Earth System Research Laboratory
Physical Sciences Division

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Denver

Seasonal Outlook through September 2012

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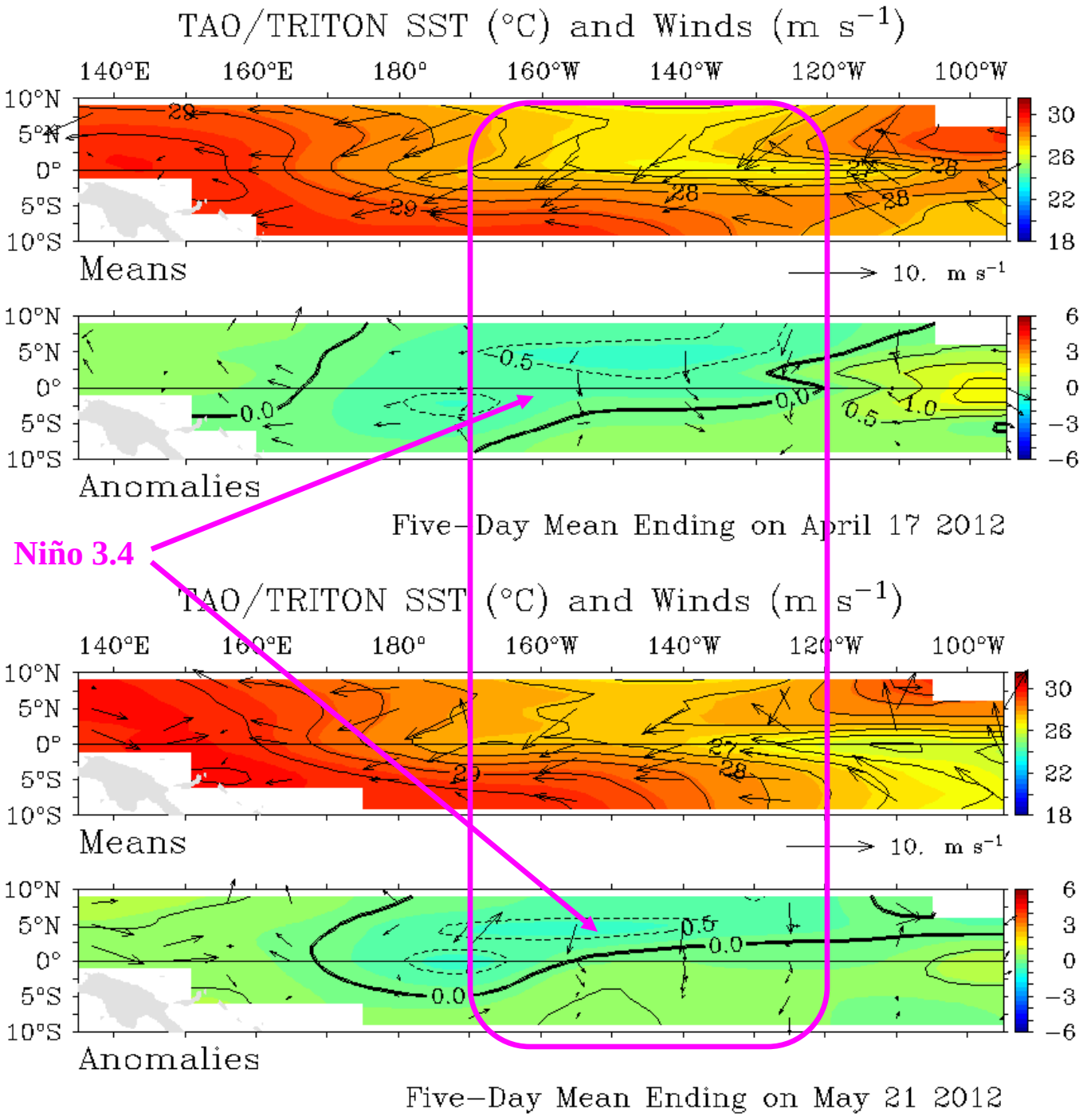
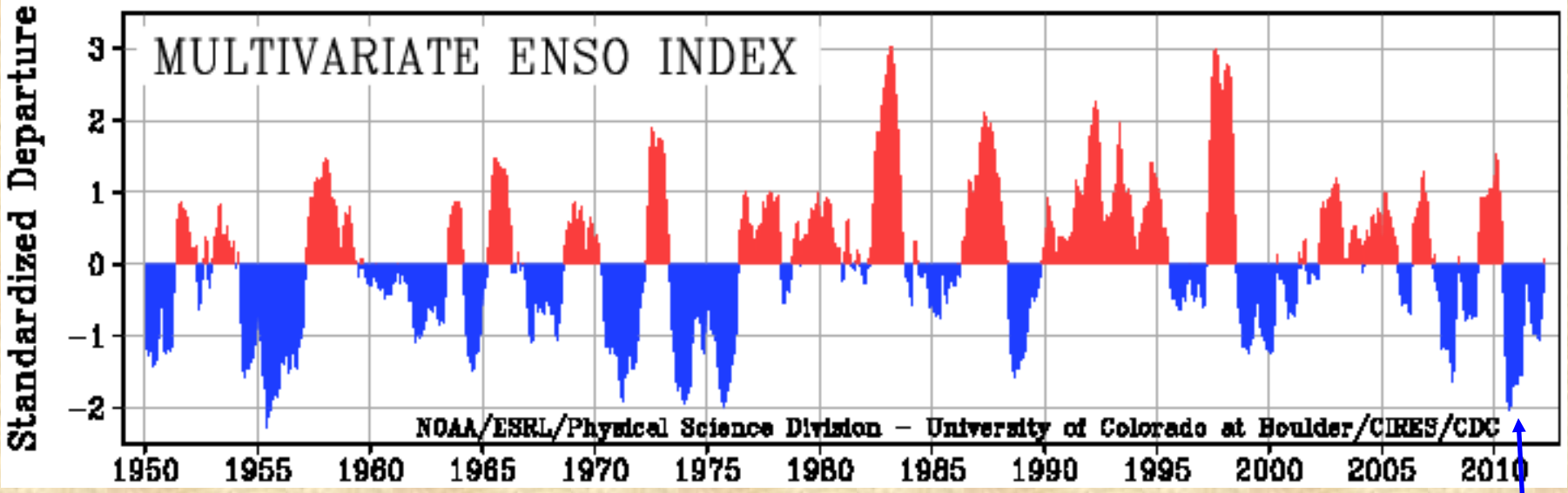
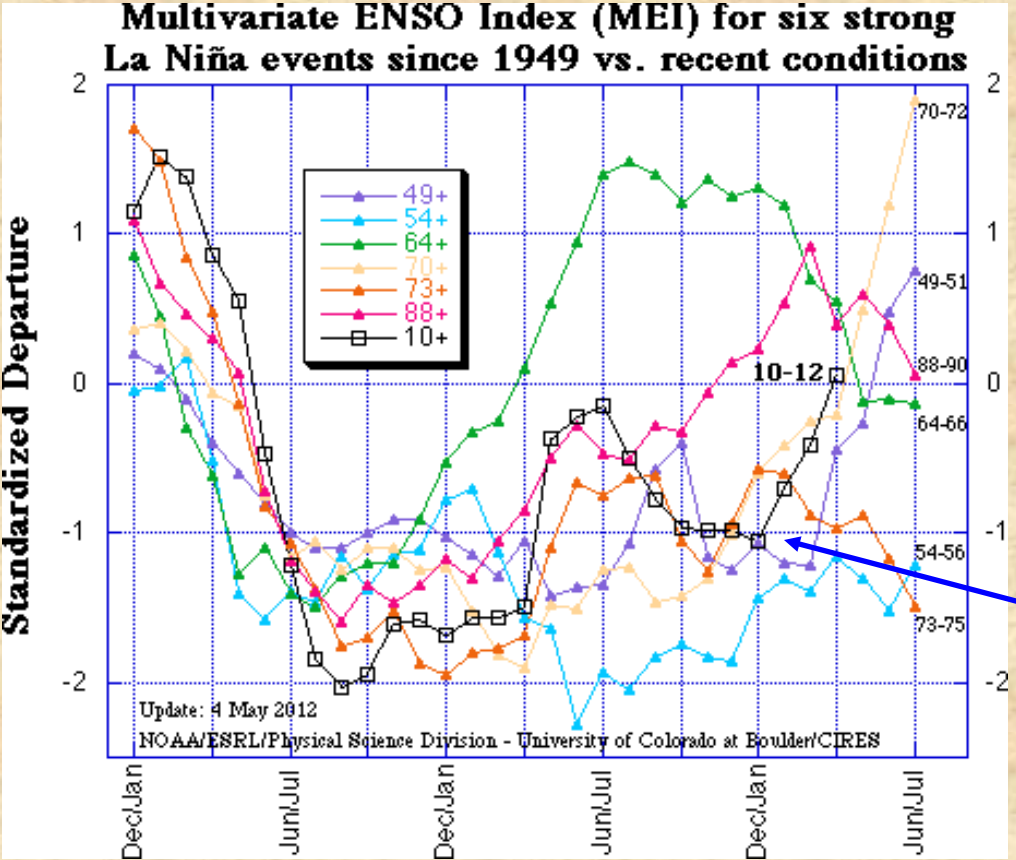
- **'Double-dip' La Niña has finished 'Round 2'**
- **What will happen next, and what does that mean for us ?**
- **Expectations for the next two weeks**
- **CPC forecasts for June through September 2012**
- **Experimental Seasonal Forecast Guidance**
- **Executive Summary**

Current state of El Niño/Southern Oscillation (ENSO) phenomenon (bottom), compared to last month (top): La Niña continues to fade. This includes smaller equatorial SST anomalies, and vanishing easterly wind anomalies. In fact, there are some westerly wind anomalies north of New Guinea that could help in the possible *slow* transition to El Niño.

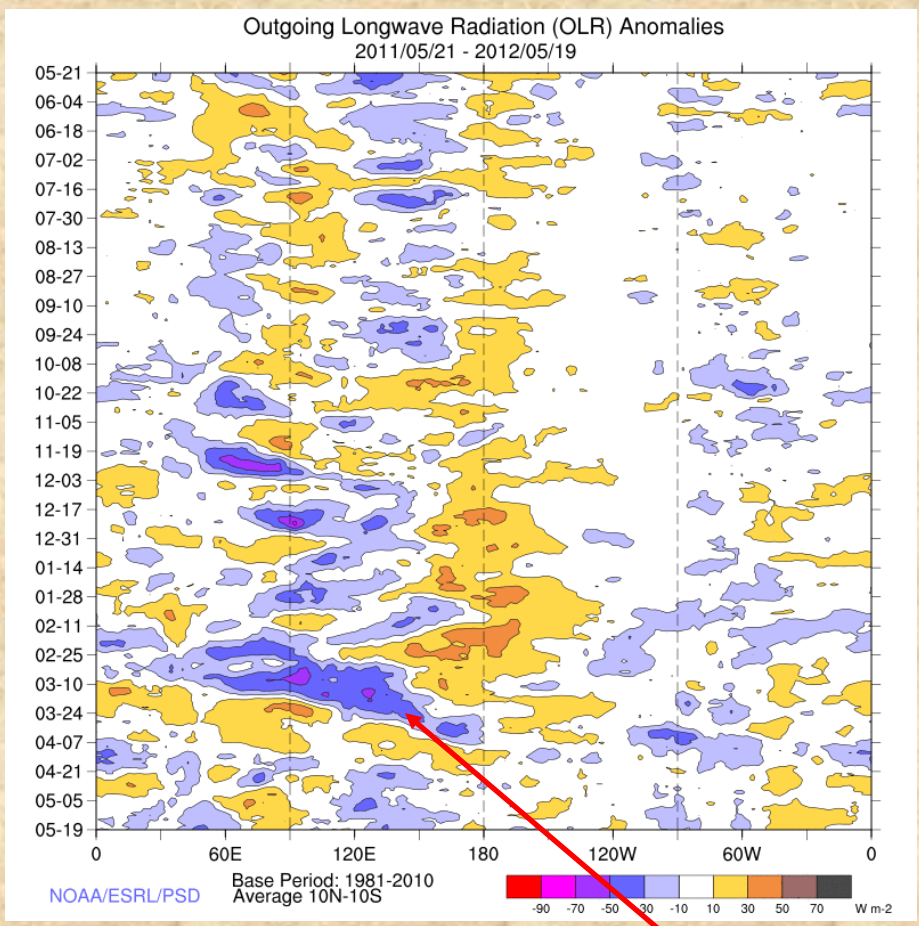


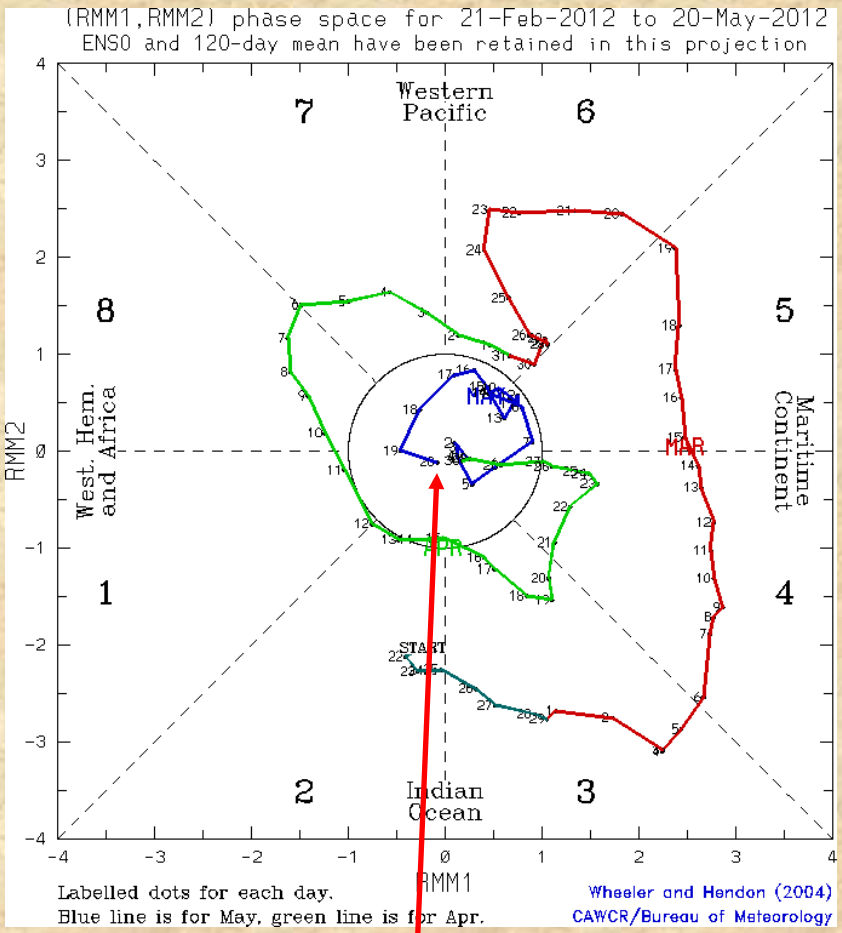




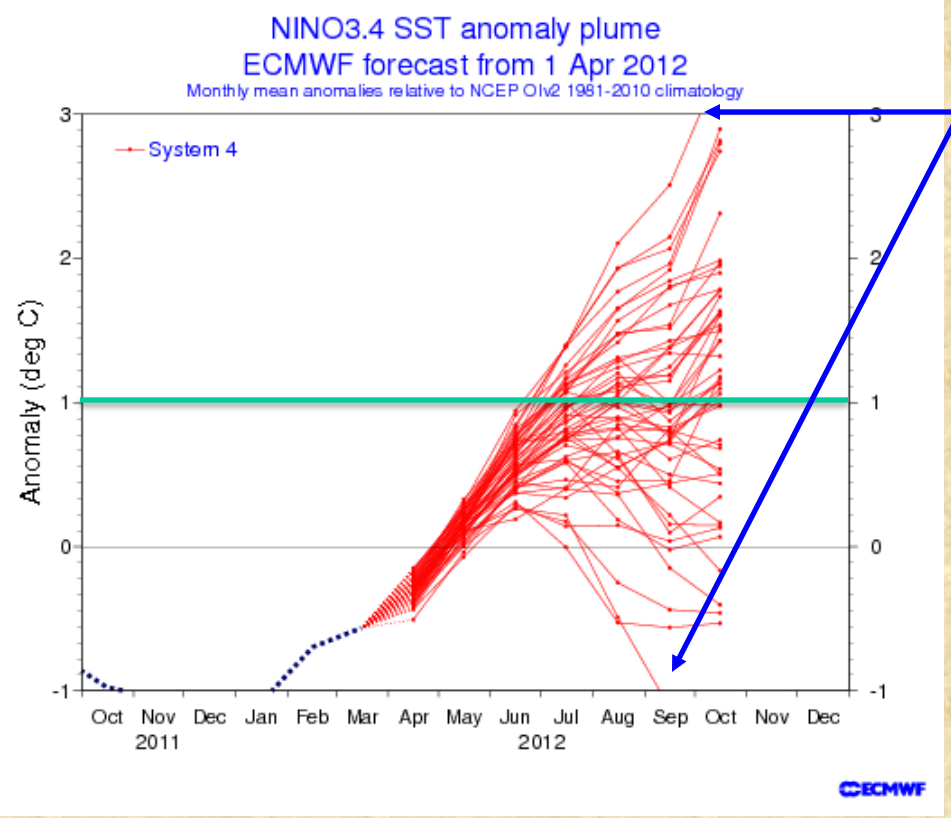
Current La Niña event reached its first peak in late 2010, followed by a brief excursion to ENSO-neutral conditions during mid-2011; it reached its second peak in December-January 2011-12, weakening rapidly since then.

http://www.esrl.noaa.gov/psd/enso/mei

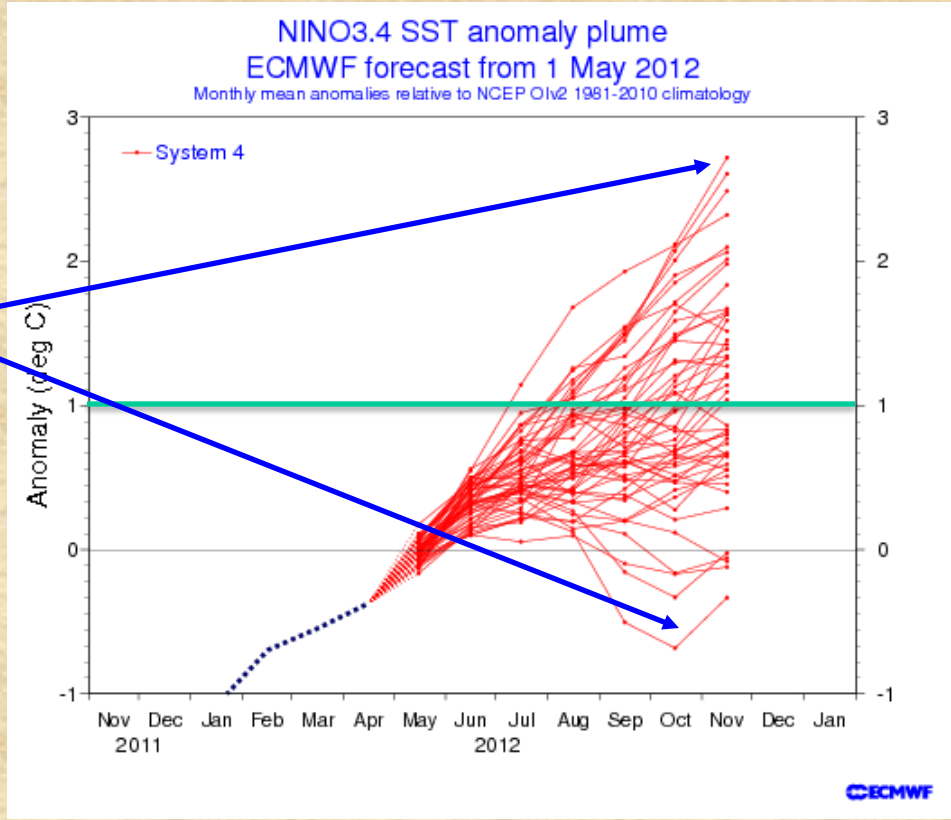




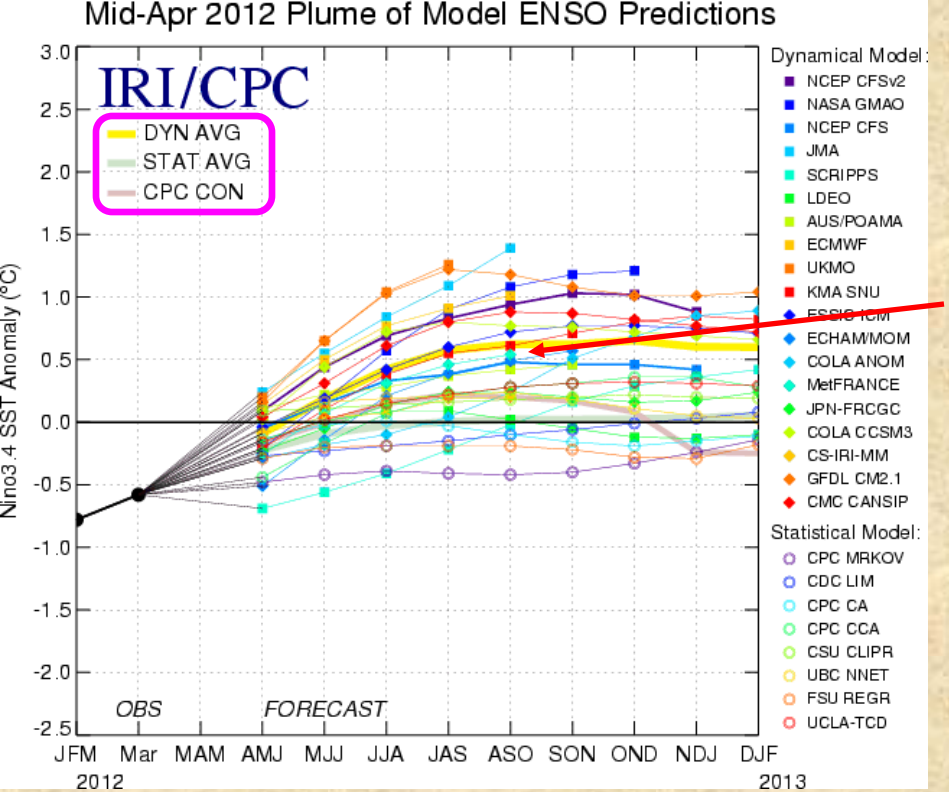
One factor that is different from 2011: Intraseasonal tropical activity ('MJO') has been enhanced compared to last year, although that by itself does not 'cause' a switch to El Niño, it can be big contributing factor. ***However, the last four weeks have fizzled, so there is no rapid transition in sight!***



The ECMWF April 2012 forecast (left) showed an astonishing range – with a single member in the moderate-to-strong *La Niña* category (-1°C) to seven members reaching 'Super-*El Niño*-size' of +2°C or more by October 2012. As I wrote last month, anything was possible, but the mean outcome (close to +1°C) was El Niño by about August 2012.



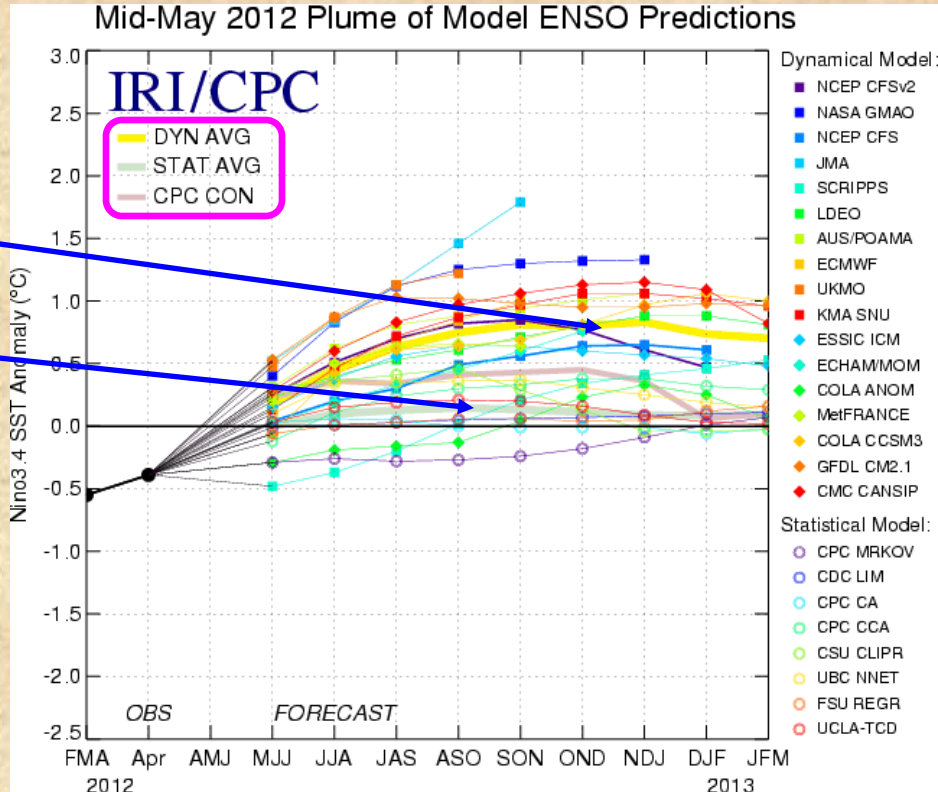
The ECMWF May 2012 forecast (right) shows a smaller, but still substantial range – with five members below 0°C and six members reaching 'Super-*El Niño*-size' of +2°C or more by November 2012. ***Compared to last month, a transition to El Niño has been postponed, certainly not in time for a wet spring...***



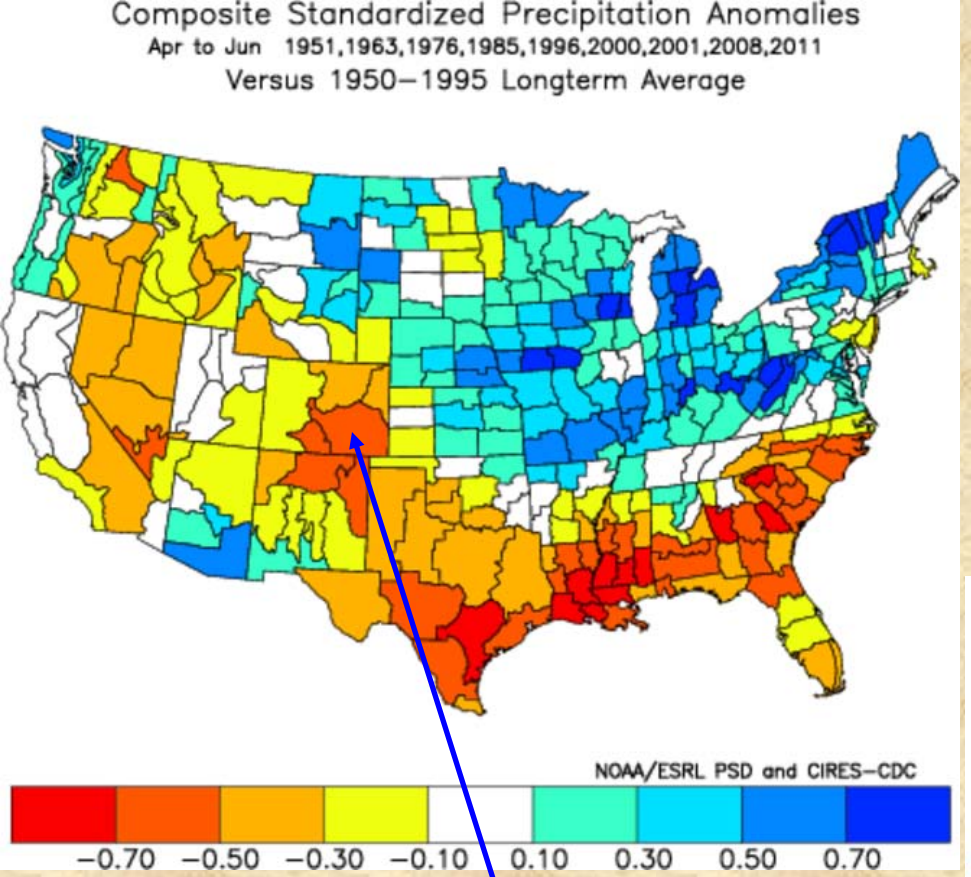
ENSO forecasts from a record 19 dynamical & 8 statistical forecast models from last month (left):

Dynamical (yellow average) showed clear preference for El Niño by July-September 2012, while statistical models never reached that threshold.

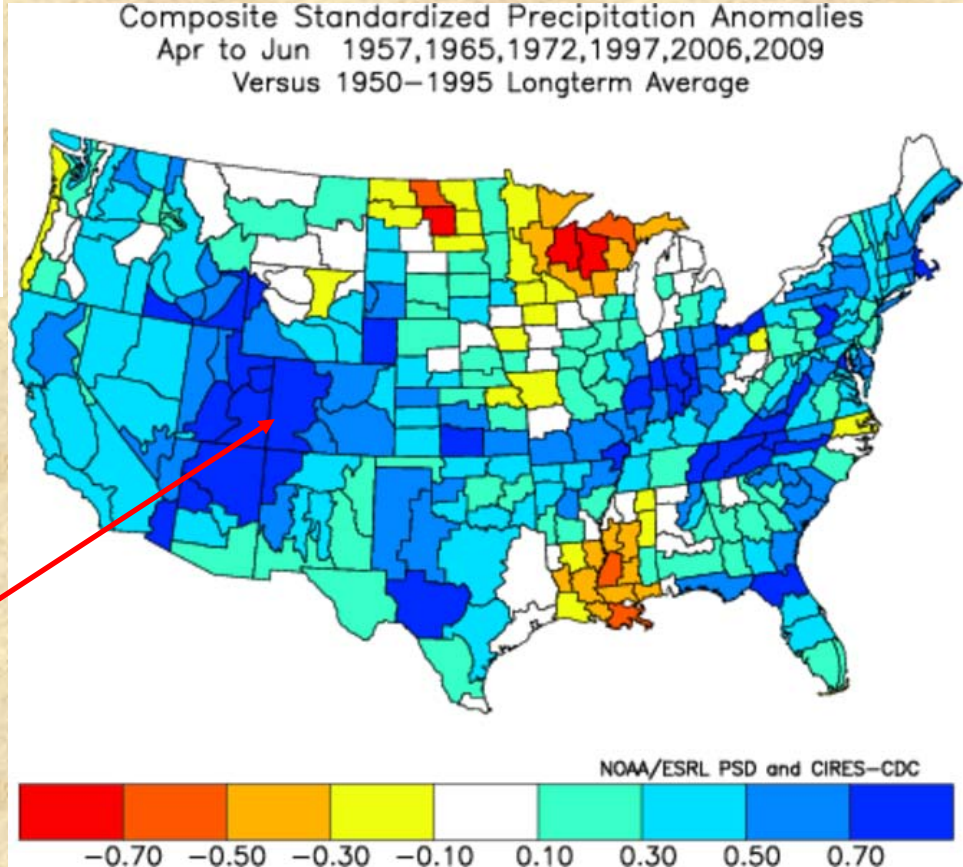
The most recent dynamical forecasts (right) show a more pronounced shift towards El Niño than last month, while the statistical models still 'withhold their support'. The difference in predicted outcomes reaches 0.7°C in the fall season. A similar situation in 2009 (ΔT: 1.0°C) ended up with El Niño, a historic 'victory' for the dynamical models.



Post-La Niña springs



While the 'Fat Lady' has not sung yet, it looks like the ENSO-neutral scenario is 'winning'...

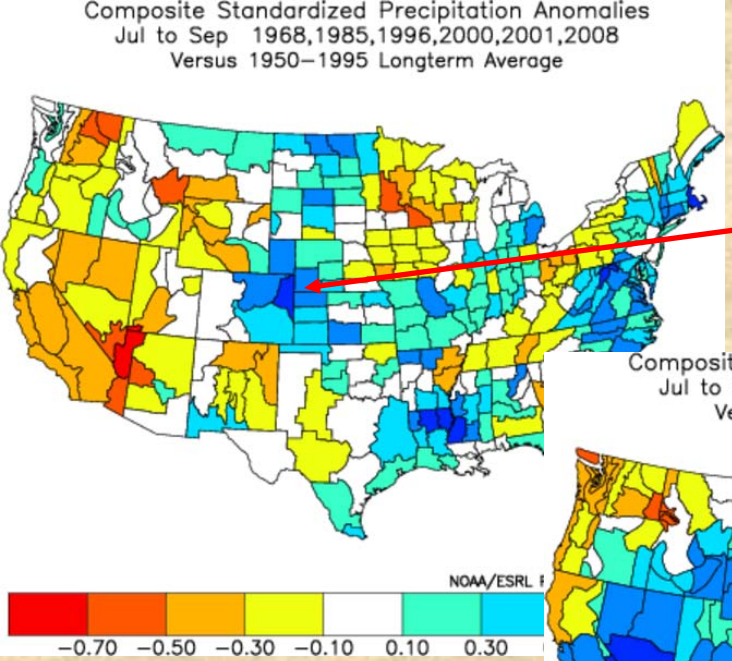


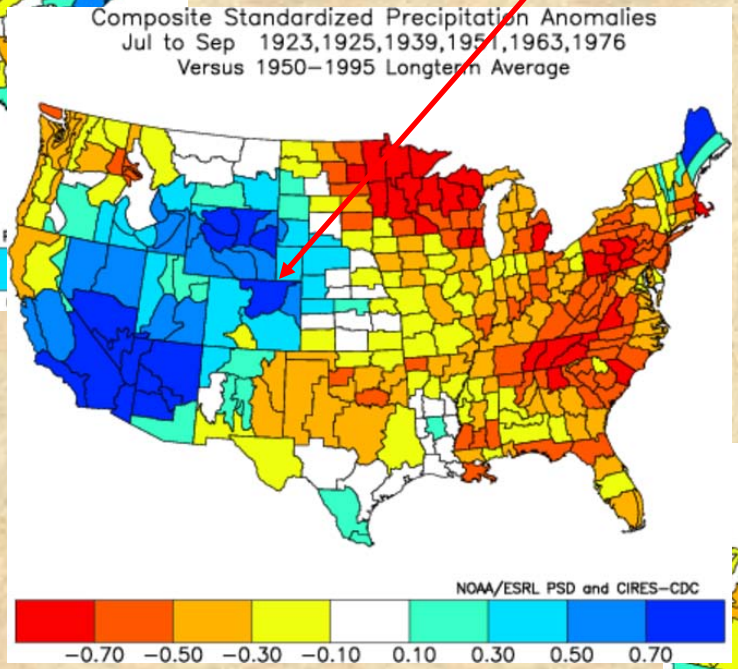
IF we go from La Niña in winter to just ENSO-neutral conditions by May-June, we tend to end up with a dry spring (top).

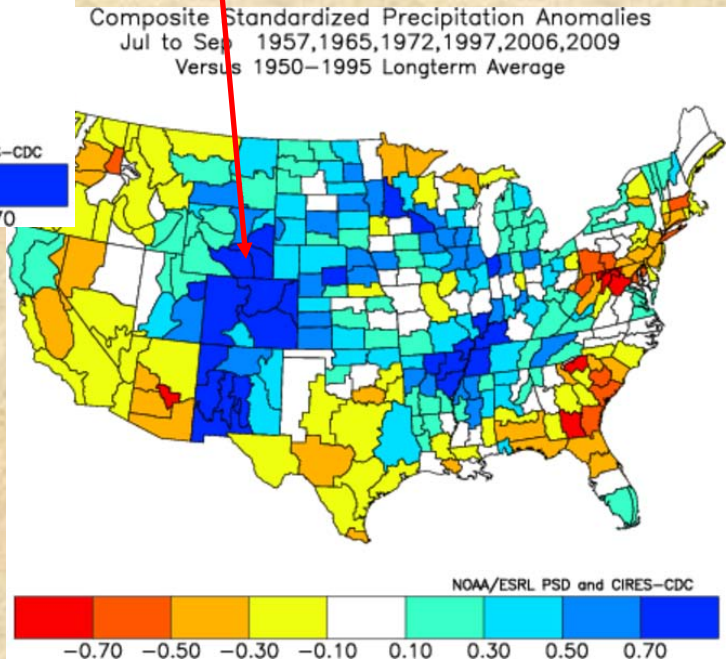
IF we were to reach El Niño conditions by May-June, we could have gotten a much wetter spring (right). ***This scenario has recently become LESS likely…***

Post-La Niña summers

ENSO-neutral (left) vs. late El Niño (middle) vs. early El Niño (bottom right) summers

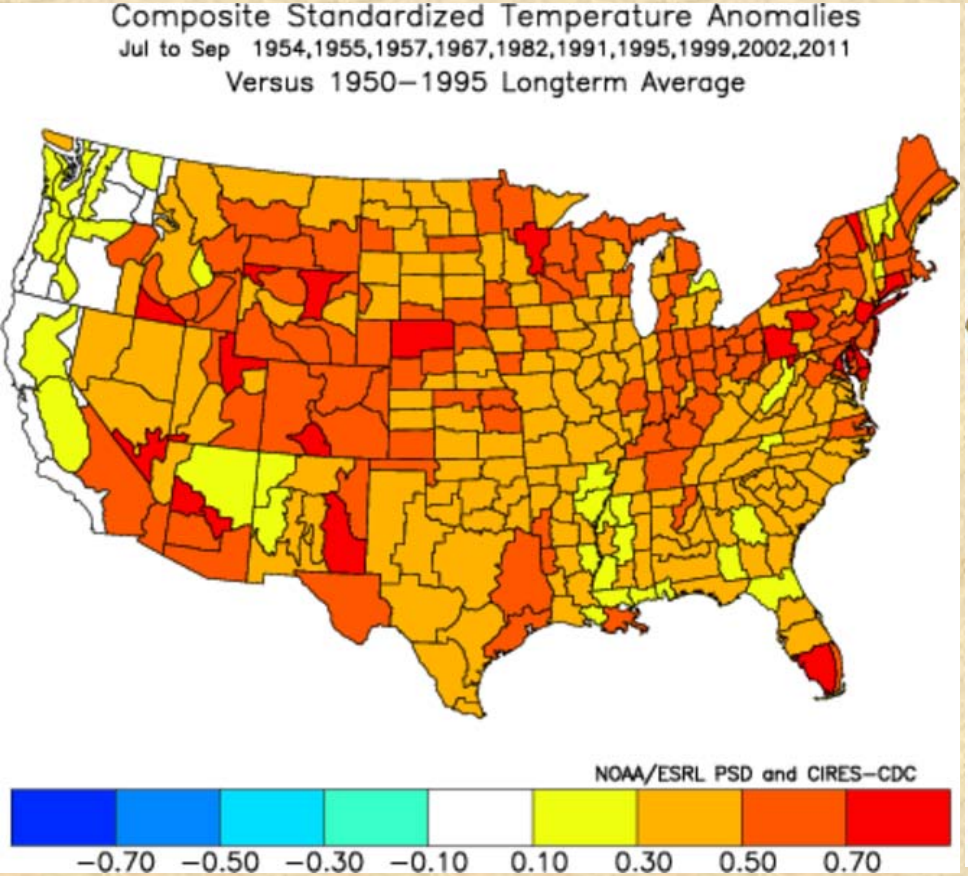


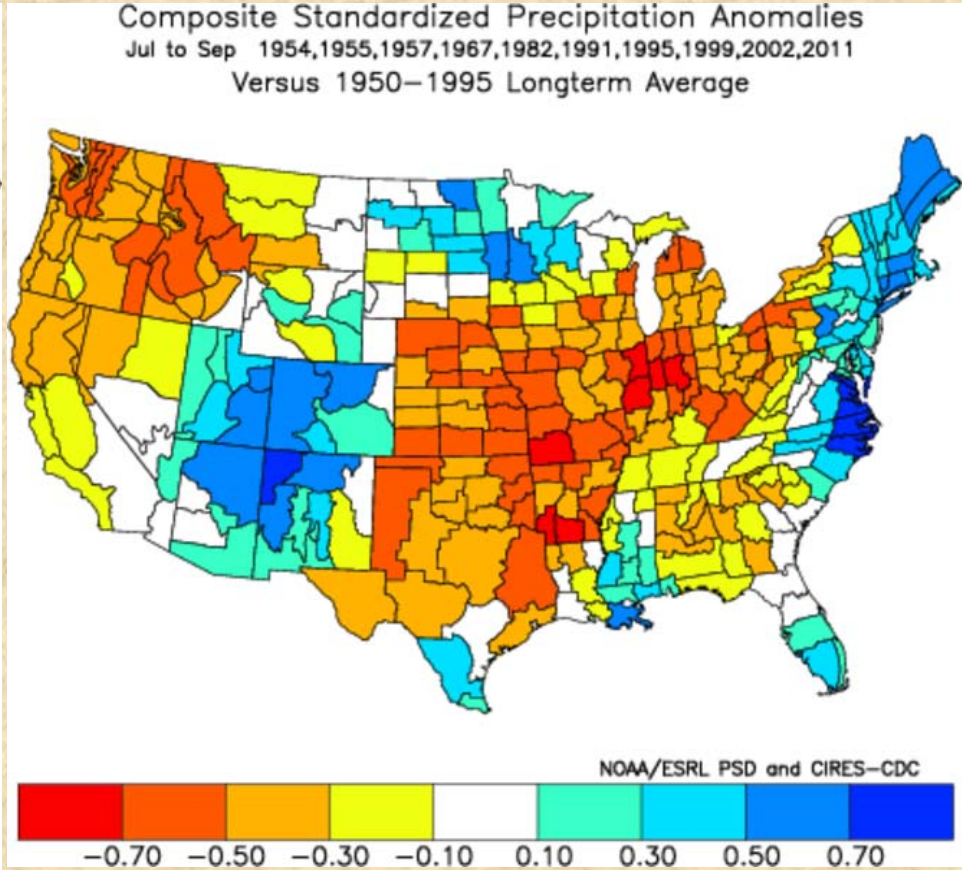




Northeast Colorado has the best chance of getting a decent monsoon season this year (in all 3 scenarios), while southern and western Colorado has a better chance of ending up near-normal.

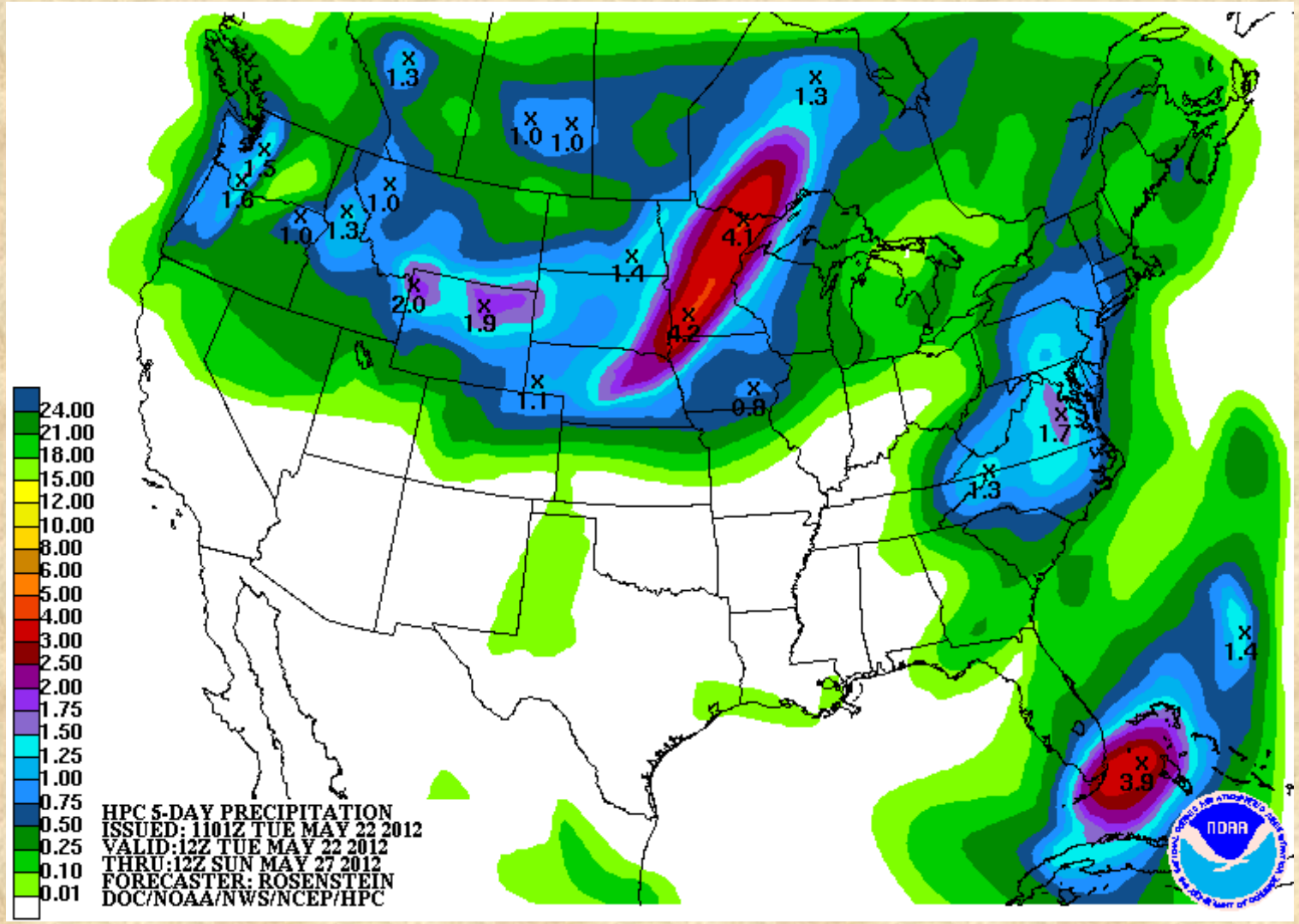
Other considerations - Warm Gulf of Mexico





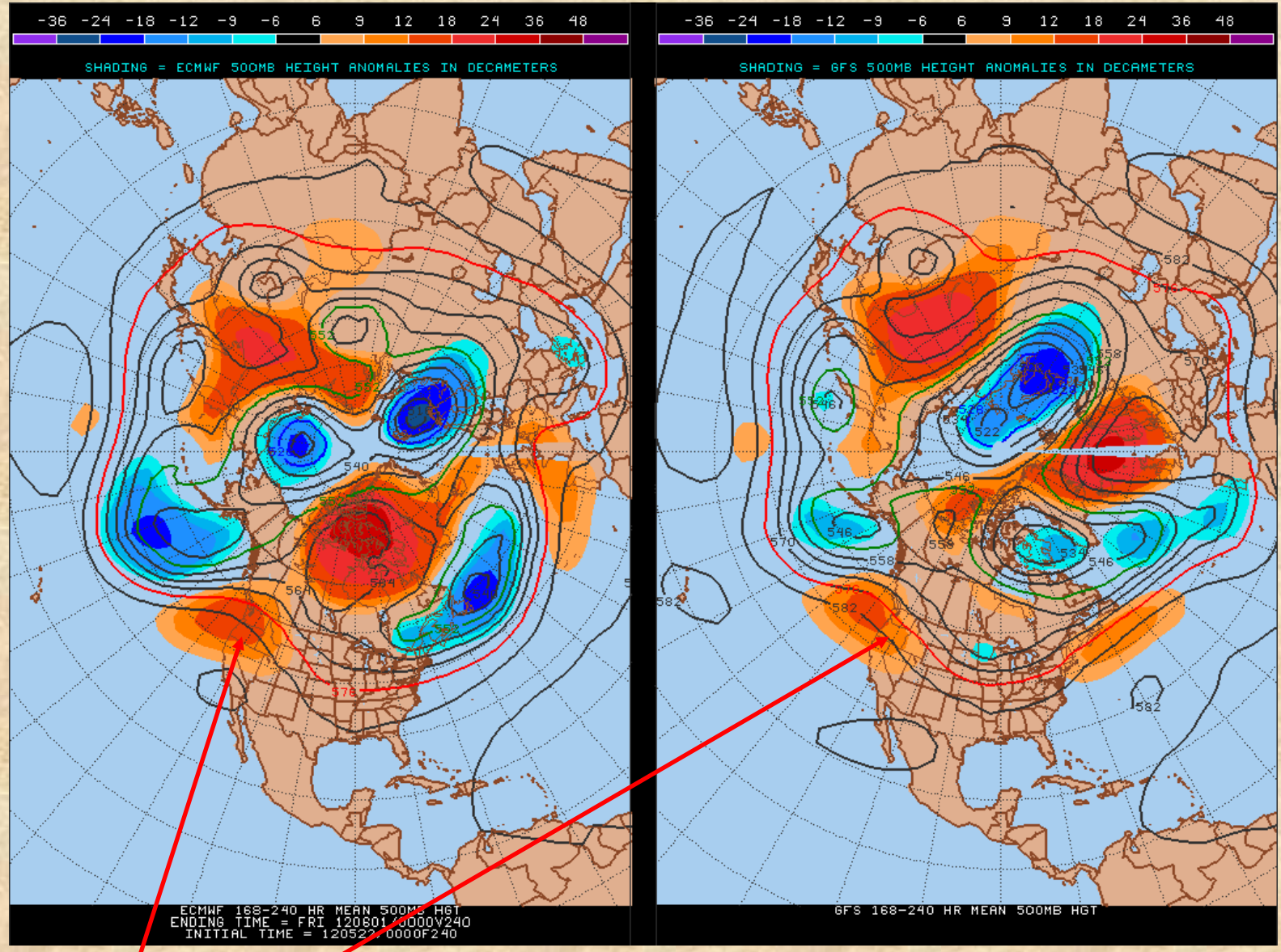
These are the composites for late summer (July-September) based on warm Gulf of Mexico SST in April (same as before). For Colorado, this would be a *warm and wet scenario* (realized last in 1999).

What can we expect in the next two weeks?



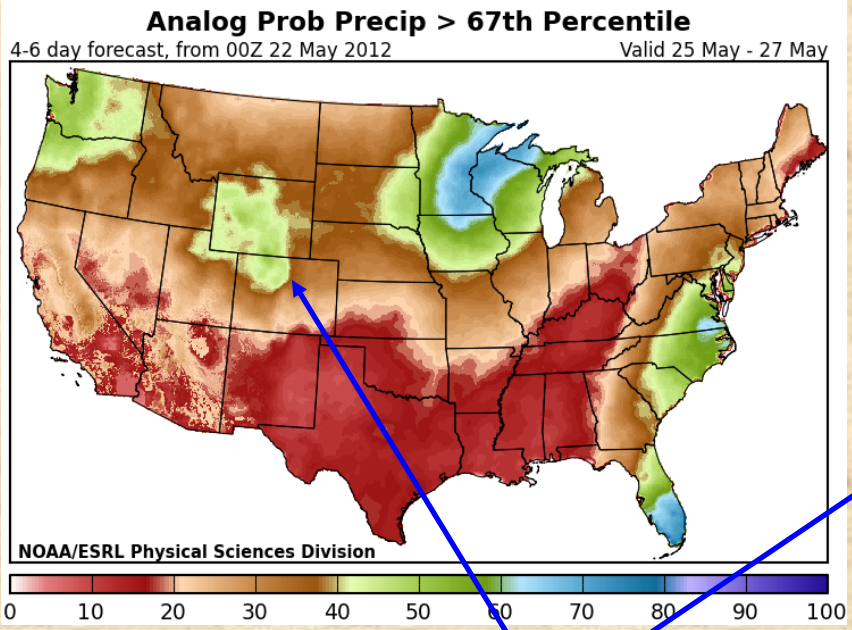
Expected total precipitation thru Sunday morning, according to the Hydrological Prediction Center (HPC): The northern Front Range may get decent moisture, with less drought relief further south and west (*actually, wide range of model outputs for this one*).

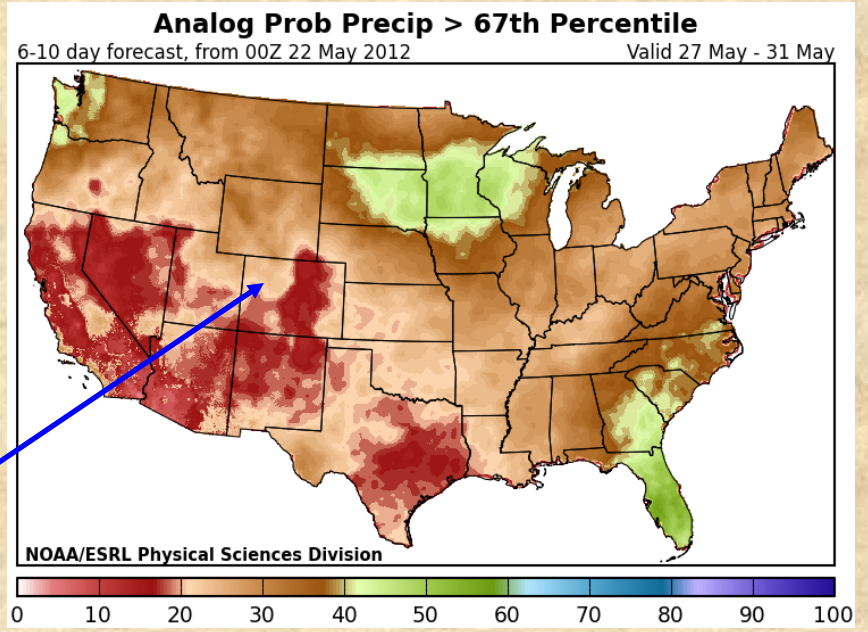
What can we expect next week?



Both ECMWF and GFS keep a developing ridge to our west 7-10 days from last night. This is a new development compared to the last few runs that were 'wetter'.

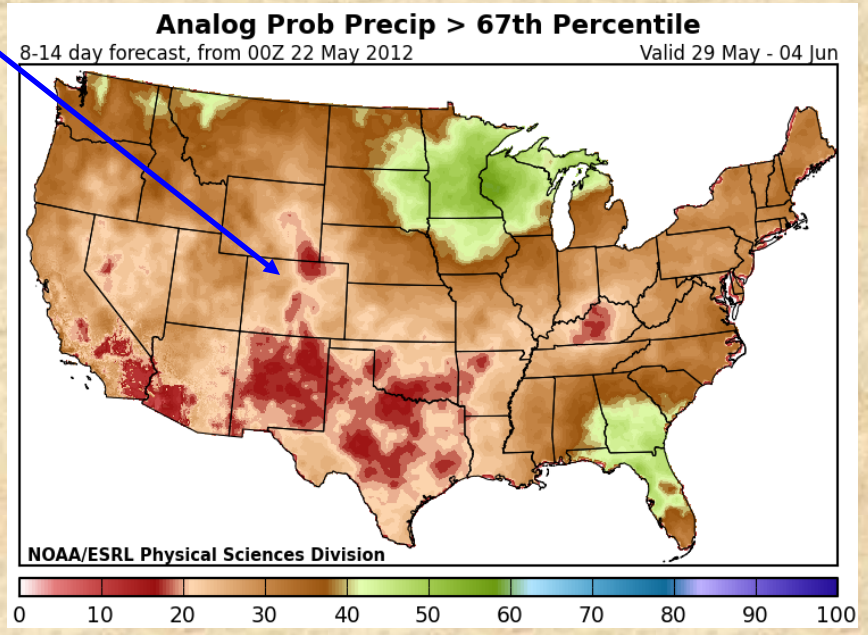
What can we expect next week?



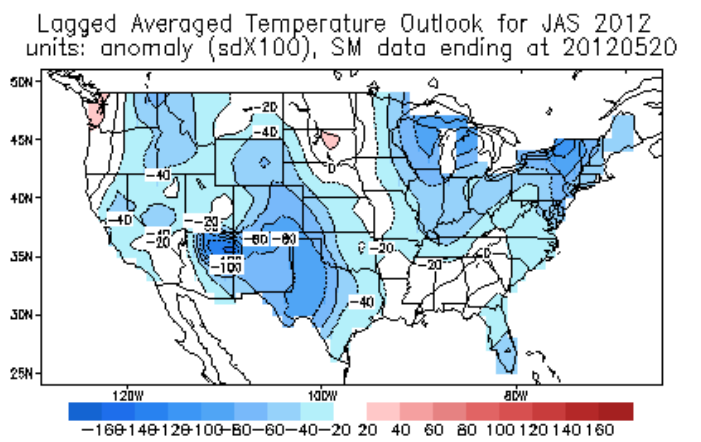


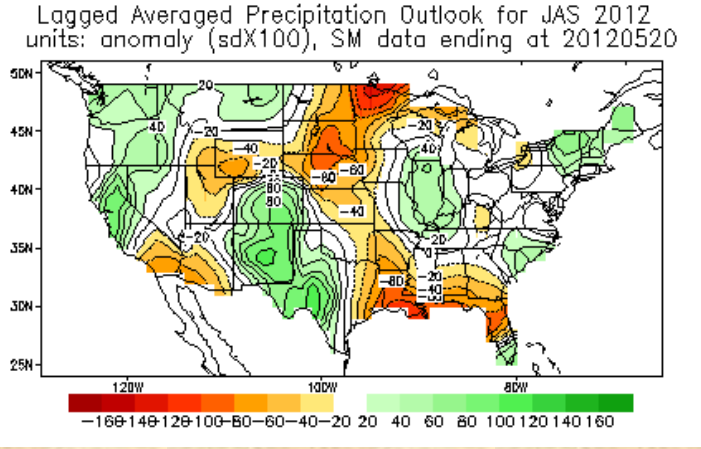
Precipitation chances for 4-6, 6-10, and 8-14 days from last night are 'decent' (near-normal for much of state, if not enhanced over NW Colorado) for the end of this week (top); suppressed for the rest of May (top right), and even into June (right).

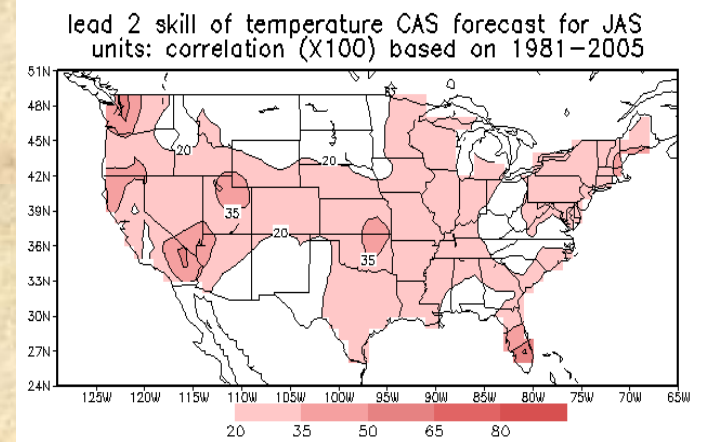
Temperatures are not expected to get much above normal in the next two weeks, the only piece of good news once we get through another unsettled weekend.

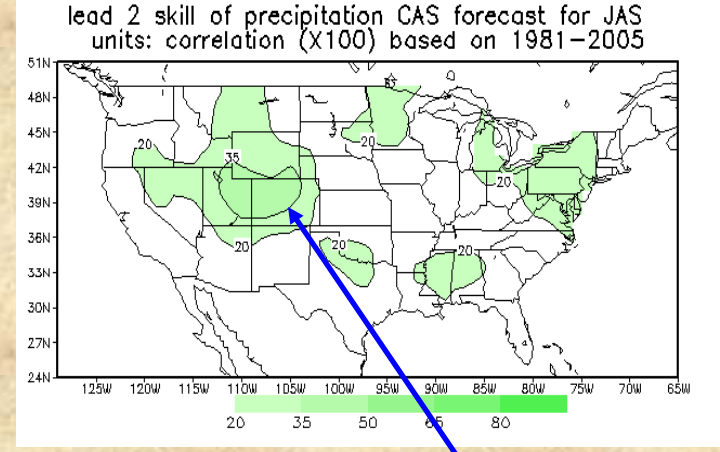


CPC-based forecasts: ‘Constructed Analog’





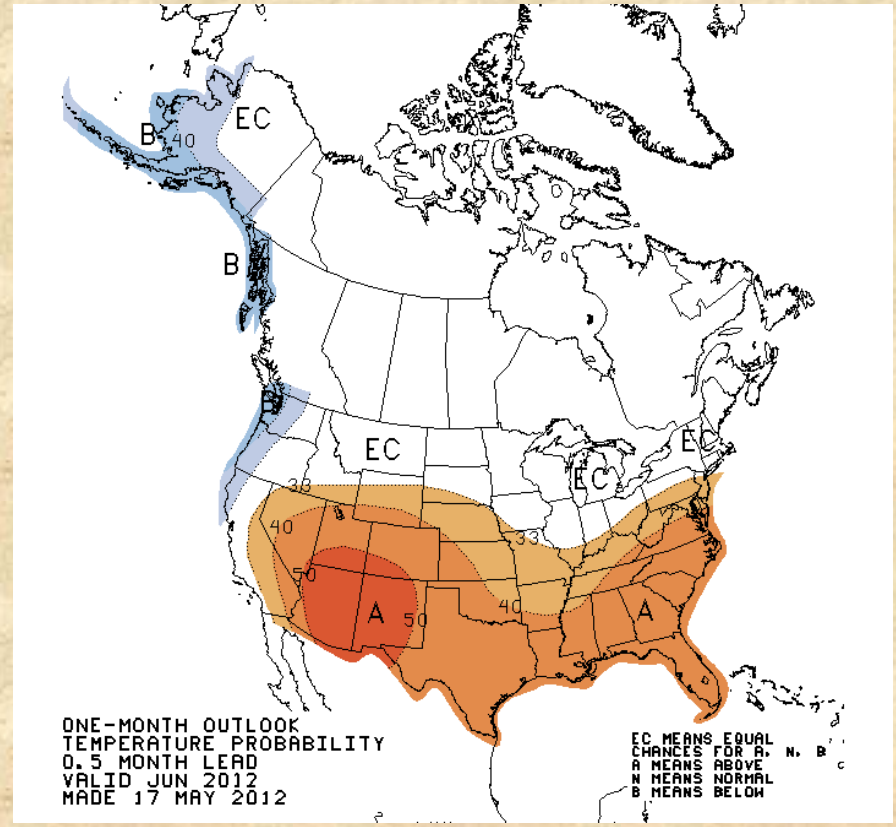


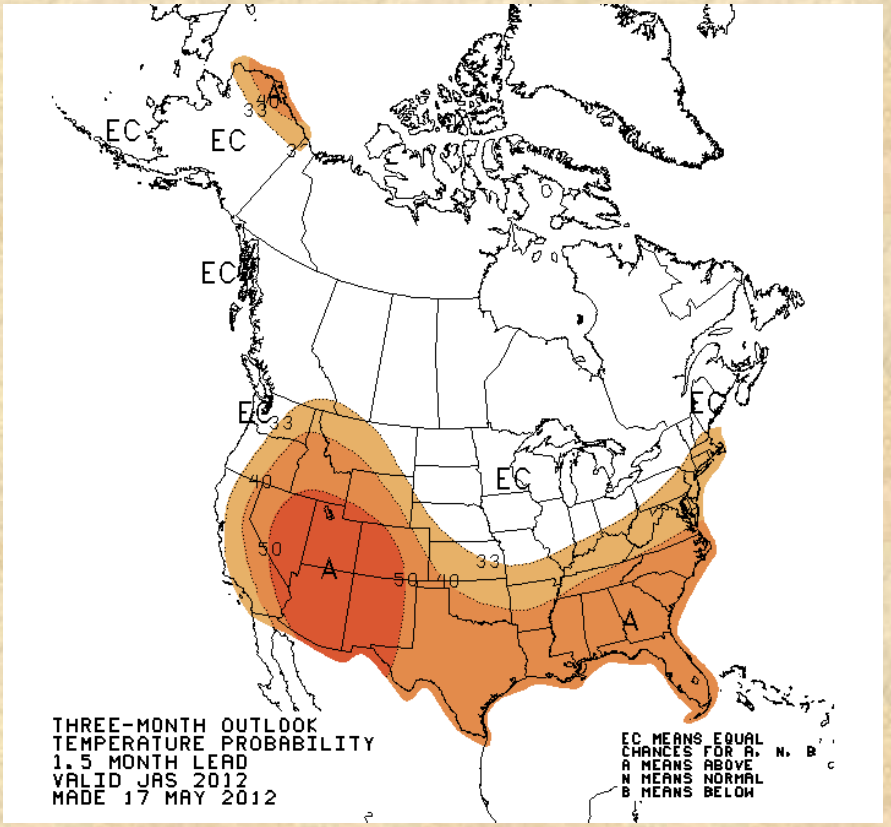


According to CPC’s soil-moisture analog forecast, Jul-Sep 2012 temperatures are more likely to be near-normal or even cool for much of the U.S., including Colorado (top left), along with a subnormal monsoon from AZ into UT vs. wet conditions from Colorado into western TX (bottom left). ***Skill at this lead-time (right) is claimed to be good for Colorado precipitation.***

Source: ***http://www.cpc.ncep.noaa.gov/soilmst/cas.shtml***

Climate Prediction Center Temperature Forecasts

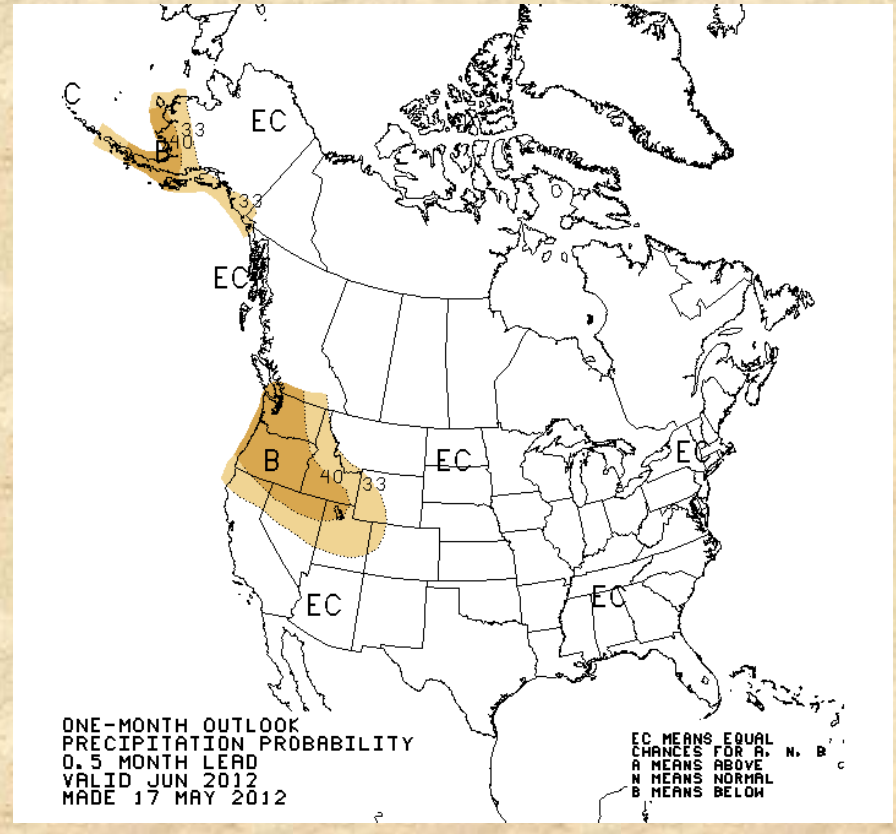


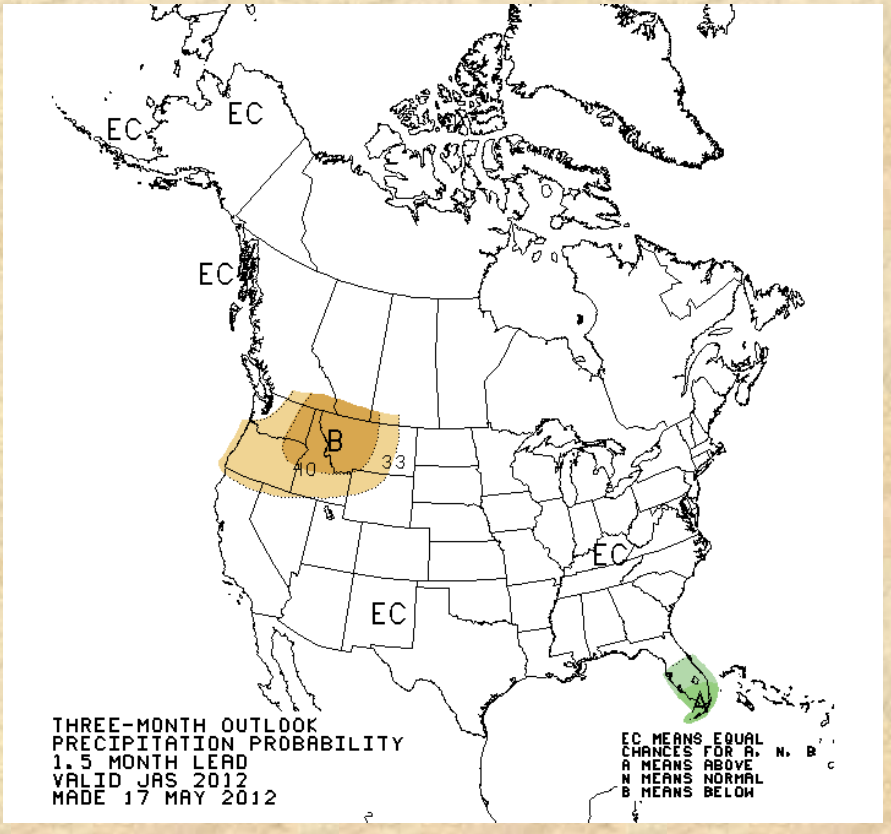


CPC's temperature forecast for June (left) and July-September (right) reflects recent warming trends – ENSO is not a factor anymore, nor is a potential El Niño assumed to 'kick in' before later this year.

Source: ***http://www.cpc.ncep.noaa.gov/products/predictions/***

Climate Prediction Center Precipitation Forecasts

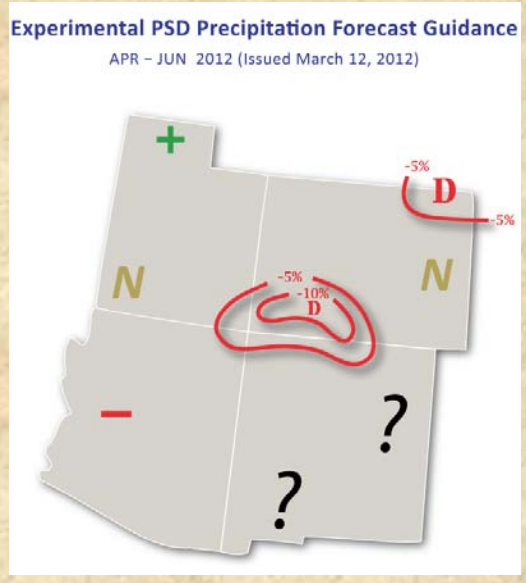


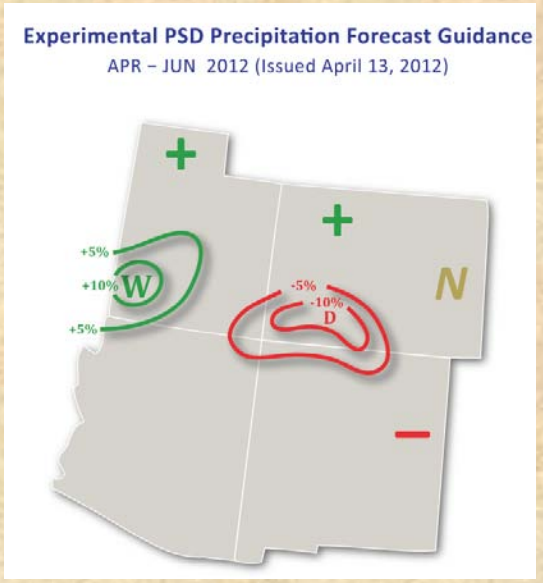


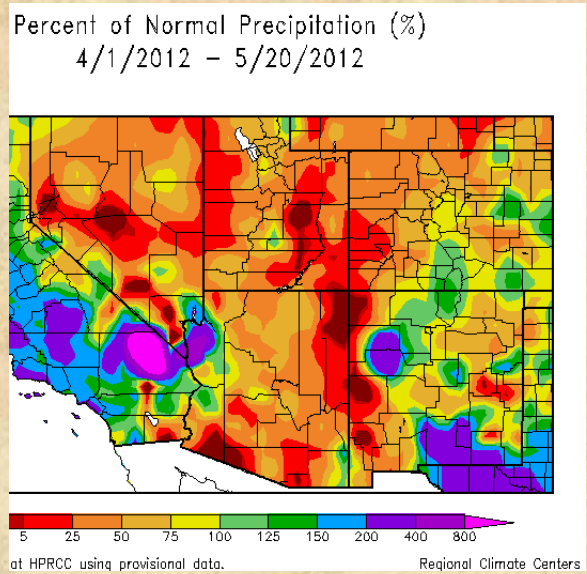
CPC's precipitation forecast for June (left) and July-September (right) reflect recent moisture trends. For Colorado, this leaves us with climatological odds ('EC').

Source: ***http://www.cpc.ncep.noaa.gov/products/predictions/***

Verification for April-June 2012



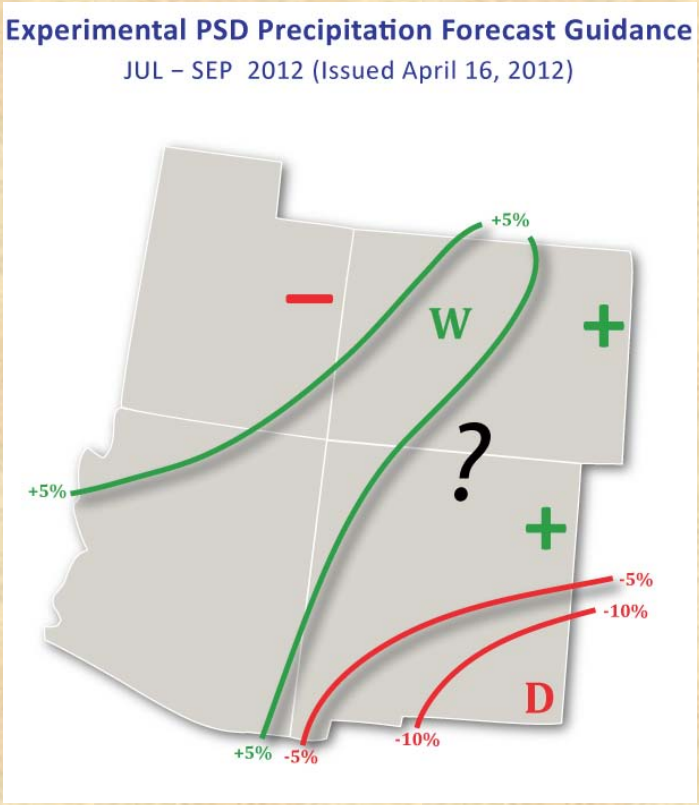


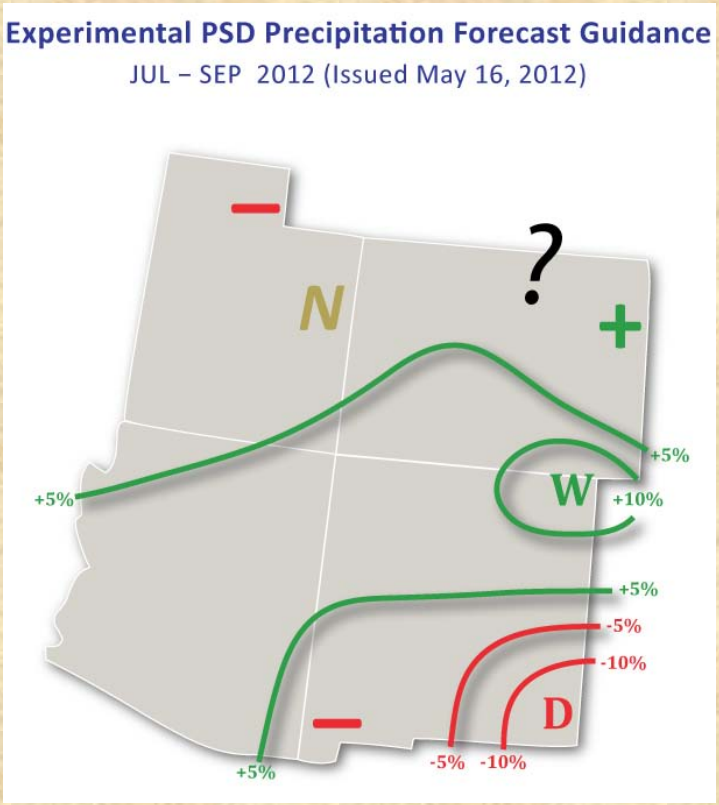


March's (left), and April's (center) forecasts for April-June 2011 were fairly confident that SW Colorado would see below-normal moisture. ***Historical skill since 2000 had been better over Utah and Colorado than over New Mexico.***

So far (right), moisture has been sparse from Arizona into Utah and Western Colorado, while much of New Mexico and eastern Colorado are doing o.k. – poor verification in NW Colorado, 'fine' for SW and E Colorado...

Statistical Forecast for July-September 2012





Last month's forecast for July-September 2012 (left) was optimistic from AZ into CO, and pessimistic for eastern UT and southern NM. The new forecast (right) remains guardedly optimistic for most of Colorado. *Operational skill has been best over UT, northwest and eastern Colorado, as well as from southwest to northeast NM. There has been little skill from AZ into southwest Colorado, as well as over southeast NM.*

Executive Summary (22 May 2012)

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1. **La Niña ended up weaker than last year, and did not leave all the typical footprints. For Colorado, an overall drier Water Year was correctly anticipated based on typical 2nd year La Niña outcomes. A full transition to El Niño is not expected this spring, but could occur later this summer.**

1. **A dry spring has been typical indeed for La Niña (and the stalled transition to El Niño). The next two weeks will continue to oscillate between warm and dry weather (today and later next week into early June) and near-normal moisture and temperatures later this week.**

1. **My forecast for late summer (July-September) shows a tilt towards wet conditions covering most of southern Colorado, near-normal moisture over the northwestern portion of our state, and a slight tilt towards wetness in northeast Colorado. If we were to see a transition to El Niño later this summer, it would still improve our chances for moisture statewide.**

2. **Bottomline: The 'Hail-Mary Pass' to a quick onset of El Niño did not work out in 2012. However, the consensus of the dynamical models is still that we will see an El Niño later this summer. If that were to occur, a return to La Niña could be ruled out for the upcoming winter. However, if we remain stuck in ENSO-neutral conditions through the summer, a return to La Niña would become increasingly likely. By late 2012, the difference for Colorado could be between an effective end to current drought conditions (El Niño) or worsening drought conditions (return to La Niña). By next month, I will put new odds on each of the three (E, N, L) scenarios for late 2012.**