NIDIS Prediction and Forecasts Working Group (WG)

NIDIS All-Chair Meeting
April 26-27, 2016

Jon Gottschalck[1] and Hailan Wang[2]

[1]NOAA / NCEP / Climate Prediction Center
[2]NASA / Goddard Space Flight Center / GMAO

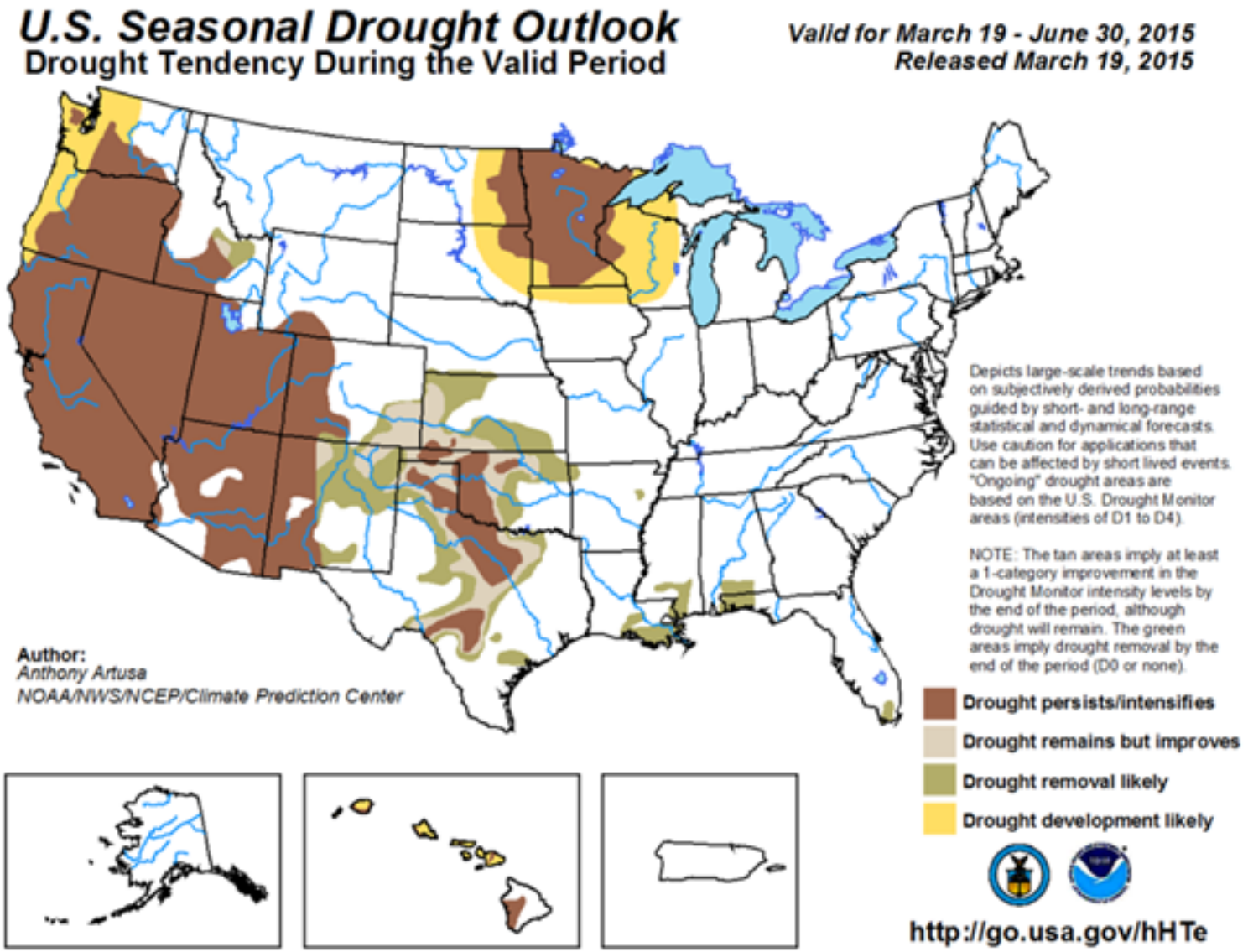
WG Role

(1) Act as a broker in the transition zone between prediction research and authoritative official operational outlooks to ensure proper coordination is performed to make these linkages

(2) Coordinate across agencies on drought reports and latest research needs (i.e., NOAA MAPP DTF Report, Wood et al. 2015)

(3) Make recommendations to inform research agenda in this area over the next few years for NIDIS

WG Role


U.S. Seasonal Drought Outlook
Drought Tendency During the Valid Period
Valid for March 19 - June 30, 2015
Released March 19, 2015
Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Use caution for applications that can be affected by short lived events. "Ongoing" drought areas are based on the U.S. Drought Monitor areas (intensities of D1 to D4).
NOTE: The tan areas imply at least a 1-category improvement in the Drought Monitor intensity levels by the end of the period, although drought will remain. The green areas imply drought removal by the end of the period (D0 or none).
Author:
Anthony Artusa
NOAA/NWS/NCEP/Climate Prediction Center
Drought persists/intensifies
Drought remains but improves
Drought removal likely
Drought development likely
http://go.usa.gov/hHTe

WG Activities to Date

- Current WG is the forecast related portion of the original Monitoring and Forecasts WG during NIDIS 1.0

- Both co-chairs not involved in original WG so have concentrated efforts on information gathering and coordination

- Conducted 3 telecons to date:

  (1) Outline WG membership, objective, goals and expectations
  (2) Review membership drought related expertise and current work
  (3) Discuss priorities to inform NIDIS Implementation Plan (IP)

- Prepared draft contribution for 2016 IP and circulated to WG

WG membership

- Jon Gottschalck (**co-chair**) – NOAA / Climate Prediction Center
- Hailan Wang (**co-chair**) – NASA / Goddard Space Flight Center
- Lichuan Chen – NOAA / Climate Prediction Center
- Youlong Xia – NOAA / Environmental Modeling Center
- Randy Koster – NASA / Goddard Space Flight Center
- Dennis Lettenmaier – UCLA
- Brad Lyon – University of Maine
- Eric Maloney – Colorado State University
- Malaquias Pena Mendez – NOAA / Environmental Modeling Center
- David Miskus – NOAA / Climate Prediction Center
- Kingtse Mo – NOAA / Climate Prediction Center
- Victor Murphy – NOAA / NWS Southern Region
- Christa Peters-Lidard – NASA / Goddard Space Flight Center
- Richard Seager – LDEO Columbia University
- Duane Waliser – NASA / Jet Propulsion Laboratory
- Klaus Wolter – NOAA / ESRL / CIRES
- Wanru Wu – National Water Center

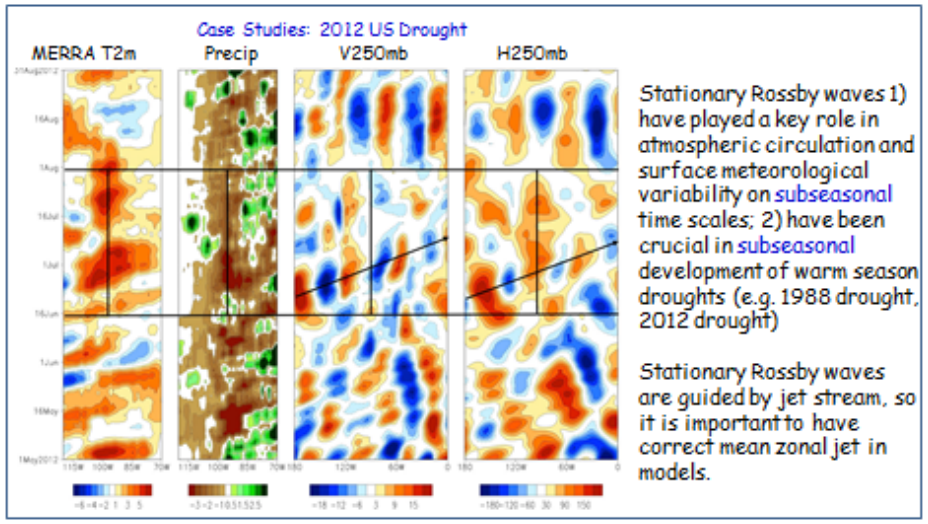
WG Drought Expertise and Work

Hailan Wang

Global Modeling and Assimilation Office

Siegfried Schubert, Hailan Wang, Randal Koster

Stationary Rossby Waves



Stationary Rossby waves 1) have played a key role in atmospheric circulation and surface meteorological variability on subseasonal time scales; 2) have been crucial in subseasonal development of warm season droughts (e.g. 1988 drought, 2012 drought)

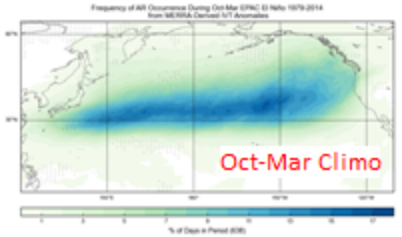
Stationary Rossby waves are guided by jet stream, so it is important to have correct mean zonal jet in models.

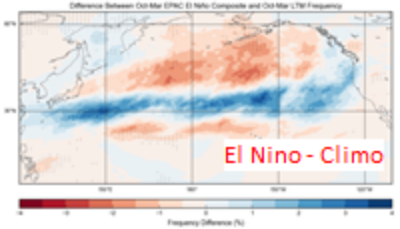
Research and prediction experience with important types of climate variability that can impact U. S. drought

Expertise spans multiple time scales with a focus on subseasonal-to-seasonal timescale (i.e. MJO, blocking, ENSO, etc.)

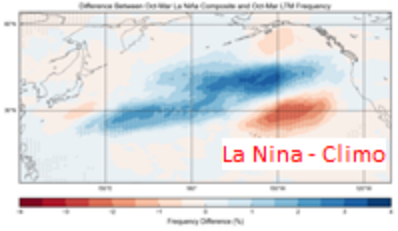
Eric Maloney

Understanding the Dynamics of Drought-Busting Atmospheric River Events



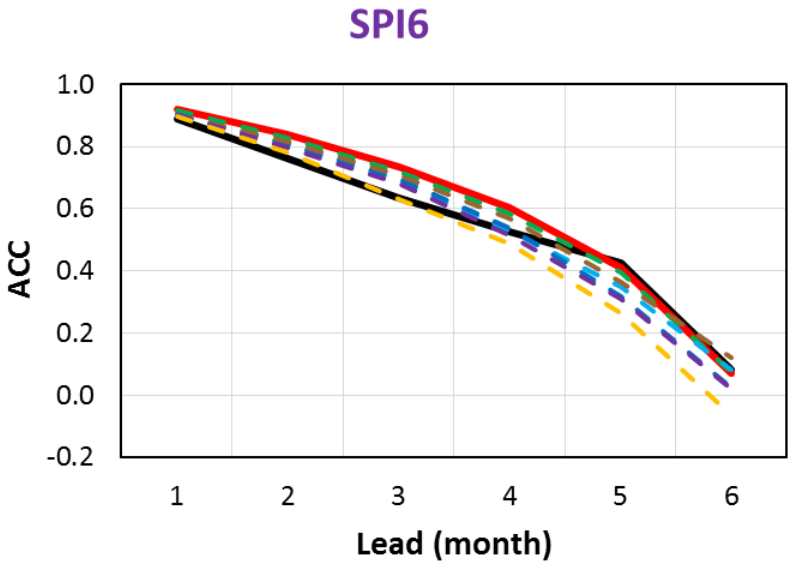


- With graduate student Brian Mundhenk and Elizabeth Barnes, we are studying the dynamics and statistics of atmospheric river (AR) events in the North Pacific and globally.
- Munbdhenk et al. (2015, right) show an example of the difference in AR activity between El Nino and La Nina and climatology.

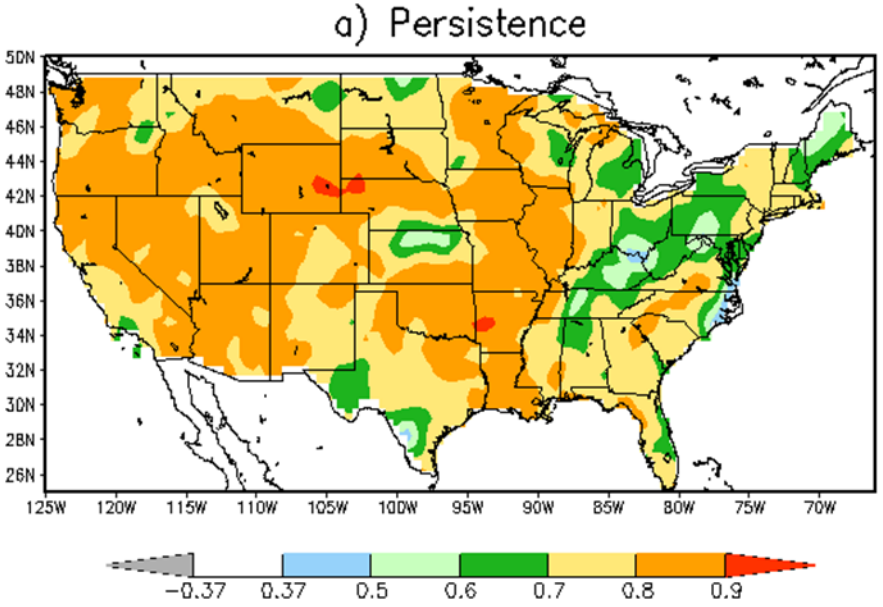


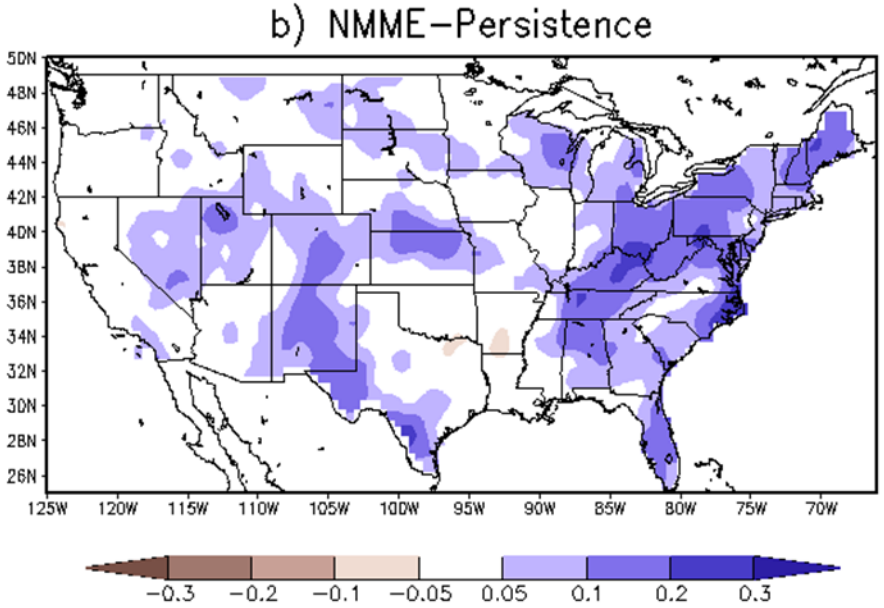
Mundhenk, Barnes, Maloney (2015)

WG Drought Expertise and Work



Experience working with state of the art GCMs and associated output such as the North American Multi-Model Ensemble (NMME) that are used in forecast operations

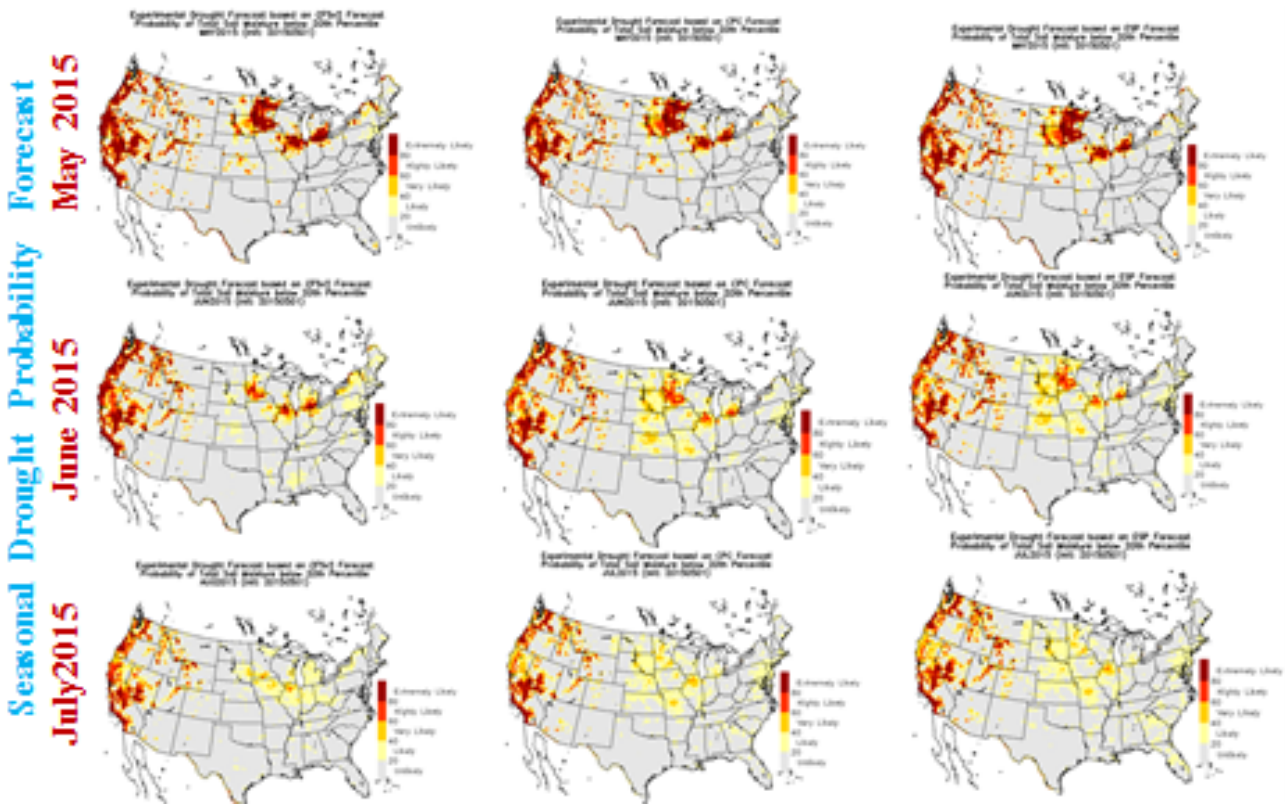




WG Drought Expertise and Work

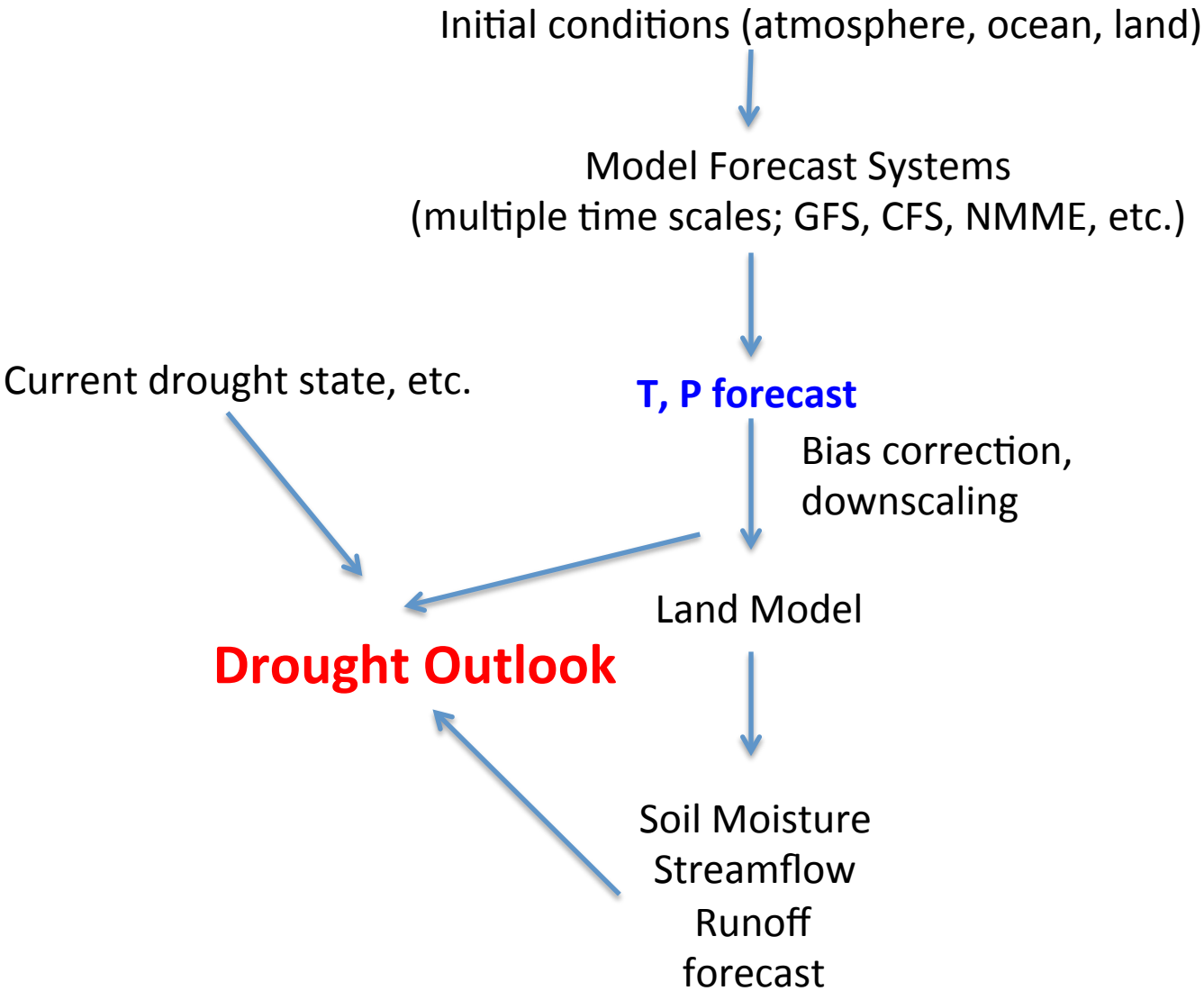
Products: Anomalies, percentiles and probability for different hydrological variables

May 2015 example



Experience working with state of the art land surface modeling systems such as NLDAS and associated observations to improve hydrological drought predictions

Drought Prediction:
High-level Schematic Diagram



WG Strategy

- WG members evaluate aspects of the drought prediction problem that fit their expertise and current work focus (respective projects)

- Include operational forecast systems and datasets as part of this framework

  (e.g., utilize CFS, NMME for various climate variability – drought relationship evaluation)

- Consider end-to-end development process (i.e., capacity for a predictive tool or clear guidance/input on how operational drought forecast could be improved)

- Use regular WG telecons as a channel to communicate on progress and findings, and discuss how they may be applied to improve operational drought forecast

WG Proposed Priority Categories

- Simulations of climate variability and their impact on U.S. drought
  - ➔ How well do operational systems exploit known climate variability - drought relationships?
- Flash droughts
  - ➔ Are some flash droughts more predictable than others? Why?
- Post-processing strategies
  - ➔ Can precipitation predictions, drought forecasts be improved by methodologies utilizing large scale model information and downscaling?
- Land initial conditions and modeling
  - ➔ Need for continuous incorporation of the latest state of the art land surface datasets in operational modeling platforms
- Communication and linkages
  - ➔ Maintain iterative dialogue with operational forecasters

WG Potential Outcome

- Provide a comprehensive assessment of current operational drought forecast system capability
- Identify aspects of current operational forecast system that can be further improved, propose strategy
- Improved linkages with DEWS structure