

Seasonal Outlook into mid-2009

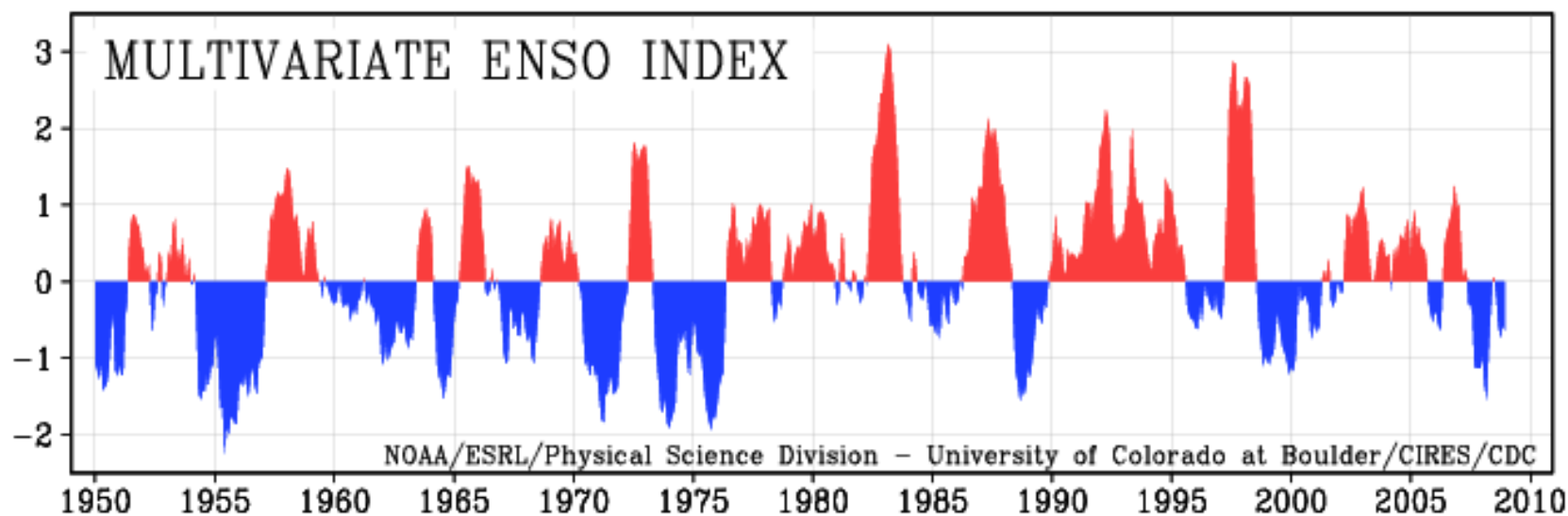
Klaus Wolter

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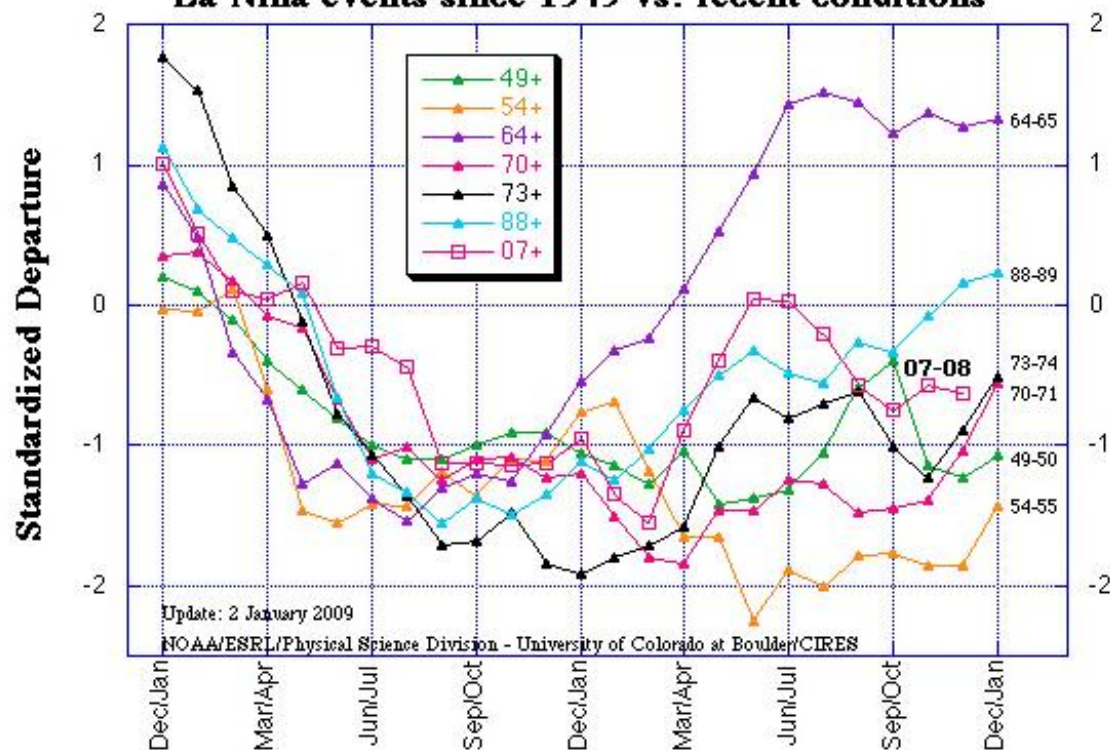
klaus.wolter@noaa.gov

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

- **La Niña: Winter #2**
- **A look at my summer and fall 2008 forecasts vs. reality**
- **January so far & expectations for the next two weeks**
- **CPC forecasts for February - June 2009**
- **Experimental forecast guidance for January - June 2009**

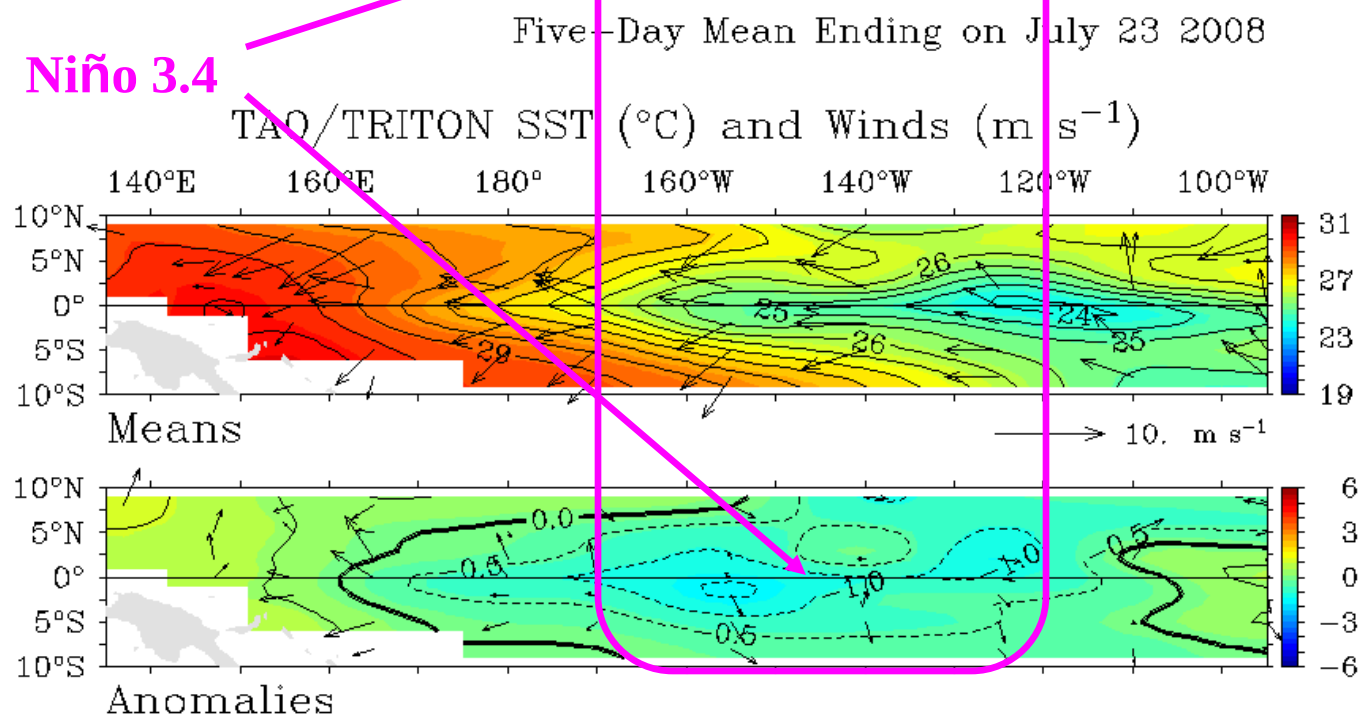
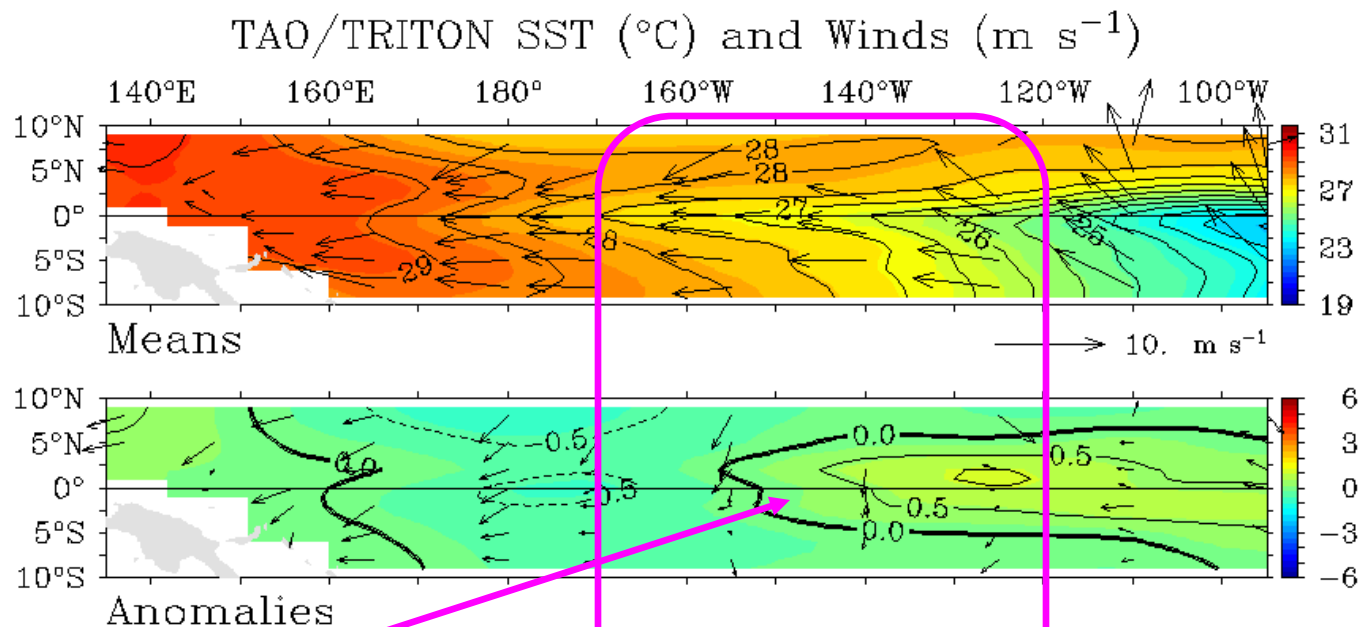


Multivariate ENSO Index (MEI) for 6 strong La Niña events since 1949 vs. recent conditions



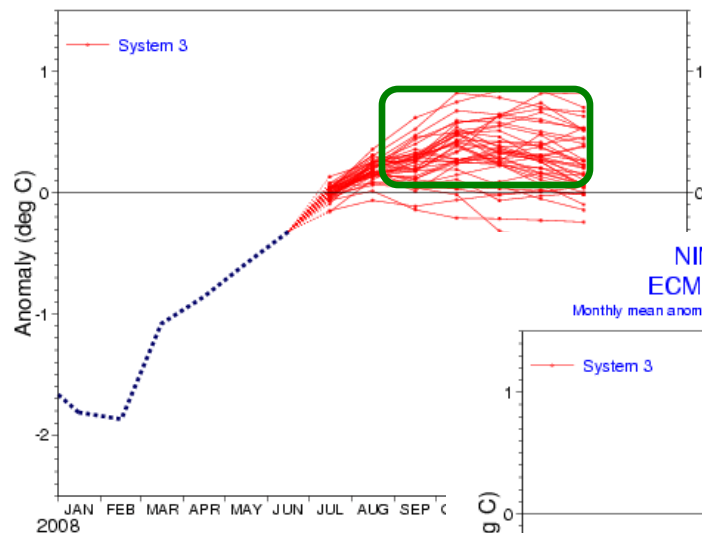
From 3rd strongest La Niña since 1950 (Feb-Mar'08) to above-normal in three months, and back to weak La Niña conditions!

Current state of ENSO (bottom) compared to July 2008 (top): the tropical Pacific has transitioned from near-neutral back to La Niña conditions; as I discussed six months ago, persistently strong trade winds set the stage for this poorly predicted comeback!



NINO3.4 SST anomaly plume
ECMWF forecast from 1 Jul 2008

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

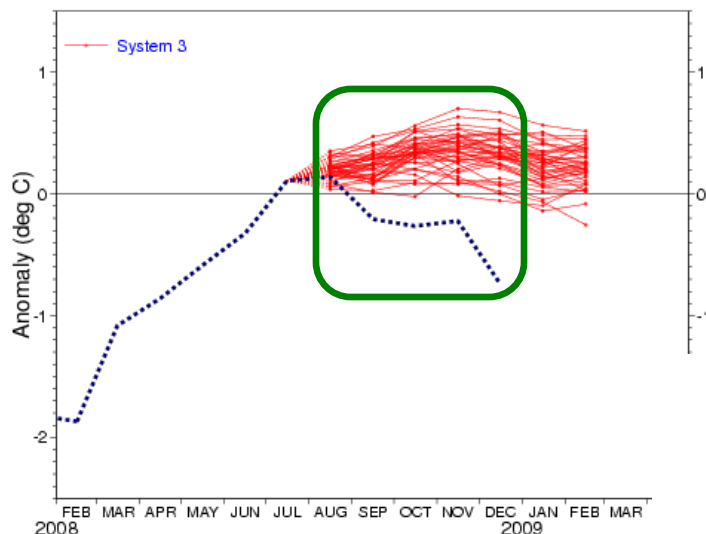


Forecast issue date: 15 Jul 2008

The European model's July forecast (left) anticipated weak El Niño conditions through the end of 2008, with a less than 10% chance for a return of La Niña;

NINO3.4 SST anomaly plume
ECMWF forecast from 1 Aug 2008

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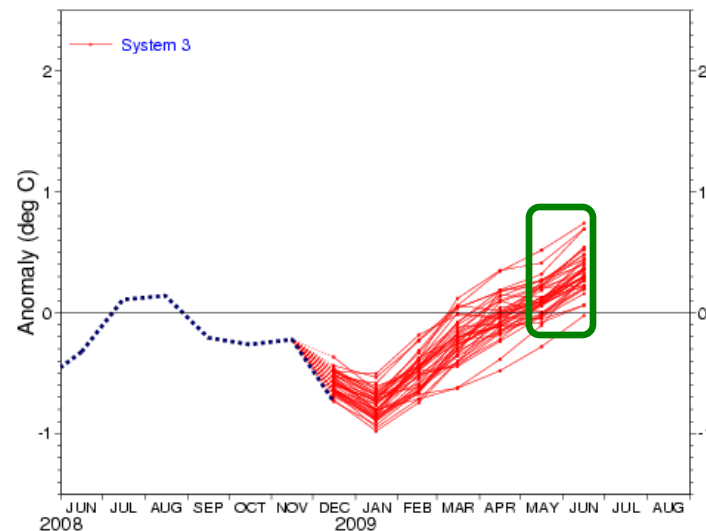


Forecast issue date: 15 Aug 2008

August was the last month with such a 'bullish' (El Niño-like) forecast (left); by September, sea surface temperatures dropped below the forecast range already - highly unusual!

NINO3.4 SST anomaly plume
ECMWF forecast from 1 Dec 2008

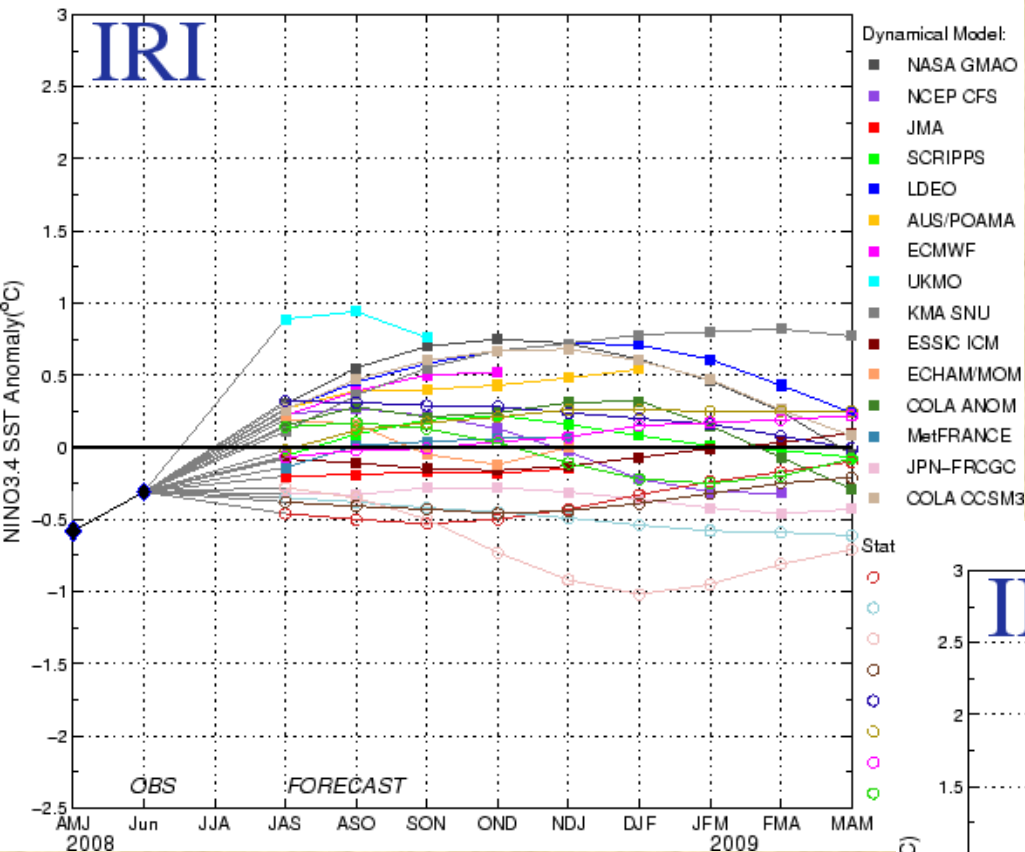
Monthly mean anomalies relative to NCEP adjusted Olv2 1971-2000 climatology



Forecast issue date: 15 Dec 2008

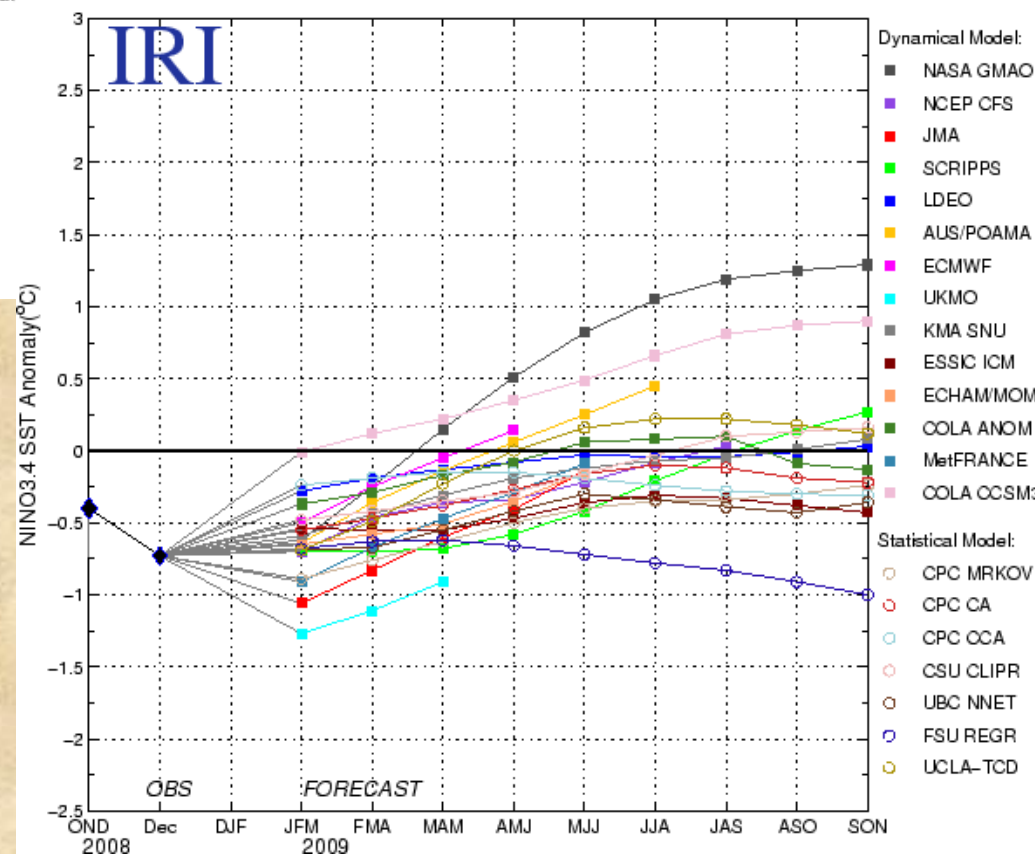
A more serious temperature drop commenced in November, and has 'plateaued' out in the last few weeks near -1C (moderate La Niña). The new forecast is not out yet, but last month's version (right) was adamant about a return to above-normal by June.

Model Forecasts of ENSO from Jul 2008



Latest ENSO forecasts from almost two dozen dynamical & statistical forecast models (below) vs. six months prior (left). Most models now show a return towards ENSO-neutral by the spring, with a wide range of possible outcomes (+/-1C).

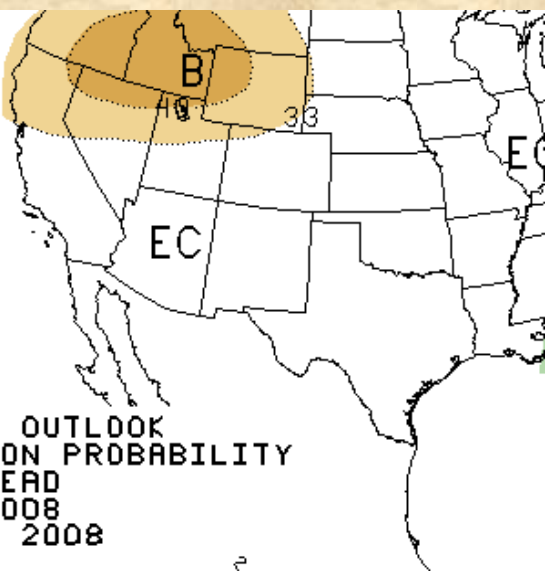
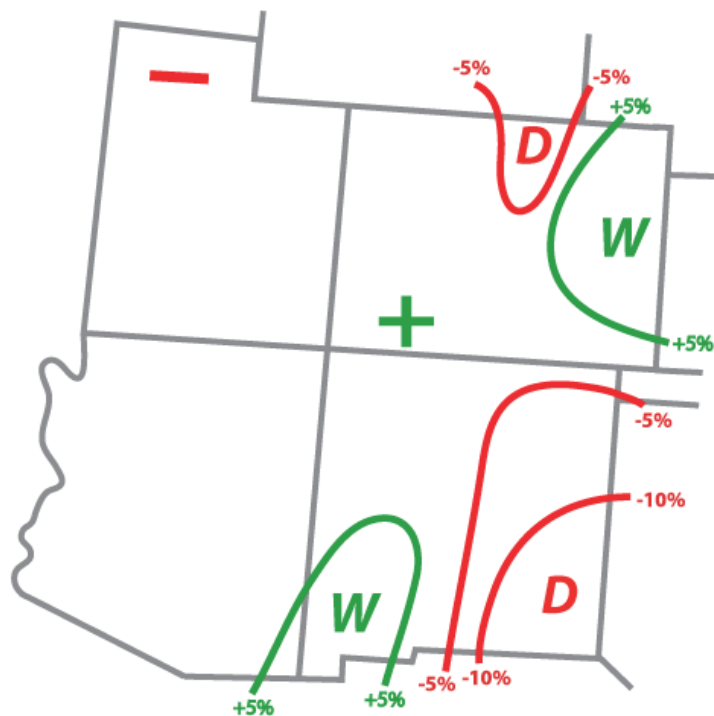
Model Forecasts of ENSO from Jan 2009



Historically, La Niña events of the recent magnitude have had a tendency to continue for three years+ (54-57; 73-76; 98-01), much more so than El Niños.

How did my forecasts do in JAS&OND'08?



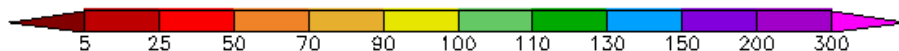
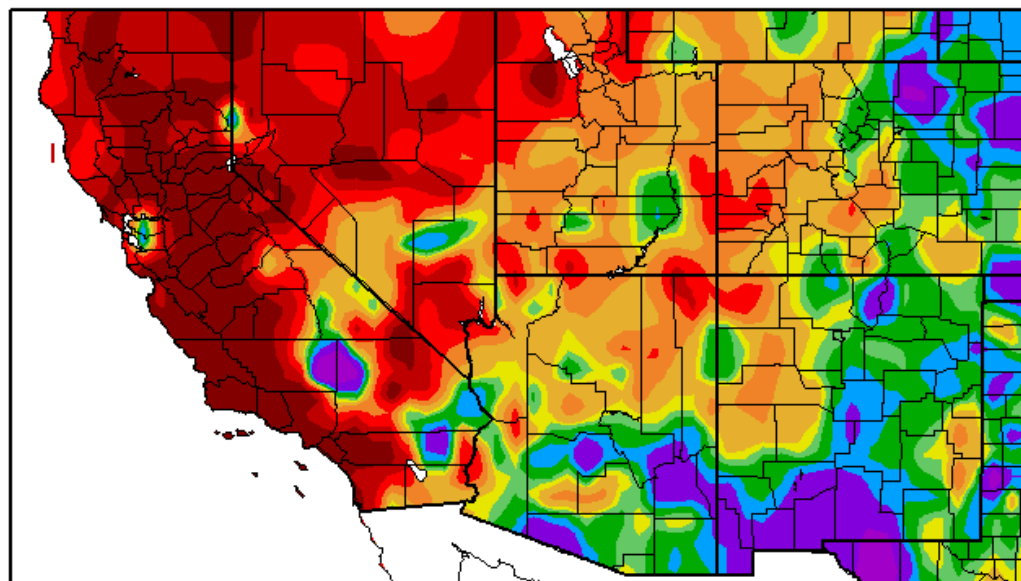


THREE-MONTH OUTLOOK
PRECIPITATION PROBABILITY
0.5 MONTH LEAD
VALID JAS 2008
MADE 19 JUN 2008

POSTMORTEM FOR JULY-SEPTEMBER FORECAST:

After a dry start in July, my wet forecast for the 3rd quarter of 2008 turned out alright for eastern Colorado, while dry conditions in western Colorado were more widespread than expected. *The dry forecast from CPC for northern Utah verified well, but they 'punted' elsewhere ('EC').*

Percent of Normal Precipitation (%)
7/1/2008 - 9/30/2008



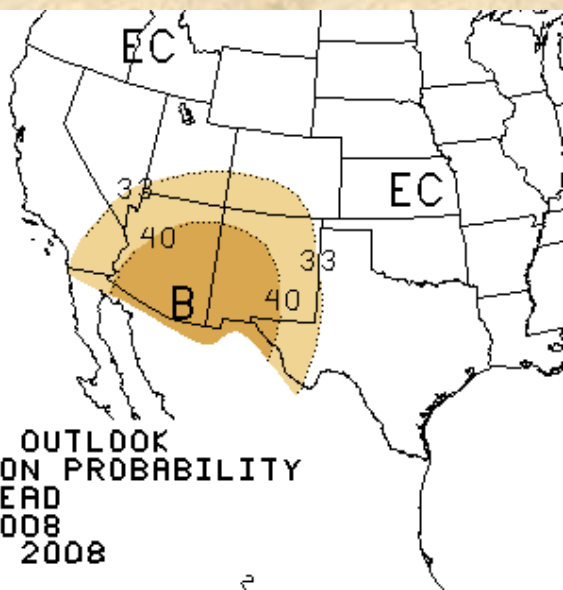
Generated 10/11/2008 at HPRCC using provisional data.

NOAA Regional Climate Centers



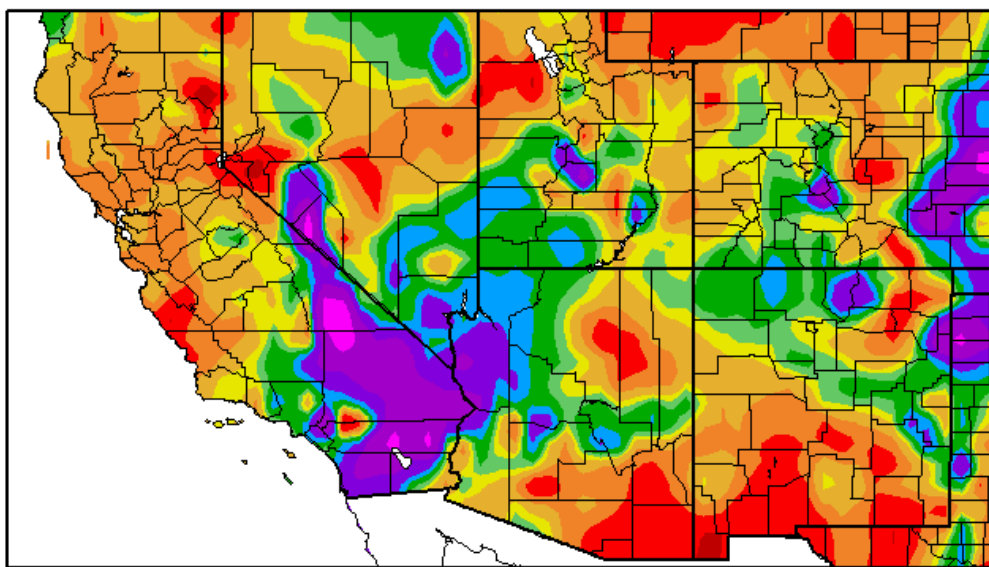
POSTMORTEM OCTOBER-DECEMBER FORECAST:

My dry forecast would have verified everywhere if it had not been for one big storm in October in eastern Colorado and December wetness west of the Divide. *The dry forecast from CPC for AZ and NM verified about as well, but they had left states to the north as 'EC'.*



THREE-MONTH OUTLOOK
PRECIPITATION PROBABILITY
0.5 MONTH LEAD
VALID OND 2008
MADE 18 SEP 2008

Percent of Normal Precipitation (%)
10/1/2008 - 12/31/2008

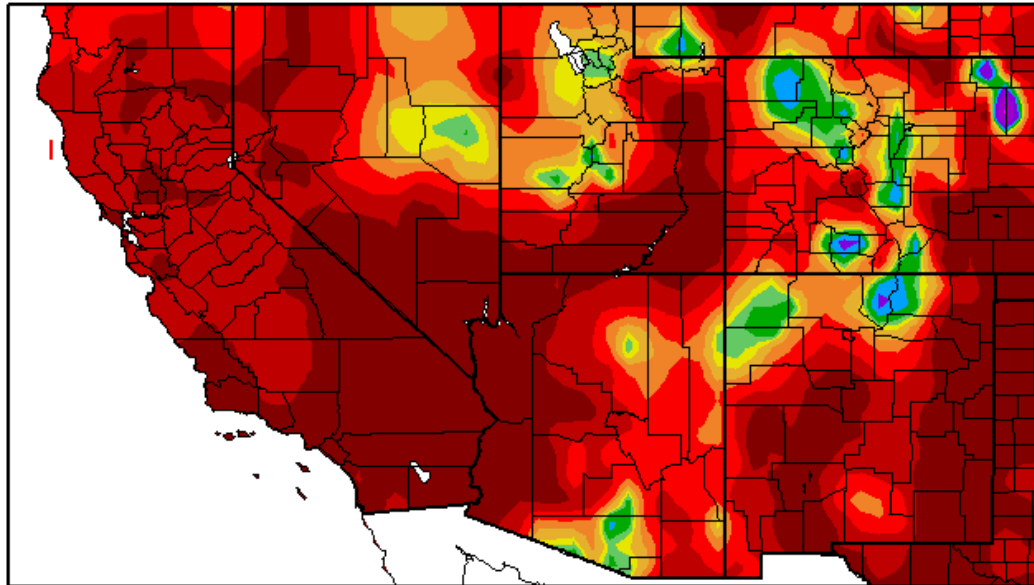


Generated 1/11/2009 at HPRCC using provisional data.

NOAA Regional Climate Centers

What has happened so far in 2009?

Percent of Normal Precipitation (%)
1/1/2009 – 1/20/2009

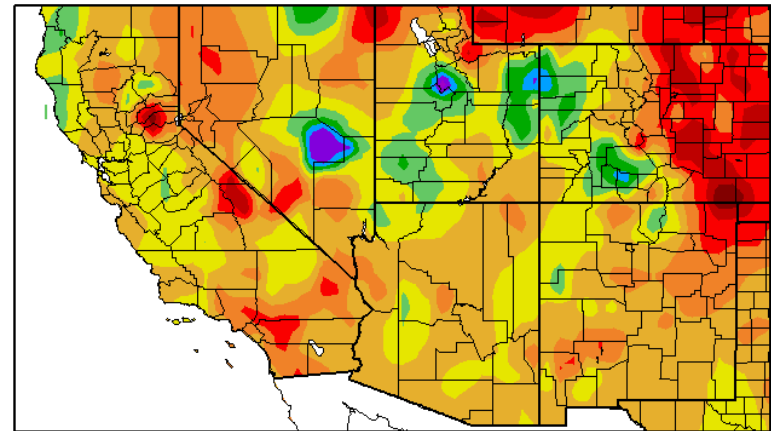


Generated 1/21/2009 at HPRCC using provisional data.

NOAA Regional Climate Cen

Our northern mountains have continued to receive decent moisture this month (left), while the southern mountains have taken a ‘break’. Cold air remains trapped west of the Divide (below), while frequent Chinooks have kept us warm in the Front Range and wiped out our snowcover below ~7K.

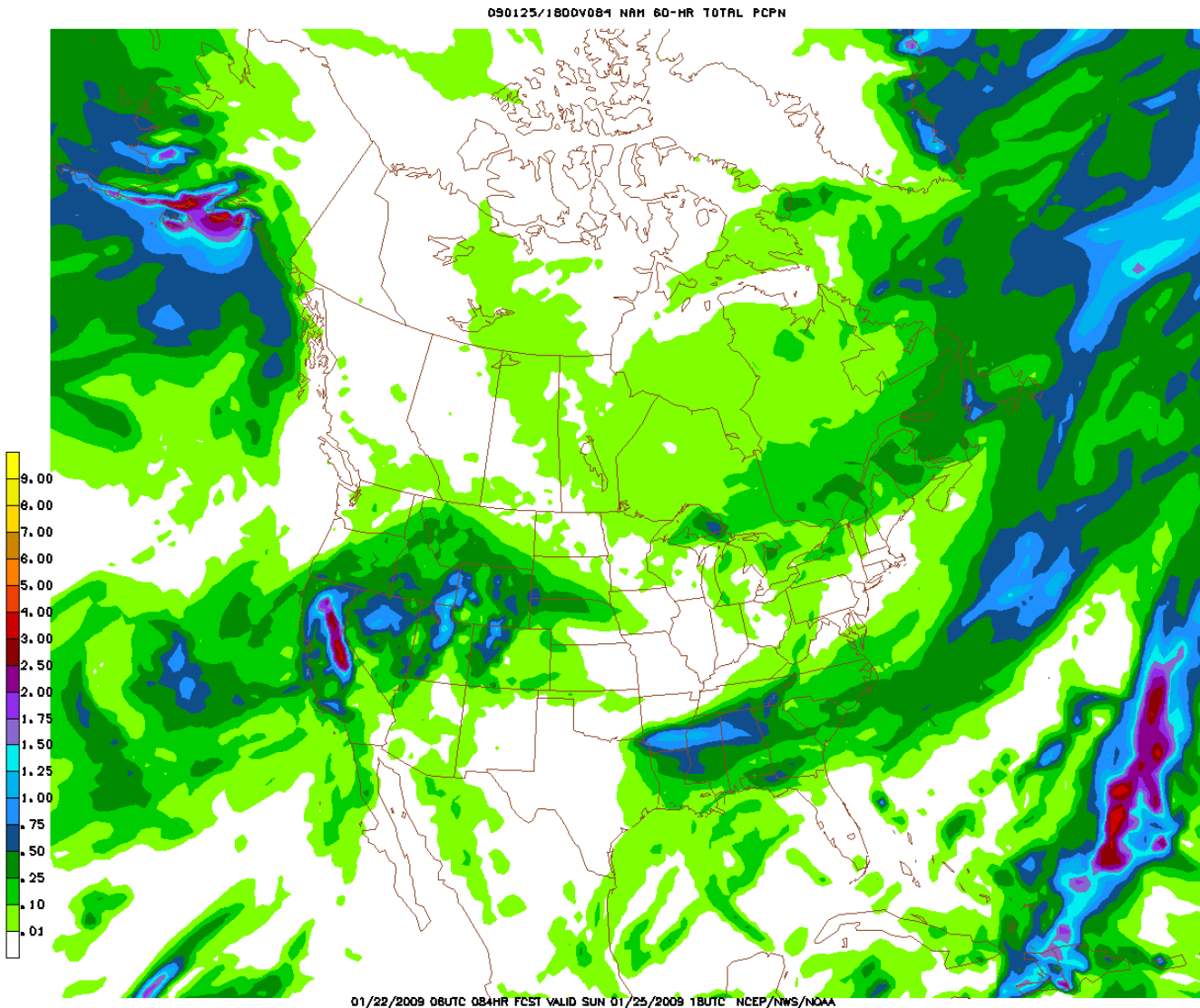
Departure from Normal Temperature (F)
1/1/2009 – 1/20/2009



Generated 1/21/2009 at HPRCC using provisional data.

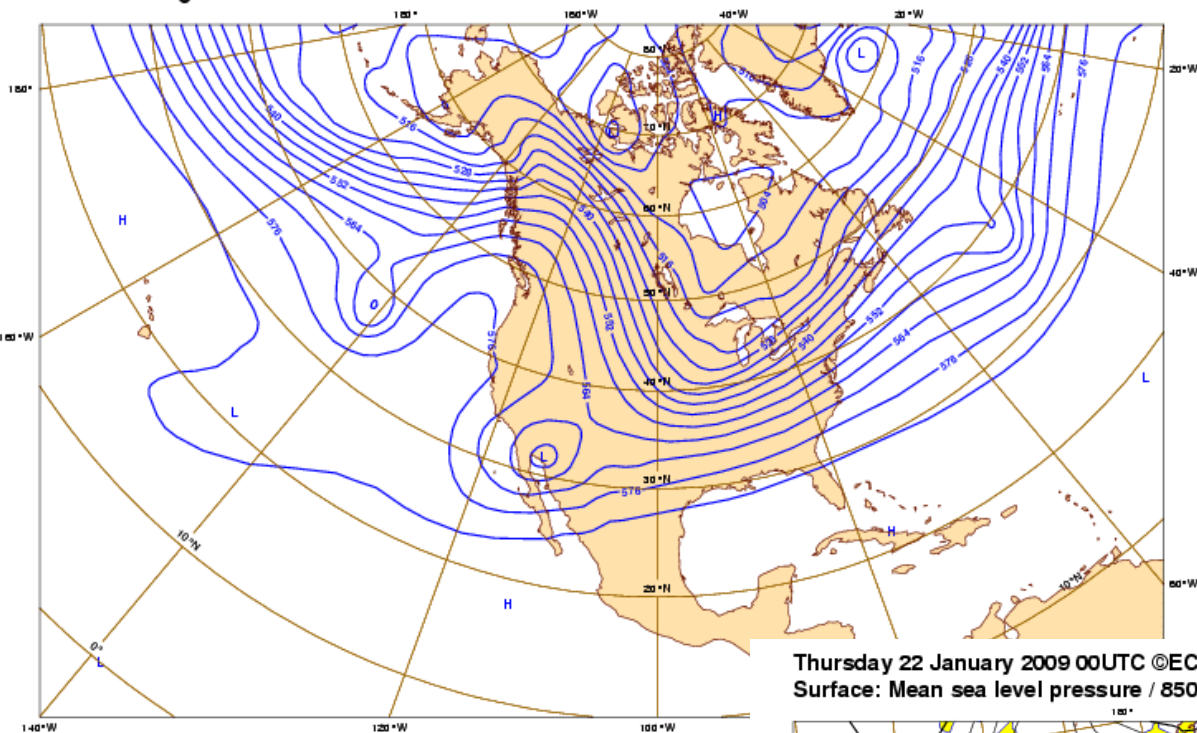
NOAA Regional Climate Center

What can we expect in the near-term?



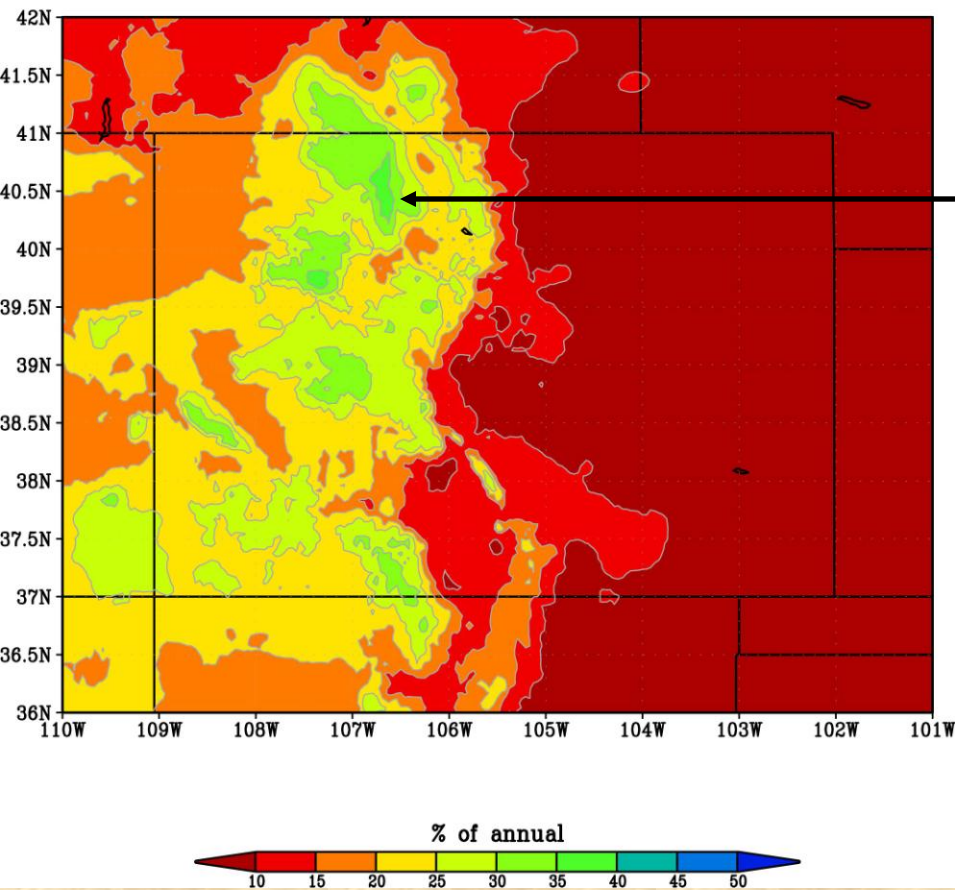
Rain has already started to fall in CA, and moisture is on its way to CO, to begin affecting our state by Friday morning. Map (left) shows total precipitation from Friday thru mid-day Sunday: up to 1" for our northwestern mountains, and 0.1" at best for eastern CO (arctic air tries to return, but gets hung up in WY, due to southwesterly flow aloft).

Thursday 22 January 2009 00UTC ©ECMWF Forecast t+192 VT: Friday 30 January 2009 00UTC
500 hPa Height

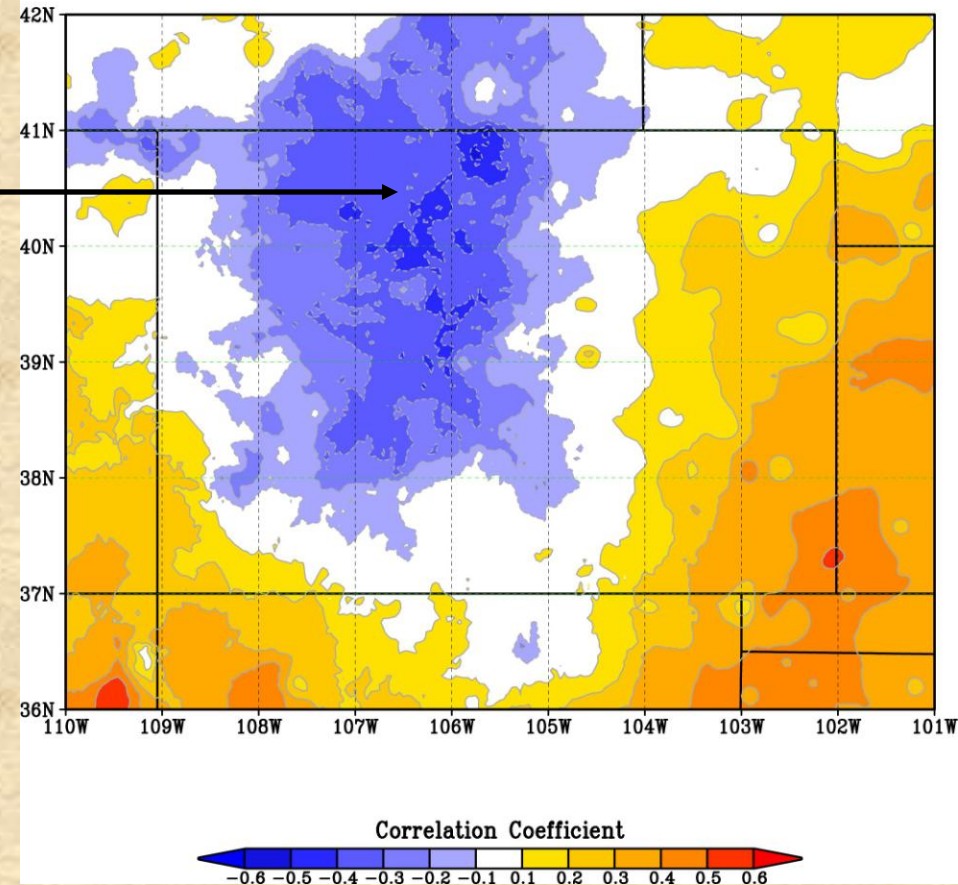


What are typical La Niña impacts in the winter?

DJF Climatological Precipitation



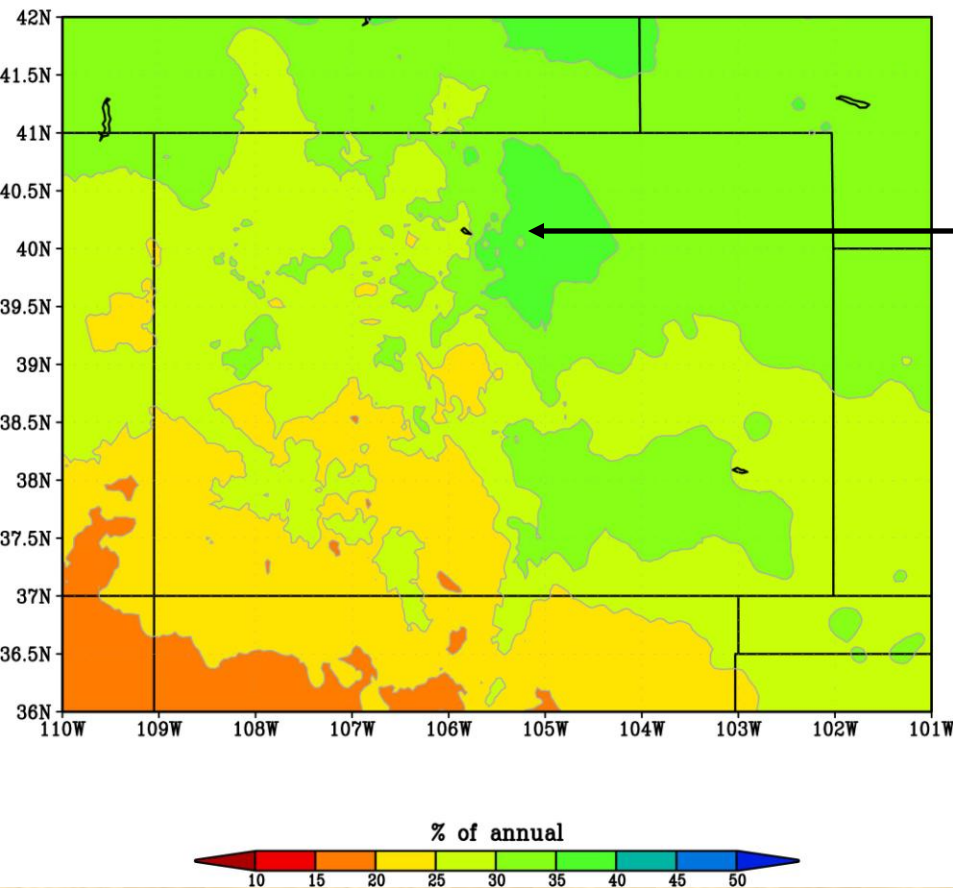
DJF Precipitation versus MEI (1956–2005)



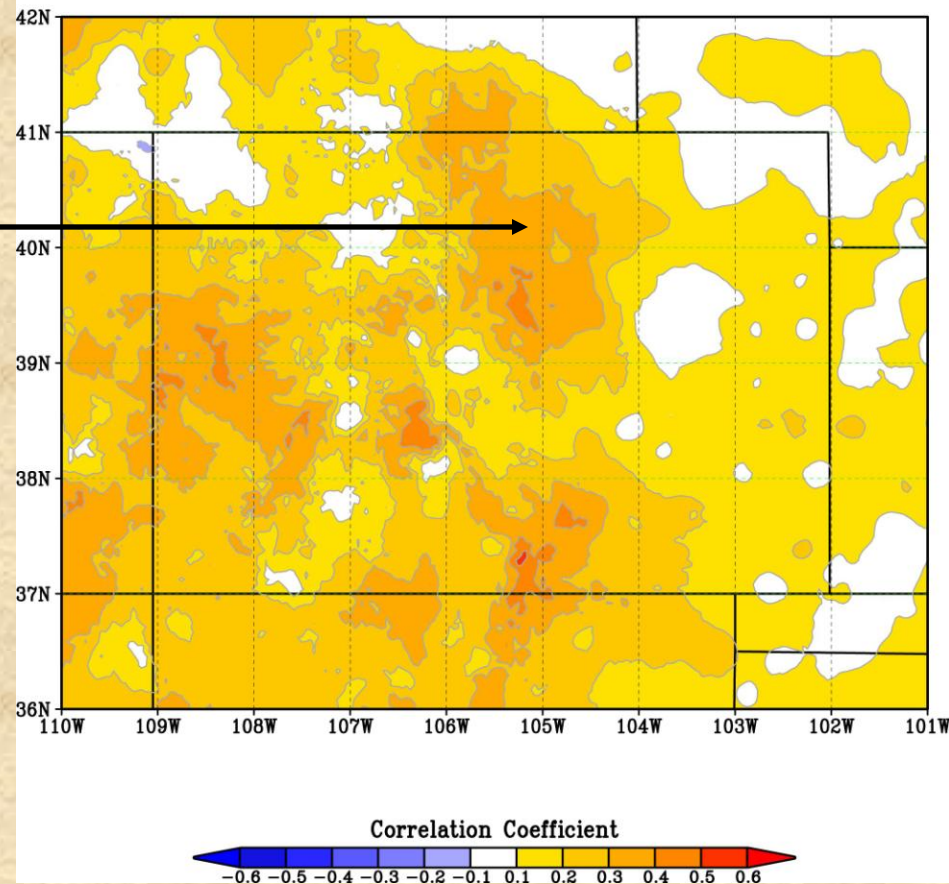
Northwest Colorado benefits the most from average winter seasons (left), even more so during La Niña conditions (negative correlations; right).

What are typical La Niña impacts in the spring?

MAM Climatological Precipitation



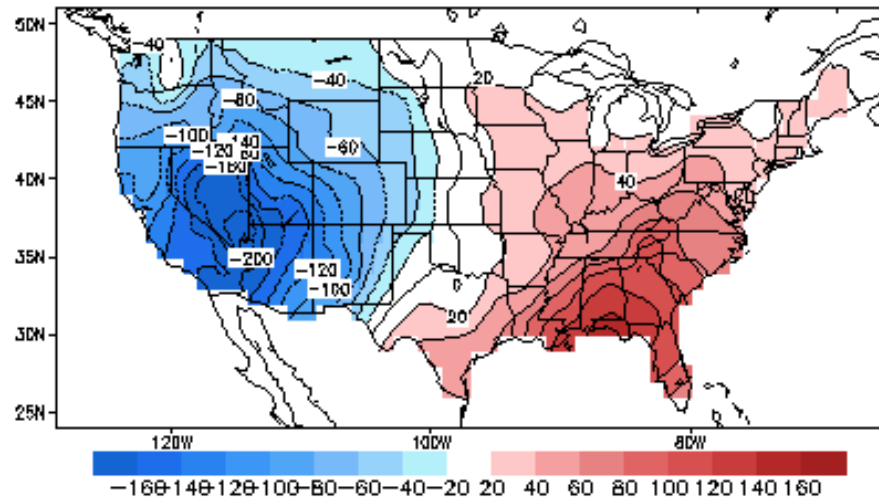
MAM Precipitation versus MEI (1956–2005)



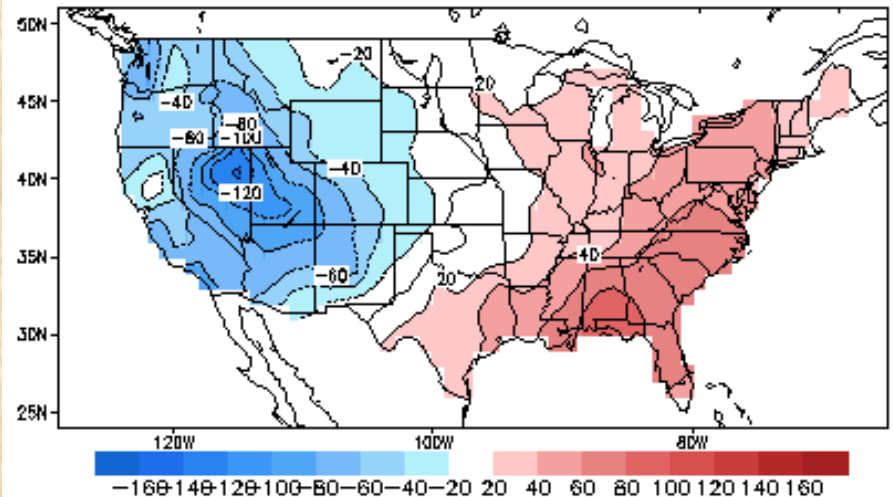
Northeast Colorado benefits the most from average spring seasons (left), but less so during La Niña conditions (positive correlations; right). Best case scenario: a switch from La Niña to El Niño early in year (such as 1957; 1997).

What about 'Constructed Analog' Forecasts?

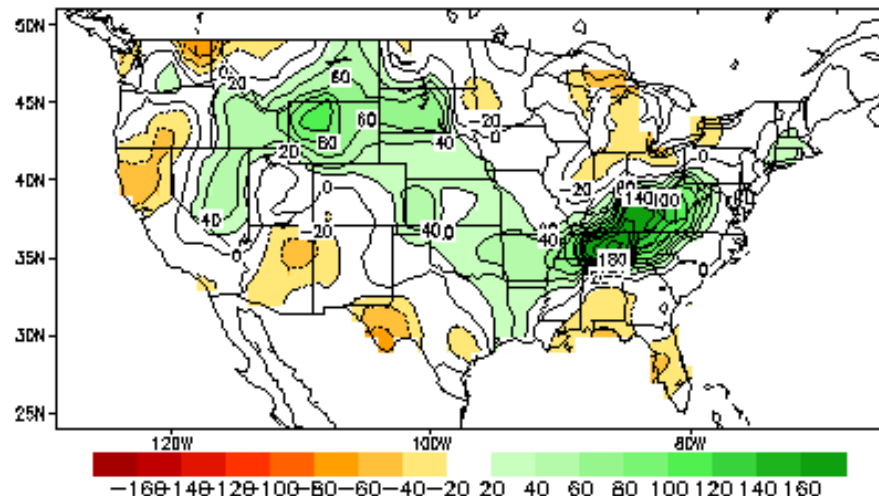
Lagged Averaged Temperature Outlook for FEB 2009
units: anomaly (sdX100), SM data ending at 20090120



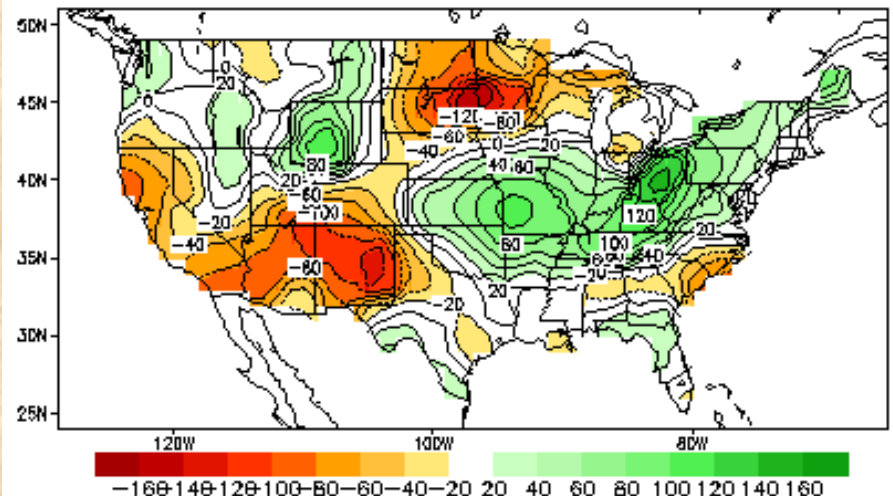
Lagged Averaged Temperature Outlook for FMA 2009
units: anomaly (sdX100), SM data ending at 20090120



Lagged Averaged Precipitation Outlook for FEB 2009
units: anomaly (sdX100), SM data ending at 20090120



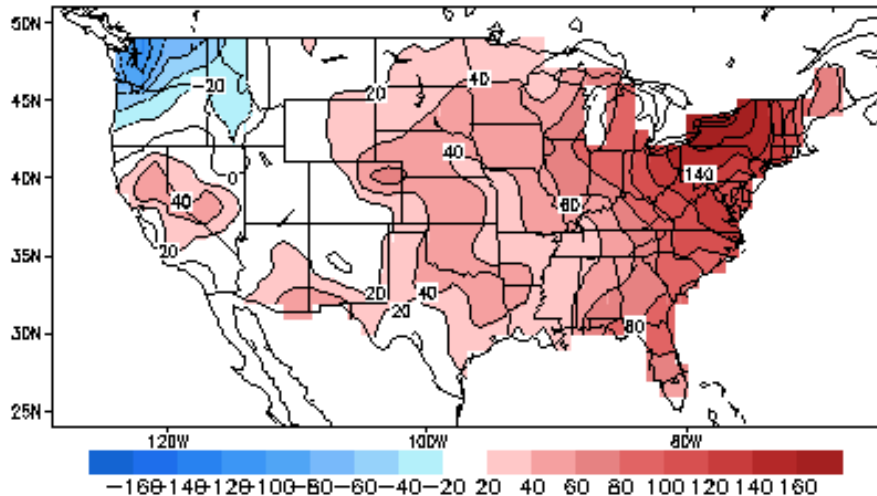
Lagged Averaged Precipitation Outlook for FMA 2009
units: anomaly (sdX100), SM data ending at 20090120



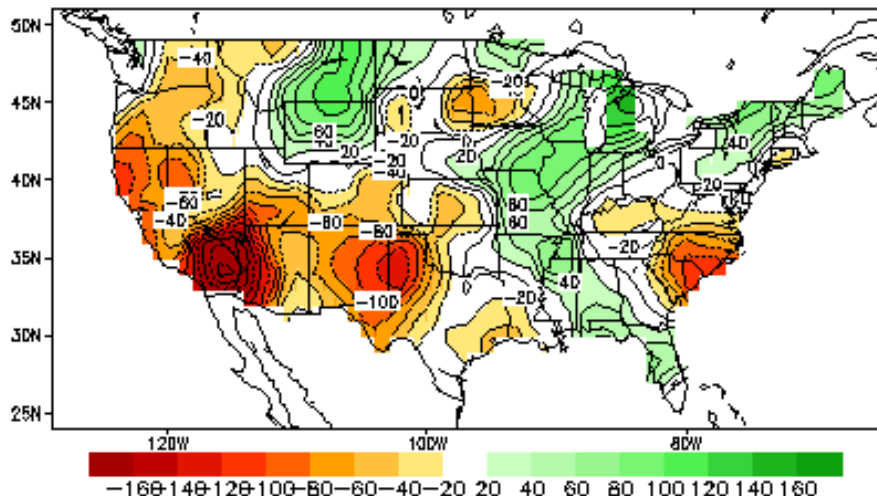
Little hope for above-normal moisture for next three months!

What about 'Constructed Analog' Forecasts?

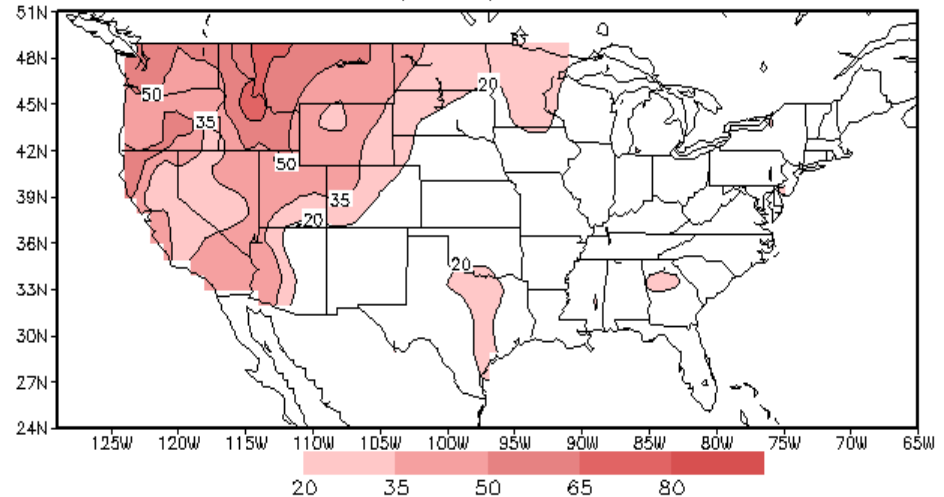
Lagged Averaged Temperature Outlook for AMJ 2009
units: anomaly (sdX100), SM data ending at 20090120



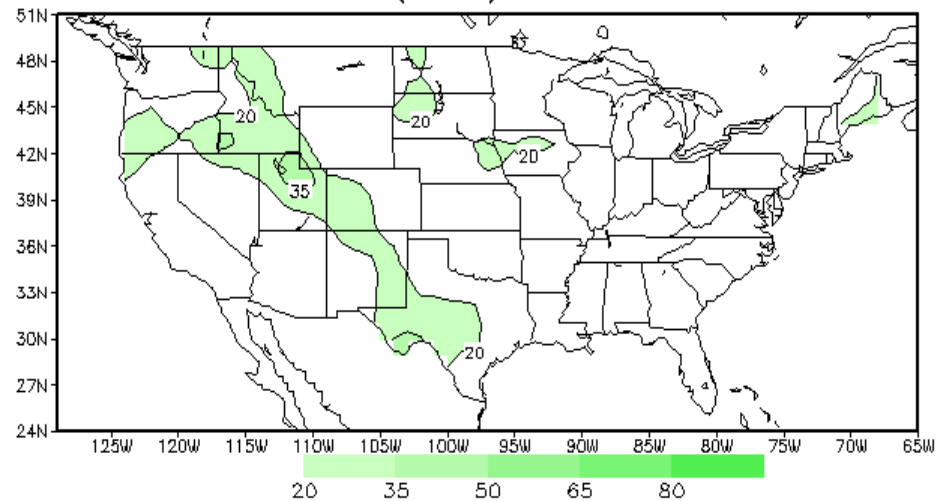
Lagged Averaged Precipitation Outlook for AMJ 2009
units: anomaly (sdX100), SM data ending at 20090120



lead 3 skill of temperature CAS forecast for AMJ
units: correlation (X100) based on 1981-2005

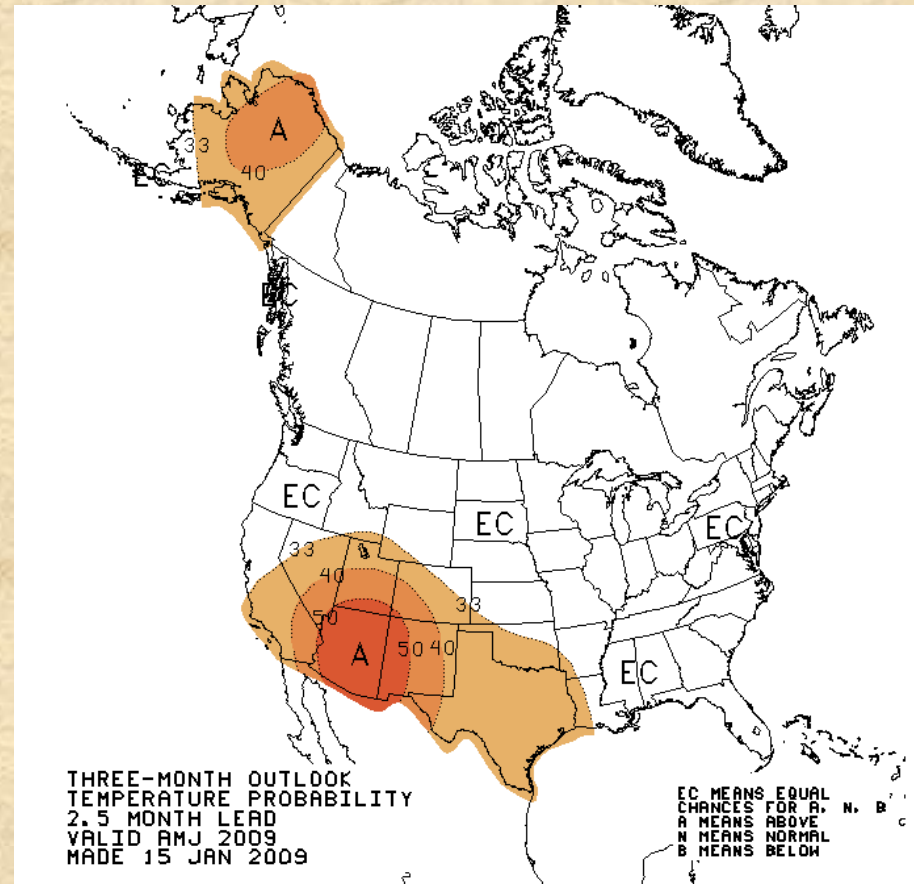
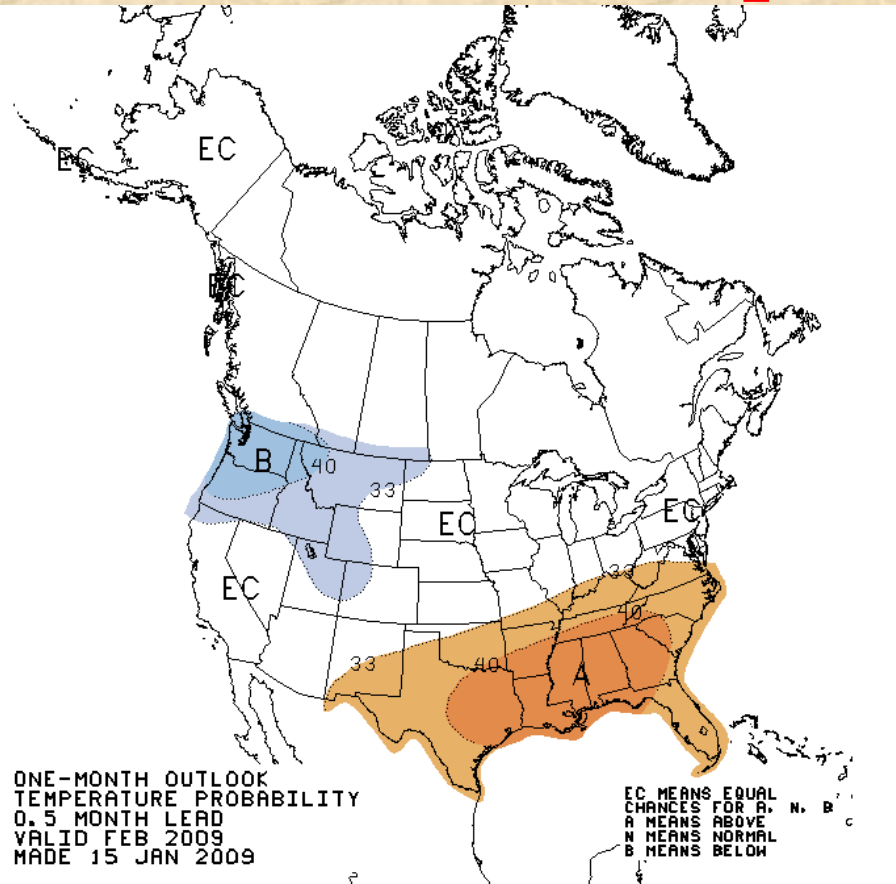


lead 3 skill of precipitation CAS forecast for AMJ
units: correlation (X100) based on 1981-2005



A mostly dry spring forecast is backed up by some skill in the past...

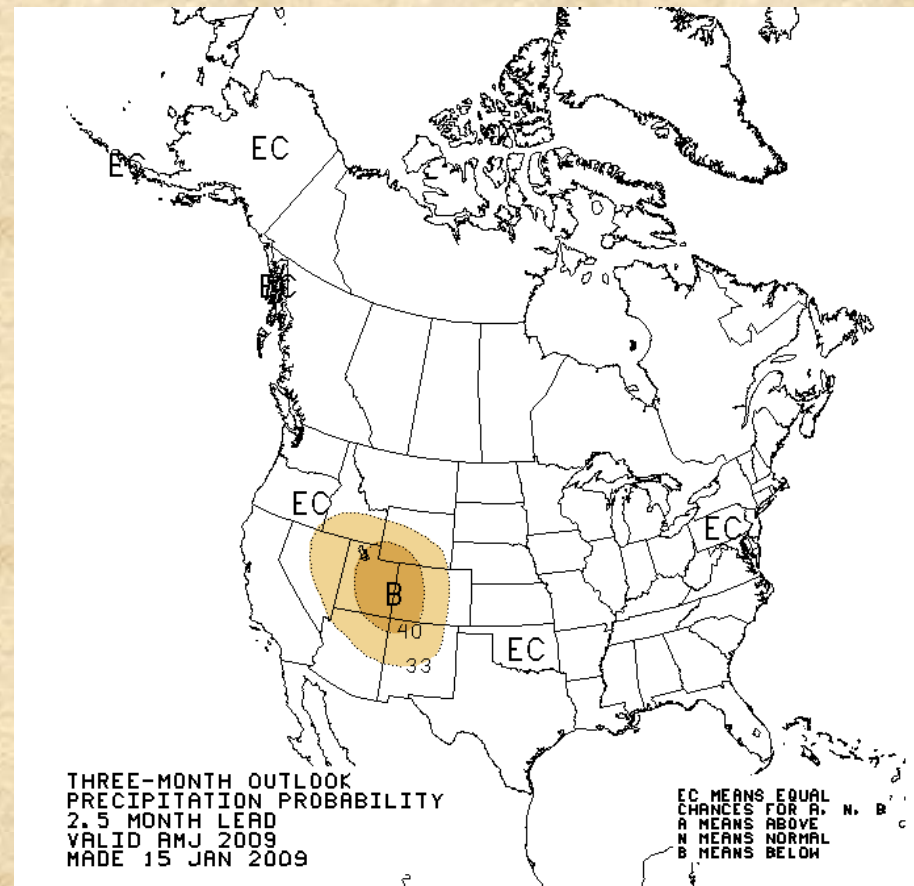
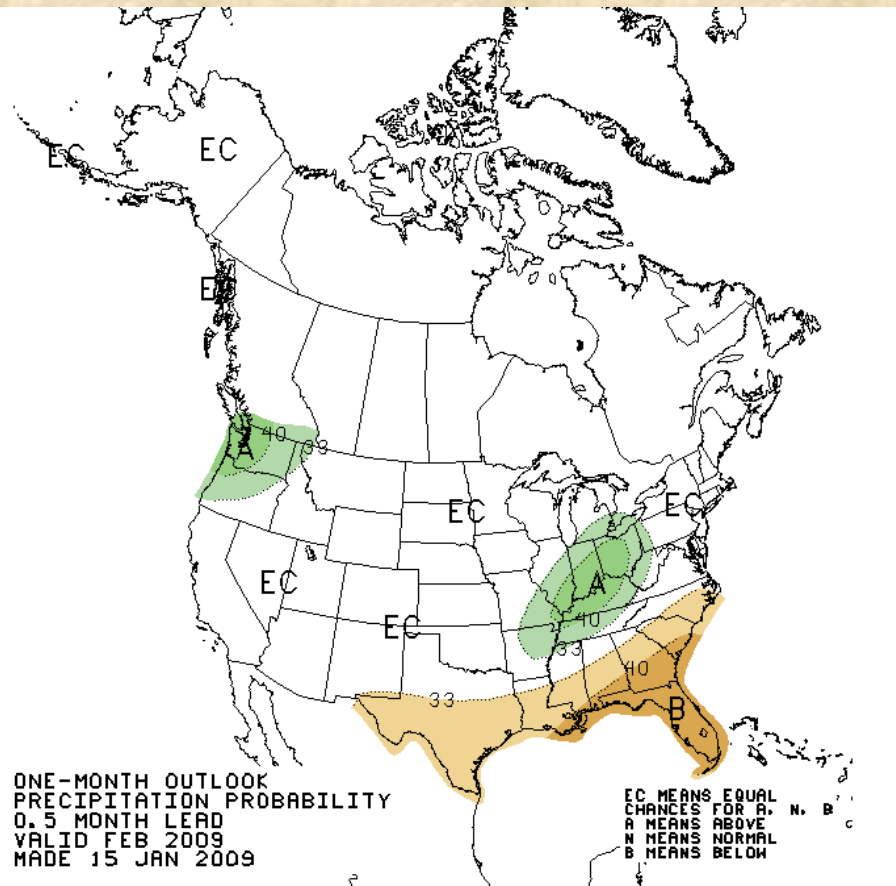
CPC Temperature Forecasts



According to CPC's official forecasts from last week, February (left) and April-June (right) temperature forecasts start out colder than average over western Colorado, only to revert to warmer conditions by spring, consistent with the long-term trend for this season and region.

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

CPC Precipitation Forecasts

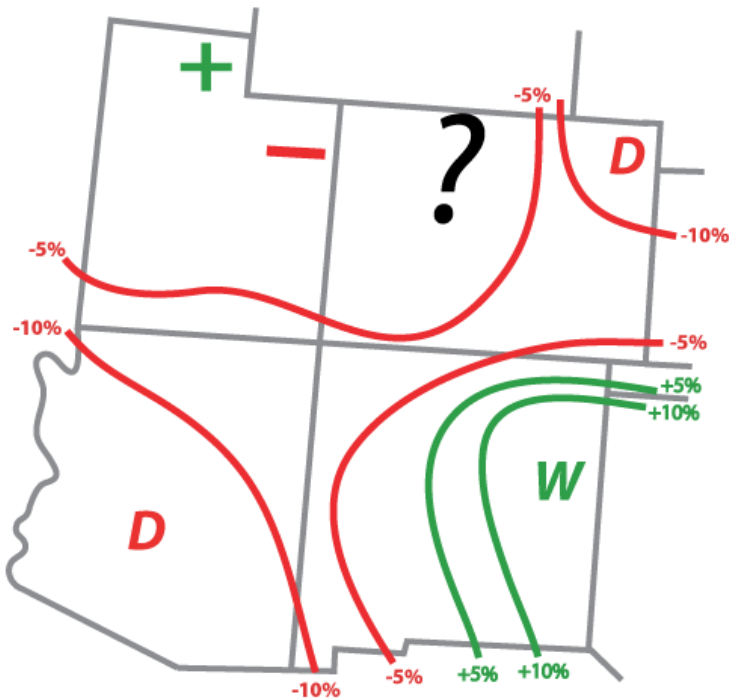


According to CPC's official official forecasts from last week, February (left) and April-June (right) precipitation forecasts are undecided at the beginning, and lean towards dry conditions in the spring. The latter can be attributed to lingering La Niña effects in at least some forecast models.

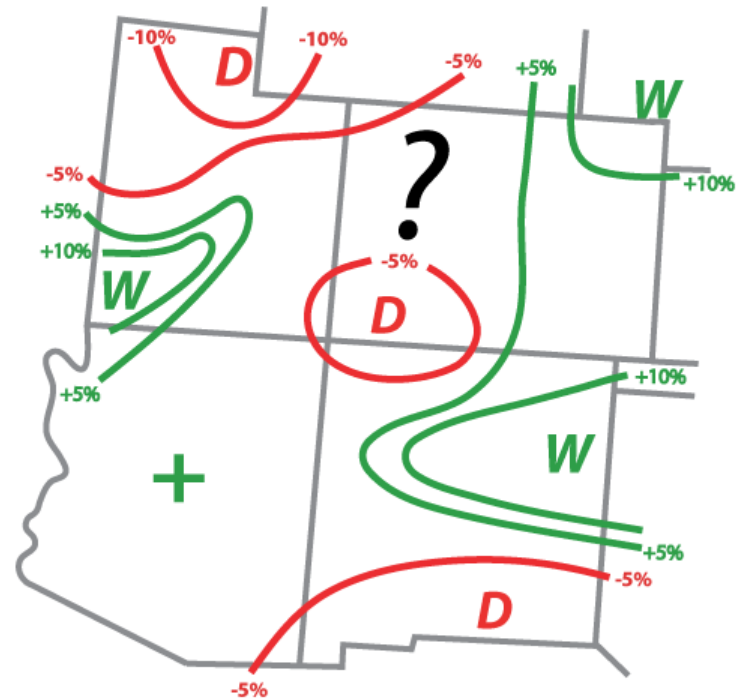
Source: <http://www.cpc.ncep.noaa.gov/products/predictions/>

Experimental CDC “Forecast Guidance”

EXPERIMENTAL PSD PRECIPITATION FORECAST GUIDANCE
JAN - MAR 2009 (issued January 20, 2009)



EXPERIMENTAL PSD PRECIPITATION FORECAST GUIDANCE
APR - JUN 2009 (issued January 21, 2009)



My Jan-Mar (left) and Apr-Jun forecast (right) are almost inverse of each other: eastern Colorado switches from a tilt towards a dry winter to a wet-leaning spring, mountains west of here continue a long run of ‘undecided’, and southwestern Colorado leans towards dry conditions for all of the next half year. *Skill levels for both maps ‘leave room for improvement’!*

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

Executive Summary (22jan09)

“Final” version at: <http://www.cdc.noaa.gov/people/klaus.wolter/SWcasts/>

- While the 2007-08 La Niña event almost disappeared last summer, it kept an atmospheric footprint right through that period. Late last fall, La Niña returned in moderate force, and should persist at least thru February.
- After a mostly dry fall, a La Niña-influenced stormtrack brought above-normal snowfall to our mountains, rescuing our snowpack from a weak start. This active pattern should resume by Friday, and stick around for the remainder of January.
- My experimental forecast guidance for the late winter season keeps northeastern CO dry, while leaving the door open for a ‘normal’ to wet season for the north-central mountains, as is typical for La Niña. A first look into the spring season holds out hope for above-normal moisture for the eastern plains, consistent with at least weakened La Niña, if not a switch to El Niño.
- Bottomline: La Niña has returned for an encore performance, consistent with historic precedents. Our mountains should continue to benefit from this set-up into next month, while spring could turn ‘ugly’, if La Niña were to stick around.

Stay tuned for next month’s update!