NOAA-CIRES Climate Diagnostics Center

CO WATF
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Denver

Western Water Assessment

Seasonal Outlook through December 2009

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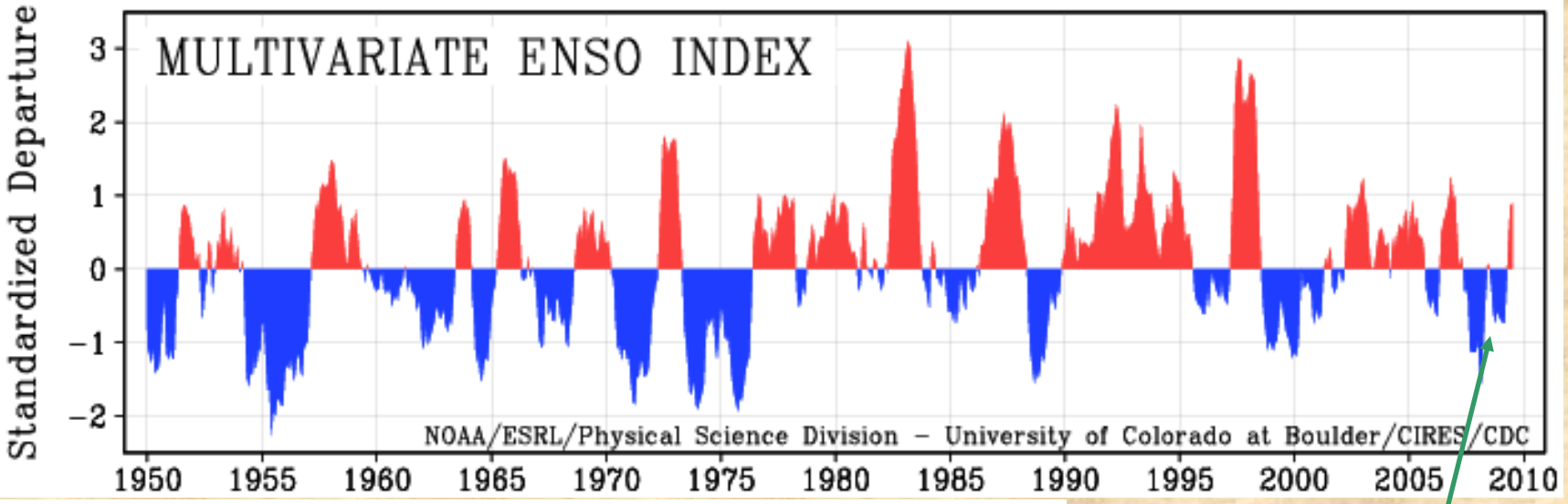
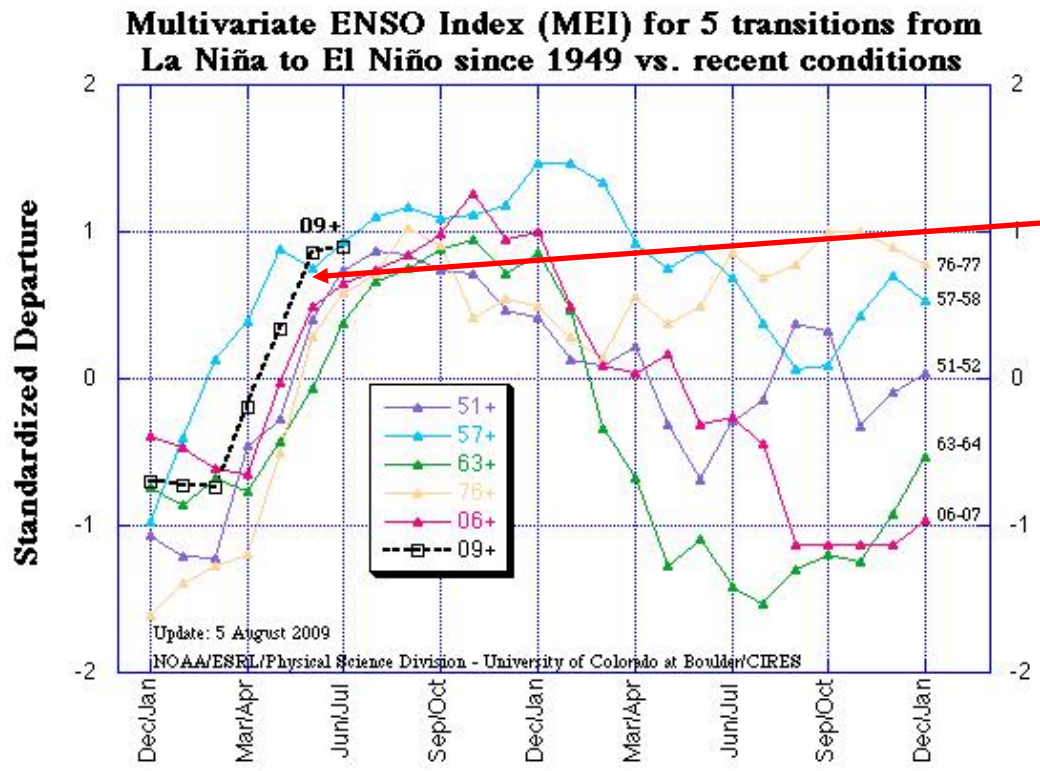
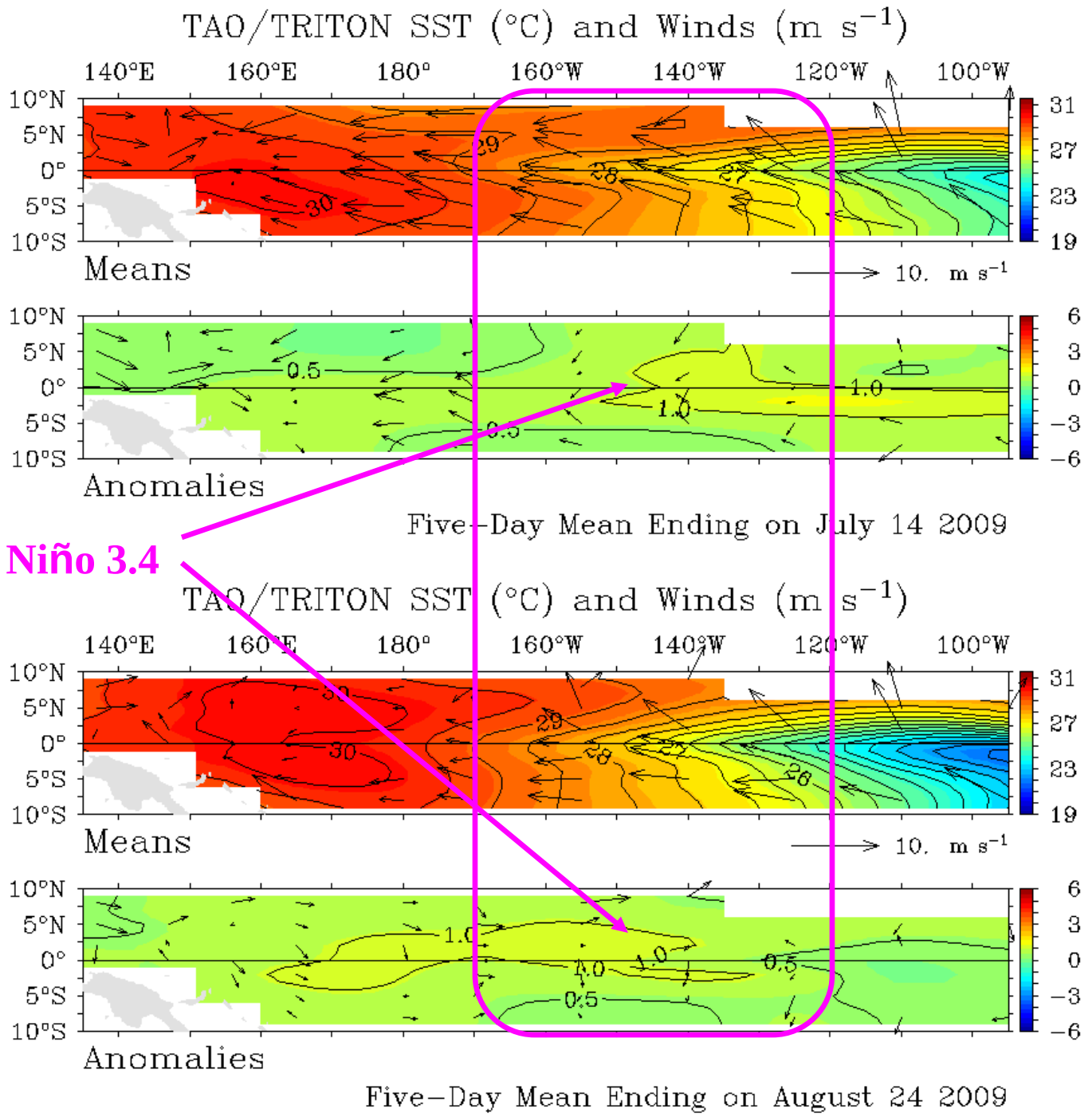
- **El Niño here to stay, at least for a few months**
- **Recent weather & expectations for next few weeks**
- **Updated El Niño-based composites into the winter**
- **Experimental Outlooks**
- **CPC forecasts for Sep-Dec ‘09**

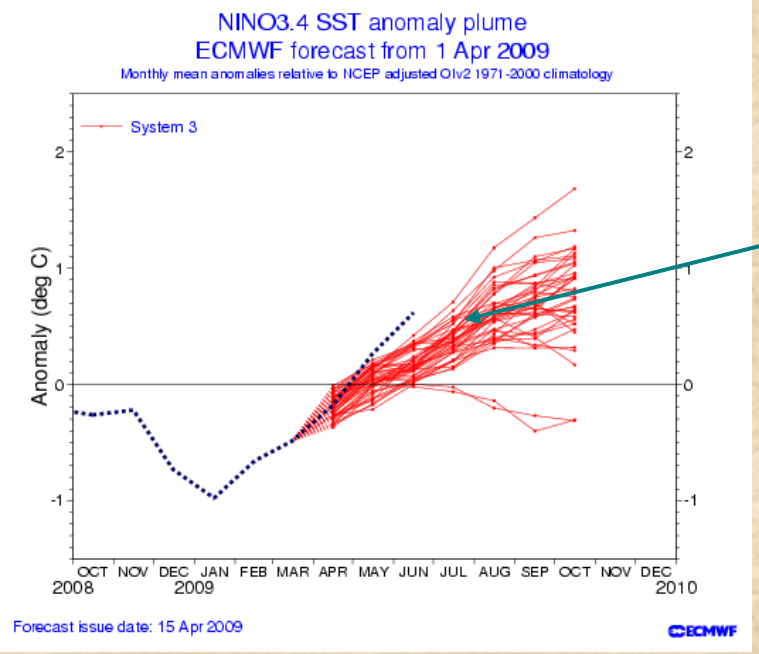




Good-bye La Niña, hello El Niño! While the last month has seen 'arrested development', we definitely witnessed a transition to El Niño conditions this spring, a tad earlier than in 2006 and 1976, the last two 'analog' cases.

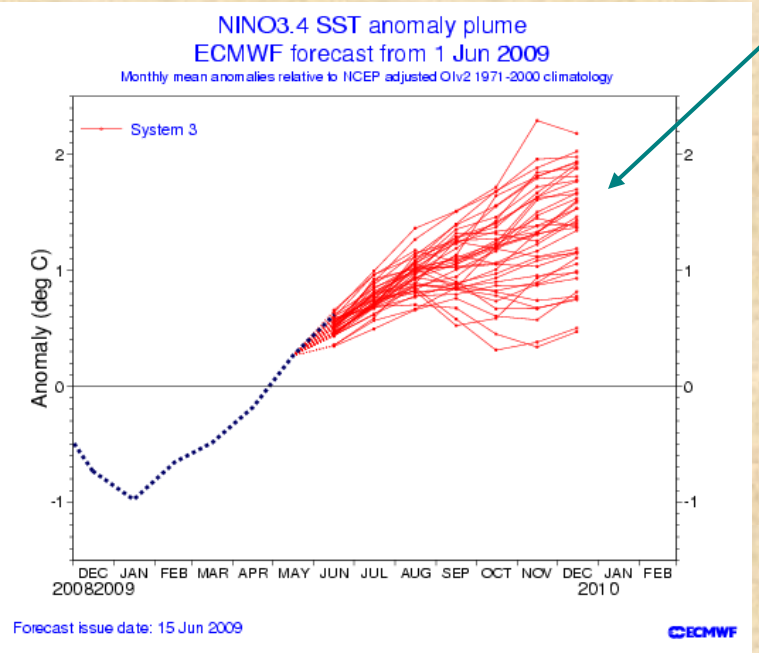
Current state of ENSO (bottom) compared to six weeks ago (top): warm-up has shifted from eastern (top) to central Pacific El Niño conditions (bottom)! Wind anomalies are weak, showing westerly anomalies near the dateline. No rapid changes are expected right now.



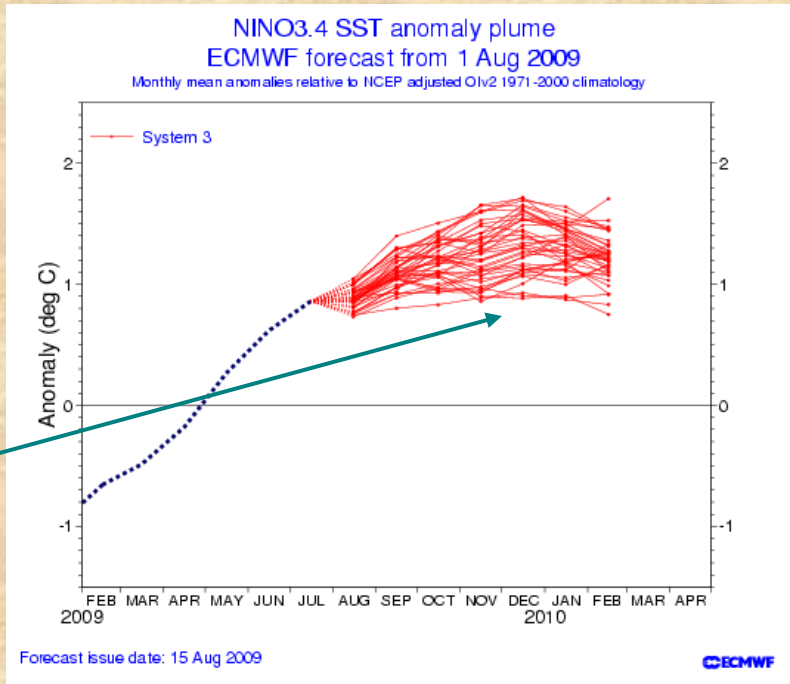


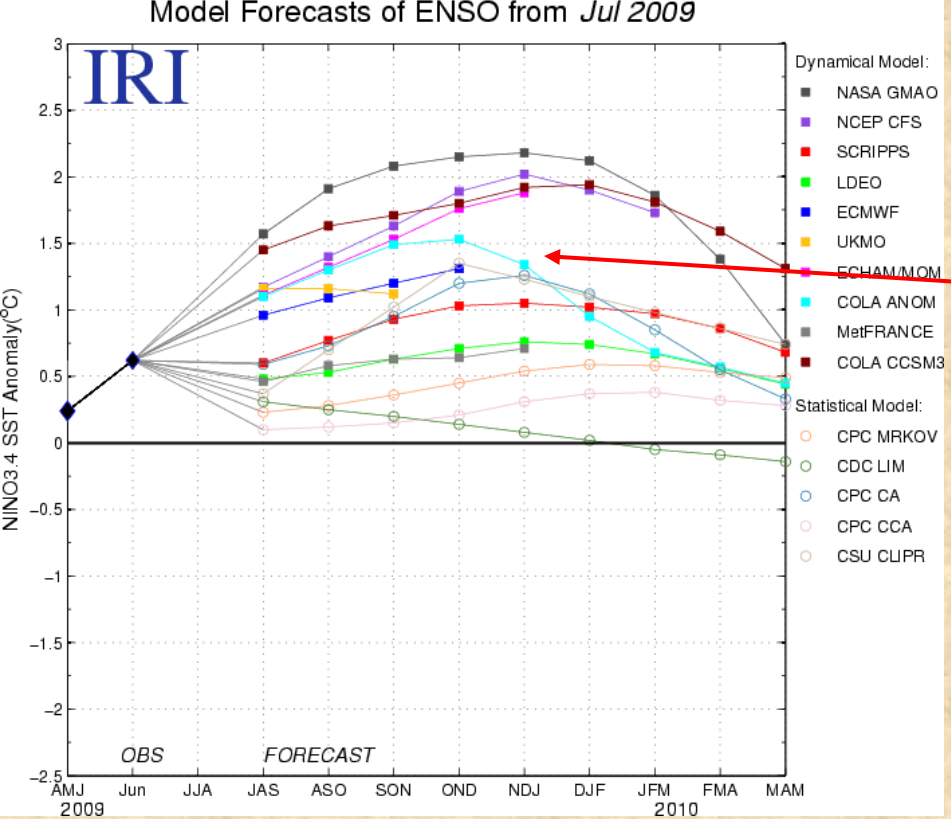
The European model's April '09 forecast (left) anticipated El Niño conditions by July, not bad, but a bit too conservative;

The forecast I showed last month went for continued growth into the winter season, with the potential for borderline strong El Niño conditions this winter;

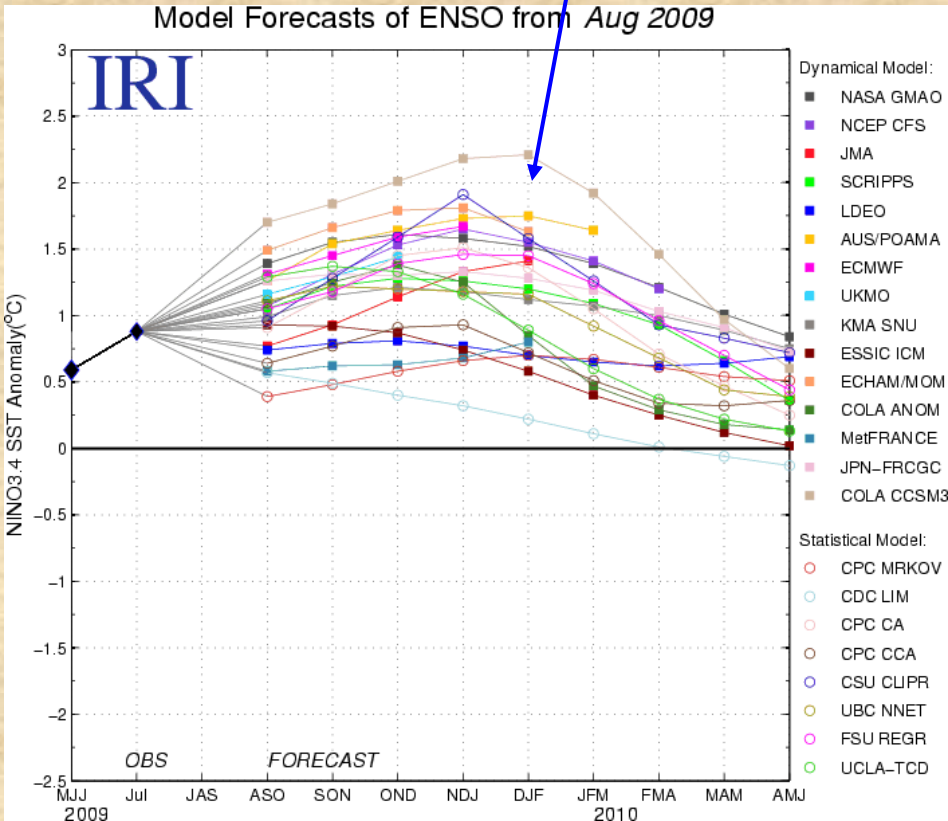


'Chastened' by recently stalled warming, the latest forecast maintains a moderate event into next year.



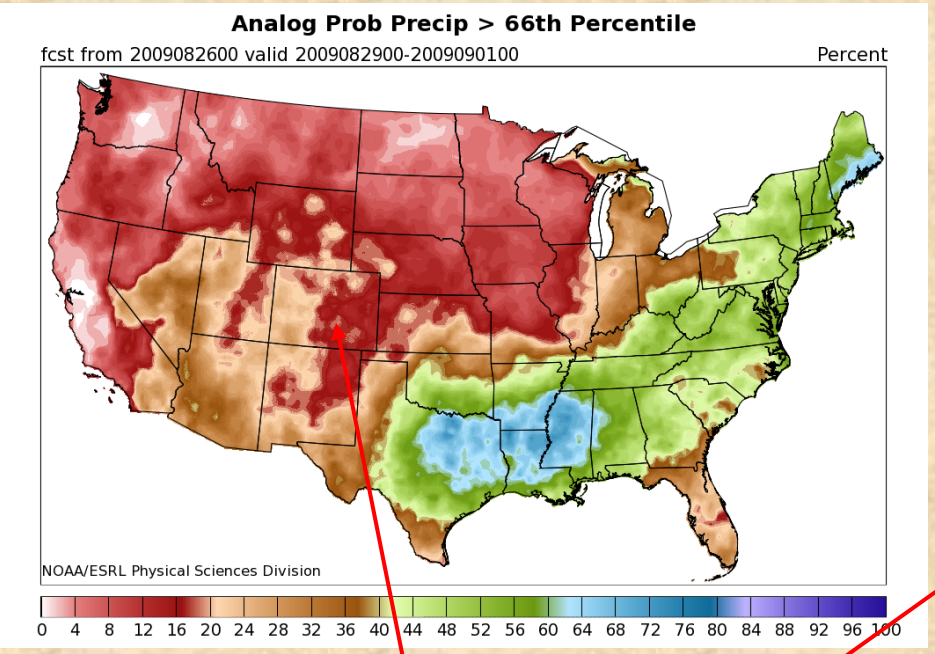


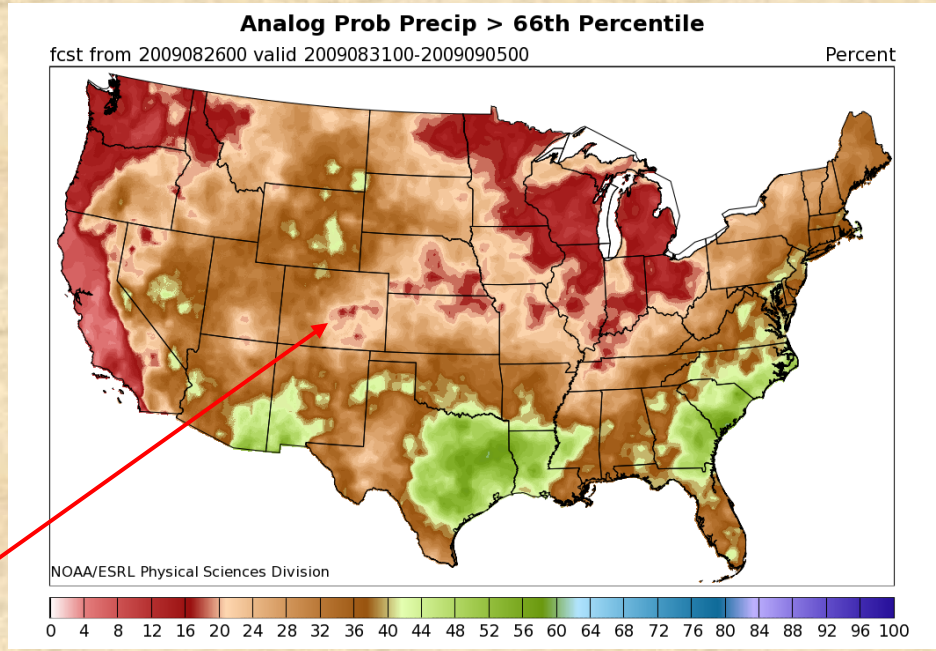
ENSO forecasts from almost two dozen dynamical & statistical forecast models (below) vs. last one I showed (left). Most models agreed on El Niño by last month, but the forecast range for this winter was still quite large (0 to +2C). The most recent forecast range remains quite large, but the difference between statistical and dynamical models has finally shrunk to 0.3C or less (first time this year).

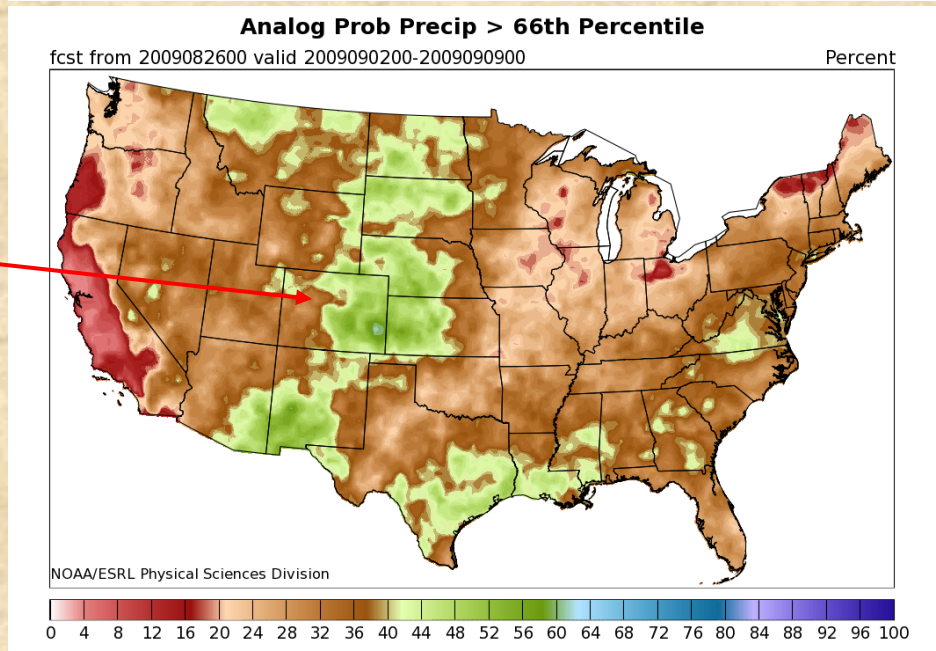


This El Niño will continue into the upcoming winter, but it could be an early 'peaker', and it may remain only weak-to-moderate over the next six months. Meanwhile, the PDO has moderated to just below 0 in June&July, in stark contrast to last year's strongly negative run through the ENSO-neutral summer. It may have reverted to a more passive role this winter.

What can we expect in the next two weeks?

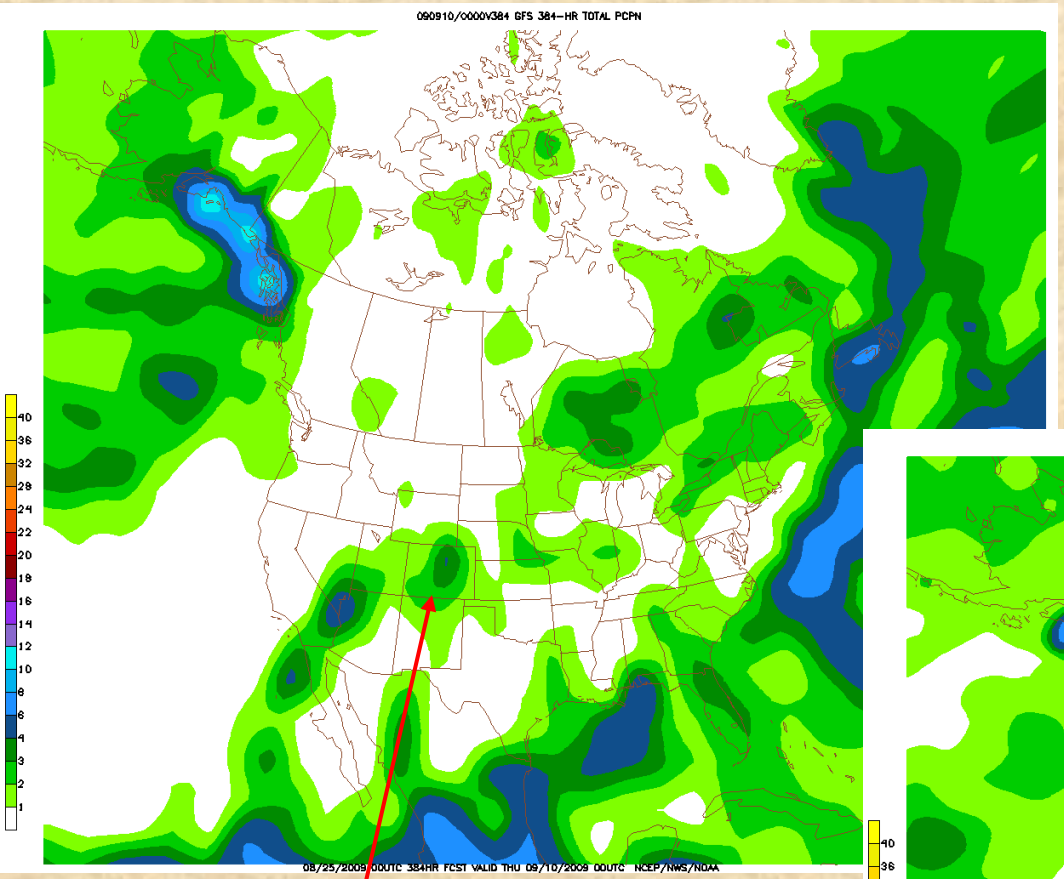




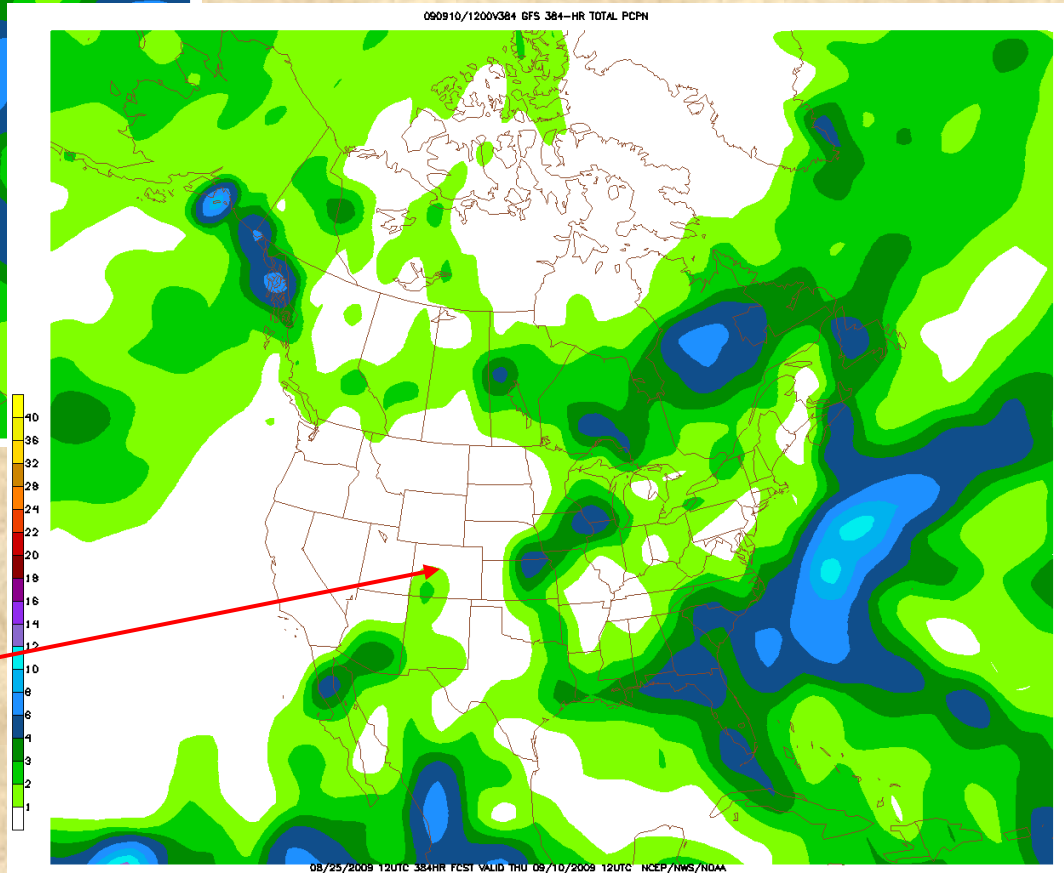


Rainfall chances for 4-6, 6-10, and 8-14 days from today start out with a subdued monsoonal pattern west of the Divide, but increase to above-normal odds east of the Divide by Week 2. While the monsoon is currently 'sputtering', these maps indicate that it will come back by early September, especially for eastern Colorado.

What can we expect in the next two weeks?

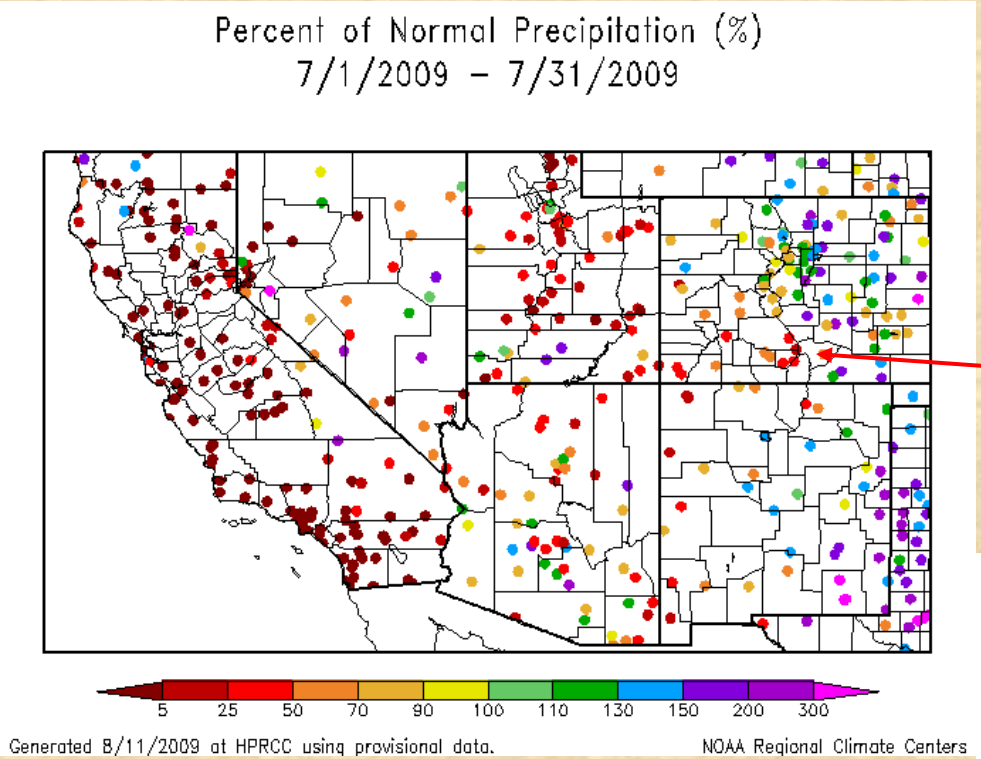


Tuesday evening runs: still mostly dry for Colorado for the next two weeks (<1")

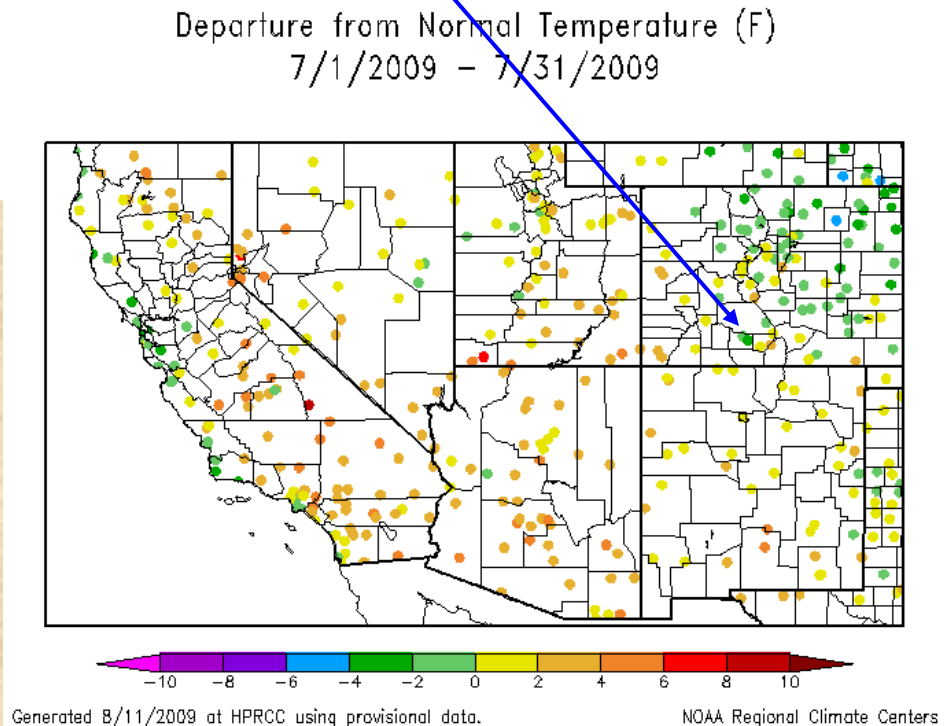


<u>Monday night's</u> GFS precipitation total for next two weeks (top) vs. <u>Tuesday morning's</u> (top right): Front Range deluge (3-4"+) vs. dry (<1") separated by 12h forecast time - is Mother Nature (i.e., Lucy) going to yank the ball yet again from us (Charlie Brown)?!

What has happened since July 1st?

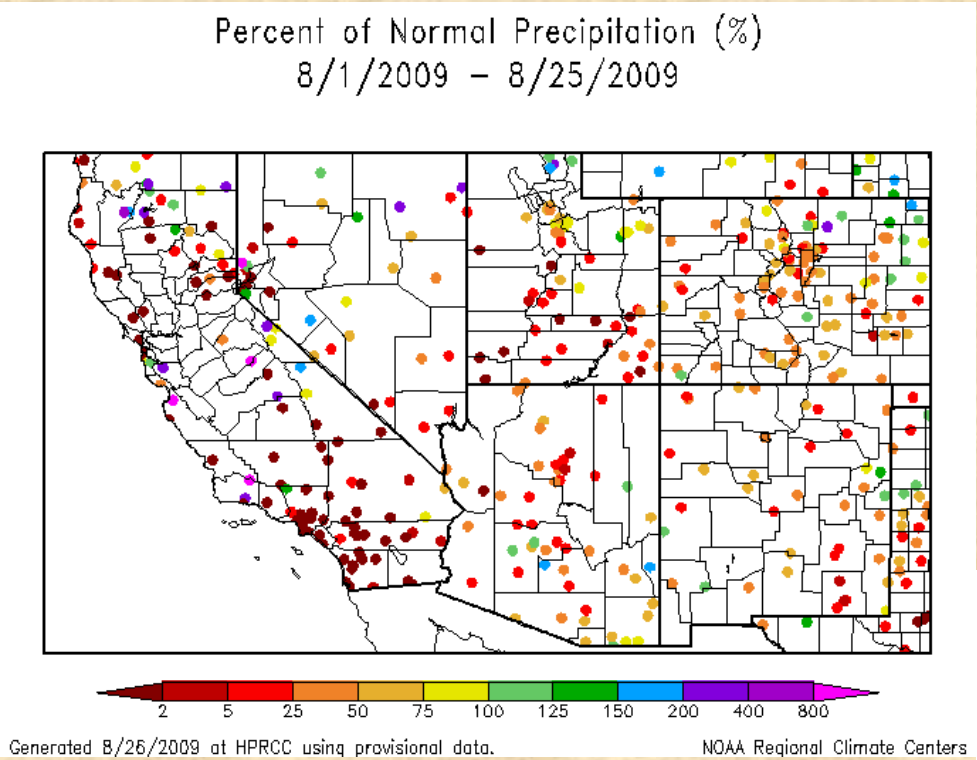


July brought above-average moisture to the eastern plains (left), while temperatures remained on the cool side (below). (South-)western Colorado ended up drier and slightly warmer than normal. There was a transition zone with dry but cool conditions that kept the water balance more favorable than otherwise.



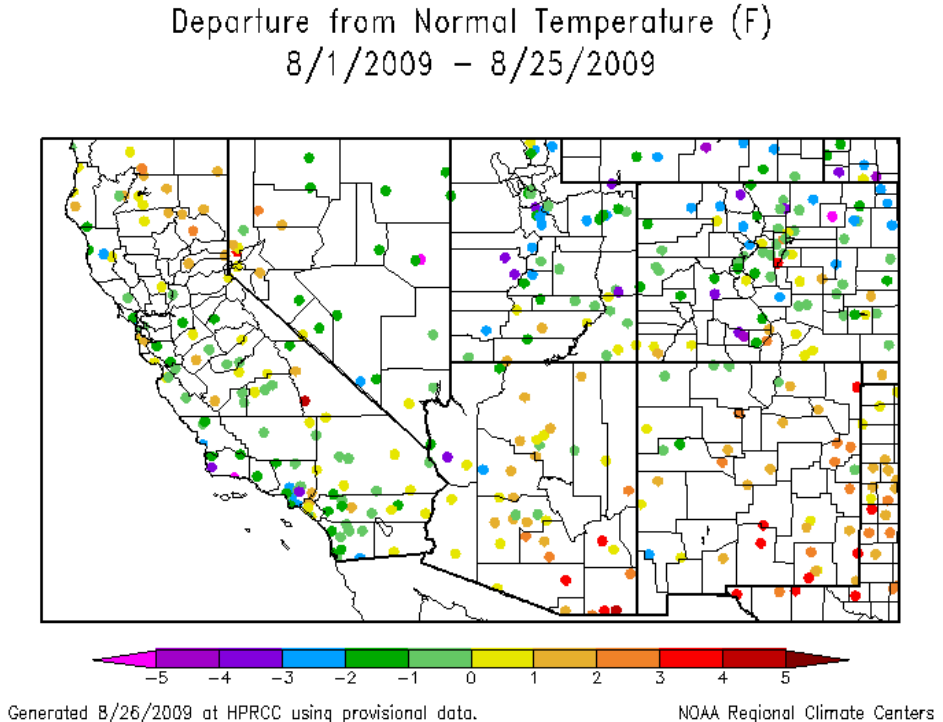
El Niño and our monsoon slowed down in July…

What has happened since August 1st?

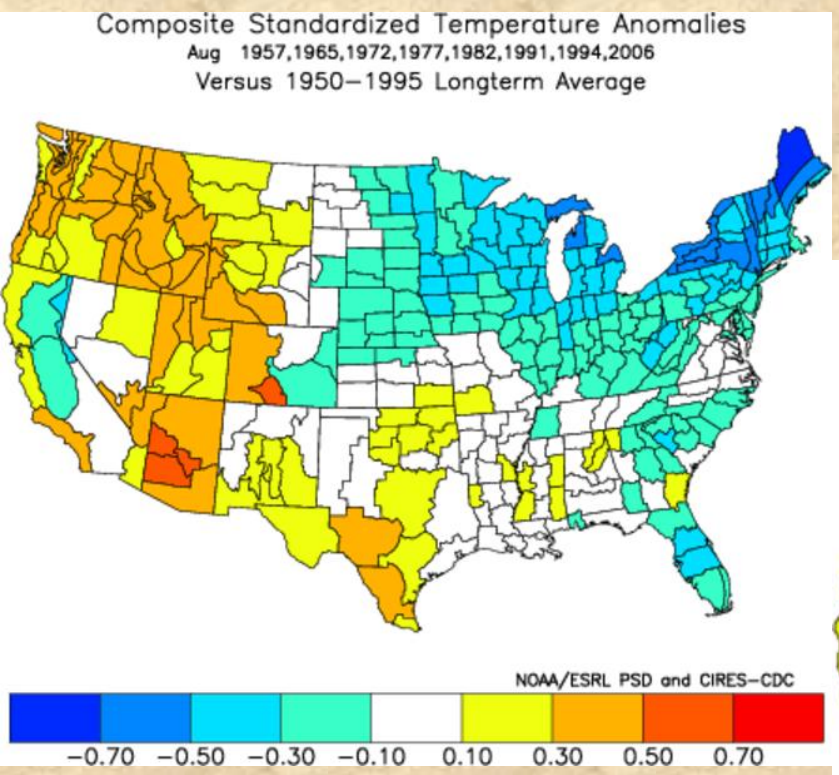


August has been a lot drier than July in most of Colorado (except for some stations in the northeastern plains). Temperatures have remained mostly on the cool side, which has been the saving grace this summer. ***On a national scale, this cool summer may be linked to both El Niño and a couple of 'upstream' volcano eruptions earlier this year.***

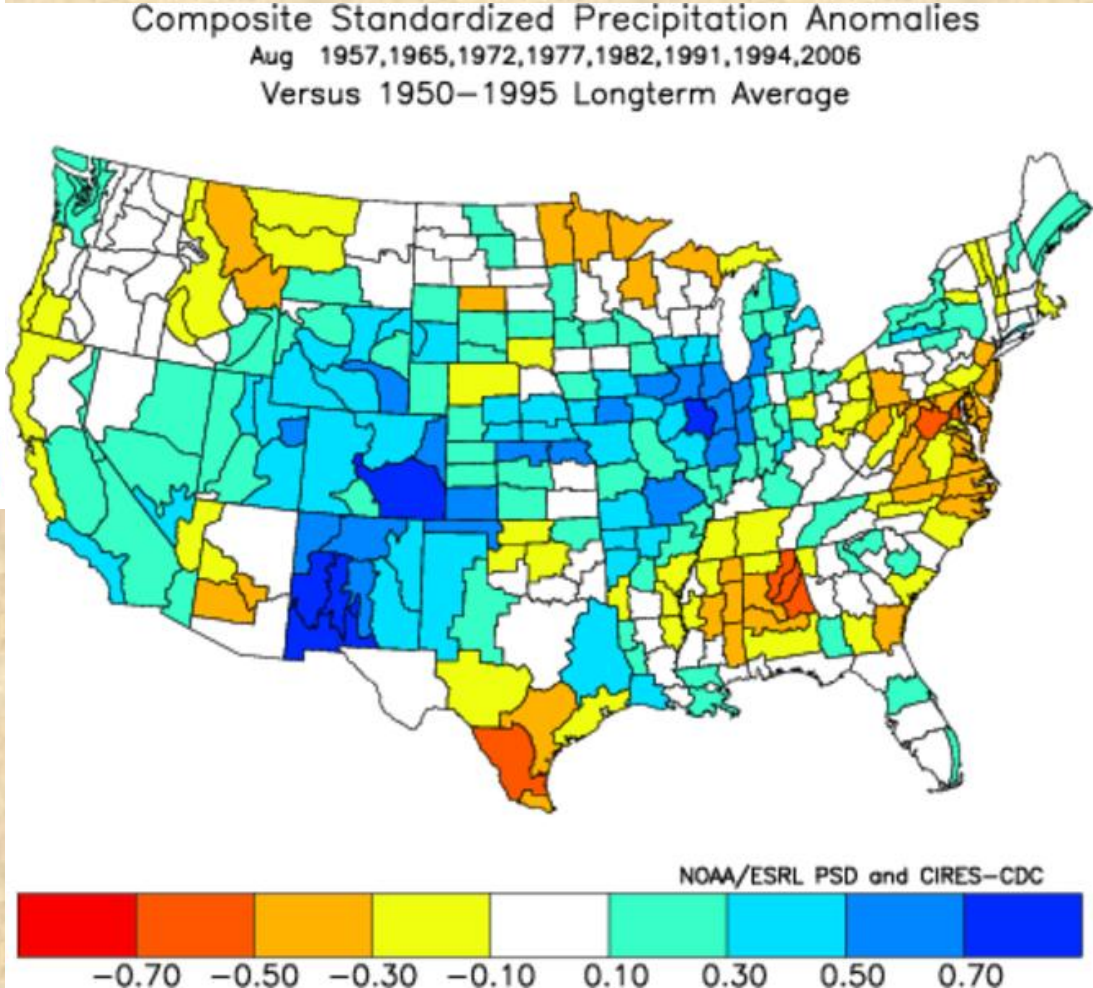
El Niño has not delivered the expected moisture in August (see next page) either…



What are typical temp&precip patterns in August with El Niño onset conditions (same as last month)?



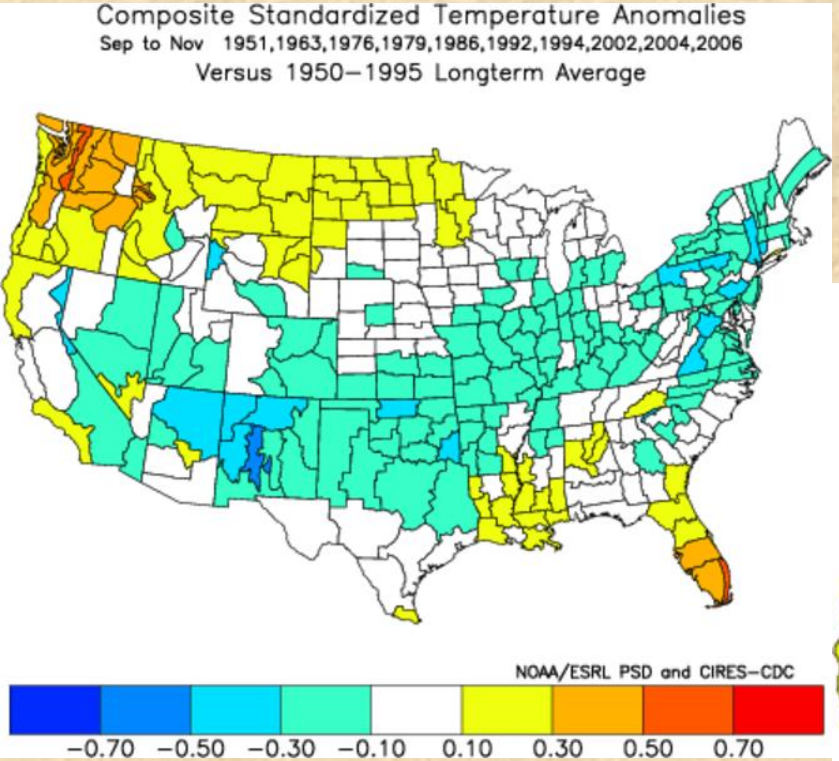
Mostly warmer to our west (left), with only a slight tilt towards cold east of the Divide.



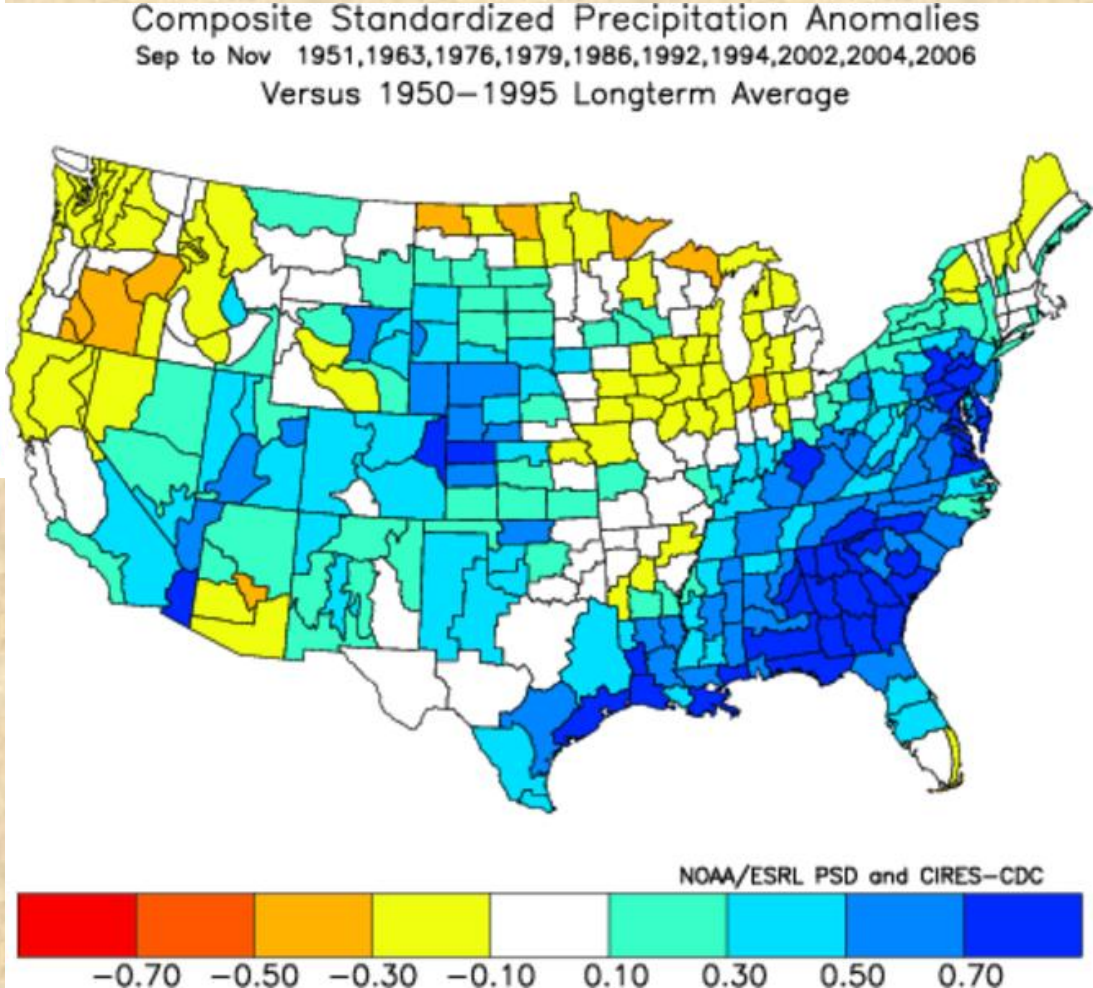
Significant wet precipitation anomalies (right) from New Mexico right into eastern Colorado - El Niño enhances our monsoon, while leaving Arizona dry and hot.

August 2009 appears to have flipped T & P anomaly patterns…

What are typical temp&precip patterns in the fall with moderate El Niño conditions?

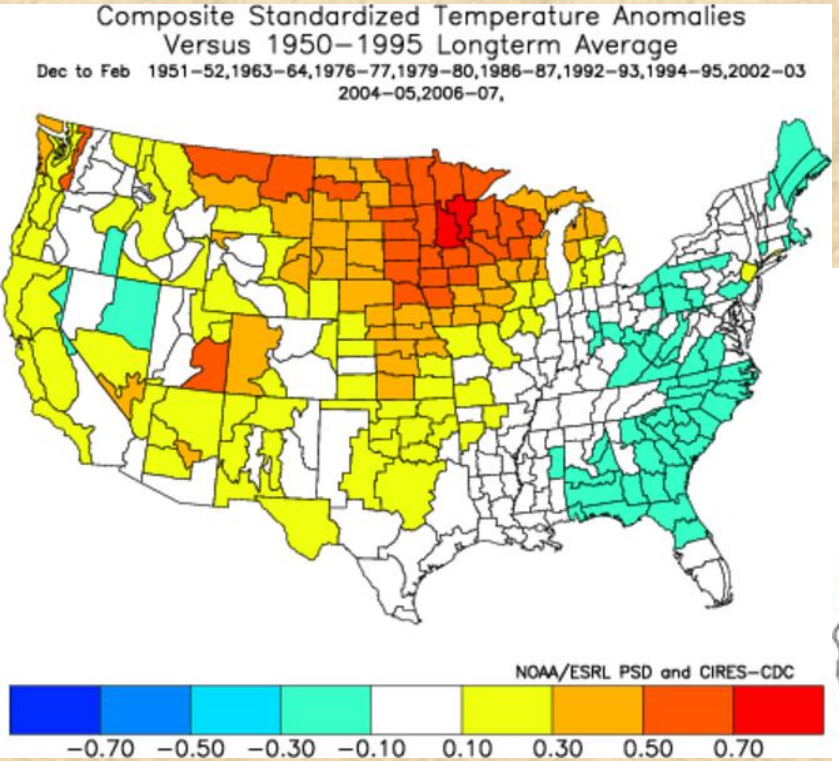


Near-normal or slightly cooler than average in Colorado and surrounding states (left).

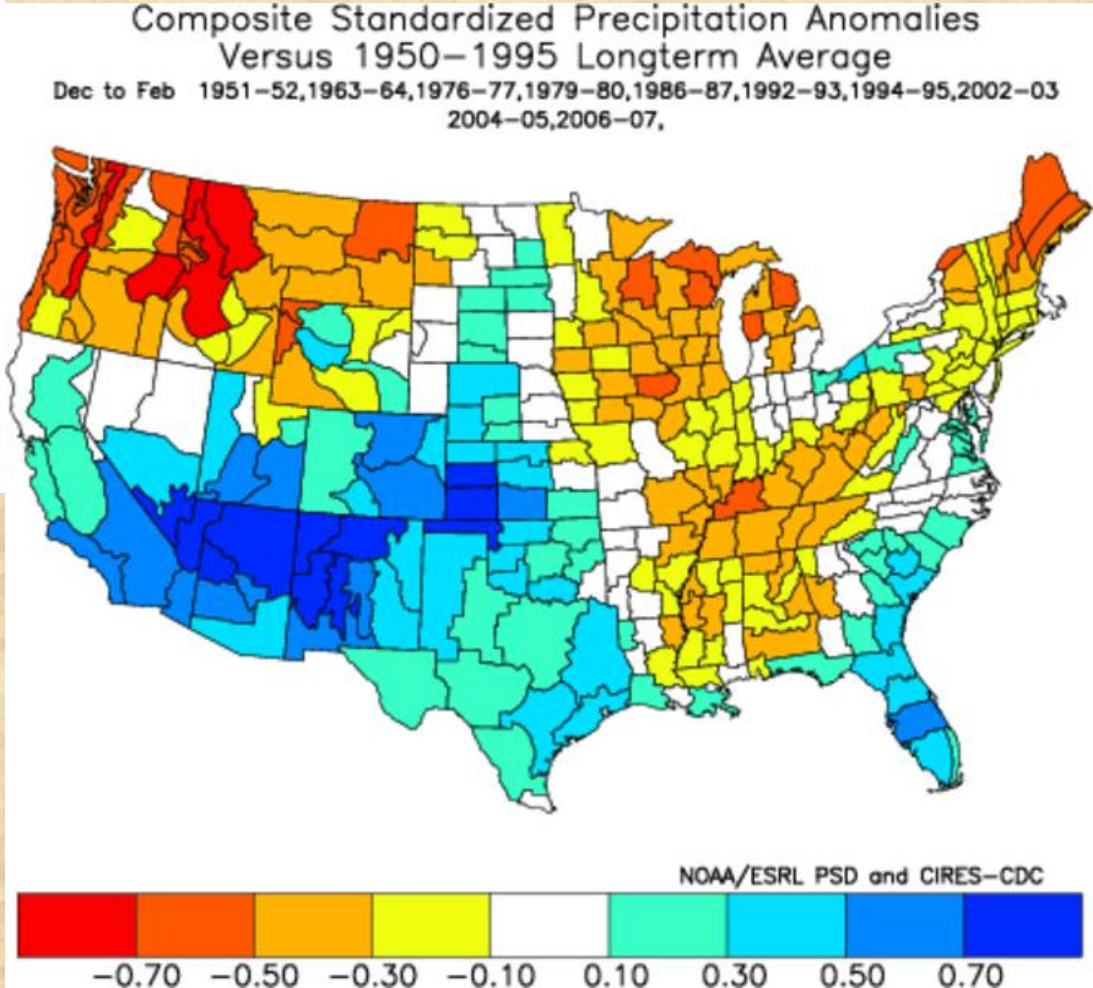


On average, wet precipitation anomalies (right) from Utah across Colorado, wettest to our east. In the recent decade, this pattern was anchored by wet El Niño Octobers.

What are typical temp&precip patterns in the winter with moderate El Niño conditions?

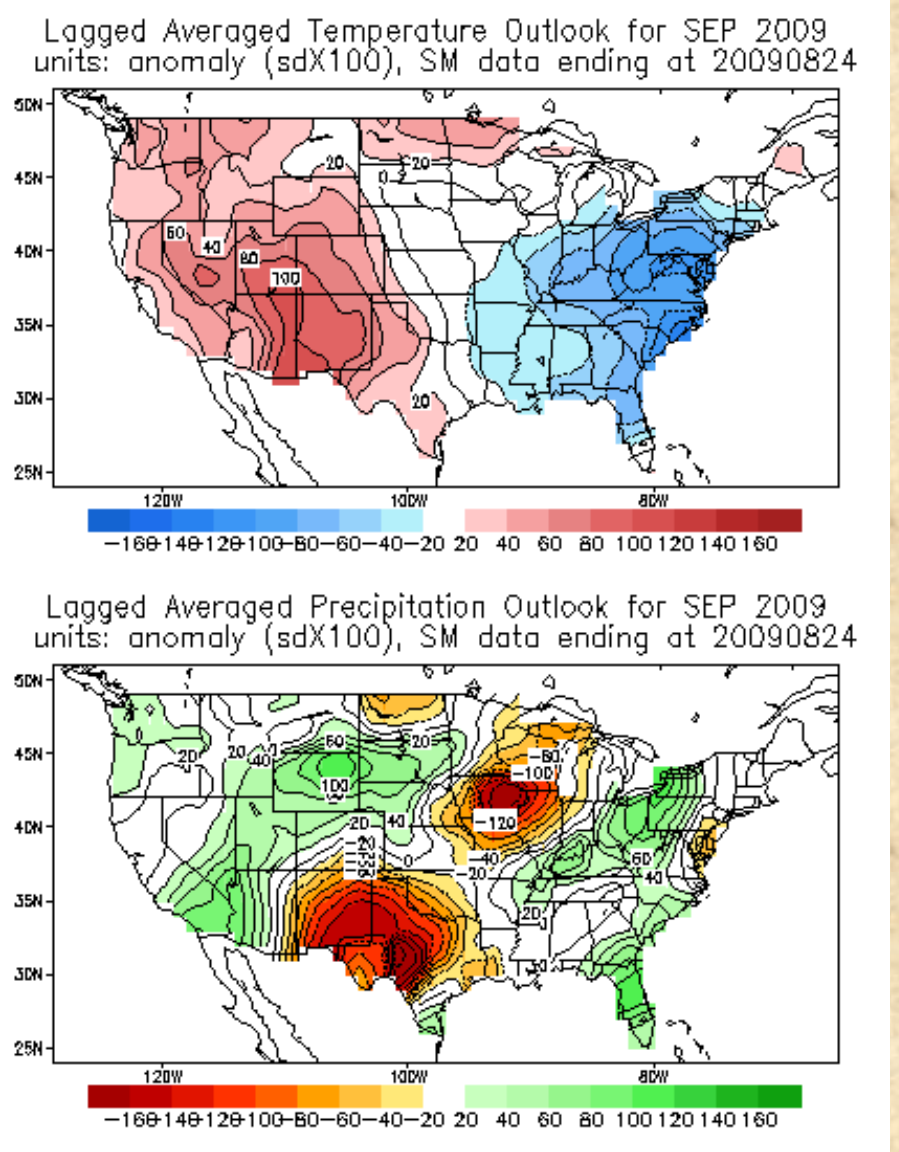


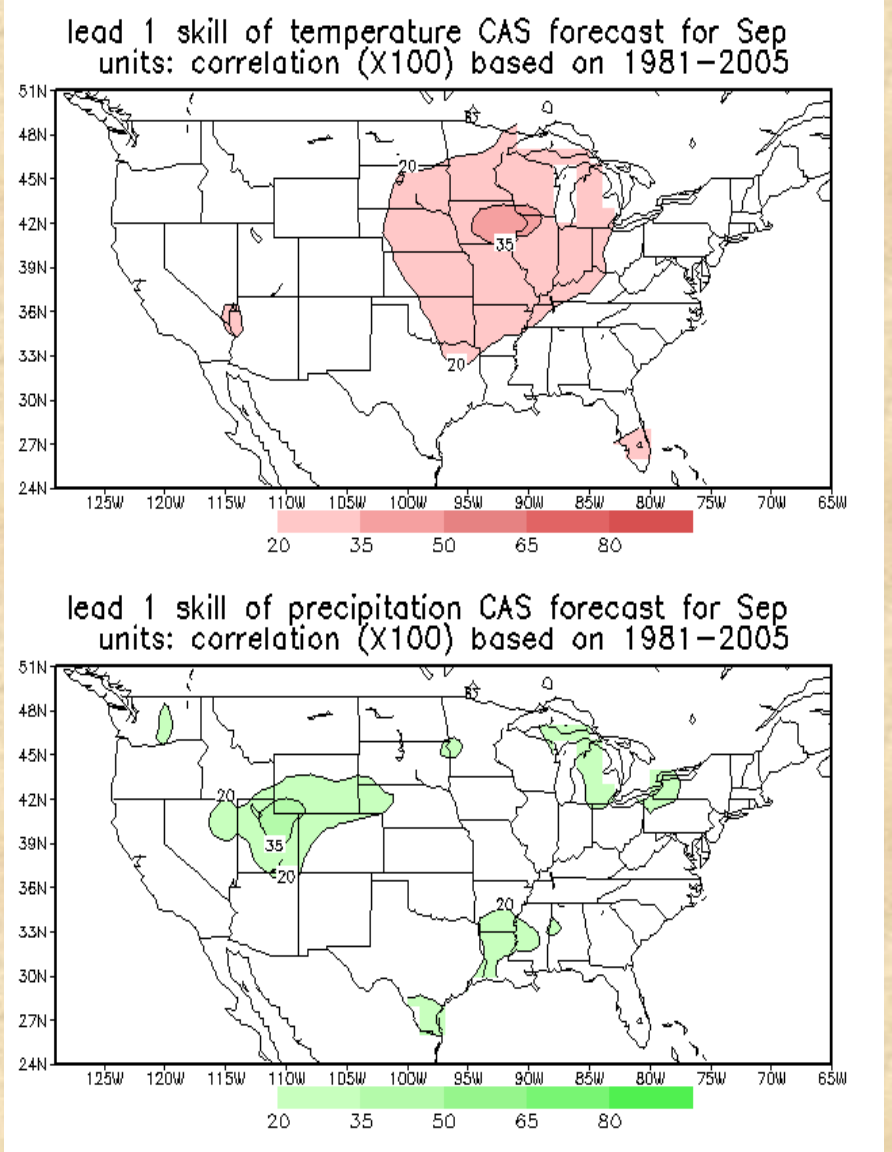
Near-normal on the eastern plains to warmer than average in Western Colorado and most of the surrounding states (left).



On average, wet precipitation anomalies (right) near the Four Corners, especially in AZ & NM. In eastern Colorado, this pattern was anchored by several wet Decembers and Februaries, while Januaries tended to be dry.

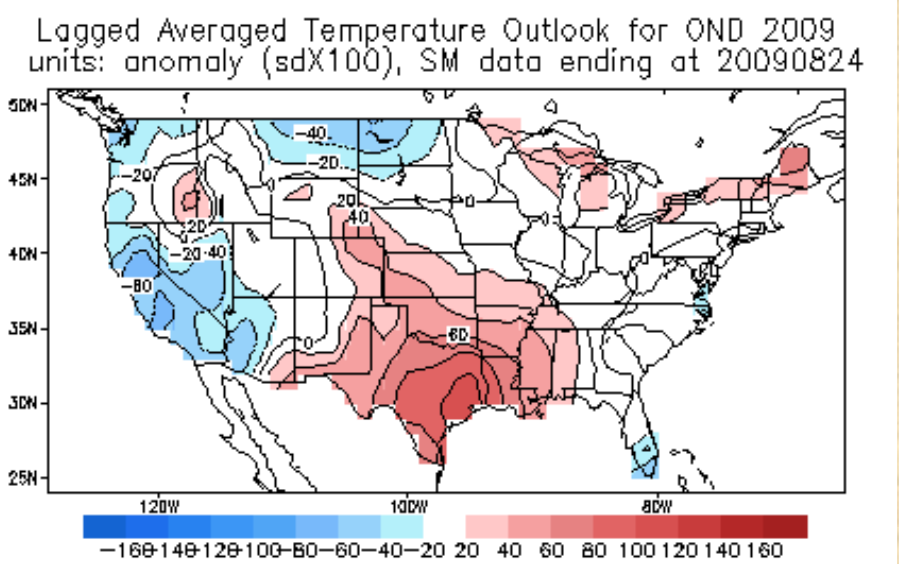
What about 'Constructed Analog' Forecasts?

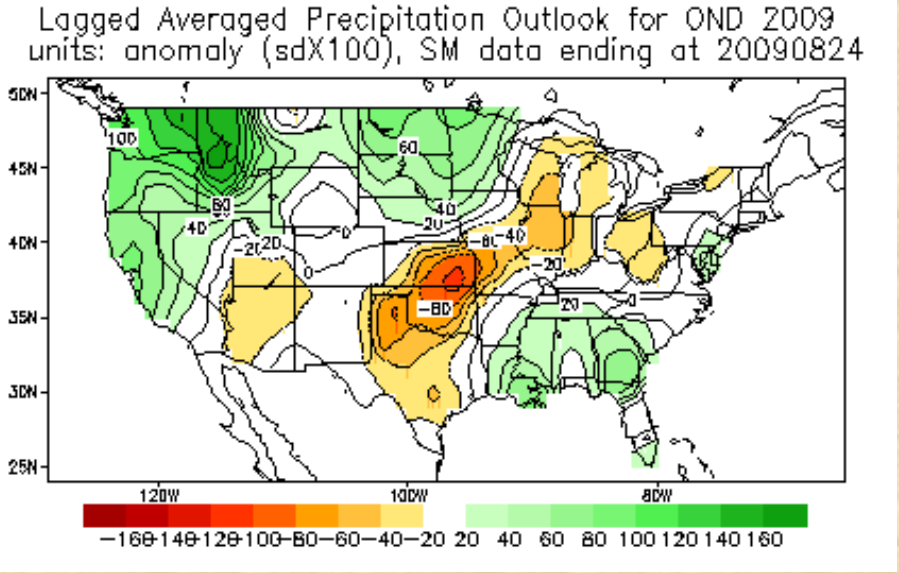


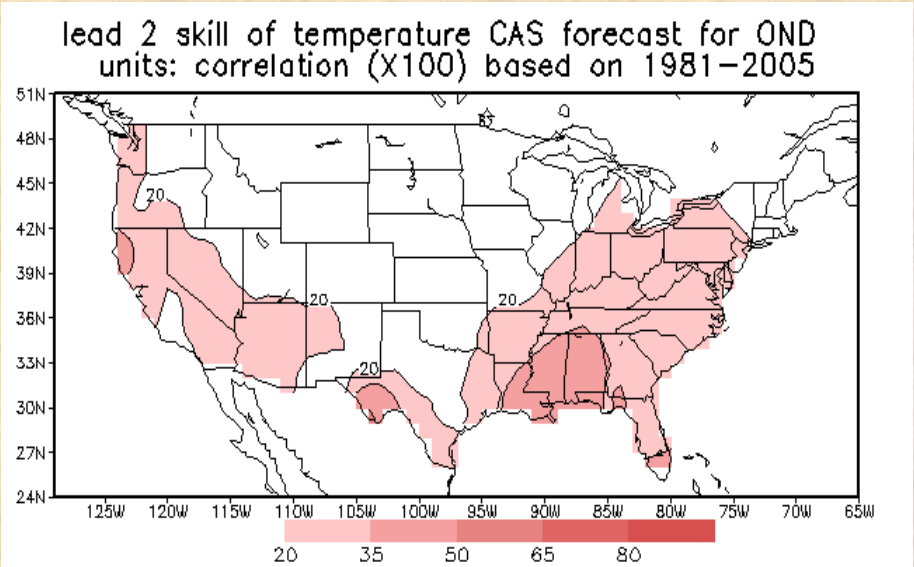


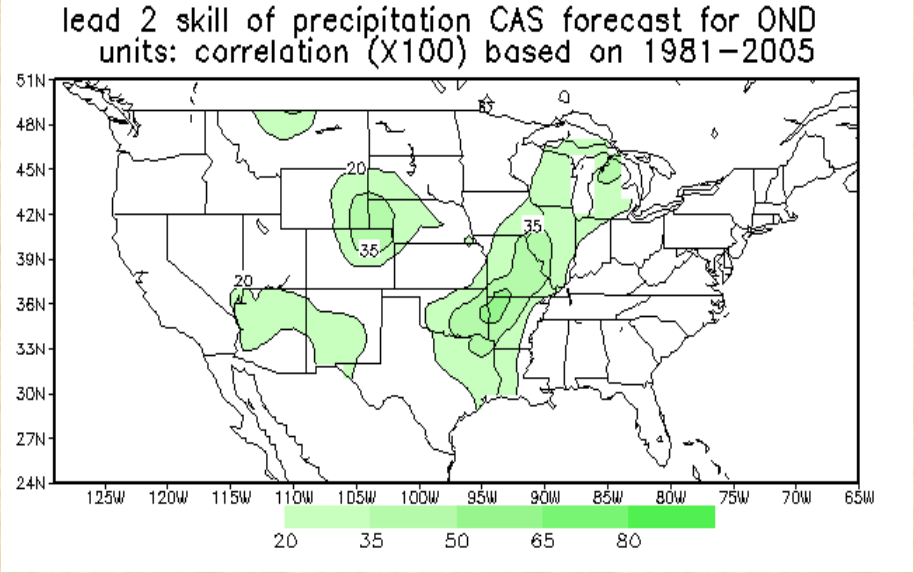
September precipitation forecasts have shown skill in Utah and northwestern Colorado, where warm & wet is predicted - consistent with El Niño in that region!

What about 'Constructed Analog' Forecasts?



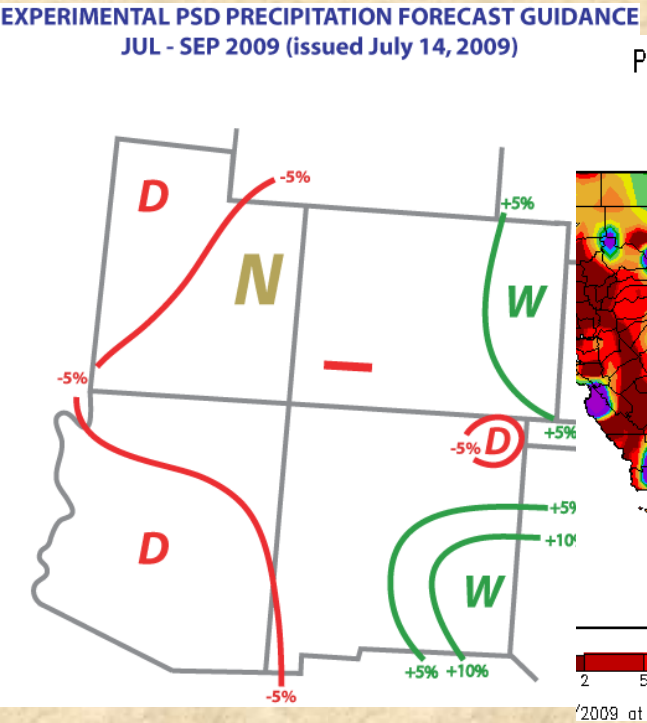


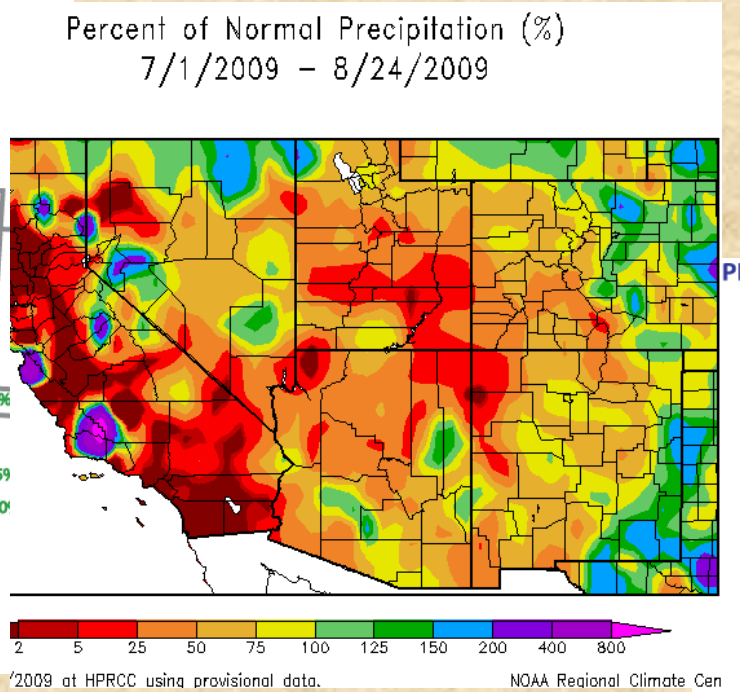


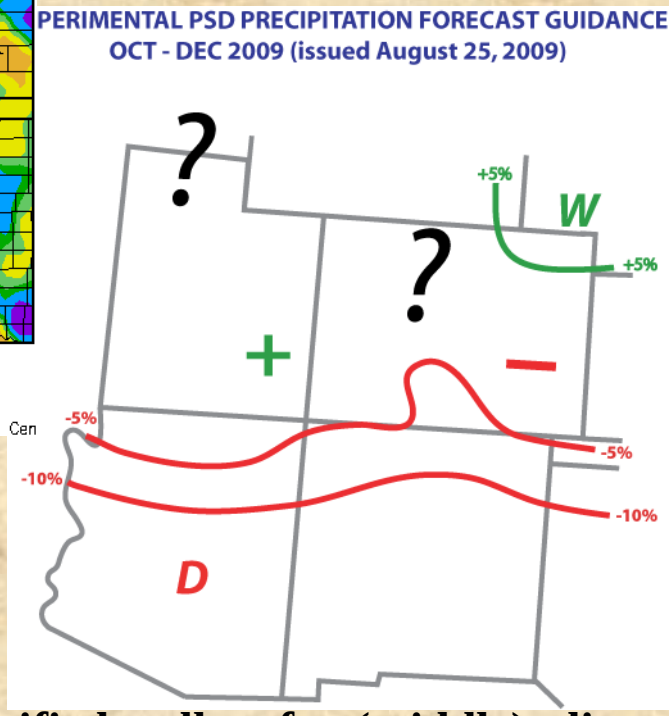


Decent skill for precipitation forecasts in Oct-Dec is 'wasted' on neutral forecast in northeast Colorado; rest of state is toss-up as well!

Experimental CDC "Forecast Guidance"



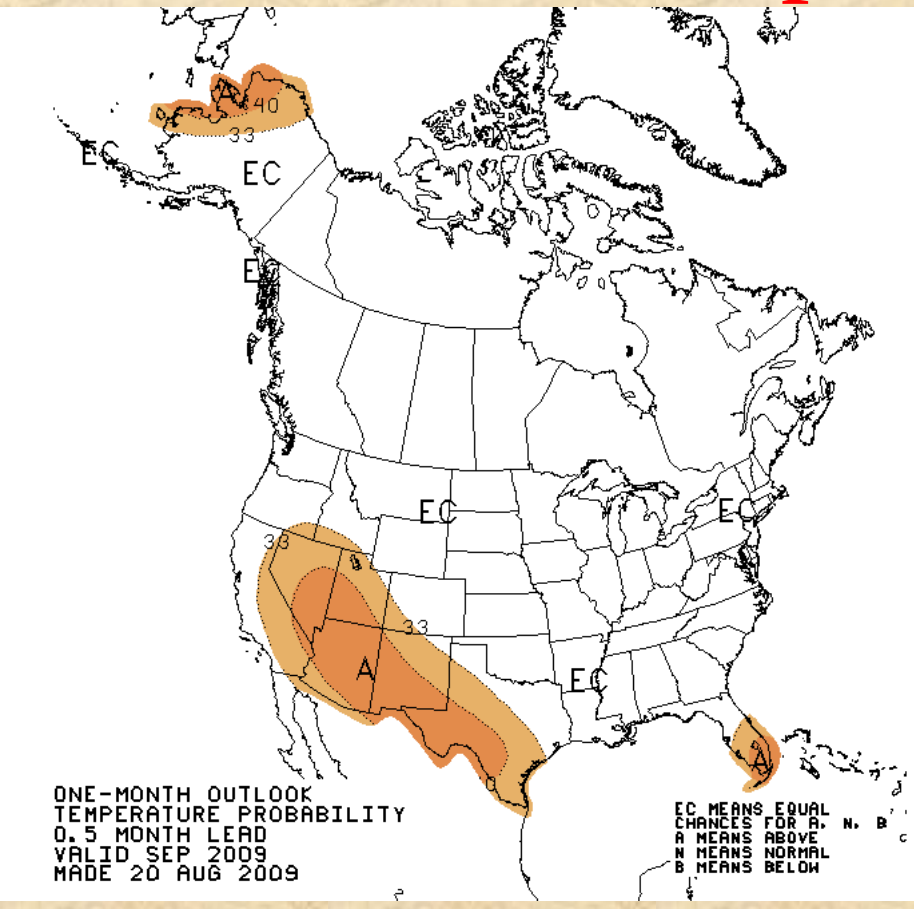


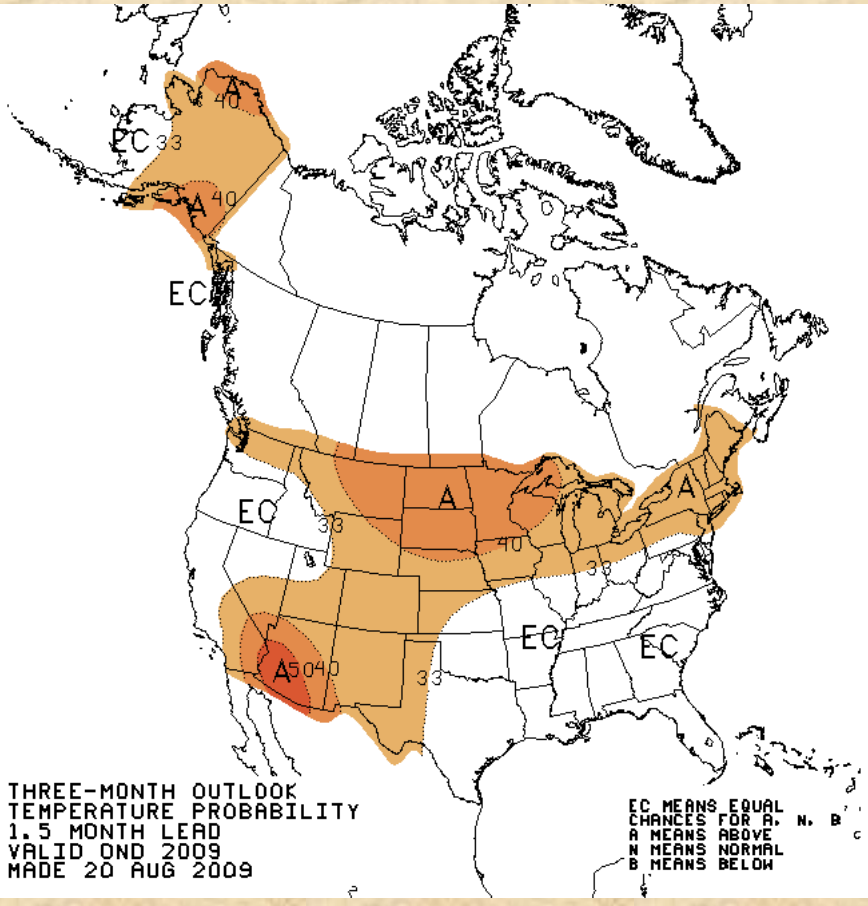


My dry summer forecast (left) for western Colorado has verified well so far (middle), ditto for 'wet' eastern plains, and sketchy along the Front Range (Boulder has drawn one of shorter straws so far). ***The first fall forecast of 2009 is dry to our south, with hope for some moisture from the Front Range northeastward. Skill for this season and lead-time is limited.***

Source: ***http://www.cdc.noaa.gov/people/klaus.wolter/SWcasts/***

CPC Temperature Forecasts

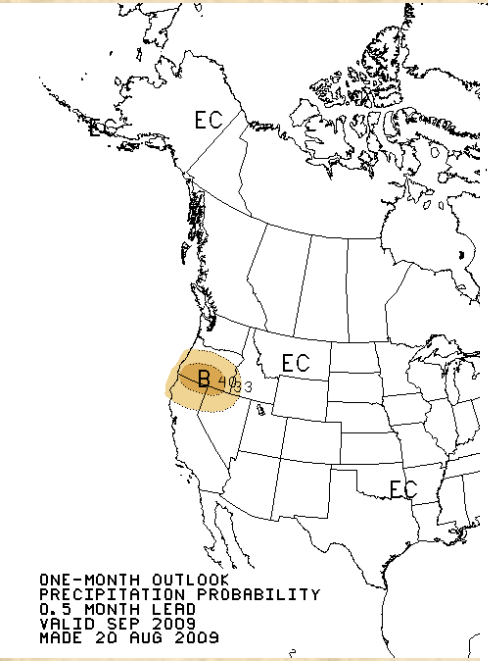


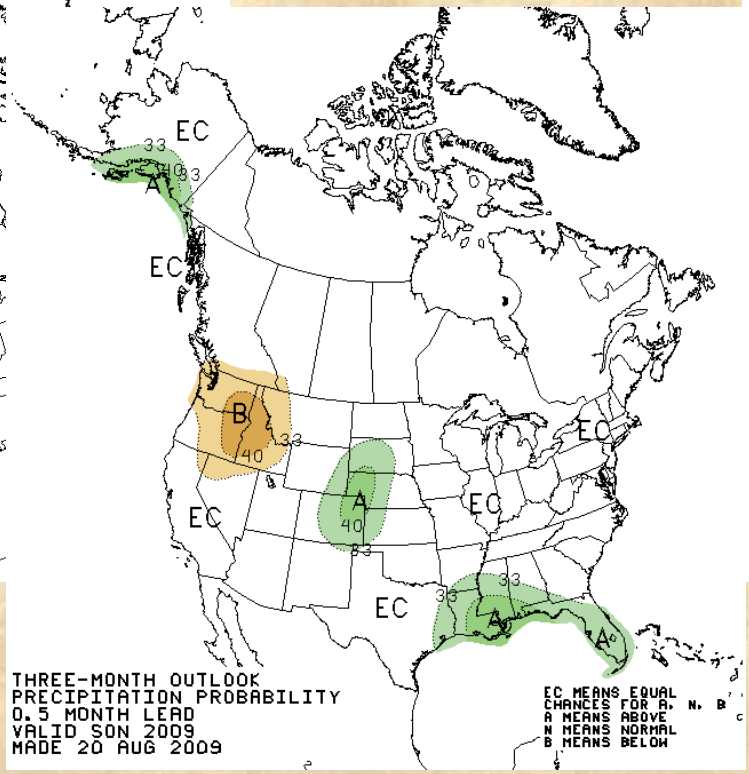


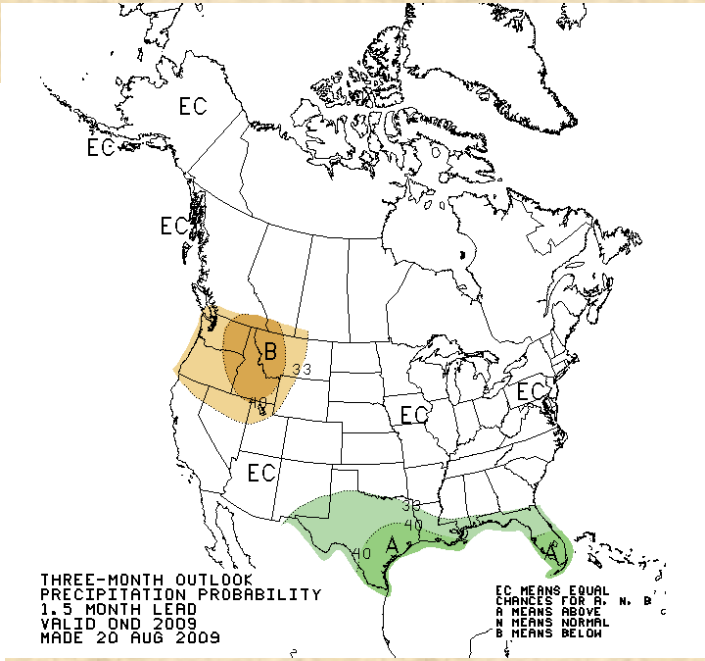
According to CPC's latest forecast from mid-August, September (left) and October-December (right) temperature forecasts lean towards warmer temperatures in much of the Southwest, due to long-term trends, with warmer temperatures to the north due to El Niño.

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

CPC Precipitation Forecasts







According to CPC's latest official forecasts, September (left) and October-December (right) precipitation forecasts show no tilt of the odds for Colorado. However, the September-November forecast (middle) remains wet, due to El Niño-related expectations.

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

Executive Summary (early version)

1. **The La Niña of 2007-09 ended about four months ago. Weak-to-moderate El Niño conditions became established in June, but have been struggling ever since. It is unclear whether they will last through next winter, or whether they will strengthen substantially at all.**

2. **After our anticipated wet week in late July, the summer monsoon has been underperforming for much of August in the western two thirds of Colorado. Remaining surplus soil moisture and continued overall cool weather have cushioned the blow where it has been dry.**

3. **My experimental forecast guidance for the fall season (October-December) is pessimistic (dry) for New Mexico and Arizona, but more neutral for Colorado, including increased odds for the northeastern corner of the state where forecast skill has been highest. Based on El Niño conditions alone, we have a better-than-average chance for increased fall precipitation in much of our state.**

4. **Bottomline: The fledgling El Niño of 2009 may have been a factor in our cool and wet early summer, but has 'dropped the ball' in August so far. All things being equal, we have a decent chance of a wet fall due to El Niño, despite a less optimistic statistical ("SWcasts") forecast.**

Updated later this week at: ***http://www.cdc.noaa.gov/people/klaus.wolter/SWcasts/***