NOAA-CIRES Climate Diagnostics Center

CO WA&FTF
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Denver

Western Water Assessment

Seasonal Outlook through September 2009

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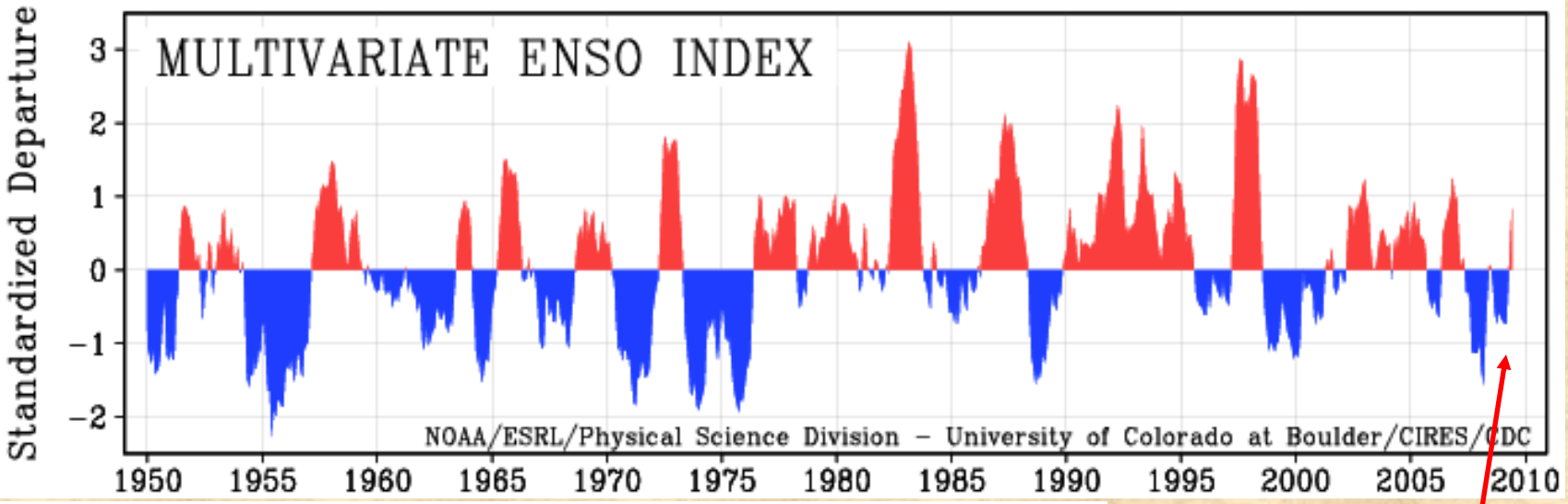
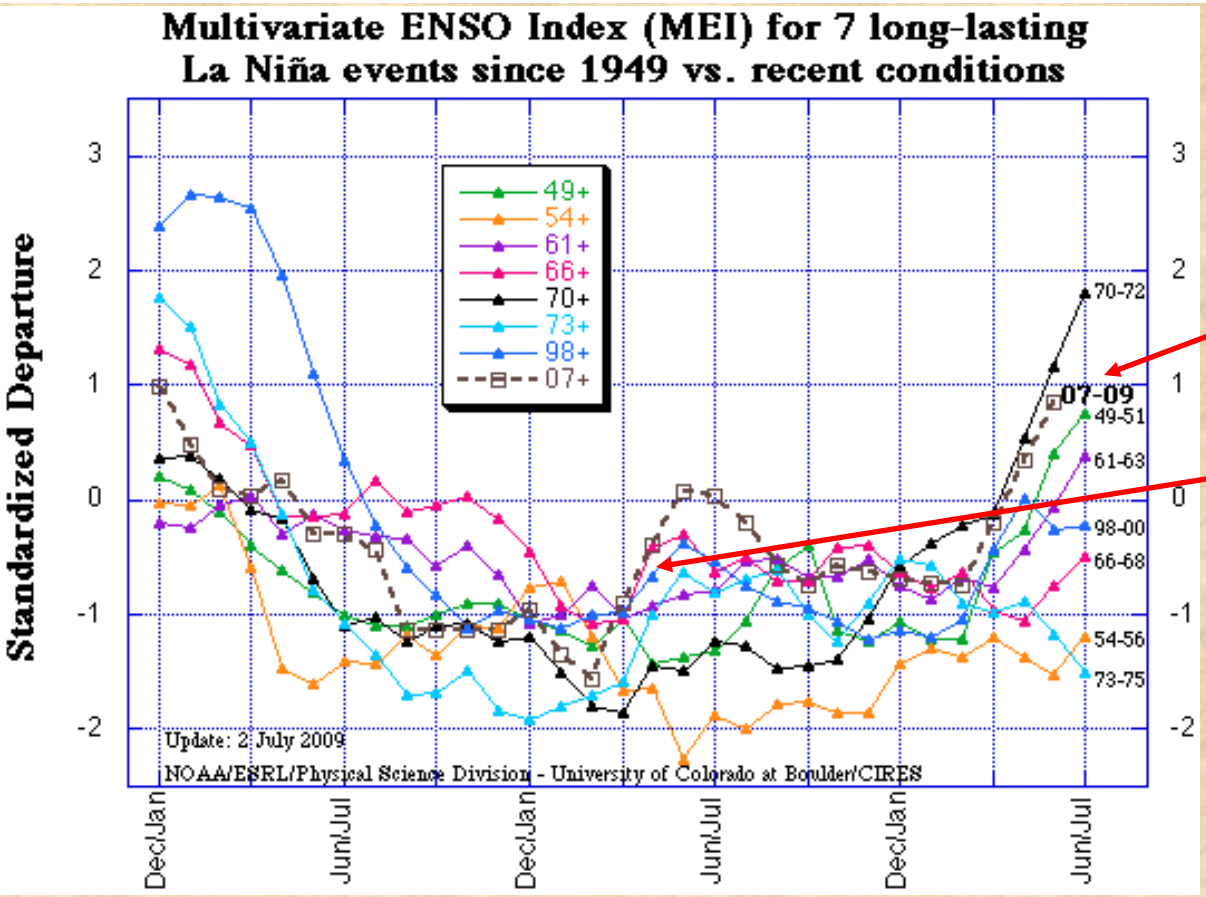
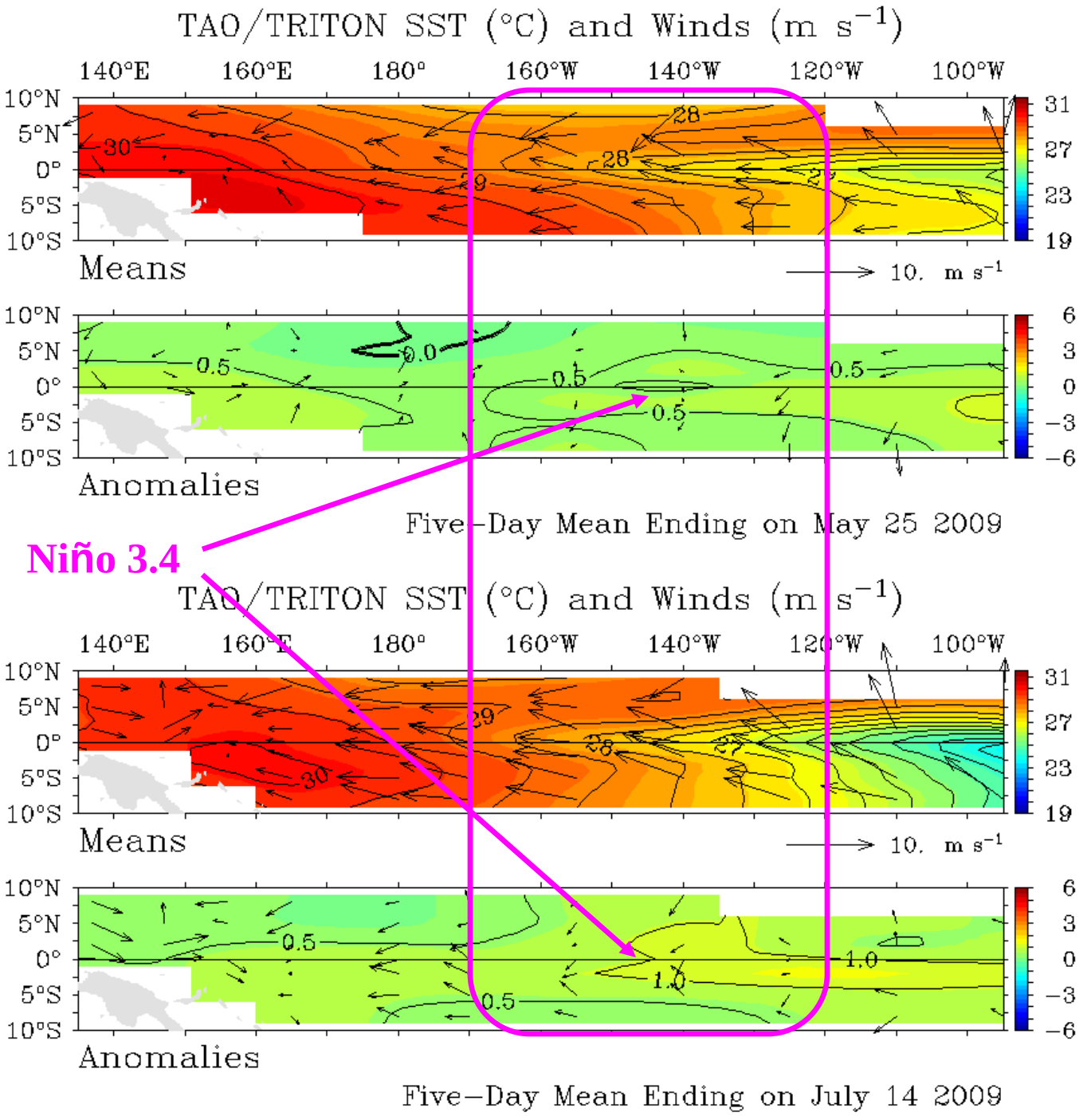
- **El Niño here to stay?!**
- **Recent weather & expectations for next few weeks**
- **Updated El Niño-based composites through November**
- **Experimental Outlook Jul-Sep '09**
- **CPC forecasts for July - November '09**

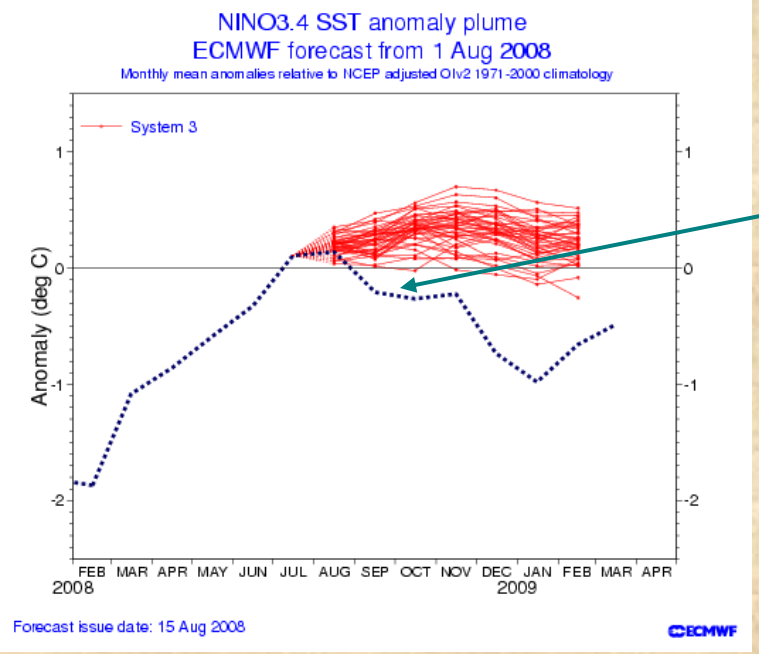




Good-bye La Niña, hello El Niño! While we had a similar rise of the MEI last spring, this one started out higher, enabling us to cross the El Niño-threshold, similar to 1951 & 1972!

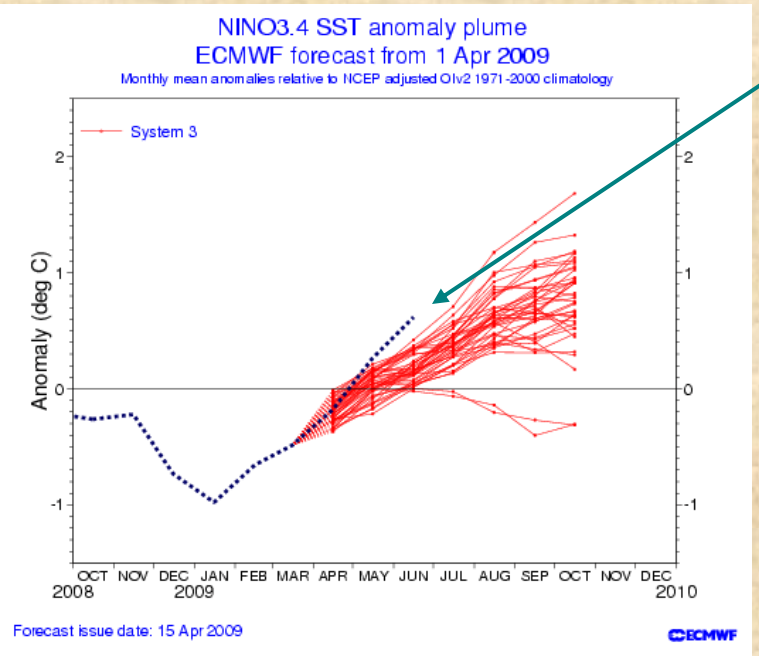
Current state of ENSO (bottom) compared to six weeks ago (top): warm-up has continued from weak (top) to borderline moderate El Niño conditions (bottom)! Wind anomalies are mixed, showing increased trade winds near the dateline, but westerly anomalies north of Papua New Guinea. No rapid changes are expected right now.



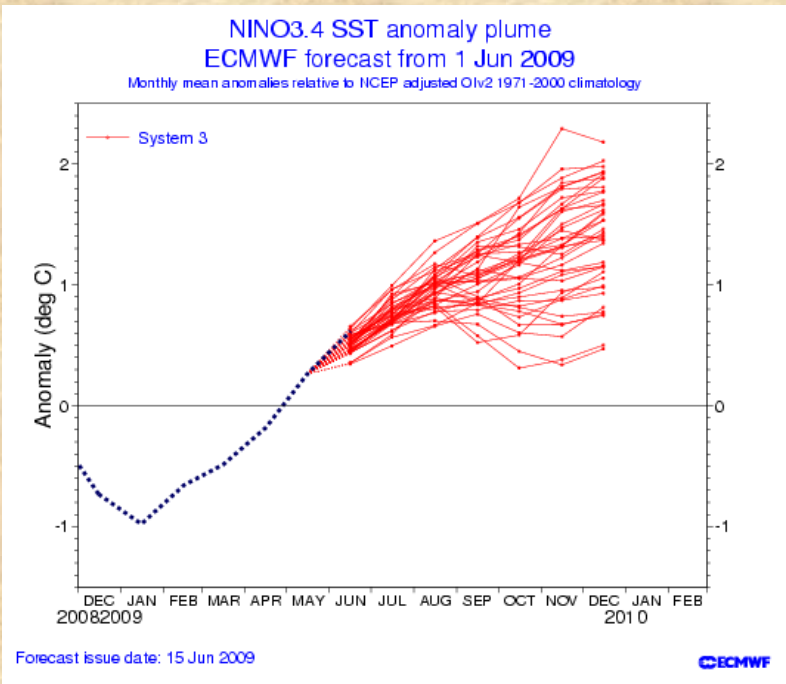


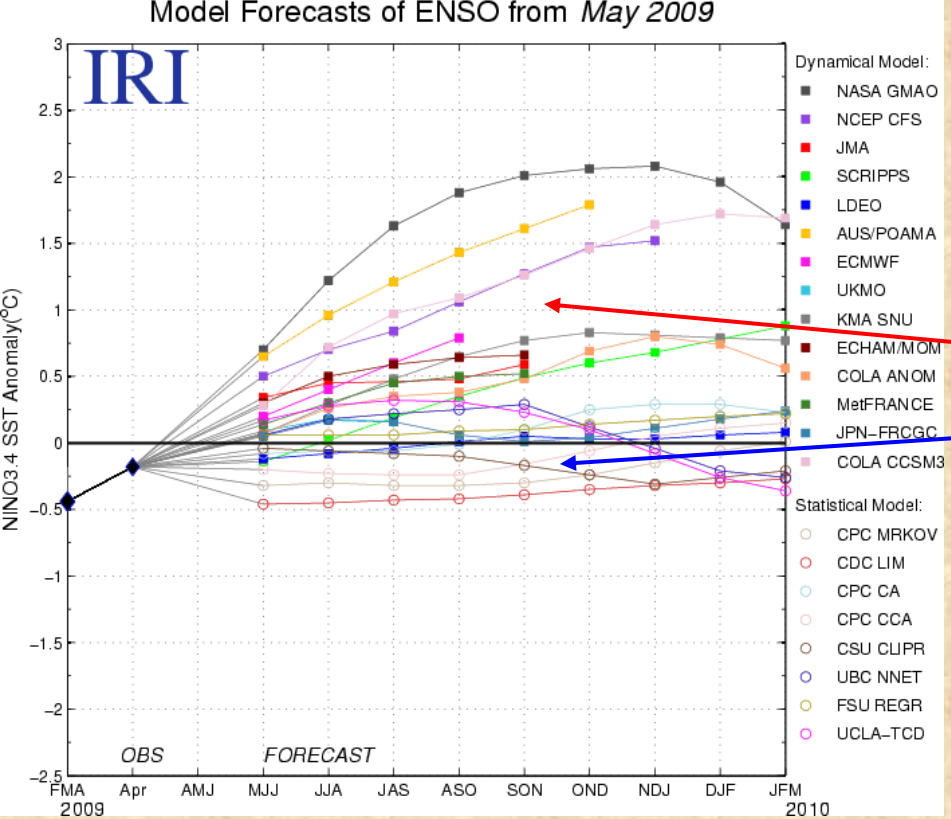
The European model's August '08 forecast (left) anticipated a weak El Niño, but was 'off' already by September, when SST had dropped below the full ensemble forecast range!

A more serious temperature drop commenced in November, and hit bottom near -1°C (moderate La Niña) in January 2009. April's forecast (bottom left) indicated a return to above-normal SST by July, with only 2 dissenters out of 50, and apparently this one was a bit too conservative!

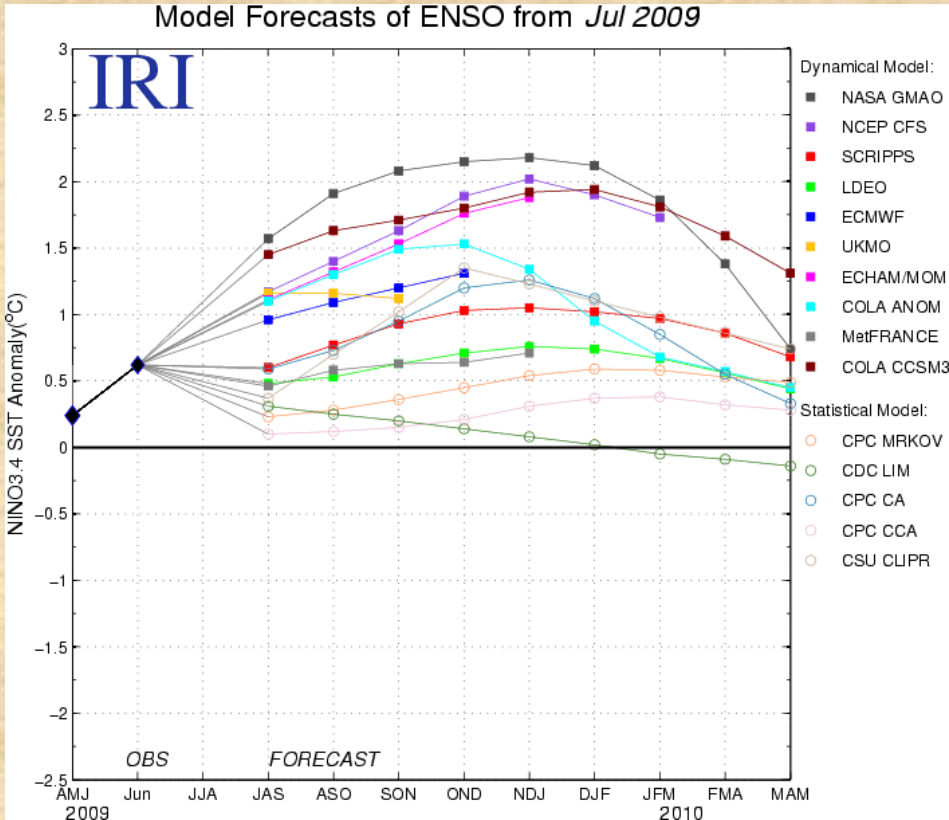


The most recent forecast (right) 'throws all caution to the wind', and gives us unambiguous El Niño (mostly >1C) conditions by August!



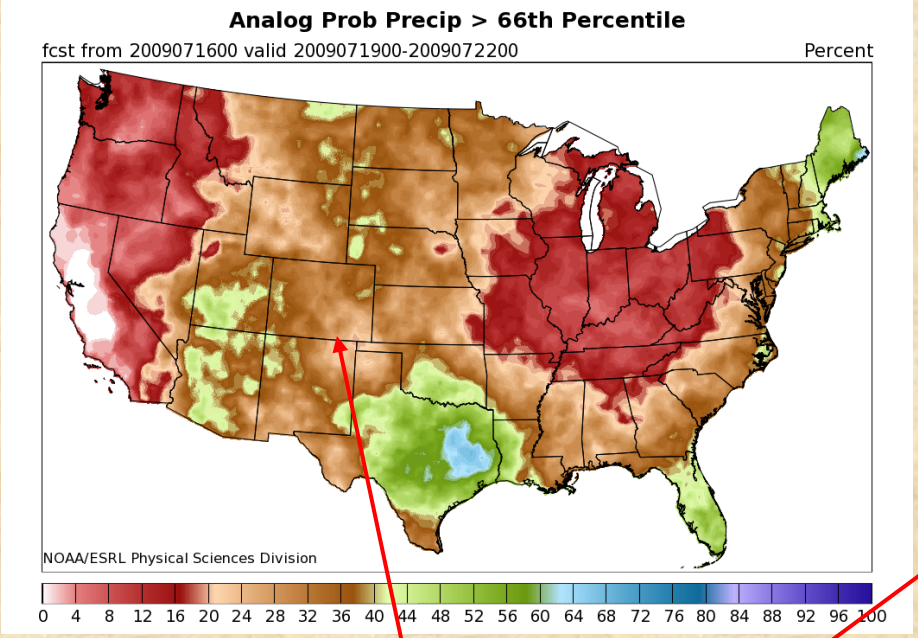


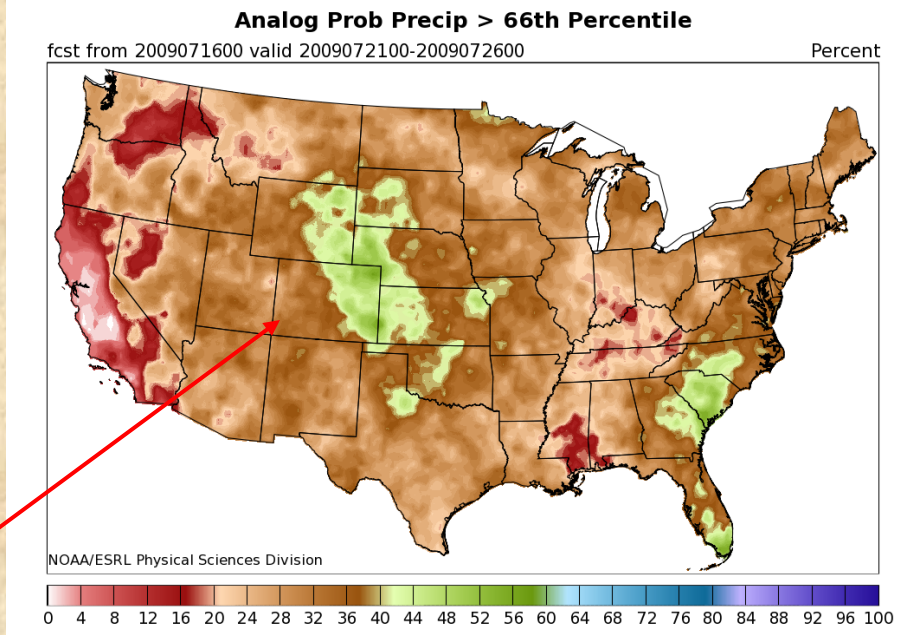
ENSO forecasts from almost two dozen dynamical & statistical forecast models (below) vs. last one I showed (left). By May'09, 11 out of 14 dynamic models showed El Niño later this year, while NONE of the statistical models reached that scenario. The split between dynamic and statistical models was as big as ever (1°C!). While still not a 'slam-dunk', the most recent verdict is still split, but more 'bullish' on El Niño (below).

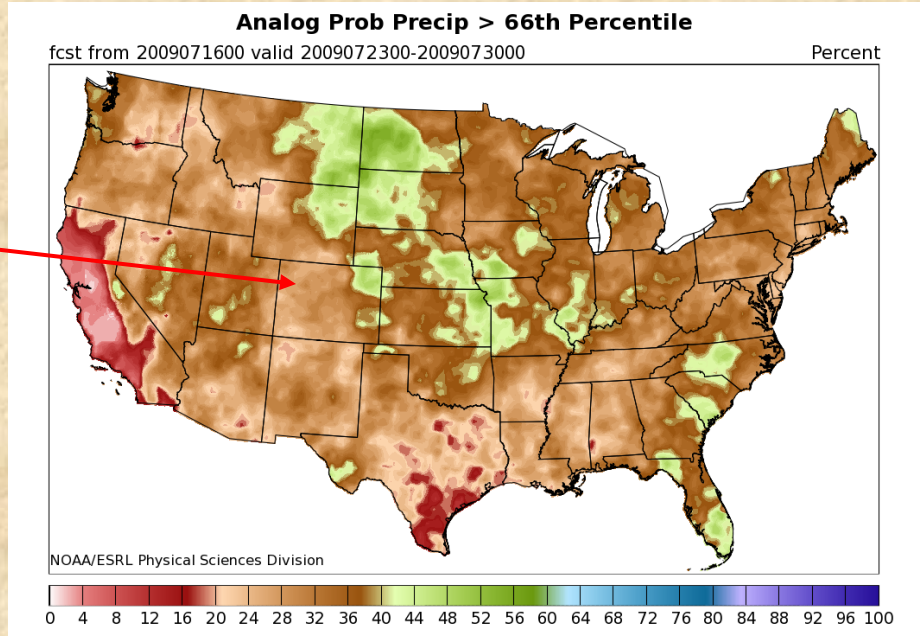


Historically, La Niña events of the recent magnitude have had a tendency to continue for three winters (54-57; 73-76; 98-01), much more so than El Niños. Mean PDO values in '56: -1.8; '75: -1.0; 2000: -0.6. After hovering around -1.5 through, the PDO has now risen up to -0.3. Since we have reached El Niño levels by June, it would be unprecedented to return to La Niña by this winter!

What can we expect in the next two weeks?

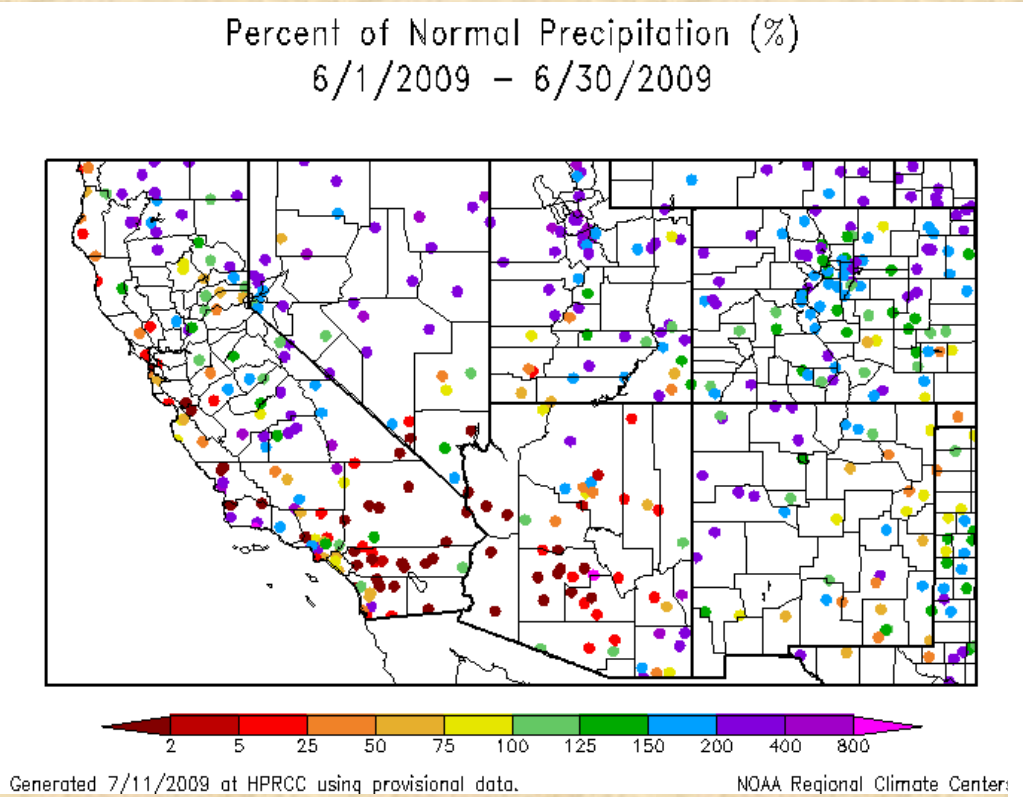




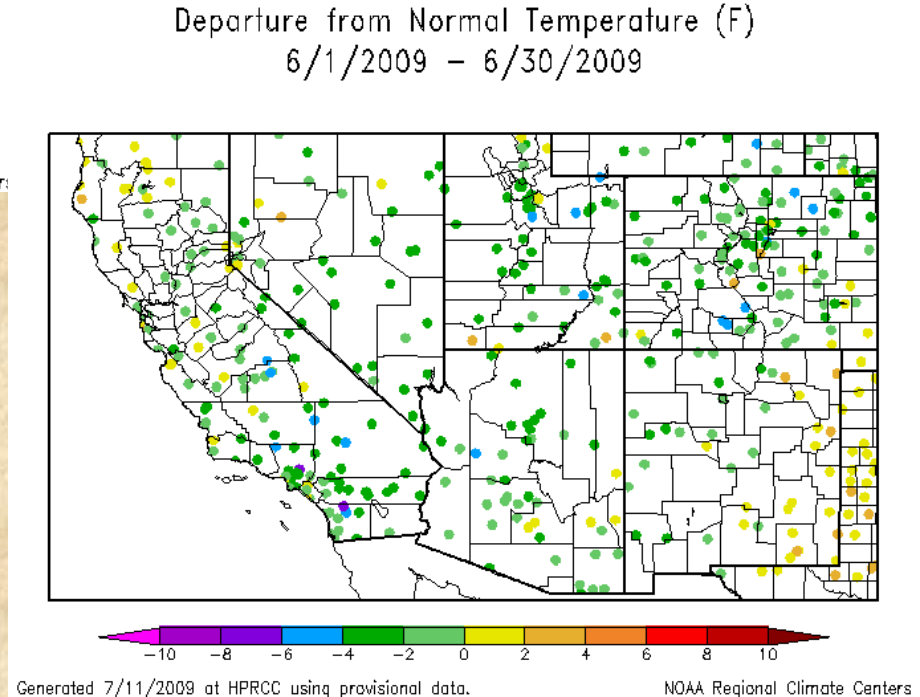


Rainfall chances for 4-6, 6-10, and 8-14 days from today show near-normal or slightly above-normal odds in most of Colorado. While the monsoon is currently 'sputtering', these maps indicate that it will come back later this month, especially for eastern Colorado.

What has happened since June 1st?



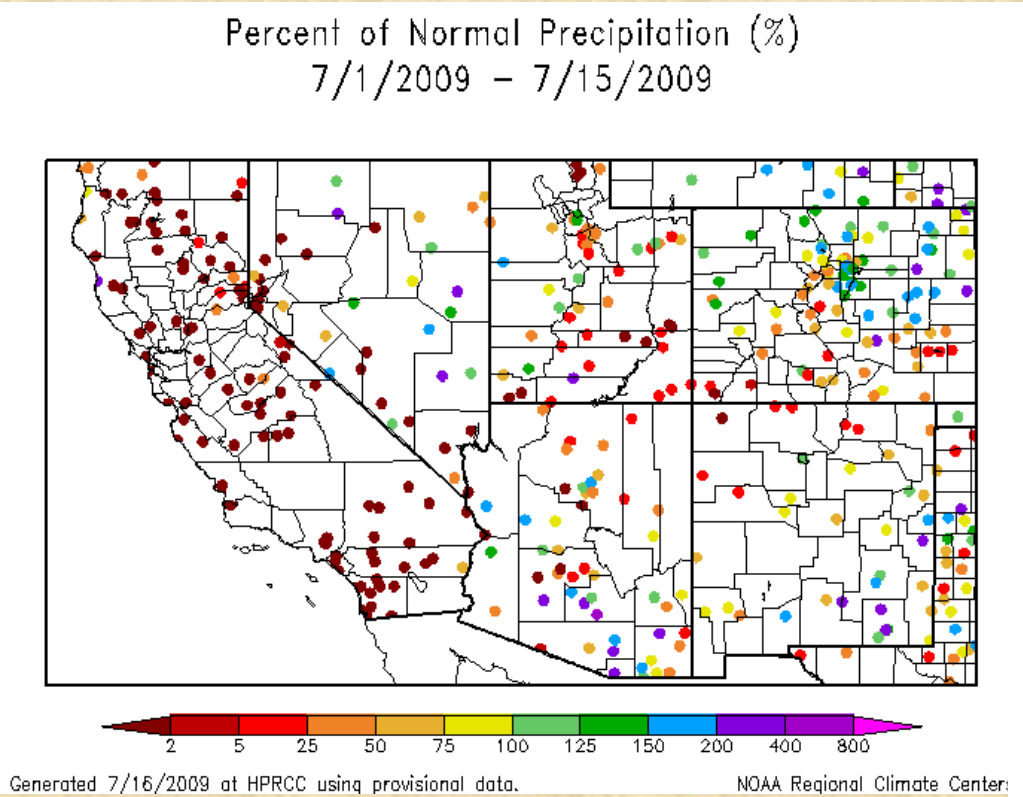
June brought above-average moisture (in some cases, near-record wetness) to our state (left), while temperatures remained on the cool side (below). This helped slow down the remaining snowmelt which had been proceeding at a record clip in the previous month. In fact, some of the highest elevations remained cold and wet enough to give us a 2ndary runoff peak in late June (Boulder Creek flooding…).



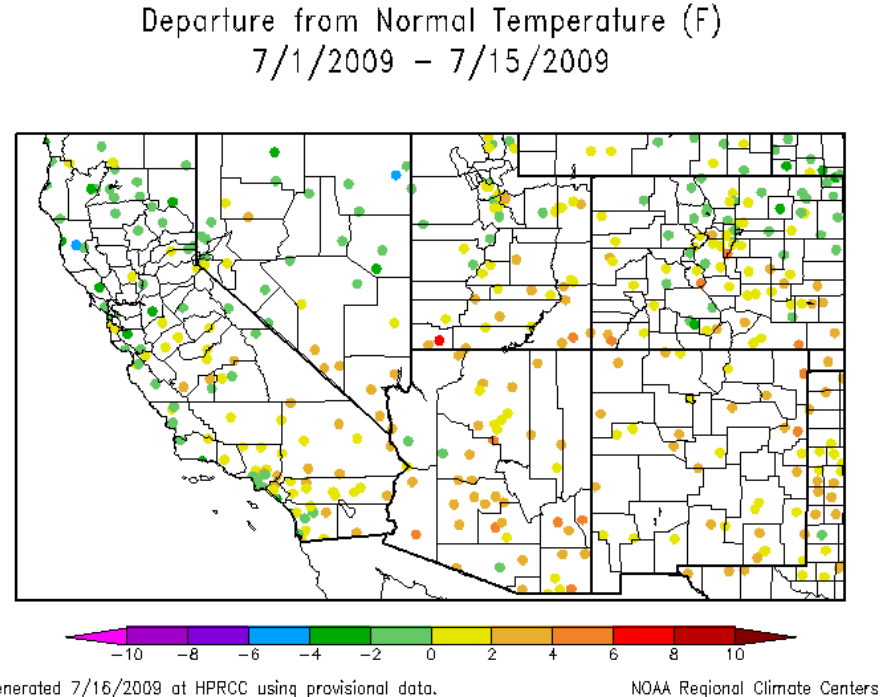
I wrote last month: "IF the Pacific keeps transitioning towards El Niño, anything goes in June!"

Indeed! Not every starting El Niño creates conditions like these, but the general circulation conditions that created this El Niño may have had a hand in this!

What has happened since July 1st?

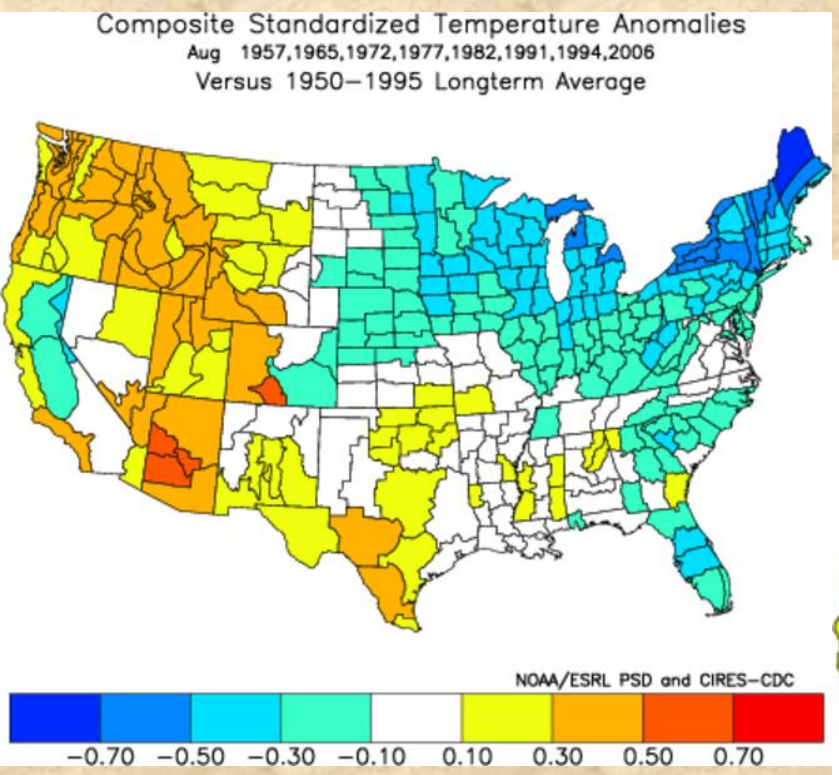


The moisture faucet got partially turned off in July (left), while temperatures rebounded to near-normal (below). This belated 'mini-dry-season' should help us re-invite the monsoon later this summer. Boulder first broke 90F on the 8th of July, just about the latest on record(?!).

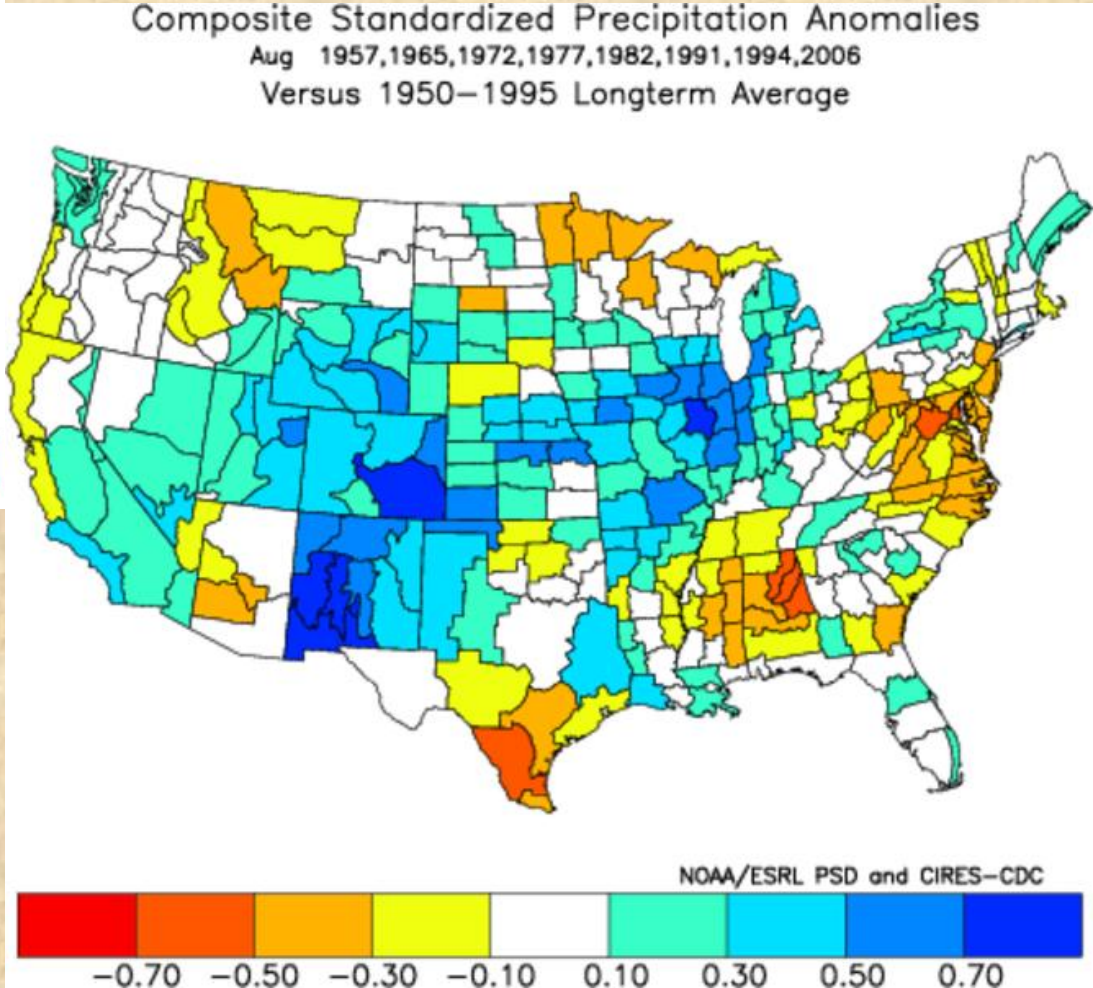


El Niño tends to give us wet summers in EASTERN COLORADO (see next page), so we should see a return of wetter conditions later this month / in August.

What are typical temp&precip patterns in August with El Niño onset conditions?

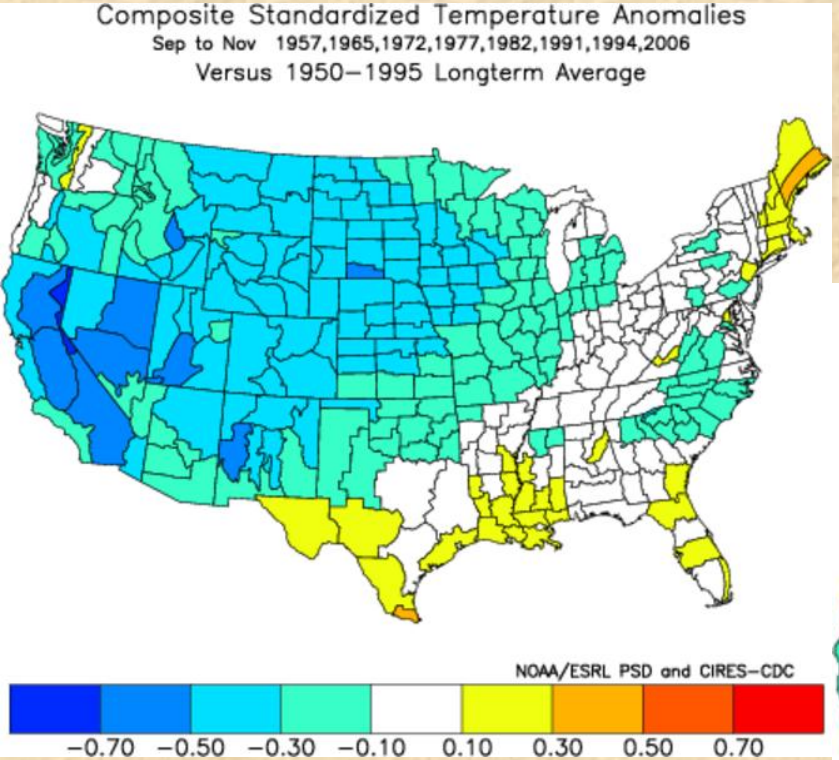


Mostly warmer to our west (left), with only a slight tilt towards cold east of the Divide.

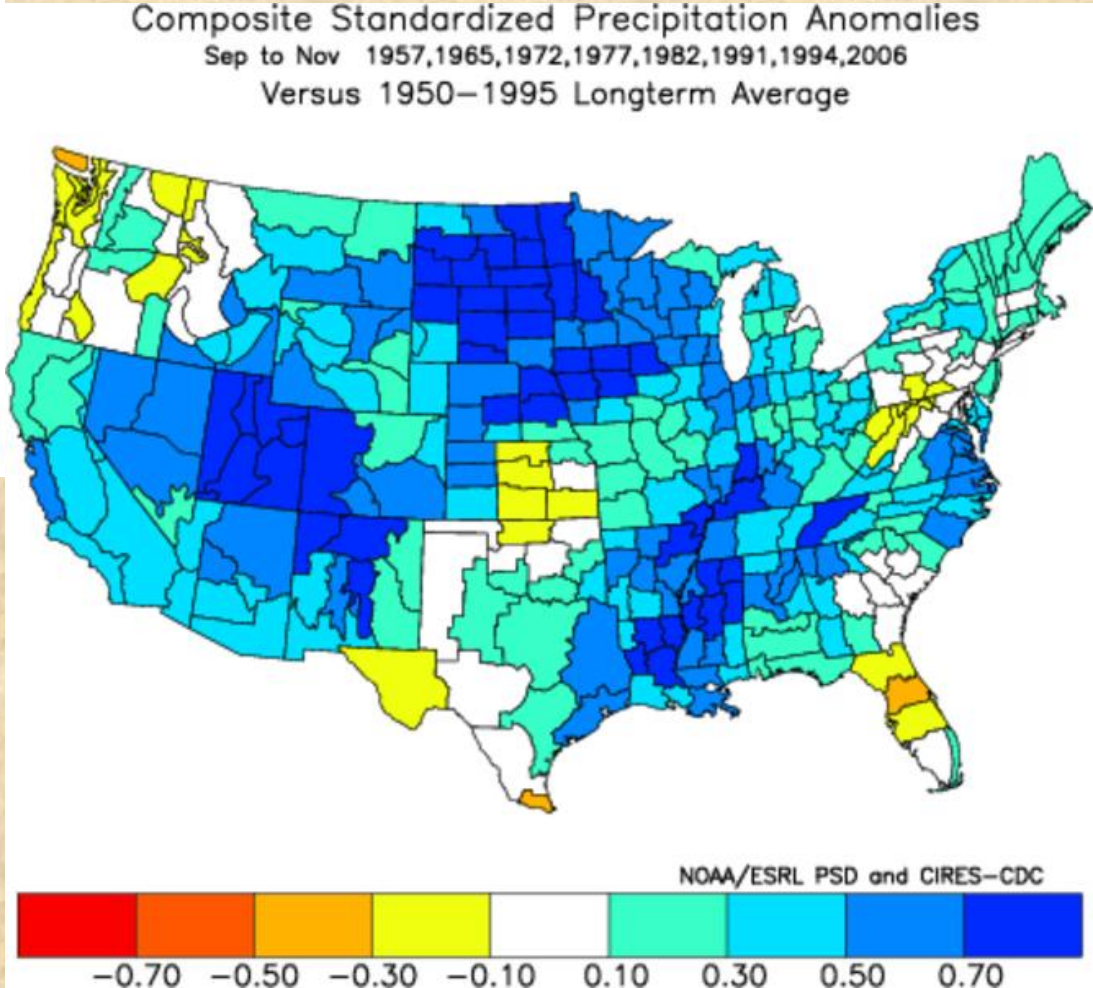


Significant wet precipitation anomalies (right) from New Mexico right into eastern Colorado - El Niño enhances our monsoon, while leaving Arizona dry and hot…

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

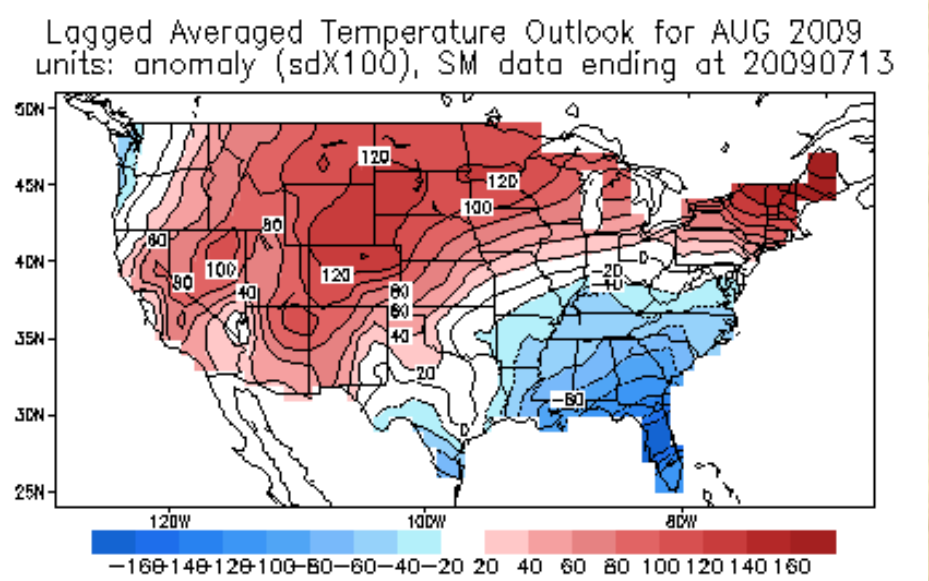


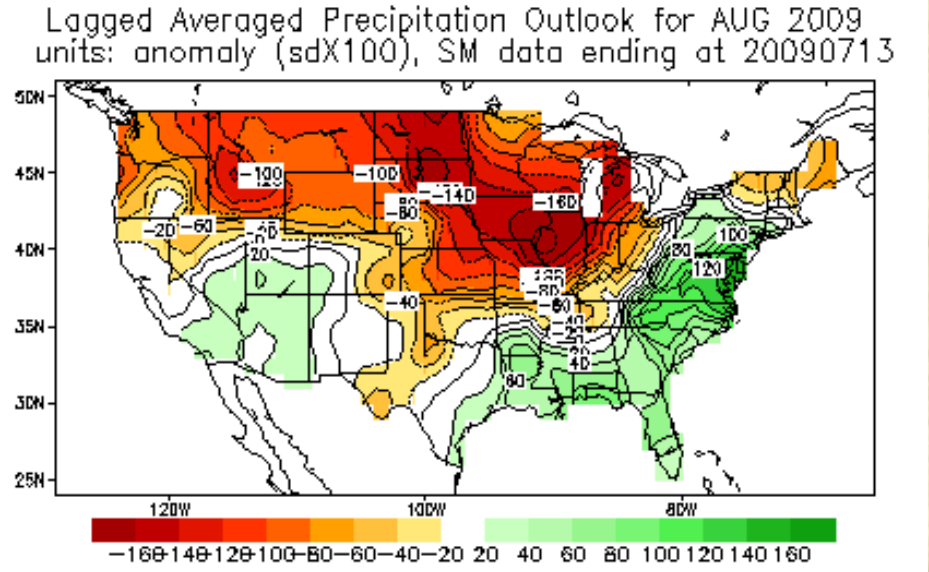
Mostly cooler than average in Colorado and surrounding states (left).

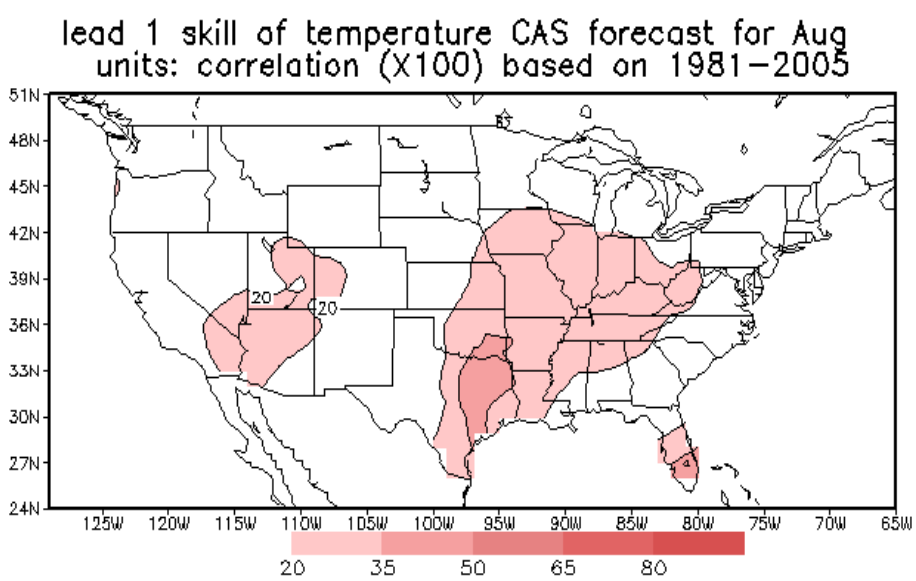


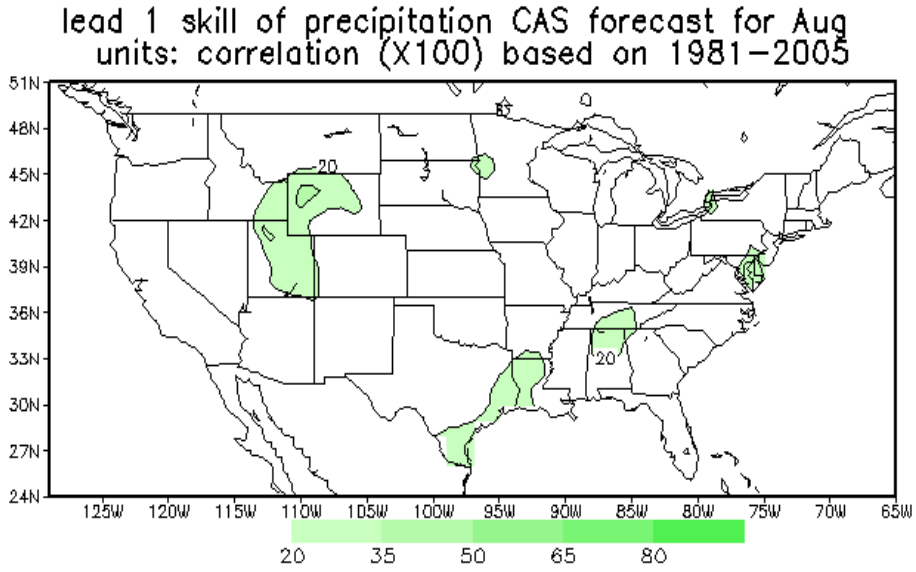
Significant wet precipitation anomalies (right) from Utah across western Colorado into northern New Mexico, leaving northern Front Range not quite as wet.

What about 'Constructed Analog' Forecasts?



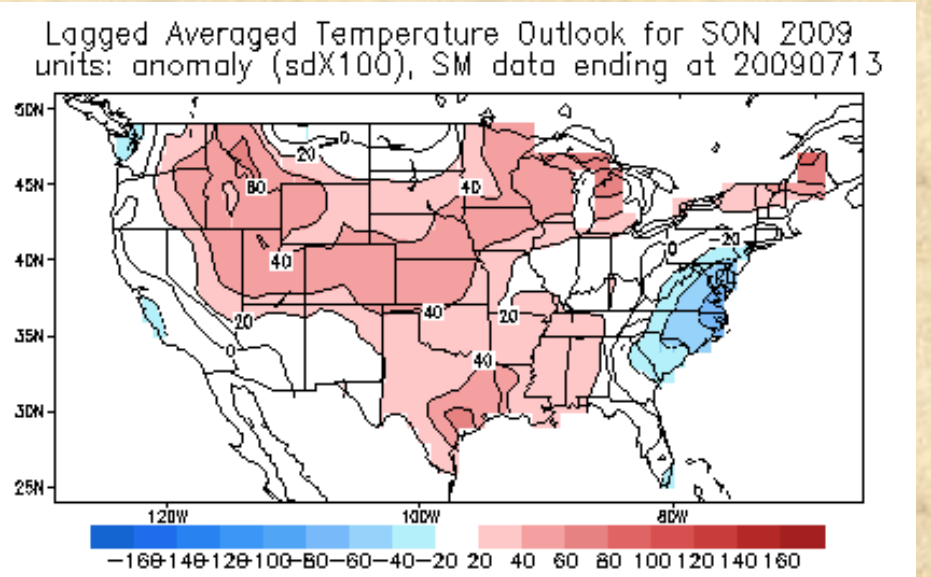


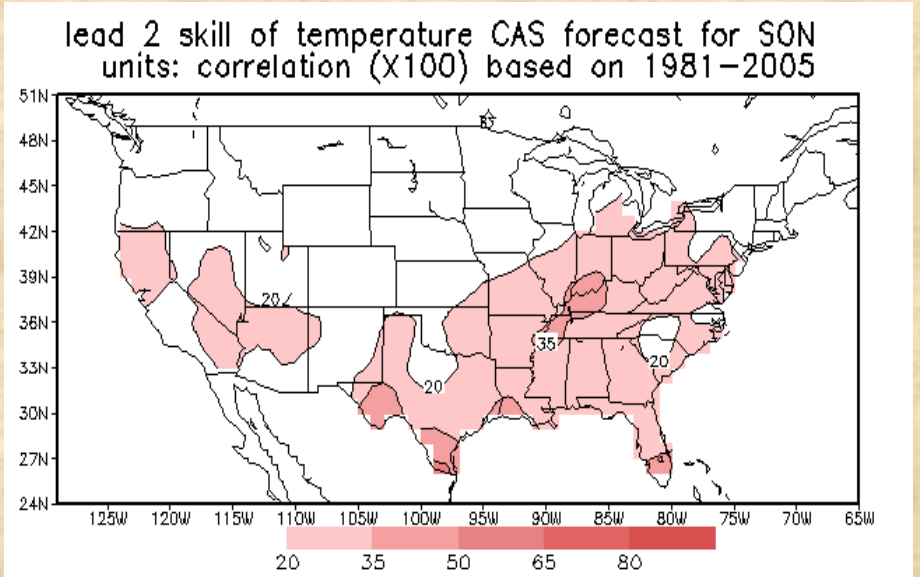


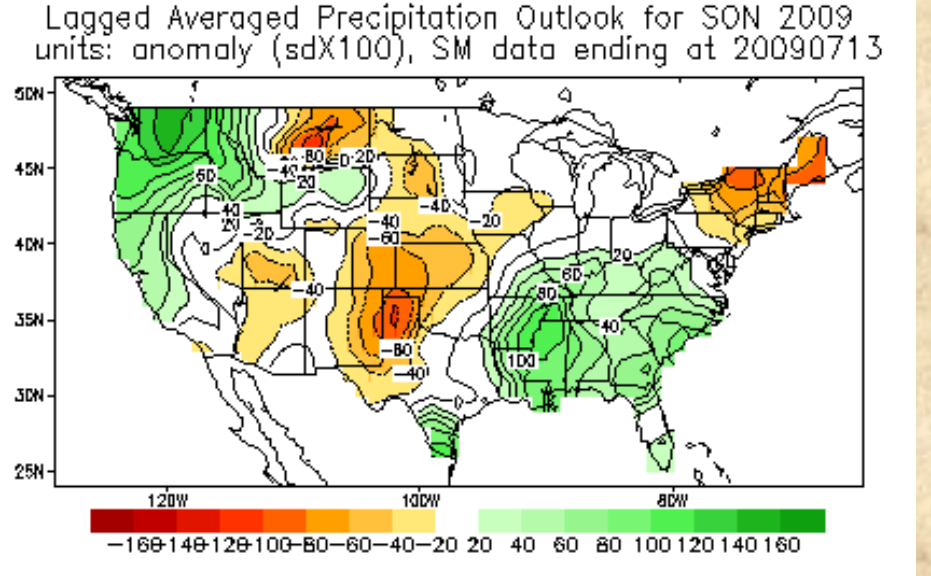


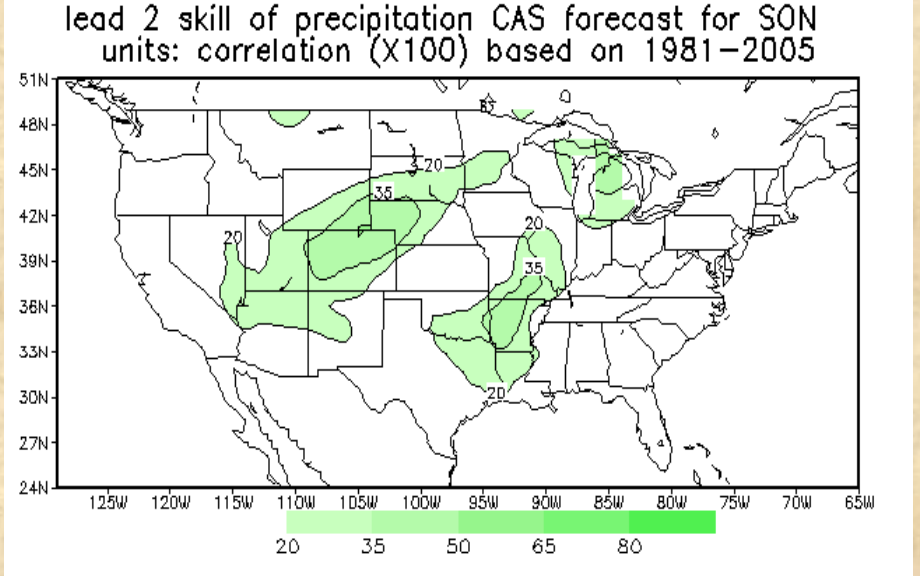
August forecasts have shown skill in southern Utah, where odd combo of warm & wet is predicted about south of 40N - constructed analog is actually consistent with El Niño in that region, but not for Colorado!

What about 'Constructed Analog' Forecasts?



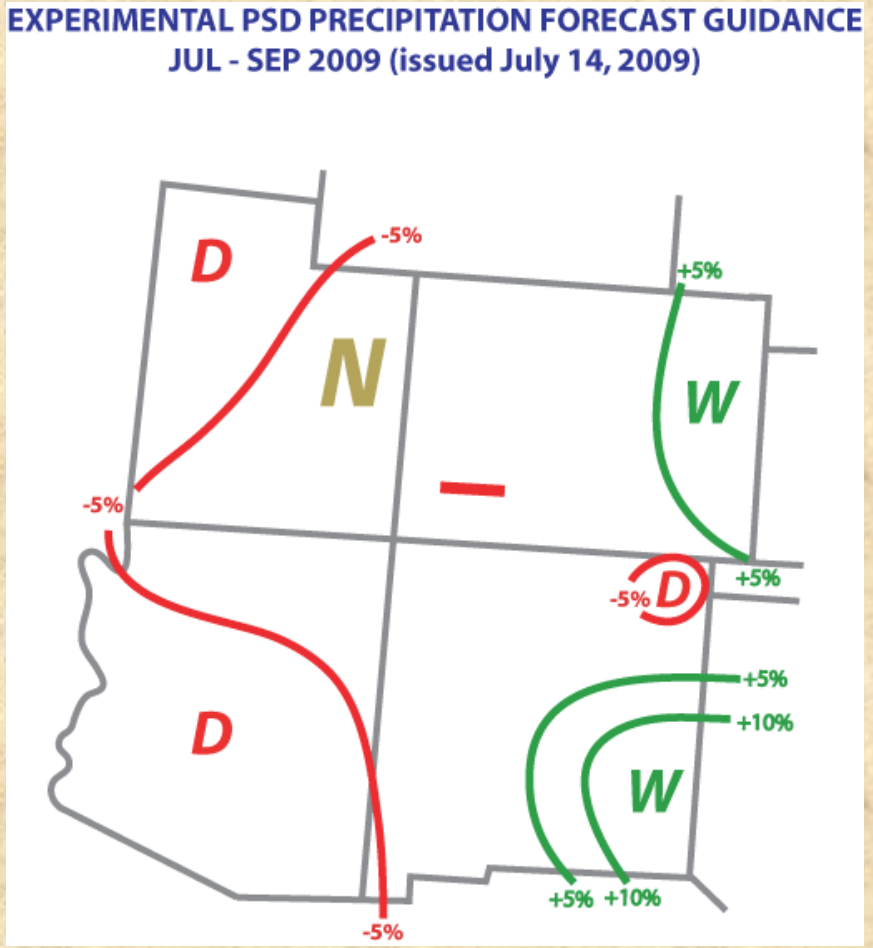


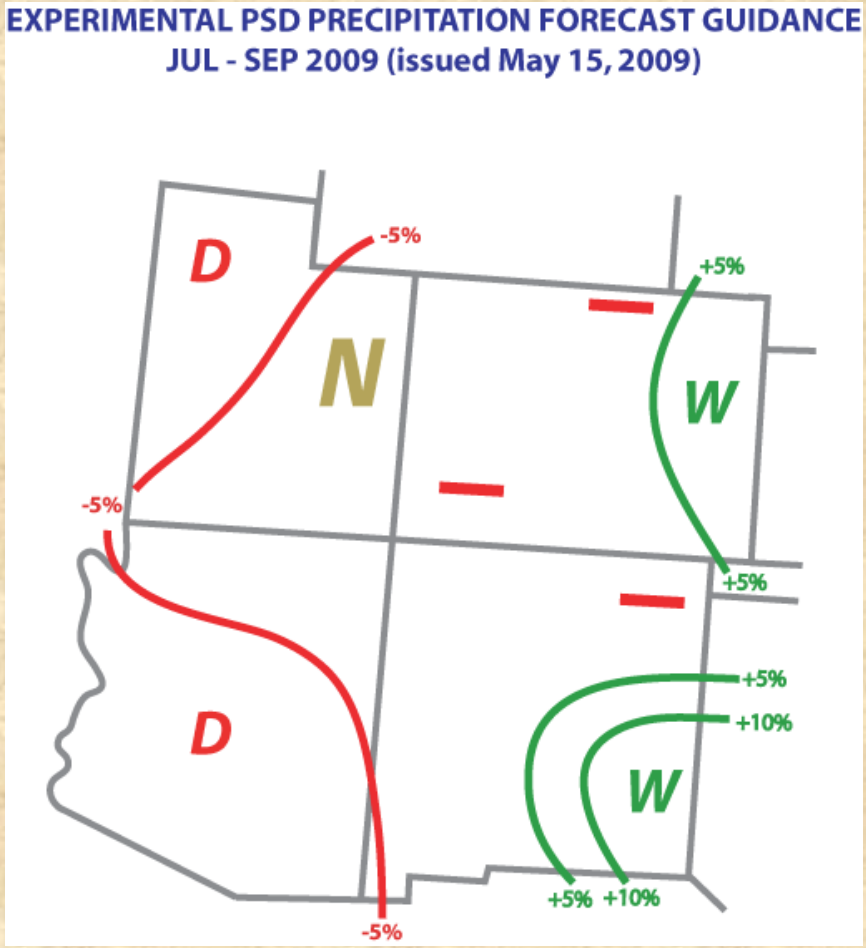




Dry & warm fall forecasts in CO&UT have skill on the precipitation side, unfortunately, since they do not match El Niño composites!

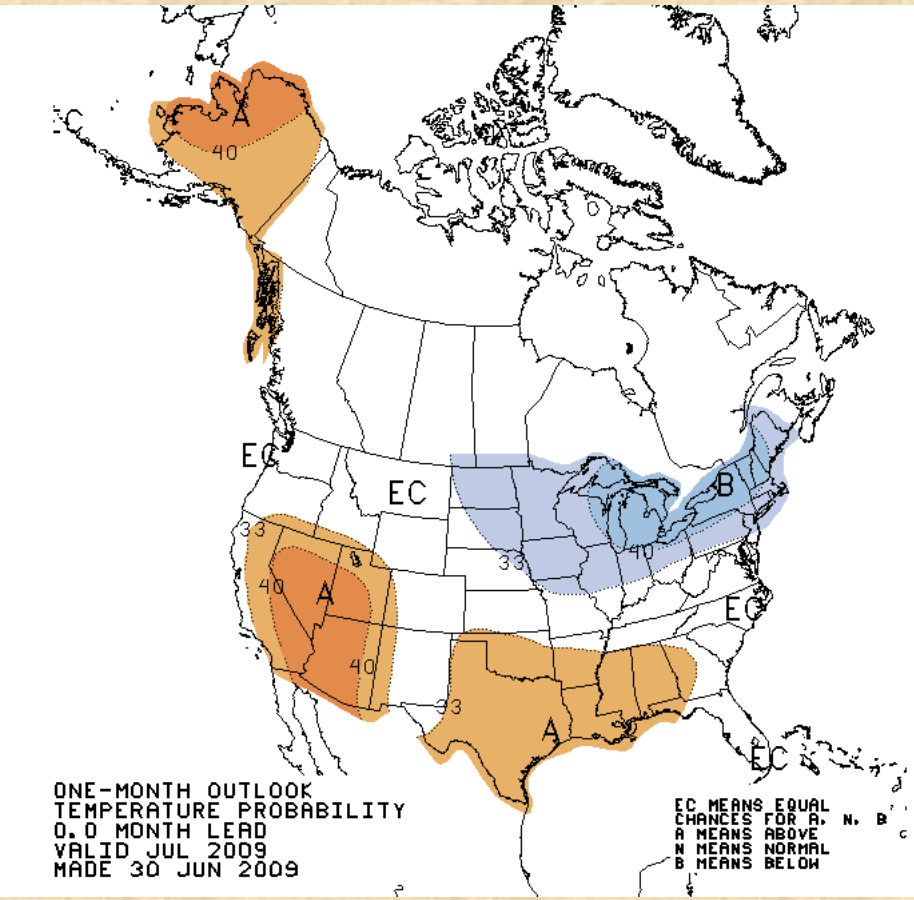
Experimental CDC "Forecast Guidance"

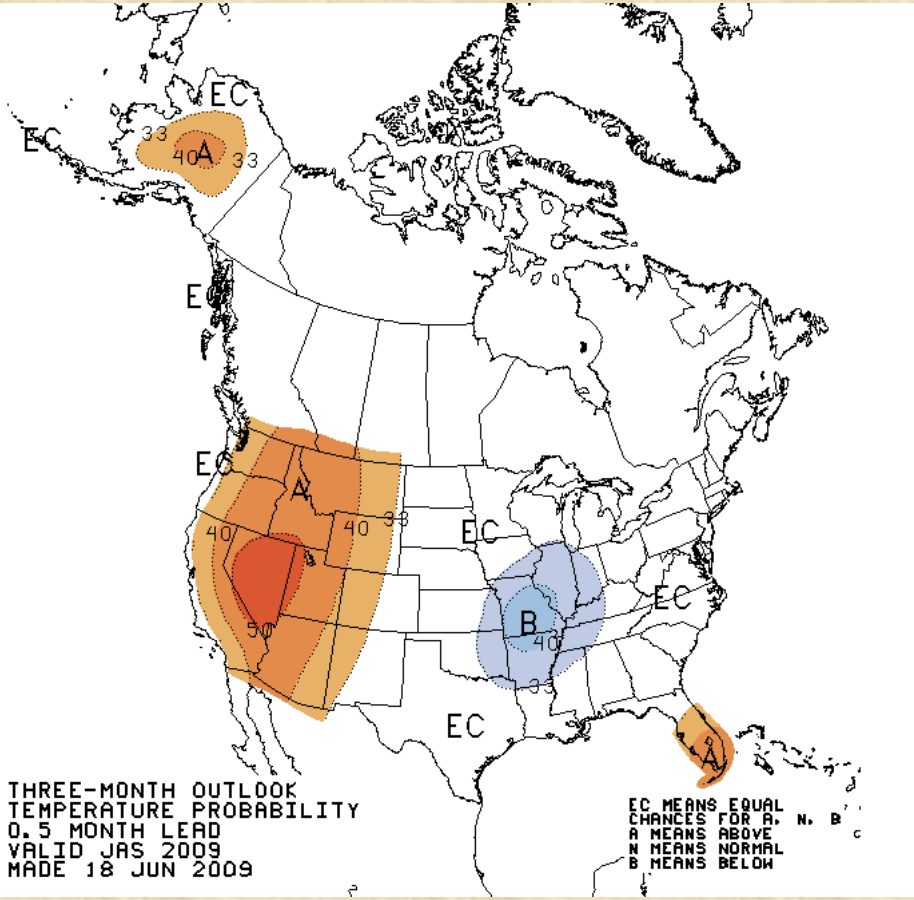




My summer forecasts have remained fairly consistent with each other, anticipating a wet monsoon over much of Colorado's eastern plains, and near-normal at best over the West slope. ***The only "wet" forecast supported by at least some skill in the last decade is the one for the eastern plains of Colorado (the 'near-normal' forecast for eastern UT/western CO is backed up by high skill levels).*** **Source:** ***http://www.cdc.noaa.gov/people/klaus.wolter/SWcasts/***

CPC Temperature Forecasts

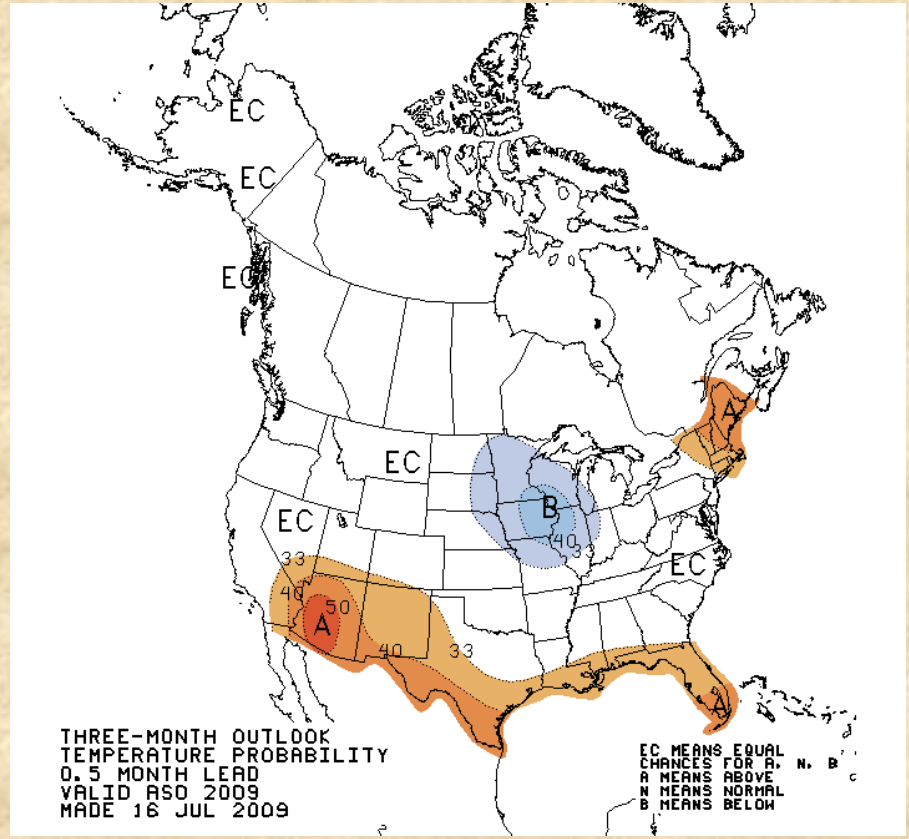


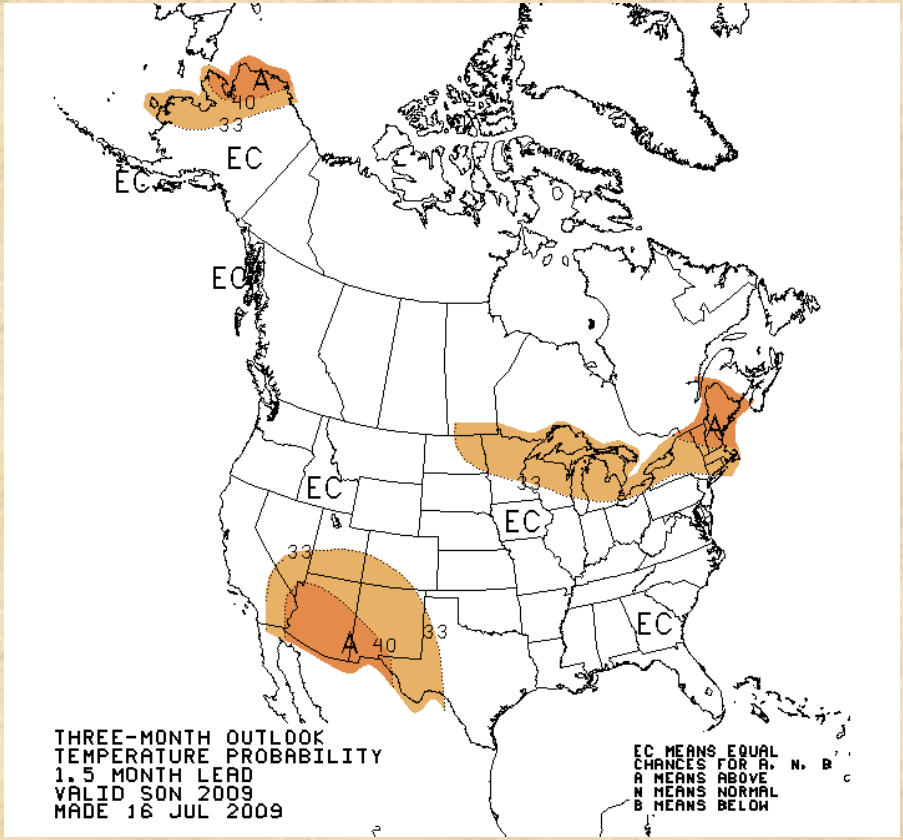


According to CPC's latest update from late June, July (left) and July-September (right) temperature forecasts anticipated warmer-than-average conditions to our west, due to long-term trends.

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

CPC Temperature Forecasts

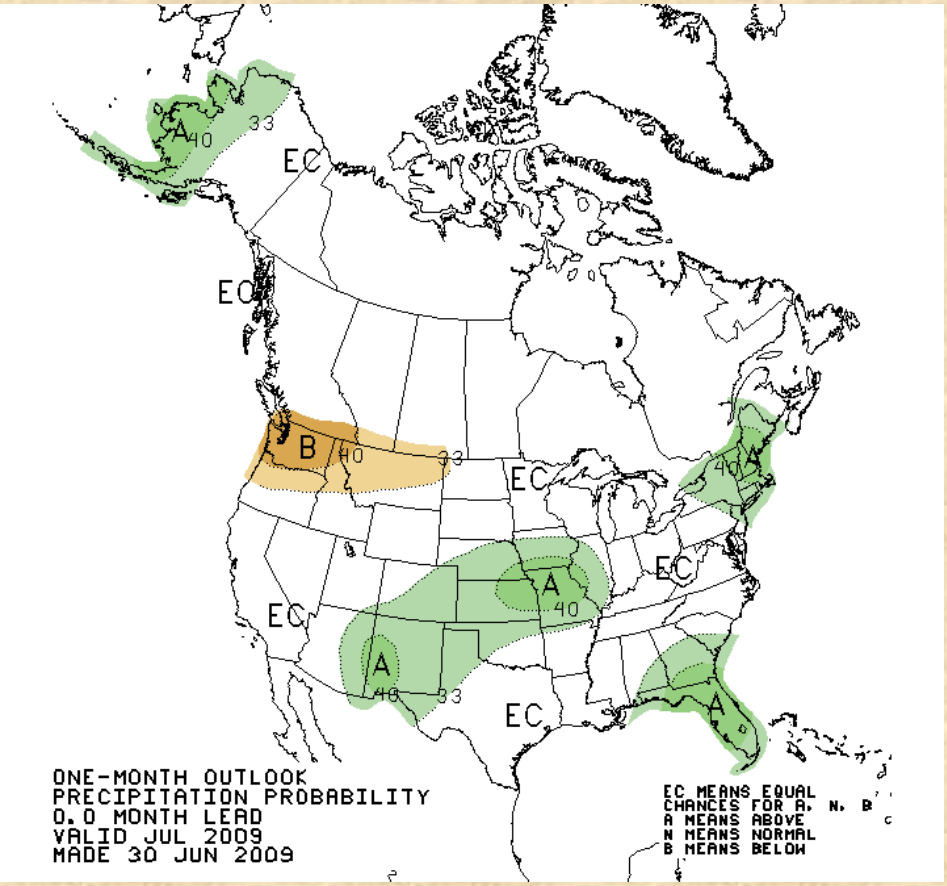


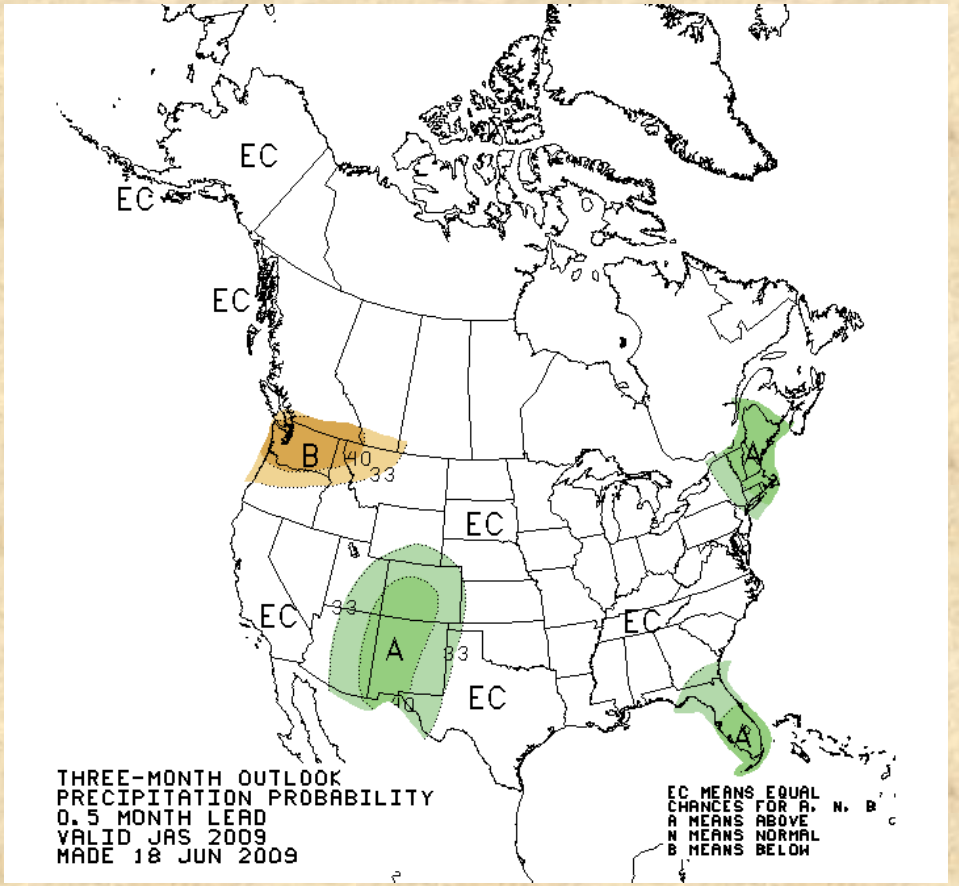


According to CPC's latest update from this morning, Aug-Oct (left) and Sep-Nov (right) temperature forecasts anticipate warmer-than-average conditions to our south, due to long-term trends.

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

CPC Precipitation Forecasts

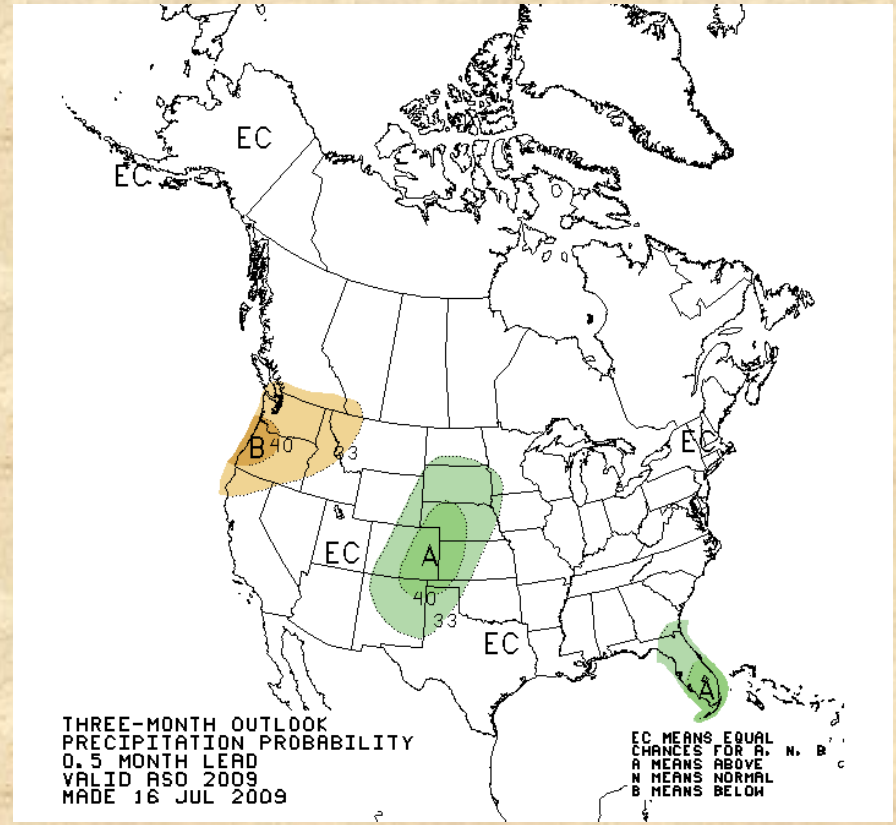


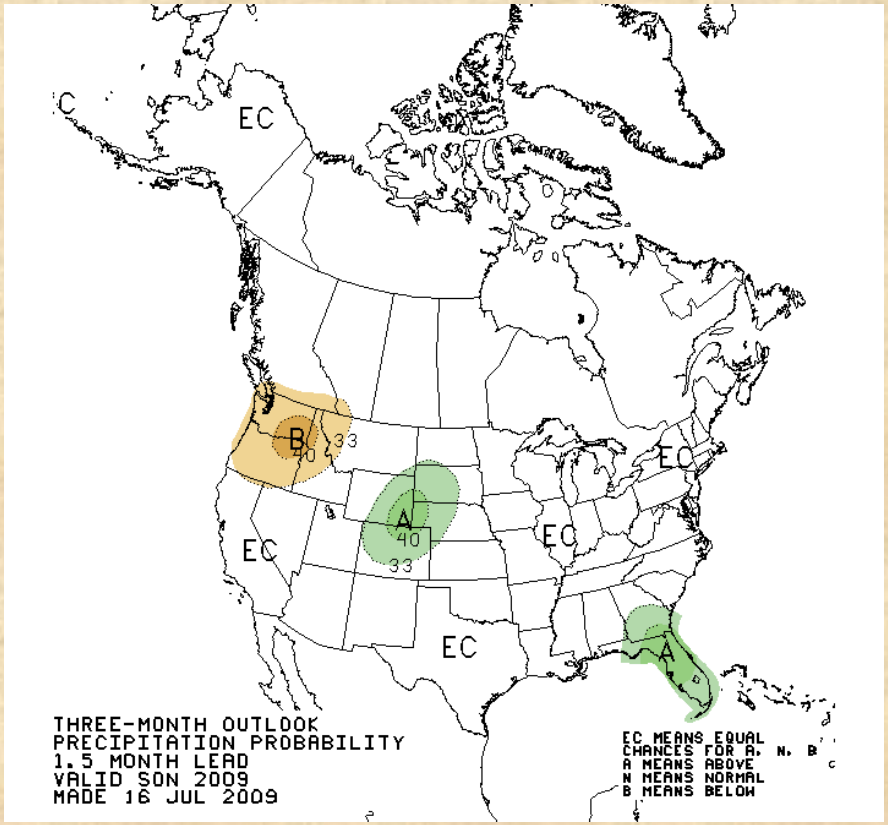


According to CPC's latest official forecasts from late June, July (left) and July-September (right) precipitation forecasts show an active monsoon centered on new Mexico and Colorado, consistent with my input to this product.

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

CPC Precipitation Forecasts





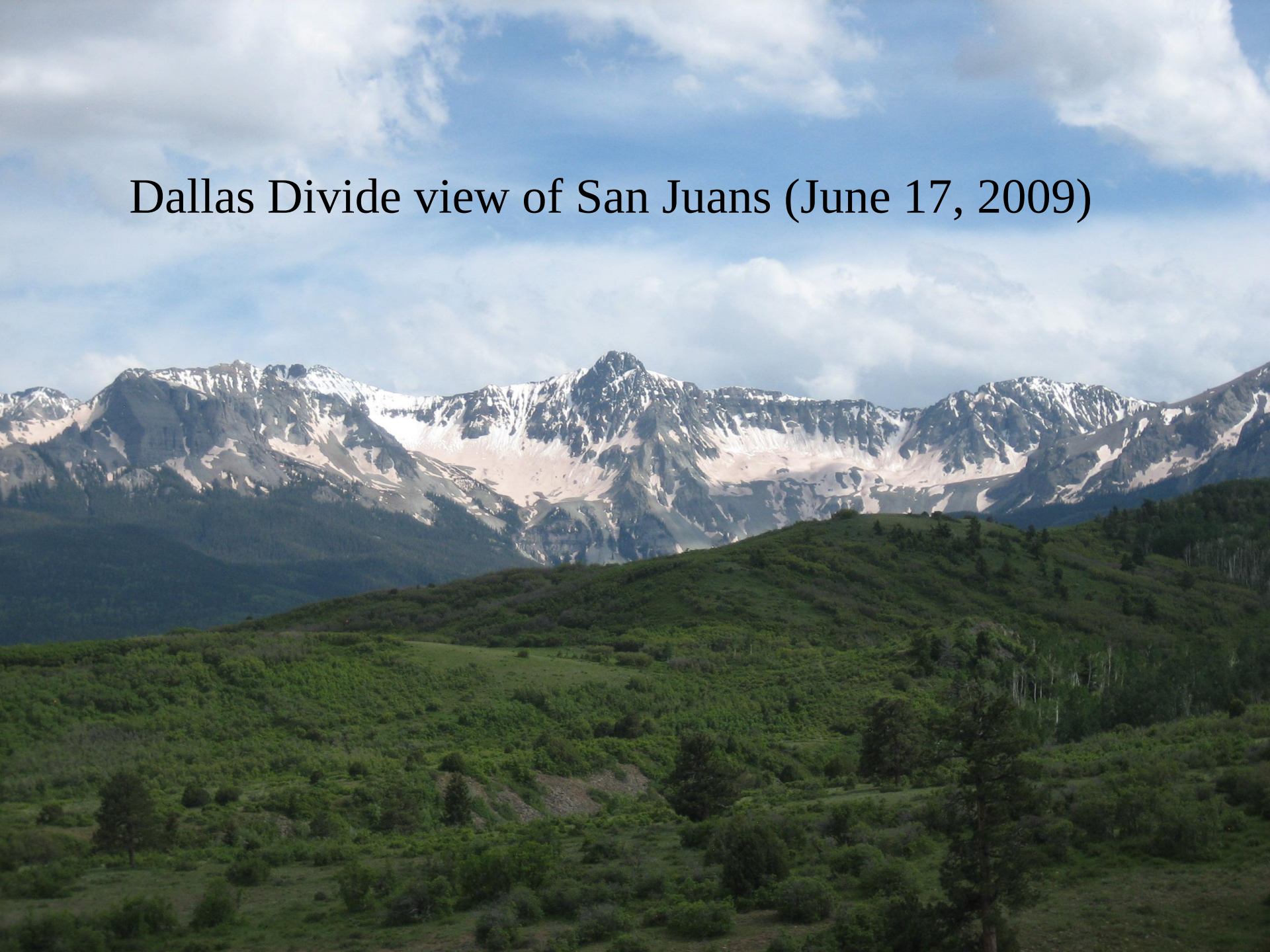
According to CPC's latest official forecasts from this morning, Aug-Oct (left) and Sep-Nov (right) precipitation forecasts show increased odds for precipitation in and around Colorado, consistent with my input to this product.

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

Executive Summary (early version)

1. During the fall of 2008, weak-to-moderate La Niña conditions returned and influenced our weather right thru the winter. As of July 2009, this second season of La Niña is clearly over. In fact, weak-to-moderate El Niño conditions have become established since June, but it is not clear how strong they will get later this summer, nor whether they will last through the next winter.
2. June have brought a return of cool and wet weather for Colorado after a dry and warm spell that led to rapid snowmelt in our higher elevations, possibly accelerated by a heavy coating of dust in at least the San Juans and Elk Range. June's early monsoon-like pattern has been replaced this month by a drier pattern that would have been more typical of late June ahead of the monsoon season... I expect to see a return of more typical monsoon-like weather by next week.
3. My experimental forecast guidance for the monsoon season (July-September 2009) is supportive of slightly enhanced precipitation chances from eastern New Mexico to eastern Colorado, while Arizona and northwestern Utah face similar but opposite precipitation odds. Compared to earlier forecasts for the monsoon, precipitation odds are about the same or slightly more favorable. The overall pattern is somewhat reminiscent of last year's summer monsoon outcome, during a brief ENSO-neutral stage in the tropical Pacific.
4. Bottomline: Instead of just going for a second 'summer vacation', La Niña has left for good. A switch to at least weak El Niño conditions did occur last month. This helps the odds for a wet monsoon season in much of Colorado, especially on the eastern plains.

Updated next week: ***http://www.cdc.noaa.gov/people/klaus.wolter/SWcasts/***


Dallas Divide view of San Juans (June 17, 2009)


Independence Pass (June 18, 2009)