# Building Capacity to Use Earth Observations for Environmental Management in Latin America: Examples of GEO activities

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# GEOSS Building Blocks

In order to build an integrated system of systems, GEO is focusing efforts in the following key areas:

- Architecture
- Data Management
- **Capacity Building: examples of NASA activities, CIEHLYC, GEOCAB**
- Science and Technology
- User Engagement

# Key Challenges: Satellite Remote Sensing for Decision Support

- Integration of satellite observations into the existing decision support framework and with other data sources
- Data characteristics (e.g. resolution) does not match the decision making activity.
- The wealth of satellite data and access to the data (how do I get started ?)
- Lack of technical/institutional capacity: includes the ability to conduct regional data validation and model integration.
- Lack of institutional support for the adoption of satellite data
- Low confidence in satellite observations

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# NASA Earth Science
# Applied Sciences Program

## **Earth Science Serving Society:** Thematic Areas

Agricultural Efficiency

Air Quality

Climate

Disaster Management

Ecological Forecasting

Public Health

Water Resources

Weather

# NASA Capacity Building Program Components


**DEVELOP**
Dual student/local government capacity building using collaborative projects

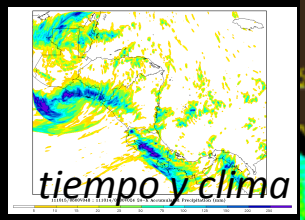
**Applied Remote SEnsing Training (ARSET)**
On-line and hands on basic/advanced trainings tailored to end-user organizations

**SERVIR Coordination Office**
Building international capacity with hubs in
- East Africa
- Hindu Kush - Himalaya
- Mesoamerica

**Gulf of Mexico Initiative (GOMI)**
Building Gulf region's capacity for local environmental management

# Connecting Space to Village

## The SERVIR Regional Visualization and Monitoring System




Improving environmental management and resilience to climate change through the use of Earth Observation satellites and geospatial technologies

www.servirglobal.net

- Regional hub at CATHALAC, Panama
- Focus on national and regional priorities: fires, air & water quality, deforestation, IT, tourism, natural hazards, through collaboration with ministries, universities
- Builds on existing capacity in GIS and remote sensing for environmental monitoring, disaster management

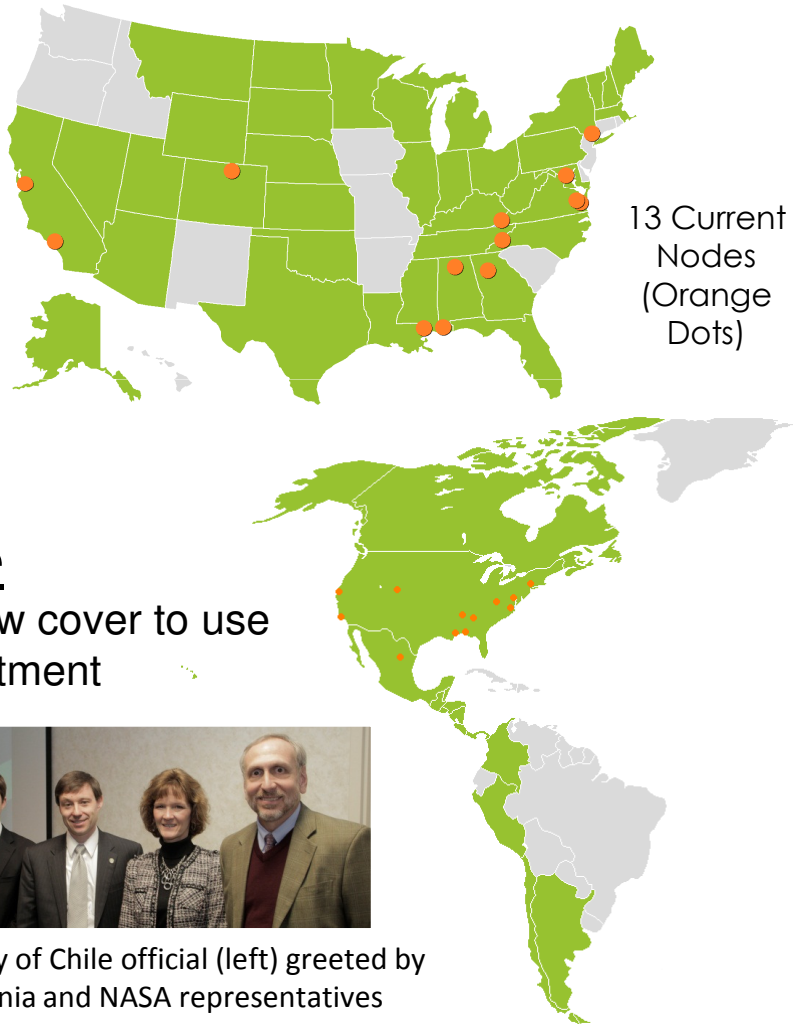
# DEVELOP

## http://develop.larc.nasa.gov

## What is DEVELOP?

***NASA*** workforce development program that ***collaborates*** with ***decision makers*** to conduct environmental research projects using ***NASA Earth observations***

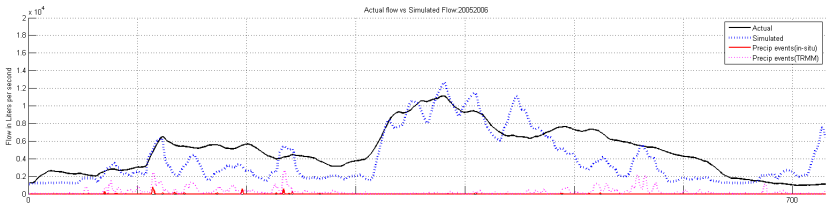
## 2014 Summer Project Impact



13 Current Nodes (Orange Dots)

## Collaboration with Embassy of Chile

NASA Earth observations used to map mountain snow cover to use in predicting water runoff for agricultural allotment




Snowmelt Runoff Model: Huasco 2005-2006



Embassy of Chile official (left) greeted by Virginia and NASA representatives

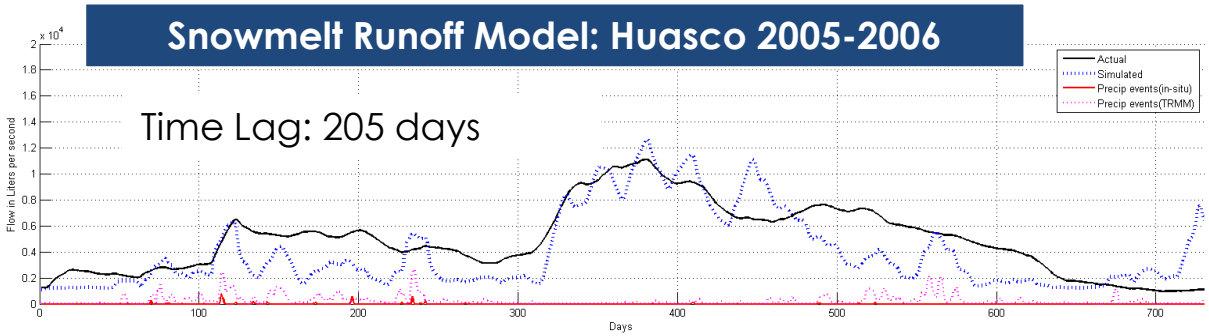
# DEVELOP: Chile Project Collaboration

## Chile Water Resources and Agriculture

*Using NASA Earth Observations to Understand Snowmelt and Address Ongoing Drought in Central Northern Chile*

- **<u>Community Concern</u>:** Water allocation for agricultural use – snowmelt runoff from Andes
- **<u>End-Users</u>:** CIREN (Natural Resources) and Embassy of Chile to the U.S.
- **<u>Tools</u>:**
  - Ability to map snow cover in Andes
  - Forecasting seasonal snowmelt runoff potential

**Webinar Link:**
https://www.earthobservations.org/documents/meetings/2014_ciehlyc_webinars/20140618_recording.mp4




Former Chilean Minister of Agriculture visits NASA Headquarters

# Applied Remote Sensing Training (ARSET)

http://arset.gsfc.nasa.gov

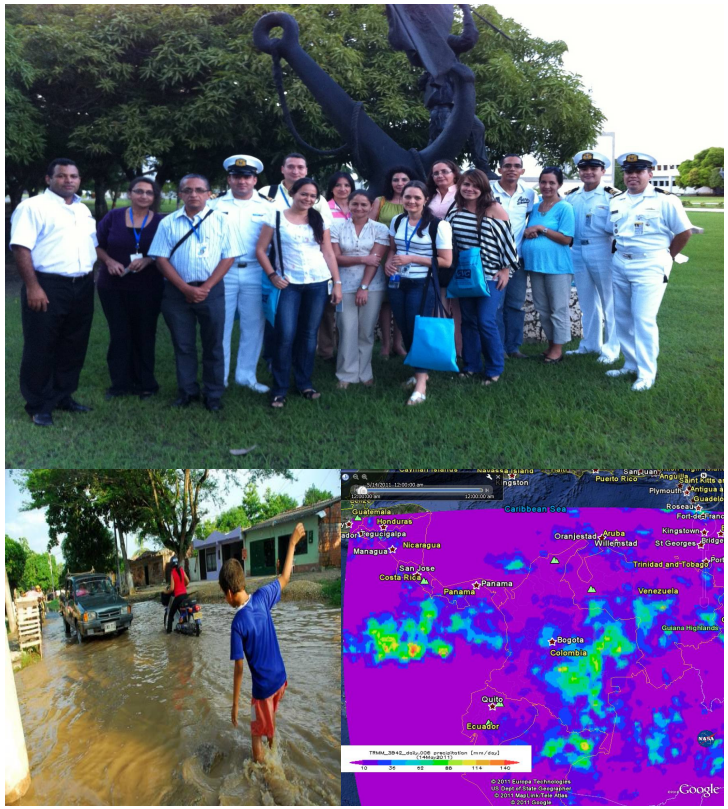
**Online courses (FREE):** Live and Recorded: 4-6 weeks

**In person training courses**: In a computer lab: 2- 4 days.

**Train the Trainers**: Learn how to design and conduct your own remote sensing training course

## Activities in Latin America

- Hands on trainings in Costa Rica and Colombia
- Translation of many training modules into Spanish (available online)
- Webinars have dramatically helped increased participation

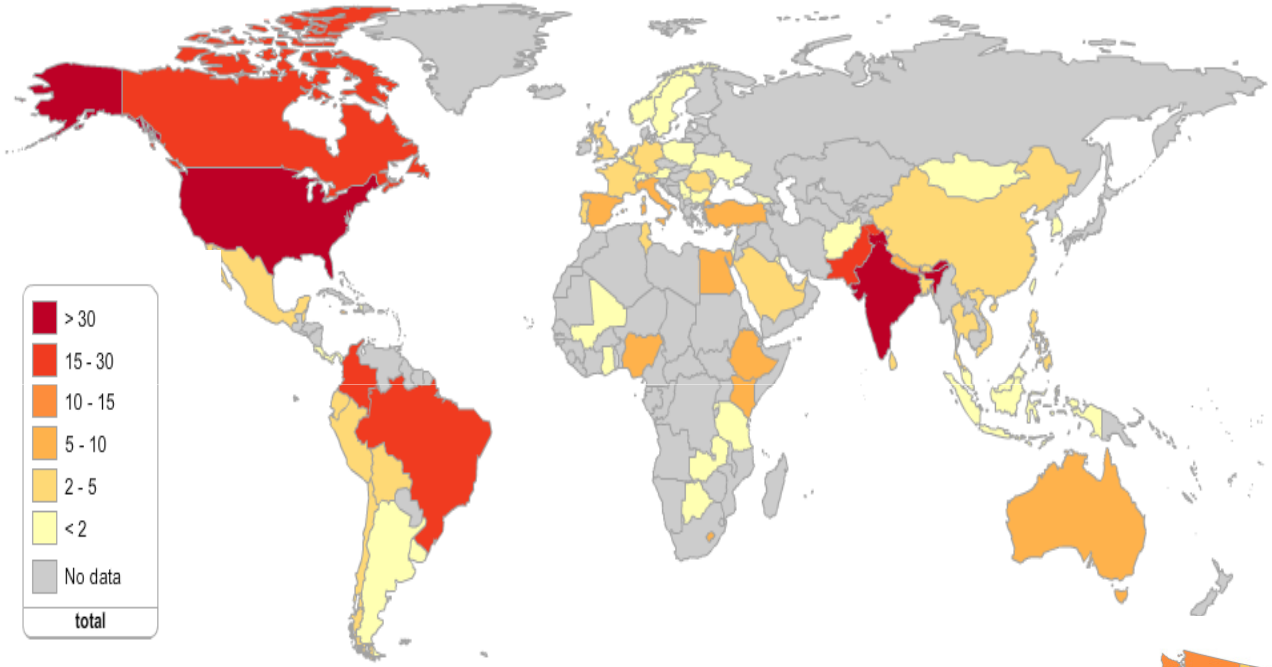



**Colombian Floods in May 2011**: Satellite observations of rain rate, clouds, winds.
**Climate variability and El Niño/Niña over south America:** Rain rate and Surface Temperature
**Access to snow cover imagery over Chile and Argentina**

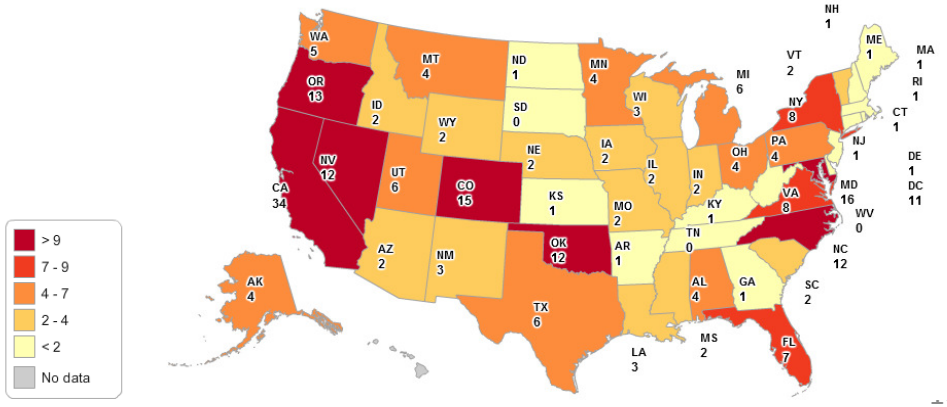
# ARSET: 2009 – 2013

## 1600+ End-users Reached

## 600+ Organizations




**Number of participating organizations per country: Air Quality, Water Resources, Flood Monitoring.**

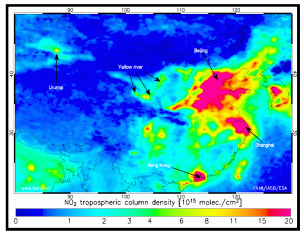


# ARSET Focus Areas

## Health (Air Quality)

- 2008 – present
- 26 Trainings
- +700 end-users
- Analysis of dust, fires and urban air pollution.
- Long range transport of pollutants
- Satellite and regional air quality model inter-comparisons.
- Support for air quality forecasting and exceptional event analysis

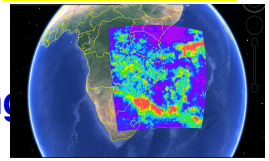
Nitrogen Dioxide over China



## Water Resources and Flood Monitoring

- April 2011 – present
- 6 Trainings
- +300 end-users
- Flood/Drought monitoring
- Severe weather and precipitation
- Watershed management
- Climate impacts on water resources
- Snow/ice monitoring
- Evapotranspiration (ET), ground water, soil moisture, and runoff.

Satellite derived precipitation

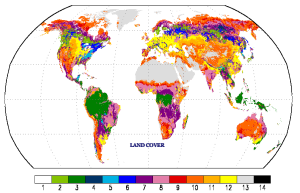


Inundation mapping

## Land Use/Change and Ecology

- Beginning in 2014
- Webinars and in-person courses
- Topics to be informed by ongoing end-user needs assessment
- GIS applications
- Land use/change and vegetation indices
- Fire products

Land Cover



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*Water Task – Component 5*

# Comunidad para la Información Espacial e Hidrográfica en Latinoamérica y el Caribe (CIEHLYC)

CIEHLYC
COMUNIDAD PARA LA INFORMACION ESPACIAL E HIDROGRAFICA EN LATINOAMERICA Y EL CARIBE

- Working group of GEOSS in the Americas
- International network of water and remote-sensing experts from governments and academia in the Americas and in the Caribbean.
- Formed in 2009 to promote and support GEOSS implementation activities in the Societal Benefit Area for Water (including Oceans) through collaborations among members, and capacity building in the use of earth observations
- Managed by three regional coordinators from Canada, U.S./Colombia, and Chile.

- 2011- Colombia is welcomed as a GEO member. Collaboration: GEO Secretariat – IDEAM – CIEHLYC.
- 2011 - Water Cycle Capacity-Building Workshop (hands-on training). Cartagena, Colombia. Collaboration: Escuela Naval de Colombia-NOAA- GEO Secretariat – CIEHLYC.

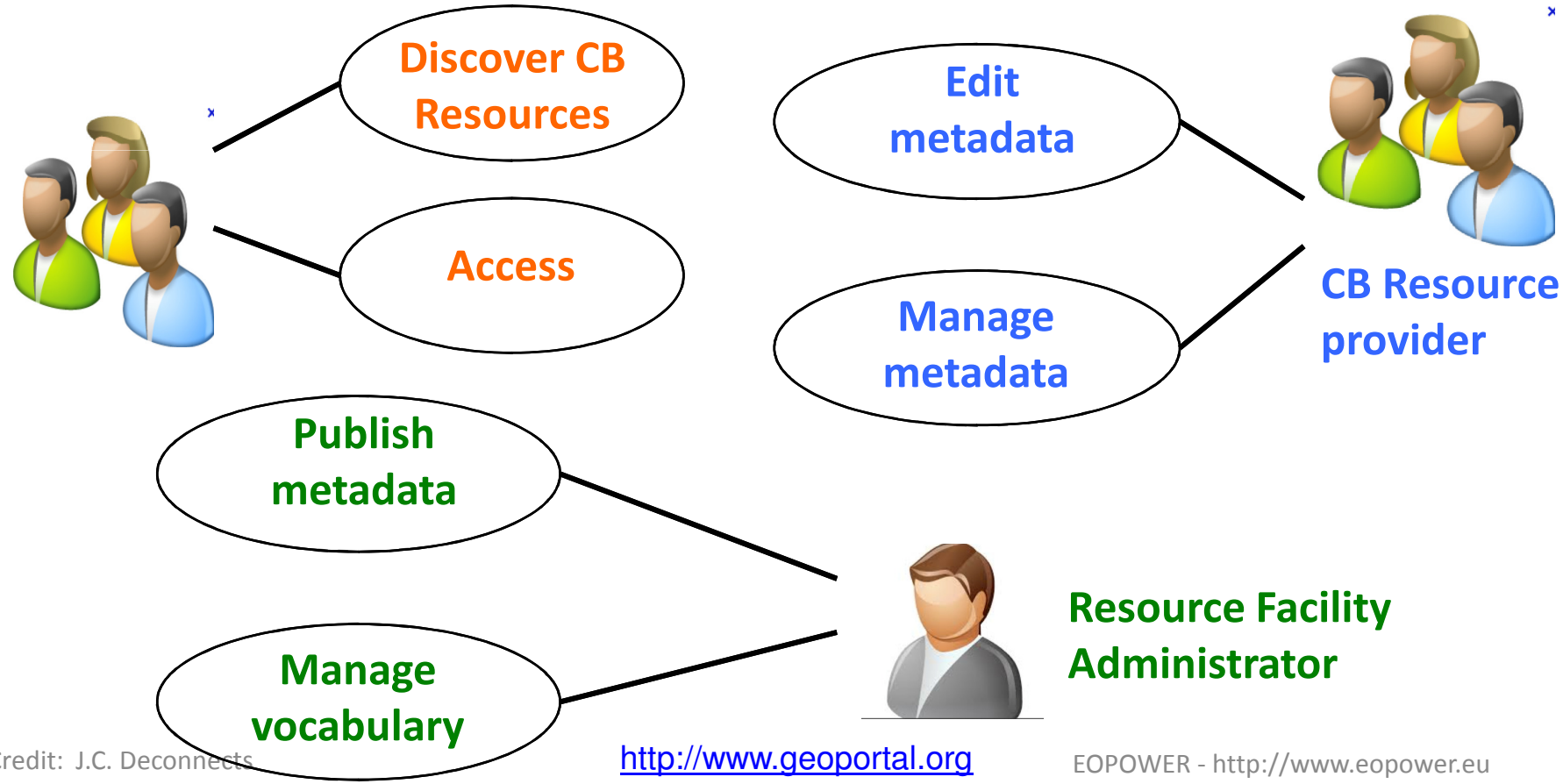
2014 – Monthly webinars on Earth-Observations projects and applications by Latin-American managers and scientists. Collaboration: GEO-Secretariat – CIEHLYC. http://earthobservations.org/webinar_ch.shtml
Presentations cover remote sensing and in-situ monitoring of fresh water and Oceans.

2013- Application of NASA Earth Observations for Assessing Potential Water Availability from Andean Snowpack for Use in Agricultural Water Allocation Planning in the Coquimbo Region of Chile. Collaboration: NASA-CIREN-CIEHLYC- Common Wealth of Virginia Government.

# GEOCAB

## Planned Capacity Building Resource Facility (November 2014)

- A joint GEO, CEOS, EU (GeoNetCab), EOPOWER, IASON project.
- Inventory of programs, services, training materials, best practices and stakeholders
- To facilitate cooperation and coordination among existing resource facilities.




Credit: J.C. Deconnects

http://www.geoportal.org

# Lessons Learned: enhancing geospatial data use

- ***A demand driven process:*** from satellite mission planning to capacity building, is key to the adoption of geospatial data.
- The ***return on investment*** must be readily evident to potential end-users, and communicated on an ongoing basis.
- ***Improving communication between research and decision-making/policy-making communities*** is one of the key functions of any successful capacity building program.
- ***Sharing of success stories among stakeholders*** (with the help of intermediate organizations) helps to gain institutional support for the adoption of satellite observations.
- ***General awareness and enabling data access*** is an important first step in the capacity building life cycle.

# Gracias !

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