Hydro-BID: Regional Simulation Model for Hydrology and Water Resources Management in Latin America and the Caribbean

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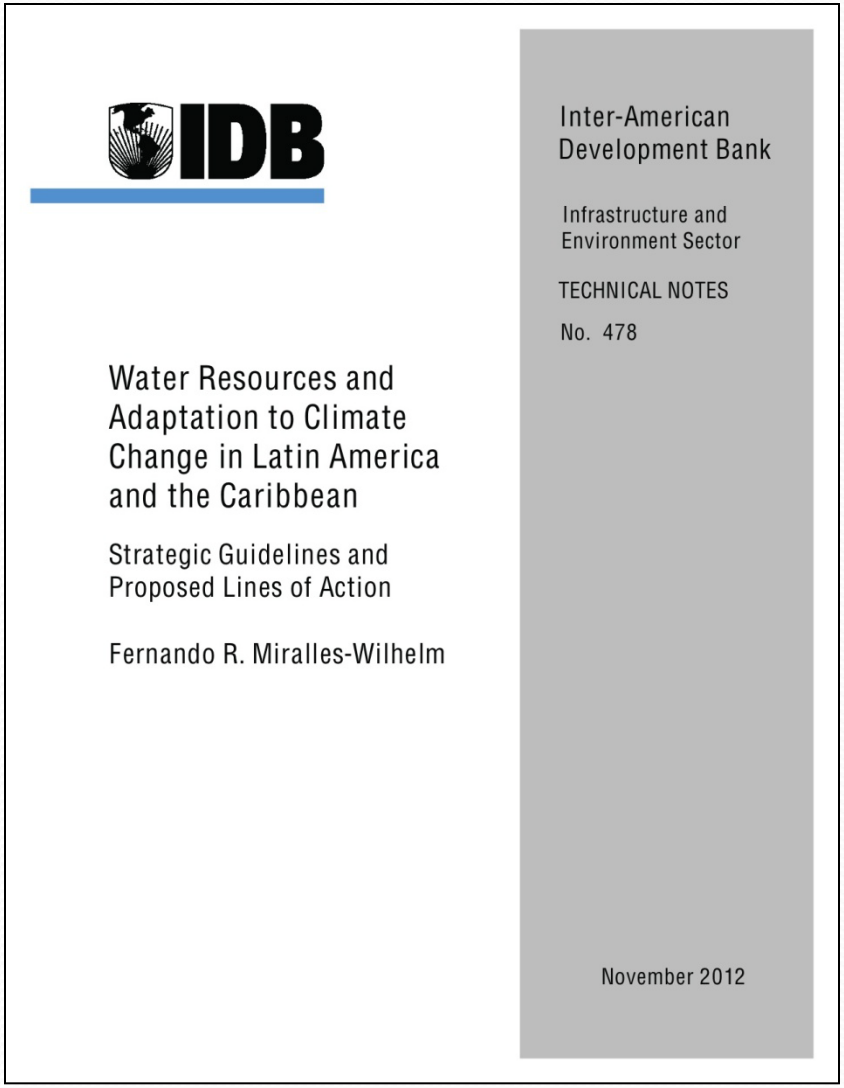
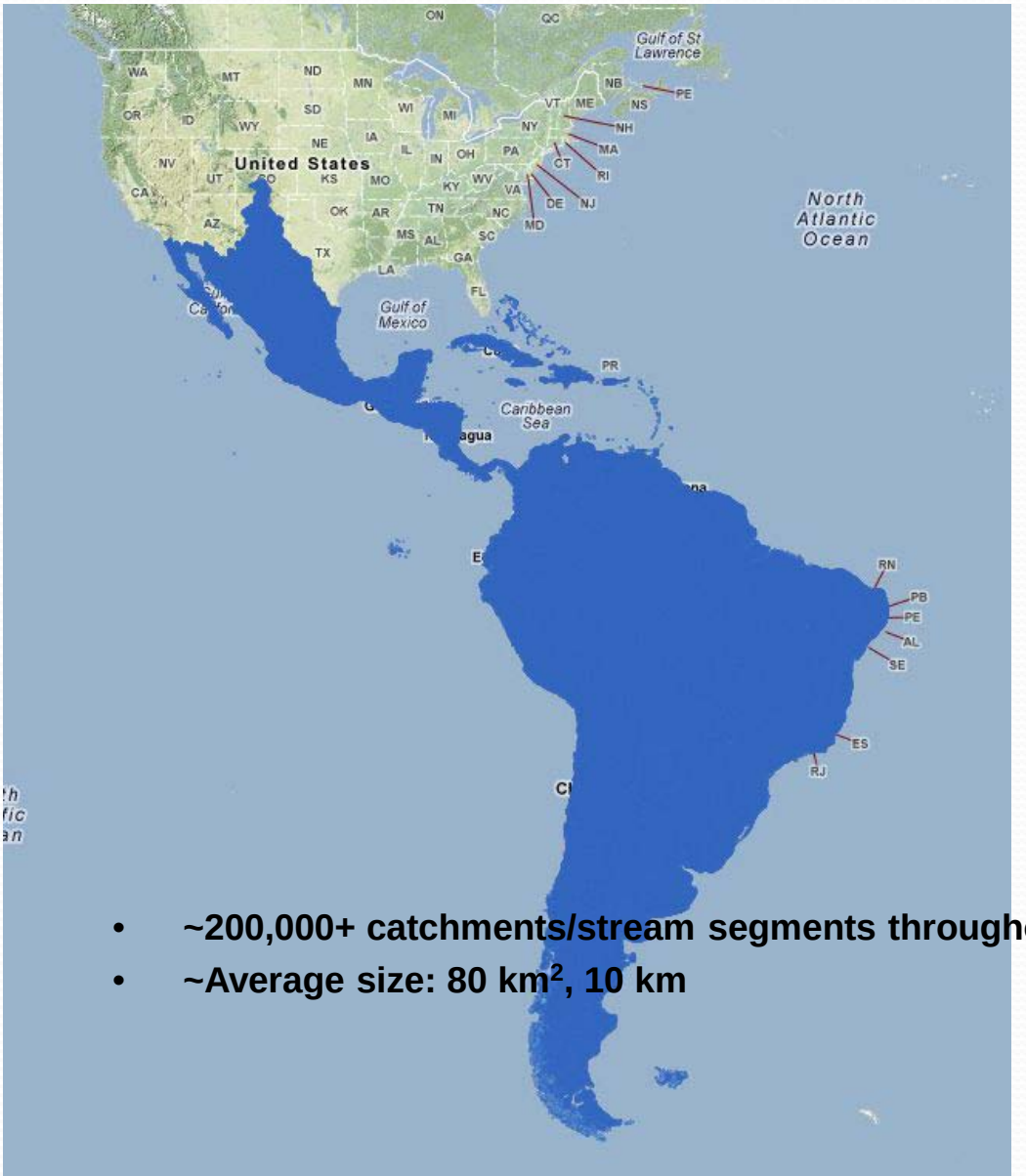
March, 2014

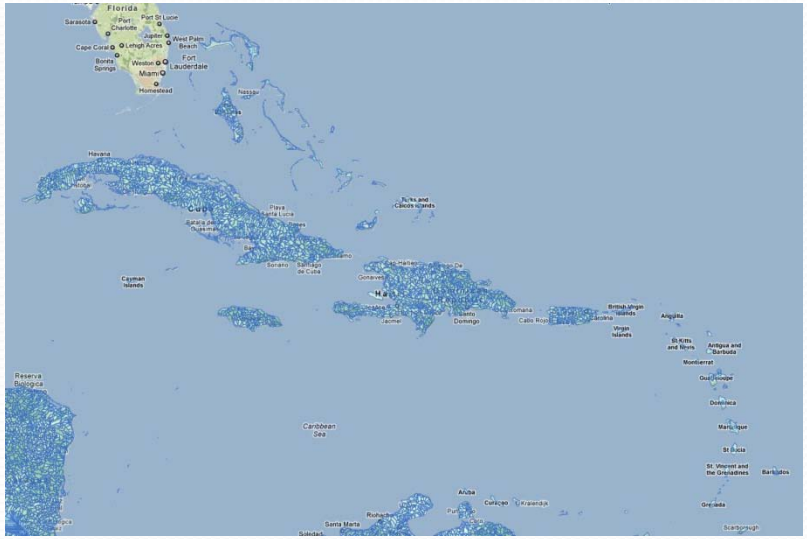
R&D with a strategic focus on identifying new investment opportunities

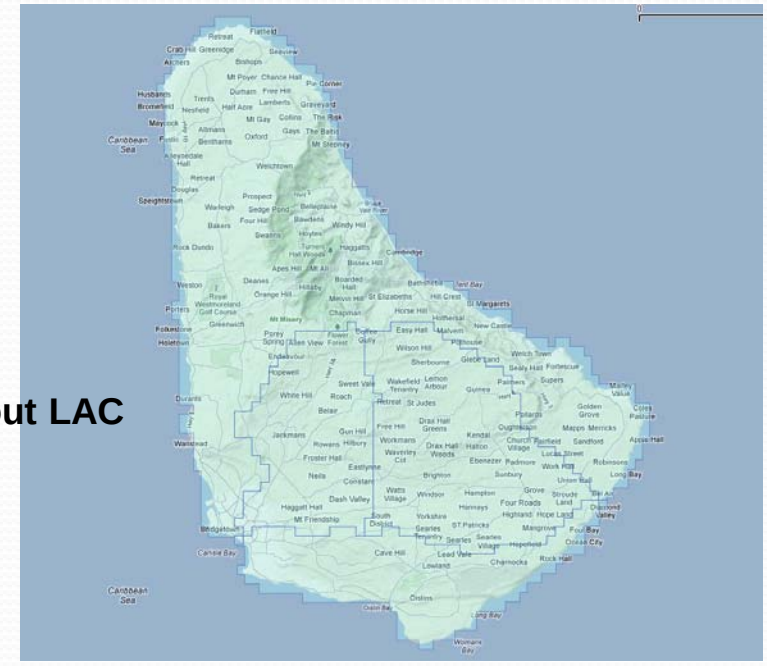
- Objective: research and knowledge; identify opportunities for development investments.
- Focus: “type” problems, e.g., floods/drainage, droughts, glacial melting, sea level rise.
- Product: potential adaptation projects identified working with clients.
- >10 projects in execution: Nicaragua, Honduras, Perú, Uruguay, Mexico, Trinidad & Tobago, Argentina, Brazil, Haiti and Ecuador.



The Hydro-BID Simulation System







- **~200,000+ catchments/stream segments throughout LAC**
- **~Average size: 80 km^2, 10 km**

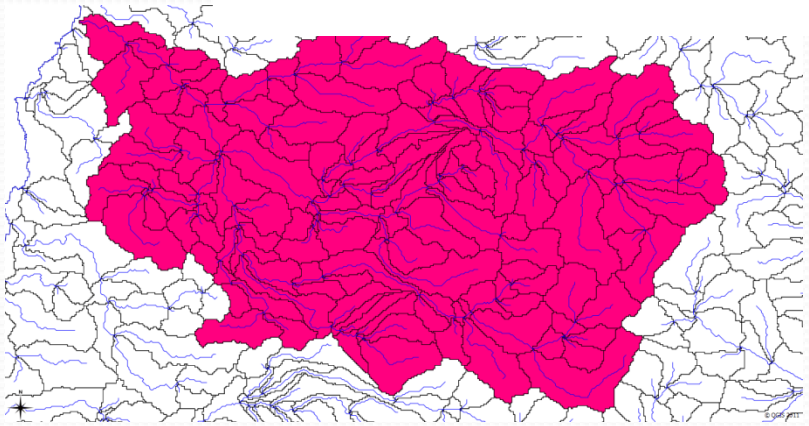
The AHD supports navigation across scales, upstream and downstream

Hydro-BID: Key Features

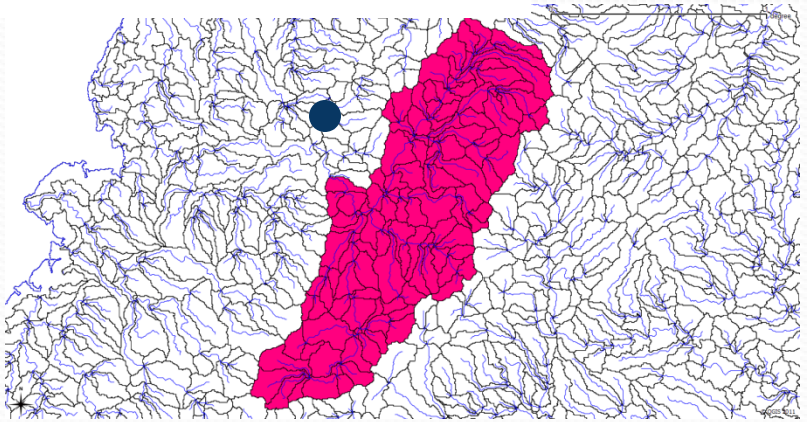
- Covers the **entire LAC region**: useful to **organize** and **aggregate scarce data**; the whole is greater than the sum of its parts
- Spatial and temporal resolution suited for **planning and design** of water resources **infrastructure**
- Simulates basin hydrology driven by climate in a **modular, flexible and scalable** way; **robust** hydrologic model formulation that is able to interact with just about **any type of climate model or data source**
- **Tailored** to simulate water resources at **all time-scales:** near term, intra/inter-annual, decadal and beyond
- Designed to be community-driven, opening the doors to a **rich development and improvement process**

Hydrographic Database (LAC-AHD)

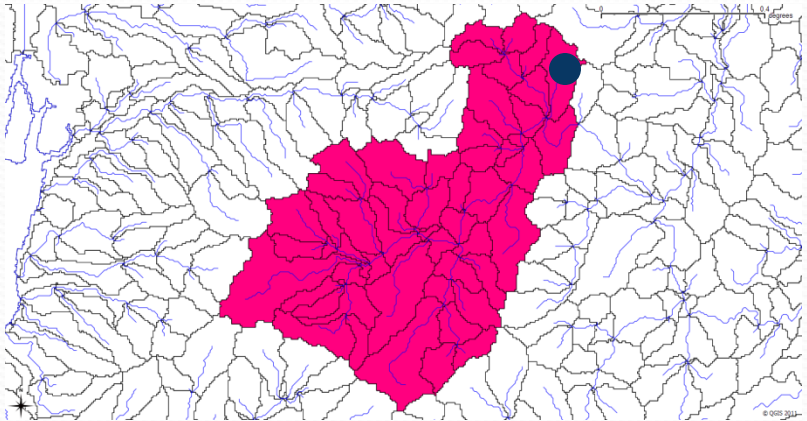
Country Name	ID	Source	Station	River	Latitude	Longitude	Drainage Area: Sq. Km. (Gauge)	Drainage Area: Sq. Km. (AHD)
Chile	35	UNESCO	Corneche	Rapel	−33.98	−71.58	13,186	13,782
Colombia	51	UNESCO	Pte Pusmeo	Patia	1.7	−77.61	13,147	13,172
Ecuador	59	UNESCO	D.J. Palmira	Paute	−2.55	−78.55	5,162	5,172



Rapel

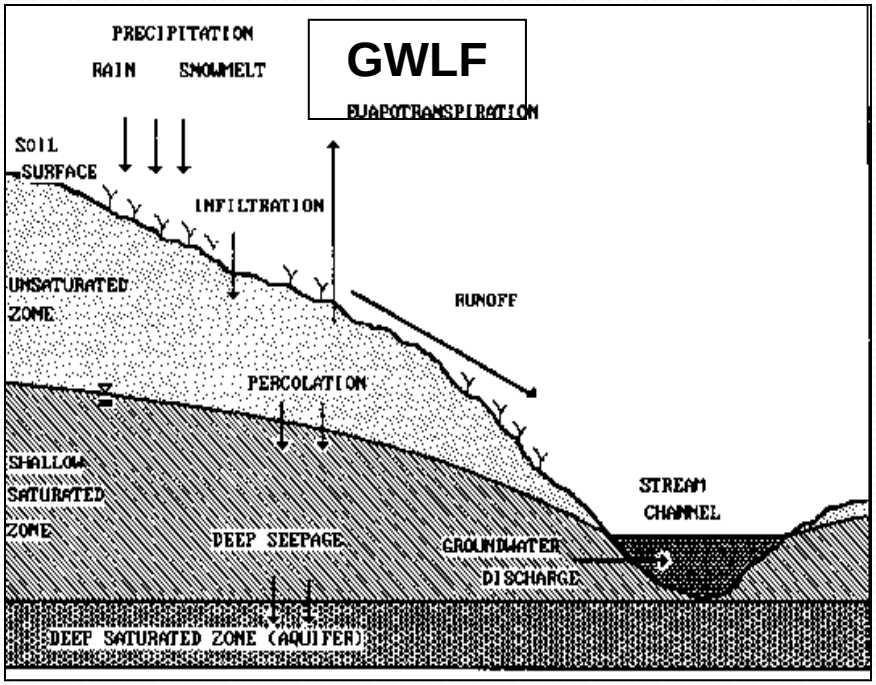


Patia

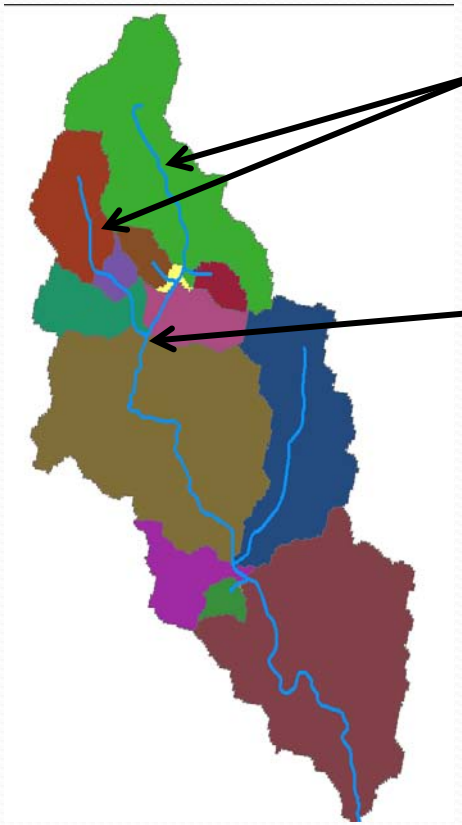


Paute

LAC: Hydrologic Model (GWLF)



Source: GWLF User Manual Version, Haith et al., 1996



AHD Catchments

Headwater reach flows generated with GWLF

Outflow from catchment after inflow + GWLF flow subjected to routing method

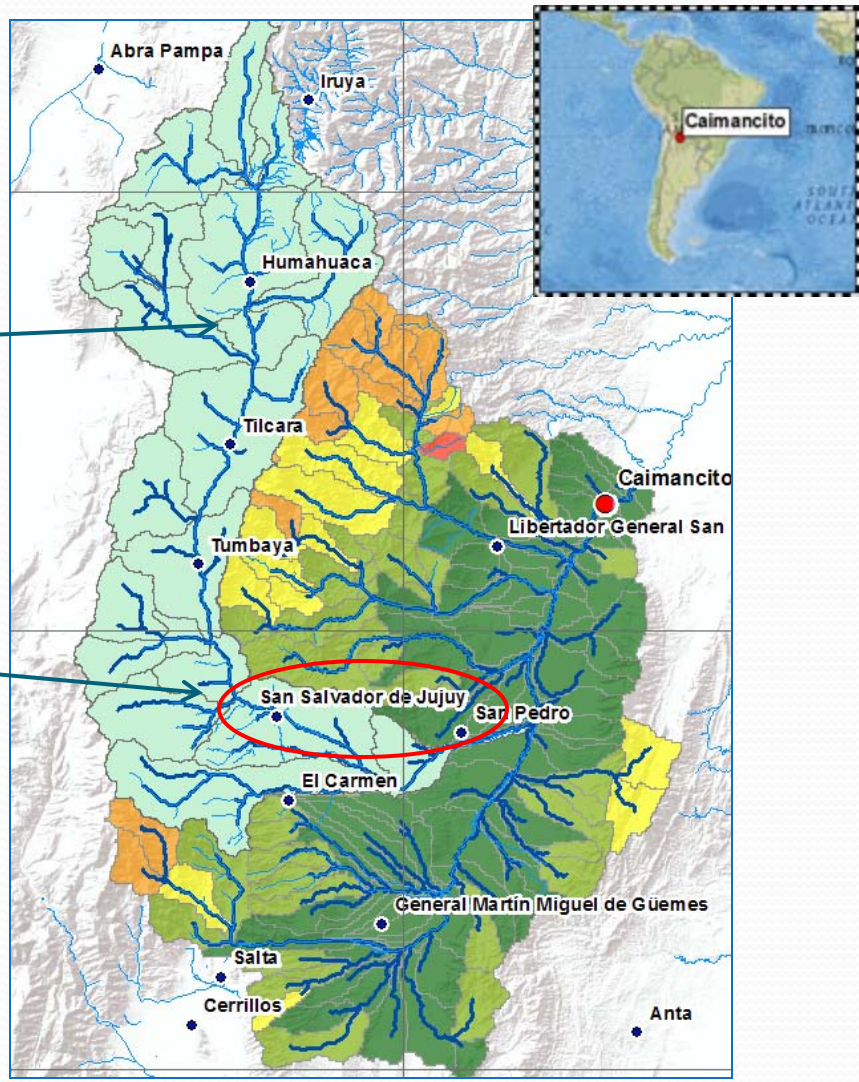
Catchment data layers:

- precipitation
- temperature
- land cover
- topography
- human withdrawals
- human returns
- hydrologic parameters
- other

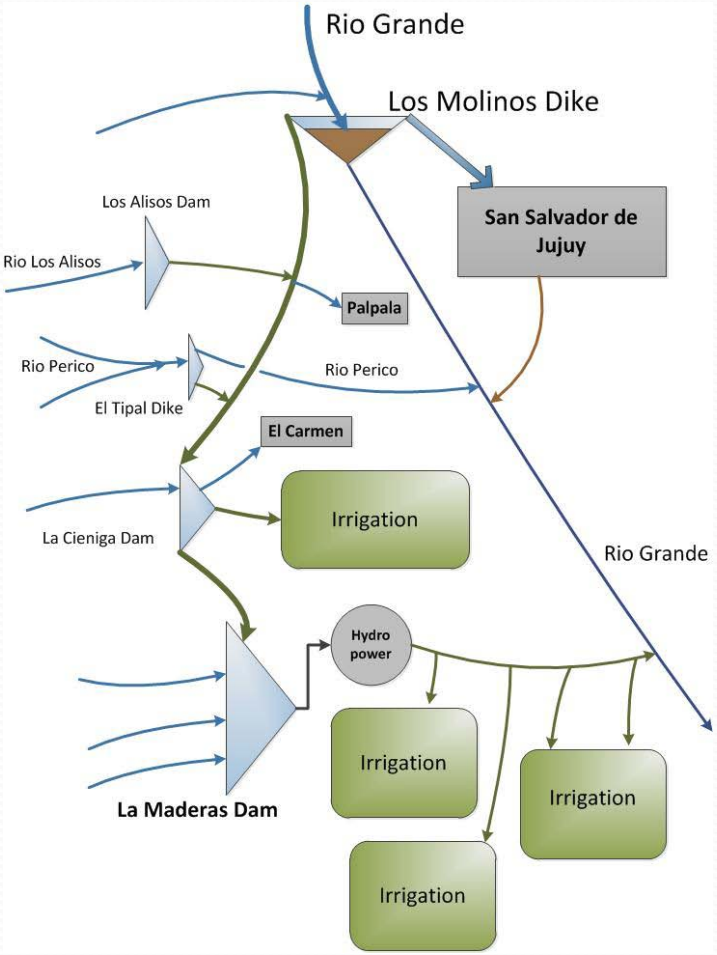
Case Study: Bermejo River Basin (Argentina)

Cabecera de la cuenca

Dique Los Molinos



Usos del Agua en la Cuenca



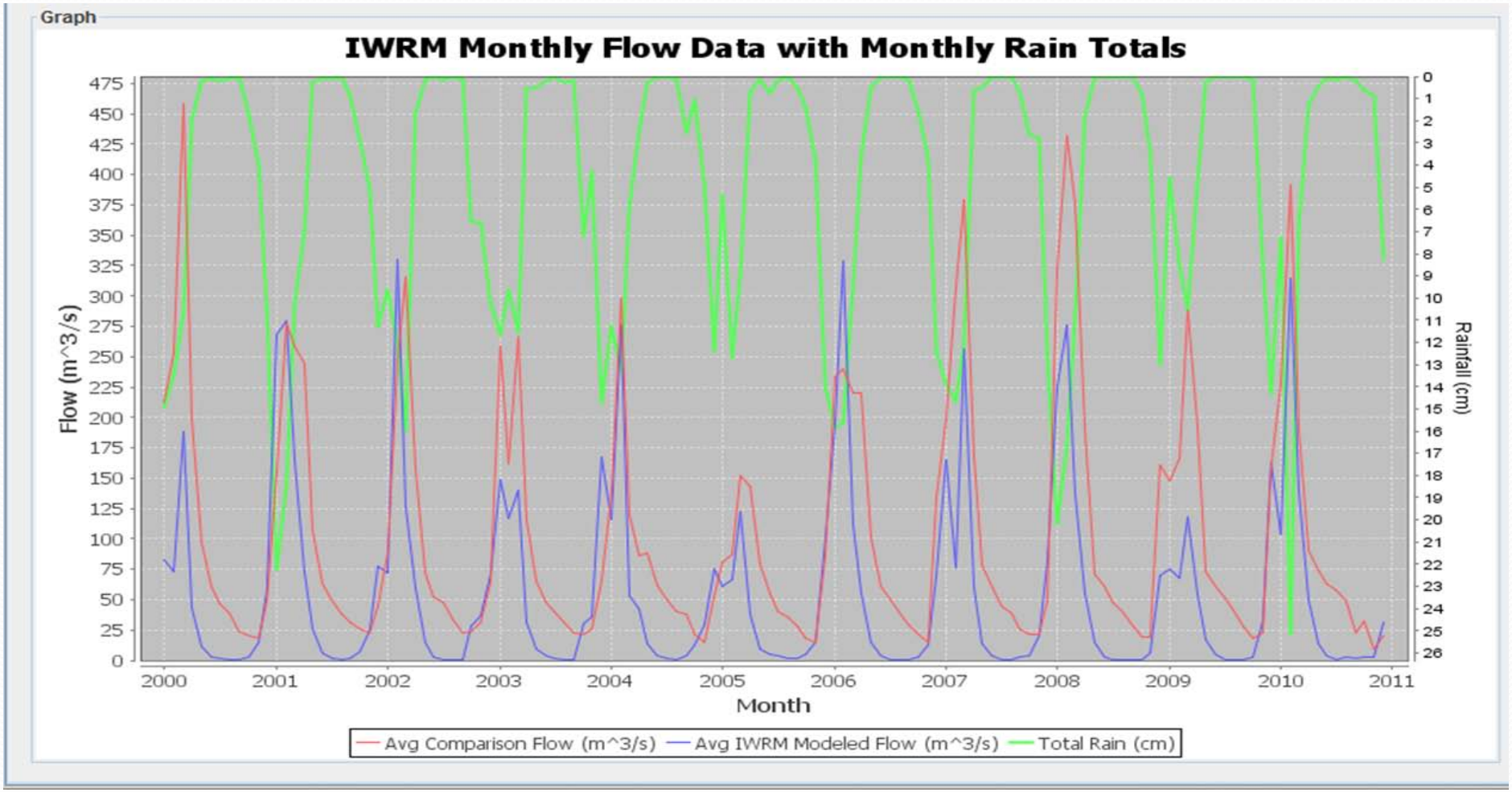
Usos del Agua

- Urbano: San Salvador
- Caña de azúcar y tabaco
- Procesamiento de azúcar
- Pequeña hidroeléctrica

Problemas

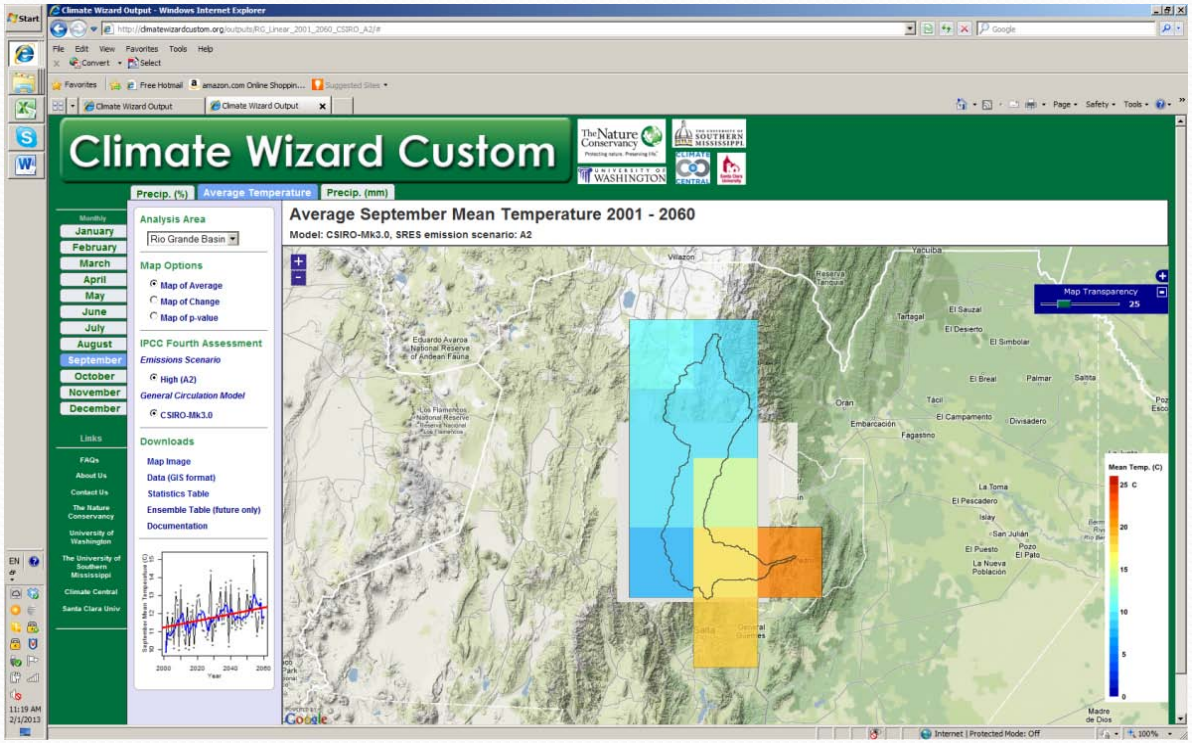
- Escaséz durante sequías
- Sedimentación
  - Pérdida de capacidad
  - Costos de tratamiento
- Inundaciones

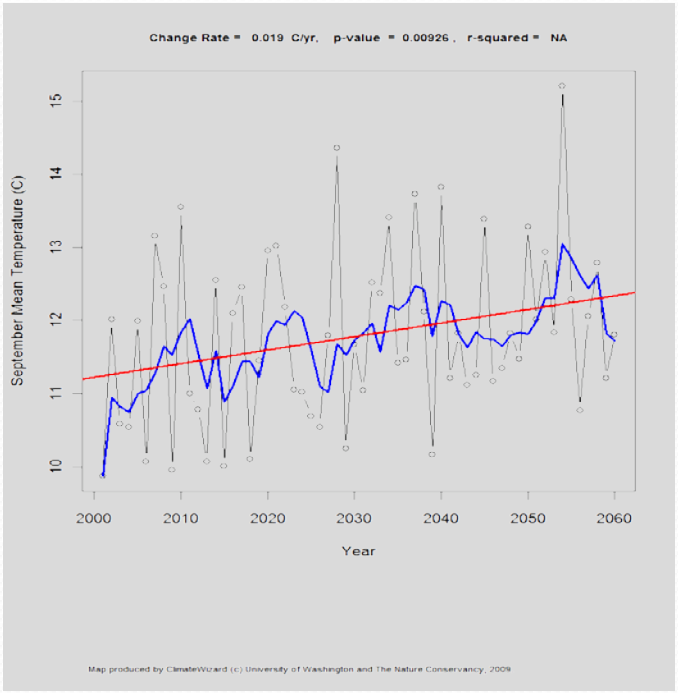
Simulación de Calibración (2000-2010)



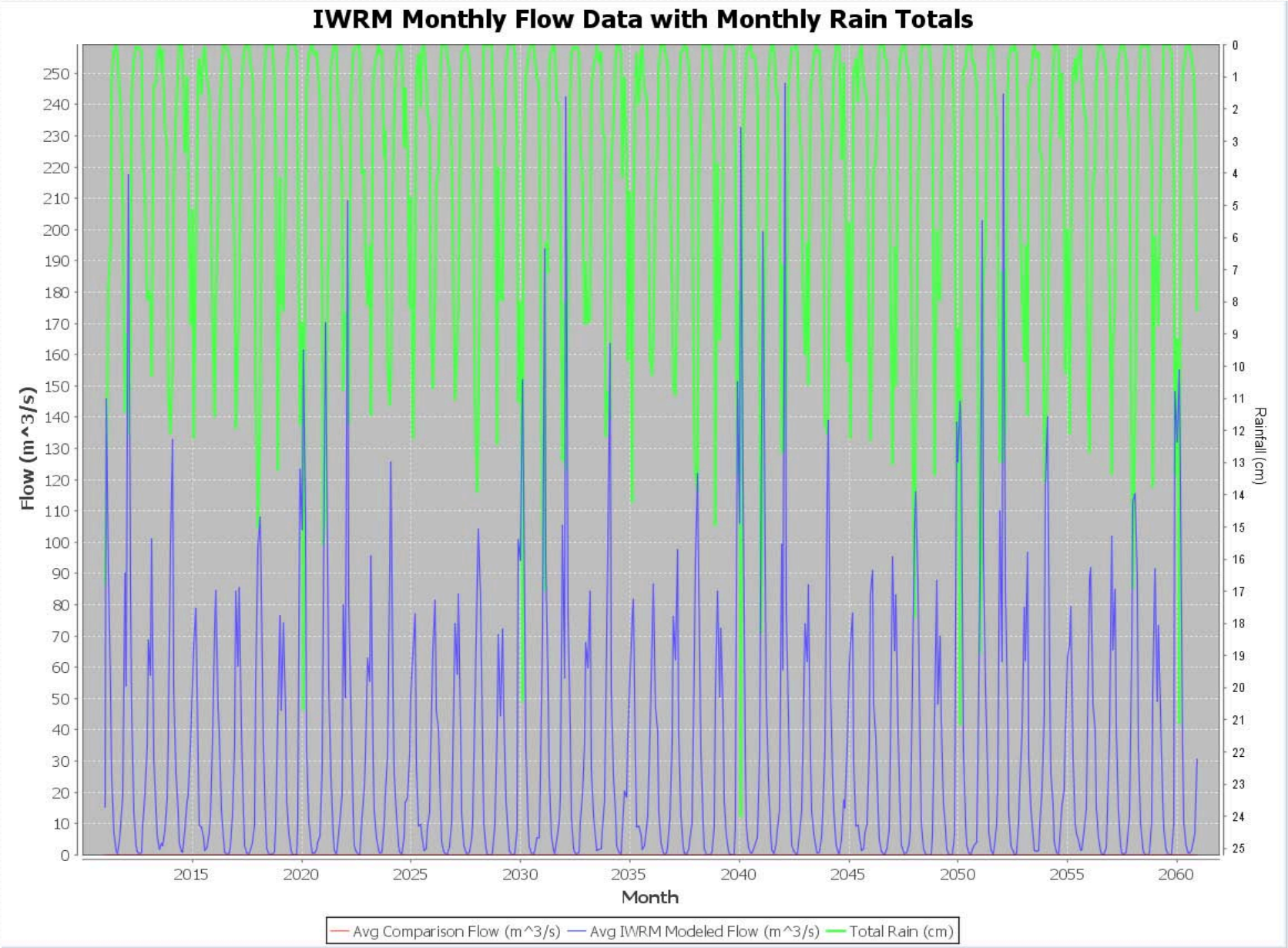
El simulador hidrológico genera series temporales de caudal en cualquier localidad de la región. Estos resultados se pueden agregar como series diarias, mensuales (o de cualquier otra duración).

Aplicación: Impactos del cambio climático

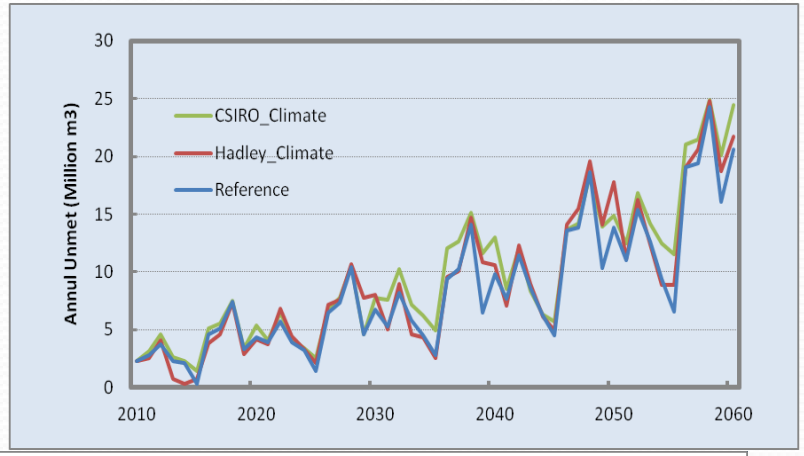




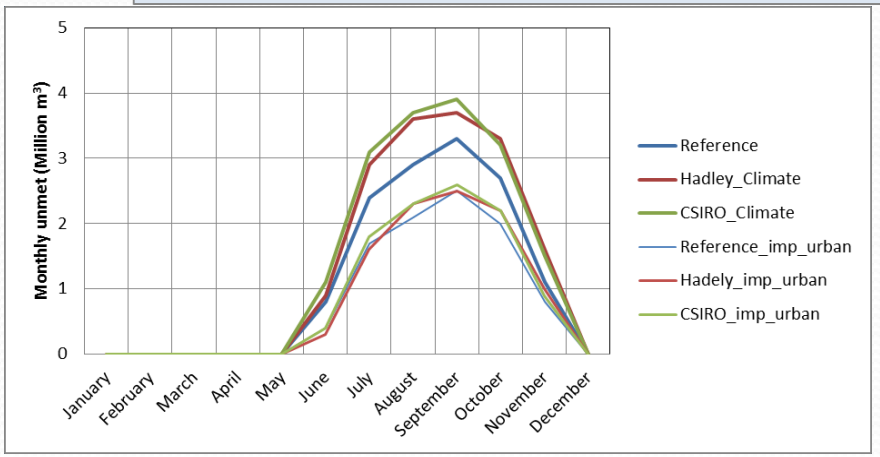
Temp: +0.5 C (2011-2060)



Procesamiento de Resultados

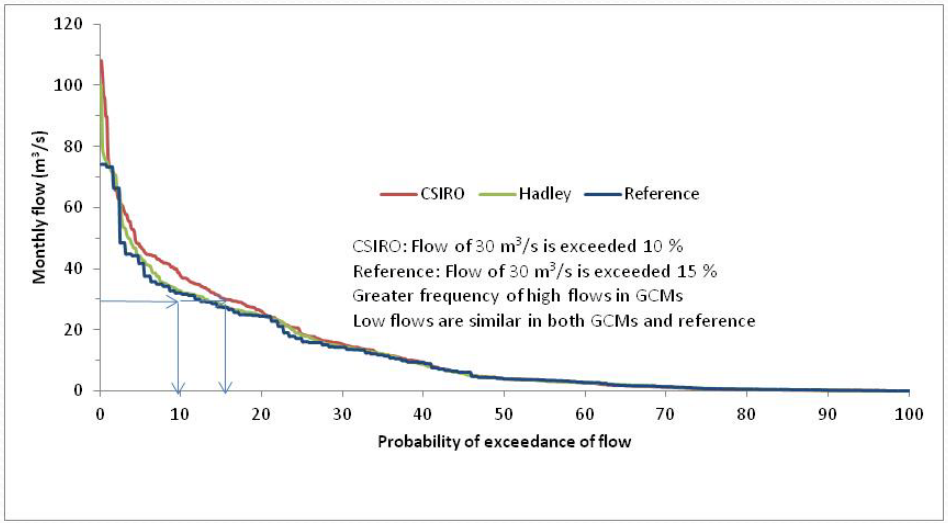


Proyección de demanda no satisfecha



Simular opciones de adaptación

Curvas de duración para evaluaciones de riesgo y cálculos financieros



Ongoing projects

- **Haiti**: Watershed management in Northern Haiti
- **Perú**: drought management in Trujillo
- **Uruguay**: chronic flooding in Montevideo
- **Trinidad and Tobago**: urban flooding in PoS (driven by SLR)
- **Mexico**: creation of water reserves as adaptation measure
- Other ongoing projects in Nicaragua, Honduras, Argentina.

Climate information issues

- For development users, “climate information” is not just about data; “loading truck” approach won’t cut it.
- Isolation of scientific community from decision makers
- Models: resolution, uncertainty => risk management approach
- Who/where is climate information generated?
- Capacity building for coordination, ownership
- Dissemination and communication
- Ties to CIRUN, CICS and other ESSIC activities

Hydro-BID, version 2

- Water resources infrastructure, particularly management of water storage and reservoirs: collaboration with Columbia University

- Visualization, scenario analysis and decision support (interactive “decision theater” approach): collaboration with Arizona State University

- Real-time hydroclimatic data assimilation in decision support tools: collaboration with NOAA

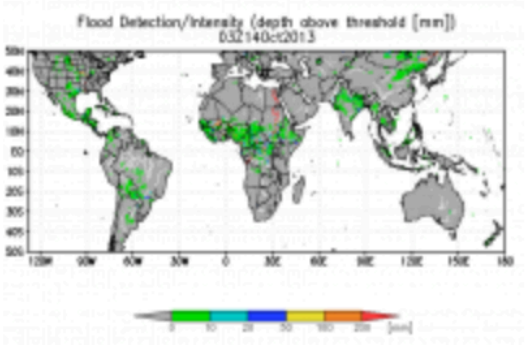
Climate Today

Weather Topicality

by Dr. Fernando Miralles-Wilhelm

Are we ready for the end of uncertainty in hydroclimatic data?

By: Fernando Miralles-Wilhelm



Yes, I confess I was cranky on that Thursday morning.

Maybe it was the infusion of coffee too early in the day, maybe it was that I had not slept too well (jetlag gets me every time, no matter how hard I try to avoid its effects), maybe I was bored, or maybe I was just having one of those days in that my patience was running short. I cannot really tell; but I kept looking at the six people sitting at the podium table (the panelists) while also looking impatiently at the clock in the room, counting the minutes until they had finished making their remarks, and then we could move on to having our discussion.

I was ready for a brawl (a verbal one, I am no street-fighter ☺).

I was sitting at a room inside the Stockholmsmässan (http://www.stockholmsmassan.se), attending a session at World Water Week 2013 (http://www.worldwaterweek.org). I have been lucky to visit the beautiful city of Stockholm many times to attend this event (http://blogs.iadb.org/cambioclimatico/2011/09/07/semana-mundial-del-agua-2011-como-adaptarnos-al-cambio-climatico/), and I have enjoyed it every time. It gives me a chance to catch up with a multitude of colleagues from around the world, and learn from them the latest work they are doing in trying to solve the multiple problems that affect that precious compound for life: water.

Read my blog:

Hablemos de Cambio Climático / Let's Talk Climate Change

http://blogs.iadb.org