

## Hydrologic Application Project (HAP)

Draft Strategic Plan  
and  
Initial Current Activities

**Project Starting Date:** Spring 2006

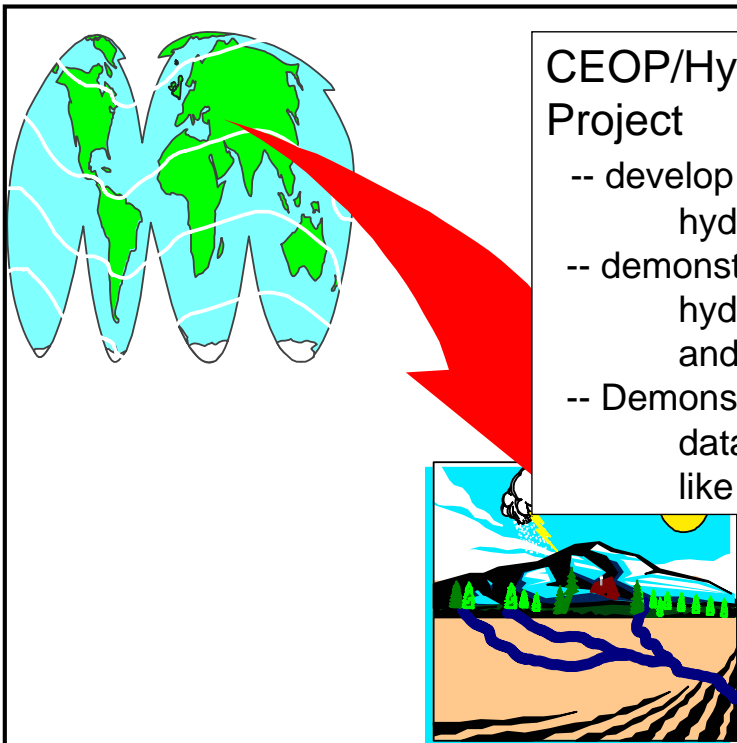
Eric F Wood, Chair  
(Princeton University)

Based upon Presentation at the GEWEX 19<sup>th</sup> SSG  
Honolulu, Hawaii

CEOP-IGWCO Meeting 2007



## Implementation Strategy



### CEOP/Hydrologic Application Project


- develop and test probabilistic hydrologic forecasts procedures
- demonstrate how to produce reliable hydrologic ensemble predictions and their use for water resources
- Demonstrate the usefulness of GEWEX data products for related activities like WISE, HEPEX, PUB, (etc.)

WRAP  HAP

The Water Resource Applications Project (WRAP) goals:

1. Dialogue with hydrological modeling community in operational environmental services;
2. Demonstrate skill in predicting change in water resources and soil moisture on time scales up to seasonal and annual;
3. Collaborate with water resources agencies to develop better hydrometeorological predictions

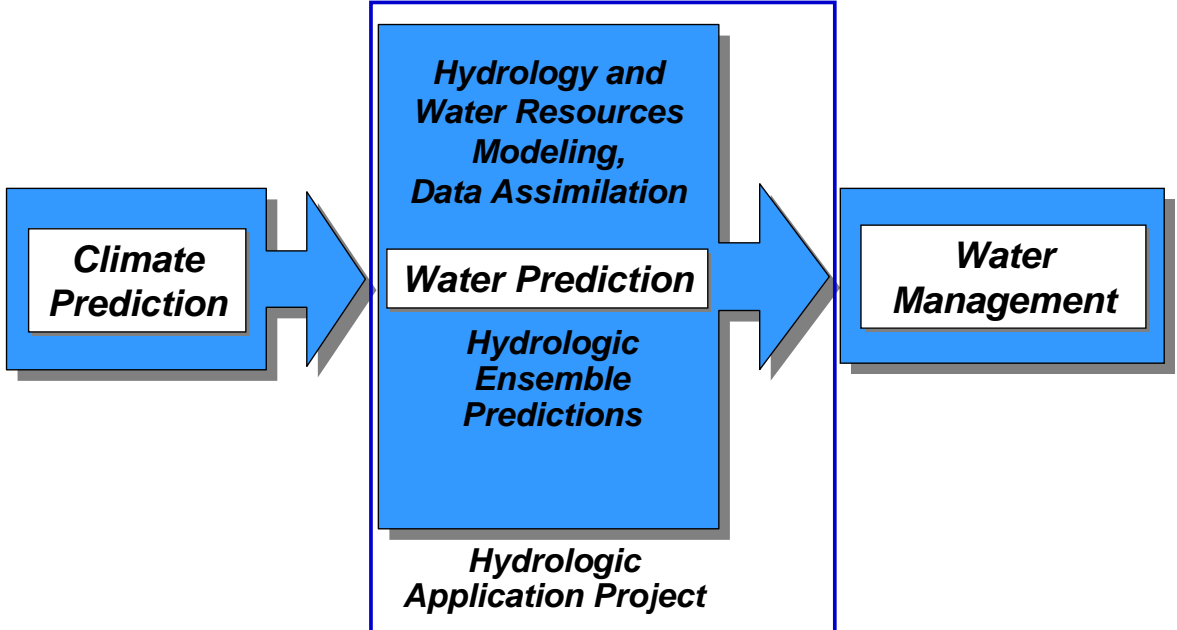
**Developing the science behind skillful ensemble hydrologic seasonal forecasts, and demonstrating their usefulness.**



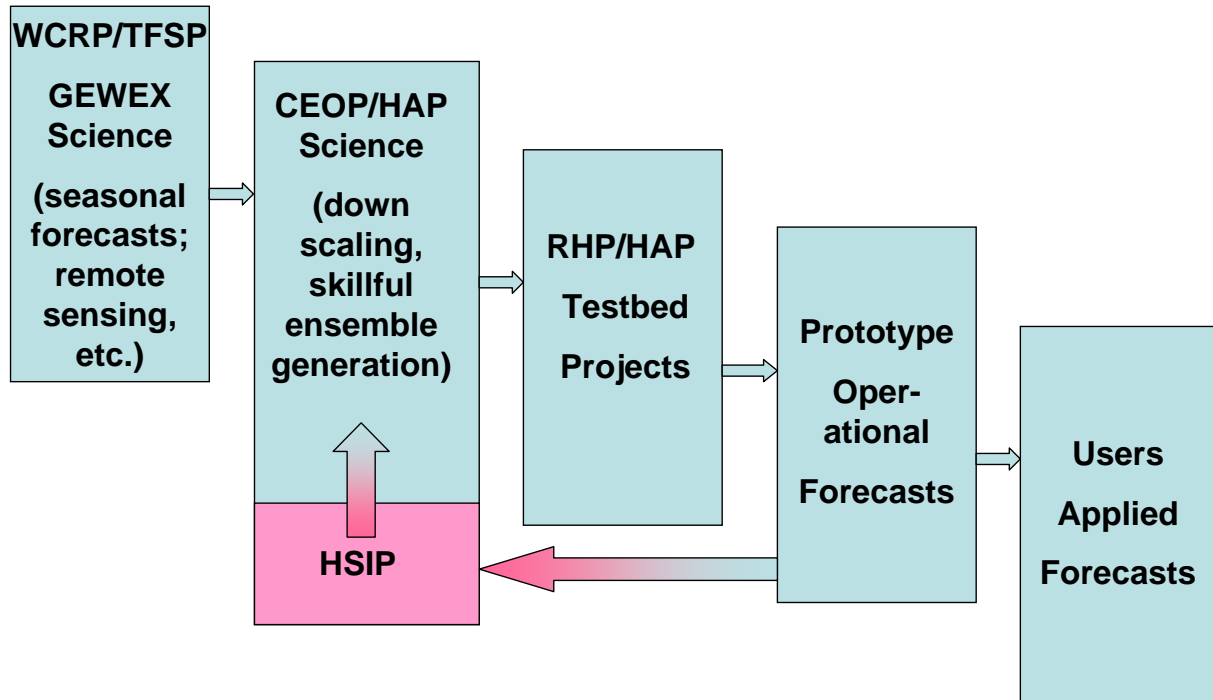
CEOP Hydrologic Application Project (HAP) (draft) goals:

1. Developing procedures for assessing current hydrologic conditions through application of GEWEX supported data products, including remotely sensing;
2. Developing and testing of reliable, hydrologic ensemble forecast procedures based on seasonal climate model forecasts;
3. Demonstrating that the procedures can be applied at scales useful for water resources through test-bed sites and demonstration projects;
4. Working with related projects, like CEOP/WISE, HEPEX, Project for Ungauged Basins (PUB).

## From Climate Prediction to Water Management



## HAP Science Infusion Process (HSIP)



## Current (Initial) HAP Activities

### *Development of a HAP Draft Strategic Plan.*

Completed and distributed at this meeting. After approval, HAP will establish Working Groups and a more detailed schedule of activities.

### *Seasonal Hydrologic Predictions.*

HAP will generate a global (land) hydrologic re-forecasts (hindcasts) based on NOAA and DEMETER seasonal forecasts and a 50-year surface meteorological data set that will serve as the basis for bias correction and downscaling. There is close collaboration with HEPEX with this activity.

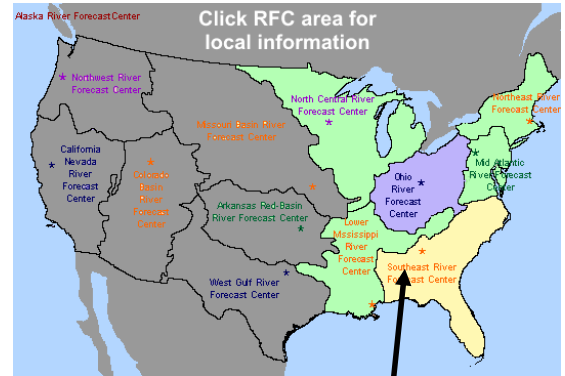
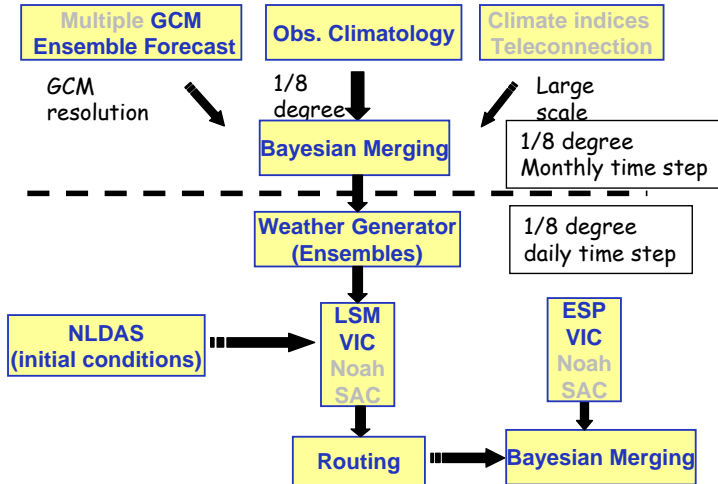
### *Estimation of current hydrologic conditions (snow, soil wetness)*

HAP is partnering with groups to estimate such current conditions but needs a strategy to expand this globally. (Requires real-time surface meteorology.)

# Experimental Seasonal Hydrologic Forecast System over the Eastern US

## Project objectives:

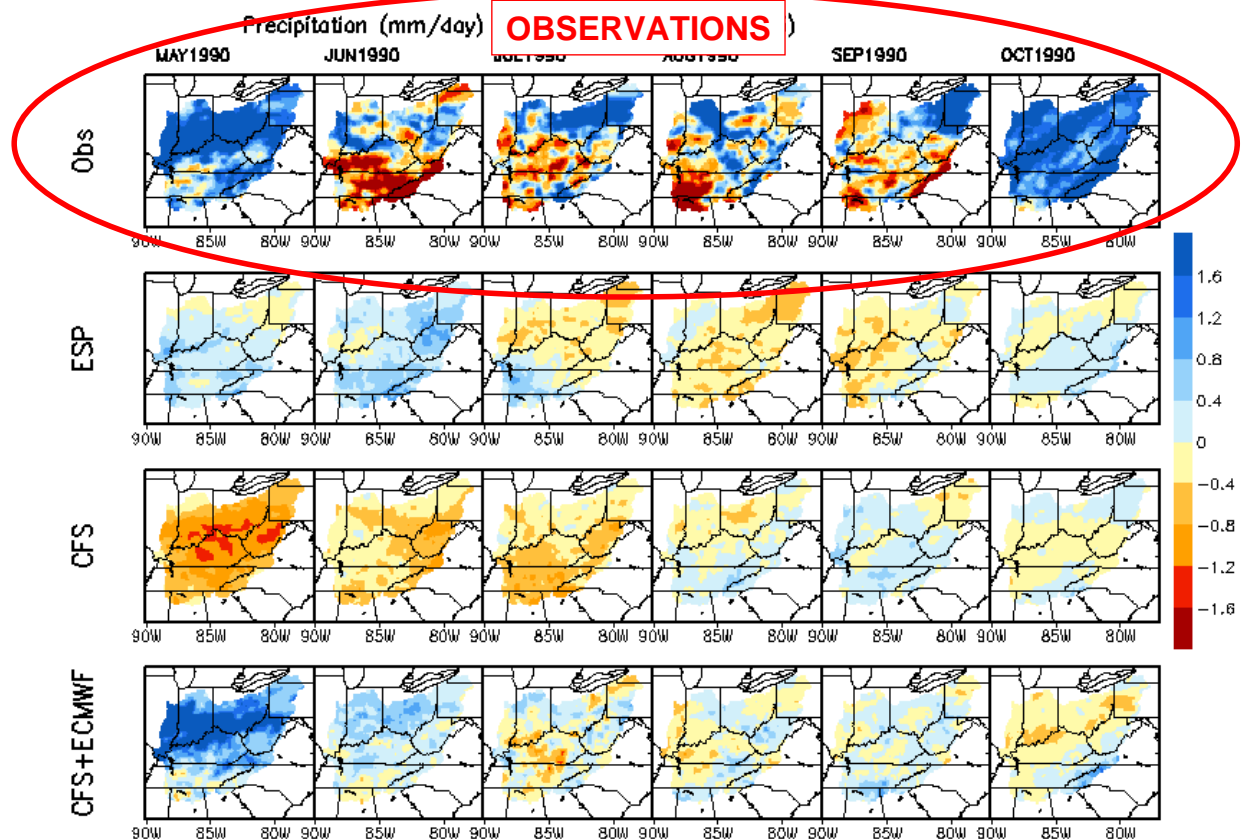
- (i) develop a seasonal hydrologic forecasting system that utilizes NCEP dynamical Climate Forecast System (CFS),
- (ii) evaluate the hydrologic forecast uncertainty and skill over a range of basins and
- (iii) develop verification approaches for the generated hydrologic ensembles.



Forecast region. 2005 focus on SE

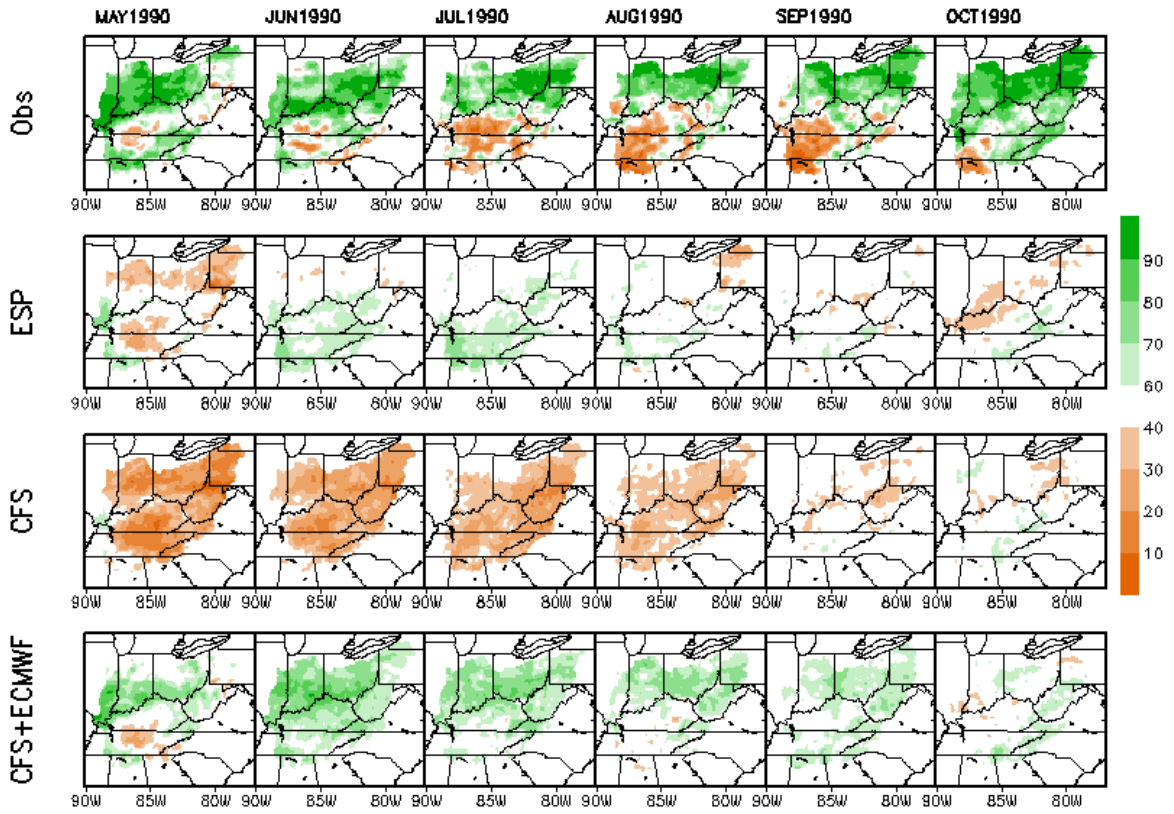


Princeton University

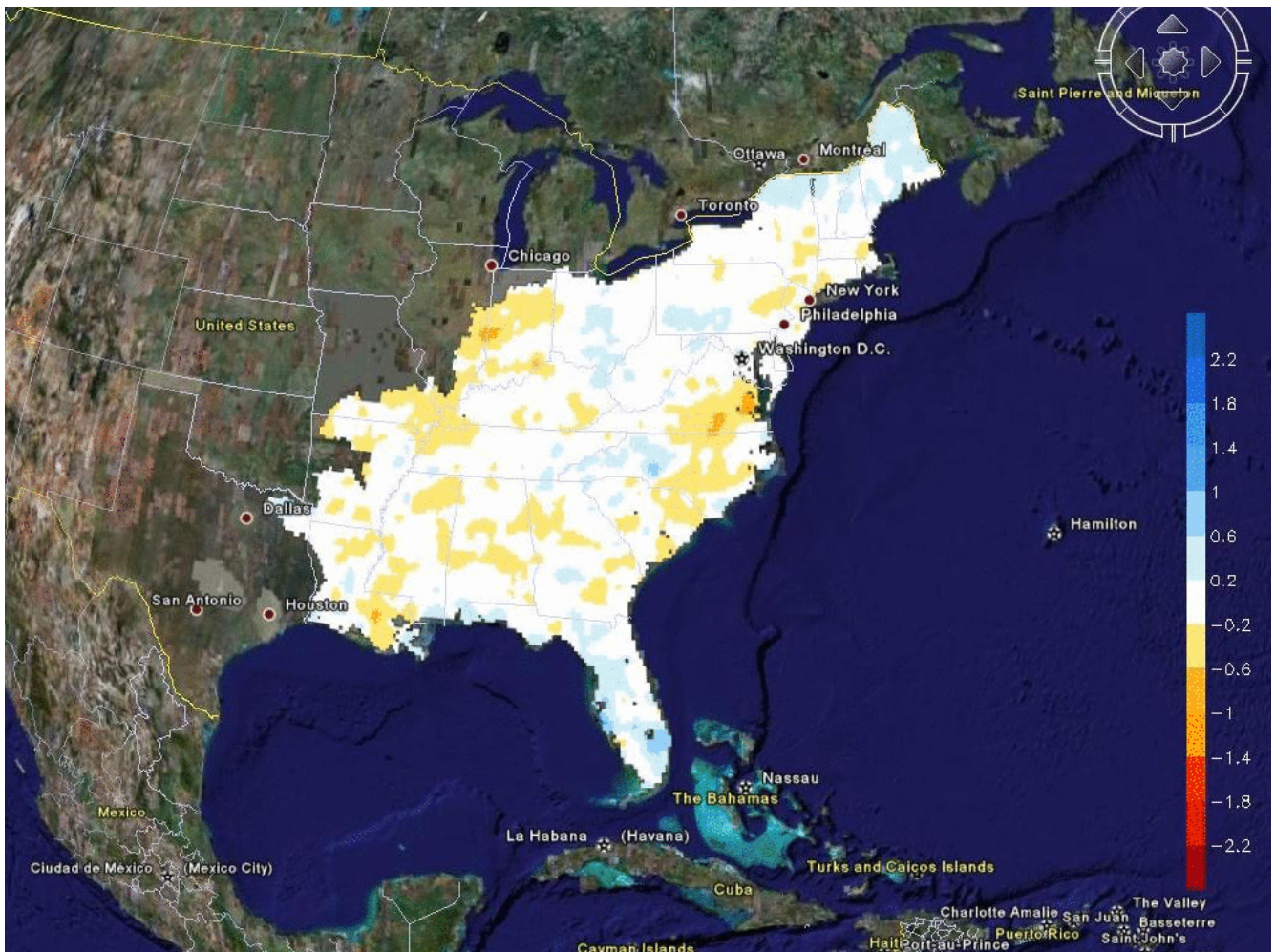




**Total Column Soil Moisture (mm) Mean Percentile (Init: 199005)**

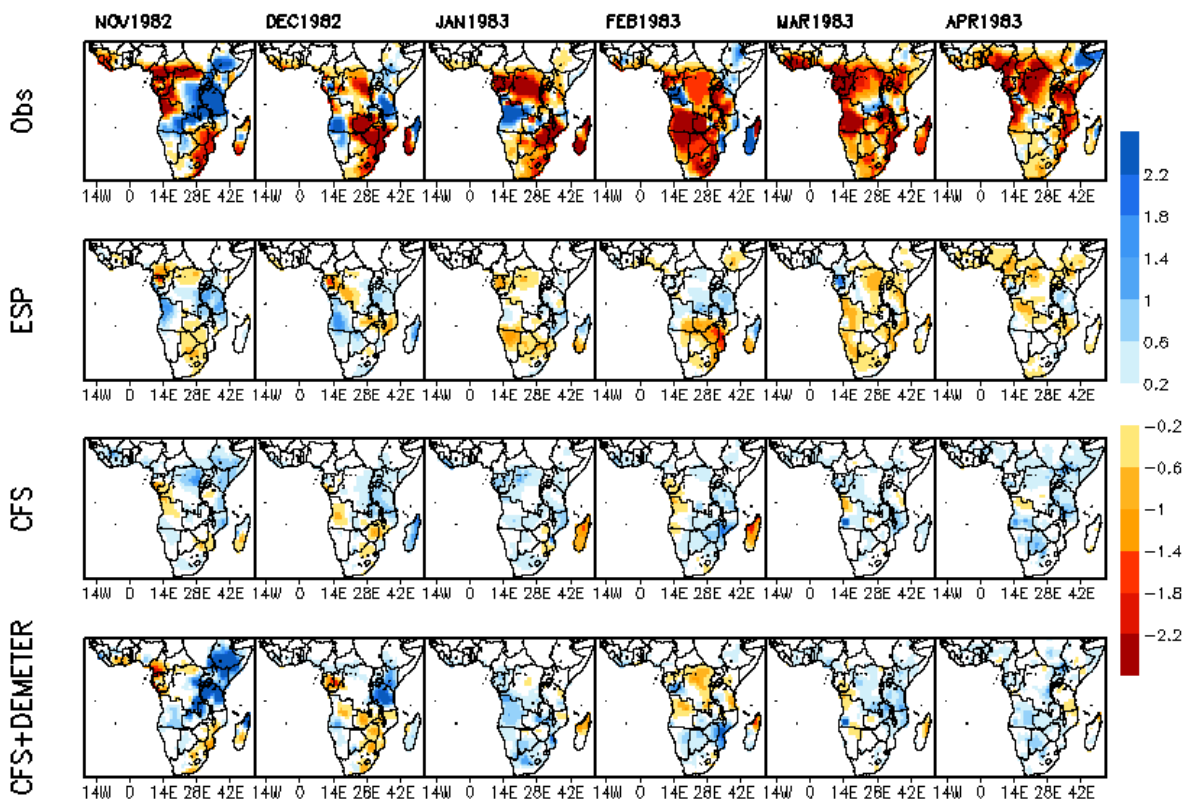


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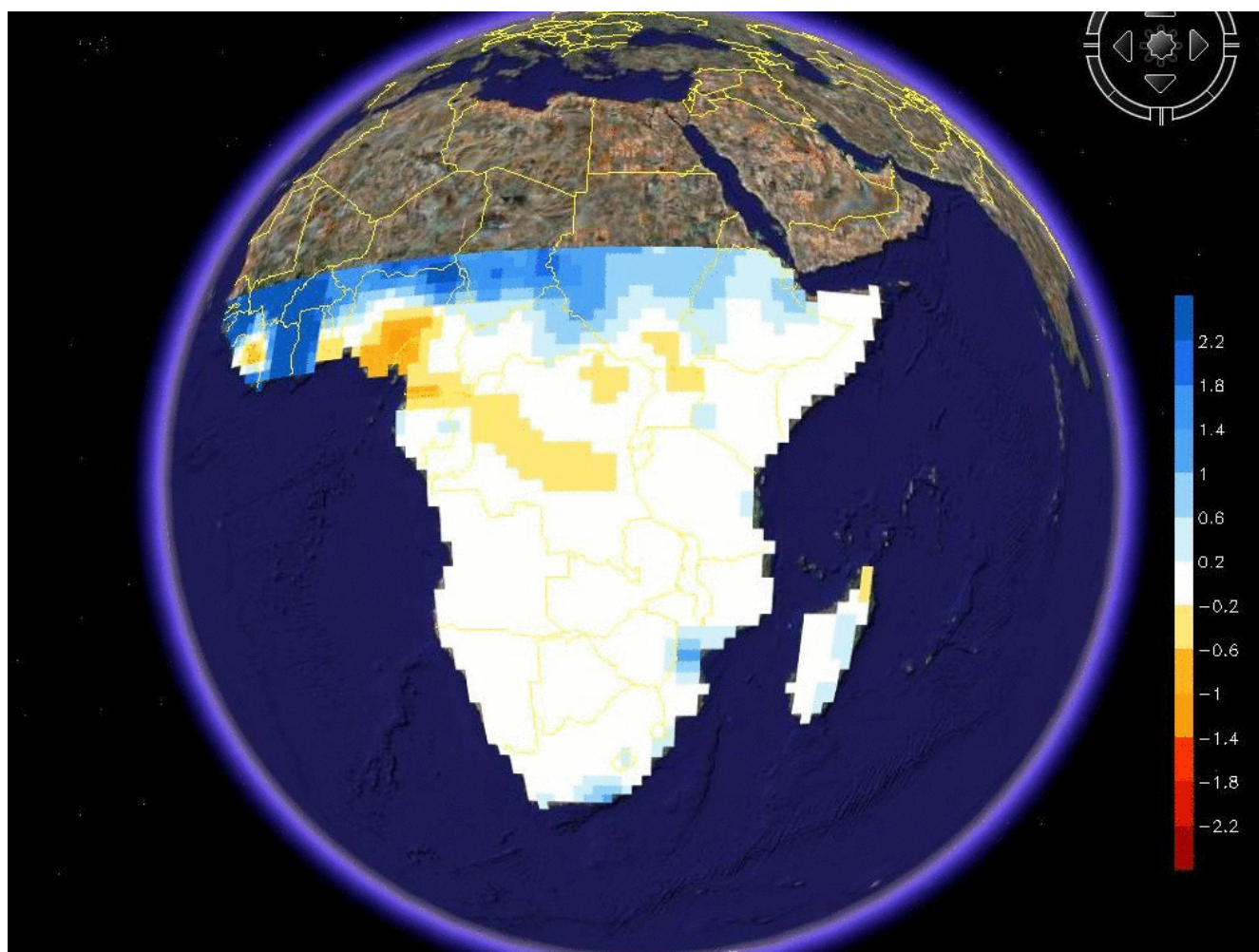


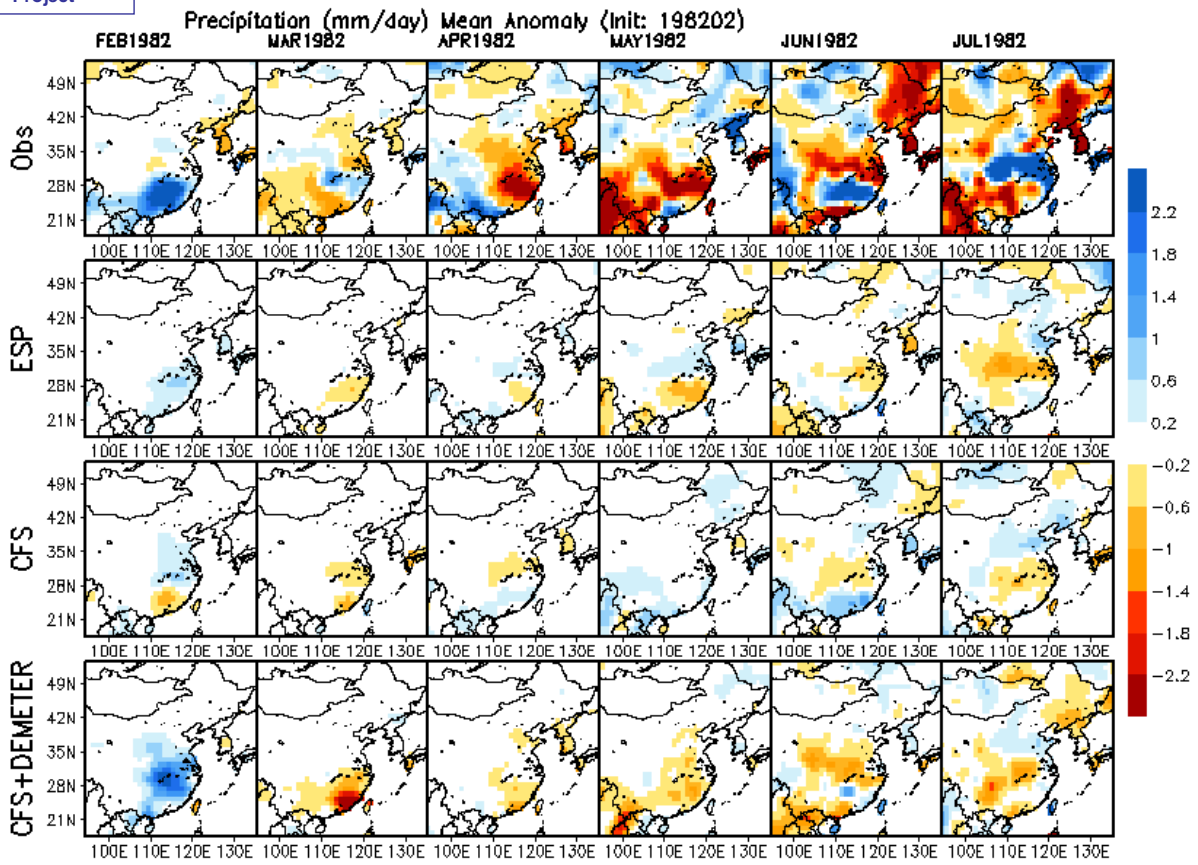


Precipitation (mm/day) Mean Anomaly (Init: 198211)

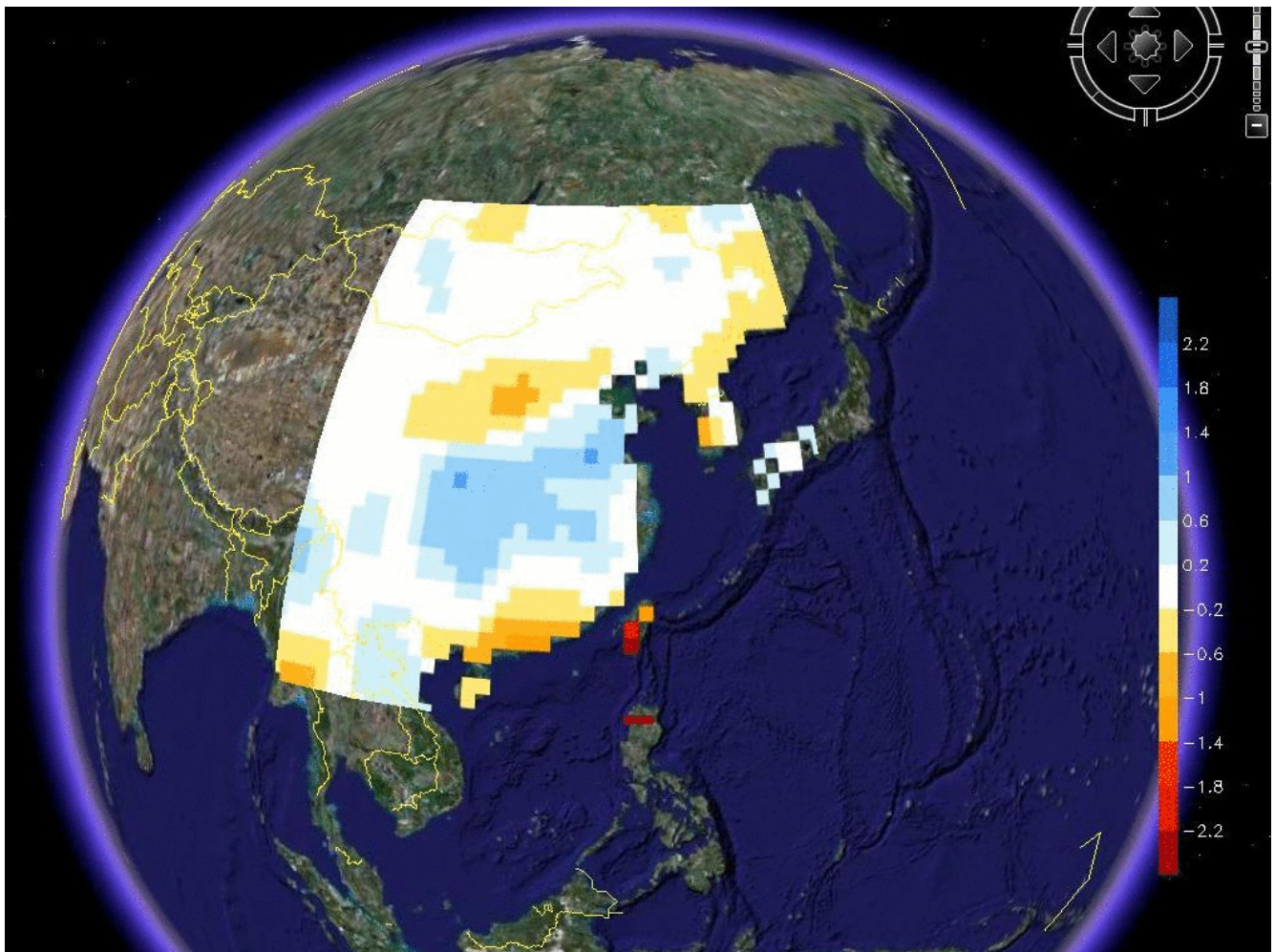


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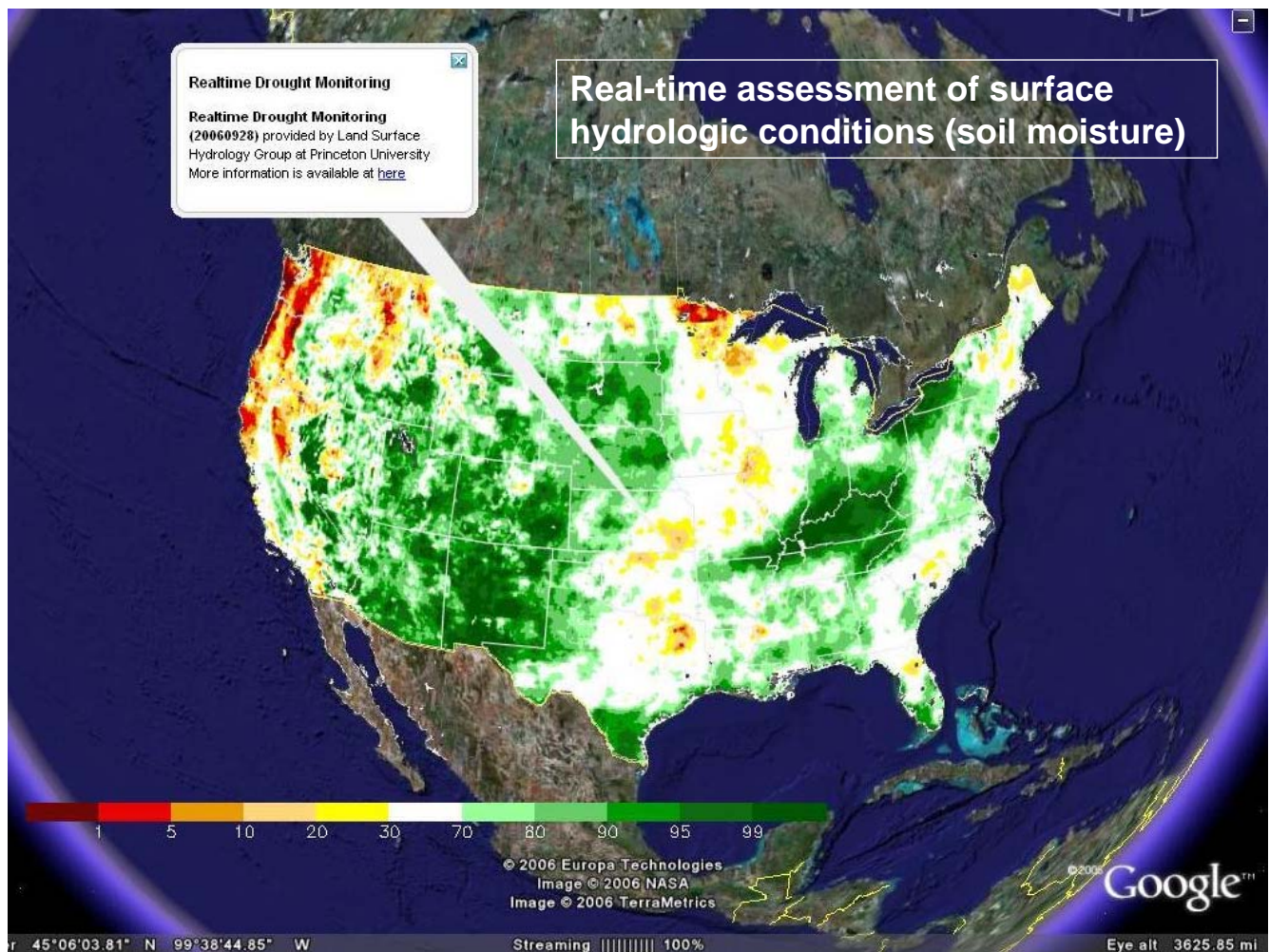




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## Future HAP Activities

### *Development of a HAP Science Implementation Plan.*

The establishment of HAP Working Groups, finalizing the HAP terms of reference, and writing a science plans needs to be completed over the next 12 months.

### *Contributions to the GEWEX Milestones.*

Will contribute to GEWEX objectives through “Improve the predictive capability for key water and energy cycle variables....and determine the geographical and seasonal characteristics over land areas” and “...demonstrating the value of GEWEX research” to operational hydrometeorological services.

And....



## Future HAP Activities

### *Seasonal Hydrologic Predictions.*

HAP will generate a global (land) hydrologic re-forecasts (hindcasts) based on NOAA and DEMETER seasonal forecasts. RHP's (CSEs) should identify testbed activities, and groups to evaluate the hydrologic ensemble forecasts. HAP will expand its collaboration with HEPEX.

### *Estimation of current hydrologic conditions (snow, soil wetness)*

HAP will try to work with other GEWEX activities and weather centers to obtain real-time data that will allow for such estimation. GEWEX needs to help to facilitate this.

## HAP Linkages

### *Within CEOP*

GLDAS can provide input data needed by HAP.

RHP's (former CSEs) need to be involved in establishing CEOP HAP testbeds, and in testing the HAP forecast products

### *Within GEWEX*

GEWEX Modeling and Prediction Panel (GMPP). Given the modeling focus of HAP, does it fit better in GMPP?

### *Within WCRP*

WCRP Task Force on Seasonal Prediction . Overarching goal of TFSP is "to determine the extent to which seasonal prediction is possible and useful in all regions of the globe with currently available models and data", which is synergistic with HAP. It is recommended that GEWEX nominate a HAP person to participate on TFSP.

### *Outside of WCRP*

GEOSS HAP would offer products directly relevant to GEOSS.

HEPEX (Hydrologic Ensemble Prediction Experiment. Very synergistic.

UNESCO. HAP needs to get the attention of UNESCO's IHP.

ESSP. HAP can contribute to Global Water System Project (GWSP)