CAF DEVELOPMENT BANK OF LATIN AMERICA

GeoSUR Newsletter

News of Interest to the Geospatial Community in the Americas
(Original in Spanish)

July / August 2015 Volume 2, Numbers 7-8

"GeoSUR develops geographic services on a free-access web platform"

The Editor's Note

This issue focuses on the generation of spatial data as well as their technical and development-prone applications. Satellite observation of floods and the progress towards an early warning system in the Americas are the focus of the interview of the month. Applications of GeoSUR's geospatial information by various users including CAF, as well as key events in collaborative-cartographic production in South America, are part of the permanent columns of this newsletter. Examples on how to access GeoSUR's data as well as a note on a Master's thesis that technically assesses GeoSUR's spatial resources in comparison to INSPIRE are also included.

GeoSUR newsletter seeks to disseminate GeoSUR Program's achievements and characteristics as well as events, projects and best practices for the application of GI into sustainable development and decision making in the region, as part of the Geospatial Data Infrastructure of the Americas. The Portuguese translation is performed by **Eduardo Freitas**, Manager of the GEOeduc Institute of Brazil. Please send your contributions and suggestions to: **Nancy Aguirre**, Editor of GeoSUR Newsletter, at: cnaguirre@ipgh.org.

Inside this Issue:

Robert Brakenridge is the Director, of the Dartmouth Flood Observatory (DFO), which is engaged in space-based measurement, mapping, and modeling of inland surface waters on a global basis, including the suite of flood products that GeoSUR uses. He is also Senior Research Scientist CSDMS, INSTAAR, University of Colorado, Boulder.

An early warning system is in progress: Robert Brakenridge and Albert Kettner, Director and Co-Director of the Dartmouth Flood Observatory, say

The Dartmouth Flood Observatory (DFO; http://floodobservatory.colorado.edu), directed by Robert Brakenridge, has been mapping flood extents based on satellite imagery since the mid-1990s.

In GeoSUR portal are now available flood maps for this century that did not previously exist. Which could be the practical uses of this information?

In the early days of DFO, floods were only mapped when they were reported in the news, and thus the mapped floods needed to be of significant impact.

Many reliable news outlets were monitored as floods could have a large impact for one country but be off less significance for the rest of the world.

After 2011, DFO developed a technique to automate the flood extent detection algorithm in collaboration with a team from NASA Goddard Space Flight Center.

This resulted in the daily updated flood extent product with a resolution of ~250x250m we now obtain for the entire world.

New capability allows us to present these daily updated flood extents at GeoSUR as well (http://www.geosur.info/geosur/index.php/).

Today, anybody can go to the web, to the GeoSUR site, and look at current flooding in Latin America and the Caribbean.

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An early warning system... *continues*

Albert Kettner became Co-Director of the Dartmouth Flood Observatory (DFO) since 2011, housed at the University of Colorado. For DFO he designs and implements procedures and protocols to automate DFO product distribution like the global flood inundation maps and the status of remotely sensed gauging stations.

"Early warning systems for floods can now be implemented and DFO is currently further developing this capability in collaboration with colleagues involved in hydrological modeling using meteorological data."

Still, it is difficult to understand for somebody who is not familiar with the area how severe an ongoing flood is. You have to compare the specific flood with events in the past.

This is where historical flood extent maps that summarize all floods that occurred over a 10-year period (2000-2010), are very useful.

Another good reason to have easy access to historical flood extent data is when policy makers and decision makers of a certain country or local region are planning and implementing large infrastructure or other development projects.

These flood extent maps provide knowledge about floods in the past, and can inform the implementation risks of these kinds of projects.

How close we are to have an early warning system for flooding events?

Early warning systems for floods can now be implemented and DFO is currently further developing this capability in collaboration with colleagues involved in hydrological modeling using meteorological data.

All DFO surface water mapping is based on global coverage satellite information; we do receive water information for specific areas multiple times a day, but we are limited in the local monitoring sometimes by cloud cover.

Based on a satellite radar technique DFO is, however, providing water discharge values at locations of interest for the GeoSUR project, and this satellite technique is not hindered by cloud cover.

Right now, people can view the water discharge for a particular river stretch, and once a monitoring station is reliably calibrated, we can reconstruct a discharge signal back to 1998.

New satellite gauging stations can be added based upon need, so just let us know.

One spectacular way to use this technique is situating multiple stations from upstream along one river all the way to the ocean, and this can enable detection of a flood wave traveling downstream and, of course, downstream prediction.

In this way, we can develop an early warning system for downstream areas. Potentially, automated messages, either by email or by SMS, could be provided to local authorities from such satellite information.

In the beginning what would be the limitations of the warning system?

The technique has not been tested rigorously, so we need to do some more research but one limitation that I can think of is that it is much more difficult to have an early warning system high upstream in a river catchment, where flash floods occur with little warning.

Other limitations have to do with the temporal and spatial resolution: we rely on few daily satellite passes, and the satellite sensor provides coarse resolution data, so again flash flood events are difficult to detect.

For now we focus our early warning system development on larger river systems, which have a bigger footprint and wherein a flood wave develops more than a day in advance upstream.

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An early warning system... *continues*

"DFO measures global water extent and water discharge by utilizing satellite data... Recently, CAF has been very helpful in making these products easily available through the GeoSUR project; one portal where a host of geographic data is made available for Latin America and the Caribbean region."

"And with the assistance of CAF and NASA both we made annual extent layers from 2011 onwards as well; these layers are now available in the GeoSUR portal.
It is exciting to see DFO, CAF and NASA work closely together to provide better knowledge about water resources and water hazards, and we hope to continue doing so in the foreseeable future."

With hydrological modeling partners, we could also include rainfall measurements using NASA's Global Precipitation Mission satellite data, which are provided on nearly an hourly basis.

How is the relationship between this project, the CAF and NASA?

DFO measures global water extent and water discharge by utilizing satellite data. Most of the satellite data that is used for our analysis is managed and made freely available by NASA.

And, as indicated earlier, in close collaboration with the NASA Goddard Space Flight Center, we have automated the water detection algorithm such that water is detected on a daily basis for the world.

Recently, CAF has been very helpful in making these products easily available through the GeoSUR project; one portal where a host of geographic data is made available for Latin America and the Caribbean region.

Some of our products shown in the GeoSUR portal are updated daily and we had to develop an Internet infrastructure and protocols to get these updates automatically presented in the GeoSUR portal.

Other data products, like the 10-year (2000-2010) flood extent layer, are developed solely with help of CAF.

We may have obtained the data but just did not have the resources to analyze and generate 10 years flood maps. And with the assistance of CAF and NASA both we made annual extent layers from 2011 onwards as well; these layers are now available in the GeoSUR portal.

It is exciting to see DFO, CAF and NASA work closely together to provide better knowledge about water resources and water hazards, and we hope to continue doing so in the foreseeable future.

Users input in this process is important as these products can only be improved when we learn from end-users directly how and what products are being used for and what important information is missing and would be valuable new additions.

Santiago Borrero, GeoSUR Program Coordinator

What is said from the Coordination of GeoSUR?

By Santiago Borrero

GeoSUR born in 2007, with financial support from the CAF and joint coordination of the Pan American Institute of Geography and History (PAIGH), with the primary purpose of making geospatial information available to the user-community in the Americas.

Users of the network of geographic information services available in GeoSUR are many and diverse. From national mapping agencies, to research centers, and it is also the CAF -as a financial institution for integral development-, one of such very important users and a net consumer of spatial data for the fulfillment of its purposes.

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"Clearly, GeoSUR spatial data are potentially important to becoming a transversal asset and input to the Bank and its knowledge generation strategy. This is one of GeoSUR Action Plan 2015-2017 central objectives."

What is said from the Coordination… *continues*

CAF's experience as a development bank shows that proper planning of investments in physical infrastructure projects for economic development and regional integration requires available and properly integrated geo-referenced and standardized spatial information.

The priority themes provided by the Infrastructure area as part of CAF's Agenda have a high spatial component: the future of cities, border areas, and its observatories -including those for ICT and the Urban and Rural Mobility, for example-, so indicate.

Clearly, GeoSUR spatial data are potentially important to becoming a transversal asset and input to the Bank and its knowledge generation strategy. This is one of GeoSUR Action Plan 2015-2017 central objectives.

From the PAIGH's Secretary General

By Rodrigo Barriga

During the latest period, works for the "Integrated Northern Andean Map (in Spanish MIAN)", -a project framed within the GeoSUR Program with CAF's funding-, have continued.

Thus, the 2nd Workshop of this project was held in Quito, Ecuador between Monday 13 and Friday 17, in July, 2015, under auspices of this country's Military Geographic Institute, the specialized coordination of the National Geographic Information Center (CNIG) of Spain, and the cooperation of the United States Geological Survey (USGS).

Notably, there were significant advances in the objects' catalog and application schema, the joints in border areas, as well as progresses for the integration of reference data including hydrography, which is an important issue in several procedures for future applications to support sustainable development as well as studies on climate change adaptation, and natural hazard management.

Plans for publishing a Web Map Service (WMS) during first quarter of 2016 and for generating a hydrography graph set along that same year are also maintained.

Organizations participating in MIAN Project include: the Military Geographic Institute of Bolivia, the Geographic Institute "Agustin Codazzi" of Colombia, the Military Geographic Institute of Ecuador, the National Geographic Institute "Tommy Guardia" of Panama, and the National Geographic Institute of Peru.

In the near future there are plans for participating in various international events as to continuously forging key links with other agencies.

Second MIAN Workshop (Ecuador, 2015)

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Novelties in GeoSUR Portal

Recent Flood in Argentina Monitored by DFO

By Robert Brakenridge and Albert Kettner, Director and Co-Director of the Dartmouth Flood Observatory (DFO)

DFO detected a severe flooding in Argentina, just south of Buenos Aires. It is mainly farmland that has been flooded but according to news sites (see below) over 11,000 people needed to be evacuated and there were three casualties.

The flood shows up well on the GeoSUR site, when looking at the 2 week total flood extent layer. DFO also made an image of the flood and placed it on the front page of the DFO website; the disaster charter picked up on this flood as well.

When large floods occur it is useful to let people know this is monitored on the GeoSUR site as well.

Floods in Argentina in August 2015, on the GeoSUR Regional Map Viewer

Some news reports on the floods:

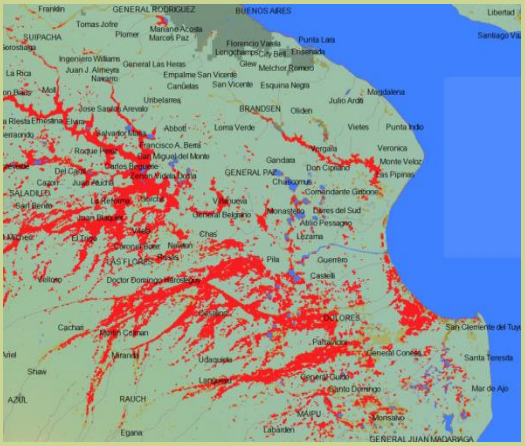
http://floodlist.com/tag/argentina

http://www.weather.com/safety/floods/news/south-america-flooding-argentina

The data is available as described below:

1. For the GeoSUR portal, you can do the following steps:
   a. Go to: http://www.geosur.info/geosur/index.php/es/, then click on "Regional Map Viewer".
   b. First zoom in to the area of interest (so south of Buenos Aires), then on the top right site of the browser hover over "map layers", scroll down to the layer "LAC floods last 2 weeks".
   c. That will show the flooding in light blue through your browser (so no GIS software needed).

2. The data is available in different formats on the DFO site:
   a. A jpeg and geoTIFF file can be downloaded from this page: http://floodobservatory.colorado.edu/GlobalFloodplains/060W030SCurrent.html
   b. The 2 week accumulated water extent layer can be downloaded as shapefile as well (so GIS software is needed): http://csdms.colorado.edu/pub/flood_observatory/MODIS lance_2wkpro/060w030s/. This layer only shows the flooded areas, with no background image or anything.



Floods in Argentina in August 2015. The data is available in different formats on the DFO site

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PAN AMERICAN INSTITUTE OF GEOGRAPHY AND HISTORY OAS

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Novelties in GeoSUR Portal… *continues*

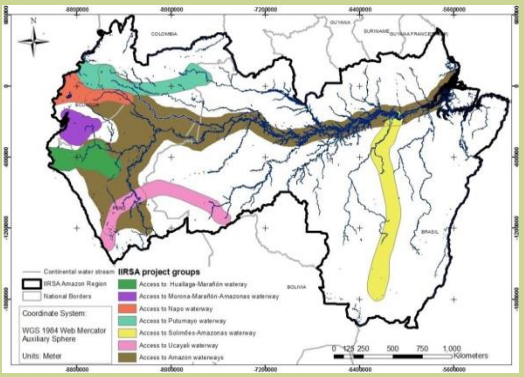
Fourth edition of GeoSUR Award (2015)

The call for GeoSUR Award 2015 is now opened. Institutions or individuals of any country of Latin America and the Caribbean may apply. Interested parties must submit the required documents no later than **September 28**, 2015, only by electronic means, to premios@ipgh.org and / or secretariageneral@ipgh.org. Winner of 3rd edition of GeoSUR Award (2014) was the "Computational platform for development of environmental-extremes monitoring, analysis and alert Systems" of the National Institute for Space Research (in Portuguese INPE) of Brazil; whilst in 2013, the winner of 2nd edition of the Award was "Terra-i, first habitat-loss monitoring system in Latin America and the Caribbean," of the International Center for Tropical Agriculture (in Spanish CIAT) in Colombia.

Master's thesis evaluates and compares GeoSUR to INSPIRE

[Full document and suggested citation: *Castillo Villamor, L. 2015. Technical assessment of GeoSUR and comparison with INSPIRE experience in the context of an environmental vulnerability analysis. MSc. Thesis. Lund University, University of Twente, The Netherlands*.]

Excerpts: This research performs a technical assessment of GeoSUR to identify the extent to which the spatial resources provided by the network are accessible, applicable and usable for decision making processes at regional (multinational) level. This study is conducted in the context of a real case that implements Spatial Multicriteria Evaluation to assess the environmental vulnerability of the Amazon IIRSA region. There are differences between an SDI as INSPIRE and a network for spatial data exchange as GeoSUR, mainly due to the existence of a legal framework in Europe, which is not available in Latin America. However, similarities also arise from the aims and objectives of the "Joint Action Plan for Accelerating the Development of Spatial Data Infrastructure in the Americas," which seeks to develop GeoSUR services on an SDI for the Americas. Results indicate that although both in GeoSUR and INSPIRE the ability to discover resources is better than the ability to download data, GeoSUR shows strengths at finding spatial resources and also on the accessibility to regional datasets. This, perhaps because it allows access to several sets of regional and global data that cannot be accessed from national SDIs, as GeoSUR also participates in the creation of some of them. However, several obstacles still limit the accessibility, applicability and usability of spatial data for analysis at the regional level. INSPIRE elements such as common implementing rules and technical guidelines are identified as useful to address these obstacles and to supporting spatial and data services between institutions.



Map of structured project groups in IIRSA Amazon Region (Source: CastilloVillamor, L., 2015, p.13)

GeoSUR Program: Basic Figures

Years in Operation	8
Participating Institutions	110
Beneficiary Countries	26
GeoSUR Network Specialists	550
Officials Trained (6 Regional Workshops)	314
CAF Officials Trained	130
Virtual Workshops Offered	41
Available Digital Maps	20,000
Available Metadata	14,000
Map Services (WMS)	310
WFS Services	25

Webpage: http://www.geosur.info

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How to discover and visualize data in GeoSUR?

This time we include the example of Infrastructure Projects added to GeoSUR portal based on a previous CAF system called "Condor".

By Miguel Blanco, Information Technology Consultant for GeoSUR

In this example you may download maps of various projects related to "Development Integration Hubs" for integration of the South American Regional Infrastructure Initiative (IIRSA). Maps are regularly reviewed and updated as a result of modifications made by the IIRSA national coordination.

In GeoSUR, as noted in the previous edition of this newsletter, there are different ways to access information. Here we show a sequence to access data from the GeoSUR Regional Map Viewer as a map service.

To do this, you may perform the following sequence:

1. On the main GeoSUR Portal menu, click on "Regional Map Viewer" (Figure 1).
2. When the list of subjects become visible, click on "Map Layers" (Figure 2).
3. Select "IIRSA Infrastructure". In the current version, layers contained in the Condor Viewer were incorporated into the Infrastructure subject (Figure 3).
4. Clicking on the button "IIRSA Infrastructure" and then on the arrow, the list of thematic subgroups and layers expands. By default, visible layers include "specific projects" and "Linear Projects" (Figure 4).
5. In order to make visible the symbols (Legends), you must click on each layer; on the image the symbols for "specific projects" are displayed (Figure 5).

Figure 1.

Figure 2.

Figure 3.

Figure 4.

Figure 5.

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How to discover and visualize… *continues*

6. Symbols for "Linear Projects" are visible by clicking on this layer. The shown wispy layers indicate that they are sensitive to scale and will be visible when zooming in the pertinent layer (Figure 6).

7. You can also see sub-lists by clicking on the sub-theme "Areas of Influence" (Figure 7).

8. By way of drawing a box with the mouse you may zoom in to a specific area, thus, all the sensitive-to-scale layers will be visible (Figure 8).

9. Once any layer is enabled, it becomes visible by clicking the "Check Box" (Figure 9).

10. Finally, as this topic includes subtopics, the "Project Groups" subtopic has a list of layers that can be enabled by clicking the pertinent "Check Box" and then, the legend is shown by clicking the relevant layer (Figure 10).

In the Regional Map Viewer you can click on the top right of the display in "More Information" to open another window where you may:

- Check maps of the IIRSA initiative

- Download data and metadata found in the viewfinder , and

- Consult the Legal Notice: "These maps have been produced and / or compiled by the GeoSUR Program under the IIRSA initiative. The boundaries, colors, denominations, and other information shown do not imply any judgment on the legal status of any territory or the border by GeoSUR. Moreover, these maps are preliminary and subject to revision."

Figure 6.

Figure 7.

Figure 8.

Figure 9.

Figure 10.

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Other events in the region

INPE AND CAF LAUNCHED VIDEO-CLASS ON SATELLITE FOREST MONITORING

Capacitree Project - Training and satellite-based forest monitoring

The National Institute for Space Research (in Portuguese INPE), Brazil, and CAF launched a video-class (*videoaulas*) initiative: the Capacitree Project - Training and satellite-based forest monitoring. 24 classes will be available in Portuguese, English, Spanish and French to all stakeholders, as of August, through the webpage: www.inpe.br/cra. First four videos focus on basics of remote sensing, GIS and digital image processing, as well as on information about the INPE-Amazon Program, which uses TerraAmazon system for surveillance activities, PRODES to calculate the Amazon annual deforestation rate, and DETER, which serves for inspection alert. Specific class-contents on the TerraAmazon system is divided into 20 videos, and can be also accessed via the INPE-CRA channel in YouTube. Based on data provided by PRODES and DETER the Brazilian government has conveyed policies and authority and control actions on deforestation that had positive effects in reducing deforestation rates in the Brazilian Amazon, from more than 27 thousand km² in 2004 to around 5,000 km². With Capacitree Project, INPE also aims at becoming a world reference on satellite-based forest monitoring training. To producing these video-classes, INPE used CAF resources and support of FUNCATE (Foundation for Space Science, Applications and Technology). Ligia Castro, Director of CAF Environmental Management and Climate Change, believes this type of initiative supports the Bank's policy towards knowledge dissemination between countries and also facilitate protection of forest habitats not only in Latin America but, in this case, in all megadiverse countries.

[Source: MundoGEO and INPE].

"The National Institute for Space Research (INPE), Brazil, and CAF launched a video-class (videoaulas) initiative: the Capacitree Project - Training and satellite-based forest monitoring. As of August, 24 classes will be available in Portuguese, English, Spanish and French to all stakeholders…"

DETER is inside the Earth Observation General Coordination (OBT)

SIRGAS SYMPOSIUM 2015

SIRGAS Symposium 2015, November18-20 2015, Santo Domingo, Dominican Republic

Advances, activities in the making, and new challenges of SIRGAS are discussed annually in the SIRGAS Symposia. On this occasion, the SIRGAS 2015 Symposium will be held on November18-20 in Santo Domingo, Dominican Republic. A new edition of the SIRGAS School on Reference Systems will take place between November 16 and 17 in previous days to the symposium. Celebration of these events has the backing of the International Association of Geodesy (IAG), the Pan-American Institute of Geography and History (PAIGH) and the International Union of Geodesy and Geophysics (IUGG). Contact: The Organizing Committee, Lourdes Concepcion lconcepcion@unphu.edu.do / The Scientific Committee, correo.sirgas@googlemail.com and sirgas@dgfi.badw.de.

[Source: SIRGAS]

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Other events... *continues*

CAF CALLS FOR STUDIES ON DEPLOYMENT OF A CONNECTIVITY INTEGRATION NETWORK IN SOUTH AMERICA

August 20 to October 19, 2015

The purpose of this international public contest is the provision of consultancy services to support studies for the deployment of a Connectivity Network for South American Integration through optic fiber or other available technologies. The studies embrace three components:

- First component includes a socio-demographic analysis for diagnosing each country's demand and supply peculiarities, considering both national and UNASUR objectives.
- Second component will advance a technical analysis of existing and planned infrastructure in the next five years discriminating both owners and types (closed, open and neutral), as well as commercially-available technology alternatives for the Network deployment.
- Third component involves an economic and financial feasibility analysis for the South American Connectivity Network deployment.

[Source: CAF]

"The purpose of this international public contest is the provision of consultancy services to support studies for the deployment of a Connectivity Network for South American Integration through optic fiber or other available technologies."

GIM International Summit, Amsterdam, The Netherlands, February 10 -12, 2016

SUMMIT TO CONNECTING SOCIETAL CHALLENGES WITH THE GEOMATICS WORLD

To explore the contribution of the geospatial industry in overcoming major social challenges, the team behind *GIM International* magazine, has decided to organize their own event. The future oriented, explorative, GIM International Summit, will take place in Amsterdam, The Netherlands, from 10 to 12 February 2016 and will attract leaders and key decision makers inside and outside the geomatics industry worldwide. It will focus on discussing the future of the industry for educational institutes, professionals and policymakers alike. The main themes of the Summit - water, food security and social justice - will be brought together under the overarching theme of "Seeking Space for Future Development". For more information please log on to: www.gimsummit.com.

[Source: Wim van Wegen, editorial manager, *GIM International,* August 2015 Newsletter]