GEOSS in the Americas Forum on Coastal Management

NASA Support of Capacity Building with an Emphasis in Latin America

David Toll (NASA/GSFC)
Hydrological Sciences Branch, NASA/GSFC
Deputy Program Manager of NASA Water Resources

Rick Lawford (UMBC)

David.L.Toll@NASA.Gov

20 November 2009
OUTLINE

• NASA Earth Science, Applications & Water Resources

• NASA GEO Capacity Building Support in Water
  - Workshops
    + Latin America CB in Lima, Peru
    + Hydro-Climate Training in Iguassu Falls, Brazil
  - Projects
    + LBA, La Plata Basin Hydroclimatology, SALDAS, SERVIR
  - Global Projects – Latin America
NASA develops and operates Earth-observing satellites that monitor changes to our planet’s oceans, ice caps, land masses and atmosphere from a unique global perspective.
Goal: Facilitate application of NASA Earth science products as a routine use in integrated water resources management for the sustainable use of water. Also includes extreme events of drought and floods and the adaptation to the impacts from climate change.

WATER RESOURCES FUNCTIONAL THEMES:
1) Streamflow & Floods (Includes Snowpack)
2) Drought Monitoring & Prediction
3) Irrigation and Water Supply (Includes ‘ET’)
4) Water Quality
5) Climate Change and Water Resources
Relevant Facts:
- Involves ~80 nations and ~50 international organizations who have agreed to work together to build the GEOSS.
- Coordinated by the Group on Earth Observations (GEO) which implements the GEOSS work plan through the best efforts of its community.

The Water Target
By 2015, produce comprehensive sets of data, information products and services to support decision-making for efficient management of the world's water resources, based on coordinated, sustained observations of the water cycle on multiple scales.
As part of realizing the benefits arising from Earth Observations, GEO has launched a Capacity Building effort. The water community has a strategy for building the capability for using Earth Observations that recognizes the unique capabilities of different capabilities and norms in different parts of the World.

**WA-06-07: Capacity Building for Water Resource Management**

Initiate capacity building programs in support of water management, to show the value of, and develop tools for, Earth observation data.

*a) Latin America*

*b) Africa*

- NASA Support of USAID Famine Early Warning System Network (FEWS-NET)
- African SERVIR Activities
- Middle East & North African Water Data Platforms

*c) Asia*

- Several research and application projects
A GEO Water Cycle Capacity Building workshop will be held in Lima Peru at CONIDA on November 30 to December 4, 2009.

Sponsors for the workshop include:
- Canadian Group on Earth Observations
- International Geophysical and Biophysical Programme (South American Office)
- National Oceanic and Atmospheric Administration
- National Aeronautics and Space Administration
- United Nations Educational and Scientific Organization
Specific objectives for the workshop/symposium include:

- To develop an inventory of the national and regional data needs and data infrastructure in Latin America and the Caribbean.
- To introduce representatives of countries in Latin America and the Caribbean to the tools that are available for analysis through GEO and GEO members.
- To develop a plan for a program of Capacity Building in the water sector for the countries of Latin and Caribbean America and a framework to support “North-South” and “South-South” support and collaboration.
Latin and Caribbean America
Argentina
Belize
Bolivia
Brazil
Chile
Columbia
Costa Rica
Ecuador
Guatemala (?)
Haiti
Honduras
Jamaica
Mexico
Panama
Paraguay
Peru
Uruguay

Supporting Countries:
Canada
The Netherlands
United States
A workshop report that summarizes the needs and capabilities for Earth Observations in Latin America and the Caribbean.

Initiate at least two new Latin America initiatives through the interactions between experts at this workshop.

Identification of a core group of experts from Latin America and the Caribbean with sufficient understanding to access data for utilization of Earth Observations for water management applications.
“International Summer School on Land Cover Change and Hydro-climate of the La Plata Basin”
Foz do Iguassu, Brazil, Nov 2-13

Floobs

Land cover/
Land use changes

Biomas

NDVI changes 1980-2000
South American Land Data Assimilation System (SALDAS)

**Goal:** combine local observations and parameters with NASA advanced hydrological modeling expertise and capabilities to improve SA NWP, climate and water management through collaboration with various centers (government, universities and research institutes)

**Collaborative work for the past 4 years with the Brazilian Center for Weather Forecast and Climate Studies (CPTEC - an equivalent to NOAA/NCEP in SA) a division from the Brazilian National Institute for Space Research (INPE - an equivalent to NASA in SA). CPTEC/INPE is a lead and reference institution in Latin America for operational and research modeling. This collaborative work includes promoting interaction between Latin America students and researchers and US institutions as well as Capacity Building.**

**Funded Activities**

**NASA THP - La Plata Basin**

combine NASA products with local observations to improve understanding of the hydrological and meteorological processes over the region

La Plata basin integrated total runoff (Kg/m²) at 1Km resolution (January 2000)

**IAI - La Plata Basin Land Use/Land Change due to natural and anthropogenic causes**

**NDVI 1981-2000 trends:** surrogate for primary production from NOAA-AVHRR images. Red: decrease Blue: increase. [Courtesy of Jobbagy.]

Other Activities

**NASA LBA Ecology – LSM Intercomparison Project**

leverage on 8 flux sites in the Amazon region. SALDAS forcing used for wall-to-wall intercomparison.

Amazon Observational Network of eddy flux tower sites (red dots) on a map of vegetation types in Amazônia and Brazil.

**NASA Applied Sciences Program project to improve decisions support systems in agriculture, drought and water resources management for South America**

Regions with significant impacts on latent heat flux when comparing initial conditions for operational NWP models models with well-balanced SALDAS fields

**SALDAS – CTR latent heat flux**

(a) SALDAS – CTR precipitation

(b) SALDAS – CTR latent heat flux

(b)
SERVIR
The Mesoamerican Regional Visualization and Monitoring System

Home
User's Manual
Downloads
What's New
About SERVIR
Gallery
Directory
Partners
Library
Contact Us

Search this site
Go

Disasters
- Fires
- Ecological Disasters
- Weather
- Climate
- Oceans
- Water
- Agriculture
- Human Health
- Energy

SERVIR Movies
- A Vision of the Future
- Quicktime movie 2.30 MB. Click image to view movie.

Video Tierra ceniza
- A bosque saludable (WMV file). Click image to view movie.

Time Lapse of Fires
- (MPEG 17.89 MB). Click image to view movie.

NASA Contributions to GEOSS for the Americas - 20 Nov 2009
Heavy Rain, Floods, Landslides in Hispaniola--1 November 2007
Analyzed in Real-Time by Global Hazard System (GHS)

3-day heavy rains estimated from ‘TRMM’ satellite of over 250 mm over Dominican Republic related to Hurricane Noel produces flooding (deduced by hydrologic model running globally in real-time) and landslide prediction (estimated from real-time landslide potential algorithm).

Rainfall information is from TRMM Multi-satellite Precipitation Analysis (TMPA)  Adler/Goddard Space Flight Center
Streamflow Monitoring & the Dartmouth Flood Observatory
Robert Brakenridge
Dartmouth Flood Observatory
http://www.dartmouth.edu/~floods/
Help Global Network

Hydrology for the Environment, Life and Policy

- Only US contribution to IHP and UNESCO {T. Engman/NASA-SAIC N. American HELP Coordinator}
- Only international programme that is a catchment-based activity.
- Includes scientists, stakeholders, policy-makers, lawyers.
- Provides options as against imposing solutions.
- Provides testing, implementing and improving solutions.
- Sharing experiences across a global network of basins.
Communities of practice are...


Water involves a large community (many communities) of people who have a common interest and generally have great enthusiasm for their work. There is great potential for coordinating this energy through the GEO Water Cycle Community of Practice.

on an ongoing basis

Etienne Wenger
Richard McDermott
Bill Snyder

Cultivating Communities of Practice, Harvard Business School Press, 2002
A STRUCTURE TO IMPLEMENT THE WC COMMUNITY OF PRACTICE

Coordination
We would invite experts in water from your countries to:

1) Participate in the Lima Workshop

1) Join the Water Cycle Community of Practice. Interest can be expressed by sending an email to lawford@umbc.edu or registering to be a member of the water cycle forum at: http://www.watercycleforum.com.