Climate Prediction Applications Science Workshop

Group 1 Poster Summary

March 21, 2007

Drought Identification and Recovery Prediction

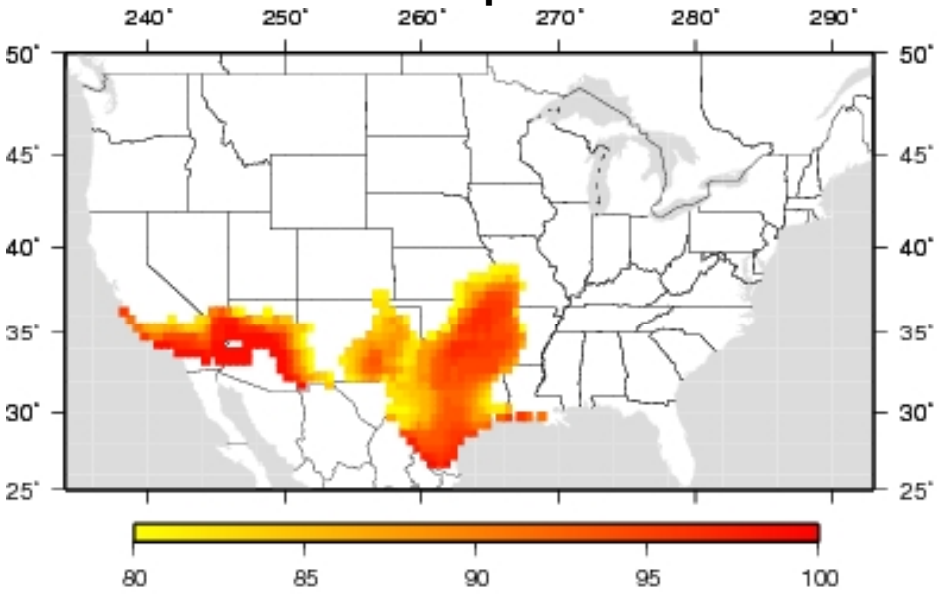
Kostas Andreadis

Andrew W. Wood

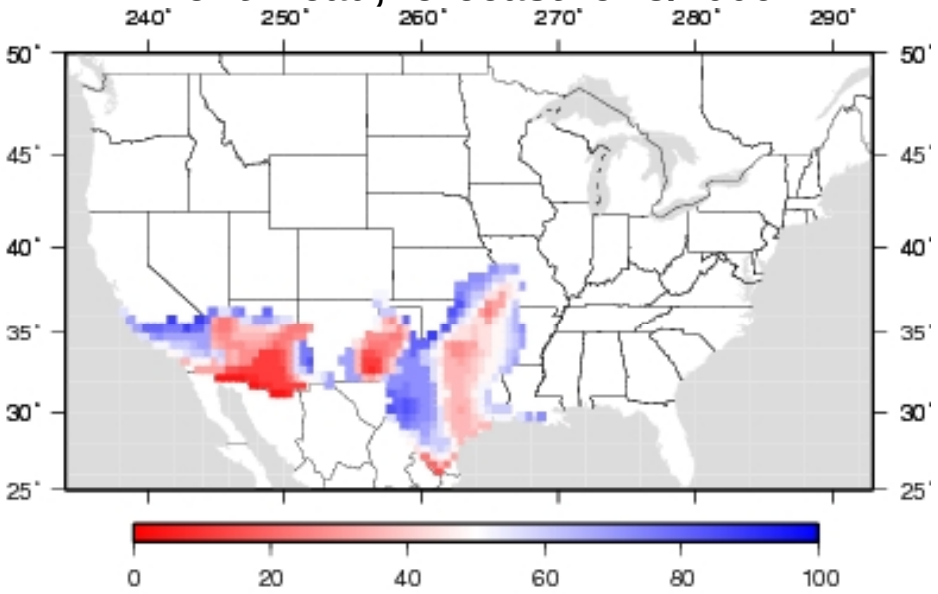
Dennis P. Lettenmaier

University of Washington

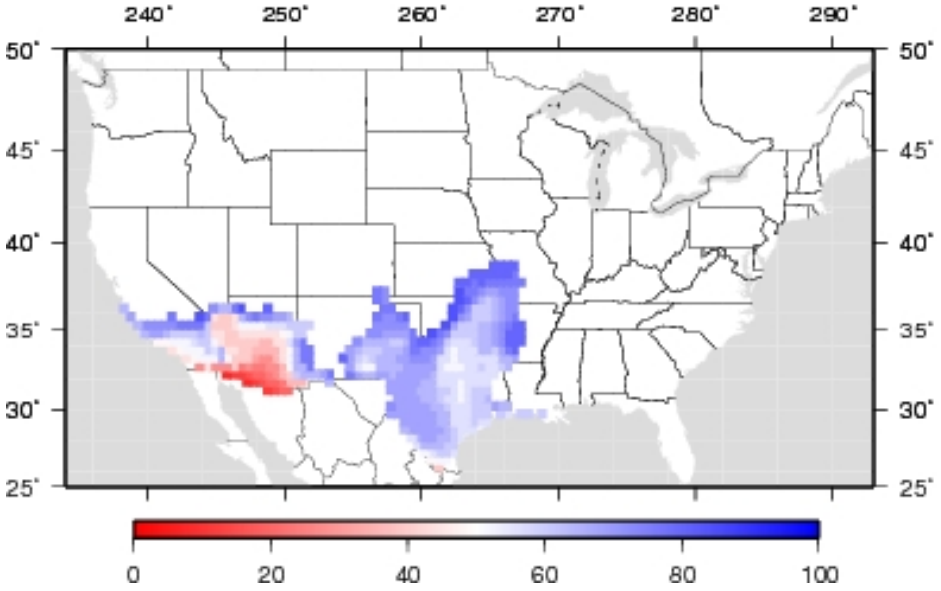
Initial soil moisture percentiles 2/2006



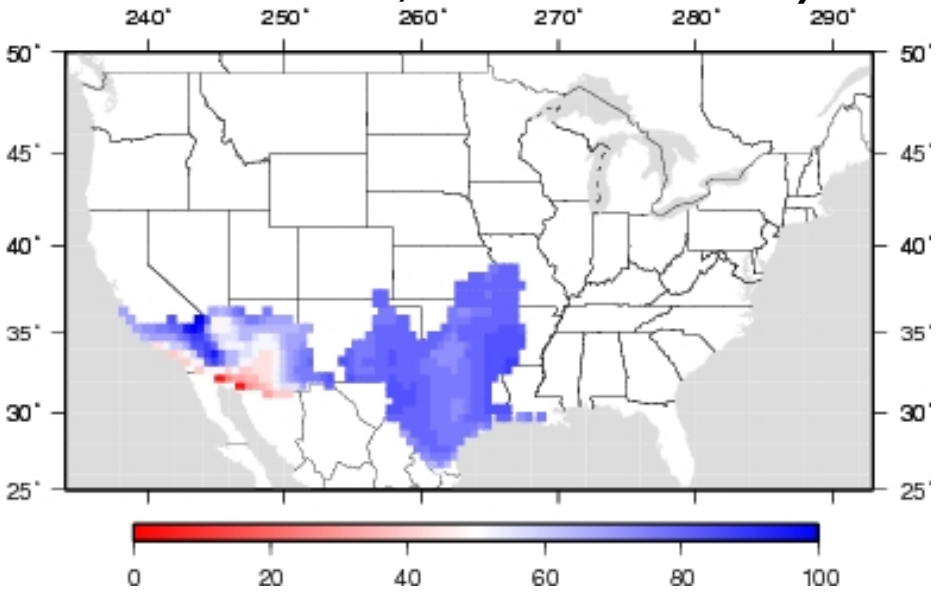
1 month lead, forecast for 3/2006



3 month lead, forecast for 5/2006



6 month lead, forecast for 8/2006)



WaterNet: The NASA Water Cycle Solutions Network

Deborah Belvedere

Center for Research on Environment and Water

WaterNet: The NASA Water Cycle Solutions Network

Goal: Network To improve and optimize the sustained ability of water cycle researchers, stakeholders, organizations and networks to interact, identify, harness, and extend NASA research results to augment decision support tools and meet national needs.

Participation Methods in Research and Development of AgClimate, a Climate-based Decision Support System for Agriculture

Norman Breuer
RSMAS-University of Miami
Gainesville, FL 32611-0570

- Climate risk decision support system, AgClimate.org
- Based on interactions with with farmers and a boundary organization, the Cooperative Extension Service.
- The work encompassed the identification of potential end users, understanding their decision processes, and the role climate forecasts play in these processes.
- Here we report results which fed and continue to feed into the research and development of the Southeast Climate Consortium's main information outlet.
- Through Sondeos and interviews we learned that producers require concise, site-specific information, presented in their own language, and that timing of information may be more important than accuracy
- From interviews we learned greater detail of the farmer decision-making process including stated goals of avoiding catastrophic losses; to attain consistent production levels, and ensure timely market delivery.
- We expect that the use of extensive stakeholder participation, multidisciplinary approaches, and assessment from the beginning of DSS development will lead to broader and longer adoption leading to useful adaptation in production and marketing practices for risk management.

NWCC Mission and Stakeholder Support

Jan Curtis
Natural Resources Conservation Service
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Reconciling Randomness & Potential Predictability of North American Drought

Ian Ferguson, Phil Duffy, John Dracup, Xu Liang

- Hydrologists and engineers have traditionally treated drought as a **stochastic (random) process**
- Recent studies show that seasonal and longer droughts are driven in part by **potentially predictable** surface-atmosphere interactions
- This study **compares stochastic and dynamic approaches** to drought analysis at seasonal to decadal timescales
- Our results suggest that:
  - **Stochastic (time-series) models** are useful tools for **water resources planning and management**
  - However, **seasonal-to-interannual drought forecasts** must be based on the **physical processes** that initiate and maintain droughts

Assessing and Mitigating Drought in Washington State

Matthew Fontaine Anne Steinemann

Objectives

- Assess drought impacts
- Identify methods of improving drought preparedness

Interviewed representatives from many sectors

- Agriculture
- Municipal suppliers
- Fisheries
- Power
- Recreation

Impacts and Recommendations

Impacts

- Who was affected?
- How severely were they affected?

Using forecasts to reduce future impacts

- Who uses forecasts?
- What decisions do forecasts support?
- When are forecasts most valuable?
- What would make forecasts more useful?

Improving water resources management in the western United States through use of remote sensing data and seasonal climate forecasts

Eric Rosenberg[1], Andrew Wood[1], Qiuhong Tang[1], Anne Steinemann[1], Bisher Imam[2], Soroosh Sorooshian[2], and Dennis Lettenmaier[1]

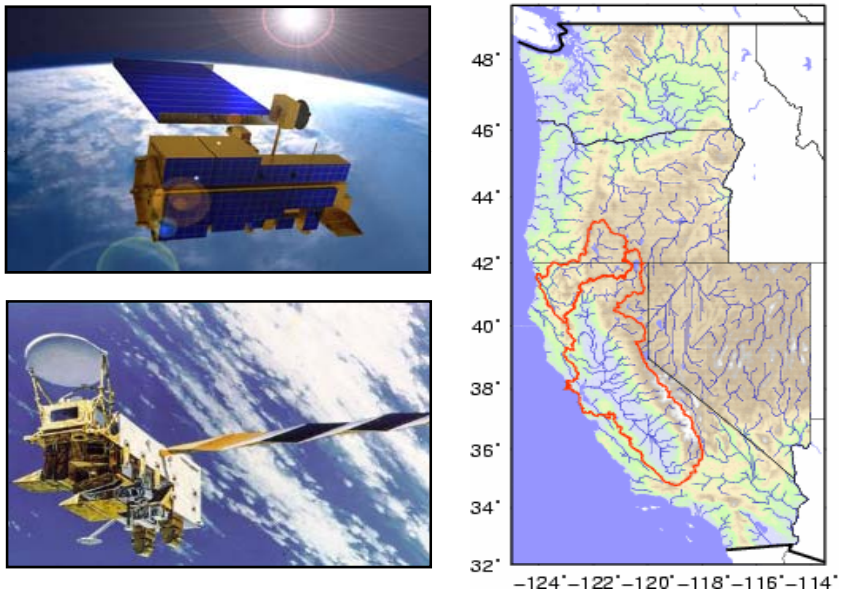
[1]Department of Civil and Environmental Engineering, University of Washington, Seattle, WA
[2]Department of Civil and Environmental Engineering, UC Irvine, Irvine, CA

This study attempts to incorporate advanced hydrologic modeling and remote sensing data within the water management decision processes of the Klamath River basin of Oregon and the Sacramento River basin of California. NASA and NOAA research results of three types are being investigated for adaptation and use by water management agencies:

- **Earth Observing System MODIS products,**
- **NASA's seasonal climate forecasts, and**
- **Seasonal climate outlooks from NOAA's CPC**

Research is being conducted in partnership with:

- **Natural Resources Conservation Service,**
- **US Bureau of Reclamation, and**
- **California Department of Water Resources**



The Terra satellite (top left), the first to carry the MODIS sensor, was launched in Dec 1999. The Aqua satellite (bottom left), the second to carry the MODIS sensor, was launched in May 2002. The study areas for the project (right) are the Klamath R. basin of Oregon and the Sacramento R. basin of California.

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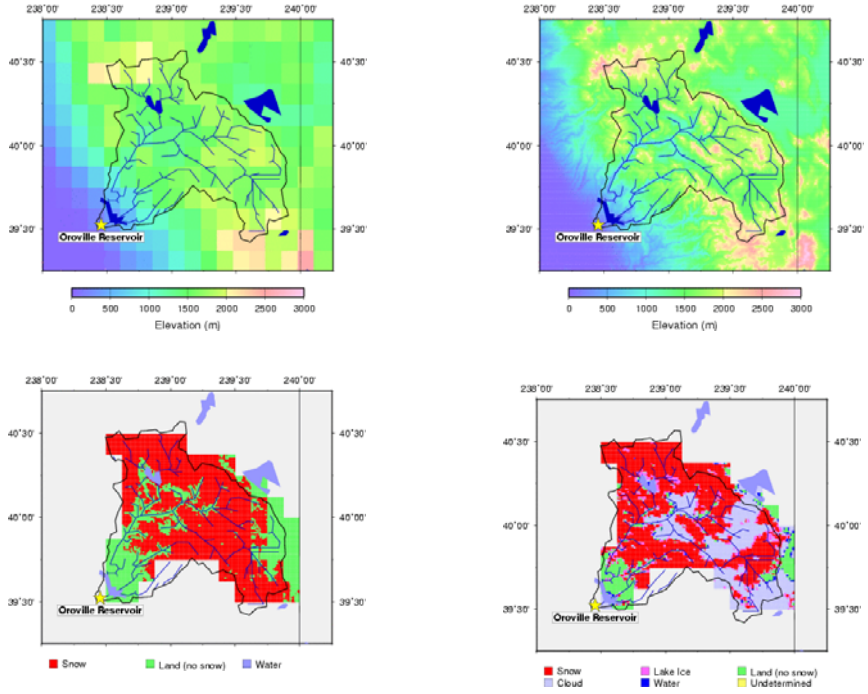
Implementation of the UW west-wide forecast system has begun with the Feather River, a major tributary of the Sacramento River. Watersheds were delineated against the Variable Infiltration Capacity (VIC) hydrologic model's 1/8 degree grid cells and are currently being upgraded to a 1/16 degree resolution. Real-time implementation is proceeding with the nowcast mode before progressing to the forecast mode (without MODIS snow inputs), and finally, the forecast mode with MODIS snow inputs. Examples shown are from a retrospective assessment.



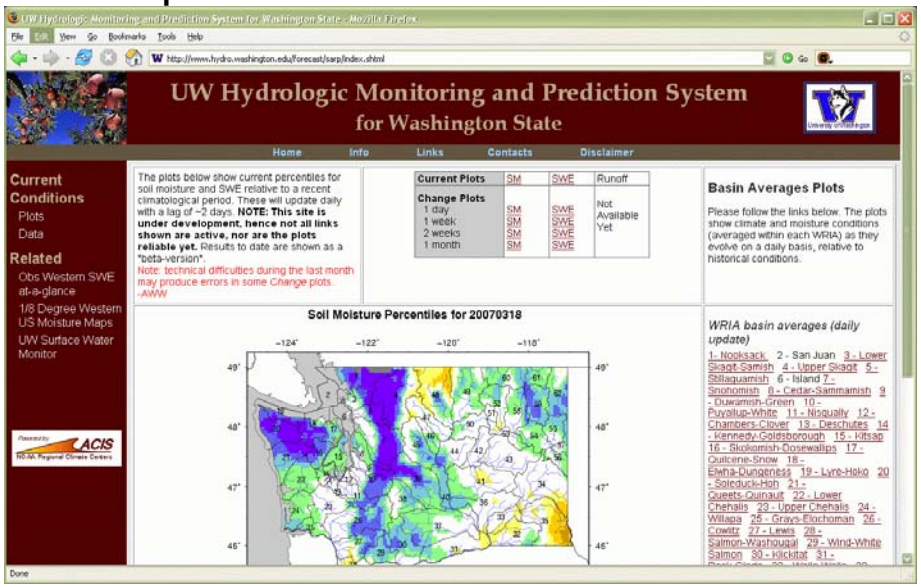
The Feather River watershed against VIC's 1/8° grid cells (top left) and against VIC's 1/16° grid cells (top right). VIC snow cover (bottom left) and MODIS snow cover (bottom right) from retrospective assessment of January 11, 2004.

Applications of Medium Range To Seasonal/Interannual Climate Forecasts For Water Resources Management In the Yakima River Basin of Washington State

Shraddhanand Shukla, Donee Alexander,
Anne Steinemann, Andy Wood
Funded by **NOAA SARP**

1) User Interaction Component
- working with USBR in Yakima Basin on forecast communication

2) Hydrologic Monitoring / Prediction component for Washington State



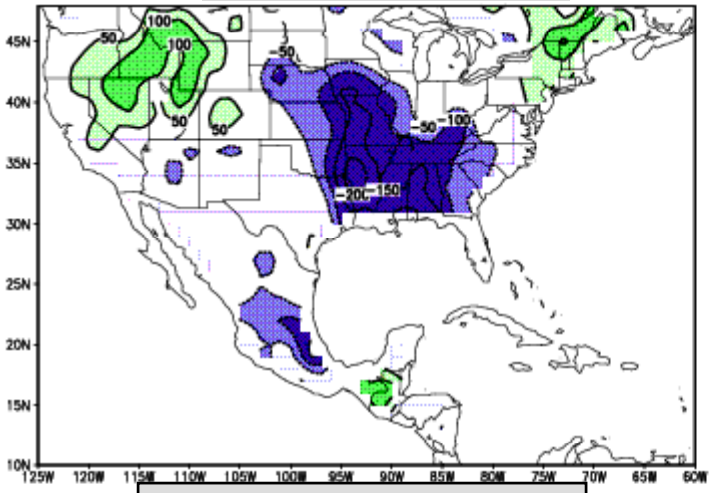
NAEFS week1 drought forecast verification for JAS 2006

Wanru Wu and Kingtse Mo

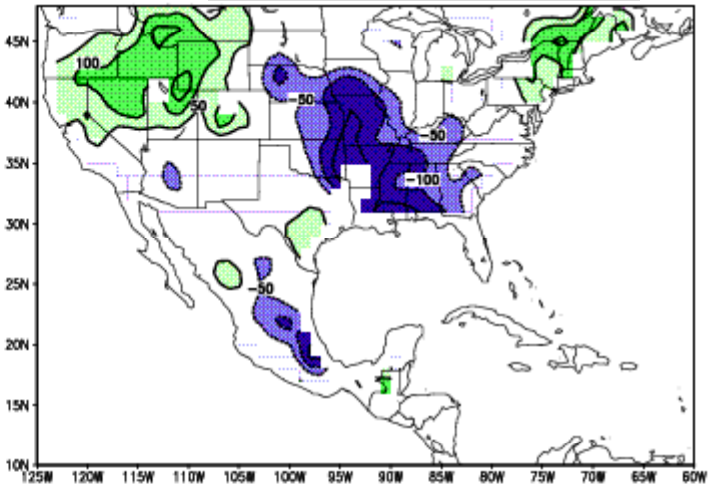
- Mean errors for total soil water storage (SM) and E are very large, but they are systematic.
- There is no initialization of surface variables at the beginning of the forecast. The positive biases in P over the SE and over Mexico induce positive and progressive SM biases.
- Error correction is not sensitive to the training period T as long as T>15 days.
- Forecasts are significantly improved after error correction.

Week1 Forecast errors

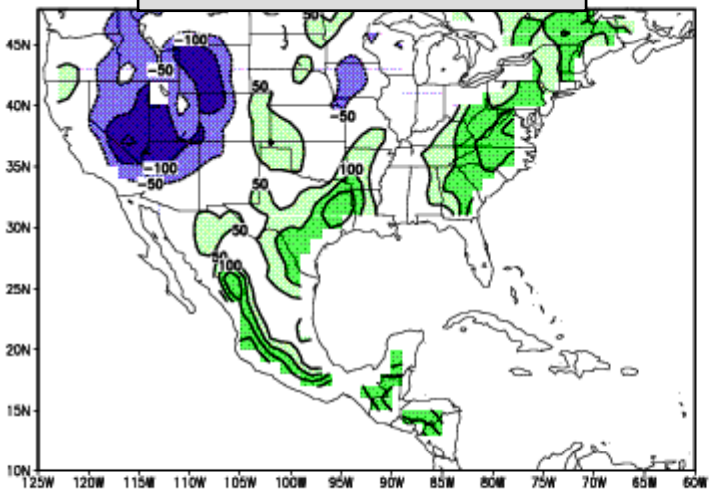
Verification

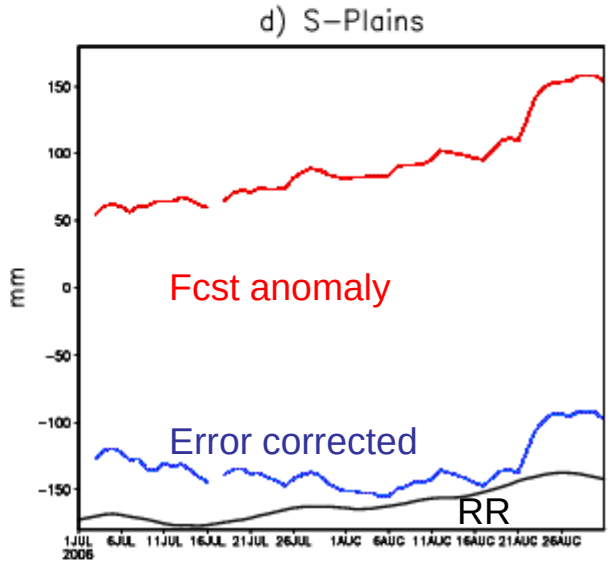


Corrected Fcst



Week1 Fcst IC
July 4,2006





Corrected forecasts are close to the RR, but the systematic errors are HUGE. Will these forecast be useful to you?

Climate Forecasts as a Critical Component to Water Resource Planning

Elliott Fry
San Antonio Water System
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Statistical Analysis of Freezes and Probability Freeze Forecast in Florida

Yoshie Goto
COAPS/FSU
Tallahassee, FL

An Alert Classification System for Monitoring and Assessing the ENSO-Cycle

Wayne Higgins
Climate Prediction Center
Camp Springs, MD 20746

Categorical Forecasts of Winter Season Precipitation for Agricultural Research and Resource Management

Steve Mauget
3810 4th Street
Lubbock, TX 79415

Status Report on NWS Climate Services and Plans for the Future

Diana Perfect
NOAA National Weather Service
Silver Spring, MD 20910-3283

The Impact of Downscaling on Forecast Dependability: The Rest of the Story

Jeanne Schneider
Research Meteorologist
USDA ARS Grazinglands Research Laboratory
El Reno, OK 73040