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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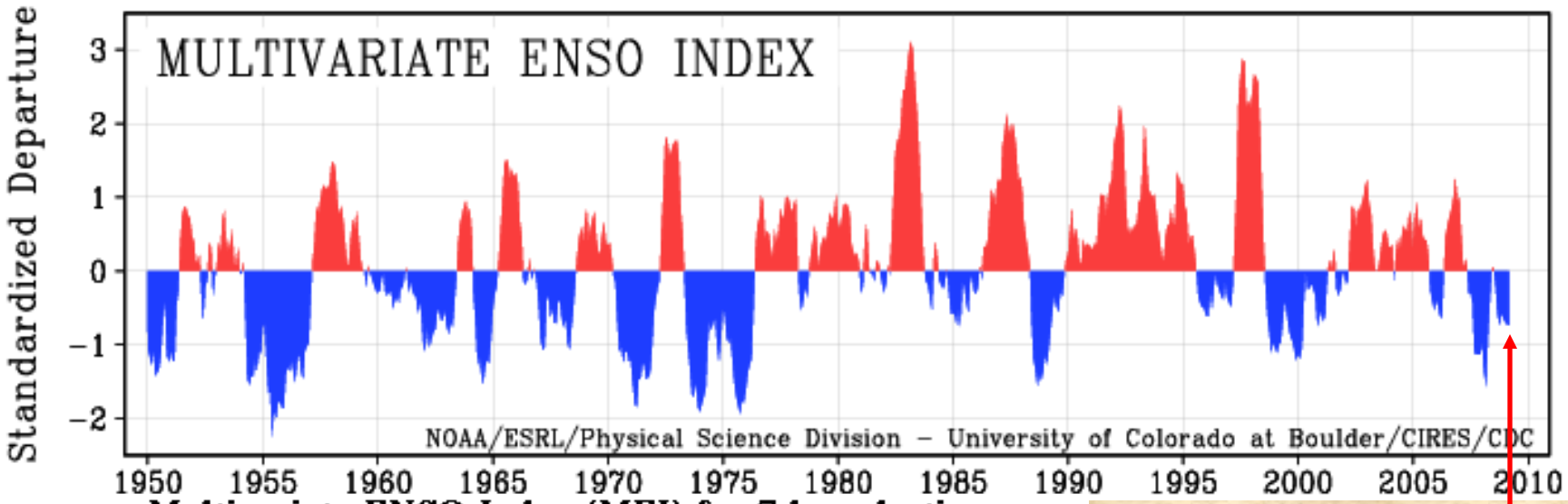
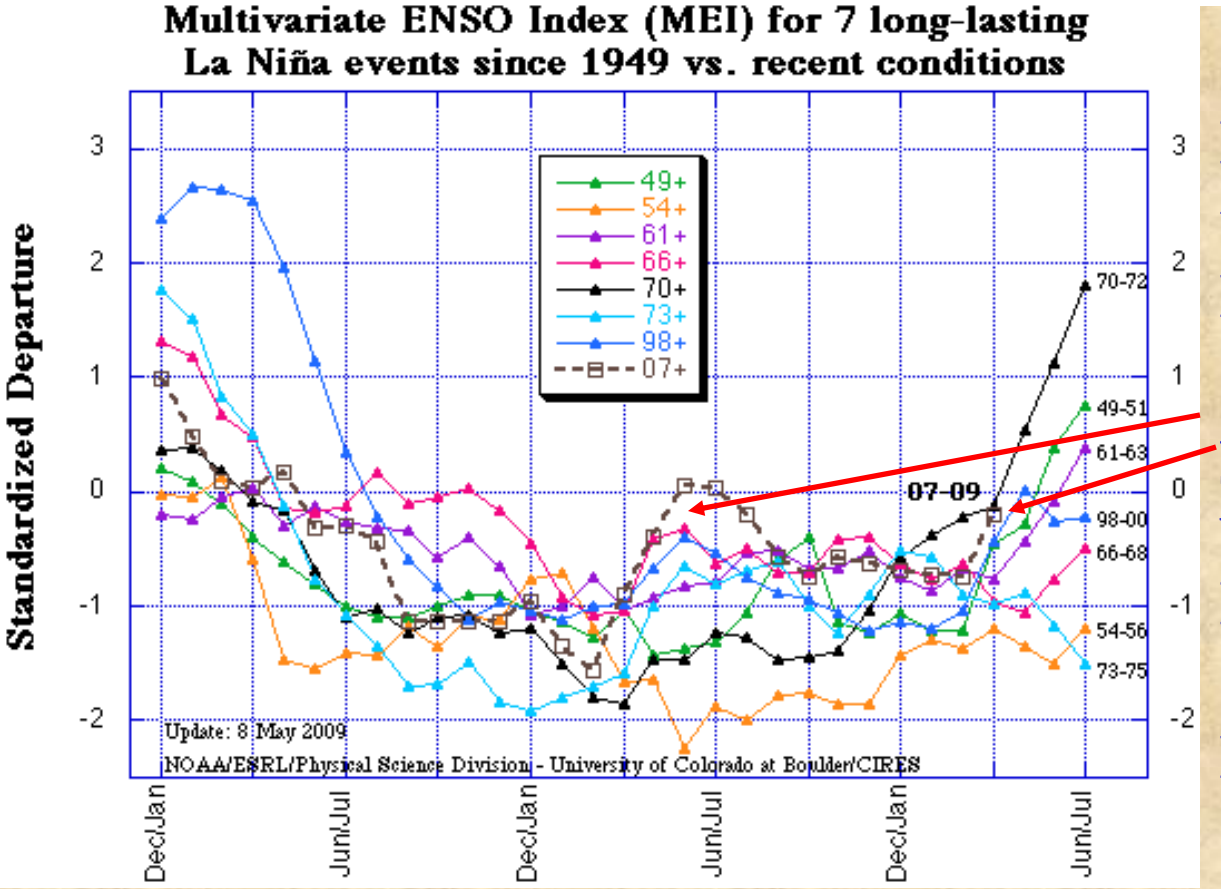
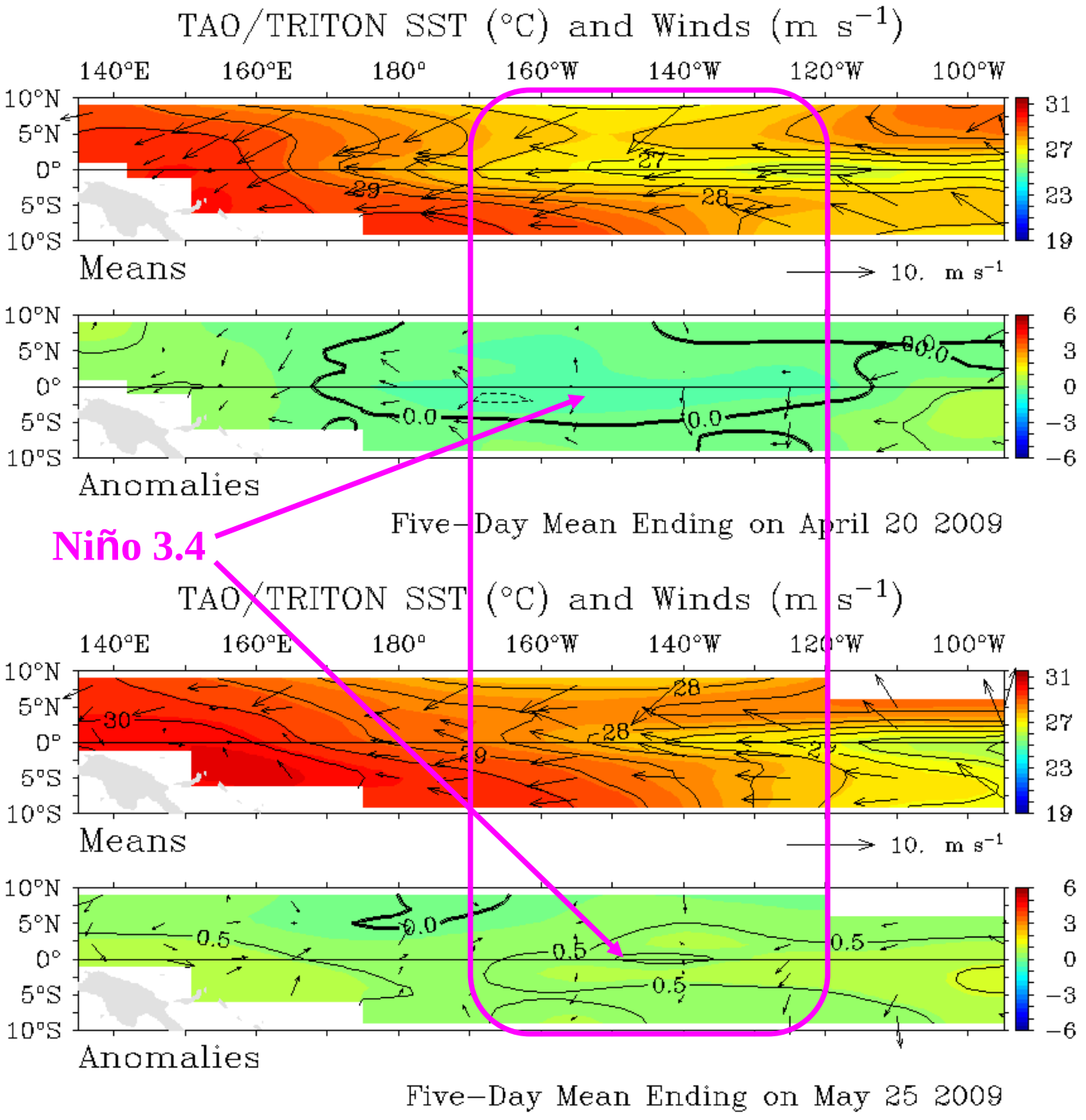
- **Good-bye La Niña/Hello El Niño?!**
- **Recent weather & expectations for next few weeks**
- **Different ENSO/PDO scenarios**
- **Experimental Outlook Jul-Sep '09**
- **CPC forecasts for June - September '09**



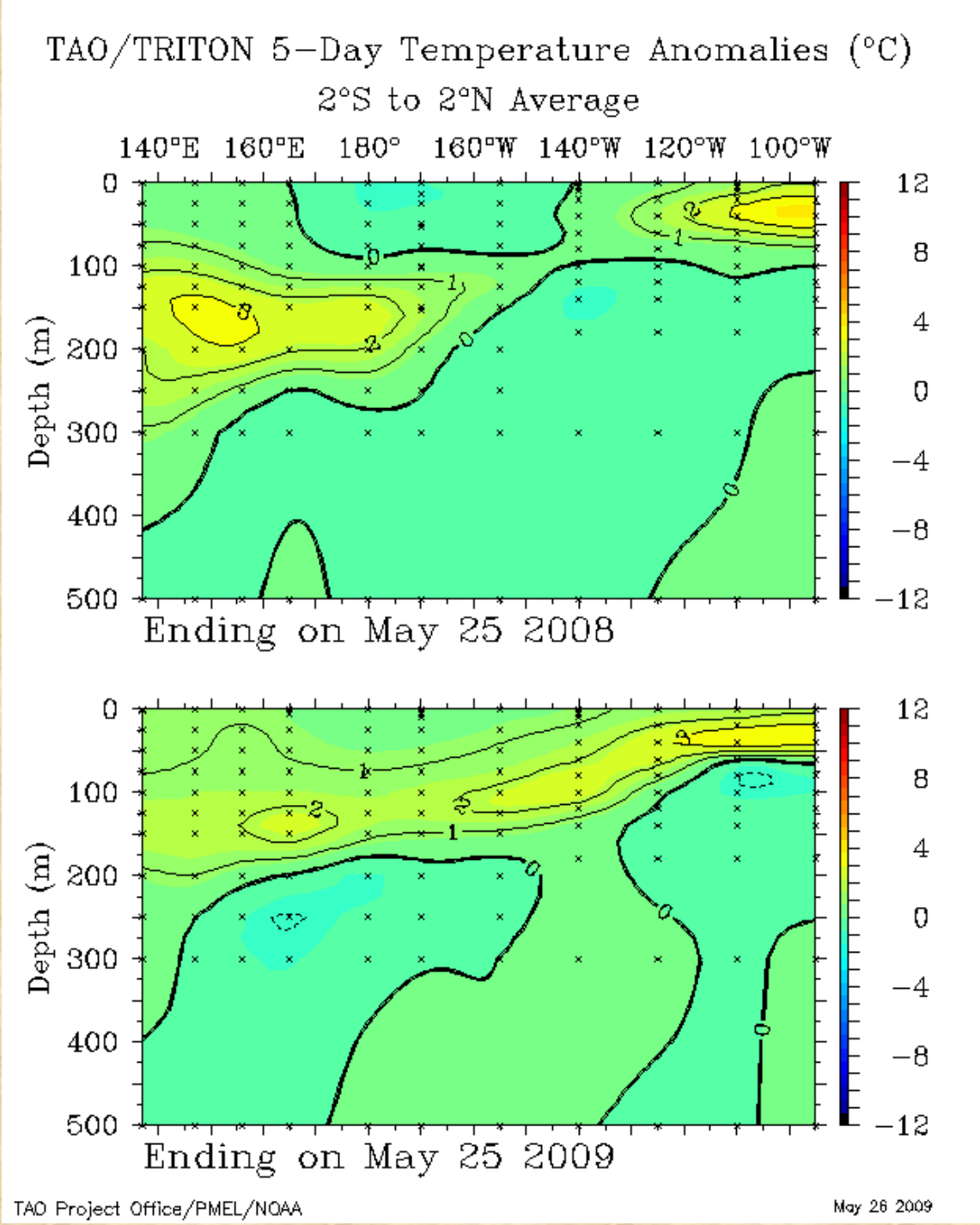



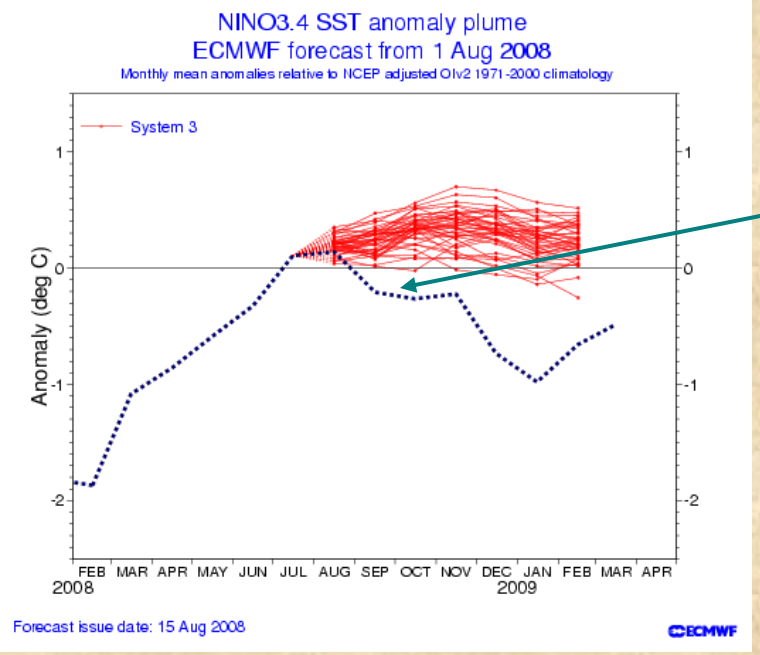

**Looks like we just saw the end of our 2nd year La Niña phase, about a month ahead of last year, partially because with this milder La Niña winter, it took less effort to get to back to ENSO-neutral.**

**Current state of ENSO (bottom) compared to last month (top): continued warm-up from La Niña two months ago to weak El Niño-like conditions this week! Wind anomalies are fairly weak, keeping all options on the table…** ***Will the warming trend be enough to carry us into an El Niño summer?***



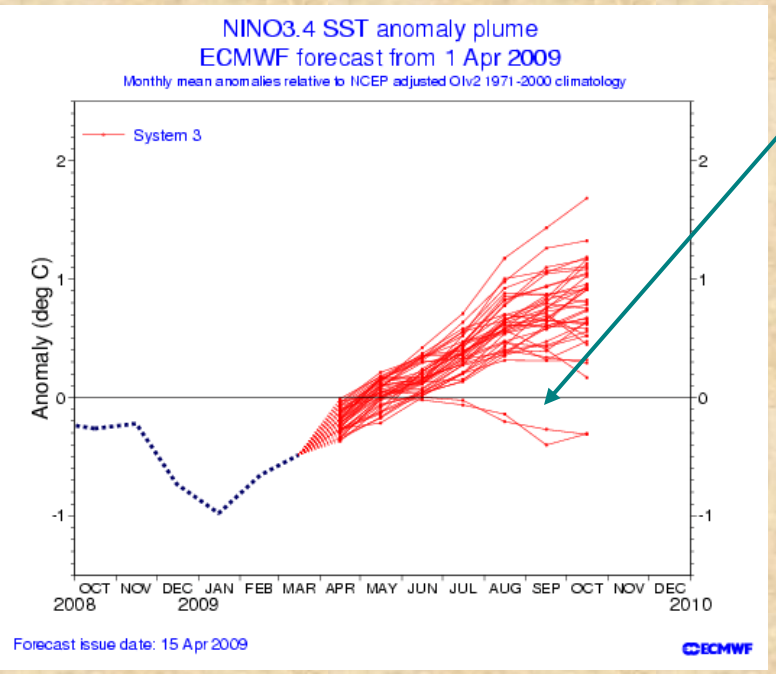
**Current state of ENSO (bottom) compared to last year (top): this cross-section comparison shows a lot of similarities to last year, when the tropical Pacific was poised for a 'summer vacation' from La Niña, but by the same token, big subsurface anomalies do not guarantee an El Niño, let alone sustain it into the winter!**



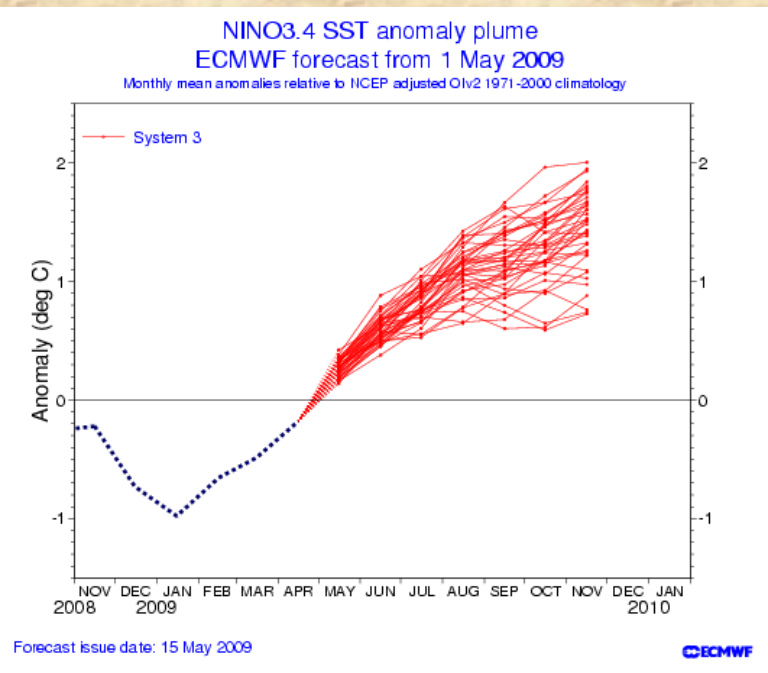


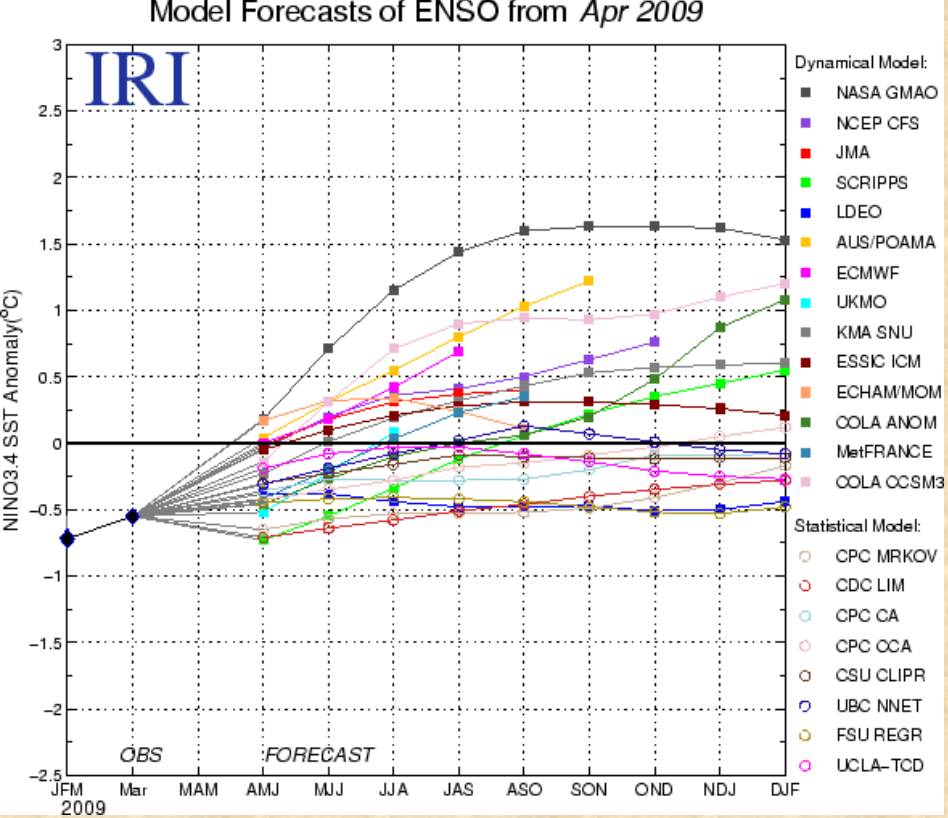

**The European model's August '08 forecast (left) anticipated a weak El Niño, but was 'off' already by September, when SST had dropped below the full ensemble forecast range!**

**A more serious temperature drop commenced in November, and hit bottom near -1°C (moderate La Niña) in January 2009. Last month's forecast (bottom left) indicated a return to above-normal SST by July, with only 2 dissenters out of 50, and less than 10 members reaching above +1C.**

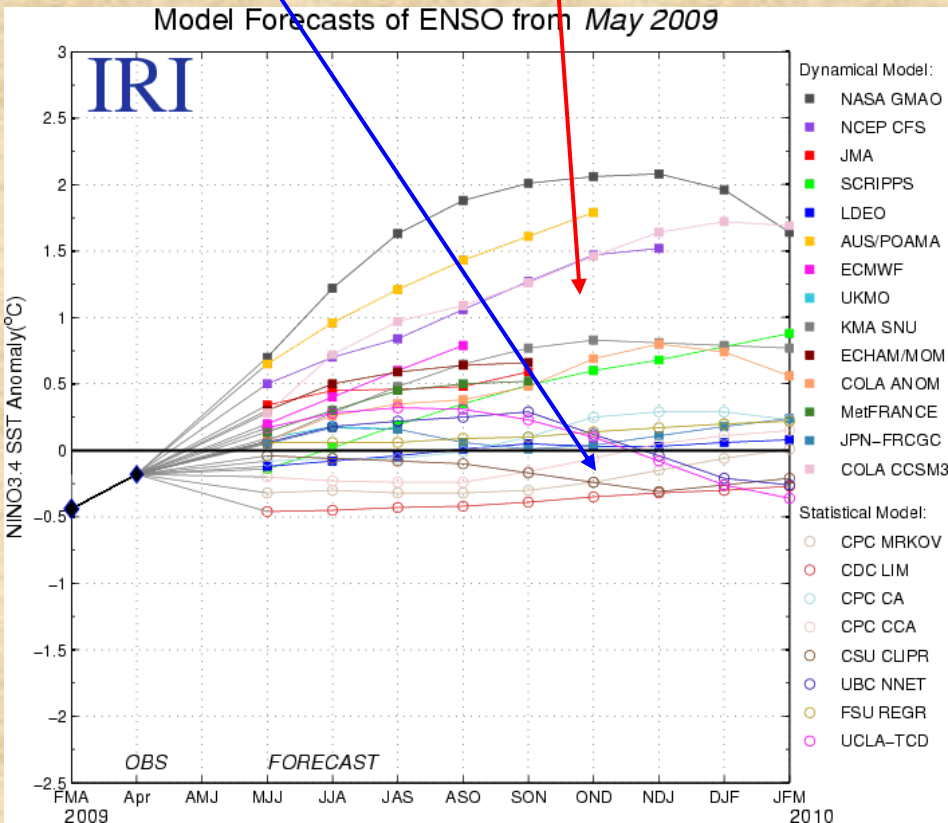



**The most recent forecast (right) 'throws all caution to the wind', and gives us unambiguous El Niño (mostly >1C) conditions by July!**



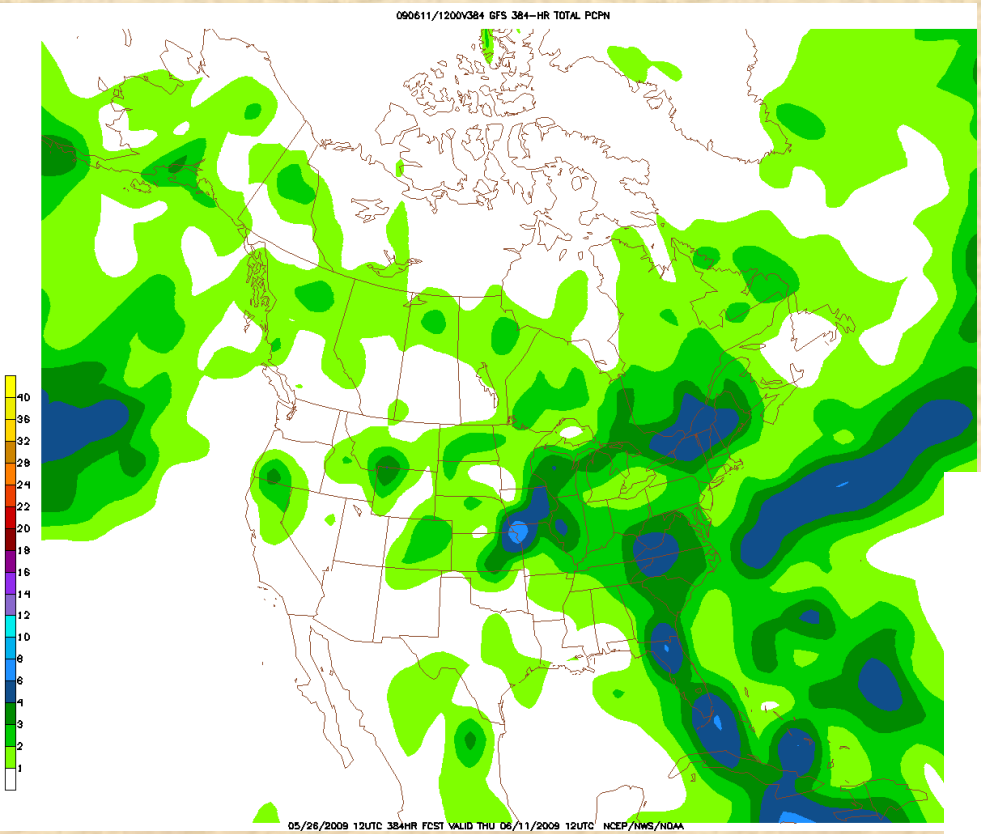



**Latest ENSO forecasts from almost two dozen dynamical & statistical forecast models (below) vs. last month (left). 11 out of 14 dynamic models show El Niño later this year, while NONE of the statistical models show that scenario. The split between dynamic and statistical models is as big as ever (1C!).**

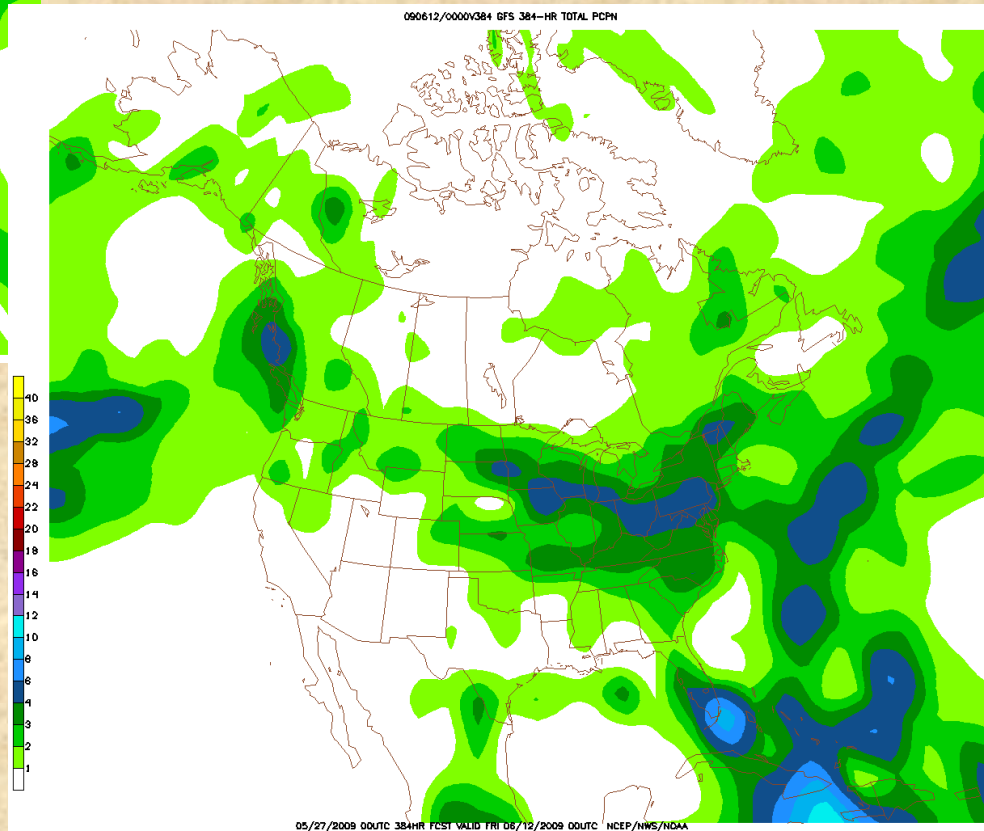



***Historically, La Niña events of the recent magnitude have had a tendency to continue for three winters (54-57; 73-76; 98-01), much more so than El Niños. Mean PDO values in '56: -1.8; '75: -1.0; 2000: -0.6. So far in 2009: below -1.4! On the other hand, if we reach El Niño levels this summer, it would be next to impossible to return to La Niña by this winter.***

# What can we expect in the next two weeks?

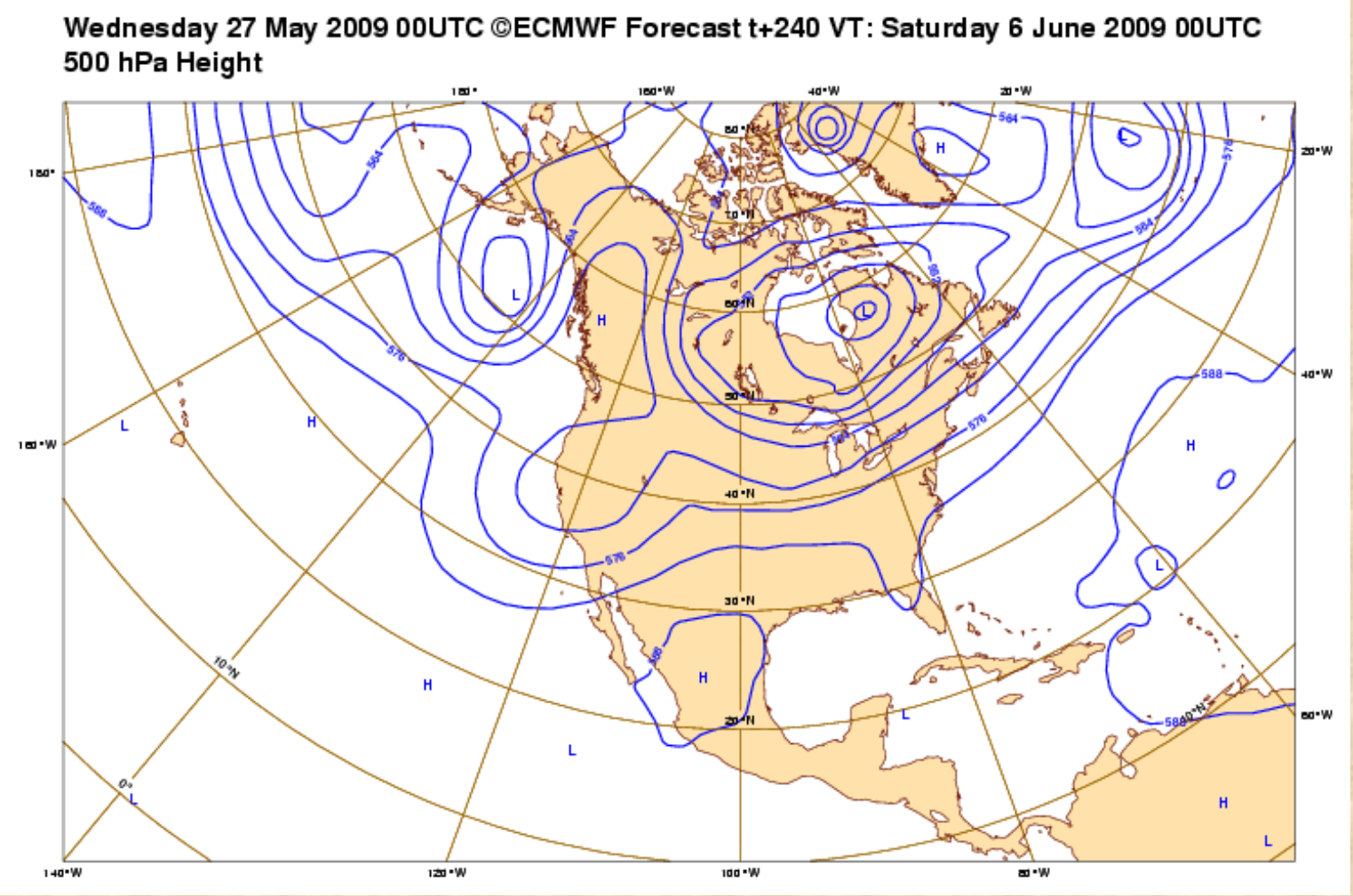



**Looks like most of Colorado has at least a decent chance for moisture in the next two weeks (still on a weekly timetable…), maybe not quite as wet as last week, but enough to keep drought concerns at bay!**



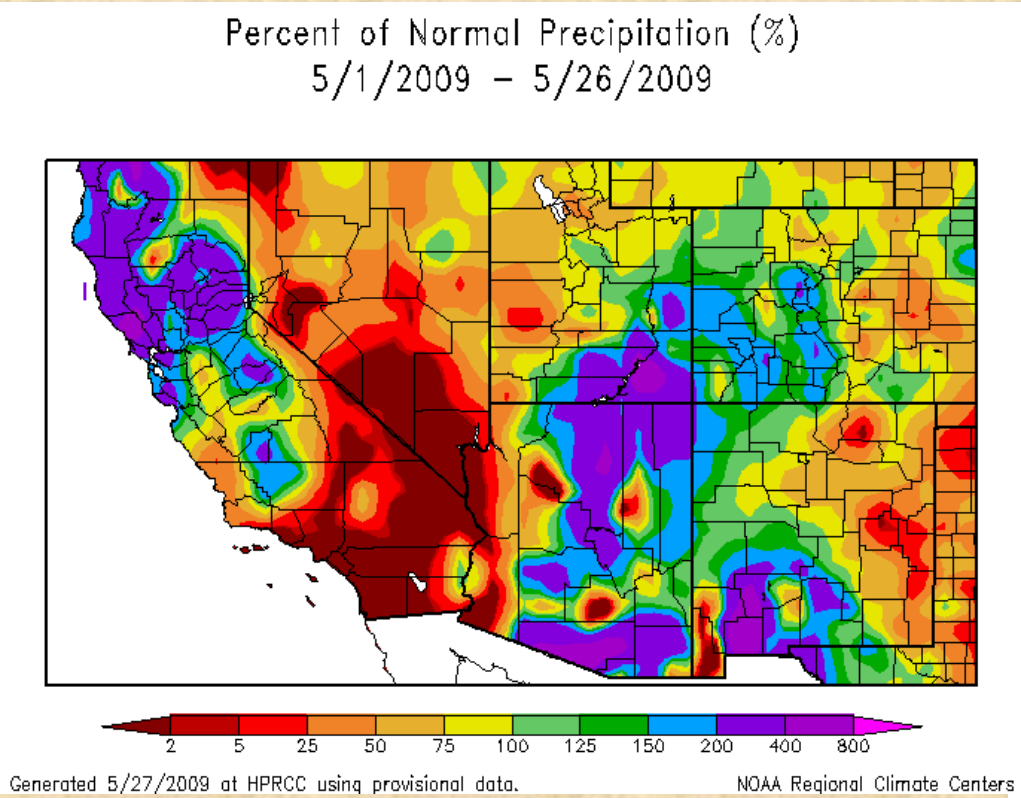

**Yesterday's morning GFS control-run (top) generated 2" for half of Colorado, while last night's run (right) kept the pattern, but lowered amounts somewhat. This model did a fair job anticipating recent wetness one week+ in advance. Our next best chance for rain is around Sunday into next Tuesday.**

# Mid-term?



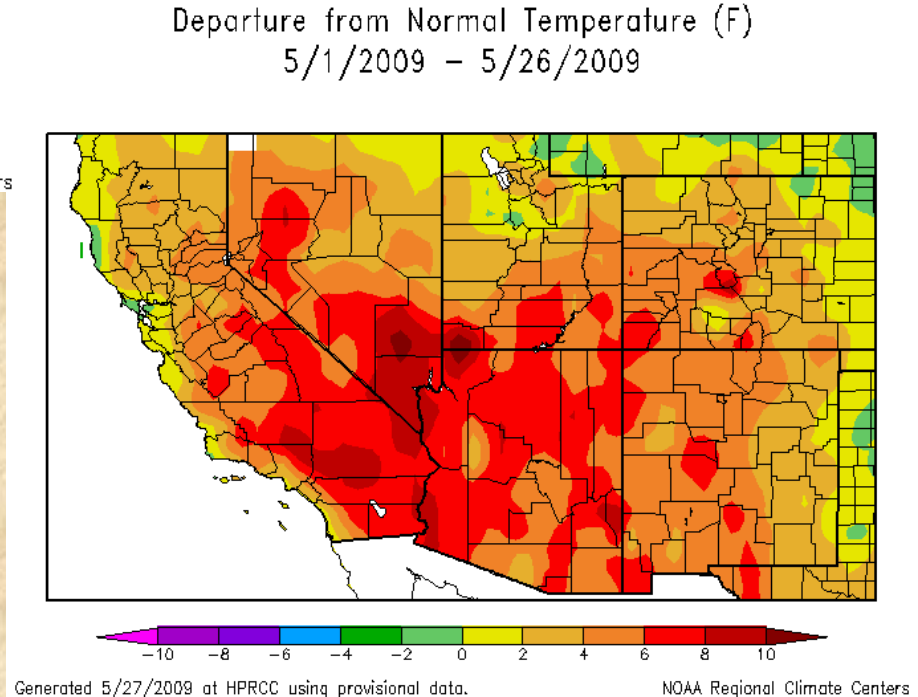

**Looks like we will alternate between unsettled and 'boring' weather over the next two weeks, with weak troughiness lingering over western North America. Typical pre-monsoonal heat waves will probably have to wait until at least the 2nd week of June.**

# What has happened this month?

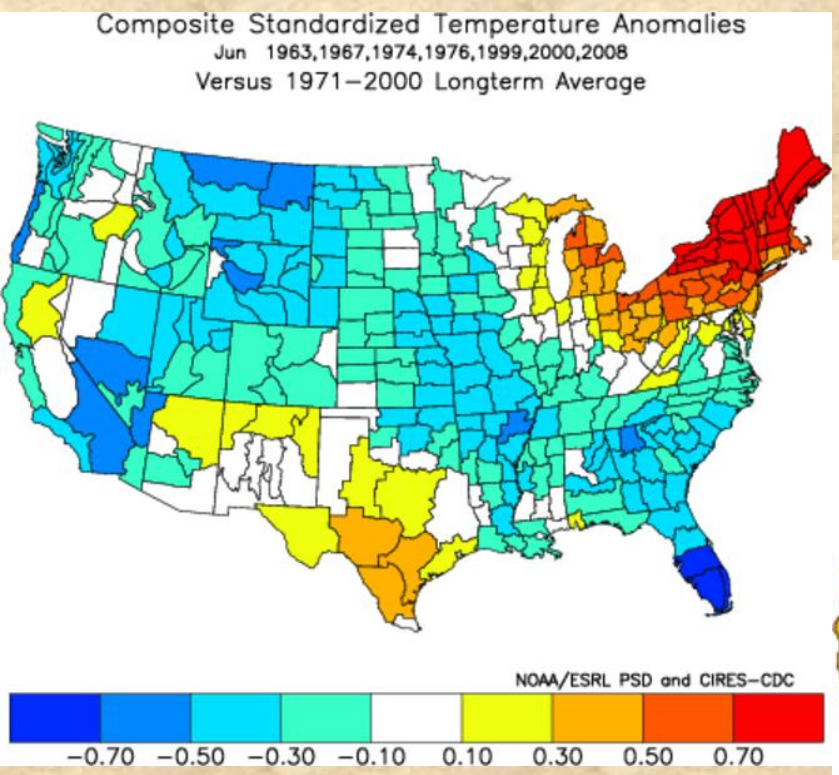



**Until last week, most of May had been warm (below) and dry (left). High temperatures, lack of cloudiness, and unusual amounts of dust led to an early & fast runoff roughly south of I-70. This weekend's 'Early-Bird' monsoonal surge returned near-normal monthly precipitation to our state, and even more to Arizona and southern New Mexico.**

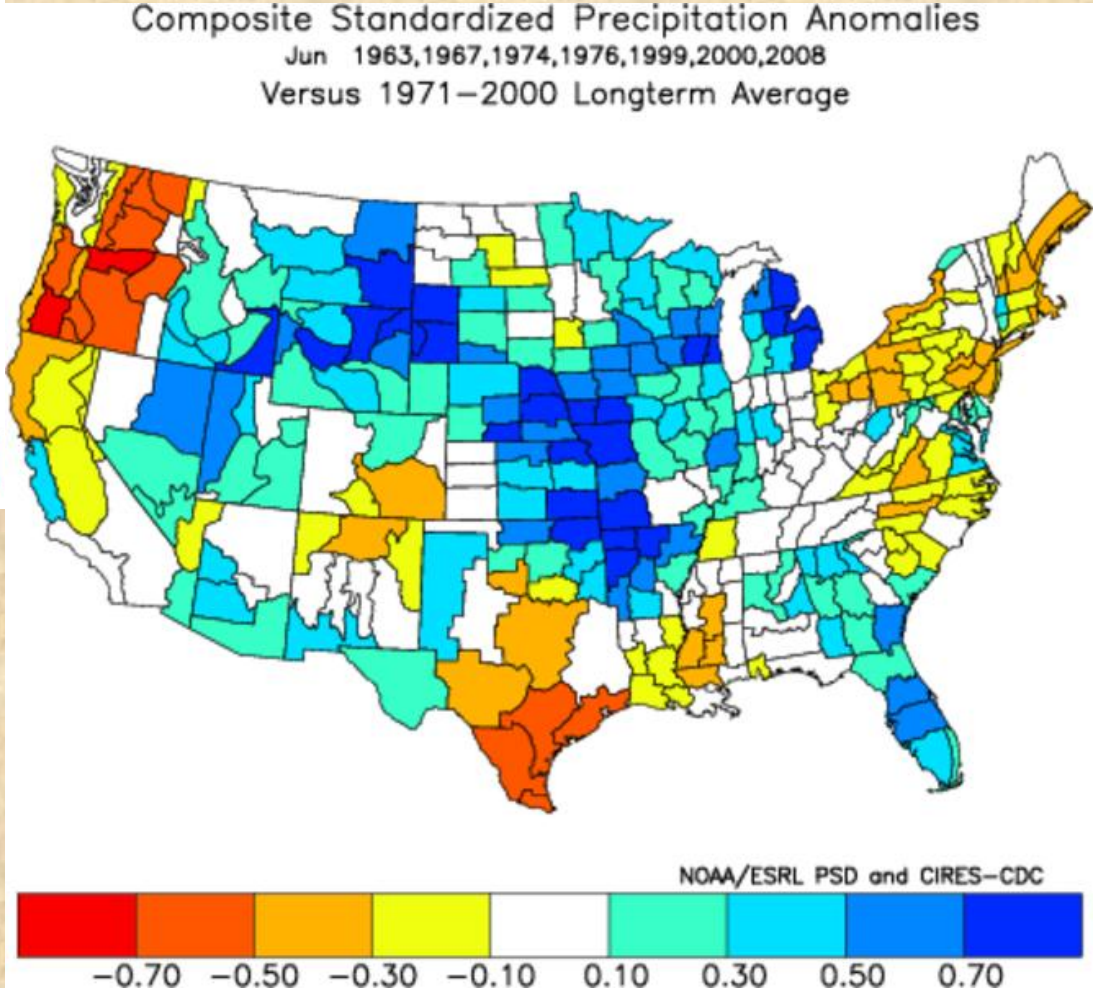
***This month's overall warmth and dryness was still consistent with lingering La Niña impacts, but the early monsoon surge was from a different 'play-book'. IF the Pacific keeps transitioning towards El Niño, anything goes in June!***



# What are typical temp&precip patterns in June with fading La Niña during negative PDO?

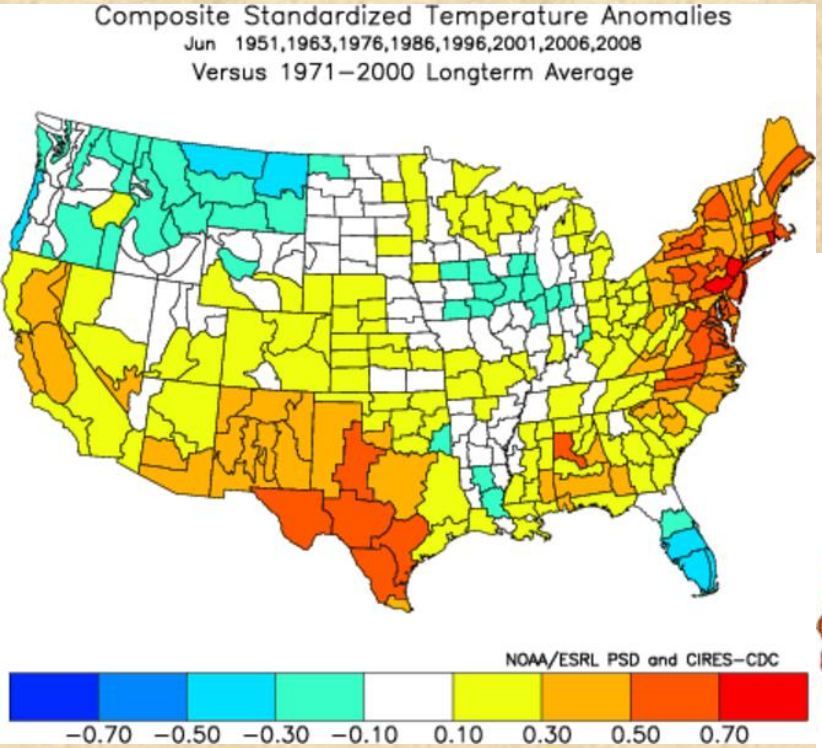



**Significant negative temperature anomalies (left) to our north and west, with only a slight tilt towards cold around here.**

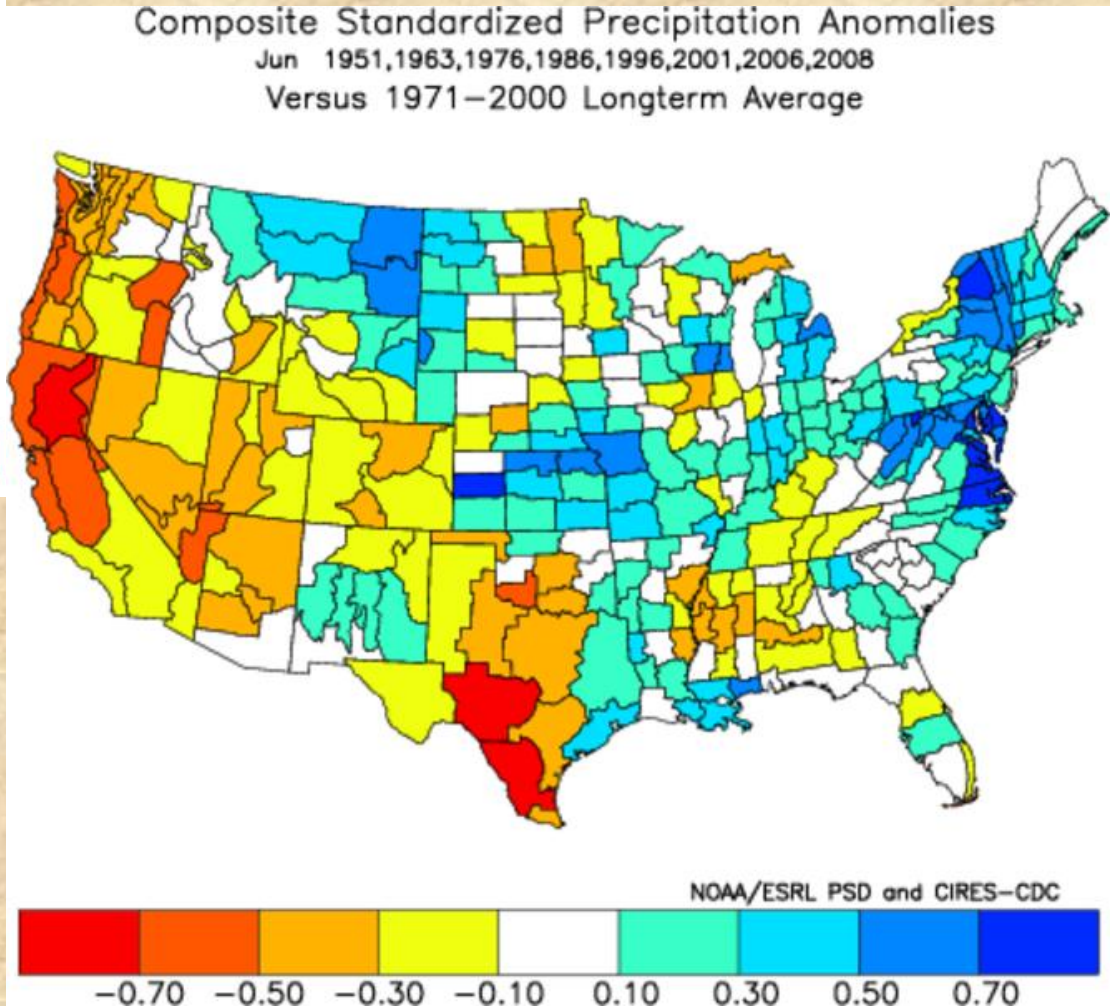



**Significant wet precipitation anomalies (right) in a horse-shoe pattern to our west, north, and east, while much of our state shows little tilt, and the highest risk for dryness in the southeastern plains.**

# What are typical temp&precip patterns in June with rising ENSO indices, but still neutral conditions?

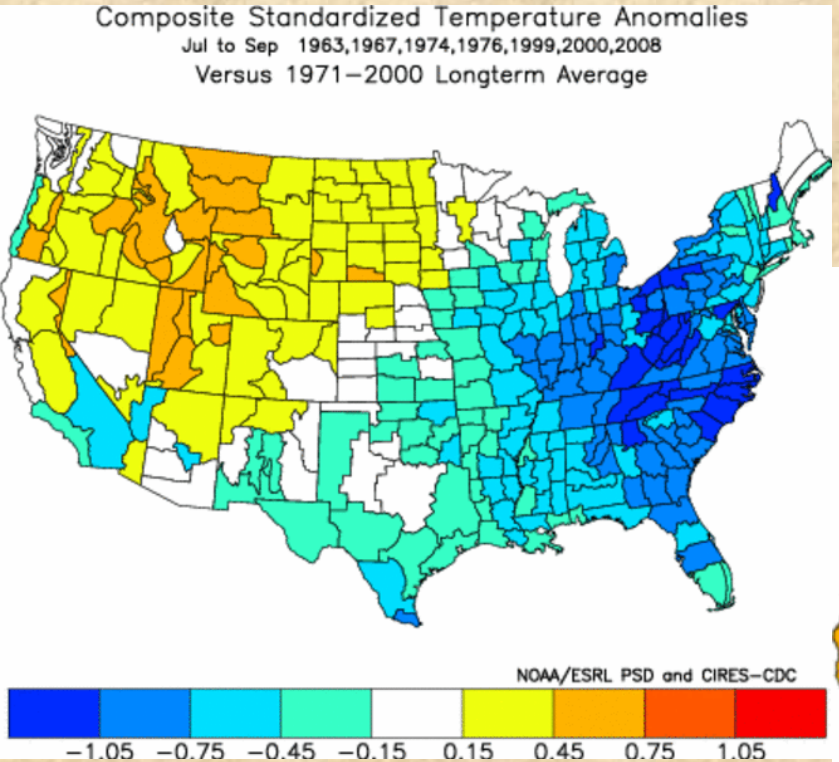



**Significant positive temperature anomalies (left) to our south (Texas), with only a slight tilt towards above-normal around here.**

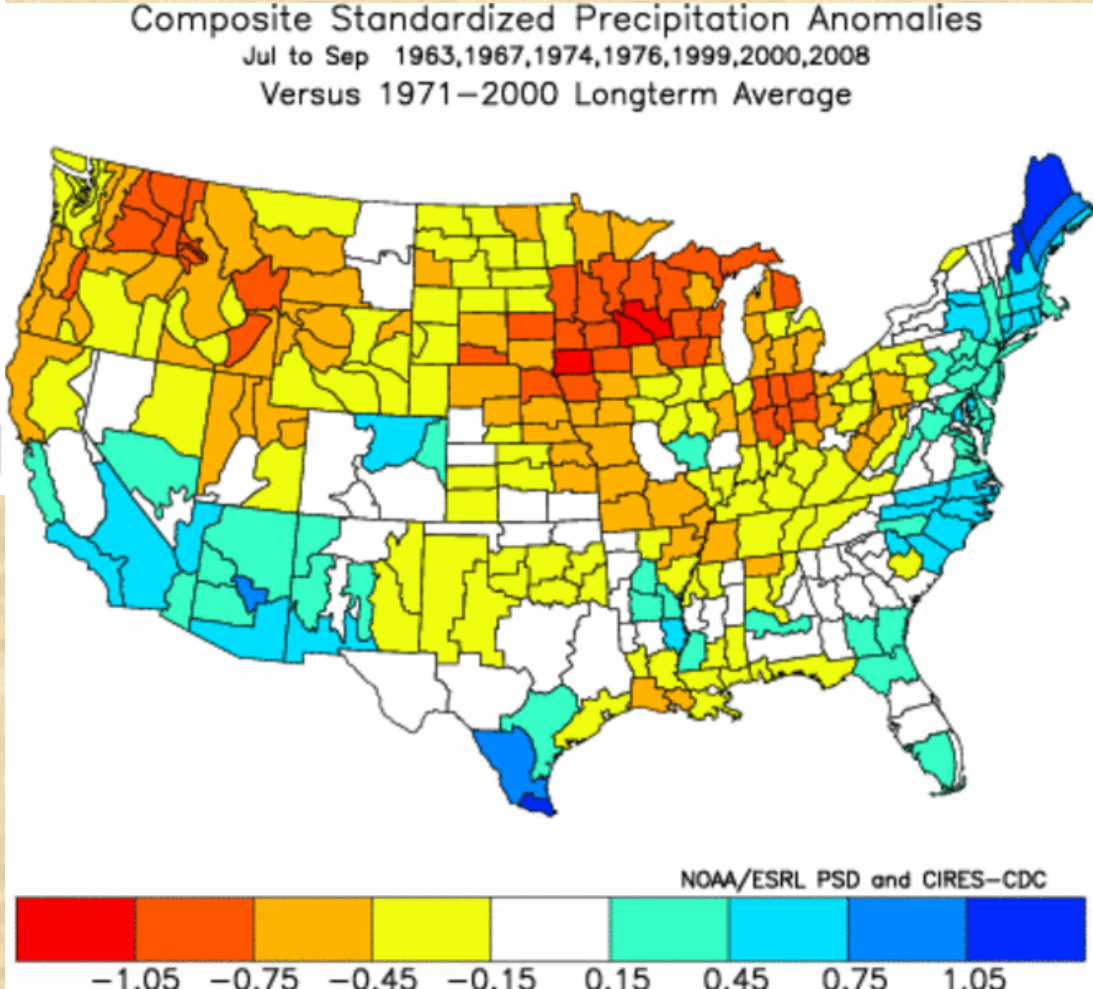



**Significant wet precipitation anomalies (right) to our north (Montana) and east (Kansas), with an overall tendency for dryness in our state.**

# What are typical temp&precip patterns in July-September with fading La Niña during negative PDO?

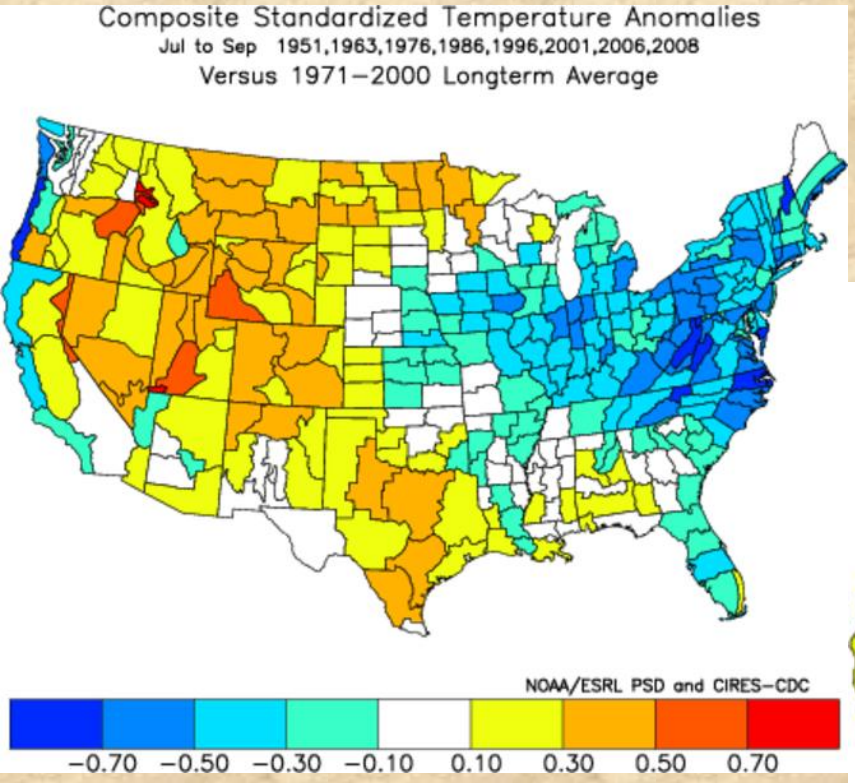



**Significant temperature anomalies (left) are well to our east for cold, and much less of a nod towards warmth to our north and west, with Colorado straddling the near-normal line.**

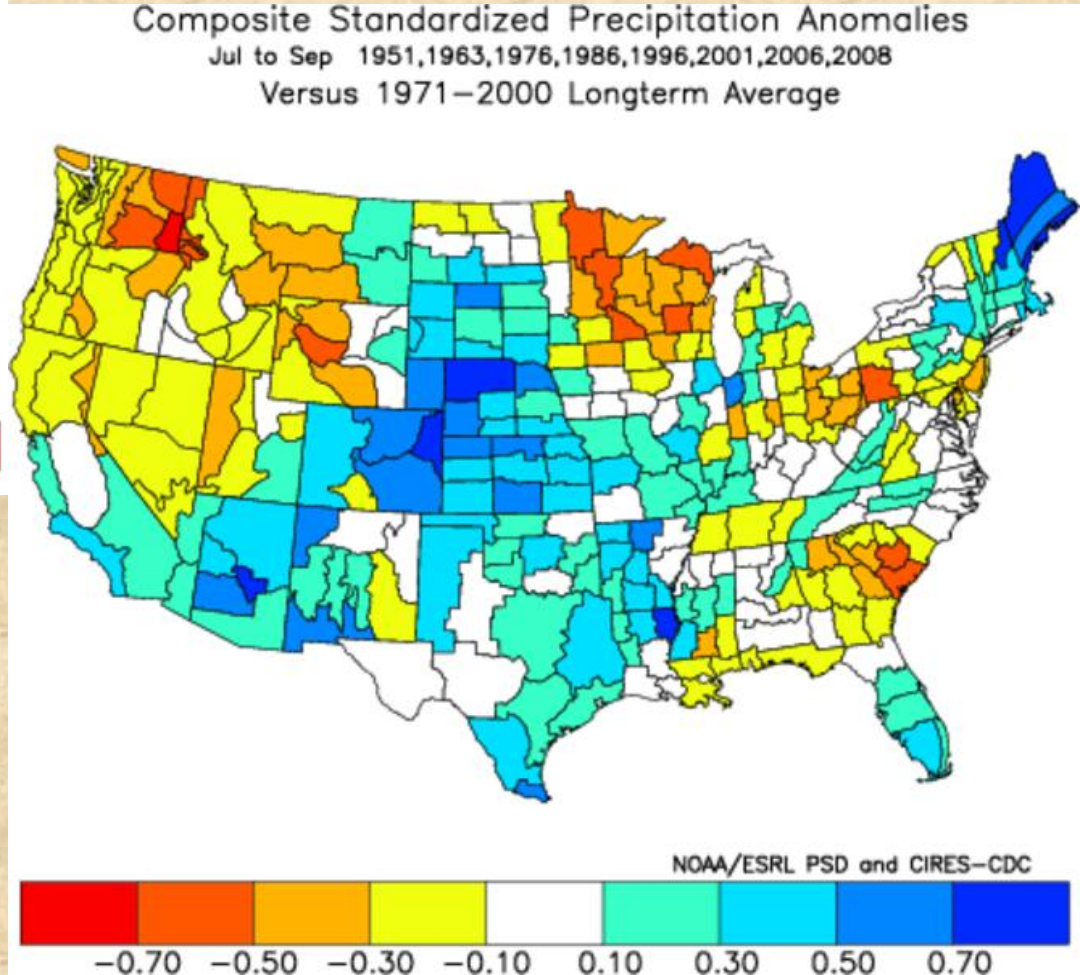



**Significant precipitation anomalies (right) over southcentral AZ, and the South Platte basin for wetness, while significant dry anomalies cover norther Utah. Otherwise, Colorado's odds are close to even.**

# What are typical temp&precip patterns in July-September with rising ENSO indices, but still neutral conditions?

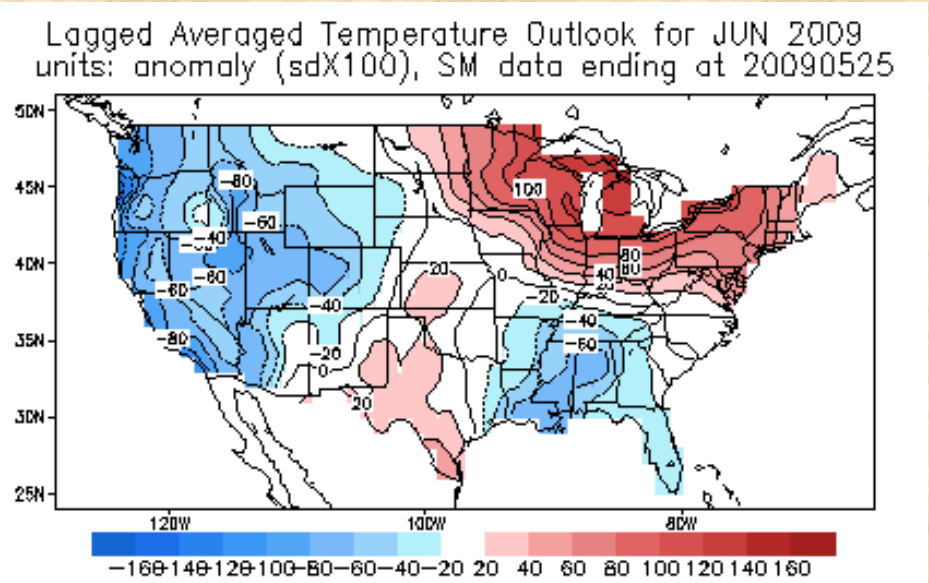


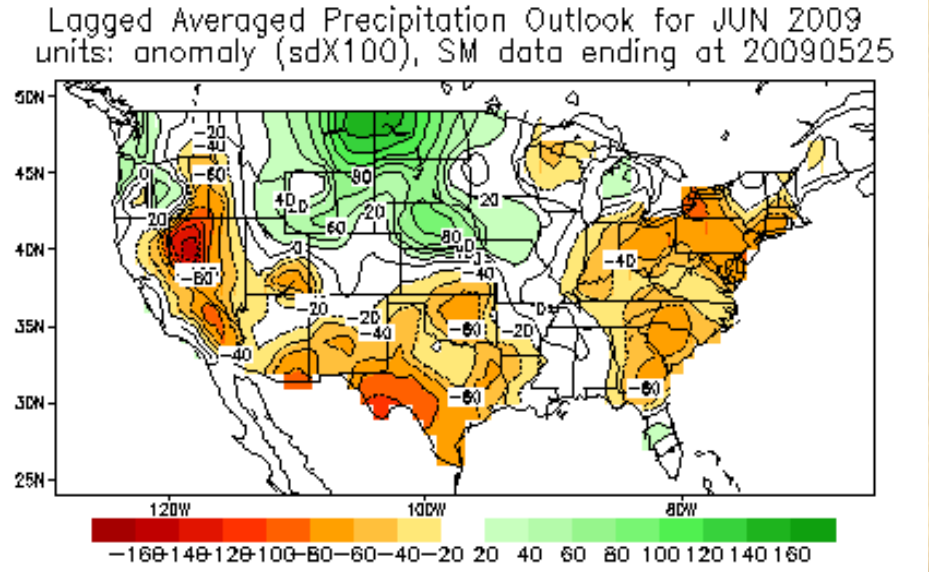

**Significant temperature anomalies (left) remain to our east for cold, with a slight preference for warmth in our state (not significant).**

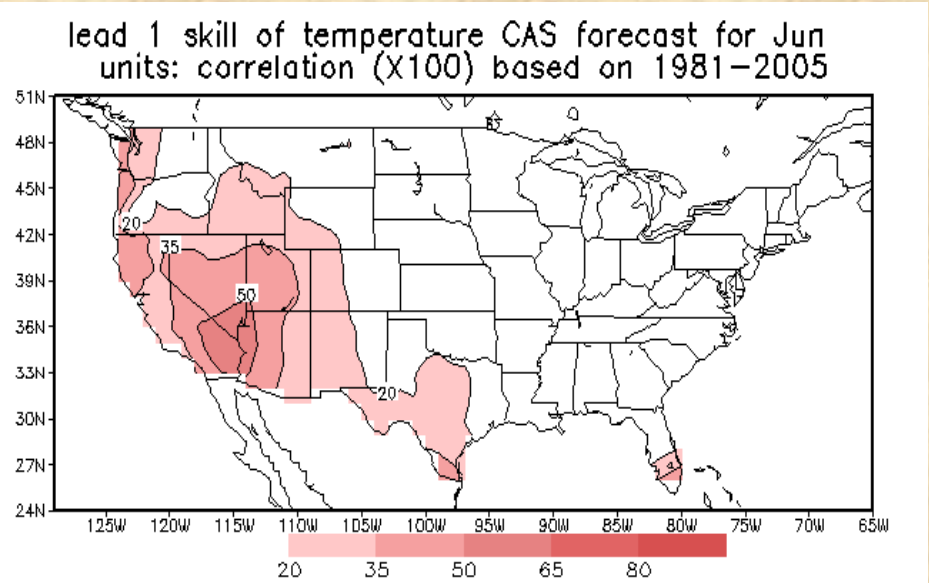


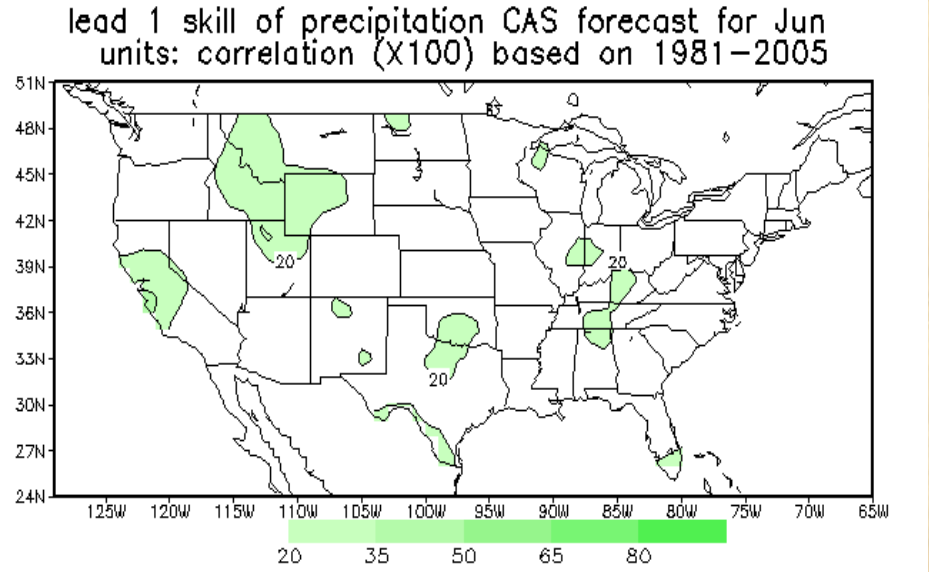

**Significant precipitation anomalies (right) on the wet side over Colorado, especially east of the divide (and in Arizona/NM).**

# What about 'Constructed Analog' Forecasts?



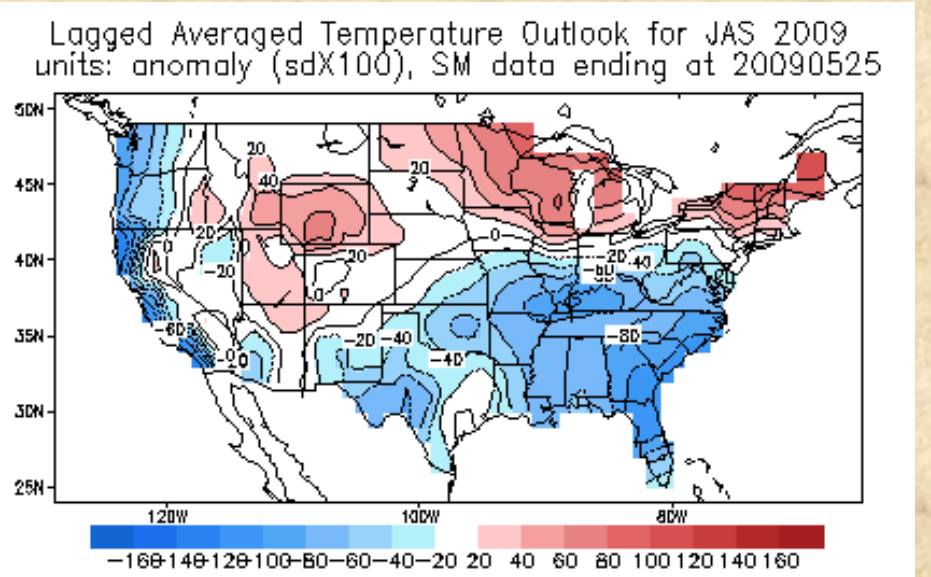



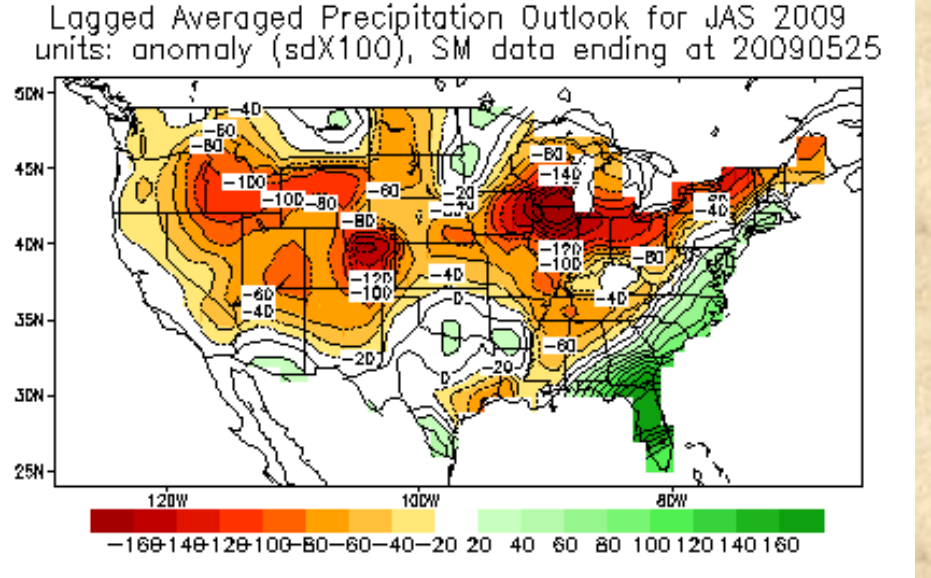



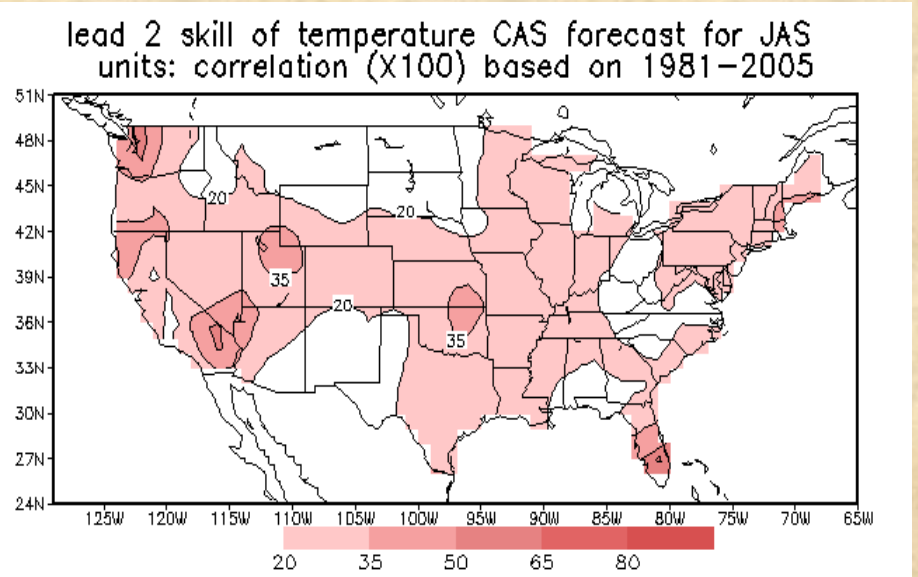



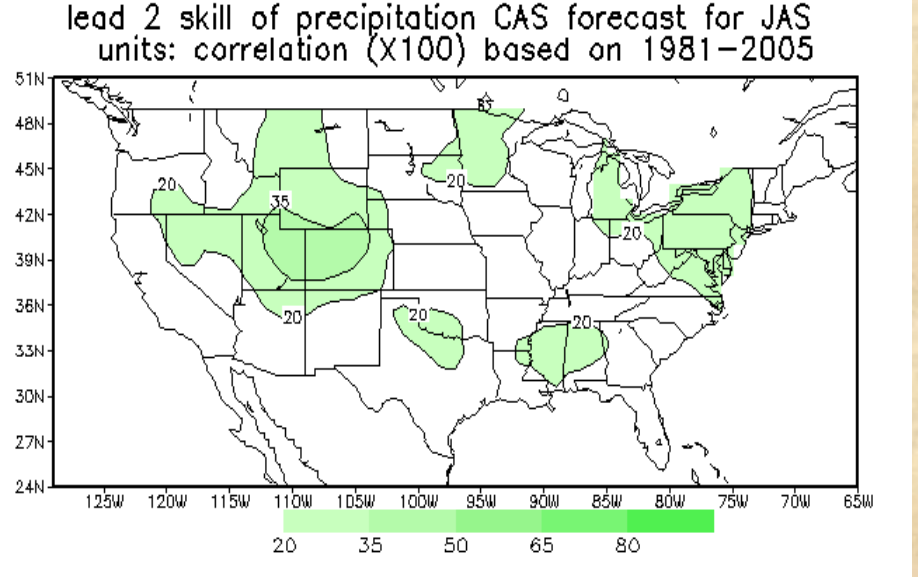

***June forecasts have shown skill in Great Basin, where odd combo of cold & dry is predicted south of 40N - fairly consistent with fading La Niña scenario under negative PDO conditions!***

# What about 'Constructed Analog' Forecasts?



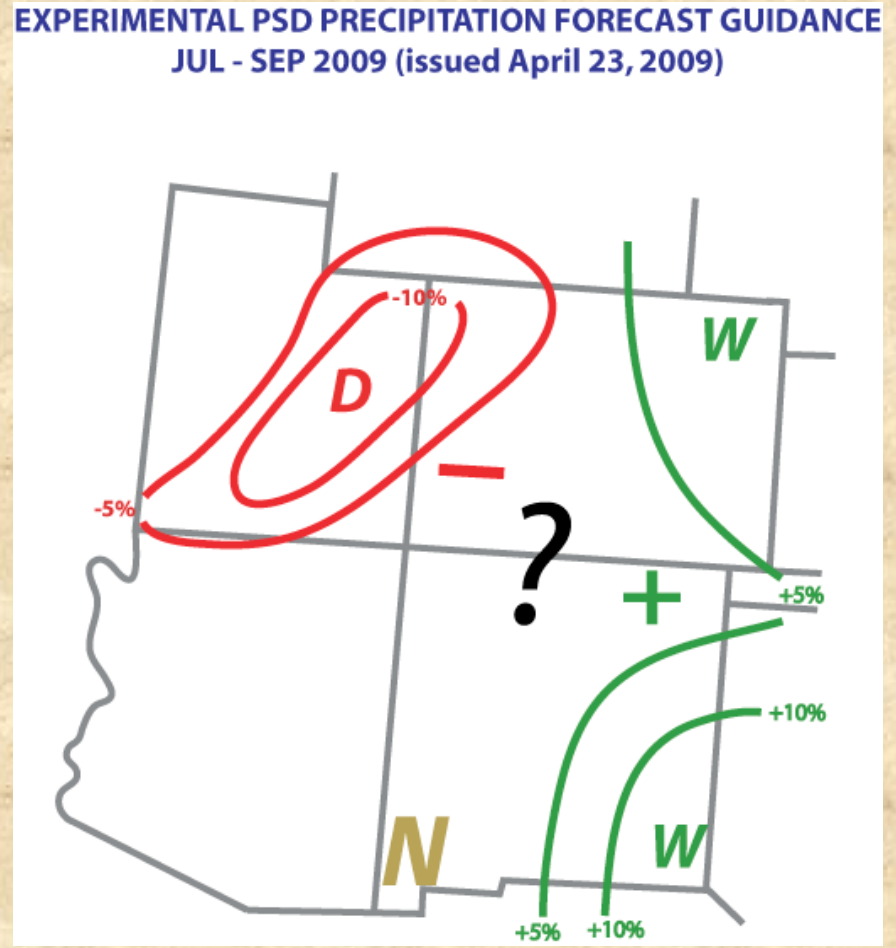



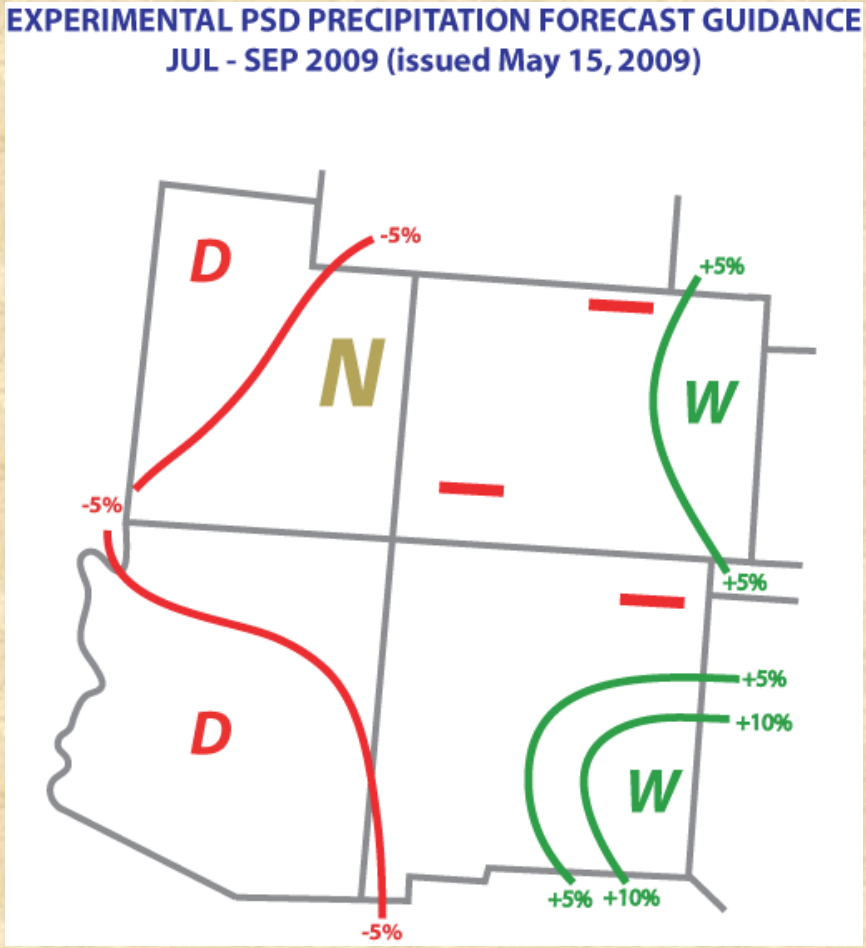




***Dry & warm Jul-Sep forecasts in CO&UT have skill, unfortunately & do not match precip. composites!***

# Experimental CDC "Forecast Guidance"

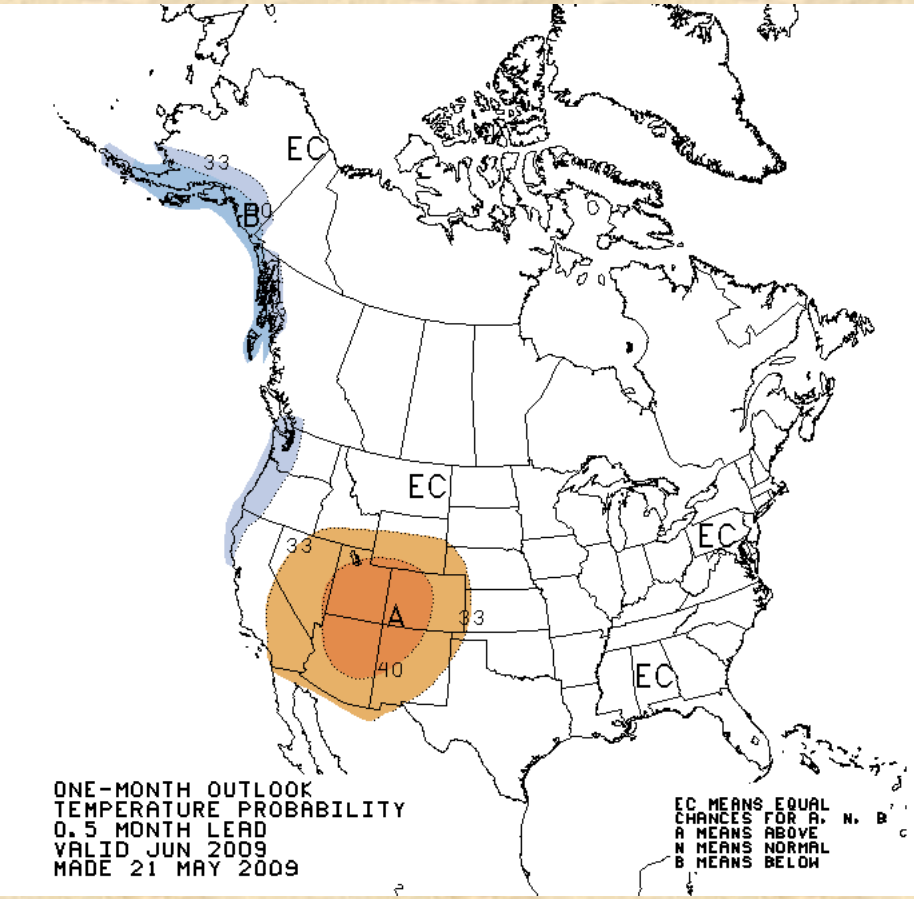


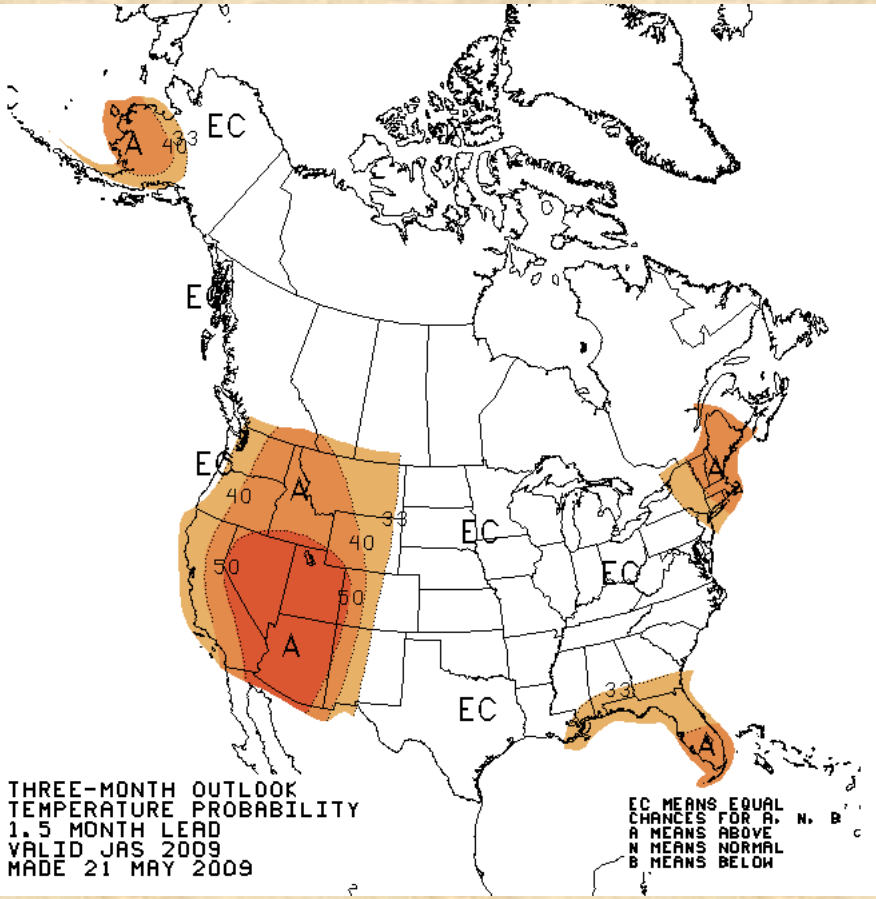




**My two summer forecasts issued so far this year (most recent one on right) are fairly consistent with each other, anticipating a wet monsoon over much of Colorado's eastern plains, and near-normal at best over the West slope.** ***The only "wet" forecast supported by at least some skill in the last decade is the one for the eastern plains of Colorado.***

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

# CPC Temperature Forecasts

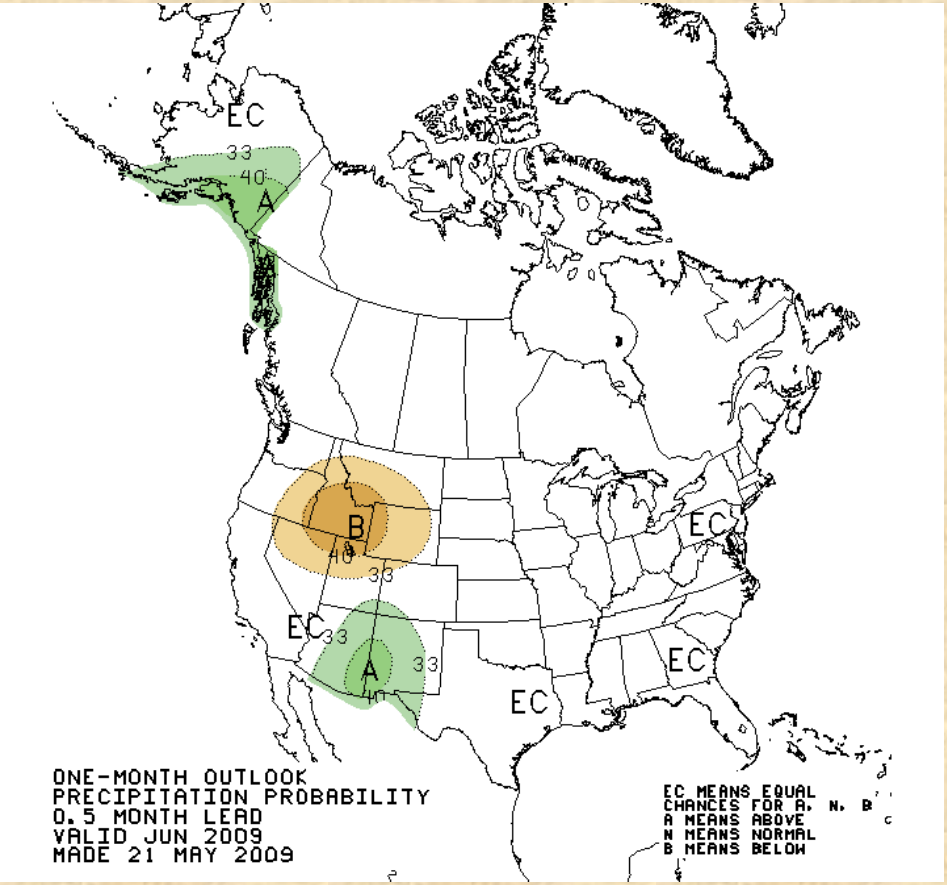


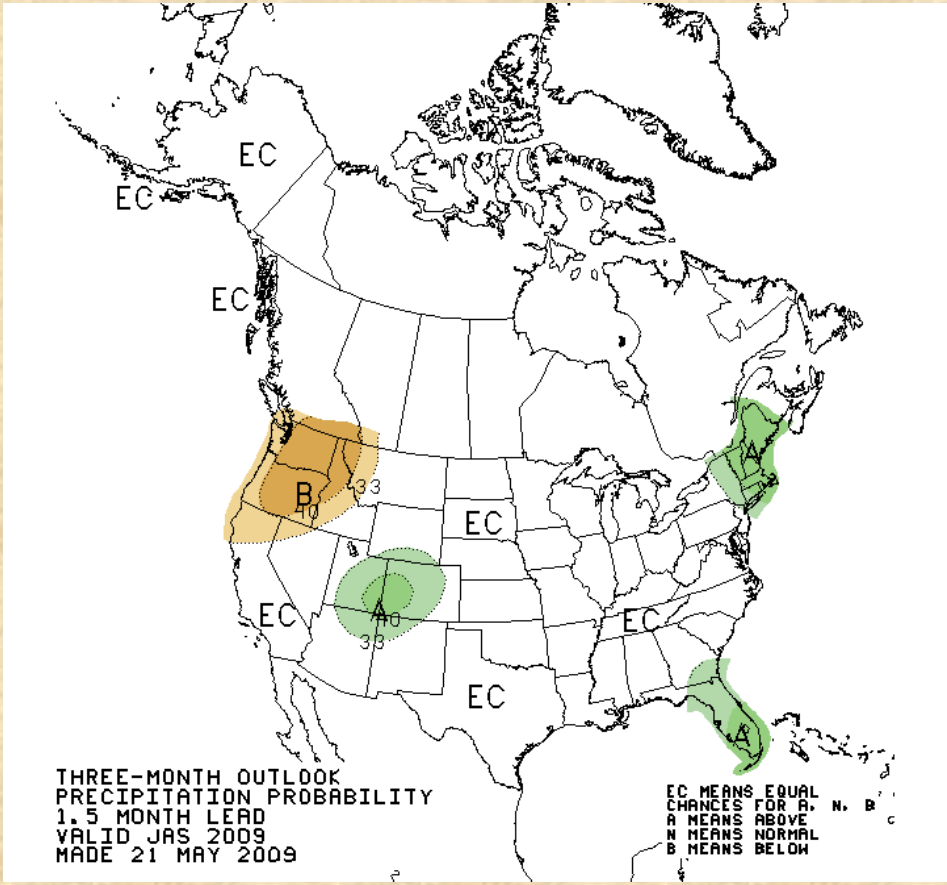




**According to CPC's latest update from this month, June (left) and July-September (right) temperature forecasts anticipate warmer-than-average conditions in all (left) and western (right) Colorado, due to long-term trends.**

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

# CPC Precipitation Forecasts



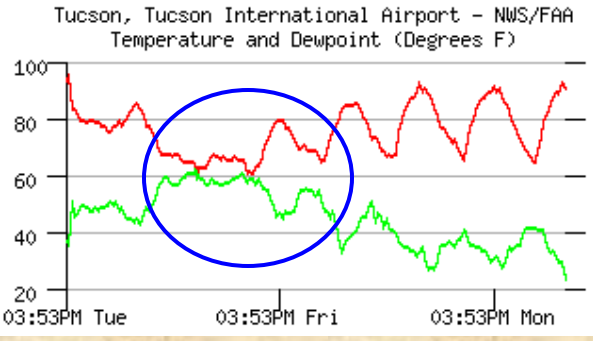

**According to CPC's latest official forecasts from this month, June (left) and July-September (right) precipitation forecasts show an early monsoon to our south (into the 4corners; left), and above-average monsoonal wetness (right) for most of our state.**

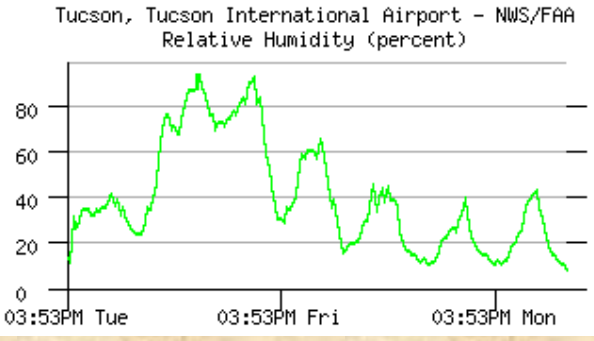
**Source**: ***http://www.cpc.ncep.noaa.gov/products/predictions/***

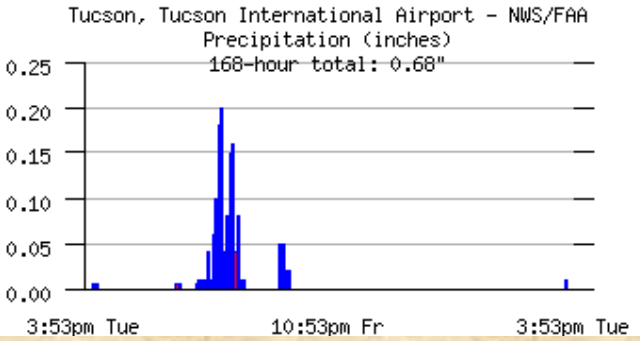
# Executive Summary (early version)

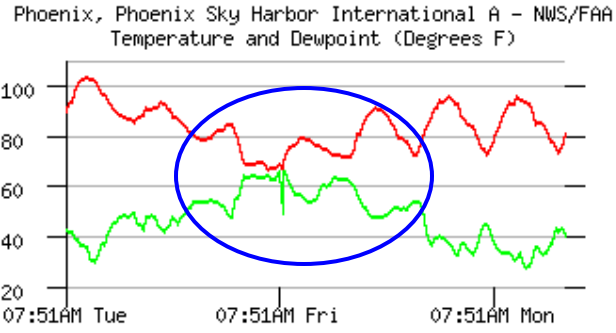
1. **During the fall of 2008, weak-to-moderate La Niña conditions returned and influenced our weather right thru the winter. The recent weakening of this event is quite similar to last year's, but started off at milder levels than a year ago, resulting in ENSO-neutral, even borderline EL Niño conditions by the end of this month. There is large uncertainty as to whether we will see a full-blown switch to El Niño, as advertized by most coupled numerical models, or whether ENSO-neutral conditions will prevail.**
2. **2. The last four weeks have brought a return of warm & dry weather for much of the southwestern U.S. after a wet interlude in late March through mid-April. After a respectable late-season peak, most of the south-central Rockies' snowpack melted off in rapid fashion, possibly accelerated by a heavy coating of dust in at least the San Juans and Elk Range of Colorado. Last weekend's weather pattern bears more than a passing resemblance to monsoonal flow patterns, giving the southwestern U.S. an unusually early taste of summer for the Memorial Day weekend.**
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. This overall pattern is somewhat reminiscent of last year's summer monsoon outcome, during a brief ENSO-neutral stage over the tropical Pacific.**
4. **Bottomline: La Niña appears to have gone on its second summer vacation this year, leaving the door more open for a transition to El Niño than last year. For now, most of the southwestern U.S. does not show a strong tilt in the odds for either a wet or dry summer, but current indications are that the eastern plains of Colorado and New Mexico may end up with a slight edge in that department. Stay tuned for next month's update!**

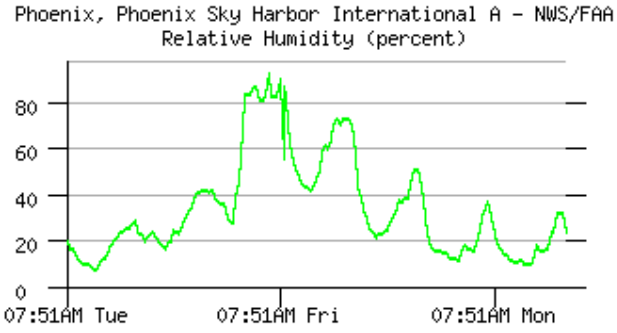
**Updated last Friday:** ***http://www.cdc.noaa.gov/people/klaus.wolter/SWcasts/***

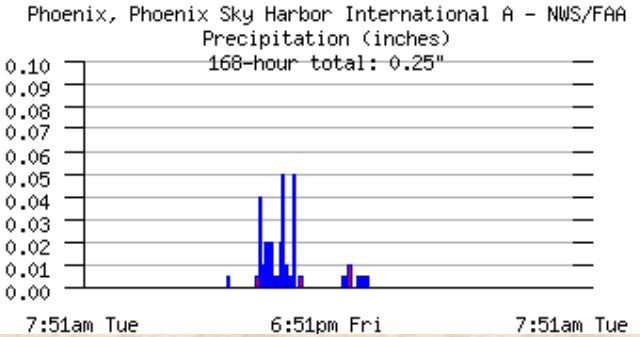


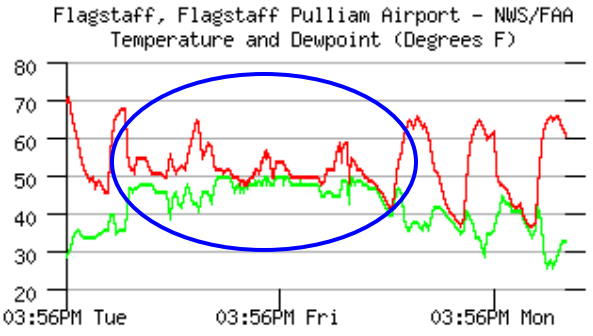



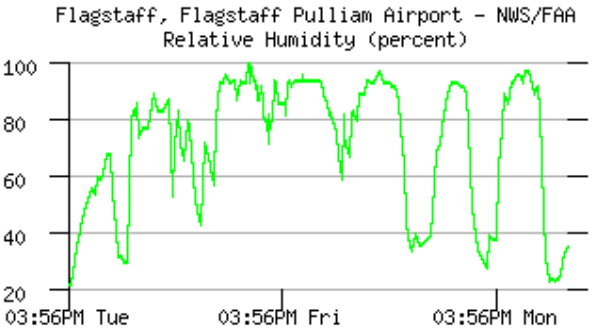



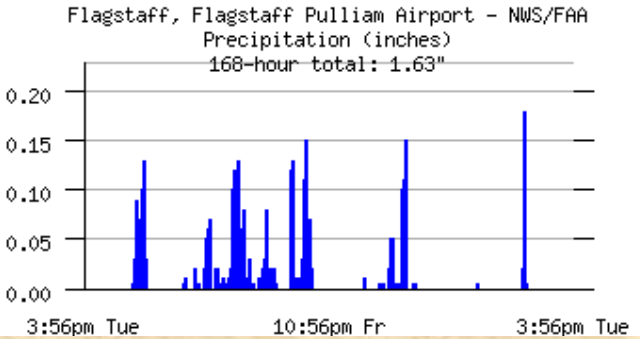




***The earliest monsoon onset on record in Arizona?***