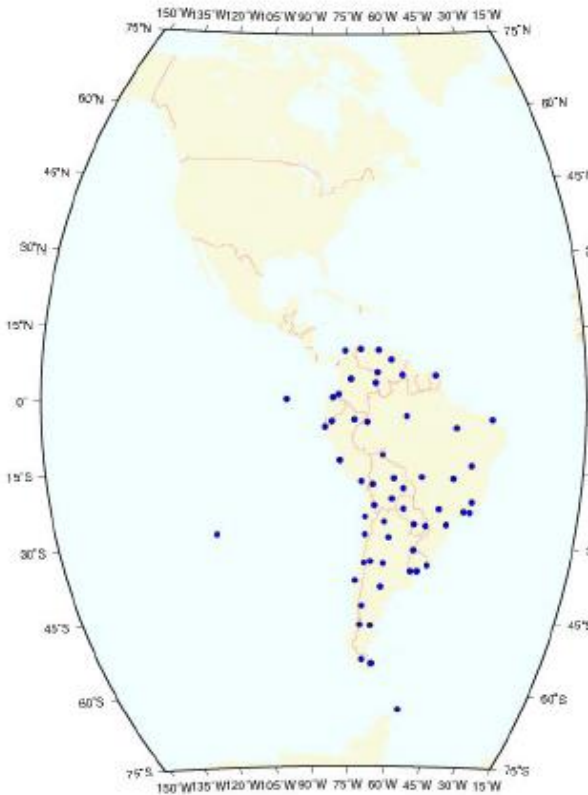
SIRGAS coordinates the largest geodetic infrastructure in Latin America and the Caribbean.



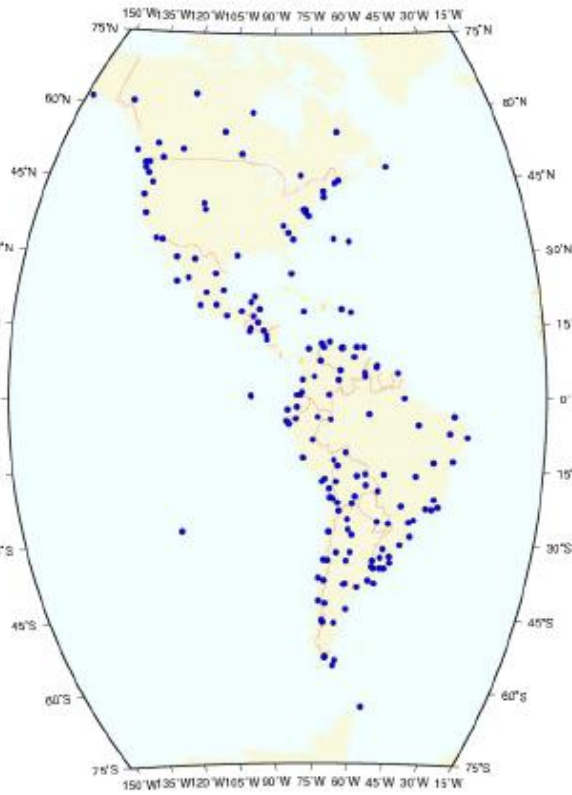
## SIRGAS WG I

It is responsible for the realization and maintenance of the three-dimensional geocentric reference system. The **SIRGAS reference frame**

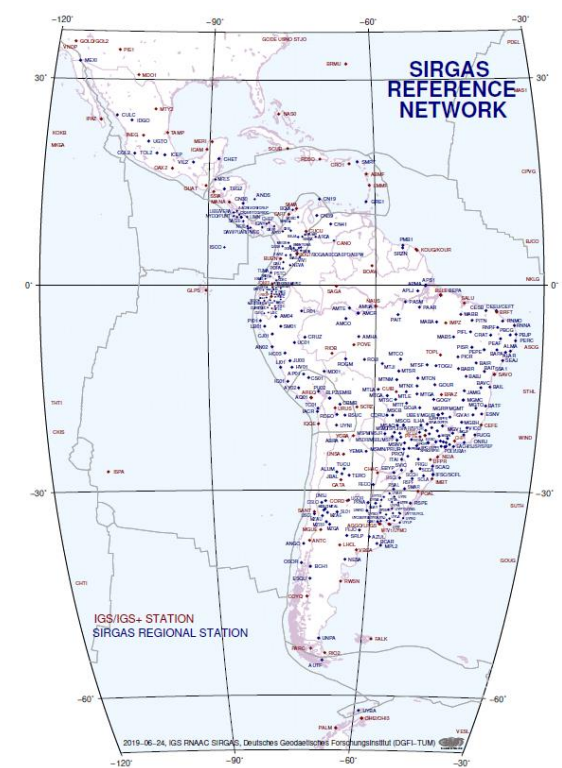
**SIRGAS 1995**  
(58 GPS Stations)  
South America



**SIRGAS 2000**  
(184 GPS stations)  
The Americas

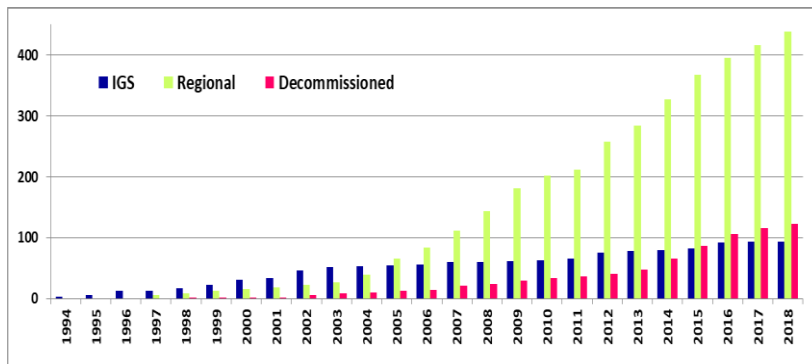


**SIRGAS-CON**  
(+ 400 GNSS stations)  
Latin America



# WG I: Reference System (2)

## SIRGAS-CON growth



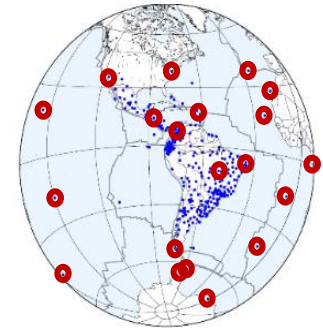
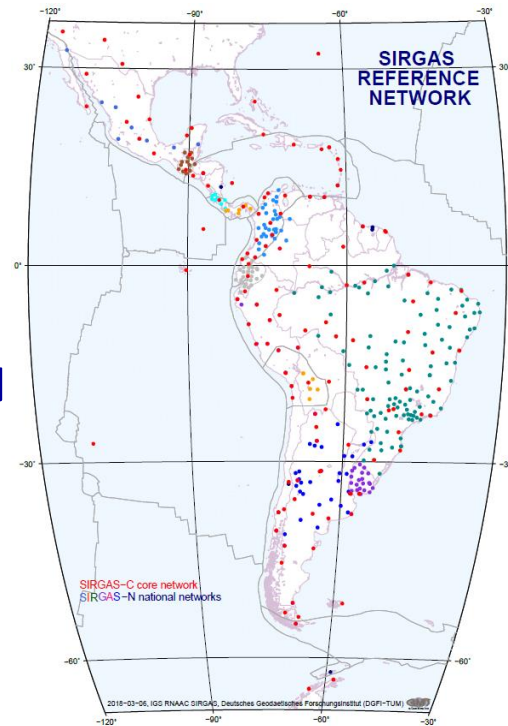
339 GPS + GLONASS

79 GPS + GLONASS + Galileo

43 GPS + GLONASS + Galileo + BeiDou

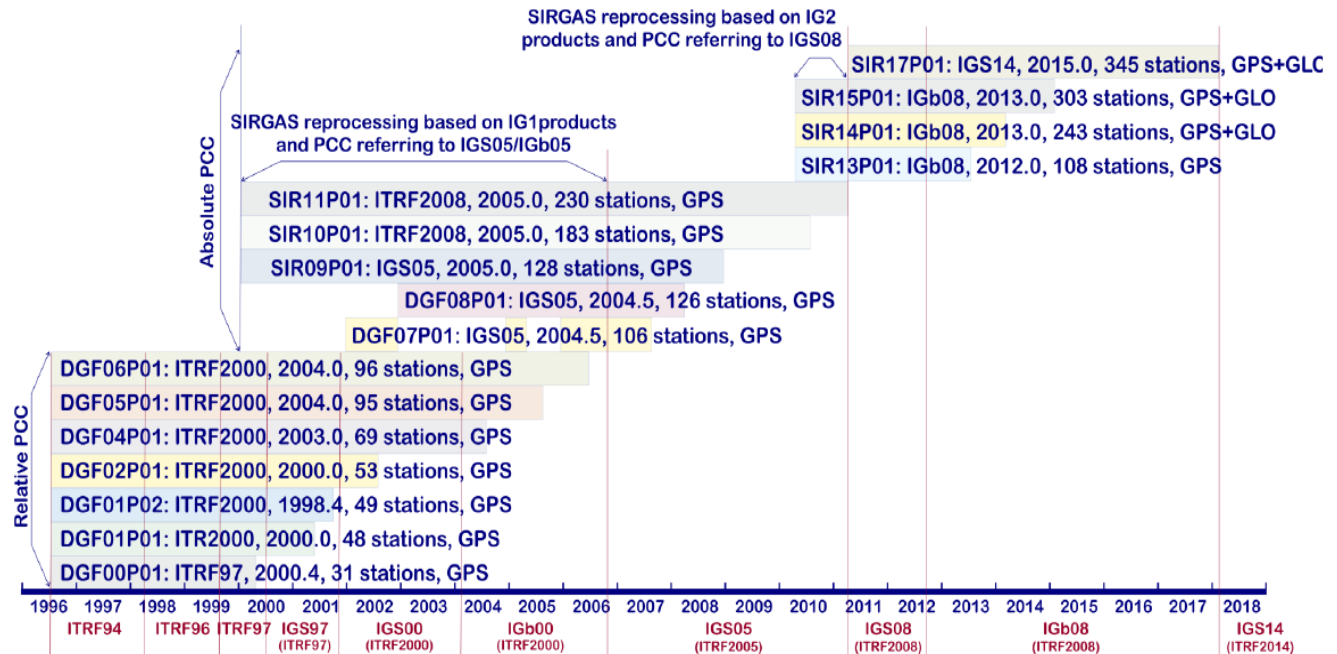
**59**  
IGS stations

**515**  
SIRGAS-CON  
(138 removed)



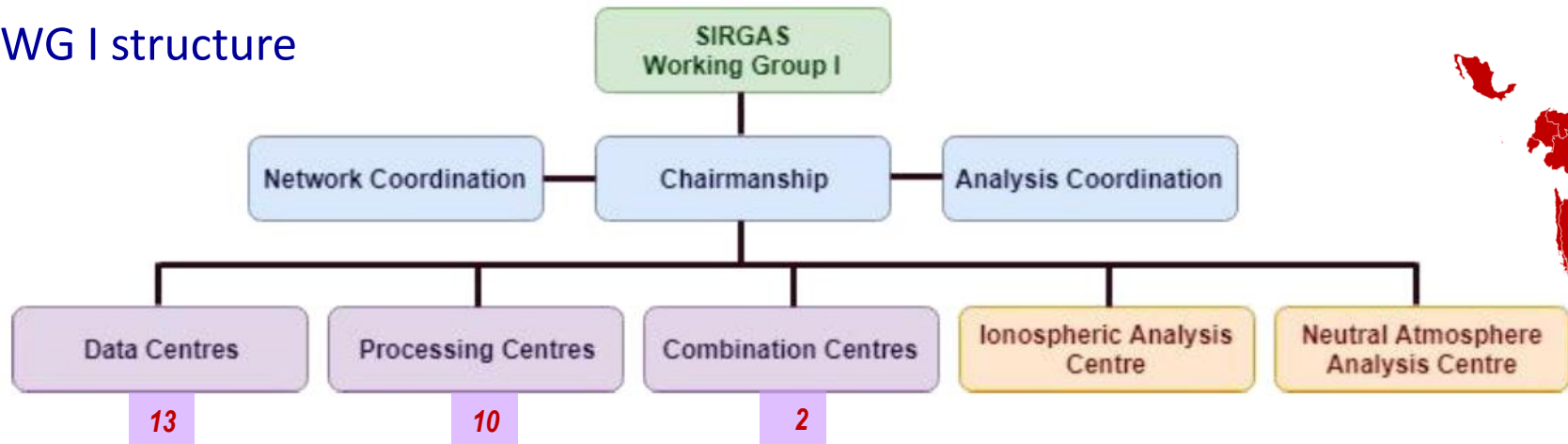
● Fiducial stations

- Oriented to ensure the availability of a highly accurate reference frame consistent with the ITRF
- Materialized by more than 400 GNSS continuous stations.
- It densifies the ITRF in Latin America and the Caribbean being rigorously processed at weekly intervals.






## SIRGAS WG I structure








**DGFI-TUM**  
(Deutsches Geodätisches Forschungsinstitut – TUM)  
→ desde **junio-1996** en condición de IGS RNAAC SIR




**IBGE**  
(Instituto Brasileiro de Geografia e Estatística)  
→ desde **agosto-2008**

**IGAC**  
(Instituto Geográfico Agustín Codazzi)  
→ desde **agosto-2008**




**LUZ**  
(Universidad del Zulia)  
→ desde **enero-2010**






**SGM**  
(Servicio Geográfico Militar)  
→ desde **enero-2010**




**IGM**  
(Instituto Geográfico Militar)  
→ desde **enero-2010**






**IGN**  
(Instituto Geográfico Nacional)  
→ desde **enero-2011**

**INEGI**  
(Instituto Nacional de Estadística y Geografía)  
→ desde **enero-2011**




**IGM**  
(Instituto Geográfico Militar)  
→ desde **enero-2013**

**UNA**  
(Universidad Nacional)  
Desde **enero-2013** hasta **enero-2019**



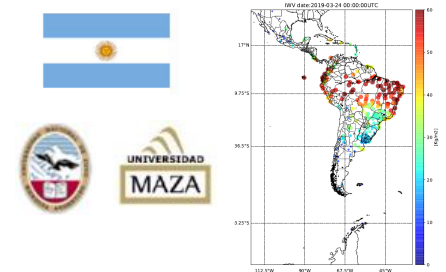

**USCH**  
Universidad de Santiago de Chile  
→ desde **mayo 2019**

### UNLP-Ar Ionospheric Analysis Centre



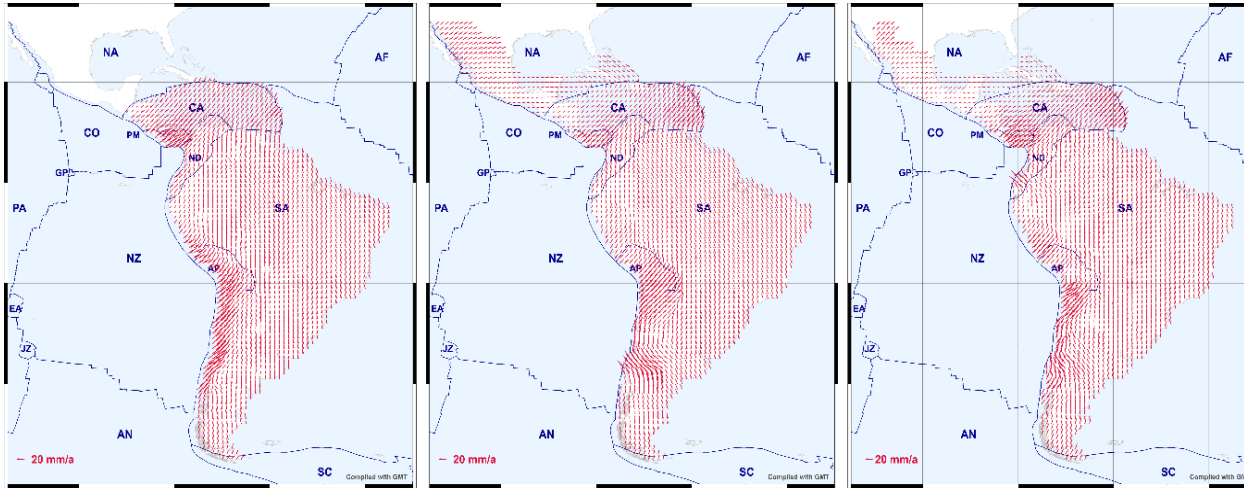
### CIMA-Ar Neutral Atmosphere Analysis Centre

Facultad de Ingeniería, UNCuyo, Umaza, desde **enero 2013**



1 European institution  
12 Latin American institutions

# WG I: Reference System (4)



VEMOS2009  
(Drewes H., Heidbach O., 2012)

VEMOS2015  
(Sánchez L., Drewes H., 2016);

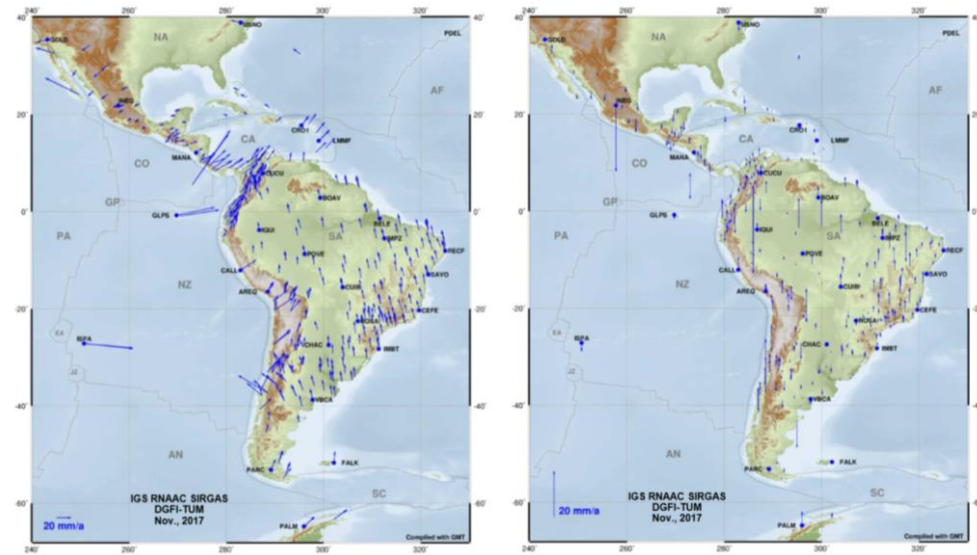
VEMOS2017  
(Drewes H. Sánchez L., 2017)

SIRGAS Products

- Weekly coordinates
- Multiyear solution
- Geodetic Velocities
- Velocity models



SIRGAS service  
SIRGAS-CON RT Stations  
RT casters

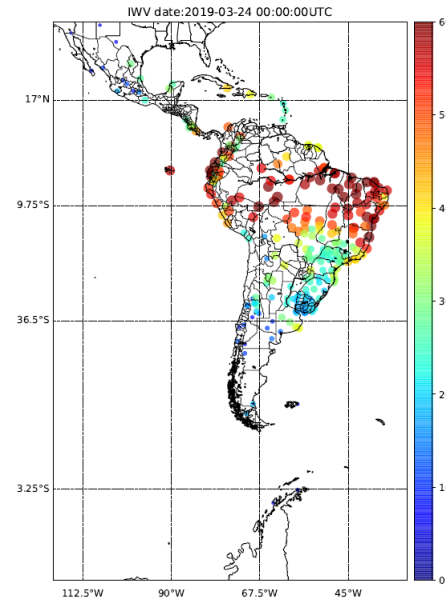
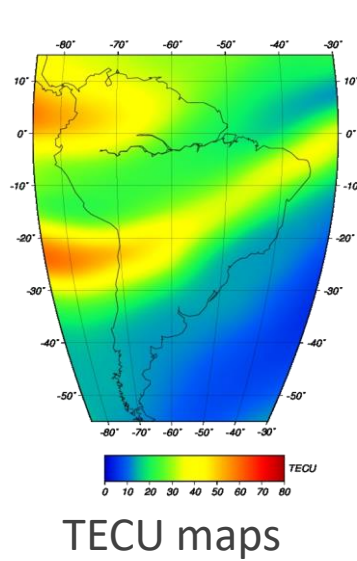
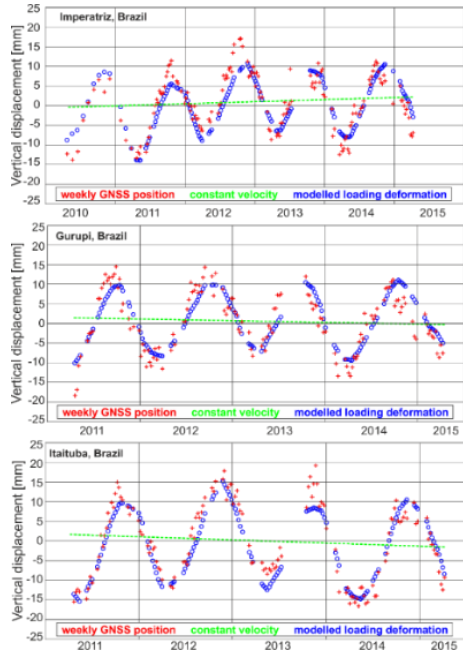


Horizontal (left) and vertical (right) velocities of the multiyear solution SIR17P01. [Sánchez, 2017]

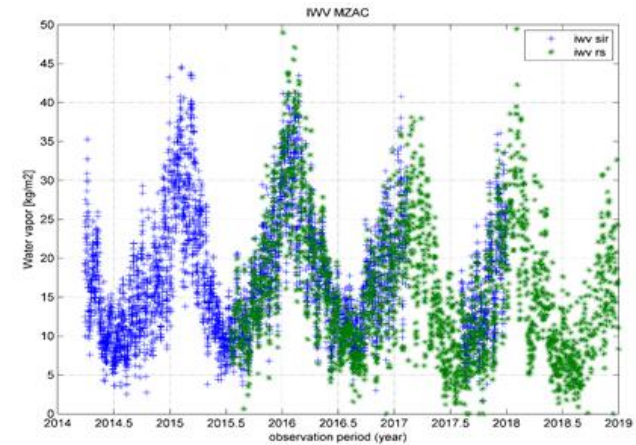
Last multiyear solution: SIR17P01

Caster	IP: Port	Web link
SIRGAS Experimental	200.3.123.65:2101	<a href="http://www.fceia.unr.edu.ar/gps/mapatr/">http://www.fceia.unr.edu.ar/gps/mapatr/</a>
REGNA-SGM (Uy)	201.217.132.178:2101	<a href="http://www.sgm.gub.uy/">http://www.sgm.gub.uy/</a>
RAMSAC-NTRIP (Ar)	ntrip.ign.gov.ar:2101	<a href="http://www.ign.gov.ar/NuestrasActividades/Geodesia/RamsacNtrip/">http://www.ign.gov.ar/NuestrasActividades/Geodesia/RamsacNtrip/</a>
IBGE - IP (Br)	gps-ntrip.ibge.gov.br:2101	<a href="http://www.ibge.gov.br/home/geociencias/geodesia/rbmc/ntrip/">http://www.ibge.gov.br/home/geociencias/geodesia/rbmc/ntrip/</a>
IGS-RT	www.igs-ip.net:2101	<a href="http://register.rtcn-ntrip.org/cgi-bin/registration.cgi">http://register.rtcn-ntrip.org/cgi-bin/registration.cgi</a>

- SIRGAS-CON also provides the geodetic infrastructure in the region for atmospheric studies: ionosphere and neutral atmosphere, modeling of effects associated with charge phenomena and general applications.

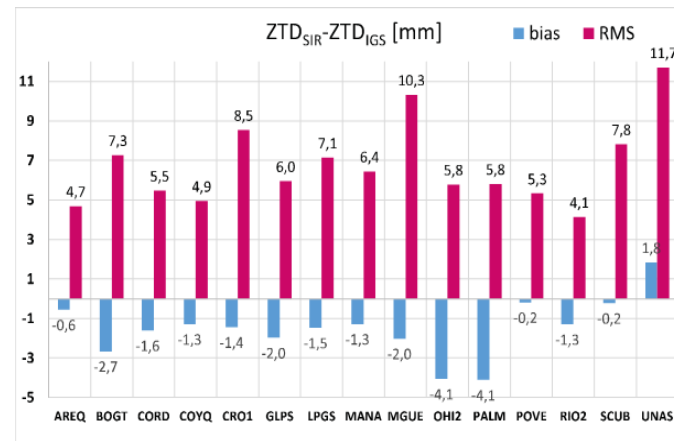
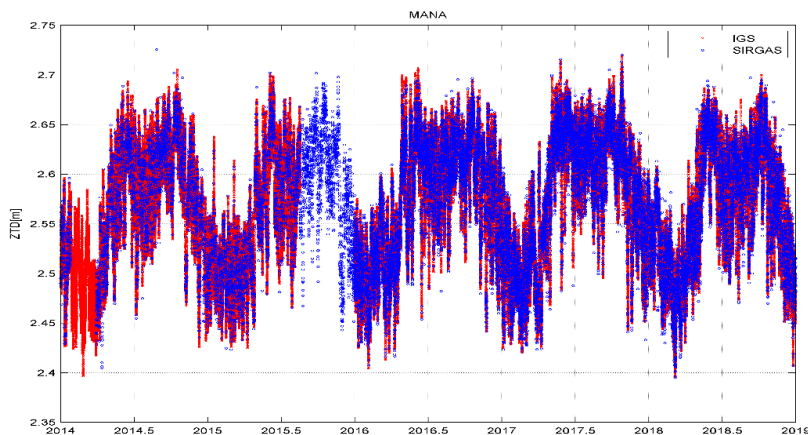


Hourly IWV maps SIRGAS\_CON stations [Mackern, 2019]

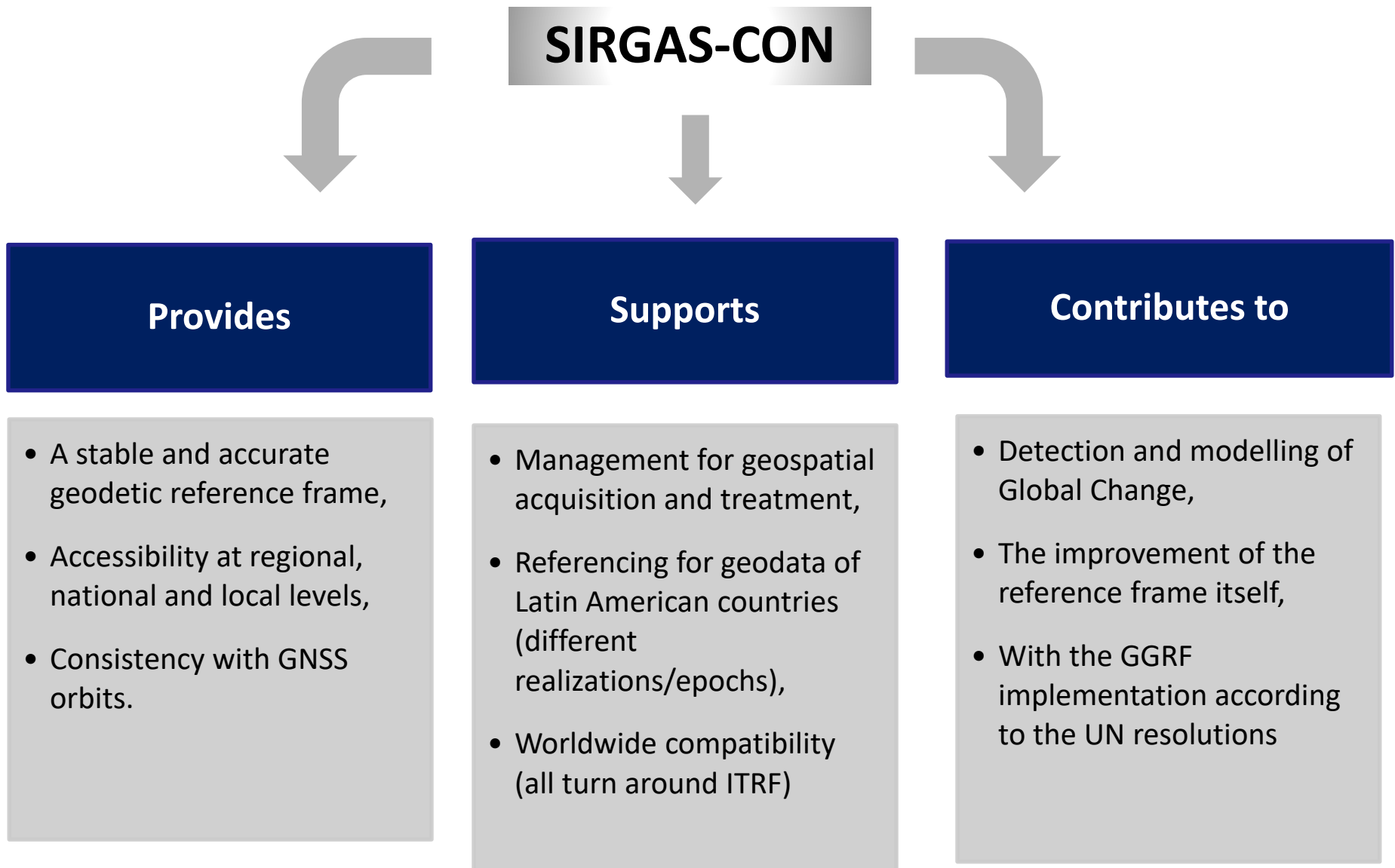


IWV<sub>SIR</sub> and radisonde profile data (IWV<sub>RS</sub>) in Mendoza (Argentina).

ZTD<sub>SIR</sub> (blue) and ZTD<sub>IGS</sub> (red) values at MANA (2014–2018).



ZTD<sub>SIR</sub> validation w.r.t. ZTD<sub>IGS</sub> [Mackern et. al, 2019]



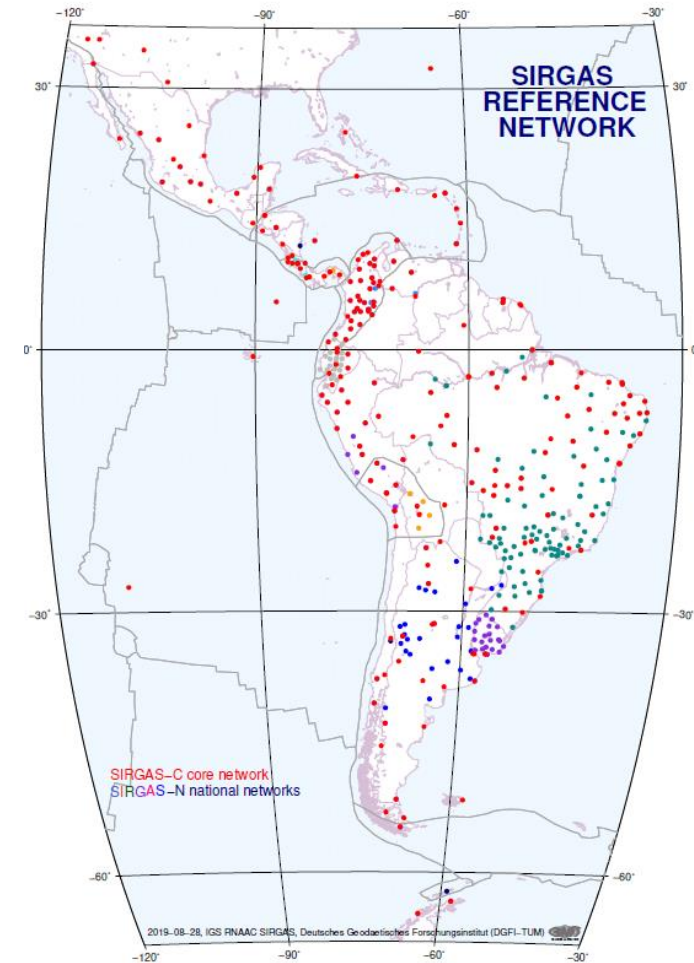
## SIRGAS WG II

To integrate the local geodetic datum in SIRGAS is based on:

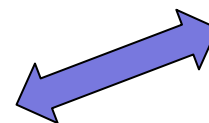
- Establishment of a first-order national GNSS network.
- Determination of transformation parameters.
- Adoption of SIRGAS as the official reference framework



Passive stations



Active stations,  
integrated in SIRGAS-CON



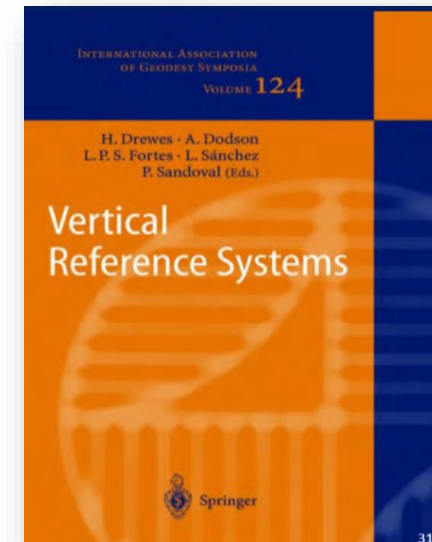
Country	National densification network
Argentina	POSGAR07 ITRF2005 (2006.6); 178 stations / RAMSAC 44 stations
Bolivia	MARGEN SIRGAS95, (1995.4); 125 stations (9 stations in SIRGAS-CON)
Brazil	SIRGAS2000 SIRGAS2000, (2000.4); 1903 stations / RBMC (147 stations in SIRGAS-CON)
Chile	SIRGAS-CHILE SIRGAS2000, (2002.0); 269 stations, updated to ITRF2008 (IGb08), (2016.0) after the Maule earthquake / (10 stations in SIRGAS-CON)
Colombia	MAGNA-SIRGAS SIRGAS95, epoch 1995.4; 70 stations included in SIRGAS, updated to ITRF2008 (IGb08), epoch 2012.0 /MAGNA-ECU 40 stations
Ecuador	RENAGE SIRGAS95, (1995.4); 135 stations included in SIRGAS / REGME 32 stations
French Guyana	RGFG Réseau Géodésique Français de Guyane; ITRF93, (1995.0); 7 stations (1 station in SIRGAS-CON)
Perú	PERU96 SIRGAS95 (1995.4); 47 /REGPMOC Red geodésica peruana de monitoreo continuo; 21 stations
Uruguay	SIRGAS-ROU98 SIRGAS95, (1995.4); 17 / REGNA-ROU Red Geodésica Nacional Activa; 23 stations included in SIRGAS-CON
Venezuela	SIRGAS-REGVEN Red geocéntrica venezolana; SIRGAS95, (1995.4); 156 stations included in SIRGAS; updated to ITRF2014, (2015.5)/ REMOS
Costa Rica	CR05, CR-SIRGAS ITRF2000 (2005.83); changed to CR-SIRGAS ITRF2008 (IGb08), (2014.59) (14 stations in SIRGAS-CON)
El Salvador	SIRGAS-ES2007 SIRGAS, (2007.8); 34 stations included in SIRGAS
Guatemala	CORS SIRGAS
Panama	MGN SIRGAS 2000 (2000.0); 17 stations (6 stations in SIRGAS-CON)
Mexico	REGNO: ITRF1992, epoch 1988.0; updated to ITRF2008, (2010.0)/ REGNA 16

## SIRGAS Working group III was created in IAG Rio de Janeiro, Brazil 1997

- Definition and realization of a unified vertical reference system, SIRGAS Vertical Reference System (SVRS), within a global frame.
- To refer the geopotential numbers (or physical heights) in American countries to one and the same equipotential surface globally defined ( $W_0$ ).
- To transform the existing height datums into the new system SIRGAS Vertical Referent System (SVRS).

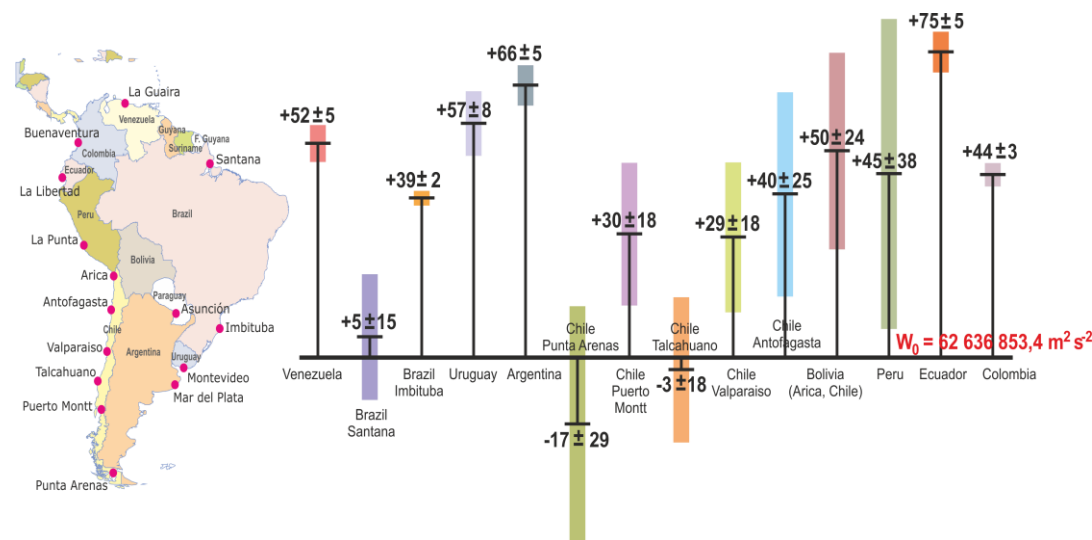
SIRGAS2000 campaign included GPS stations linked to reference tide gauges and in national borders associated with connection points among national vertical networks (Luz et al. 2002).

SIRGAS WGIII was consolidated in the IAG Vertical Reference System Symposium held in Cartagena, Colombia, 2001.

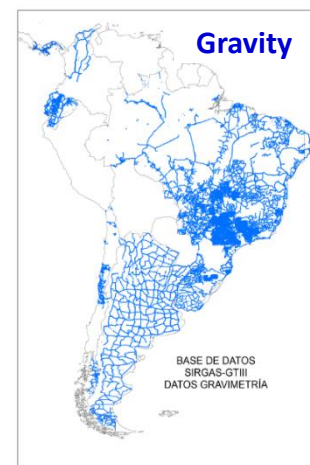
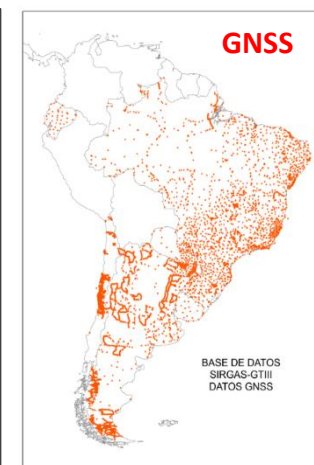
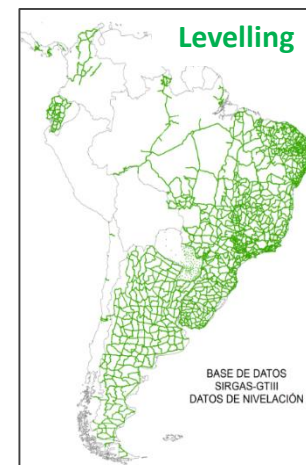


## Since 1997, SIRGAS Working Group III:

- Has been compiled information on heights (physical and geometric) and gravity from the member countries.
- Have identified and work on problems as missing connection, errors, etc.
- Have coordinated campaigns in neighboring areas.
- Provides technical accompaniment: Countries such as Argentina, Brazil, Costa Rica, Uruguay and Ecuador, have remarkable advances; Chile, Colombia, El Salvador have begun with their organization and calculation tasks.



15 vertical datums in South America  
(Sanchez, 2002)



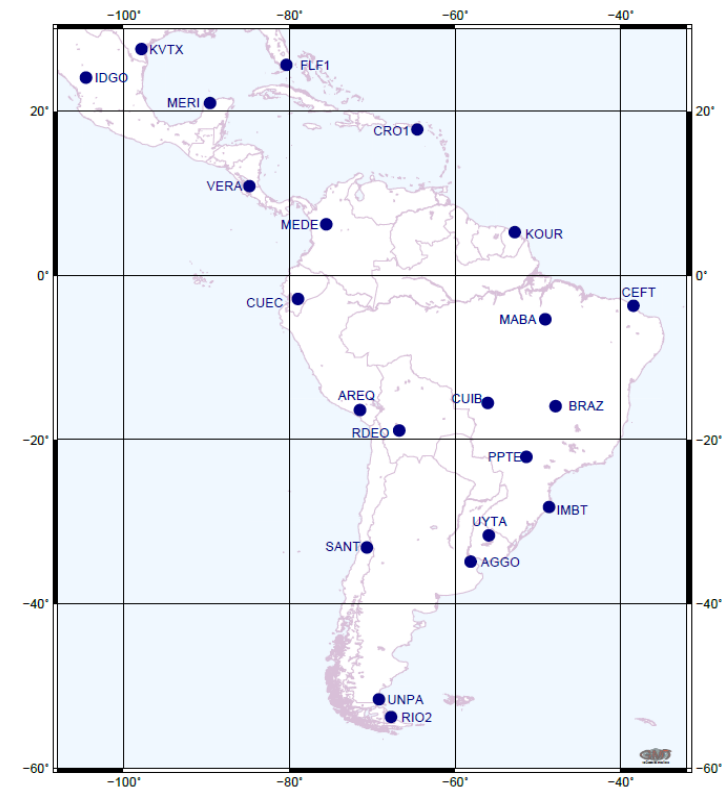


## Vertical Reference System SIRGAS (SVRS) Protocols are:

- It is performed by appropriate physical heights (involving gravity by geopotential numbers) ;
- Connected to the geometric component of SIRGAS;
- Integrates the vertical networks of member countries;
- Referred to a global reference level  $W_0$  of the **IHRF / IAG**;
- Associated with a specific reference period; i.e., you should consider the temporal variations of the coordinates and the network.
- Linked with a profile of GGRF stations consistent with the ITRF.

SIRGAS proposed a set of 22 **IHRF** stations in South America, Central America and Caribbean regions.

SIRGAS WG III is involved in the testing of approaches for facing the realization of such stations.



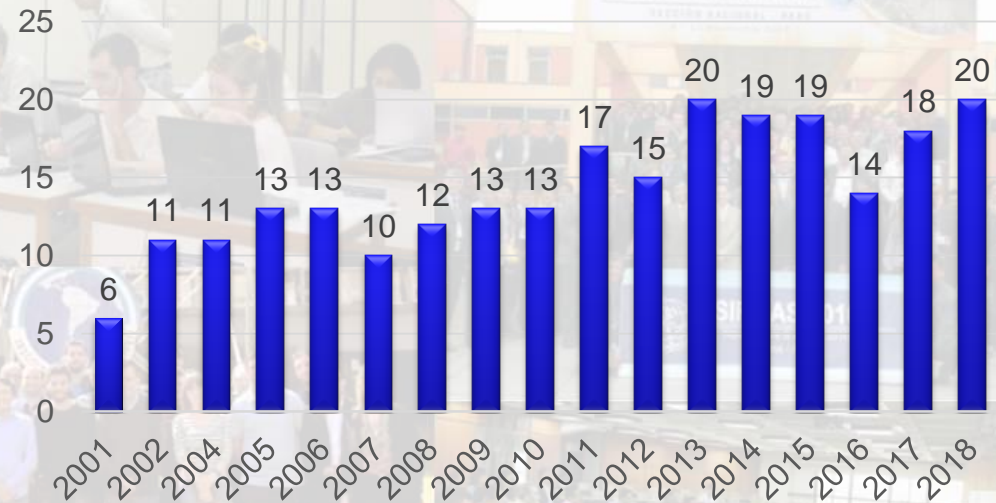
## SIRGAS Workshops:

- **13** workshops: Total **396** students.
- 10 countries on average

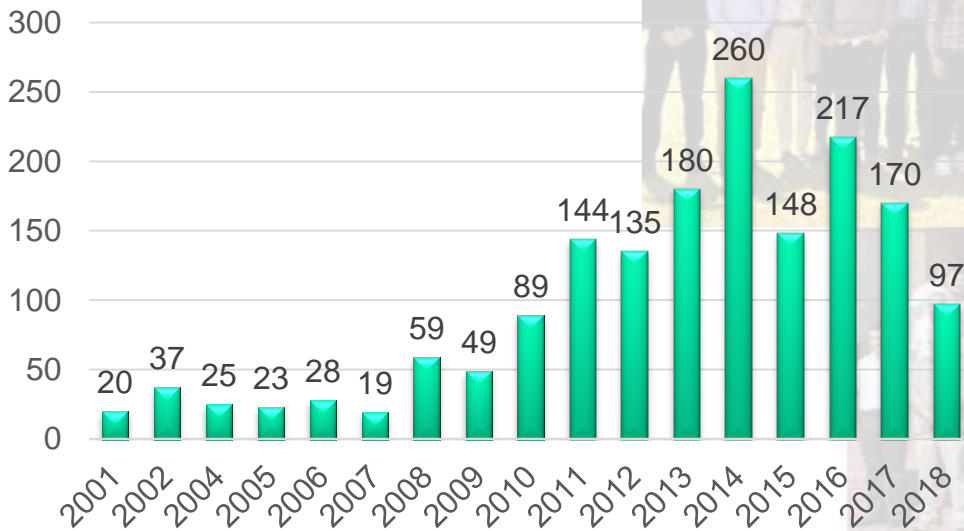
## SIRGAS Schools:

- **6** schools: Total **603** students.
- 17 countries on average

## Countries



## Attendees



## Meetings and Symposia SIRGAS

More than 1700 attendees from  
15 countries on average

## Workshop for the Implementation of the GGRF in Latin America

Buenos Aires, Argentina  
September 16-20, 2019

## Symposium SIRGAS2019

Rio de Janeiro, Brazil  
November 11-14, 2019

## SLR-Workshop

Rio de Janeiro, Brazil  
November 6-8, 2019

## Here, today



International workshop for the  
**Implementation of the Global Geodetic Reference Frame (GGRF)  
in Latin America**  
Buenos Aires, Argentina, Sep 16 - 20, 2019

In Buenos Aires , Argentina

<http://www.sirgas.org/en/ggrf/>



in Rio de Janeiro, Brazil, 6-14 November 2019

<https://eventos.ibge.gov.br/en/sirgas2019>

**Some items of the statute that we suggest must be analyzed to optimize participation and management within SIRGAS**

**Members**

Art. 3. Only American states can be members of SIRGAS. To join SIRGAS, it is only necessary to address a letter to the Executive Committee (defined in Art. 12), mentioning the interest and the will to actively work towards the accomplishment of the SIRGAS objectives. This shall include the appointment of the corresponding national representatives (according to Art. 7).

Art. 4. **The International Association of Geodesy (IAG) and the Pan-American Institute of Geography and History (PAIGH)** are considered members of SIRGAS. They have the same rights and attributions as the member countries.

Art. 5. **Other countries, entities or persons can be observing members**, providing that they do not aim at profits. They can manifest their intention to participate as such or they can be invited by any component of SIRGAS. In any case, they must be accepted by the Directing Council (see Art. 9).

**Who should be contacted in each country to invite them to be members of SIRGAS ?  
IPGH section?**

**¿A quién debemos contactar en un país para invitarlos a ser miembros de SIRGAS?**

**Sección de IPGH ?**

## Organization

Art. 8. The SIRGAS components are:

a) Directing Council; b) Executive Committee; c) Working Groups; d) Projects; e) Technical Meetings; f) Scientific Council

Art. 9. **The Directing Council is the supreme unit of SIRGAS. It outlines its scientific, technical, and administrative directions.** Its composition and functioning are governed by the following rules:

a) It is composed by **one representative of each member country, one of the IAG, and one of the PAIGH. Each member has one vote** and should appoint a substitute who will replace the representative in case he or she is not present;

b) It ordinarily meets each 4 years. The ordinary meetings should be held during the same year as the IAG General Assembly and, if possible, simultaneously to it;

c) It is chaired by the SIRGAS president;

d) **The SIRGAS authorities -defined in Art. 12- have voice but not vote, except when they belong to the official delegation of their country;**

e) The observers, cooperative members or entities, and members of the Scientific Council have voice but not vote.

**SIRGAS needs more representation and commitment from some countries.**

**It could be better ? ...**

**SIRGAS requiere mayor representación y compromiso por parte de algunos países  
Esto se podrá mejorar? ....**

## The national representatives

Art. 7. The national representatives are those persons appointed by the member countries, through the entities that congregate the scientists and technicians in Geodesy and related subjects.

The election of the national representatives follows the procedures established in each country.

IAG and PAIGH appoint their own representatives.

**Who should elect the national representatives of a member country of SIRGAS?**

**Does the absence of participation revoke the representation?**

**How to achieve greater participation in countries where the national representative changes every year?**

1. ¿Quién debería elegir a los representantes nacionales de un país miembro de SIRGAS?
2. ¿La ausencia de participación revoca la representación?
3. ¿Cómo lograr una mayor participación en países donde el representante nacional cambia cada año?

SIRGAS, by its nature, is an international initiative.

In its 26 years, SIRGAS has established itself as one of the most successful examples of scientific cooperation in the world geodesy.

It is a human network dedicated to providing, maintaining and updating the spatial reference of the region based on work, scientific rigor, cooperation, respect, and responsibility.

SIRGAS is the result of the shared and developed vision of all those convinced to achieve a spatially unified and globally compatible continent.

SIRGAS, por su naturaleza, es una iniciativa internacional.

En sus 26 años, SIRGAS se ha establecido como uno de los ejemplos más exitosos de cooperación científica en la geodesia mundial.

Es una red humana dedicada a proporcionar, mantener y actualizar la referencia espacial de la región basada en el trabajo, el rigor científico, la cooperación, el respeto y la responsabilidad.

SIRGAS es el resultado de la visión compartida y desarrollada de todos aquellos convencidos de lograr un continente espacialmente unificado y compatible a nivel mundial.

Thank you, very much

Thank you, very much



# Brainstorming 1

UN-GGIM Americas, Subcommittee on Geodesy and SIRGAS:  
which role should play SIRGAS in UN-GGIM Americas?,  
how can SIRGAS improve its participation in and support to  
UN-GGIM Americas and the Subcommittee on Geodesy ?

Estimados colegas:

*(English version below)*

Me gustaría exponer algunos conceptos adicionales acerca de SIRGAS, relacionados con los logros obtenidos en sus más de 25 años de existencia como proyecto geodésico de las Américas.

Iniciado en una conferencia internacional desarrollada en Paraguay en el año 1993, actualmente participan activamente 21 países de América representados por sus organismos vinculados con la geodesia, como así también un representante de la IAG y del IPGH.

El funcionamiento de SIRGAS está regulado por un Estatuto establecido en 2002 y revisado en 2011. Este Estatuto permitió a SIRGAS resolver de manera razonable y armoniosa todas las inconvenientes que se han planteado en más de quince años.

Algunos de los logros de SIRGAS durante los últimos 25 años :

1. 15 países americanos han adoptado SIRGAS como su marco de referencia nacional;
2. SIRGAS distribuye y apoya una red de más de 400 estaciones de referencia de operación continua (CORS), que cubre una gran parte de las Américas y el Caribe;
3. Se desarrollaron 10 Centros de Análisis (9 en América y 1 en Alemania) para procesar los datos de la red CORS;
4. Se desarrollaron 2 Centros de combinación (1 en América y 1 en Alemania) para combinar las soluciones de los Centros de análisis;
5. Todos los resultados se entregan semanalmente al Servicio GNSS Internacional (IGS) para contribuir con el Marco de Referencia Terrestre Internacional (ITRF);
6. Se desarrollaron 2 centros de análisis de datos atmosféricos para modelar y monitorear los efectos ionosféricos y troposféricos sobre GNSS;
7. Se establecieron 2 centros de análisis para la definición de un Datum Vertical para las Américas (1 en América y 1 en Alemania);
8. Más de mil colegas han recibido capacitación a través de escuelas y talleres regionales; y
9. Casi 2 mil colegas han participado en las conferencias anuales de SIRGAS.

El establecimiento de UN-GGIM y la implementación de la resolución “GGRF para el desarrollo sostenible” han modificado sustancialmente el escenario en el que se desarrollan los eventos de Geodesia. Creo que esta ocasión es apropiada para revisar el estado de SIRGAS, mejorar su gobernanza y articular su relación con otras organizaciones panamericanas e internacionales.

Un buen ejemplo de lo que acabo de decir es el Plan de Acción Conjunto desarrollado en 2012 entre UN-GGIM: Américas, el Instituto Panamericano de Geografía e Historia y GEOSUR, para consolidar "el papel de SIRGAS como proveedor único de marco de referencia geodésico para la región ", entre otros objetivos. Este plan fue renovado en 2016 y se extenderá hasta 2020.

Por lo tanto, creo que crear el Grupo de Trabajo de GGRF Américas como una nueva estructura u organización significaría desperdiciar los enormes esfuerzos realizados por la comunidad de SIRGAS para desarrollar el marco de referencia geodésico regional. En cambio, creo que deberíamos encontrar un mecanismo de gobernanza para institucionalizar SIRGAS a través de UN-GGIM: Américas, el Instituto Panamericano de Geografía e Historia y la Asociación Internacional de Geodesia, aprovechando sus logros y el compromiso de los representantes nacionales hacia la organización.

Dear Colleagues from the Americas,

I would like to present some additional concepts about SIRGAS, related to its achievements and its relevance for the region.

SIRGAS was created in 1993, during the International Conference for the Definition of a South American Geocentric Reference System. Nowadays, SIRGAS is composed by 21 American Countries (which are mainly represented by national mapping or surveying agencies); 1 member of the International Association of Geodesy; and 1 member of the Pan-American Institute of Geography and History.

The operation of SIRGAS is regulated by a Statute established in 2002 and revised in 2013. This Statute allowed SIRGAS to resolve in a reasonable and harmonious manner all disputes that have been raised in more than fifteen years.

Some of the SIRGAS' achievements during the last 25 years are the following:

1. 15 American countries have adopted SIRGAS as their national reference framework;
2. A network of more than 400 Continuously Operating Reference Stations (CORS), which covers a large part of the Americas and the Caribbean, is distributed and supported by SIRGAS;
3. 10 Analysis Centers (9 in America and 1 in Germany) were developed to process the data from the CORS network;
4. 2 Combination Centers (1 in America and 1 in Germany) were developed to combine the Analysis Centers solutions;
5. All the results are weekly delivered to the International GNSS Service (IGS) for contributing with the International Terrestrial Reference Framework (ITRF);
6. 2 atmospheric data analysis centers were developed for modelling and monitoring ionospheric and tropospheric effects on GNSS;
7. 2 analysis centers were established for the definition of a Vertical Datum for the Americas (1 in America and 1 in Germany);
8. Over 1 thousand colleagues have been trained through regional schools and workshops; and
9. Almost 2 thousand colleagues have participated in the annual SIRGAS' conferences.

The establishment of UN-GGIM and the implementation of the "GGRF for sustainable development" resolution have substantially modified the scenario in which the events of Geodesy unfold. I believe that this occasion is appropriate to review the status of SIRGAS, improve its governance, and articulate its relationship with other Pan-American and International organizations.

A good example of what I have just said is the Joint Plan of Action developed in 2012 between UN-GGIM: Americas, the Pan-American Institute of Geography and History, and GEOSUR, to consolidate "the role of SIRGAS as single supplier of the geodetic reference framework for the region", among other objectives. This plan was renewed in 2016 and will extend until 2020.

Therefore, I believe that creating the GGRF Americas Working Group as new structure or organization would mean to waste the enormous efforts done by the SIRGAS' community to develop the regional geodetic reference framework. Instead, I think that we should find a governance mechanism to institutionalize SIRGAS through UN-GGIM: Americas, the Pan-American Institute of Geography and History, and the International Association of Geodesy, taking advantage of its achievements and the national representatives' commitment towards the organization.

## SIRGAS Works

- From the structural and operational point of view, SIRGAS is the common language in the scientific, technical and political aspects of geodesy in the region.
- We considered, that it is necessary to update its statute: especially respect to WG II.

## SIRGAS needs an strategic plan to:

- Improve the alignment with the Joint Action Plan: PAIGH, UN-GGIM: Americas y GeoSUR.
- Improve its nature as a body
- Update its governance, representation and decision making

## SIRGAS funciona

- Desde el punto estructural y operativo, SIRGAS es el lenguaje común en los aspectos científicos, técnicos y políticos de la geodesia en la región.
- Consideramos que es necesario actualizar su estatuto: especialmente con respecto al GTII.


## SIRGAS necesita un plan estratégico para:

- Mejorar su alineación con el Plan de Acción Conjunto IPGH, UN-GGIM: Américas y GeoSUR
- Mejorar su naturaleza como cuerpo colegiado.
- Actualizar su gobernanza, representación y toma de decisiones.

## SIRGAS members must take part

- To share experiences, knowledge, information, infrastructure and resources
- To guarantee the continuity, efficiency and effectiveness of each initiative.
- To build a better win-win strategy.
- To avoid geodetic barriers in the Americas

## Los miembros de SIRGAS deben participar

- 
- Para compartir experiencias, conocimientos, información, infraestructura y recursos
  - Para garantizar la continuidad, eficiencia y eficacia de cada iniciativa.
  - Para construir una mejor estrategia gana-gana.
  - Para que no existan barreras geodésicas en las Américas.