Earth System Research Laboratory
Physical Sciences Division

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18 January 2012
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Seasonal Outlook into early 2012

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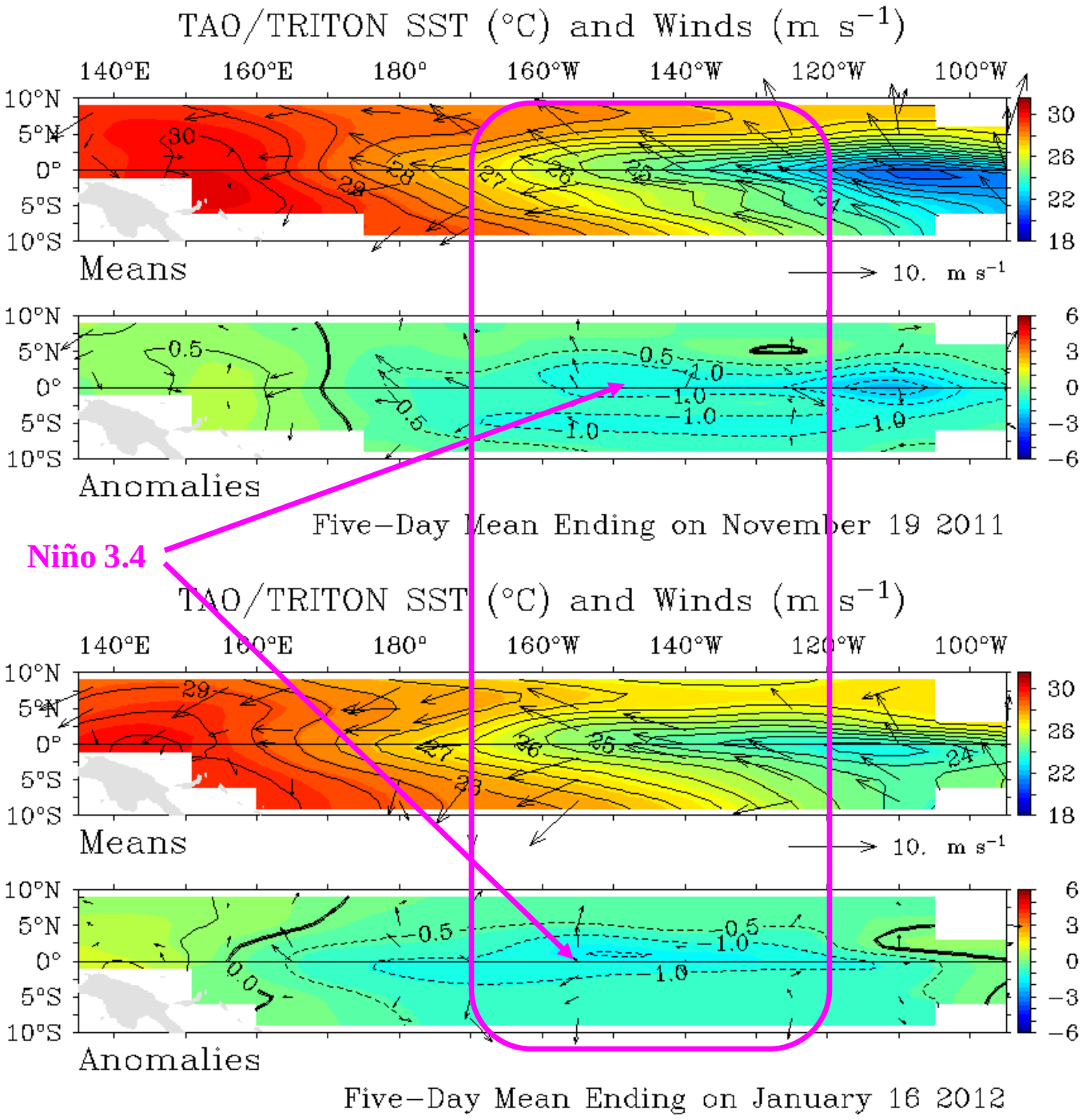
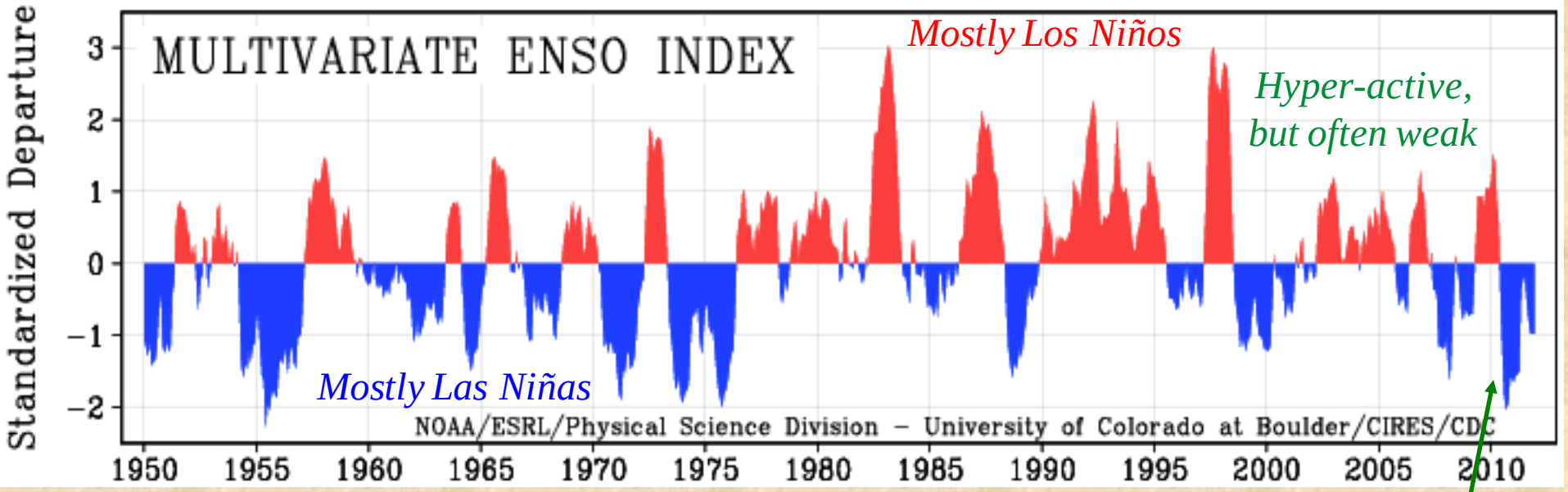
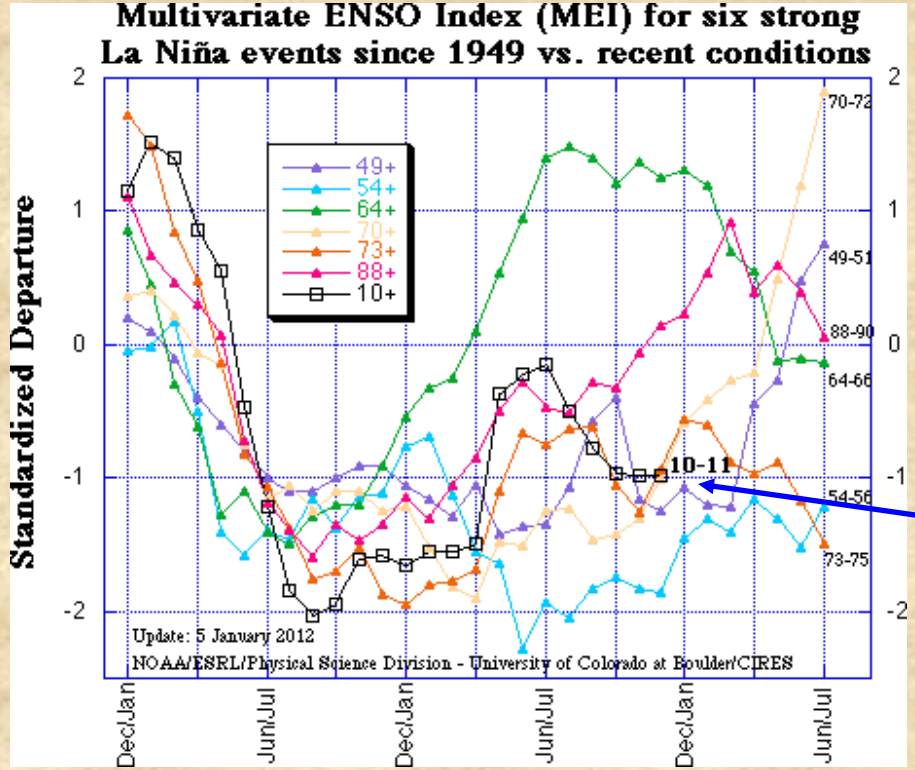
- **'Double-dip' La Niña continues**
- **What does that mean for us?**
- **Expectations for next two weeks**
- **CPC forecasts for January through May 2012**
- **Experimental Seasonal Forecast Guidance (+postmortem)**
- **Executive Summary**

Current state of El Niño/Southern Oscillation (ENSO) phenomenon (bottom), compared to two months ago(top): La Niña has continued its moderate course with anomalies near -1C. This includes enhanced trade winds near the dateline, and below-normal SST in the central tropical Pacific. Subsurface heat content (not shown) is actually comparable to last year.



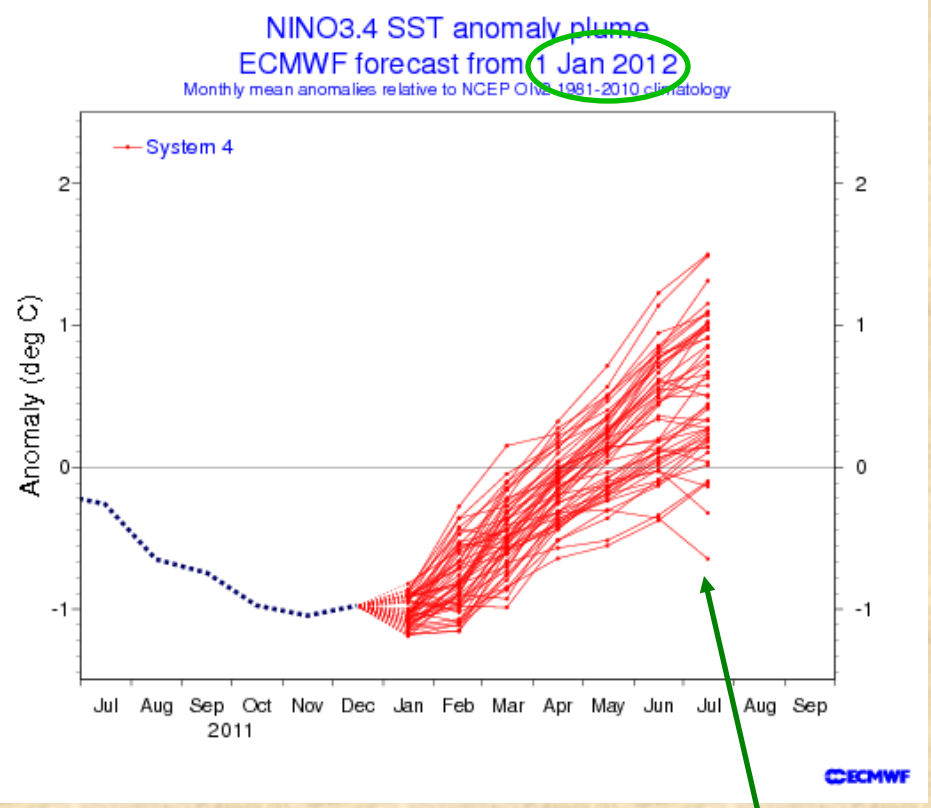


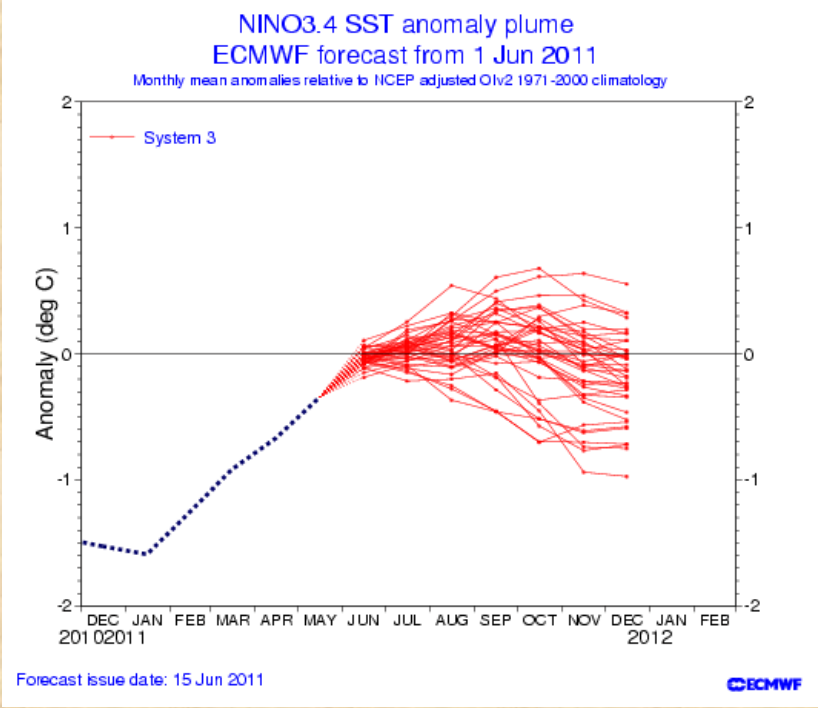
Back to the '70s?

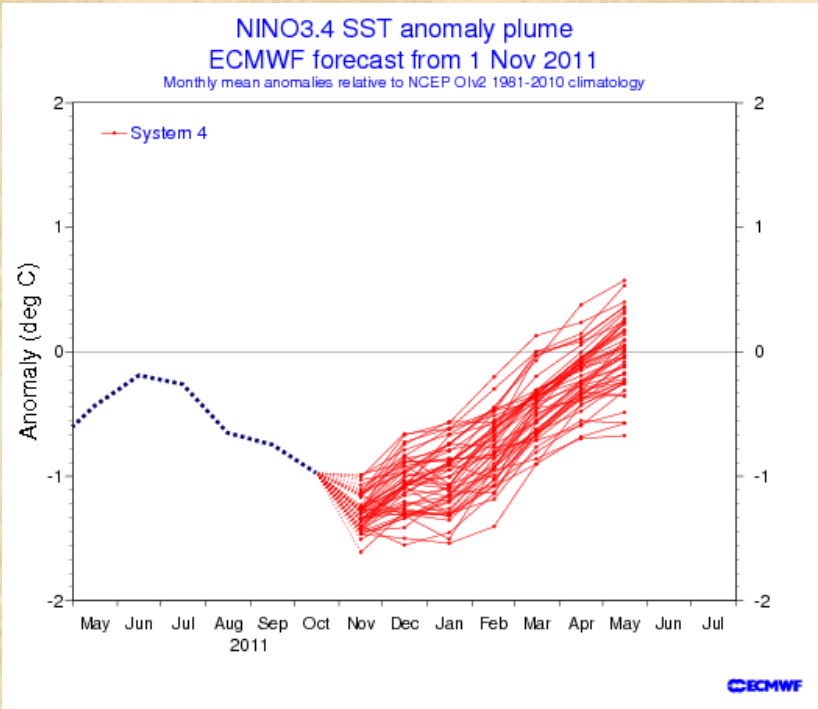


La Niña event peaked early last fall, followed by a brief excursion to ENSO-neutral conditions during boreal spring; MEI has now continued at near-moderate La Niña levels for the last three months

http://www.esrl.noaa.gov/psd/enso/mei

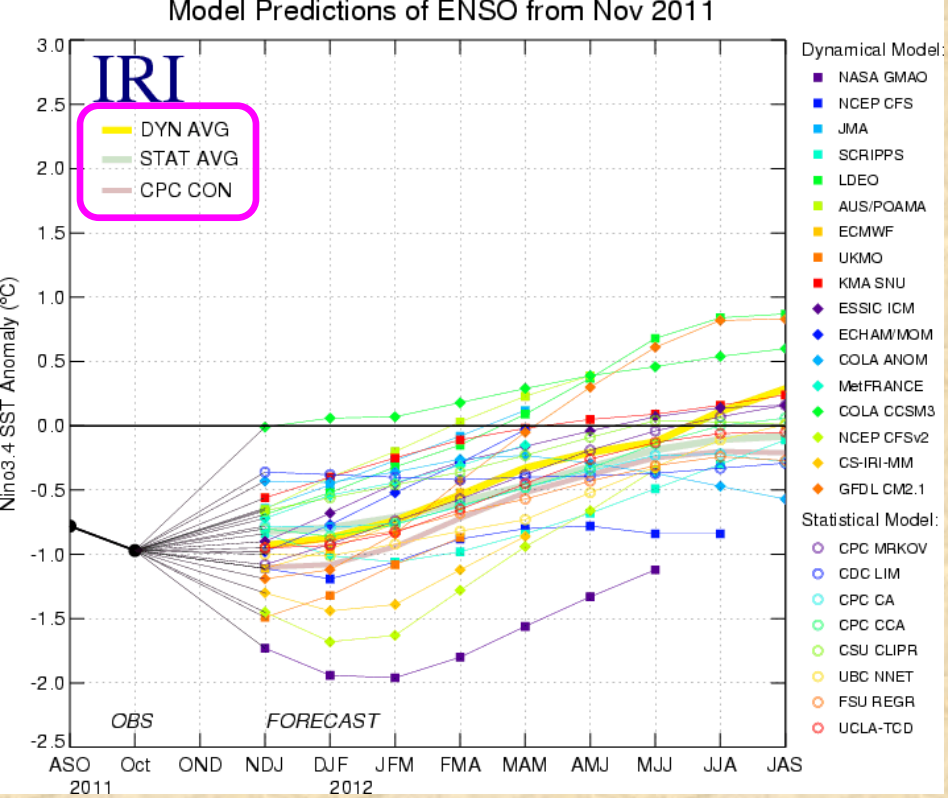






European 'forecast plume' of Niño 3.4 from this month (top) predicts a sudden end to this La Niña event by mid-spring 2012. While last year's early summer forecasts 'underestimated' the tendency of the 2011 La Niña to stage a comeback (top right), the November forecast was quite similar to this month's forecast in ending the event by April-May.

Surprisingly few (5 out of 50) members of the latest forecast run show negative anomalies by July.

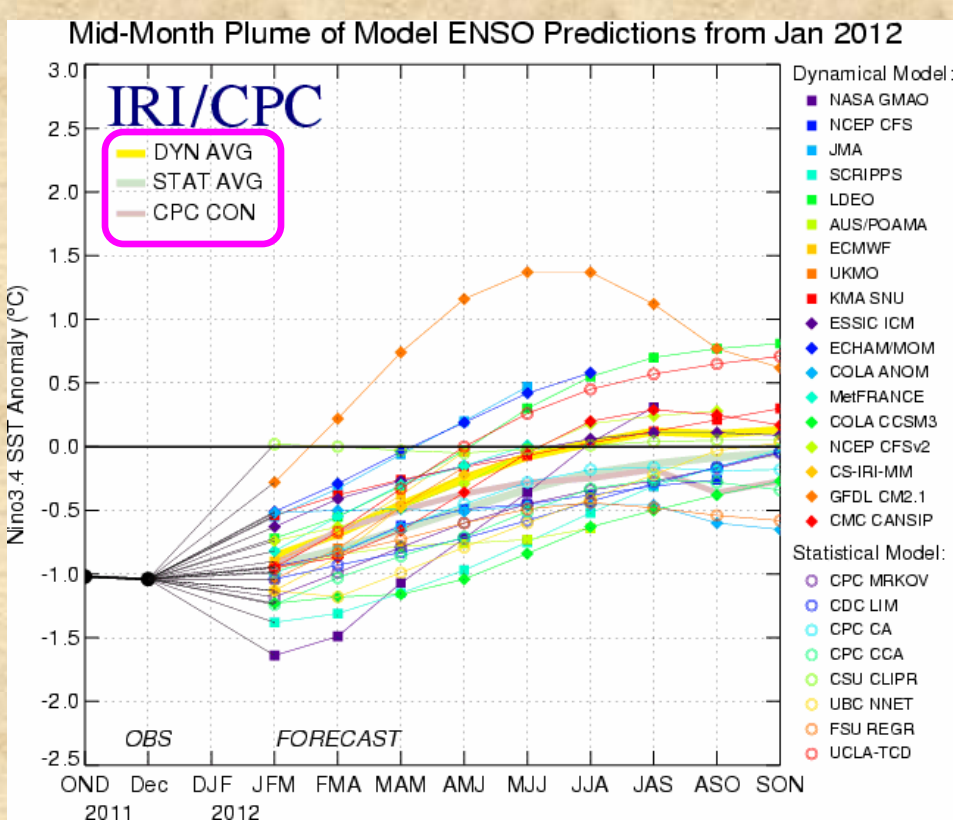


ENSO forecasts from 17 dynamical & 8 statistical forecast models two months ago (left): gradually weakening La Niña conditions were expected, with near-neutral conditions most likely by early summer.

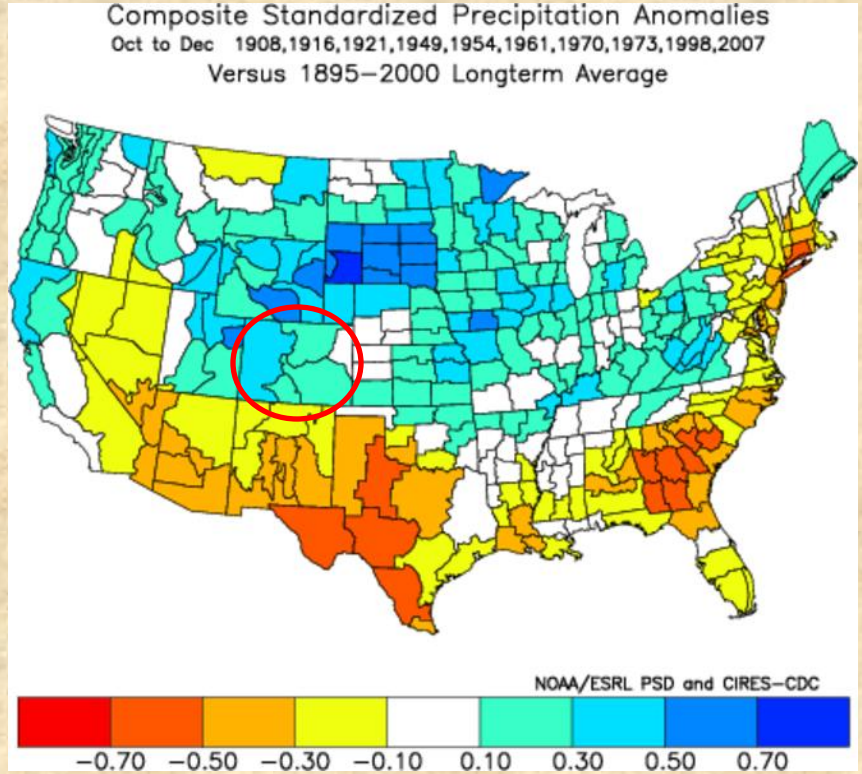
On average, dynamical models were quite similar to statistical models.

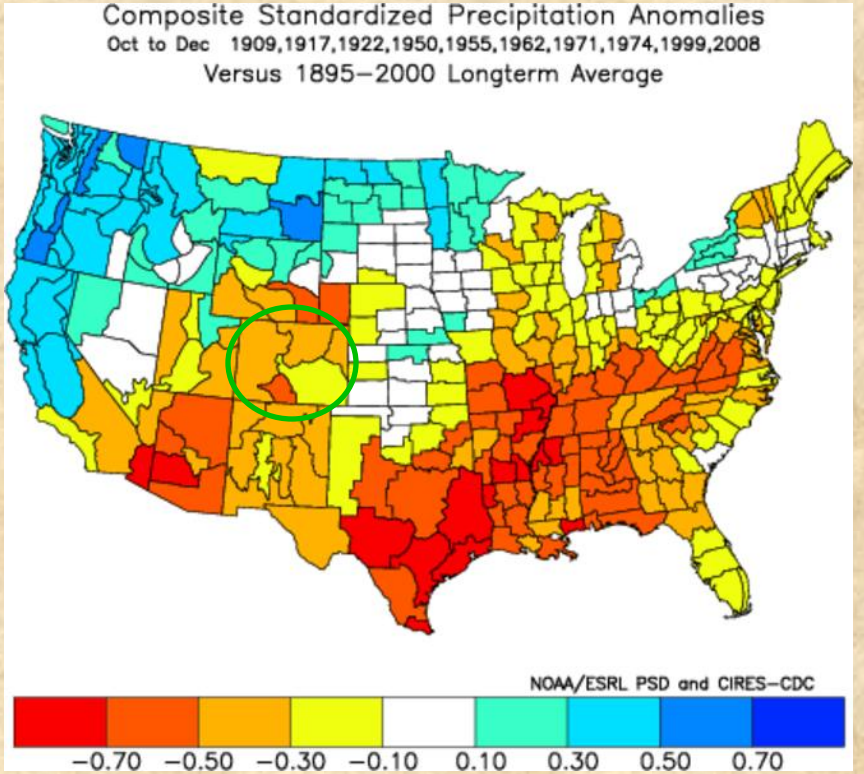
The most recent IRI plume (right) shows a similar fade-away of the current event by late spring/early summer, but faster for dynamical than statistical models (unusual(?) convergence towards ENSO-neutral by late 2012).

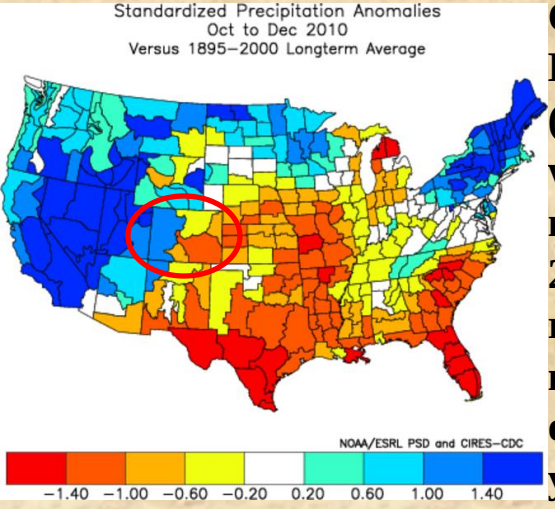
In 10 historical 'double-dip' La Niña events of the last century, 4 continued into a 3rd year, while 6 switched over to El Niño, and none went ENSO-neutral…



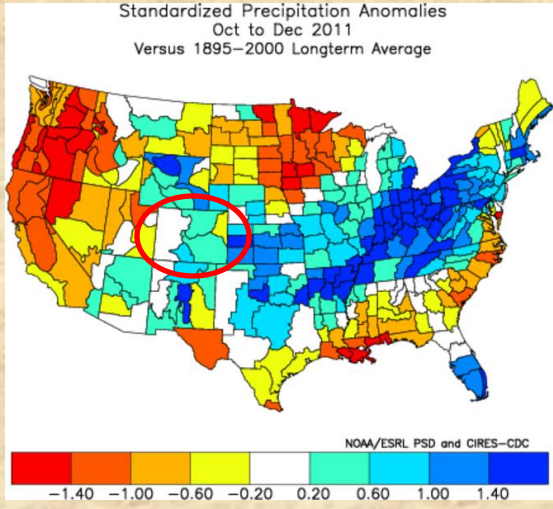
1st vs 2nd Yr La Niña composites for October-December



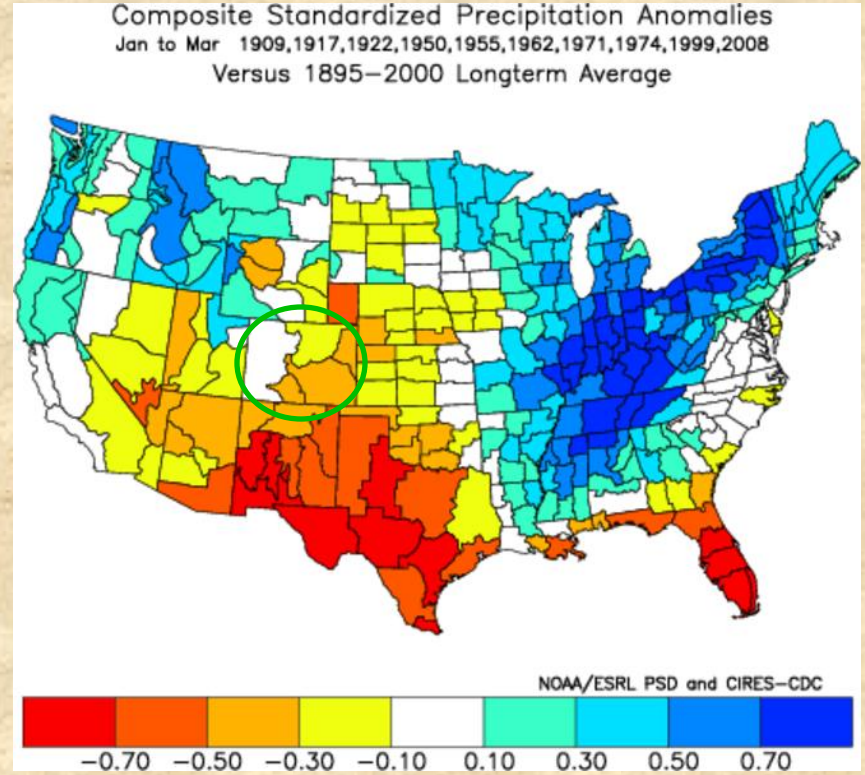


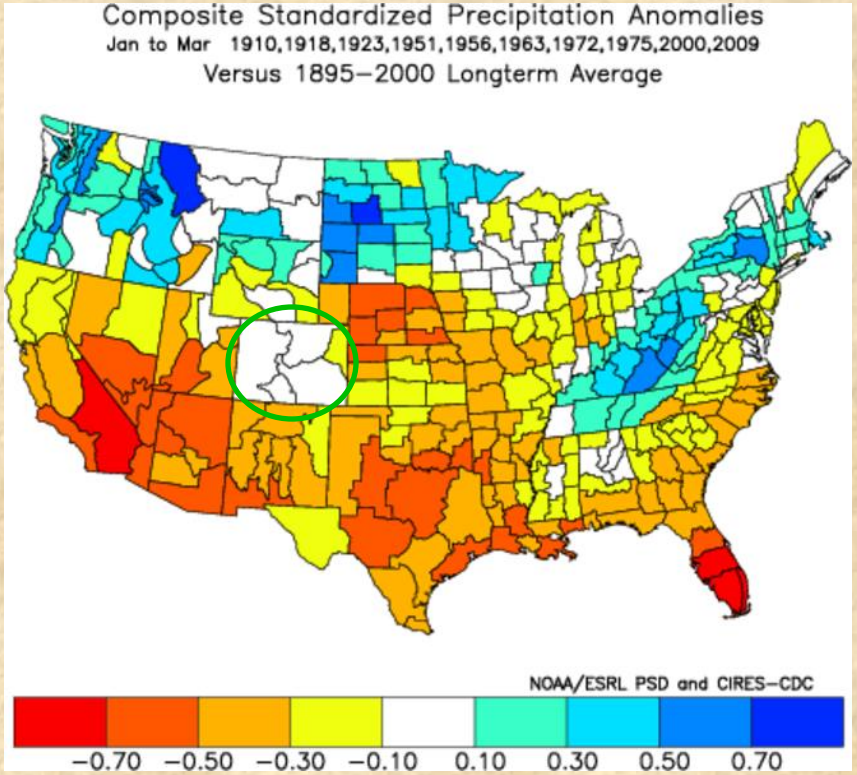


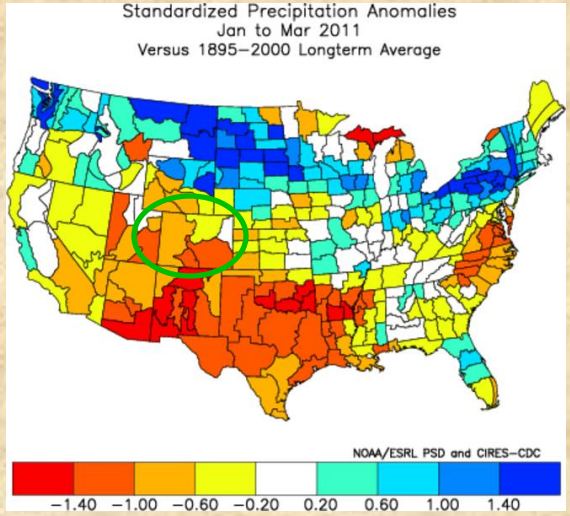
Compared to the typical outcome of 1st yr La Niña fall seasons (top left), Oct-Dec 2010 (bottom left) ended up wet in western CO, while dry conditions in E CO were much more severe than typical for La Niña. The 2011 fall season ended up inverse (bottom right), with wet conditions in E CO, and near-normal to dry conditions west of the divide. This was a mixed match with 2nd year La Niña statistics (top right).



1st vs 2nd Yr La Niña composites for January-March

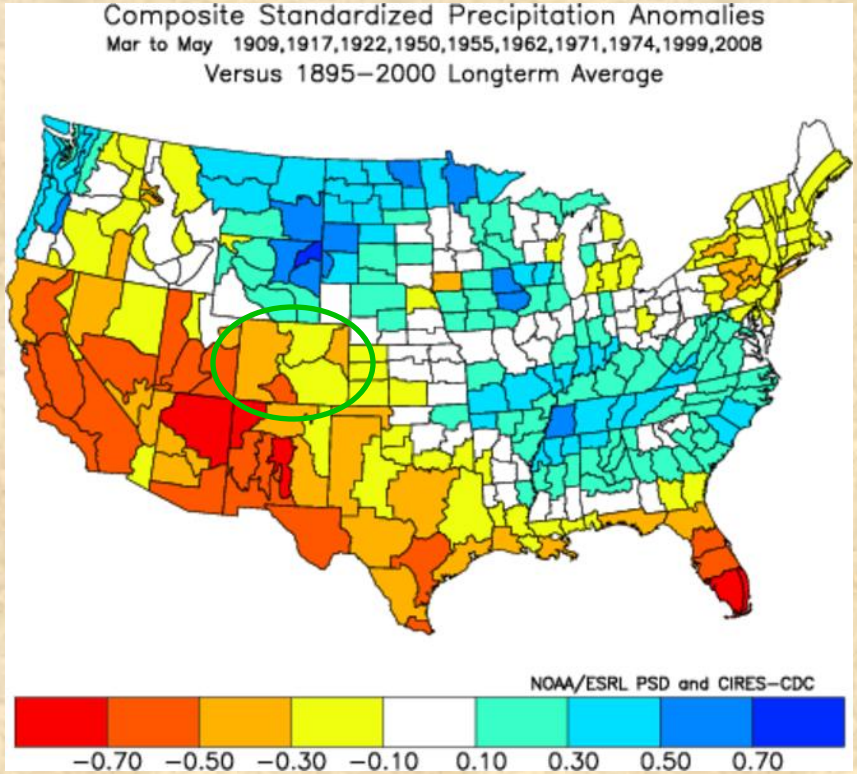


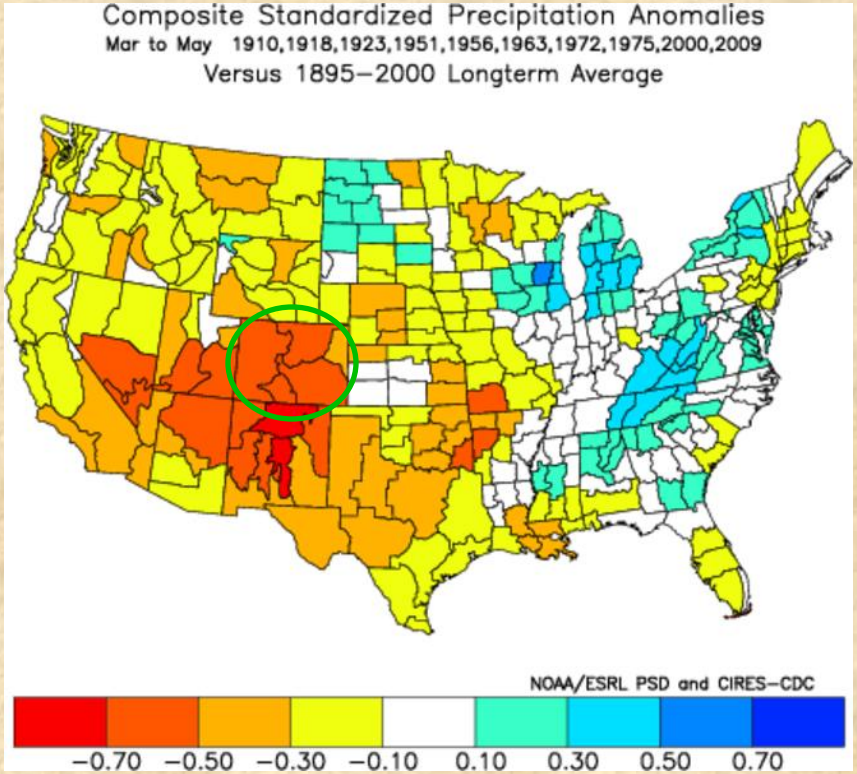


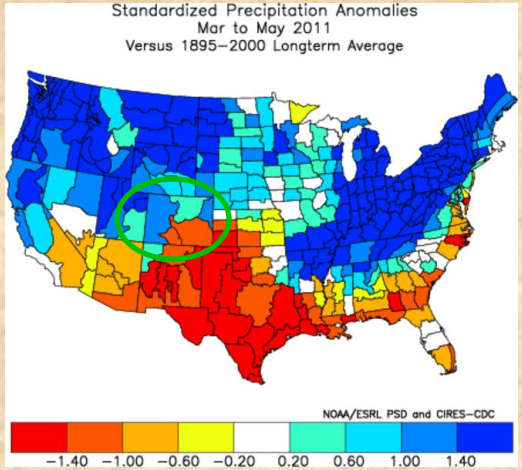


Compared to the typical outcome of La Niña winter seasons (top left), Jan-Mar '11 (bottom left) ended up close to expectations for dry conditions, especially in SE CO. The upcoming winter season shows no signal (top right), which may be our 'opening' for a possible rebound after a dry fall. *However, climate Divisions are not representative of mountain snowpack conditions*. This is based on same set of double-dip Las Niñas as presented back in October 2010.

1st vs 2nd Yr La Niña composites for March-May

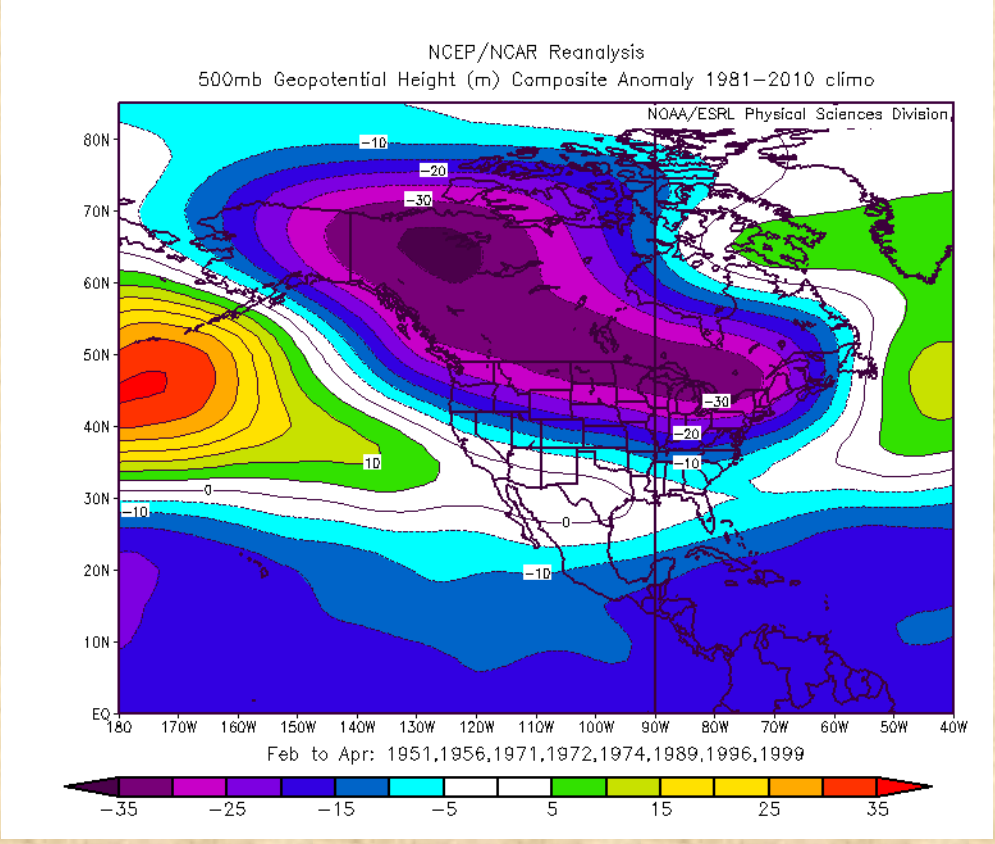


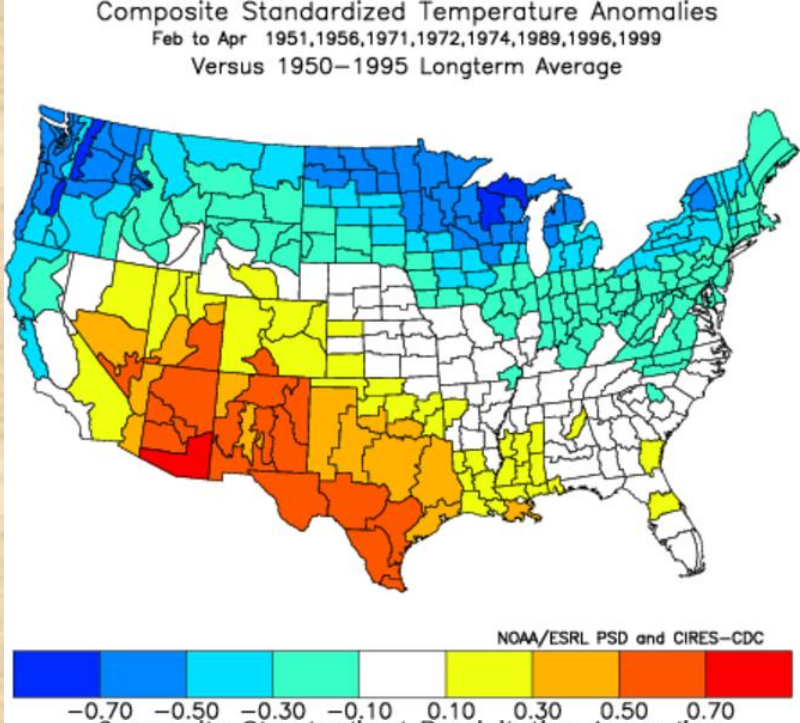


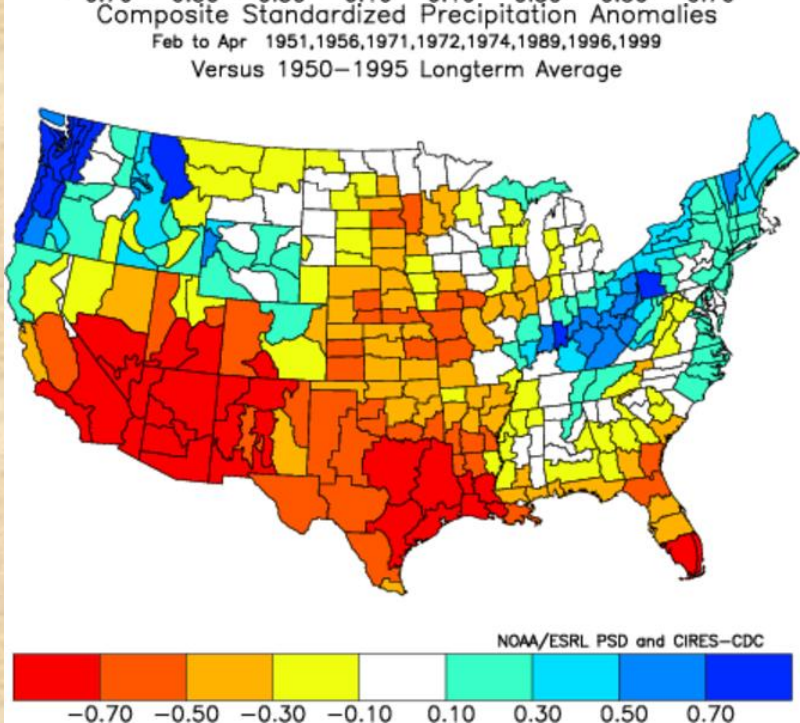


Compared to the typical outcome of La Niña spring seasons (top left), Mar-May '11 (bottom left) ended up wetter than typical in the north and west, and drier in the southeast. The upcoming spring season is often drier than normal after a 2nd La Niña winter(top right), which is not good news. This is based on same set of double-dip Las Niñas as presented back in October 2010.

La Niña & Alaska cold in January

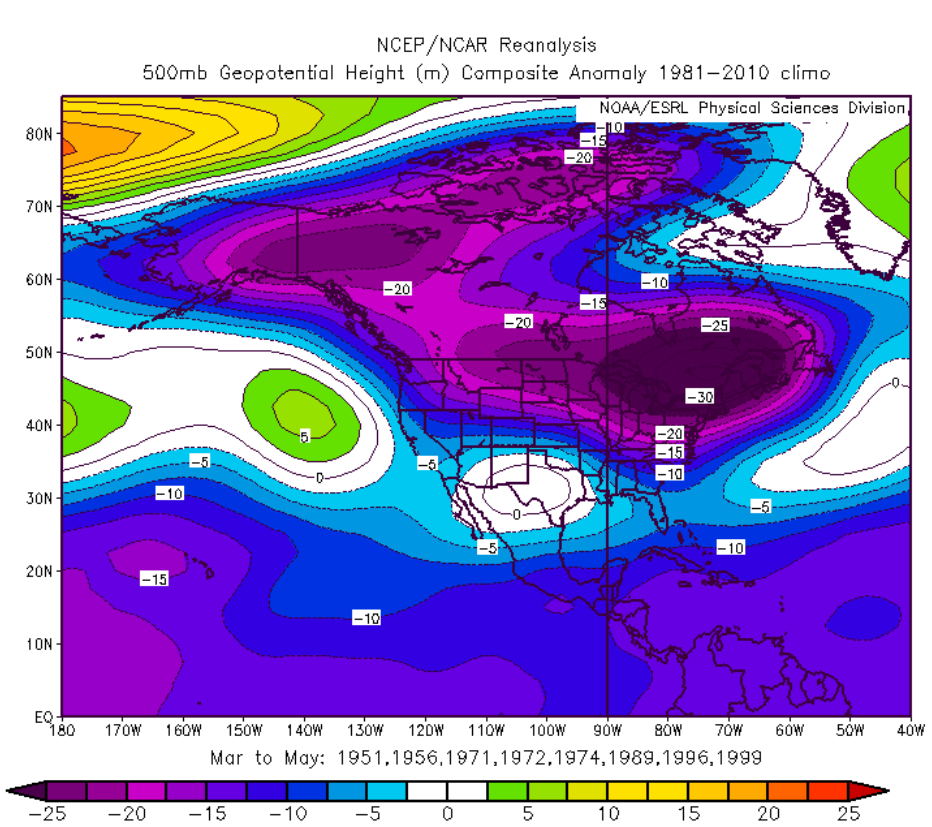


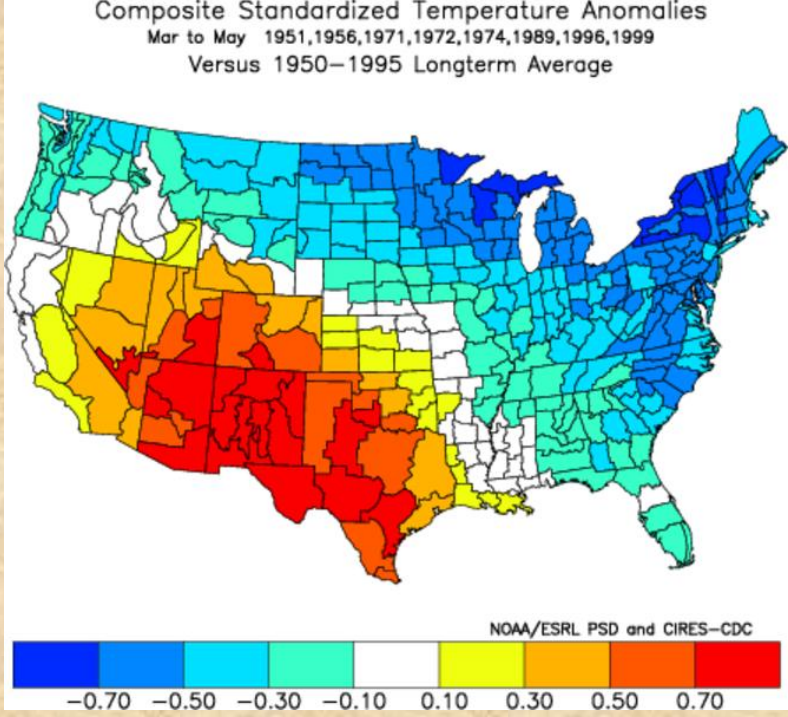


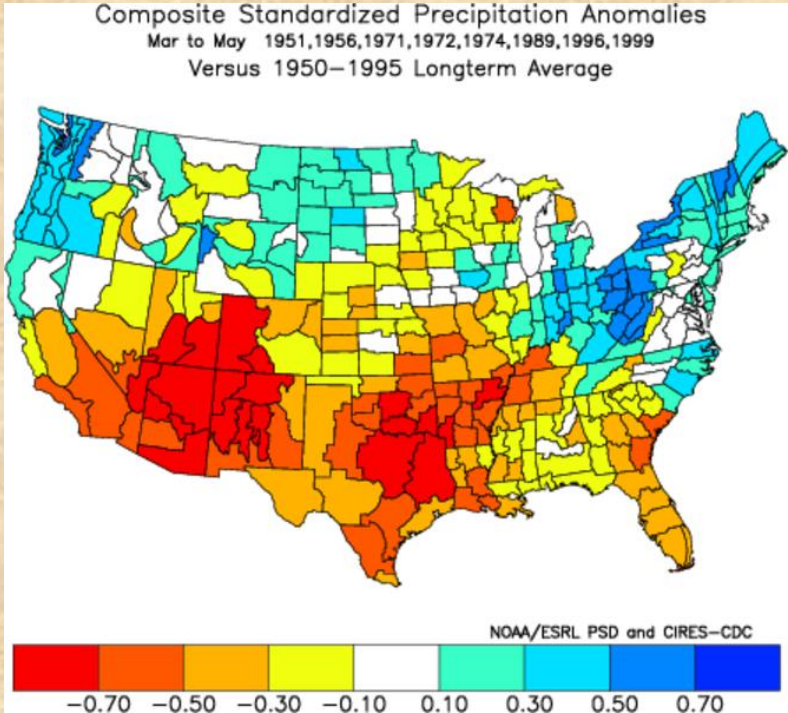


La Niña winters with a strong negative cold anomaly in Alaska in January tend to have low height anomalies in the northern U.S. from February-April (top left), accompanied by mild temperatures in Colorado (top right), and mainly dry conditions, except right here in the Front Range.

La Niña & Alaska cold in January

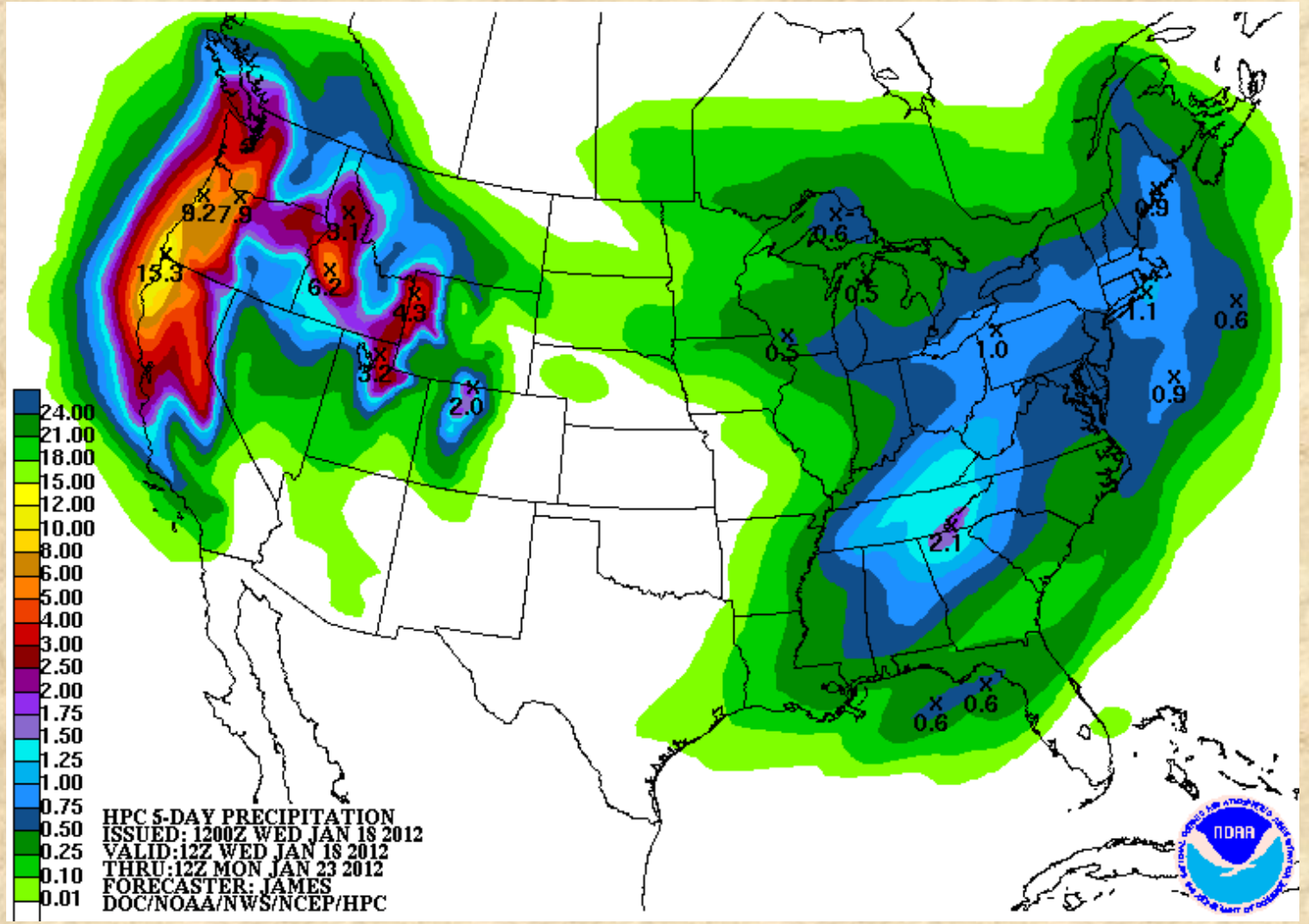






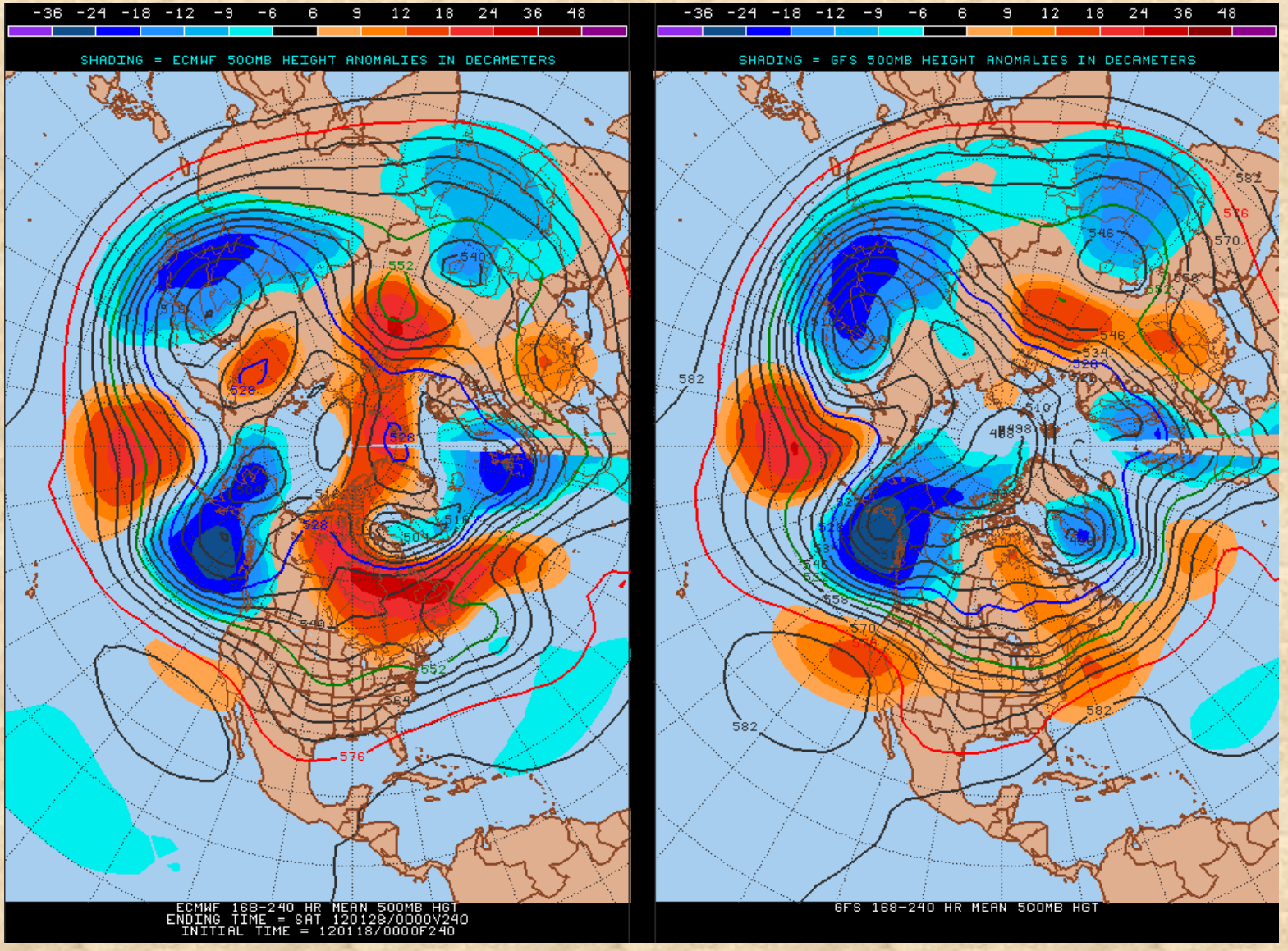
La Niña winters with a strong negative cold anomaly in Alaska in January also tend to have low height anomalies in the northern U.S. in the spring (top left), accompanied by warmer-than-average temperatures in Colorado (top right), and a dry spring, confirming the 2nd year La Niña scenario.

What can we expect in the next five days?



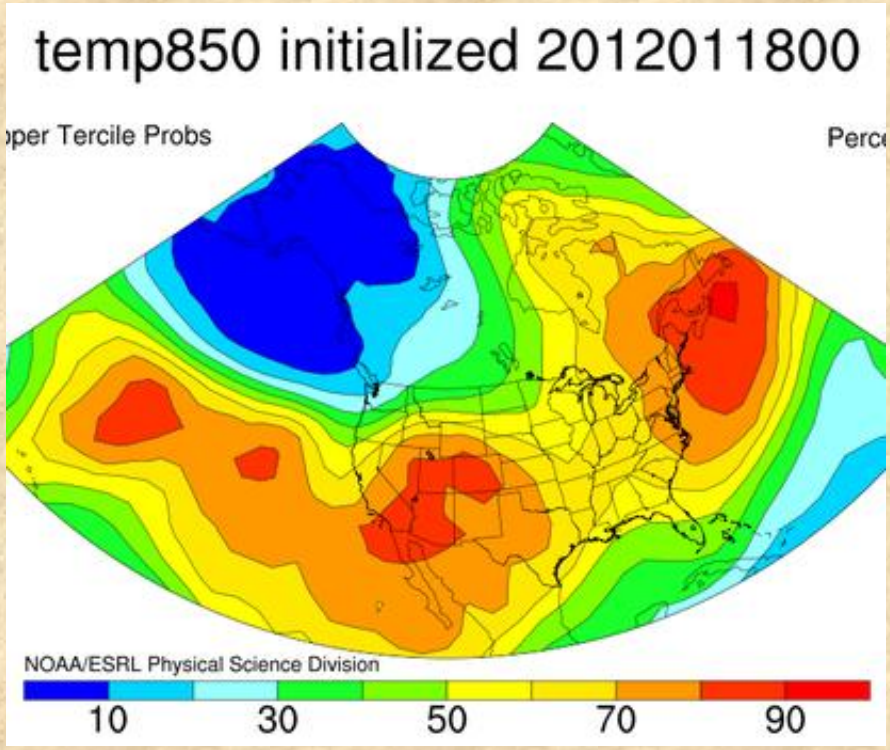
Expected total precipitation for the next five days, according to Hydrological Prediction Center (NOAA-HPC) – more or less classic La Niña footprint with a snowy period in the northern mountains of Colorado (and drought-busting moisture in northern CA)…

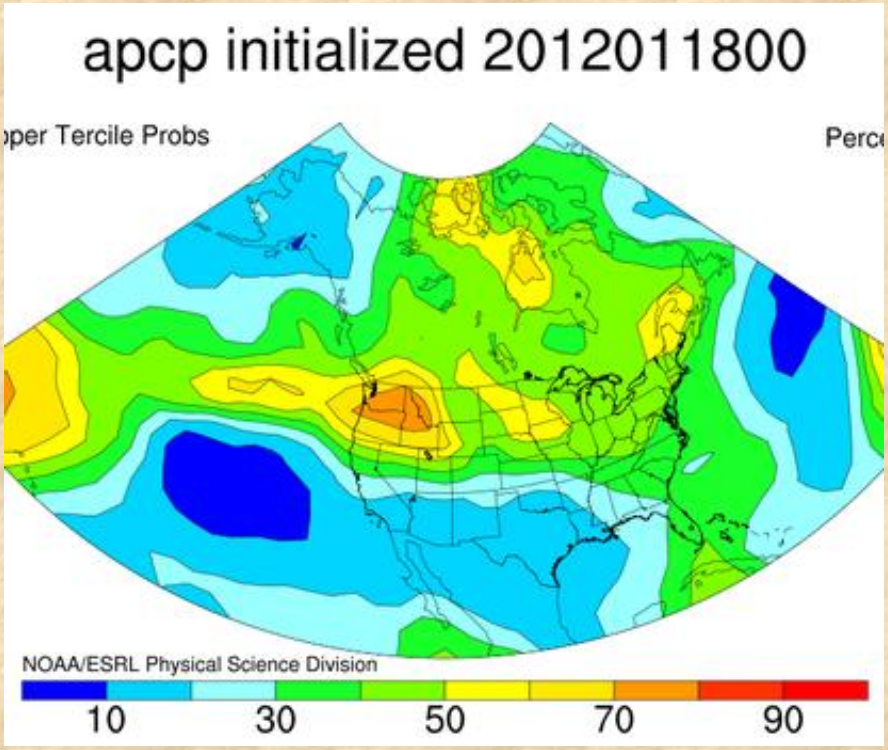
What can we expect next week and beyond?



European vs. American model 7-10 days out from last night – looking somewhat unsettled, clearly dry in southern CA (GFS (right) drier looking for us as well)

What can we expect beyond next week?

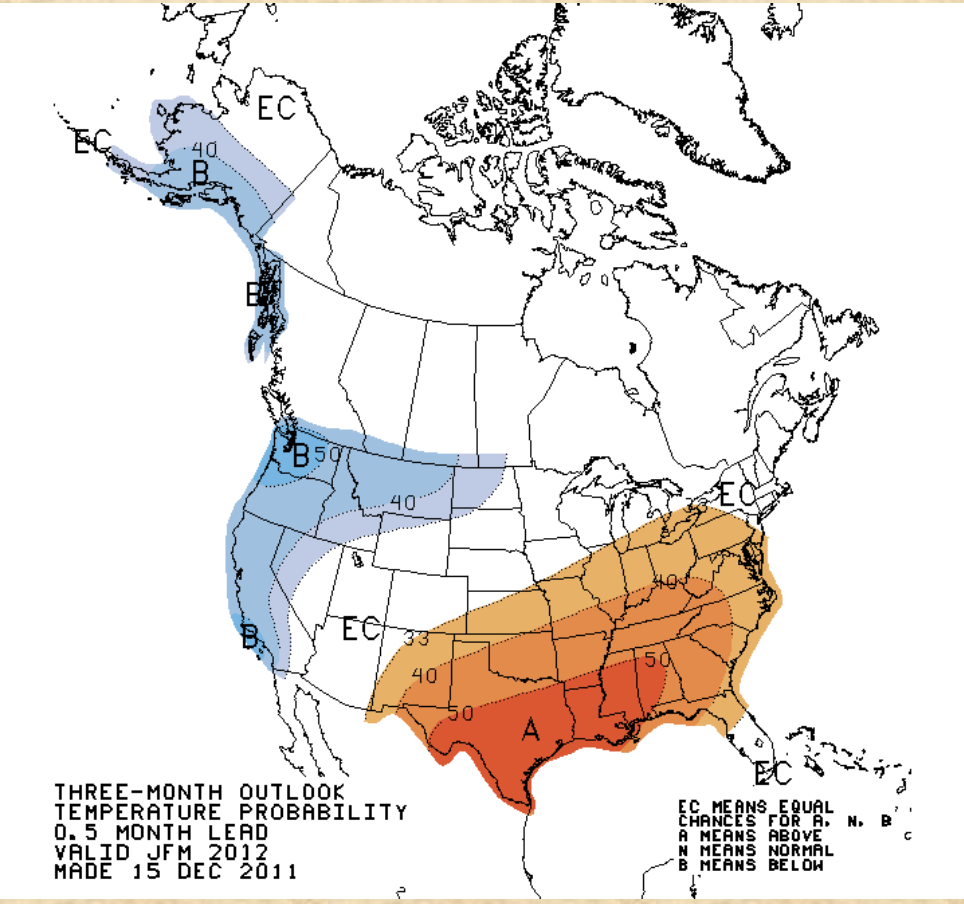


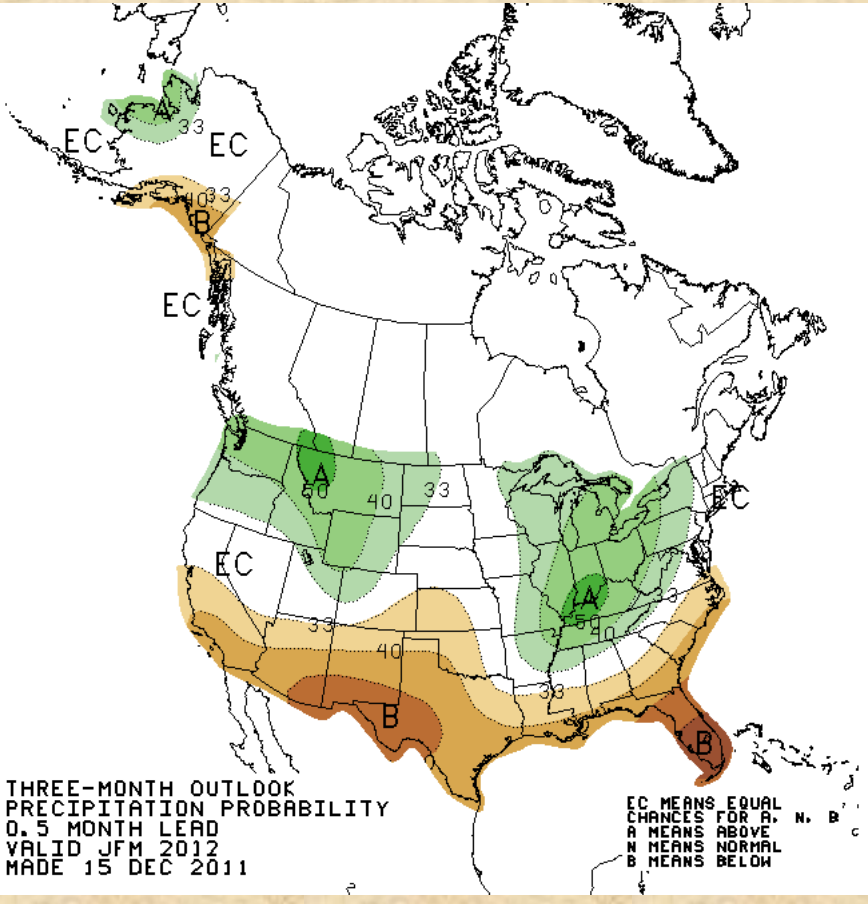


Reforecast outlook into early February (8-14 days) gives us above-average chances for moisture (right) along with mild Pacific air (left)

http://www.esrl.noaa.gov/psd/forecasts/reforecast/maps.html

Climate Prediction Center Forecasts

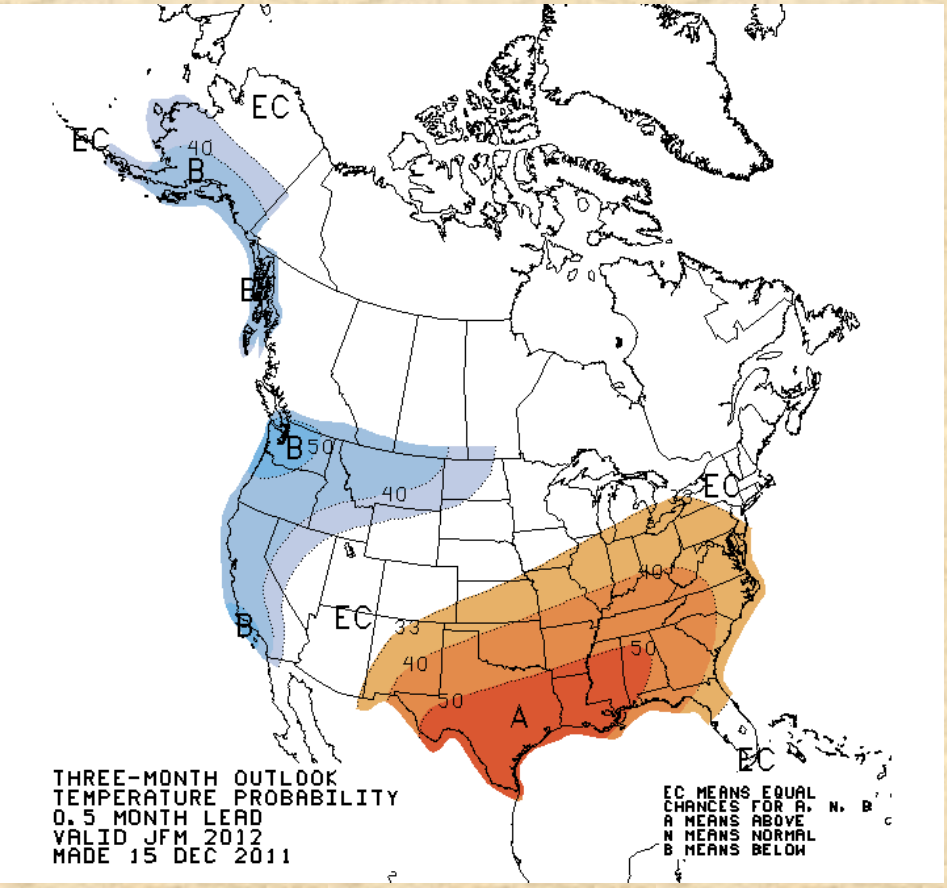


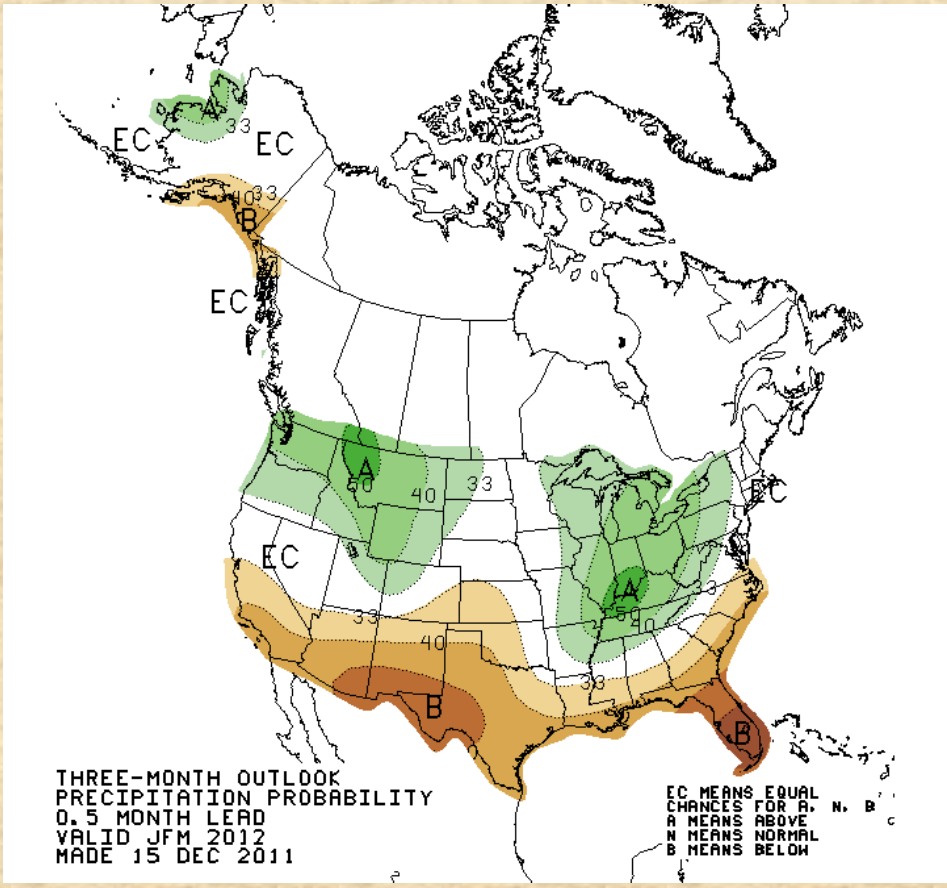


CPC's January (left) temperature forecast expects warmth to our southeast, and cold to our northwest, leaving CO 'EC'. Their precipitation forecast (right) keeps Colorado also in between dryness mostly to our southeast and wetness mostly to our northwest, more or less consistent with La Niña-based expectations.

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

Climate Prediction Center Forecasts

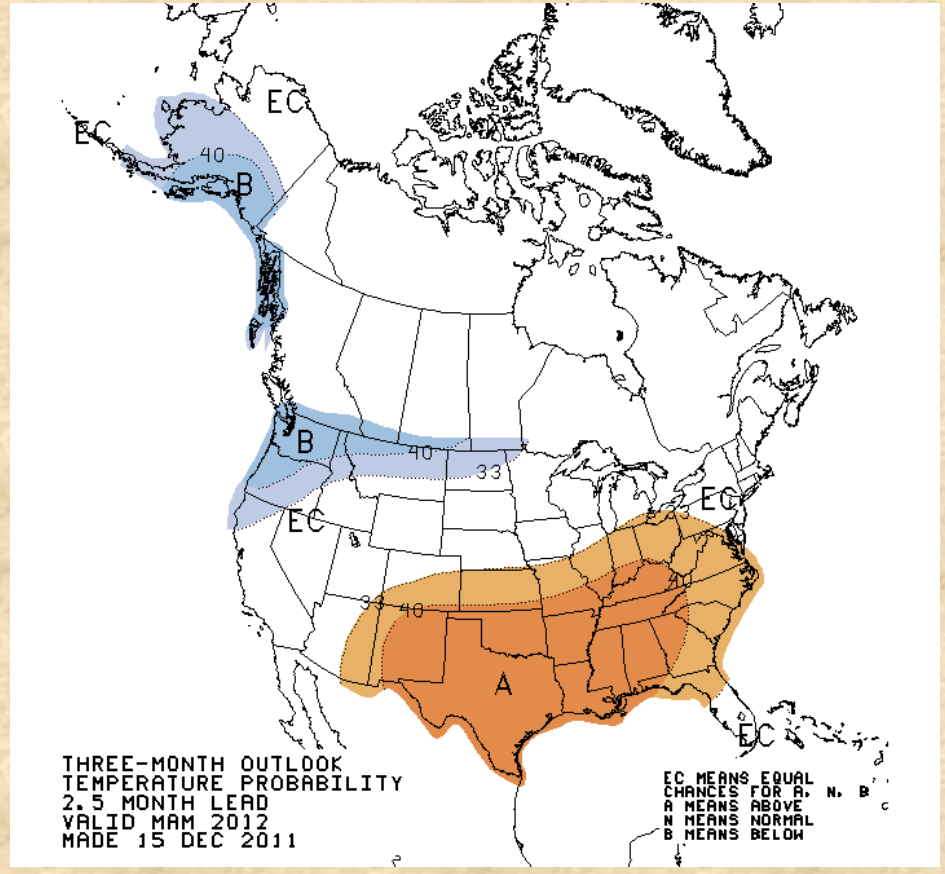


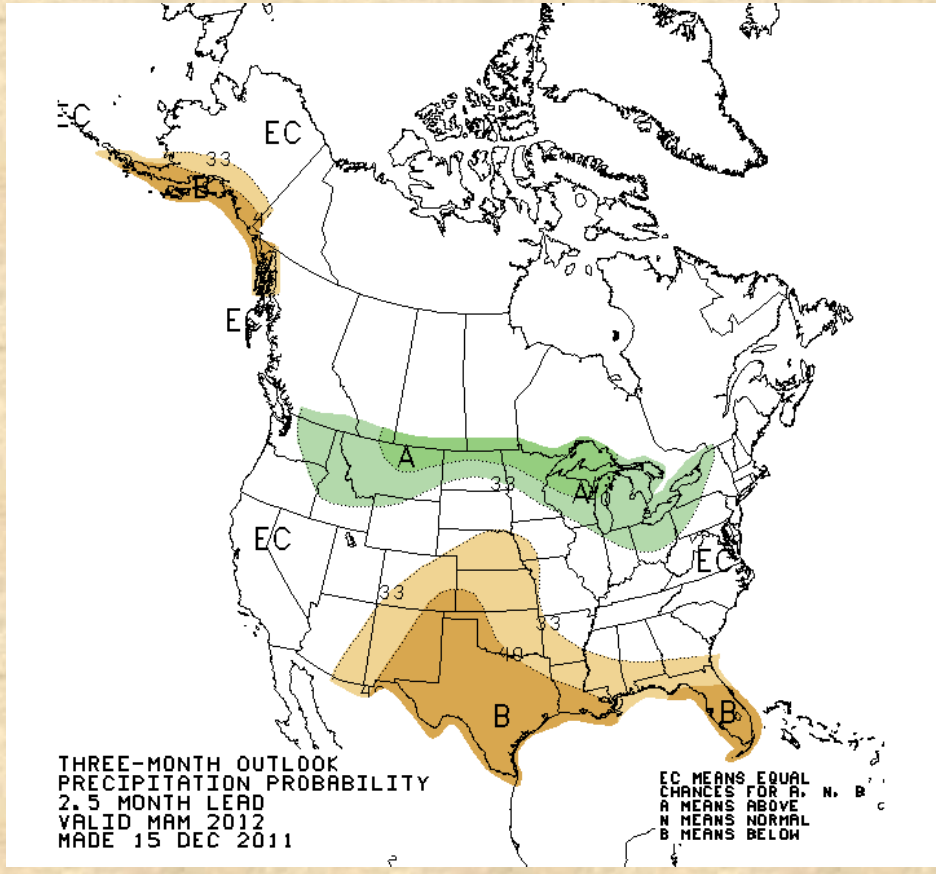


CPC's Jan-Mar '12 (left) temperature forecast expects CO to continue straddling warm anomalies to our southeast and cold anomalies to the north. A similar picture transpires for precipitation (enhanced odds for wetness clipping northern CO, dryness clipping our south), consistent with La Niña-based expectations.

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

Climate Prediction Center Forecasts

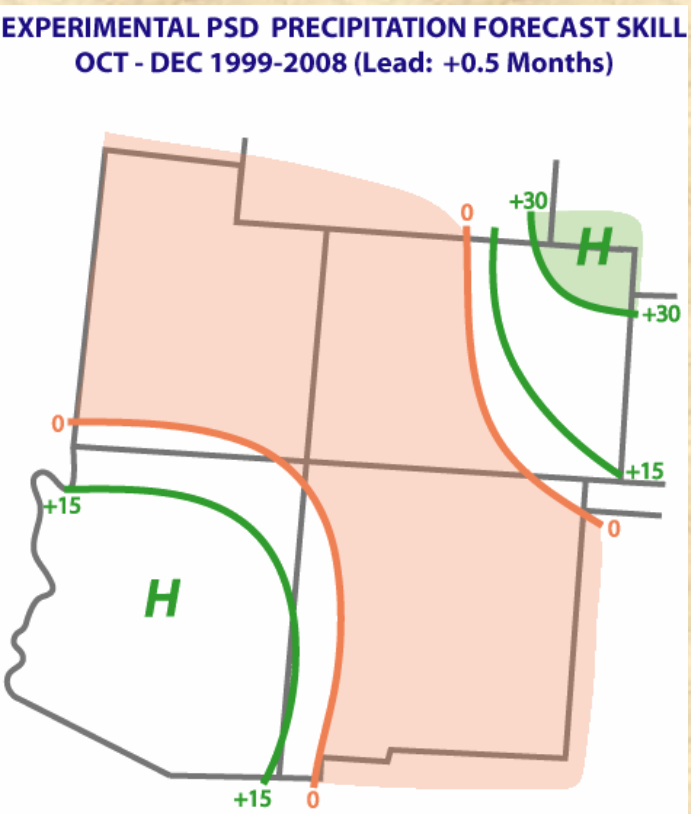


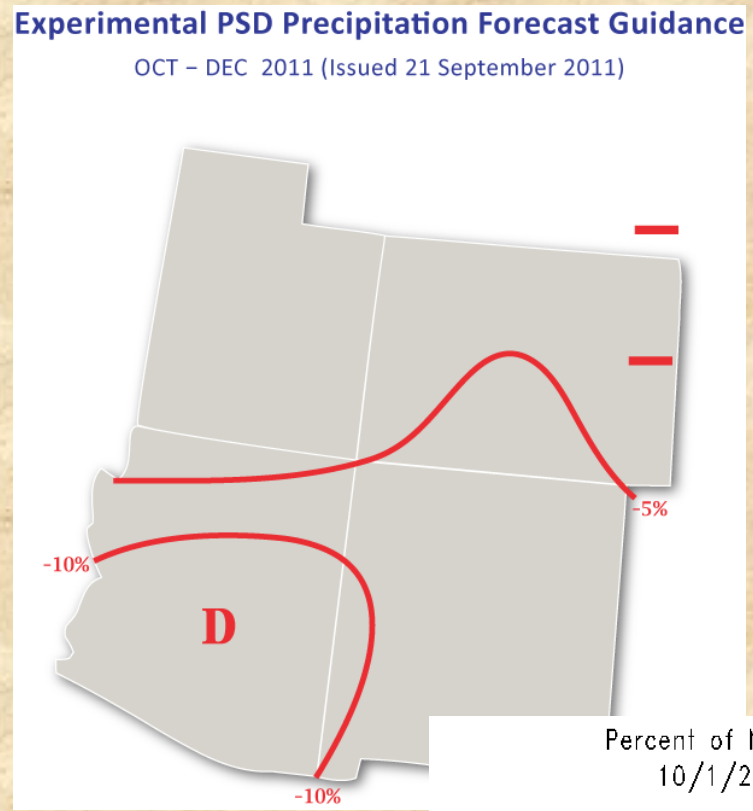


CPC's Mar-May'12 (left) temperature forecast expects CO to continue straddling warm anomalies to our southeast and cold anomalies to the north. However, there is a northward shift of the dividing line between these anomaly centers so that more real estate in CO appears to be covered by warm/dry conditions than earlier in the year.

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

Statistical Forecast for Oct-Dec 2011





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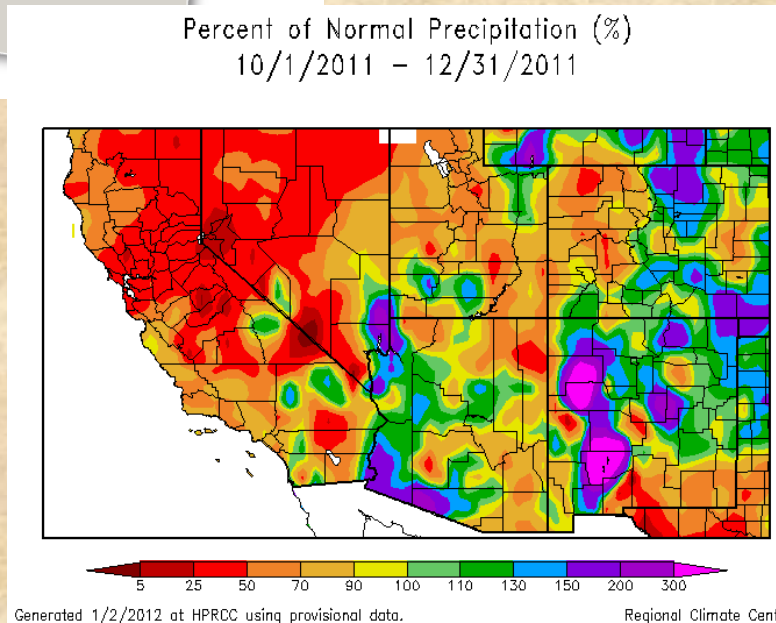
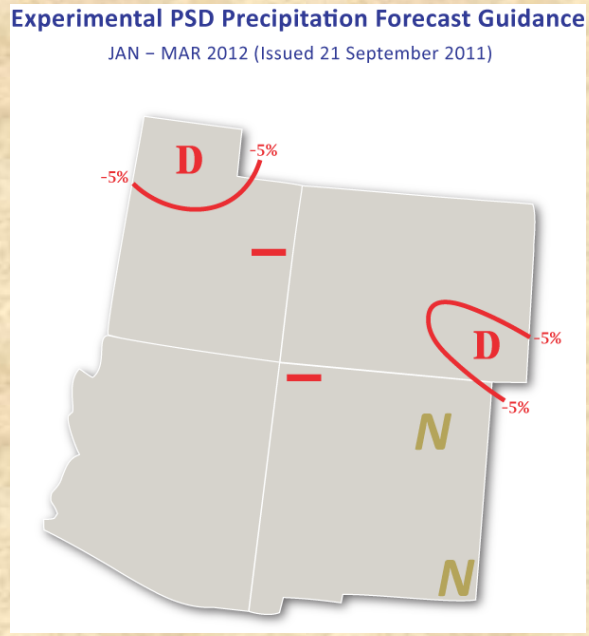
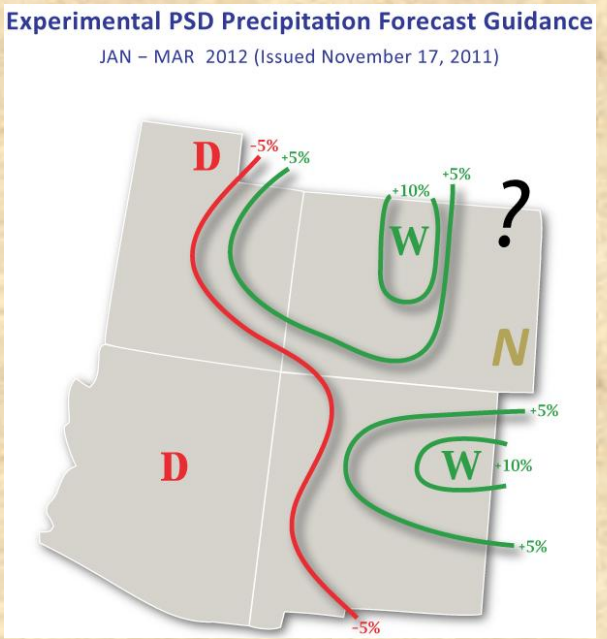
COLORADO WATER CONSERVATION BOARD
STATE OF COLORADO
1876
1937

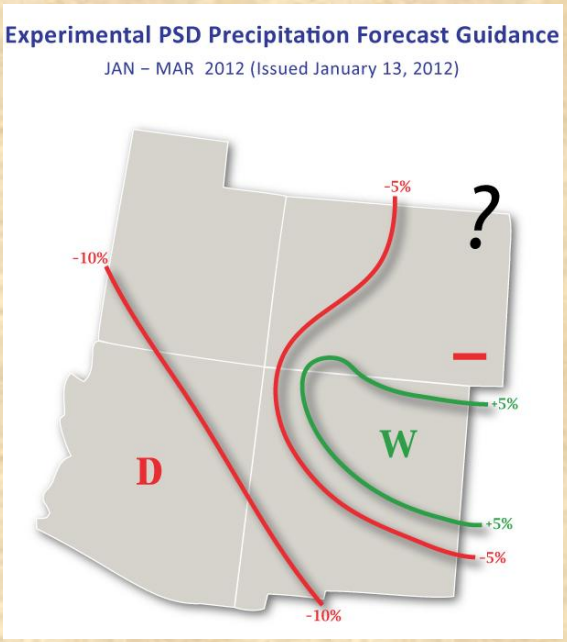


My forecast for Oct-Dec 2011 (top right) was leaning towards dry conditions over much of CO, but left western CO under climatological odds. Verification statistics over the last decade (left) show skill over eastern CO, but not in western CO. ***Dry conditions prevailed over UT, most of AZ (√), southern NM (√), western CO as well as parts of eastern CO (√). I did not anticipate the pockets of extra moisture in NM&CO.***

Statistical Forecast for Jan-Mar 2012







My September forecast for January-March 2012 (left) was leaning towards dry conditions over southeastern CO, leaving the mountains under climatological odds, and the far western valleys and Four-Corners' region with a slight tilt towards a dry late winter. The November forecast (middle) was more optimistic for CO, especially over the north-central mountains, however, skill has been marginal during the last decade, except for SE CO and NE NM. The latest forecast (right) has gone back to mostly dry for CO, except for the northeast (still "?"). This forecast is based on data through December 2011.

Executive Summary (18 January 2012) – *klaus.wolter@noaa.gov*

1. **La Niña has made a come-back, confirming my long-lead statements from last year. It is weaker than last year, and has not left the typical footprints of La Niña, such as drought in Texas – so far. However, an overall drier season was anticipated based on 2nd La Niña conditions (for our mountain snowpack).**

1. **Snowfall has been unusually anemic in north-central Colorado. This does not bode well for our runoff season (*42% variance of CO River runoff is related to fall moisture*). This week's snowstorm is hopefully just the opening salvo for a more typical La Niña storm track that will favor the mountains for at least another week or two.**

1. **My latest forecast for January through March 2012 has reverted back to a mostly dry outlook for the southwestern U.S., including most of our mountain ranges, except for the eastern San Juans and Sangre de Cristos. The only region with a tilt towards wetter conditions remains in northern New Mexico. Northeastern Colorado 'is sitting this one out' as in earlier editions of this forecast: the odds for either wet or dry conditions in the next three months are higher than for a near-normal outcome.**

2. **Bottomline: Considering that 2nd year La Niña seasons are often drier than during the 1st year, the current outlook for January through March 2012 has reverted back to that overall scenario for much of our mountains. Given the current deficit of 20-40% in our state's snowpack, it would take an almost equally large positive anomaly to recover this lost ground by April 1st. As best as I can estimate right now, the odds for this to occur are less than 10% (i.e., less than in most other years). My current estimate for Colorado River runoff in 2012 is similar to two years ago when it ended up between 12-13 MAF for the naturalized flow.**