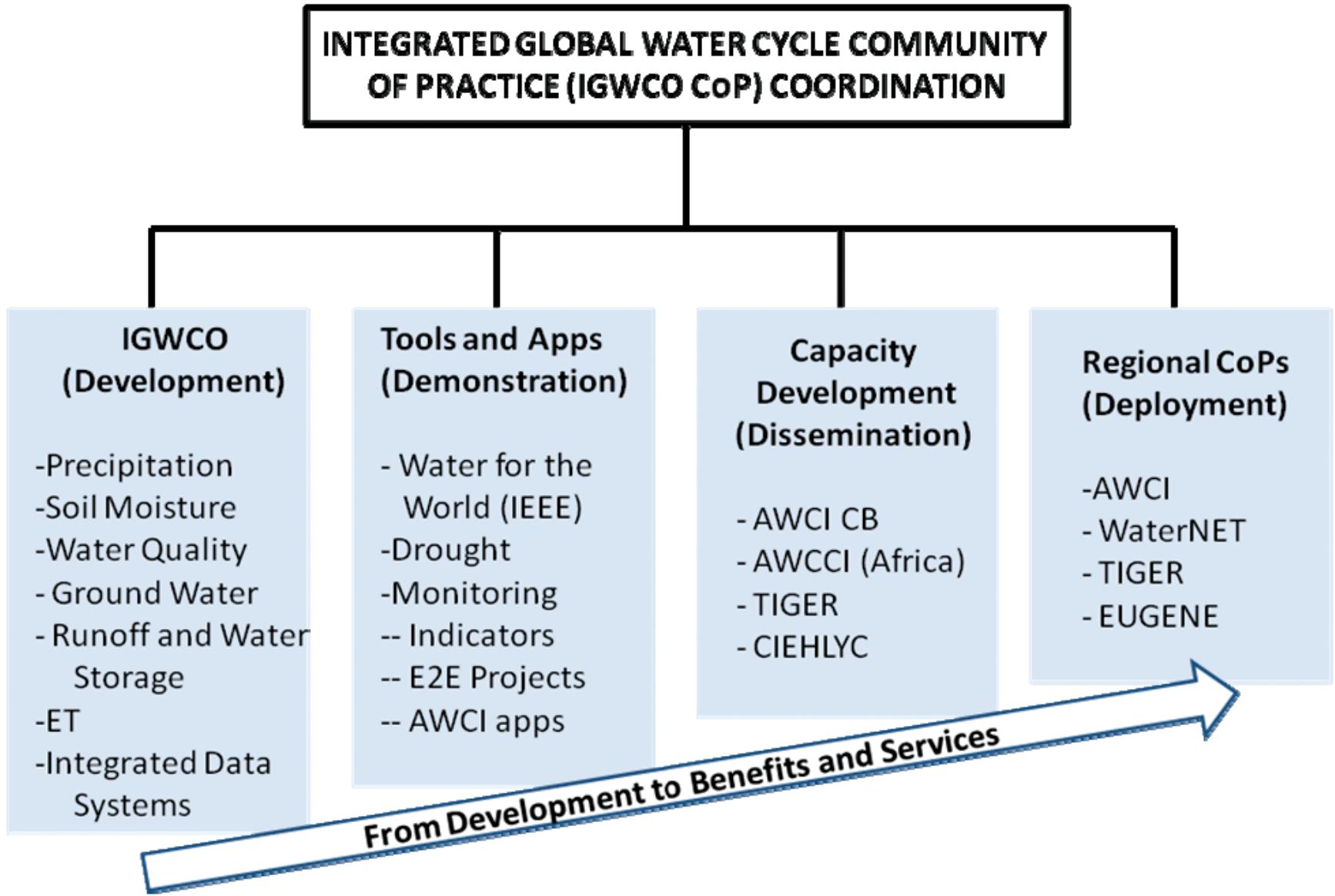
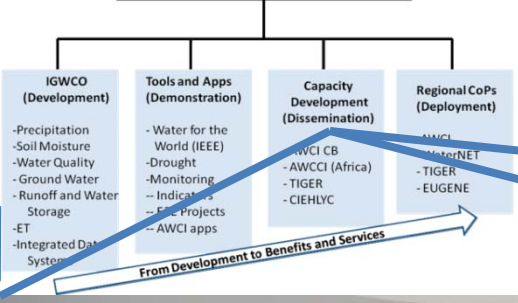


# Activity Report by Rick Lawford

In 2008, the IGWCO became the IGWCO Community of Practice within the GEO framework



**INTEGRATED GLOBAL WATER CYCLE COMMUNITY OF PRACTICE (IGWCO CoP) COORDINATION**



**Tunisia (01/09)**



**Peru (12/09)**

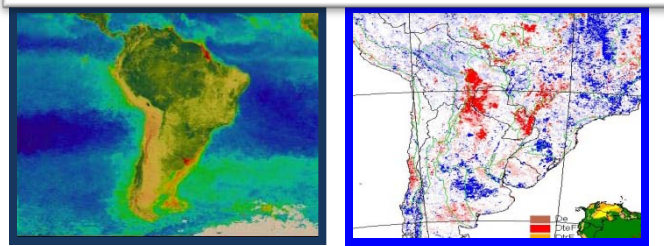


**Japan (02/09)**

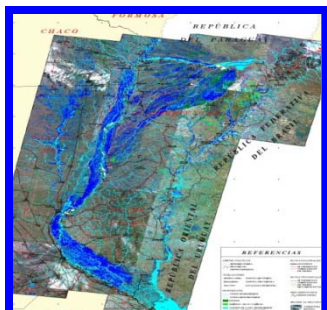
# A GEO Water Cycle Workshop for the Americas was held in Lima Peru at 'CONIDA' (the Peru 'National Aerospace & Development Commission'), Nov. 30 to Dec. 4, 2009

## Some Workshop Outcomes:

- 1) A dynamic web site has been developed for listing of data sets & services, project summaries with interactive capabilities.
- 2) Launched a "Coalición para la Información Espacial e Hidrológica en Latinoamérica y el Caribe" ('CIEHLYC'). Includes reps from Argentina, Mexico, Columbia, Haiti, Brazil, USA & Canada. Petition to GEO in the Americas to be a formal Working Group.
- 3) A 'Water Cycle Federation of America' to help integrate existing projects and develop new projects and initiatives. Issues identified including floods, droughts, glacier retreat & climate impacts.
- 4) Contacts have been made with the WB small grants programme to seek funding for several small projects.



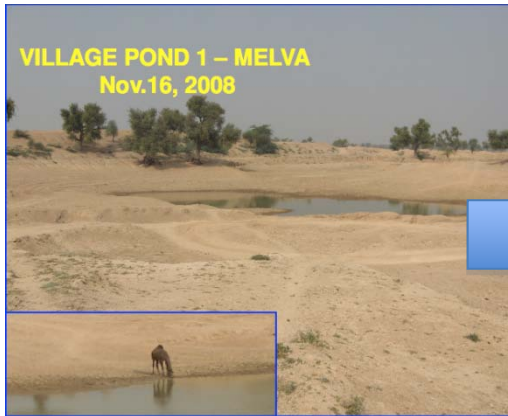
SeaWiFS Productivity MODIS Land Cover Change



La Plata Basin Area Flooding



# IEEE “Water for the World” Program



- Developing country focus
- In the field within one year
- Sustainable
- Scalable
- Reusable
- Fundable

Food Security: Water and Sustainable Agriculture - India

Urban Water - Ghana



# Assessment of the status GEO of data integration activities

		In-situ		Satellite		Integration		
Soil Moisture	ISMWG	Good Progress	More effort needed	Success	Good Progress	More effort needed		
Precipitation	IPWG	Success					Good Progress	
Runoff	WMO Lead	Success		Good Progress	More effort needed	More effort needed		
Ground water	GWWG	Good Progress	More effort needed	Success	More effort needed	More effort needed		
Water Quality	WQ WG	Good Progress	More effort needed	Good Progress	More effort needed	More effort needed		
Possible New Products	Evapotranspiration ? Water Vapour ? Skin Temperature ?							



Success



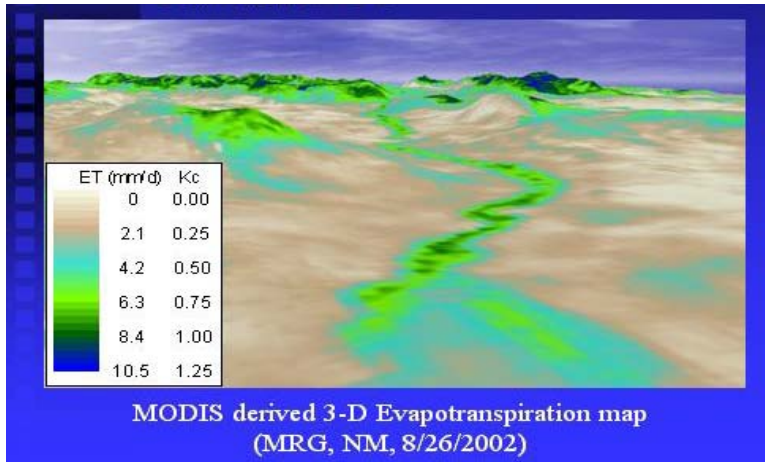
Good Progress



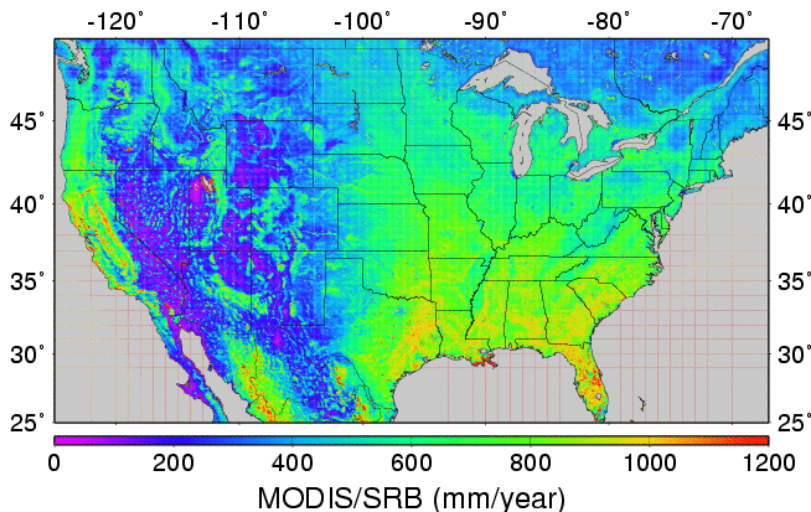
More effort needed

# NASA ET Satellite Data w/ Real-Time with Local to Global & Applications

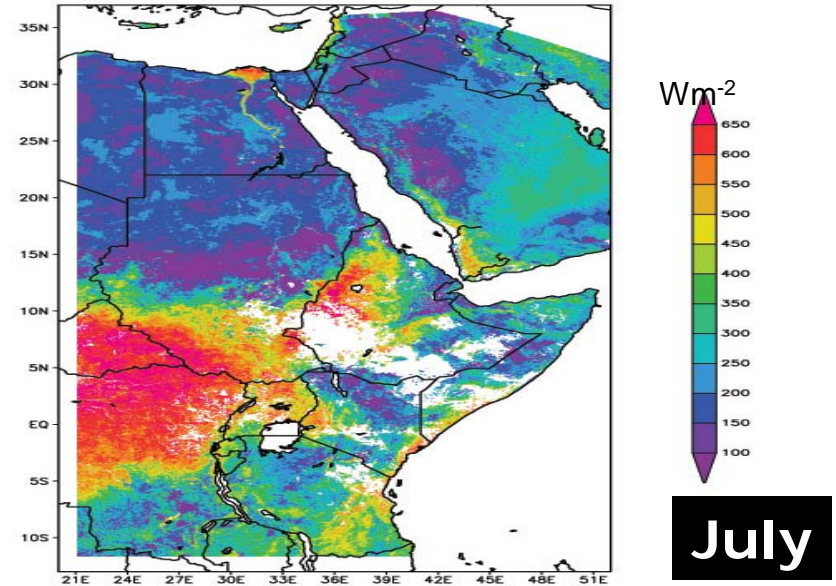
Translation of Landsat ET to MODIS ET  
for Local to Regional Applications (R. Allen)



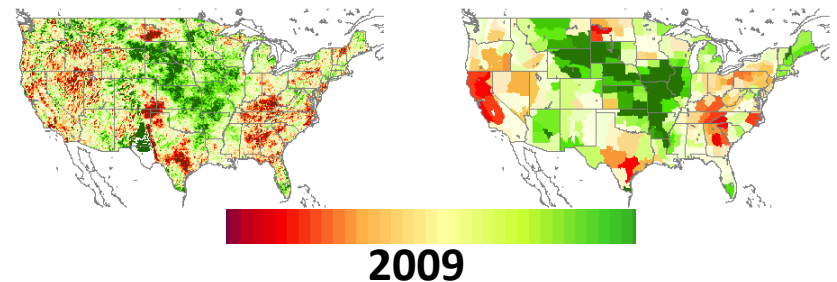
One of Two NASA MODIS & Related Products in Near Real Time towards a Global ET. U Wash. Continental US 2001-2009.(to 1-km)



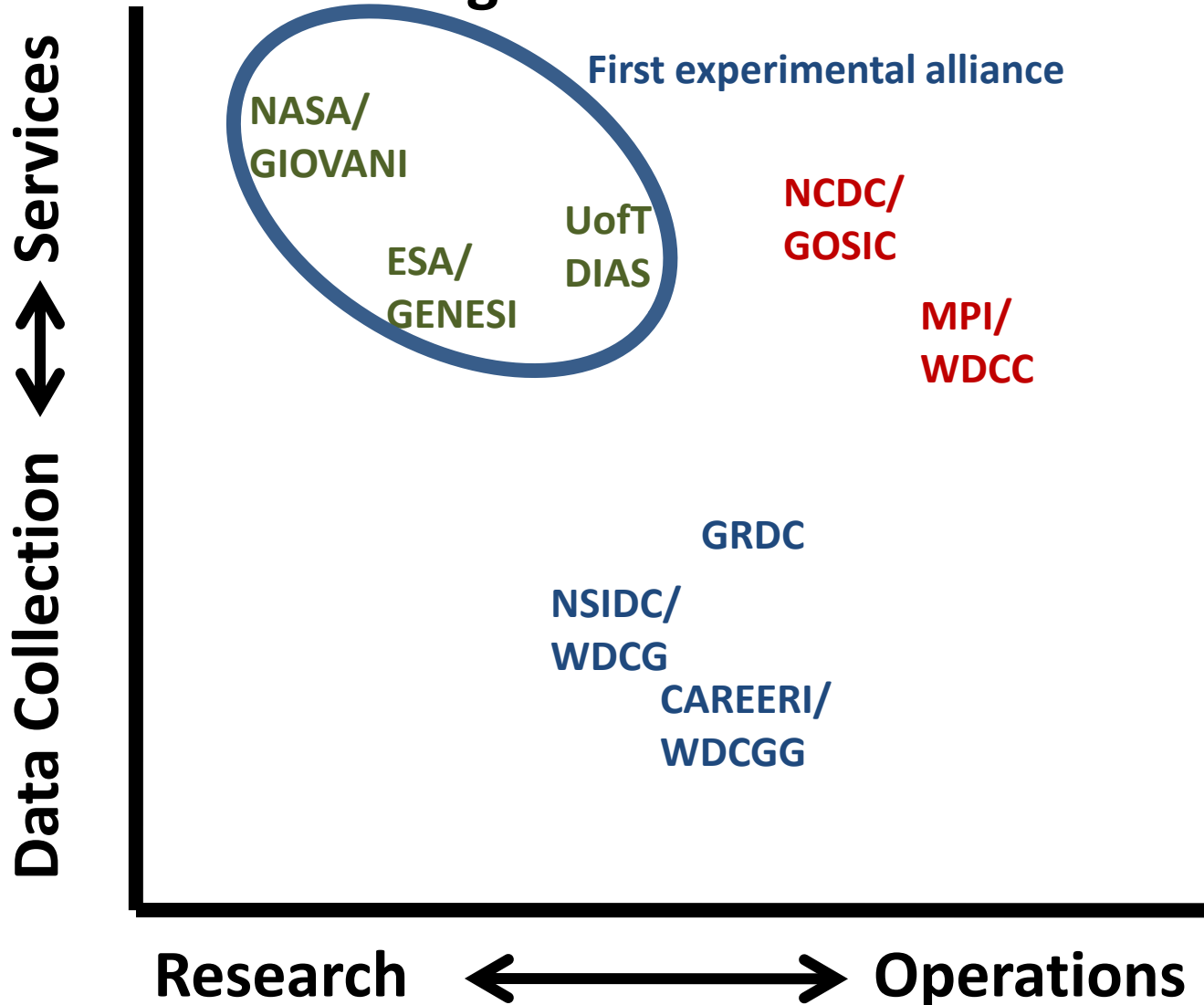
Right – USDA-ARS ‘Alexi-DisAlexi’ for Regional to Local ET. Applied to Nile. {30m – 25km}



Normalized Evaporative Stress Index  
USDA/ARS



# Experience in using surveys of data centres to a establishing data centers alliances





# Meetings where reference was made to GWSP

**November 30 – December 4, 2009: GEO Water Cycle Capacity Building Workshop – Lima, Peru**

**December 2009: IEEE/IGWCO Workshop on the use of water cycle information (San Francisco)**

**March 2010: IGWCO COP Planning Meeting at CCNY in New York**

**May 2010: DRI (Drought Research Initiative) – GEO Meeting on drought in Winnipeg, Manitoba.**

# **Planned Meetings for 2011**

**February 2011 – African Water Cycle Coordination Initiative  
(Ethiopia)**

**March 2011 – IGWCO COP Planning Meeting**

**April 2011 – Workshop on Evapotranspiration (NASA/ USDA)**

**April 2011 – Workshop on Global Drought Monitoring (NASA)**

**April 2011 – TRACE Workshop**

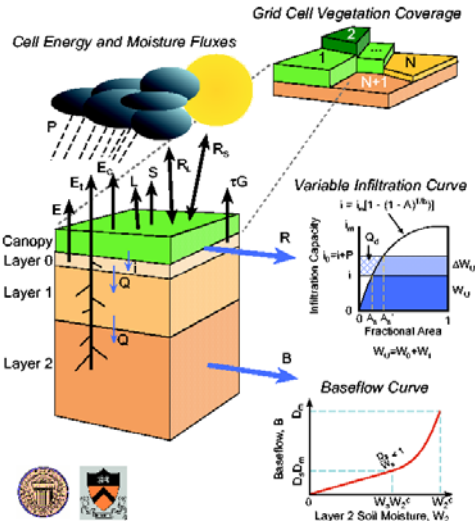
**Others:**

**Date? - IEEE Water Quality and Health workshop**

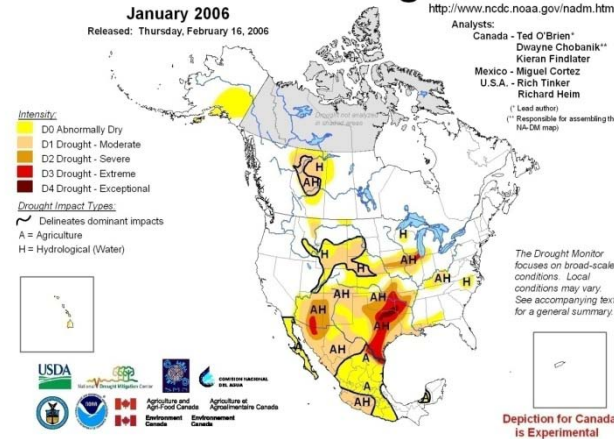
**Date? – Latin and Caribbean Americas Water Cycle Capacity  
Building**

# User Engagement: Linking Earth Observations (Drought Monitoring) to Societal Benefits

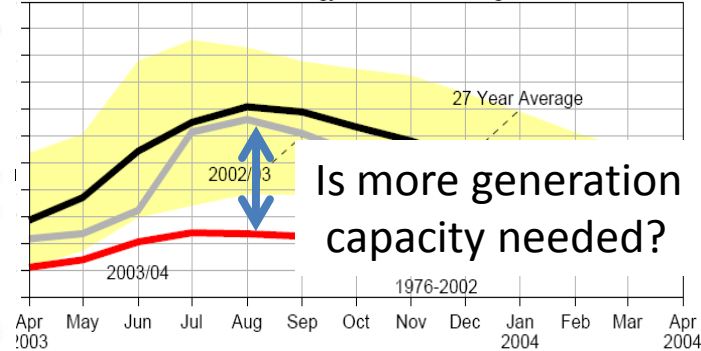
**Variable Infiltration Capacity (VIC) Macroscale Hydrologic Model**



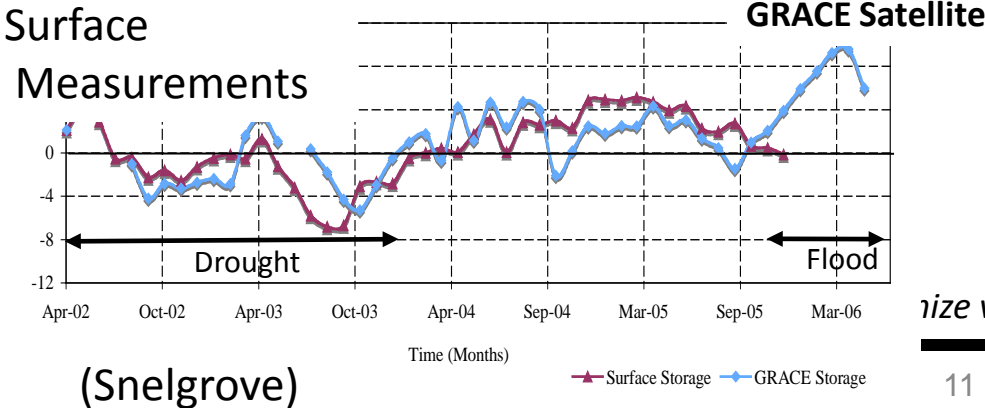
## North American Drought Monitor



**Nelson-Churchill Drainage Basin Manitoba Energy in Reservoir Storage**



**Storage Anomalies in Saskatchewan River Basin**

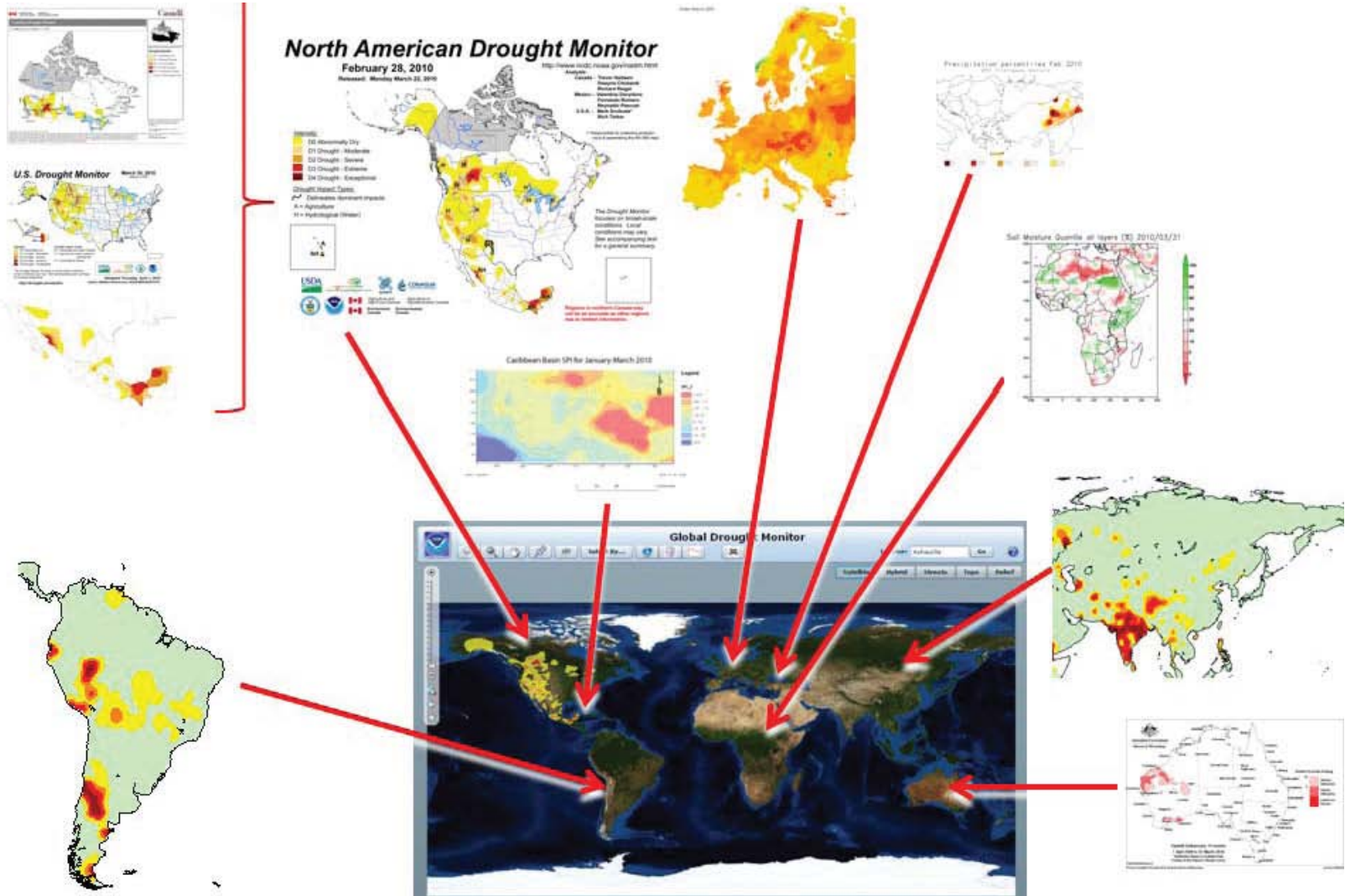


(Girling)

- Approaches:**
- Table Top Exercises
  - User Workshops

ize value and reduce gaps

Future focus: develop a plan for integrating regional drought monitoring products into a global drought monitor.



**Drought on the western Canadian prairies is an episodic event that occurs several times each decade. The talk will provide a brief overview of the drought phenomenon with perspectives on the past, present and future characteristics of the cause, intensification and demise of these events.**

***The objectives of DRI are:***

- To better understand the physical characteristics of and processes influencing Canadian Prairie droughts, and***
- To contribute to their better prediction.***



## DRI Legacy (Enhancing the DRI footprint):

In process:

- The DRI Glossy
- The DRI data system and DRI website
- A lecture series
- Methodologies for user engagement through Table Top exercises

Under consideration:

- A museum exhibit at a provincial museum
- Development of a curriculum on climate and Extremes
- Workshop on Climate and Extremes.

## TABLE OF CONTENTS

Introduction.....

*Richard Lawford, Ronald Stewart, and John Pomeroy*

### **Overviews**

A drought research initiative for the Canadian Prairies.....**5**

*Ronald Stewart, John Pomeroy, and Richard Lawford*

Physical characterization of the 1999-2005 drought.....**13**

*John Hanesiak, B.D. Amiro, E. Atallah, A.G. Barr, T.A. Black, B. Bonsal, et al..*

What effects do droughts have in Canada? Highlights of the repercussions of a major, multi-year drought.....**23**

*Elaine Wheaton*

**Atmospheric Sciences..... (7 chapters)**

**Hydrologic Sciences ..... (5 chapters)**

**Impacts**

Agricultural drought indicators for Western Canada.....75

*Paul Bullock, Manasah Mkhabela, Mark Gervais, Gordon Finlay, and Harry Sapirstein*

Evapotranspiration measurements contribute to our understanding of the effects of drought.....81

*Brian Amiro and the Canadian Carbon Program*

Impacts of the 2001-2002 drought on aspen forests in the Prairie Provinces.....83

*Ted Hogg*

The 1999-2005 drought in the context of the paleoclimatological record of Prairie drought ...87

*Dave Sauchyn*

**DRI Contributions to Data Legacy, Outreach, and Policy**

Facilitating drought data access, management and archiving through the DRI data management framework.....89

*Phillip Harder and Patrice Constanza*

Drought preparedness and information assessment through tabletop simulations.....93

*Jeremy Pittman, Nancy Lee, Phillip Harder, Tom Harrison, and Harvey Hill*

DRI research and its contribution to sustainable development during times of drought.....97

*Richard Lawford*

**Conclusion**

Summary of Science, Impacts, and Lessons..... 103

*Ronald Stewart, Richard Lawford, and John Pomeroy*



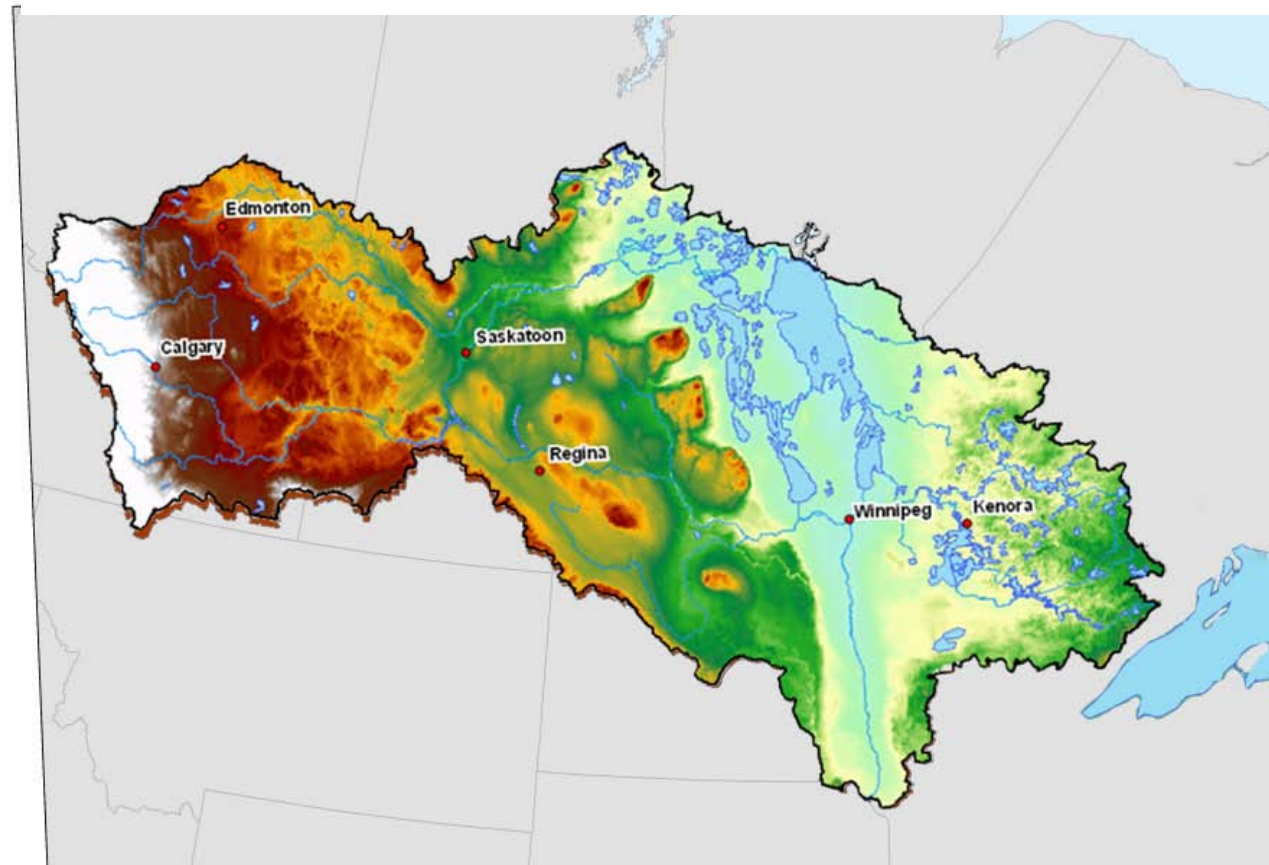
# Collaborations with the International Institute of Sustainable Development

- RBC funded the IISD Water Innovation Centre
- emphasis on the use of innovation to address environmental problems in the Lake Winnipeg basin

## The Lake Winnipeg River Basin

**The IISD (Winnipeg) would be happy to host a GWSP/GCI Workshop in Winnipeg.**

**Would GWSP like to take them up on this invitation?**



## Opportunities:

1. There is a window of opportunity to submit an item to the 2012-2015 GEO Work Plan. Indicators would provide an excellent opportunity to link GWSP and GEO interests. Would GSI be willing to work with IGWCO to Develop a proposal for a work plan item.
2. DRI has been advancing its legacy during the past year. What is the legacy of GWSP 1 and how will it be developed?
3. There is considerable potential for convergence between GWSP GCI basins, RHPs and GEO CB and Demonstration Basins. GCI could provide a framework for bringing together those aspects of these basin activities that can inform GWSP objectives and questions. I would recommend that GCI in its next phase consider working towards this goal.

## GCI Phase 2 (Scoping only):

Phase 2 of GCI is being implemented to address questions that are of concern for both the natural sciences and the social sciences. Key basins from Phase 1 and new basins that meet certain criteria will be surveyed to assess their Practices, constraints and vulnerabilities in 5 distinct areas:

- Tipping points and thresholds in relation to climate change.
- Methodologies for assessing risk from climate change, land use change, population growth.
- Characterization of the basin (drawing on inputs from Phase 1).
- Assessment of management practices and their relation to basin characteristics.
- The nature of governance in the basin and the factors controlling the evolution of basin governance principles.

### Approach:

- A meeting with the principals will be held to develop the hypotheses to be tested.
- The questionnaire will be developed to address these questions and to obtain any missing information that has not been included from Phase 1.
- A preliminary analysis will be undertaken followed by a workshop where the responses to the analysis will be discussed with survey participants.
- Based on the results from this meeting a book on Phase 2 would be written.

## Recommendations (not vetted by the CLB panel):

1. GWSP should explore the effect of the transfer of water-related information between regions, basins, cultures, etc in facilitating convergence in the provision of information and in the nature of decision making.  
(This could be part of GCI Phase 2)
2. GWSP should consider a comprehensive project to assess the value of water and develop a strategy for dissemination of the results to ensure they are used in priority setting in national and river basin plans.