



CO WATF
26 Aug 2009
Denver



Seasonal Outlook through December 2009

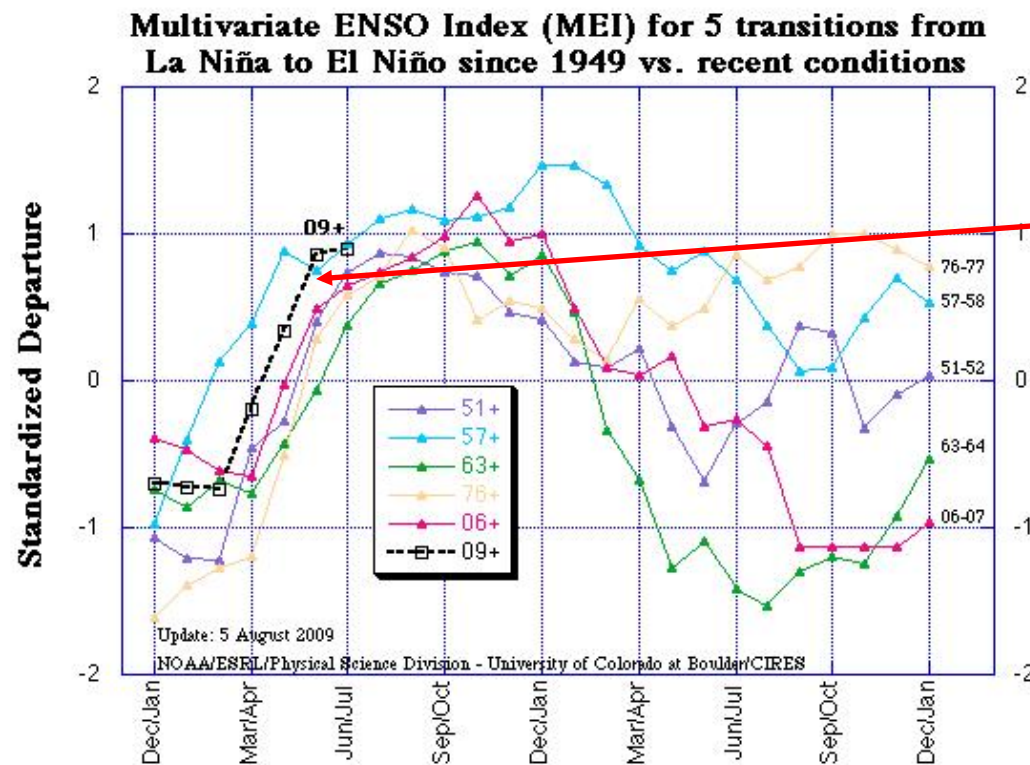
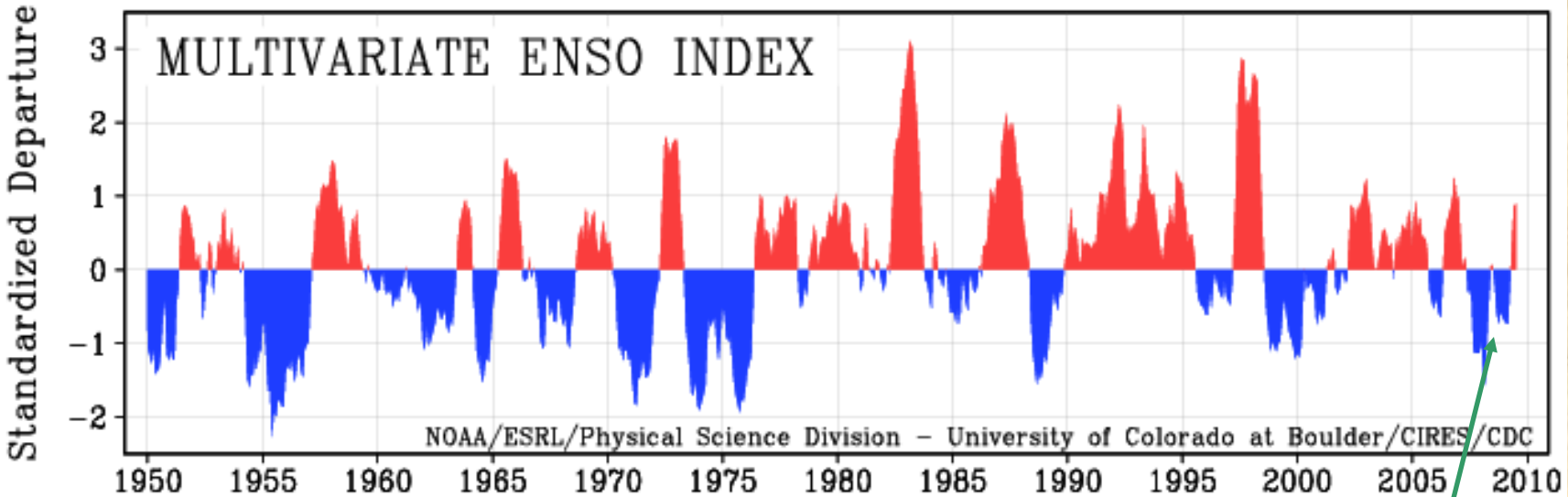
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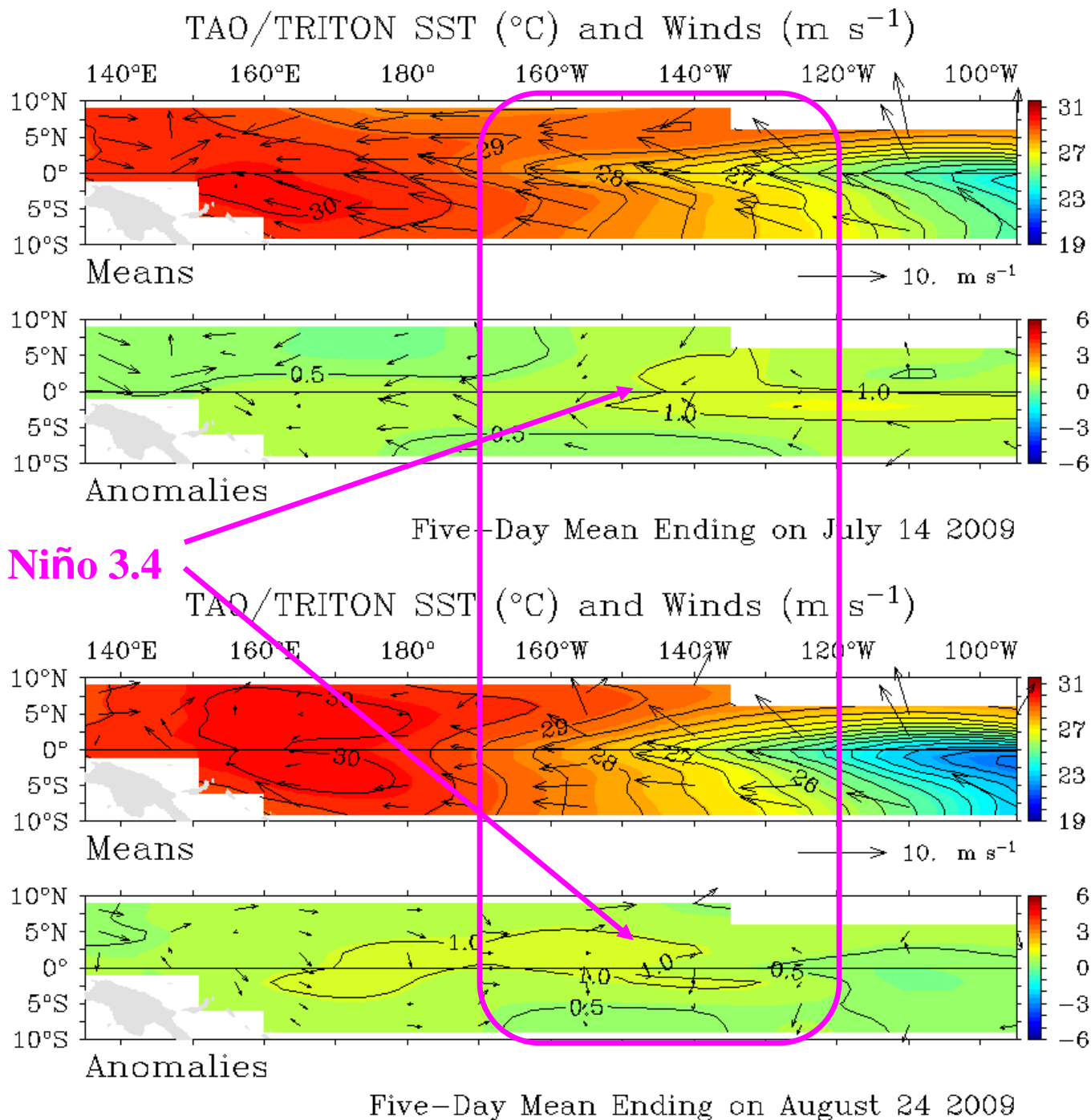
<http://www.cdc.noaa.gov/people/klaus.wolter/SWcasts/>

- 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.**

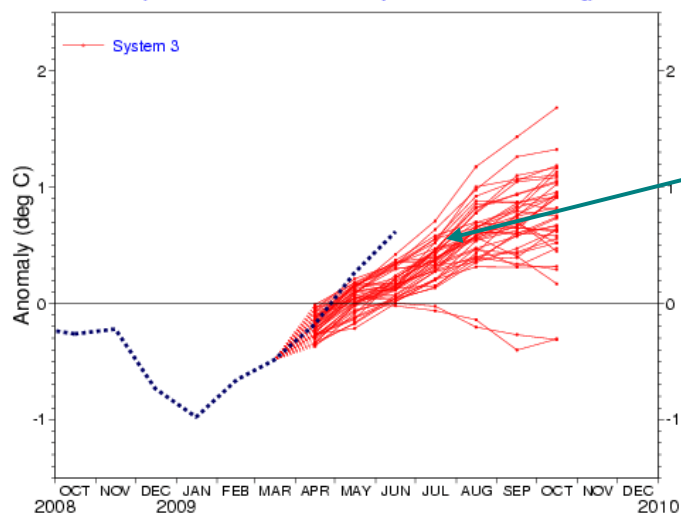
Current state of ENSO (bottom) compared to six weeks ago (top): warm-up has shifted from eastern (top) to central Pacific El Niño conditions (bottom)! Wind anomalies are weak, showing westerly anomalies near the dateline. No rapid changes are expected right now.



NINO3.4 SST anomaly plume

ECMWF forecast from 1 Apr 2009

Monthly mean anomalies relative to NCEP adjusted Olv2 1971-2000 climatology



Forecast issue date: 15 Apr 2009

ECMWF

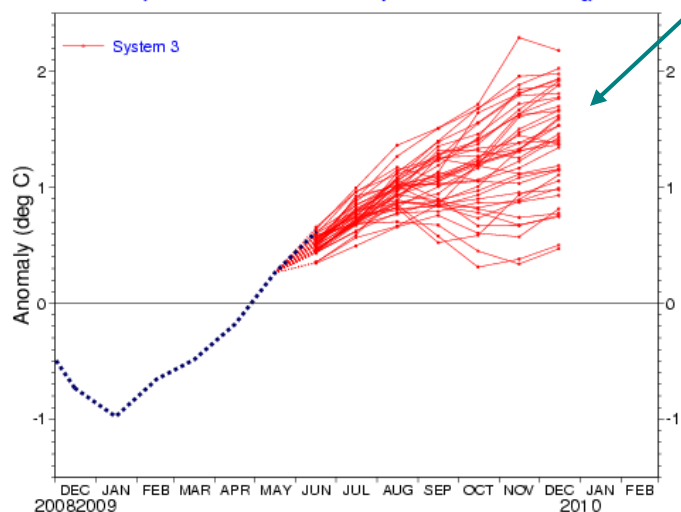
The European model's April '09 forecast (left) anticipated El Niño conditions by July, not bad, but a bit too conservative;

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;

NINO3.4 SST anomaly plume

ECMWF forecast from 1 Jun 2009

Monthly mean anomalies relative to NCEP adjusted Olv2 1971-2000 climatology



Forecast issue date: 15 Jun 2009

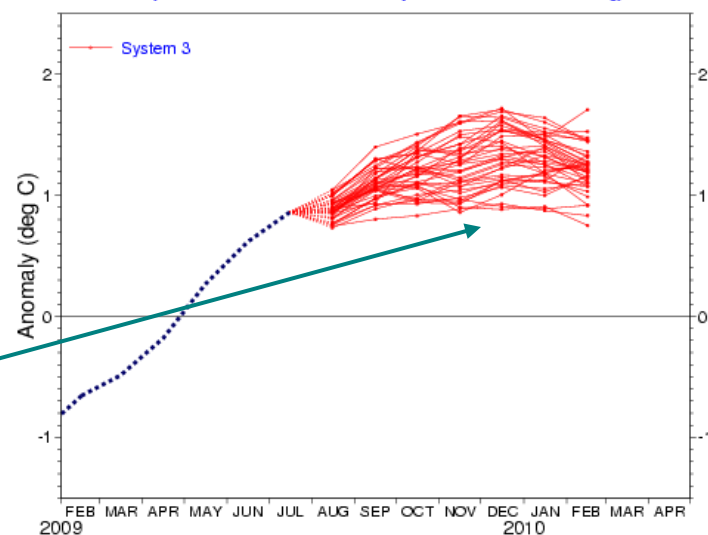
ECMWF

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

NINO3.4 SST anomaly plume

ECMWF forecast from 1 Aug 2009

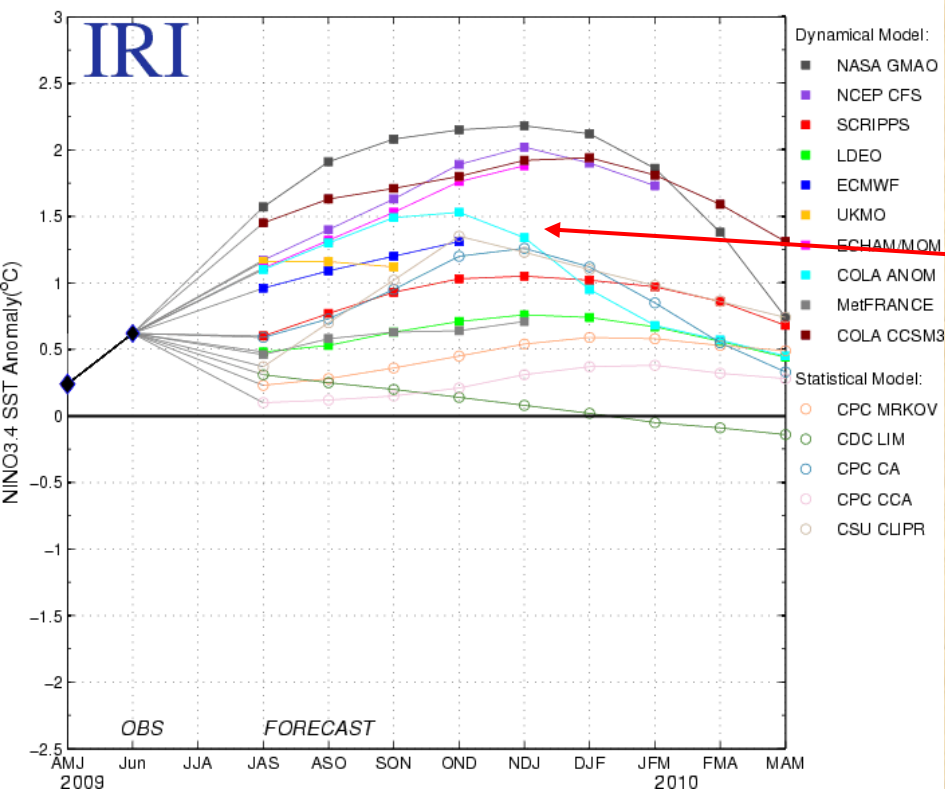
Monthly mean anomalies relative to NCEP adjusted Olv2 1971-2000 climatology



Forecast issue date: 15 Aug 2009

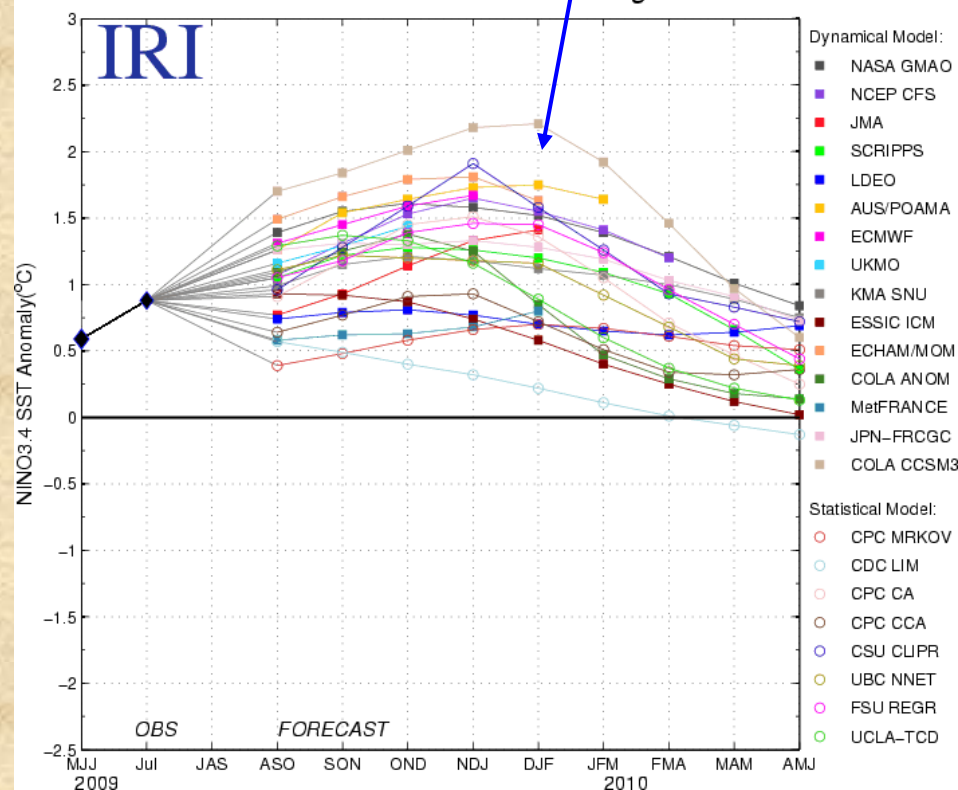
ECMWF

Model Forecasts of ENSO from Jul 2009



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).

Model Forecasts of ENSO from Aug 2009



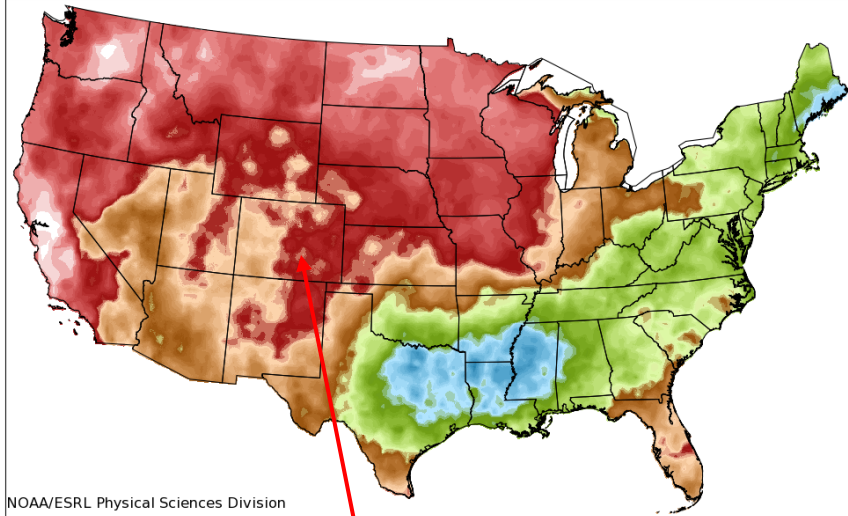
This El Niño will continue into the upcoming winter, but it could be an early 'peaker', and it may remain only weak-to-moderate over the next six months. Meanwhile, the PDO has moderated to just below 0 in June&July, in stark contrast to last year's strongly negative run through the ENSO-neutral summer.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

What can we expect in the next two weeks?

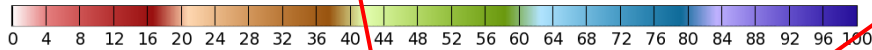
Analog Prob Precip > 66th Percentile

fcst from 2009082600 valid 2009082900-2009090100

Percent



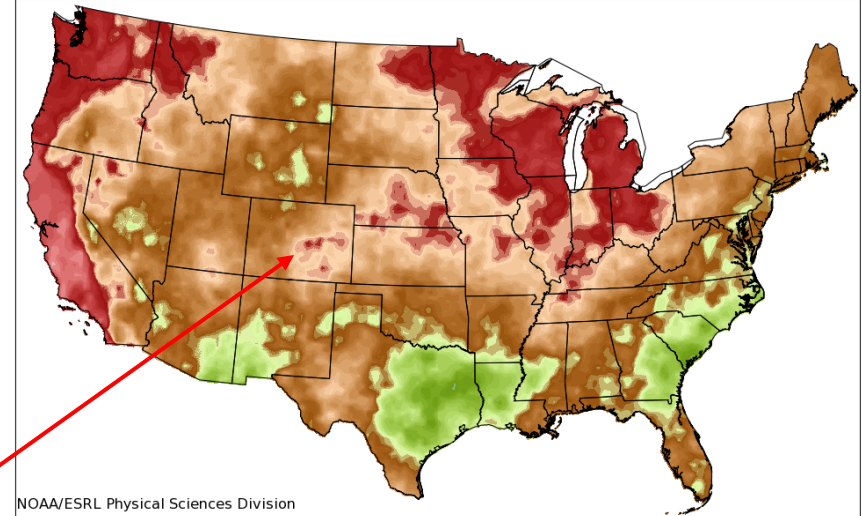
NOAA/ESRL Physical Sciences Division



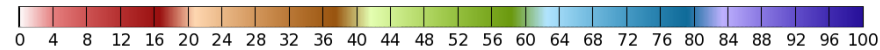
Analog Prob Precip > 66th Percentile

fcst from 2009082600 valid 2009083100-2009090500

Percent



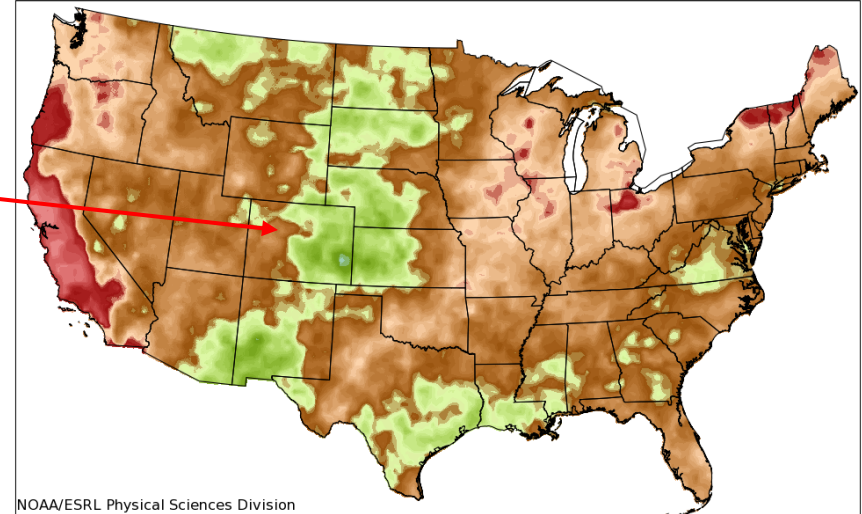
NOAA/ESRL Physical Sciences Division



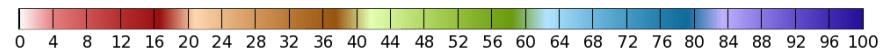
Analog Prob Precip > 66th Percentile

fcst from 2009082600 valid 2009090200-2009090900

Percent



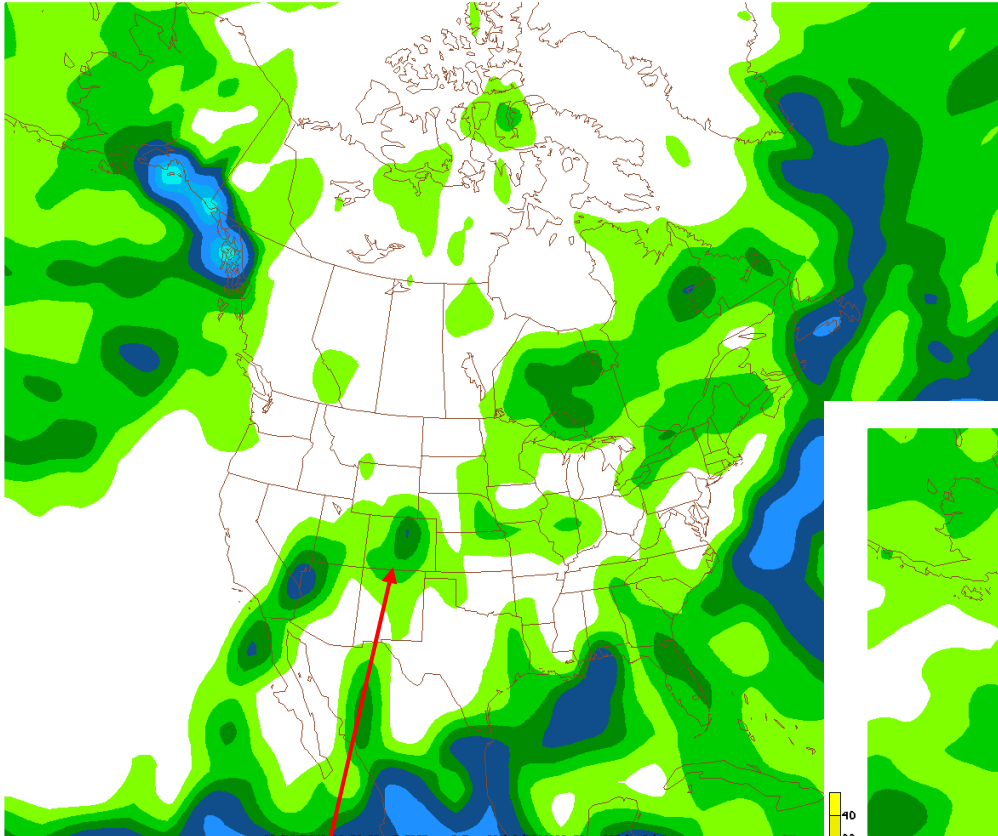
NOAA/ESRL Physical Sciences Division



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?

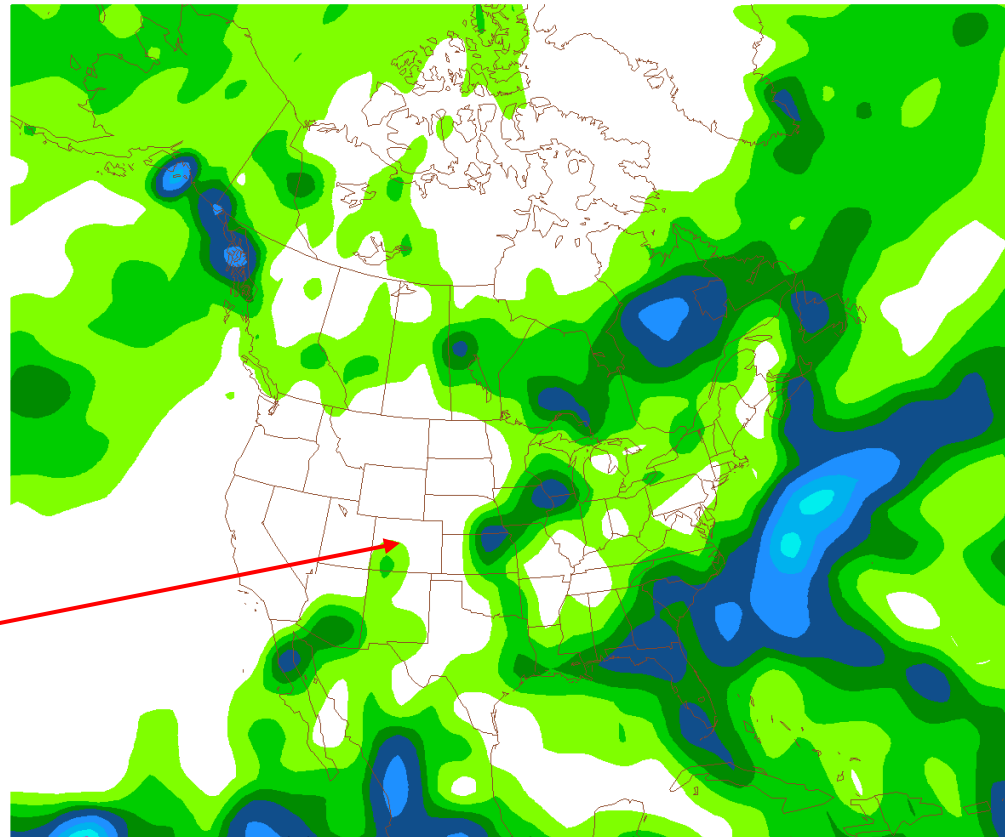
060910/0000V384 GFS 384-HR TOTAL PCPN



08/25/2009 00UTC 384HR FST VALID THU 09/10/2009 00UTC NCEP/NWS/NOAA

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

060910/1200V384 GFS 384-HR TOTAL PCPN

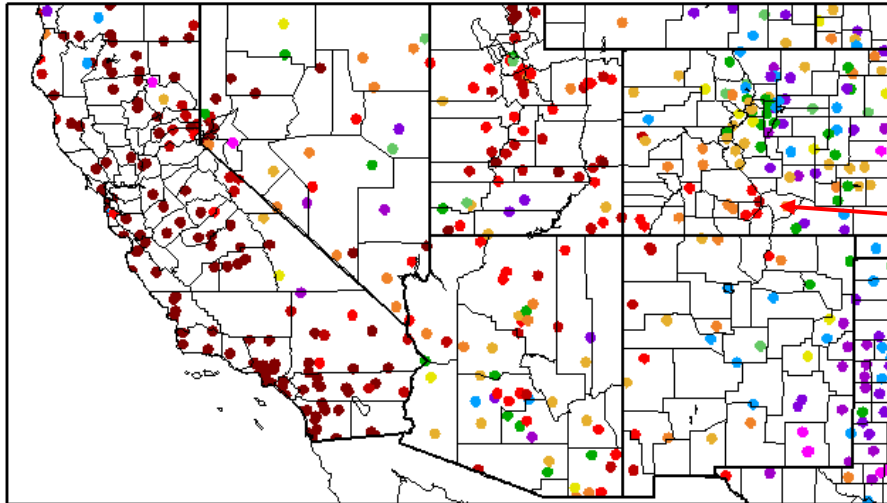


08/25/2009 12UTC 384HR FST VALID THU 09/10/2009 12UTC NCEP/NWS/NOAA

Monday night's GFS precipitation total for next two weeks (top) vs. Tuesday morning's (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?

Percent of Normal Precipitation (%)
7/1/2009 – 7/31/2009



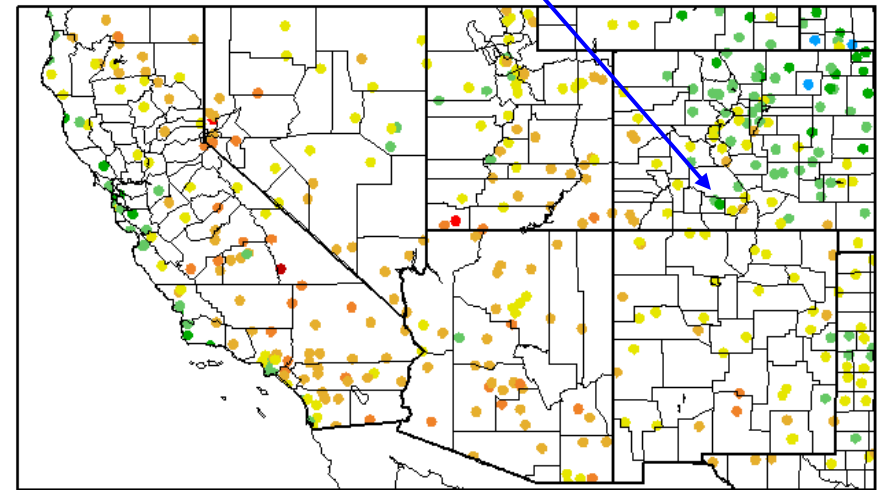
Generated 8/11/2009 at HPRCC using provisional data.

NOAA Regional Climate Centers

El Niño and our monsoon slowed down in July...

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.

Departure from Normal Temperature (F)
7/1/2009 – 7/31/2009

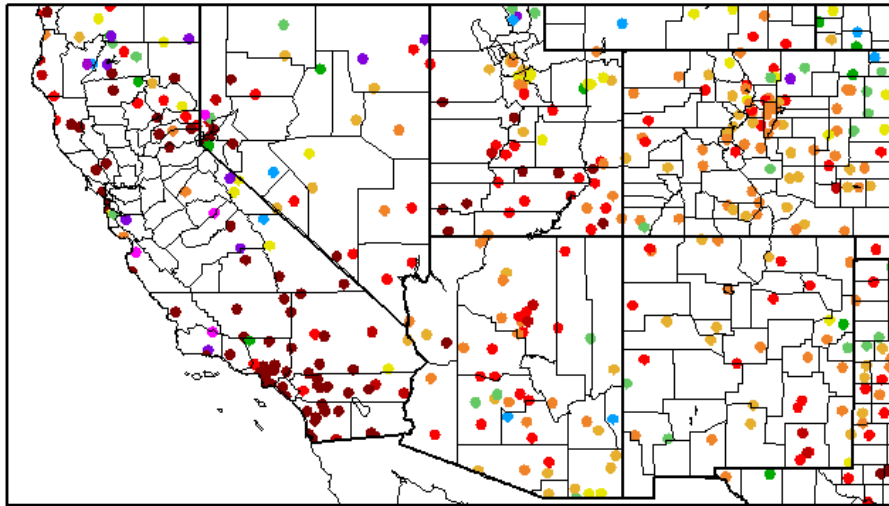


Generated 8/11/2009 at HPRCC using provisional data.

NOAA Regional Climate Centers

What has happened since August 1st?

Percent of Normal Precipitation (%)
8/1/2009 – 8/25/2009



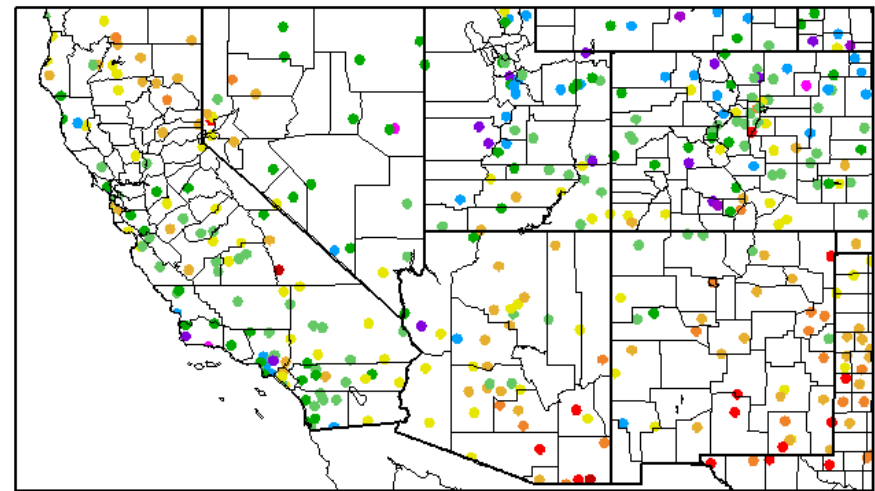
Generated 8/26/2009 at HPRCC using provisional data.

NOAA Regional Climate Centers

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

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.*

Departure from Normal Temperature (F)
8/1/2009 – 8/25/2009

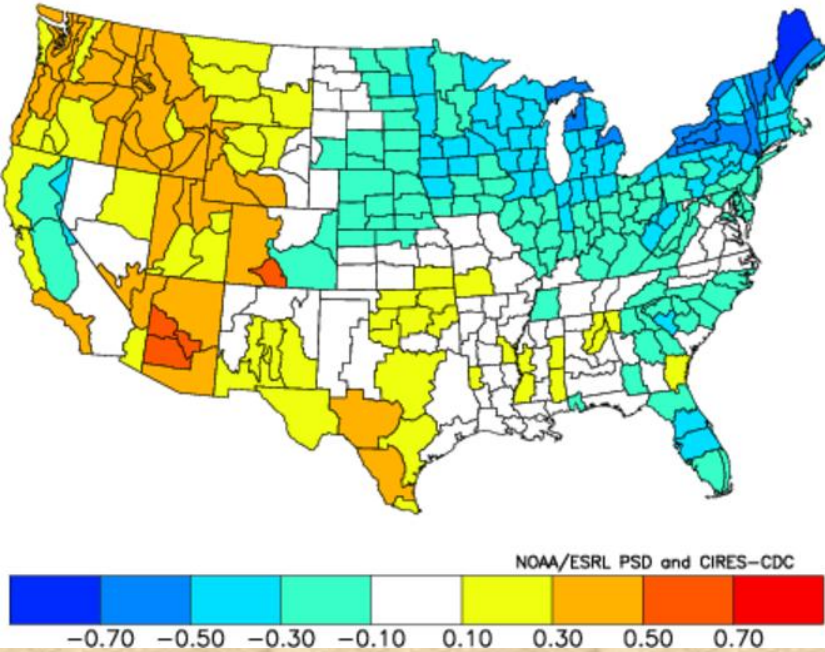


Generated 8/26/2009 at HPRCC using provisional data.

NOAA Regional Climate Centers

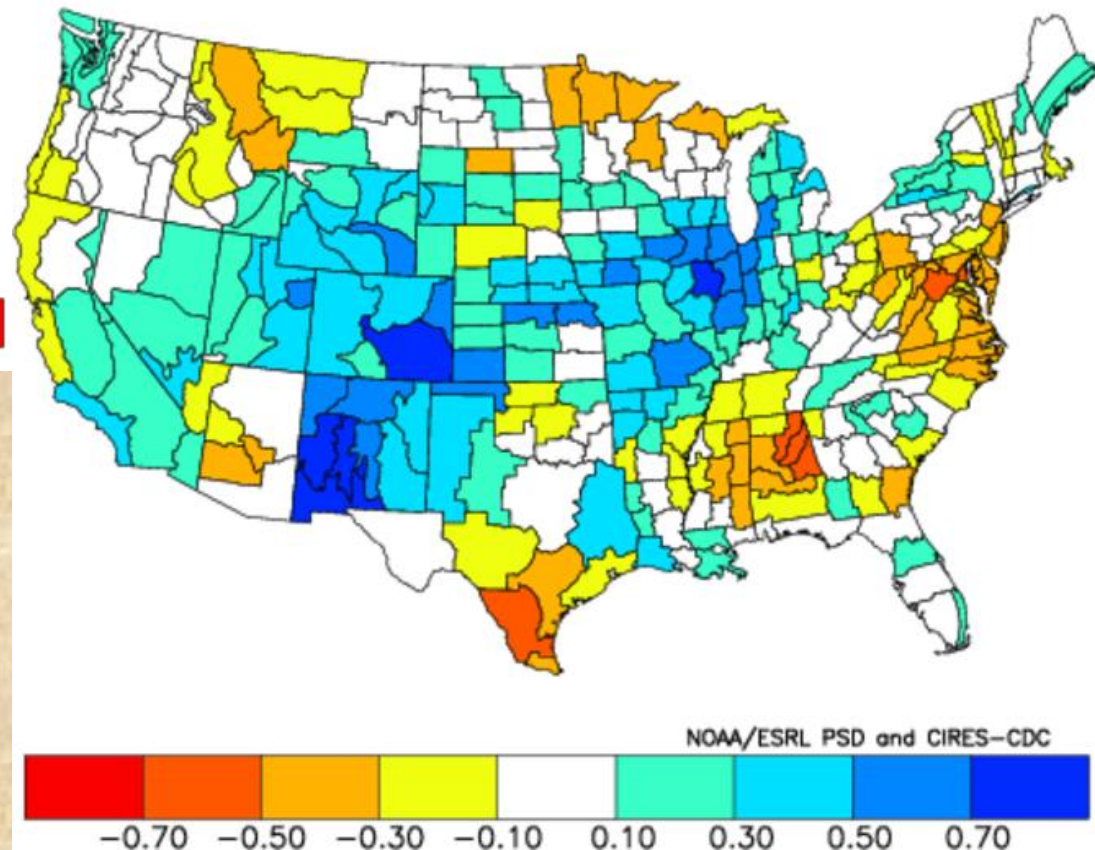
What are typical temp&precip patterns in August with El Niño onset conditions (same as last month)?

Composite Standardized Temperature Anomalies
Aug 1957,1965,1972,1977,1982,1991,1994,2006
Versus 1950–1995 Longterm Average



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

Composite Standardized Precipitation Anomalies
Aug 1957,1965,1972,1977,1982,1991,1994,2006
Versus 1950–1995 Longterm Average

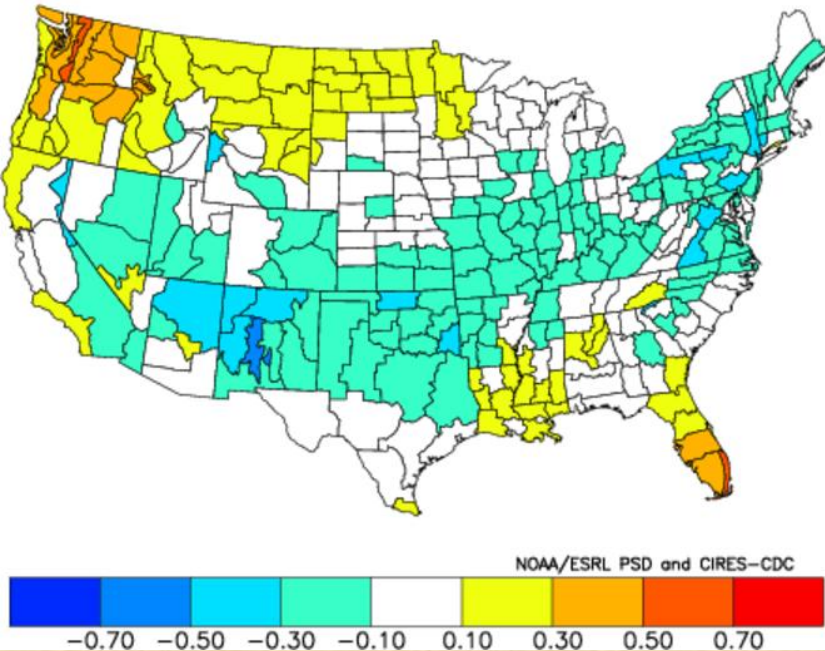


Significant wet precipitation anomalies (right) from New Mexico right into eastern Colorado - El Niño enhances our monsoon, while leaving Arizona dry and hot.

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

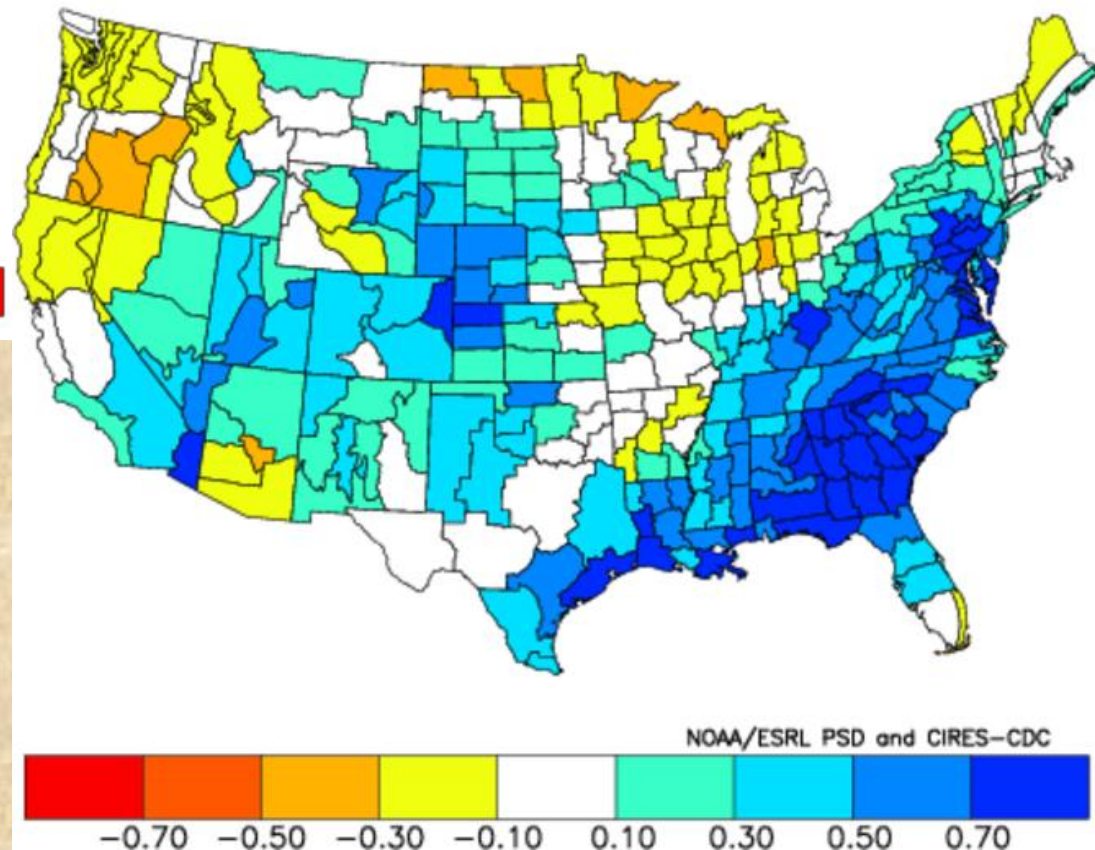
What are typical temp&precip patterns in the fall with moderate El Niño conditions?

Composite Standardized Temperature Anomalies
Sep to Nov 1951,1963,1976,1979,1986,1992,1994,2002,2004,2006
Versus 1950–1995 Longterm Average



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

Composite Standardized Precipitation Anomalies
Sep to Nov 1951,1963,1976,1979,1986,1992,1994,2002,2004,2006
Versus 1950–1995 Longterm Average

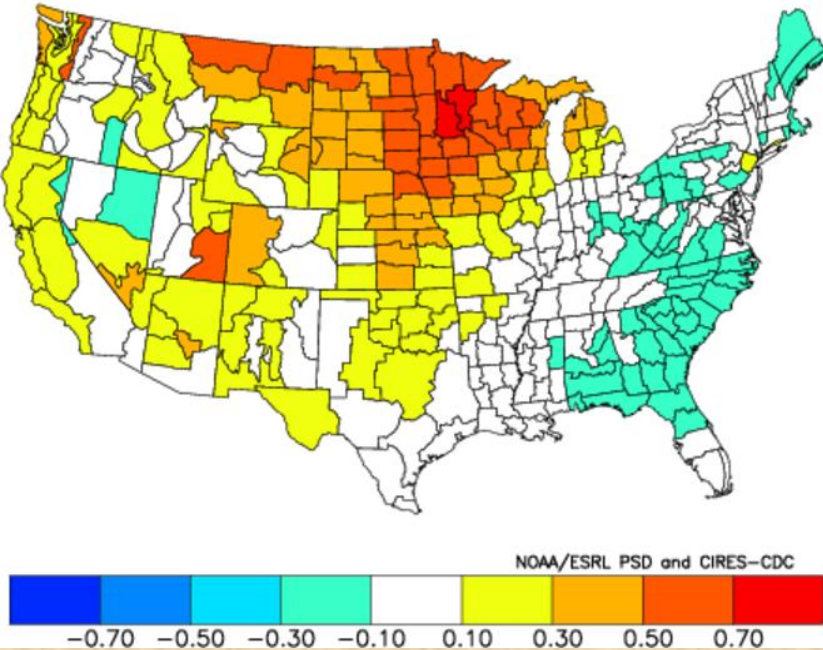


On average, wet precipitation anomalies (right) from Utah across Colorado, wettest to our east. In the recent decade, this pattern was anchored by wet El Niño Octobers.

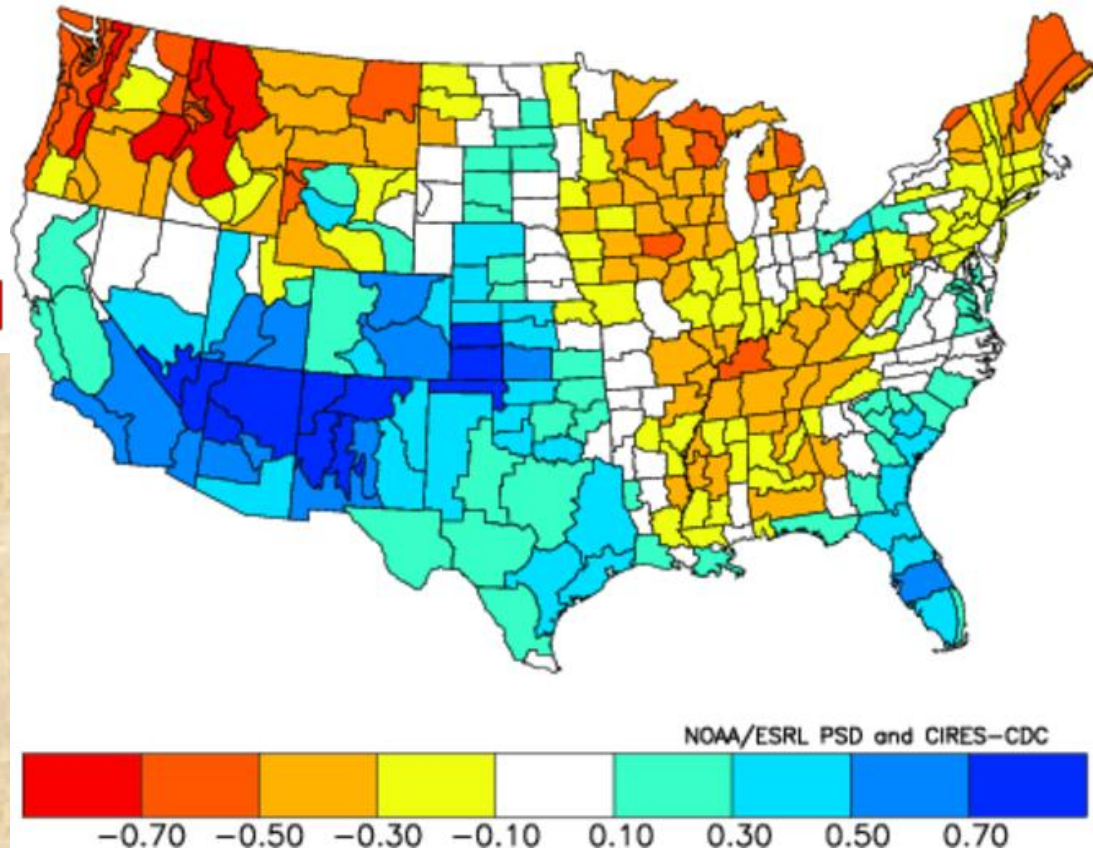
What are typical temp&precip patterns in the winter with moderate El Niño conditions?

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

Composite Standardized Temperature Anomalies
Versus 1950–1995 Longterm Average
Dec to Feb 1951–52,1963–64,1976–77,1979–80,1986–87,1992–93,1994–95,2002–03
2004–05,2006–07,



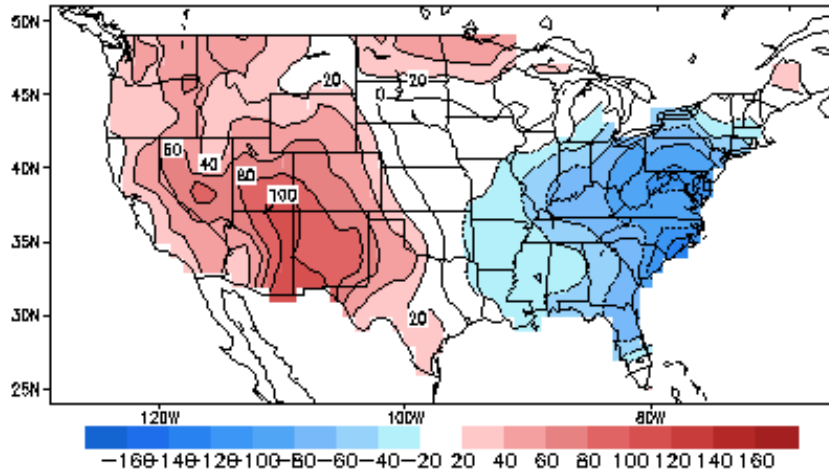
Composite Standardized Precipitation Anomalies
Versus 1950–1995 Longterm Average
Dec to Feb 1951–52,1963–64,1976–77,1979–80,1986–87,1992–93,1994–95,2002–03
2004–05,2006–07,



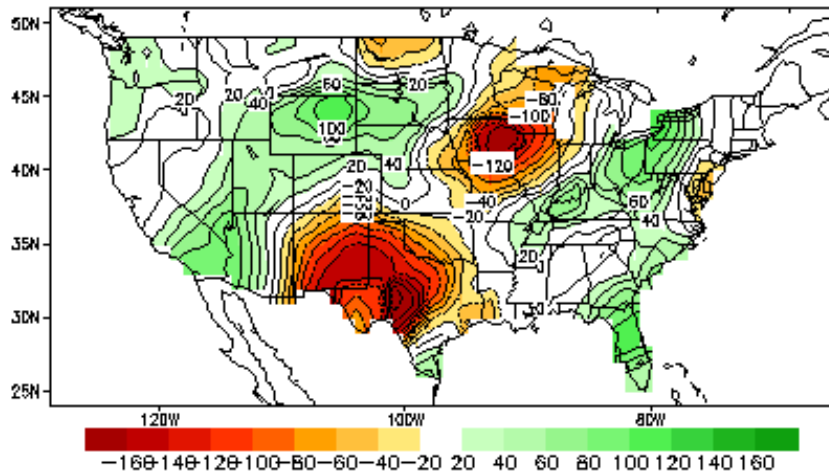
On average, wet precipitation anomalies (right) near the Four Corners, especially in AZ & NM. In eastern Colorado, this pattern was anchored by several wet Decembers and Februaries, while Januaries tended to be dry.

What about 'Constructed Analog' Forecasts?

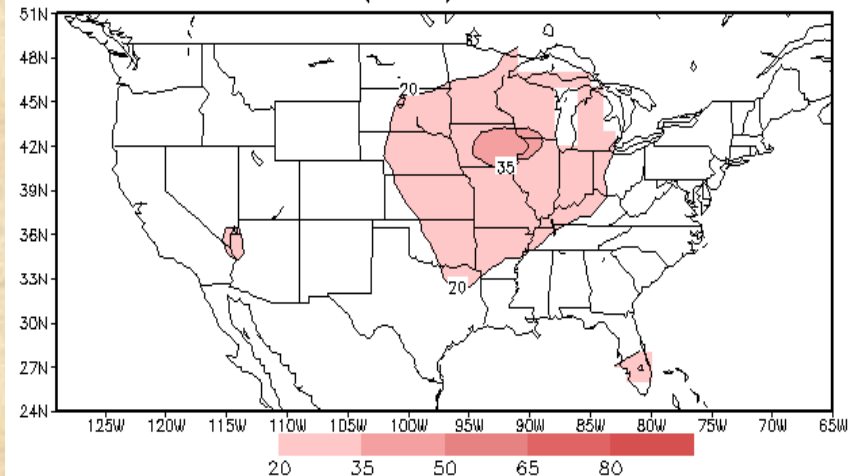
Lagged Averaged Temperature Outlook for SEP 2009
units: anomaly (sdX100), SM data ending at 20090824



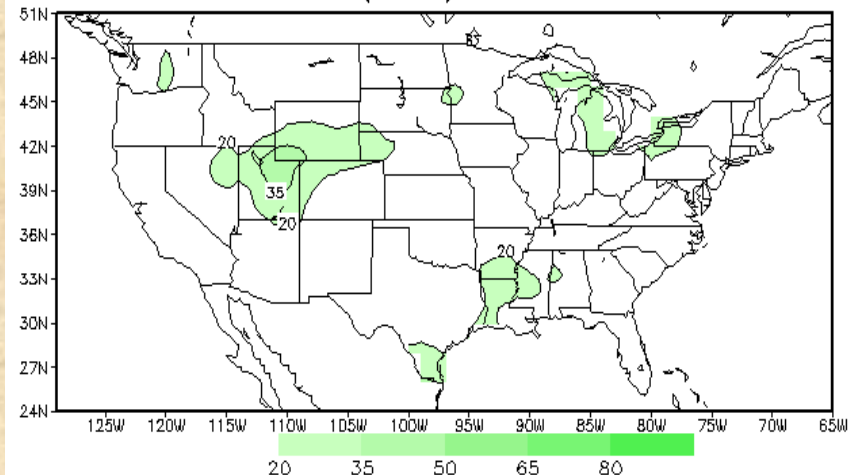
Lagged Averaged Precipitation Outlook for SEP 2009
units: anomaly (sdX100), SM data ending at 20090824



lead 1 skill of temperature CAS forecast for Sep
units: correlation (X100) based on 1981-2005



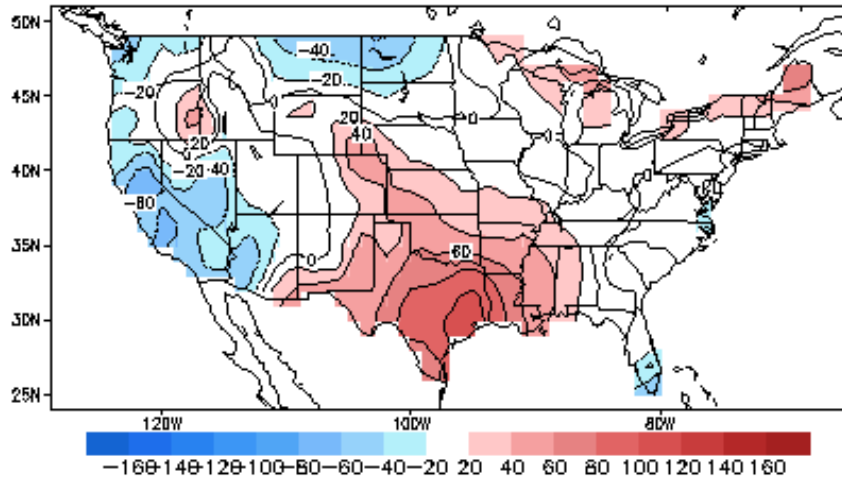
lead 1 skill of precipitation CAS forecast for Sep
units: correlation (X100) based on 1981-2005



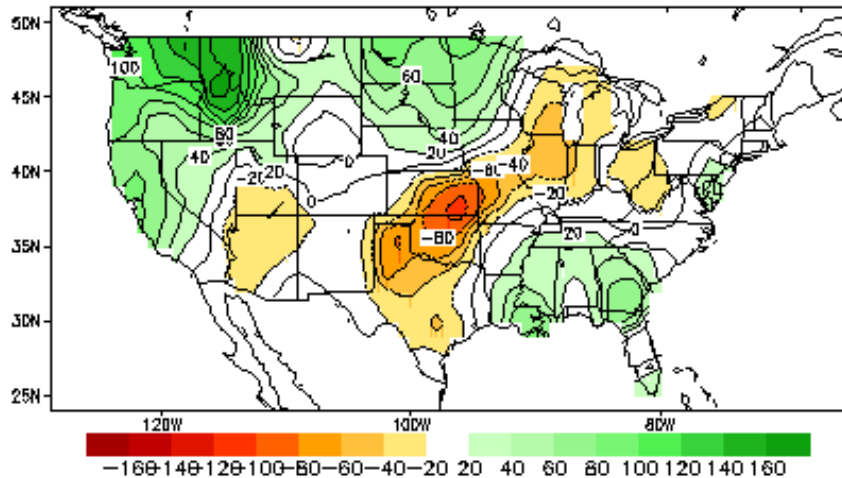
September precipitation forecasts have shown skill in Utah and northwestern Colorado, where warm & wet is predicted - consistent with El Niño in that region!

What about 'Constructed Analog' Forecasts?

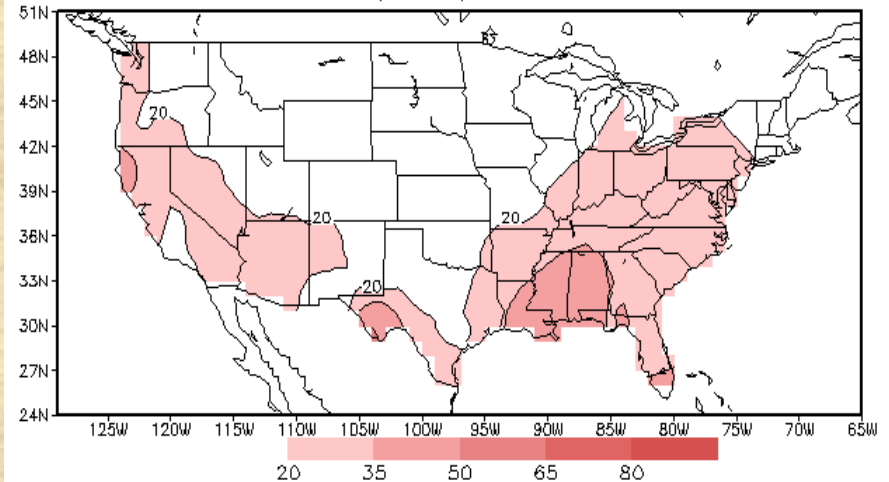
Lagged Averaged Temperature Outlook for OND 2009
units: anomaly (sdX100), SM data ending at 20090824



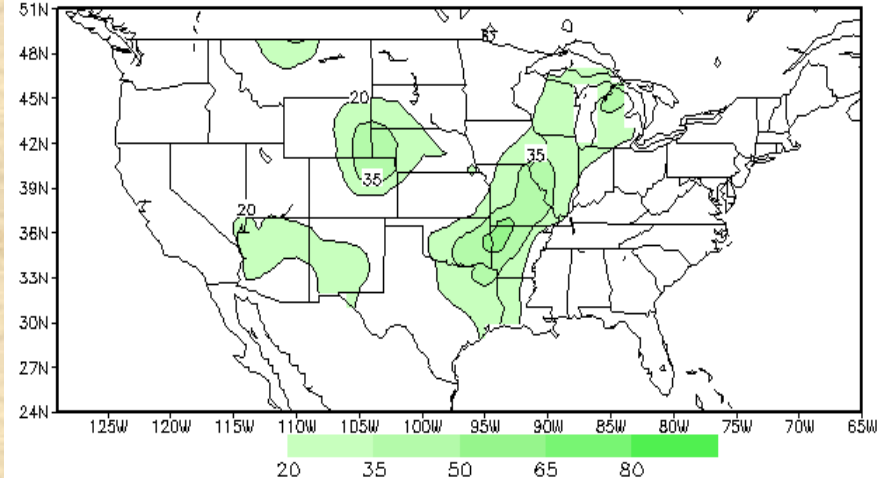
Lagged Averaged Precipitation Outlook for OND 2009
units: anomaly (sdX100), SM data ending at 20090824



lead 2 skill of temperature CAS forecast for OND
units: correlation (X100) based on 1981-2005



lead 2 skill of precipitation CAS forecast for OND
units: correlation (X100) based on 1981-2005



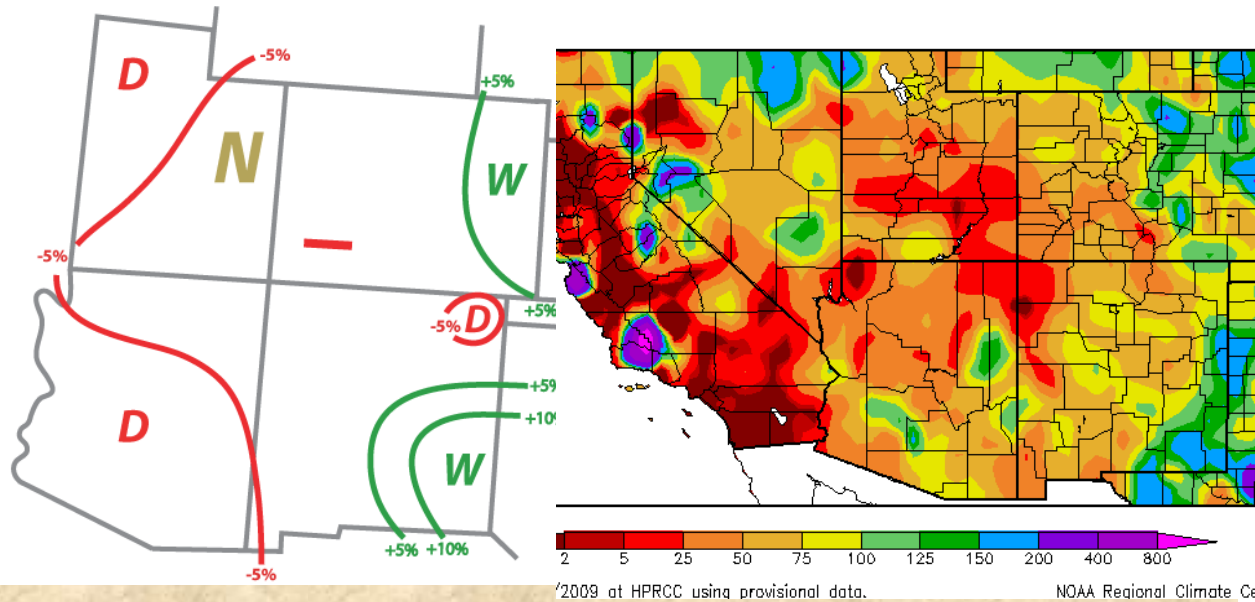
Decent skill for precipitation forecasts in Oct-Dec is 'wasted' on neutral forecast in northeast Colorado; rest of state is toss-up as well!

Experimental CDC “Forecast Guidance”

EXPERIMENTAL PSD PRECIPITATION FORECAST GUIDANCE

JUL - SEP 2009 (issued July 14, 2009)

Percent of Normal Precipitation (%)
7/1/2009 - 8/24/2009



EXPERIMENTAL PSD PRECIPITATION FORECAST GUIDANCE

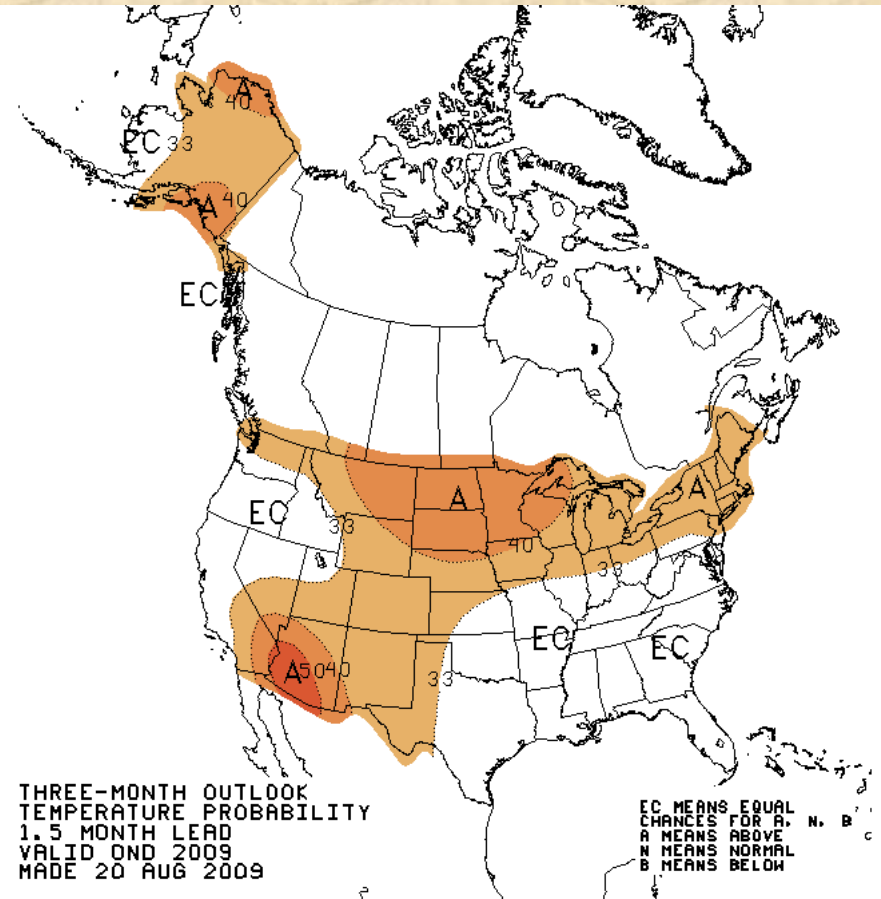
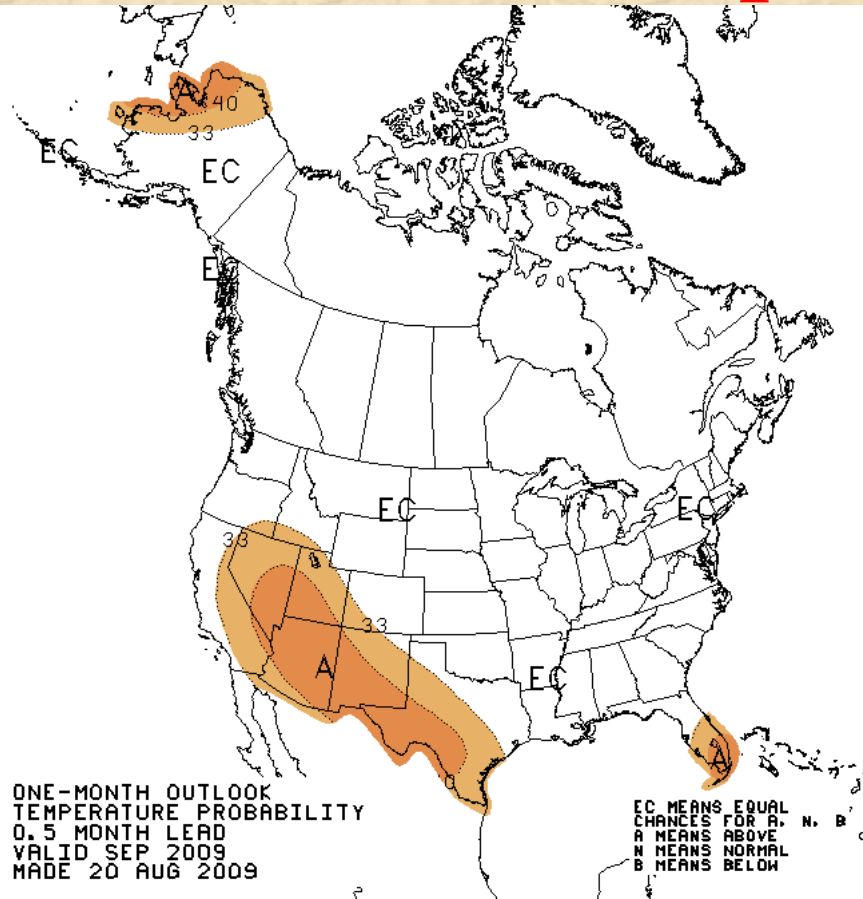
OCT - DEC 2009 (issued August 25, 2009)



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/>

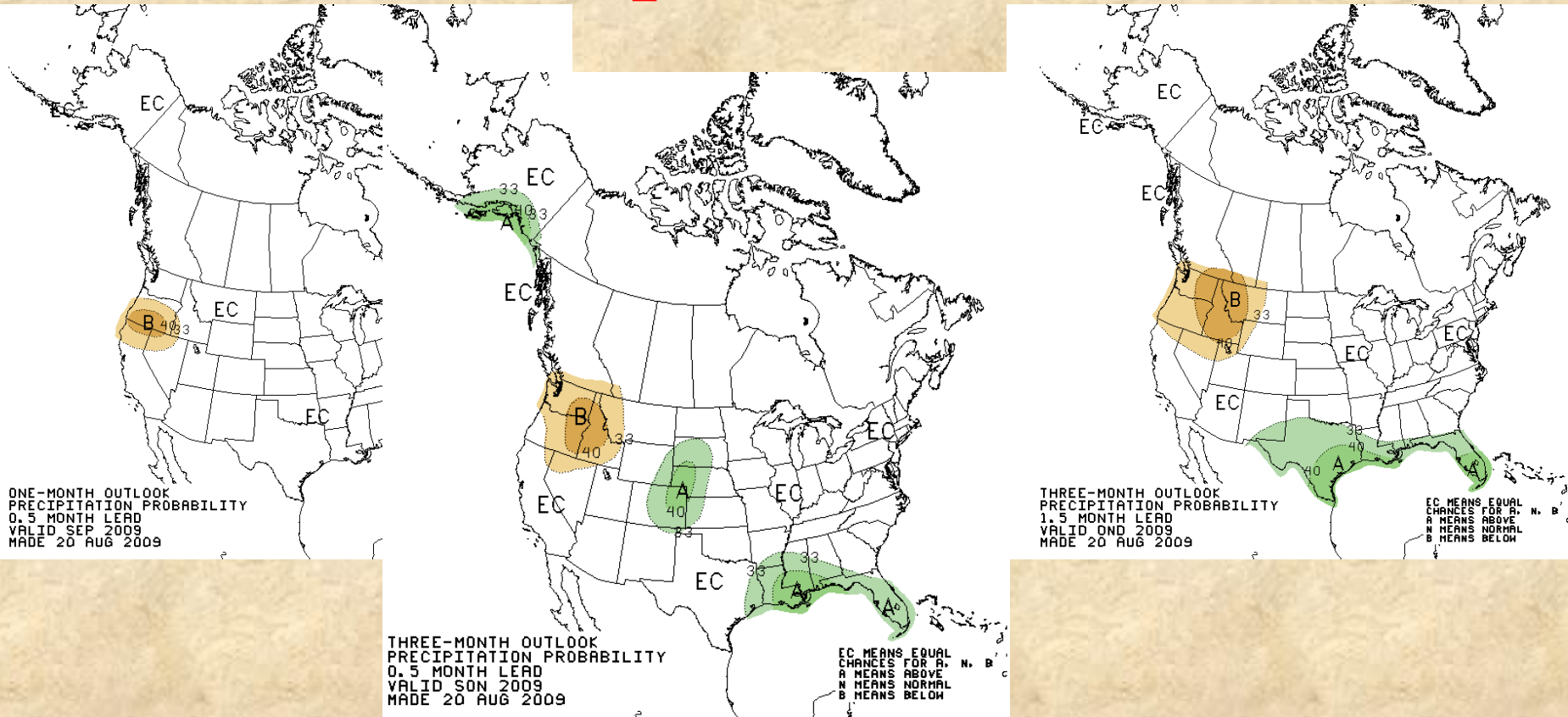
CPC Temperature Forecasts



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/>