ET Workshop Summary

Rick Lawford

ET Workshop
April, 2011
Silver Spring, MD

Observations:

-Excellent turnout (76 people) and very good presentations.

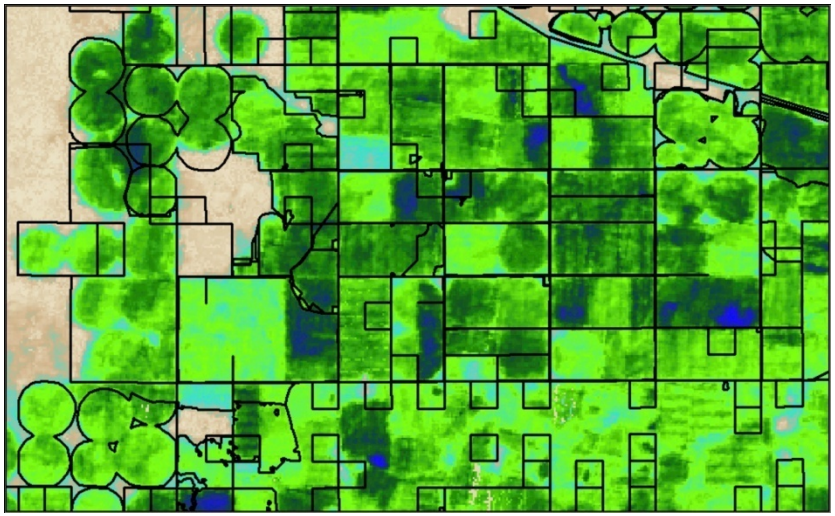
- Very good working group discussions,

- A lot of work is being done and there are many exciting possibilities.

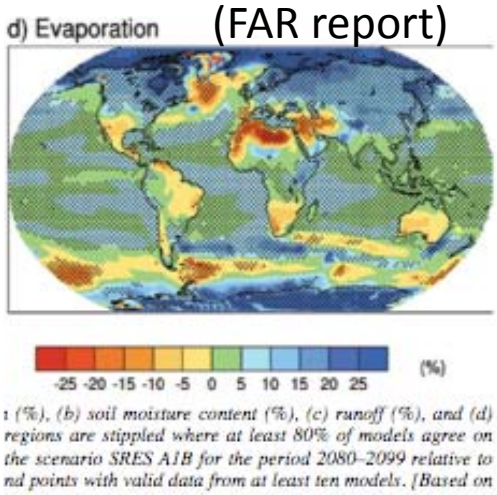
- ET is becoming a critical variable for decision making and potentially for climate. We need to ensure that we take advantage of this interest and mobilize our capabilities and interests in meeting these needs and showing the benefits of science to society.

Opportunities (1)

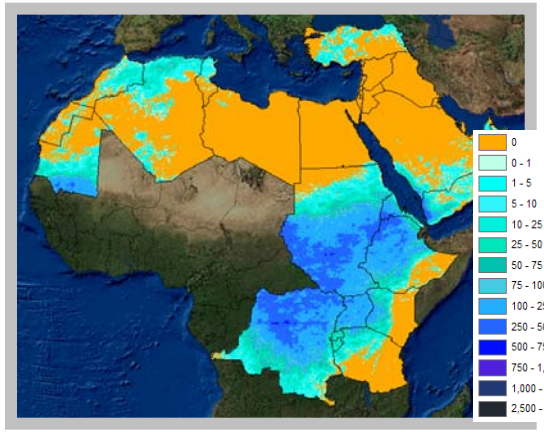
Water Rights issues provide us with a major opportunity for ET applications (Dave Tuthil)



(T. Morse)



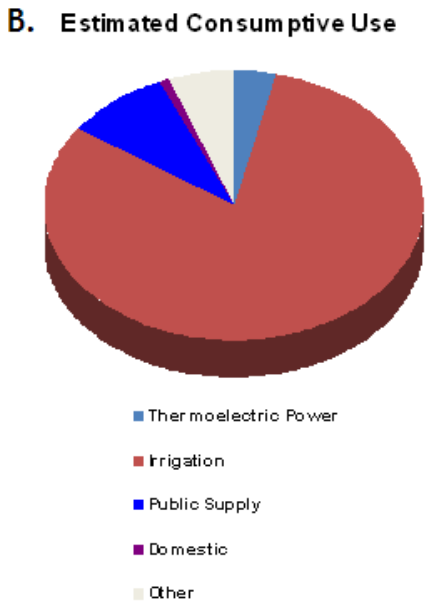
The climate change community recognizes the need for validation of GCM estimates on a global basis. (ET data not suitable for trend analysis)

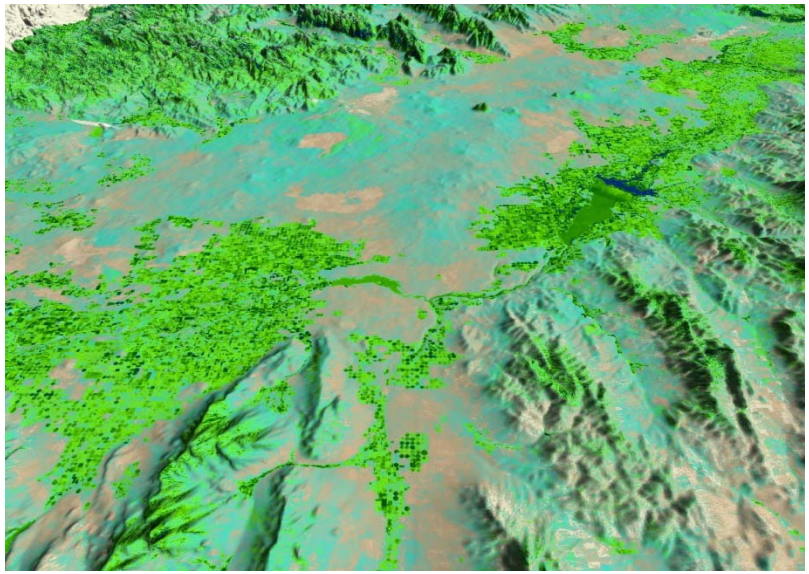


ET holds promise that it could provide Information to downstream countries where data exchange does not occur.

Opportunities (2)

ET maps can provide insights into the distribution of precipitation (Rick Allen).

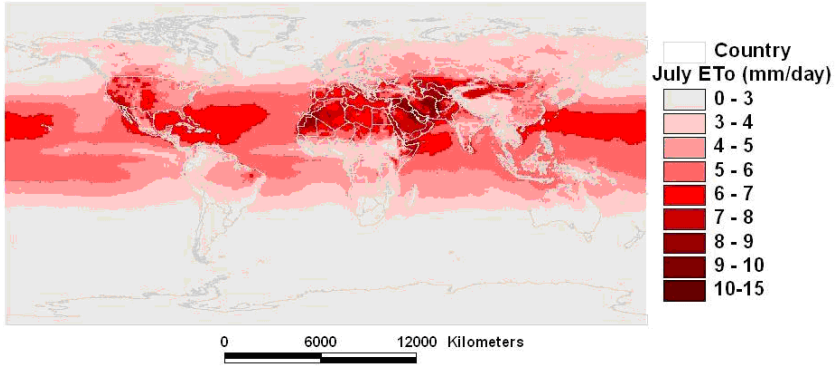




30 m resolution

ET data plays a major role in estimating water loss due to irrigation. Irrigation is the largest cause of consumptive water loss in the US.

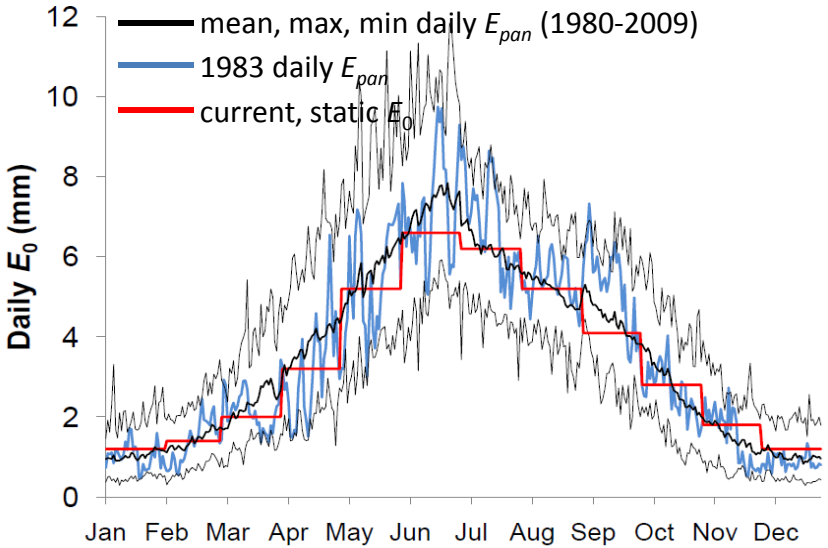
Famine warnings distributed through FEWSNET in Africa rely on accurate ET estimates (Verdin)



Opportunities (3)

Improved time resolution of ET predictions can be obtained by considering is as a dynamic variable in forecast models. (Hobbins)

E_{pan} across DRGC2H, 1980 - 2009 (& 1983)



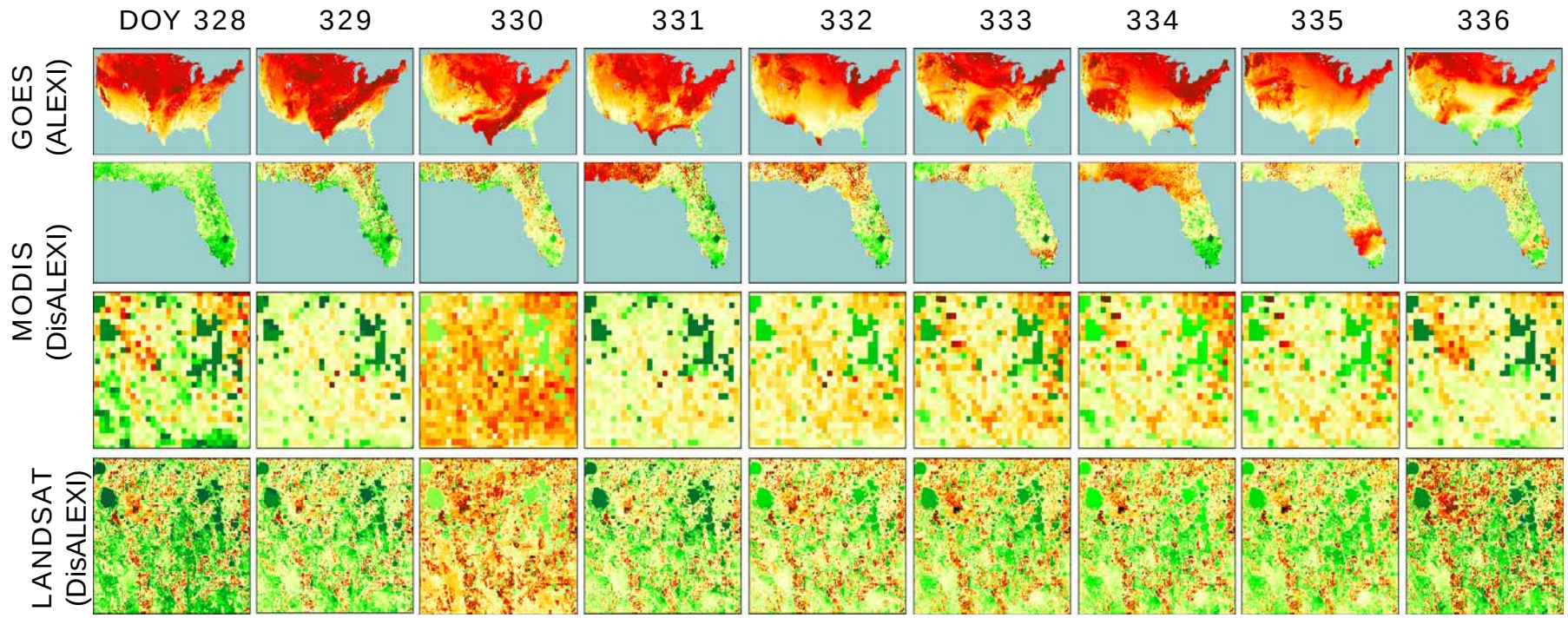
Area (ac)	Dimension (m)	Resolution (m)	Pixel Area (ac)
160	800	400	40
130	600	300	22
40-80	400	200	10
10-20	200	100	2.5
3-5	100	50	0.7

The spatial requirements for ET Information are clearly defined by The geometry of the irrigation System.

Opportunities (4)

In-situ: The selection of instrumentation can be helpful in reducing the errors and Facilitating corrections to ET measurements. (Meyers)

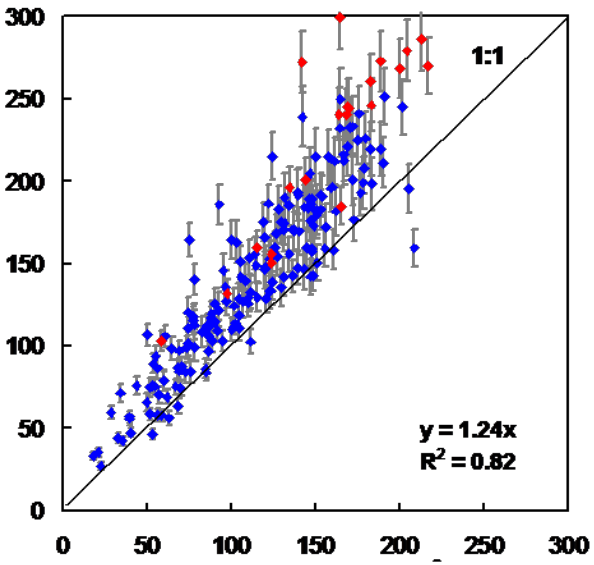
Satellite: Creative data processing can maximize the information value of observations. It is possible to get high resolution products at finer time scales with good interpolation schemes that combine infrequent high resolution data with more frequent medium resolution data. (Anderson)



Opportunities (5)

There is a range of instruments for measuring ET values. (other than FLUXNET it does not appear that these instruments have been coordinated in a network. (Preuger)

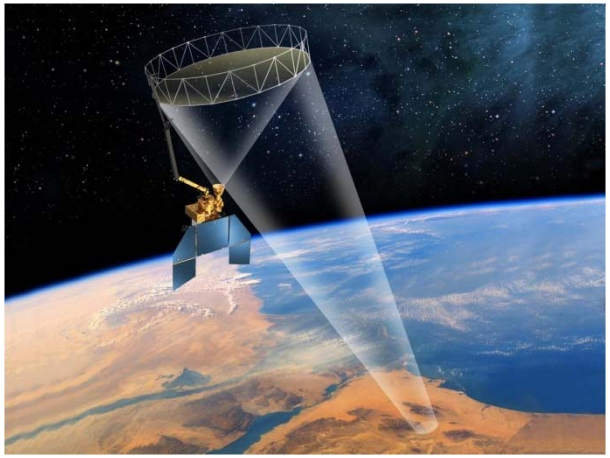
Latent heat flux, ET



Scintillometry offers a source of observations that May be a reliable basis of ET for cal/val and model development activities. (*Henk de Bruin)*

NEON is an exciting opportunity (Wee). (Do we know how to integrate NEON measurements into our plans for FLUXNET and an ET network)

Opportunities (6)



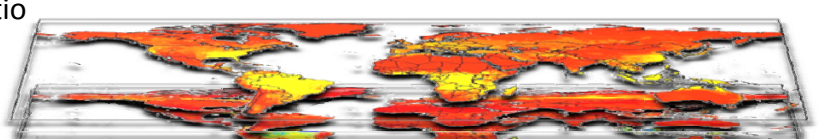
(Brown)

SMAP will provide a new product that may be very helpful for model development and ET services. (How can we help this product move beyond the research domain?)

TIRS and GOES-R provide new opportunities for ET data. (How can this community help in defining and testing new Products)

Closing the Global Terrestrial Water Budget

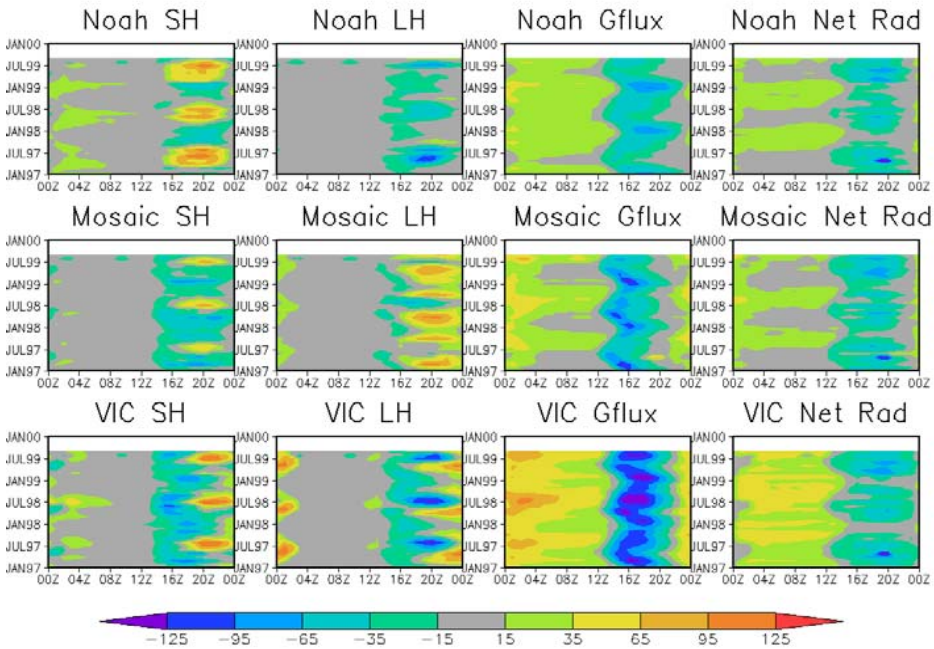
Evaporation &

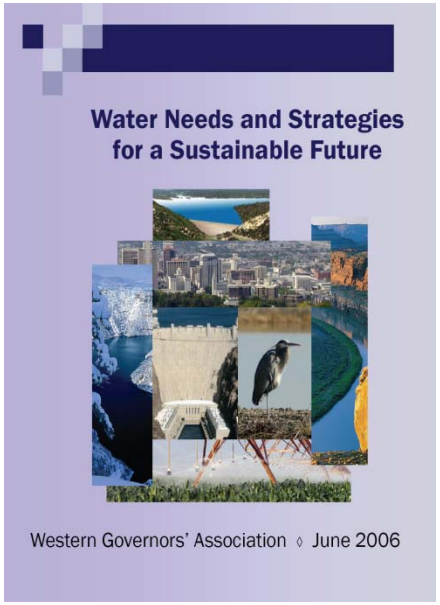


How can this community help in NASA efforts to close the Terrestrial Water Budget?

Challenges (1)

There are significant differences in the ways in which ET processes are addressed in models. (Ek)



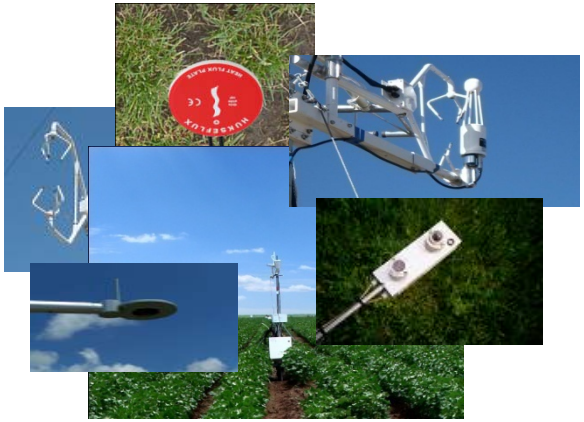


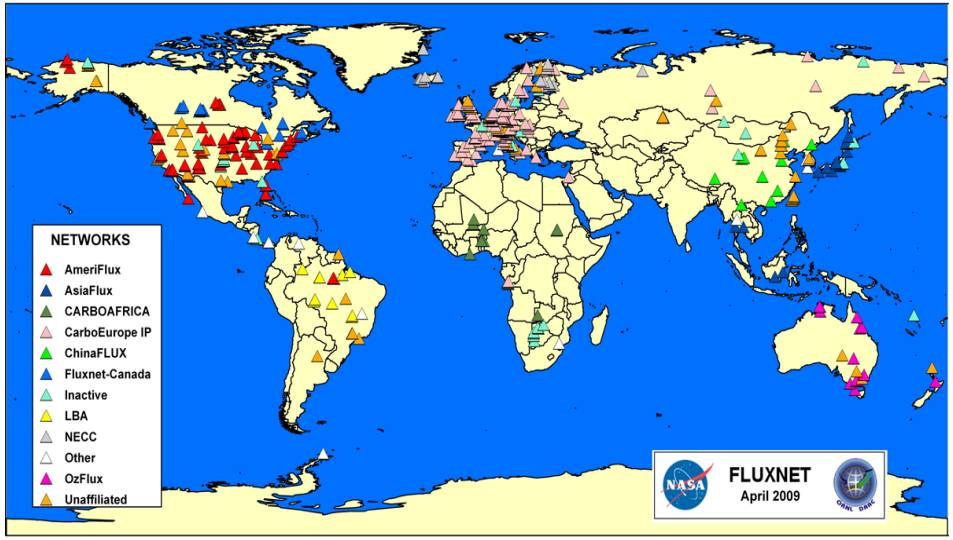
The techniques used in some of the water balance calculations in some states are badly out of date. (Opportunity for Capacity Building)

There are major commitments to water management by States in the western USA. This creates requirements for ET applications (Willardson).

Challenges (2)

The uncertainties with flux measurements are very large and while they can be addressed through post-processing they make it difficult to move flux measurements from the research domain to the operational domain. (Alfieri)

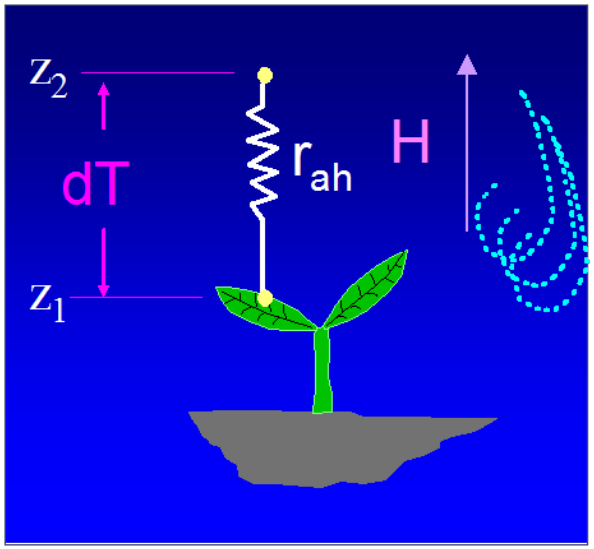




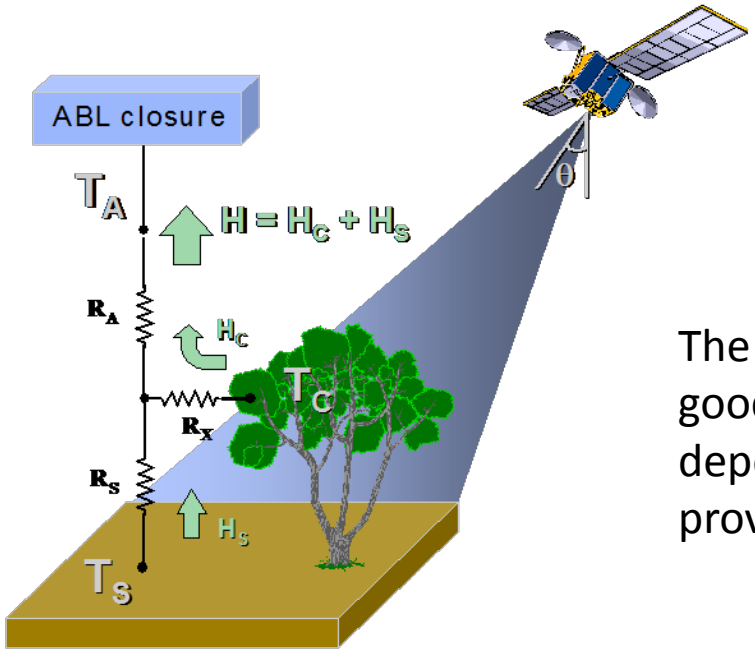
FLUXNET provides a network that covers the globe but it is not uniform nor is it coordinated as a global observational network. How do we upgrade this collection to a functional reference network

Challenges (3)

Would it clarify our thinking if we considered ET as an observation separate from ET as an analysis field? (W. Crowe)

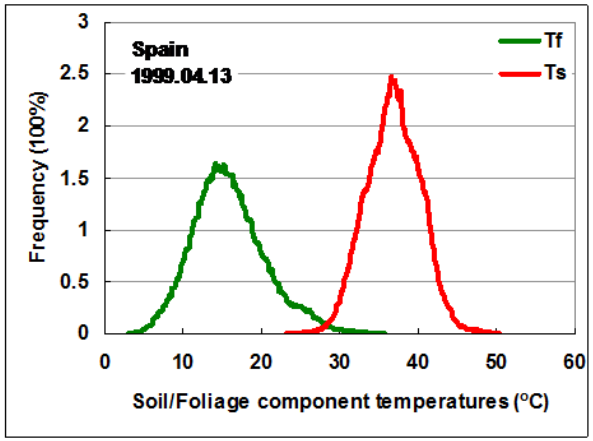


Components to energy balance computations have many uncertainties, biases and errors. It Is possible to remove the effect of the biases by incorporating them into the internal calibration. (Allen)



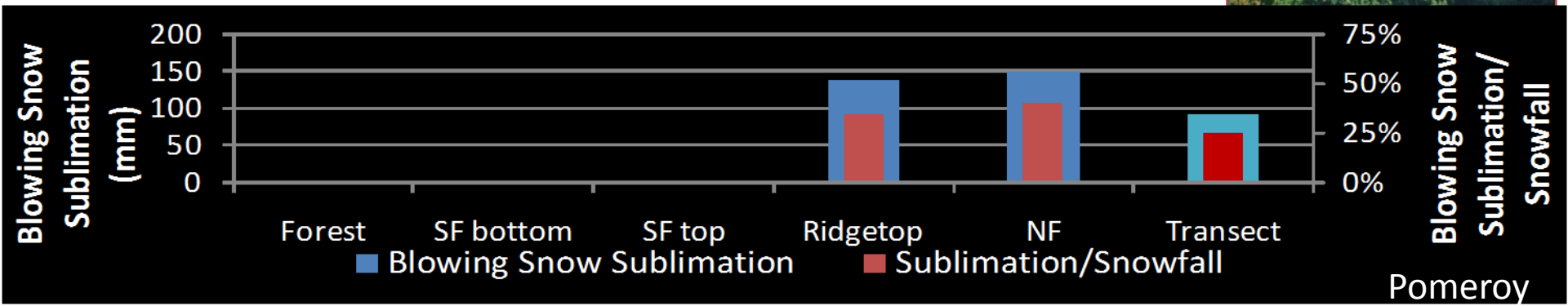
The two-source model for ET provides good estimates of ET. However it is dependent on having measurements to provide the necessary data.

Challenges (4)



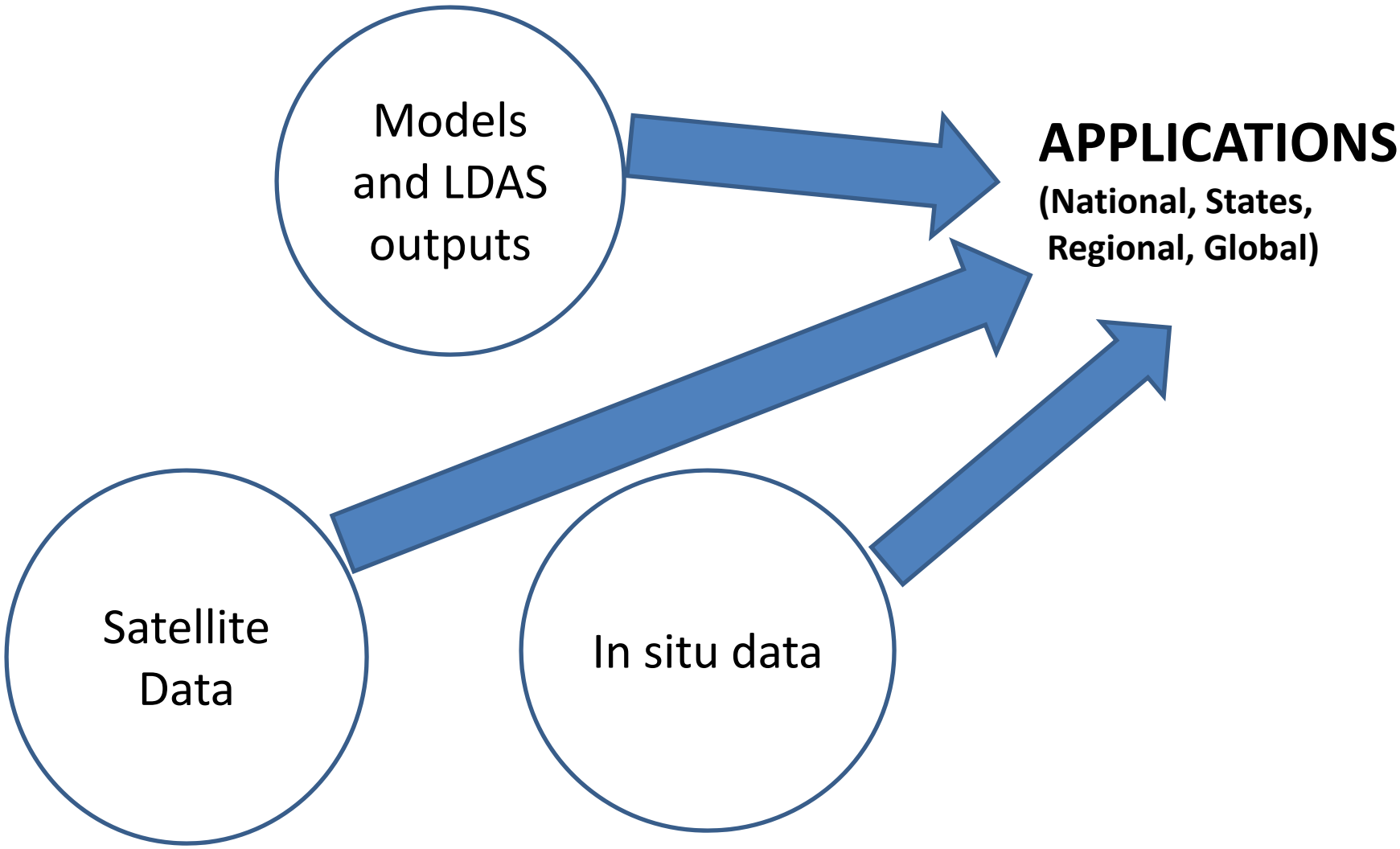
There are new results that show the complexity of temperatures associated with the surface (Menenti). (How do we represent this complexity in a 2-source model or does It matter?)

Patchy landscapes , water resource requirements and cold seasons (Images from John Pomeroy)

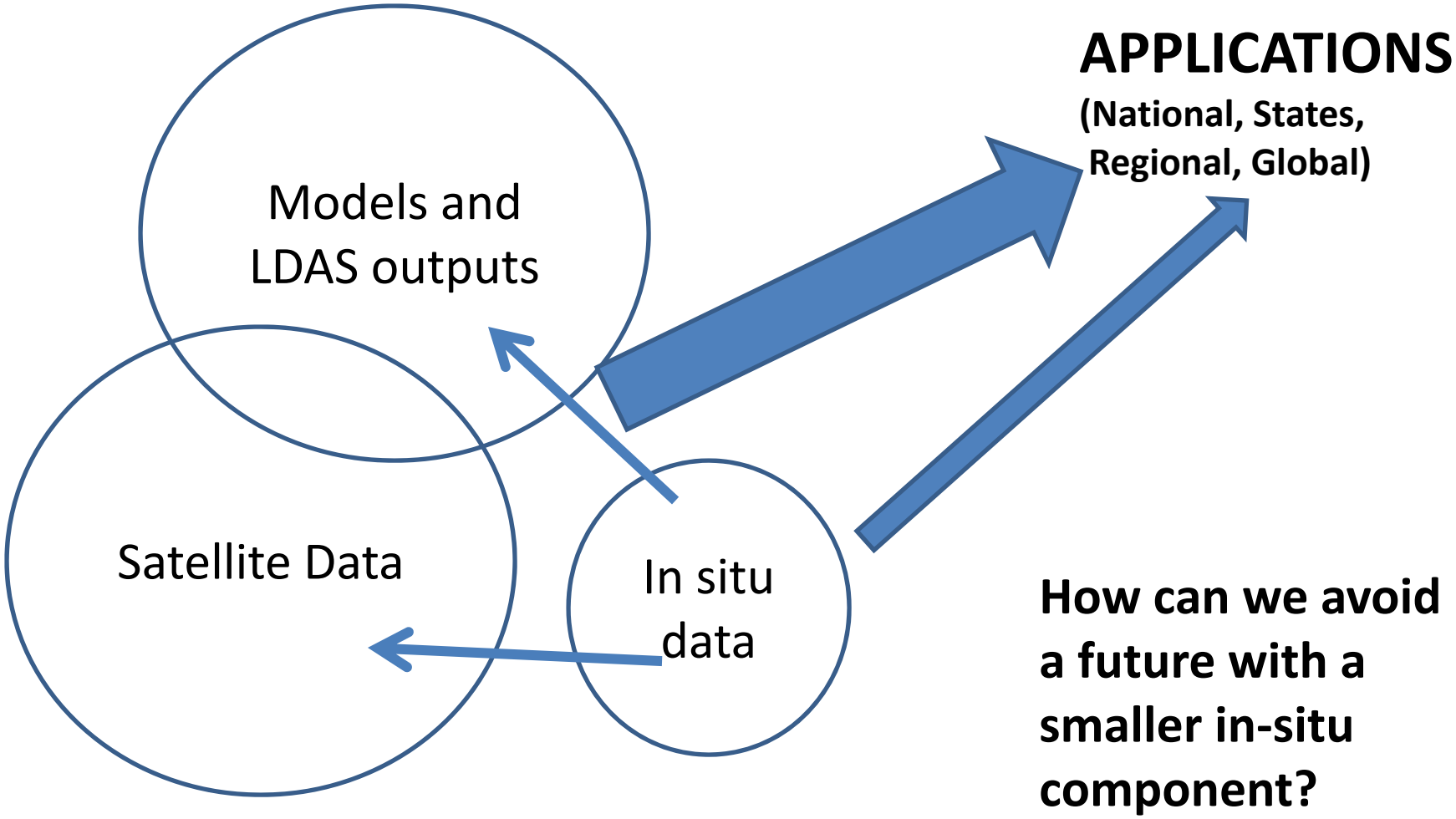


Questions (from Walthal)

- Real *need* for this information???
- Where do the algorithms work
- How "bad" do things have to be before ET information is really *needed*?
- How would *free*, *accessible*, *timely* ET products be used NOW?
- What is feasible now?
- What would a "dedicated" ET system look like?


Models and LDAS outputs
APPLICATIONS
(National, States, Regional, Global)
Satellite Data
In situ data

One possible future after this workshop



Needs:

Applications:
Periodic meetings, predictions, long term records, integrated program (ECV have connection with water resources)

Observations:
Standardization, networks, resolution, protocols

Models:
Standardize evaluation, testbed, reference network, emissivity
Measurements needed, showcase efforts through GEO, ECV –
Start with a long-term data set.

Way forward:
Inventories, seek ECV status, methodologies, integration, metrics, scale issues, long-term records

Next Steps

1. Complete the White paper(s) by the Fall of 2011.
   Develop one paper for the user community and a second version for a scientific journal – need an inventory of information.

2. Based on inputs to the white paper and recognizing the needs of GCOS for specific commitments, develop a proposal for GCOS indicating that the community believes the time is right to recognize ET as an ECV. Members of GTOS and GCOS should be invited to contribute to the development of the white paper.

3. Establish a Working Group to discuss and promote ET issues both in the US and on a global basis.

4. Develop a set of development activities to be carried out in the 2012-2015 time frame that would be considered as candidate activities for the GEO 2012-2015 work plan.

5. Hold some followon workshops including appropriate groups (e.g. LANDFLUX, specific user groups, specific regions)

So ET wants to be a GCOS ECV?

Where is our ET data archive?

Start with a web portal and work towards a distributed archive

Where is our ET Reference Network?

Can we develop FLUXNET into a reference network?

Who is developing our ET operational product that includes consideration of continuity and sustainability?

There are a number of products out there, can we deliver them
In real-time with continuity and in a sustainable way?

… and we want to be a GEO Task?

We need volunteers to step forward with proposals for a work plan item (in the next 3 weeks) to develop/ popularize an integrated ET product in the next 3 years.

Did we meet the Workshop Objectives?

1) To define the needs and requirements for evapotranspiration data in weather and climate studies, in natural and agro-ecoystem monitoring, and in water resource management YES

2) To review the methods used to measure and model evapotranspiration. YES

3) To assess surface and satellite observation systems required to support ET measurement, modeling and evaluation. YES

4) To assess the feasibility of developing a proposal for a task on evapotranspiration for the 2012-2015 GEO Work Plan. YES

5) To explore the level of support and consensus for developing a strategy for establishing evapotranspiration as an Essential Climate Variable (ECV) within the Global Climate Observing System (GCOS) framework YES