Earth System Research Laboratory
Physical Sciences Division

CIRES

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NATIONAL INTEGRATED DROUGHT INFORMATION SYSTEM

Seasonal Outlook into early 2012

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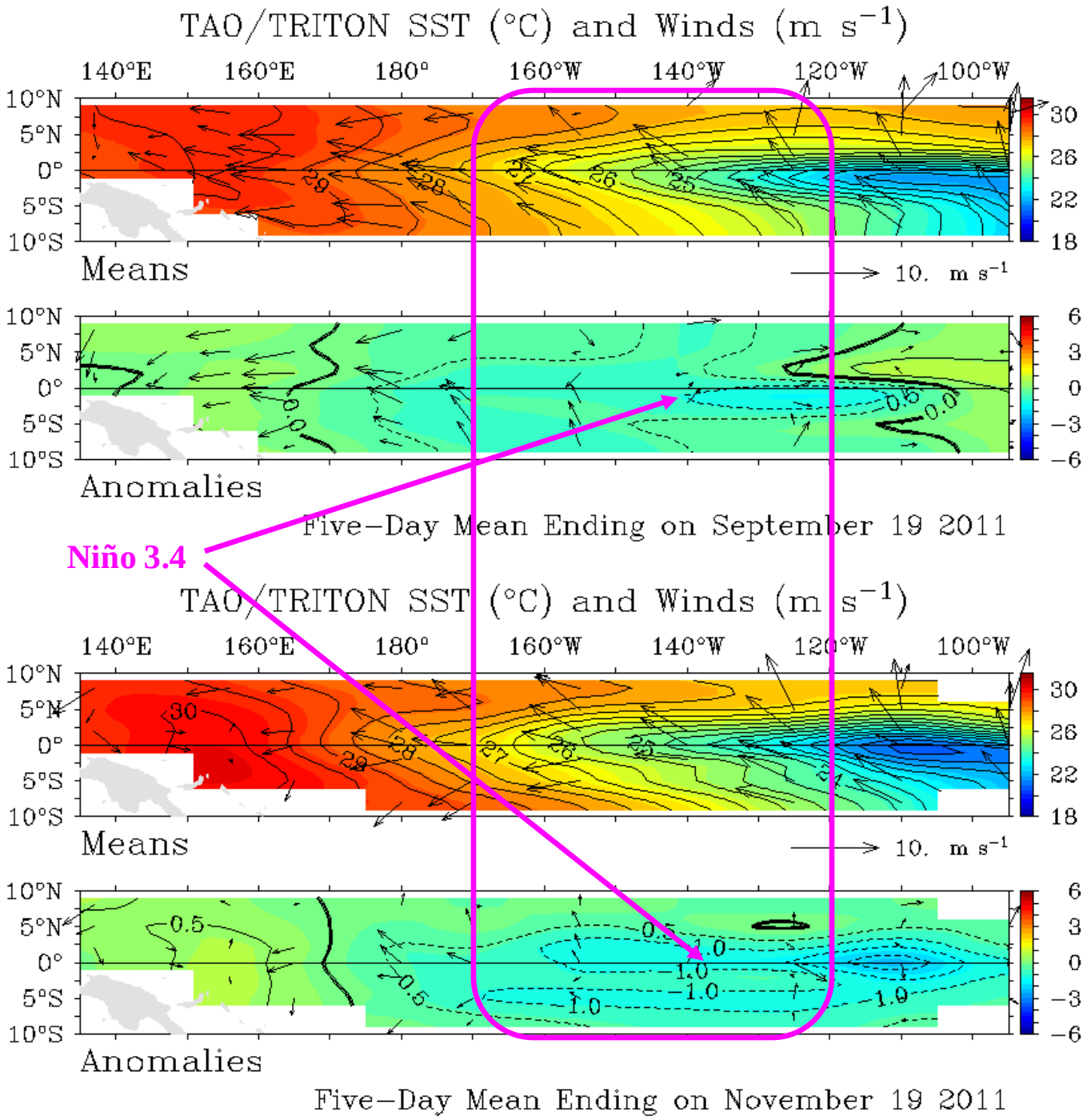
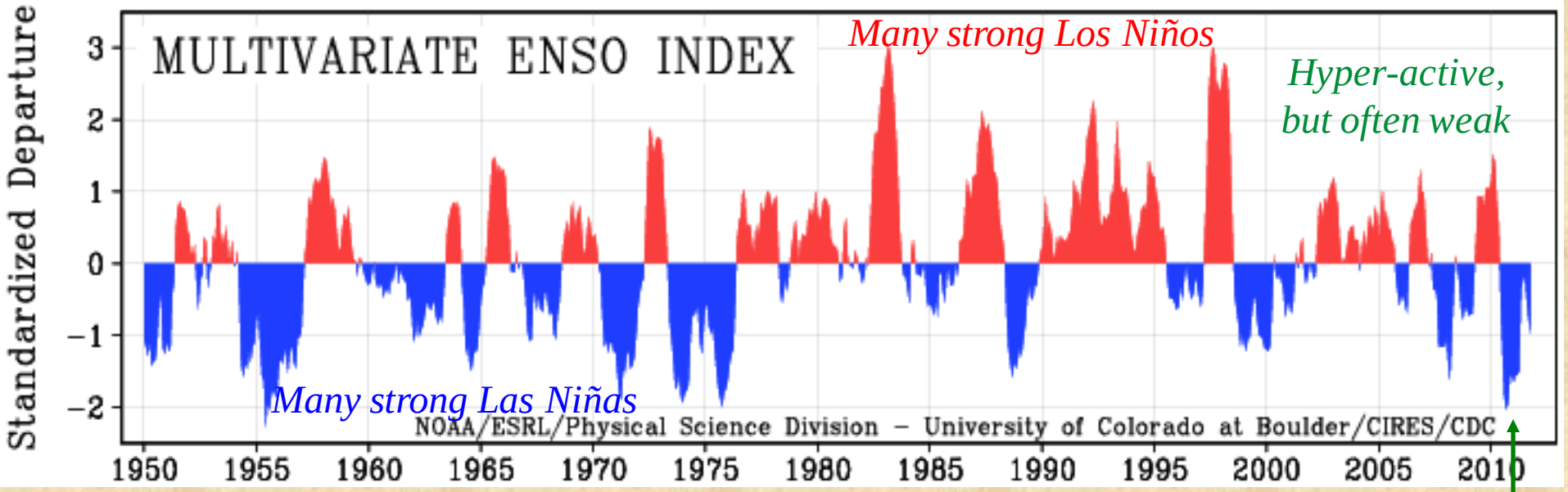
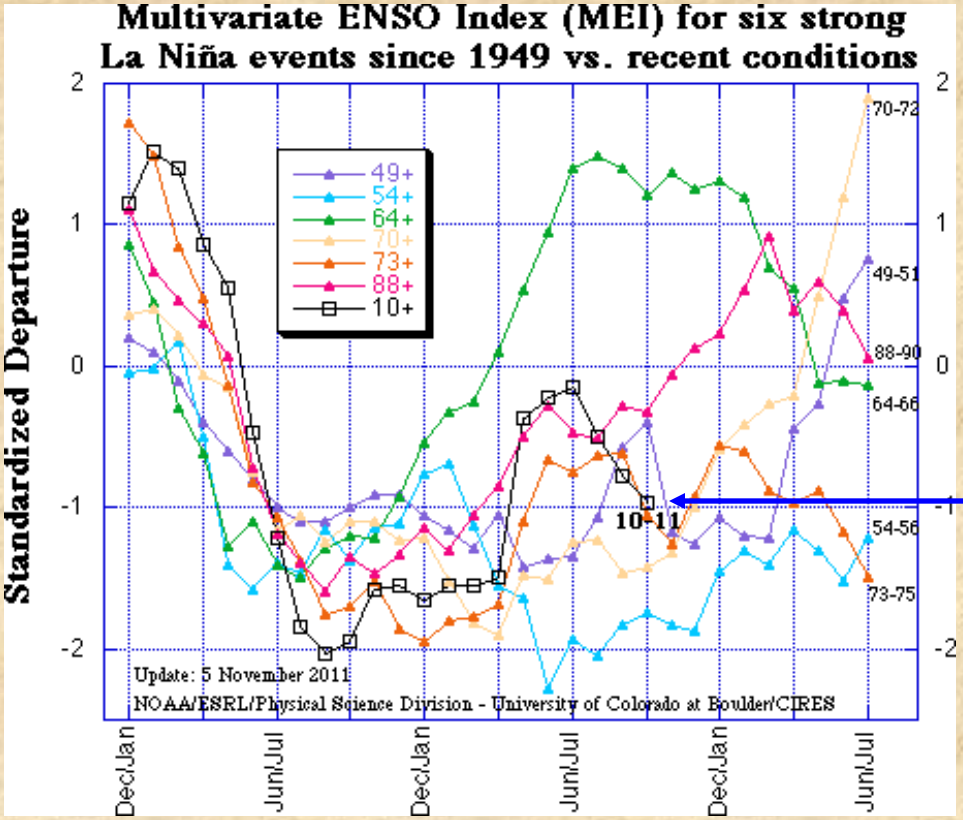
- **'Double-dip' La Niña on track**
- **What does that mean for us?**
- **Expectations for next two weeks**
- **CPC forecasts for December '11 through March '12**
- **Experimental Seasonal Forecast Guidance (+postmortem)**
- **Executive Summary**

Current state of El Niño/Southern Oscillation (ENSO) phenomenon (bottom), compared to two months ago(top): La Niña has continued its modest comeback since August. This includes enhanced trade winds near the dateline, and below-normal SST in central tropical Pacific. Biggest change has been a cool-down in easternmost Pacific (east of 120W).



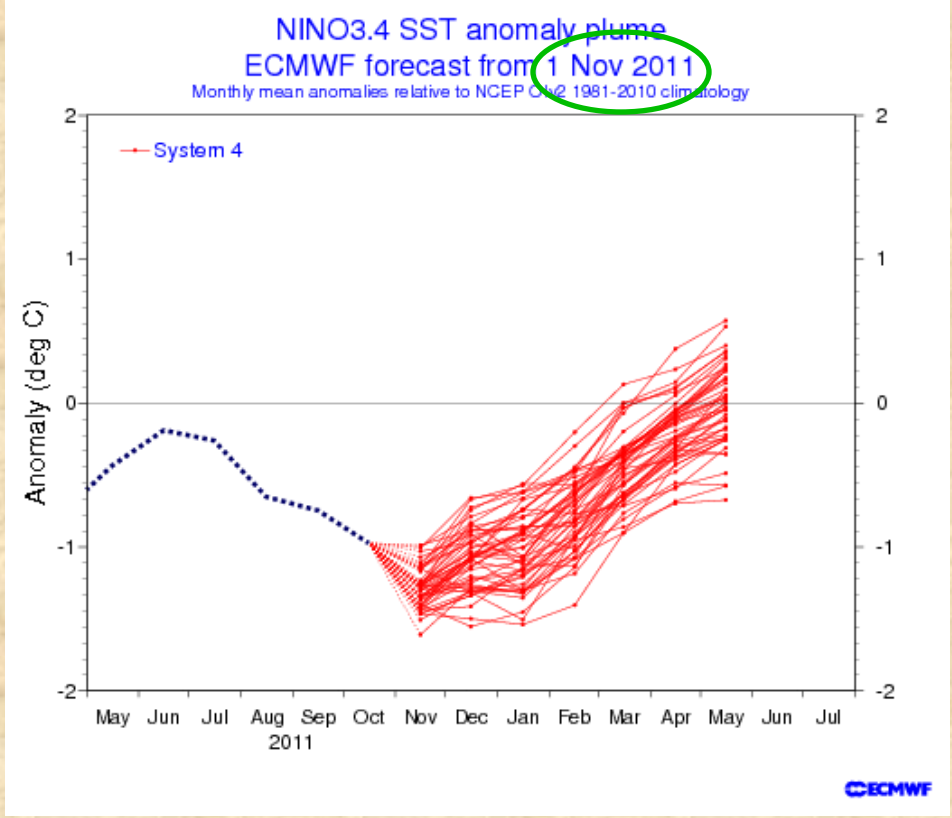


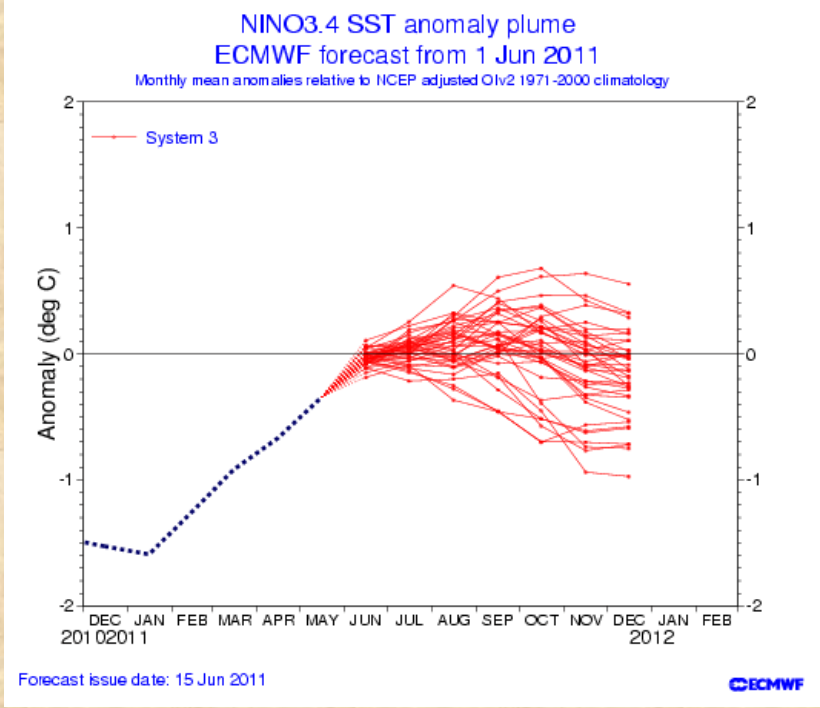
Back to the '70s?

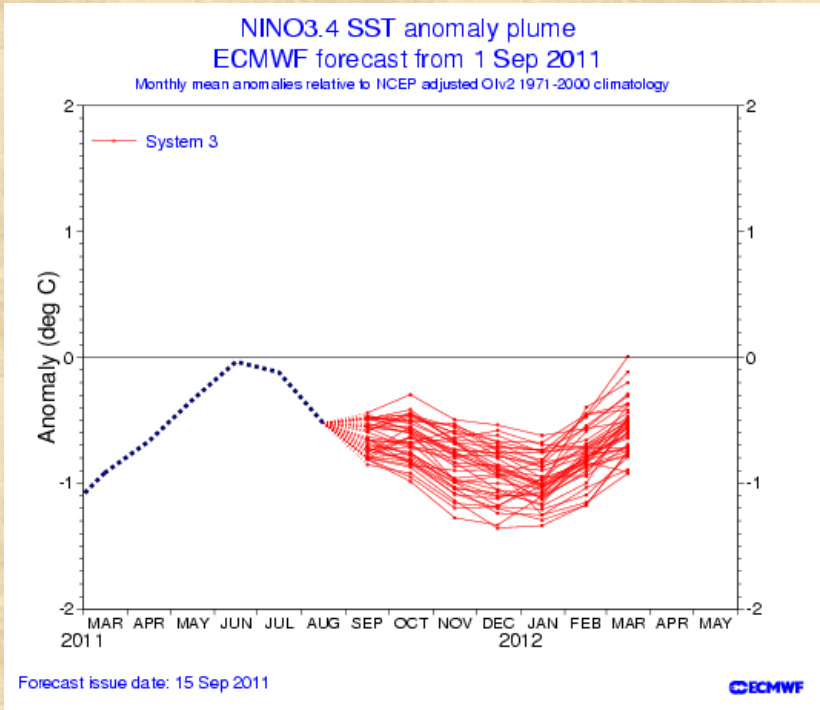


La Niña event peaked early last fall, followed by a brief excursion to ENSO-neutral conditions during boreal spring; MEI has dropped back to almost moderate La Niña conditions as of Sep-Oct 2011…

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

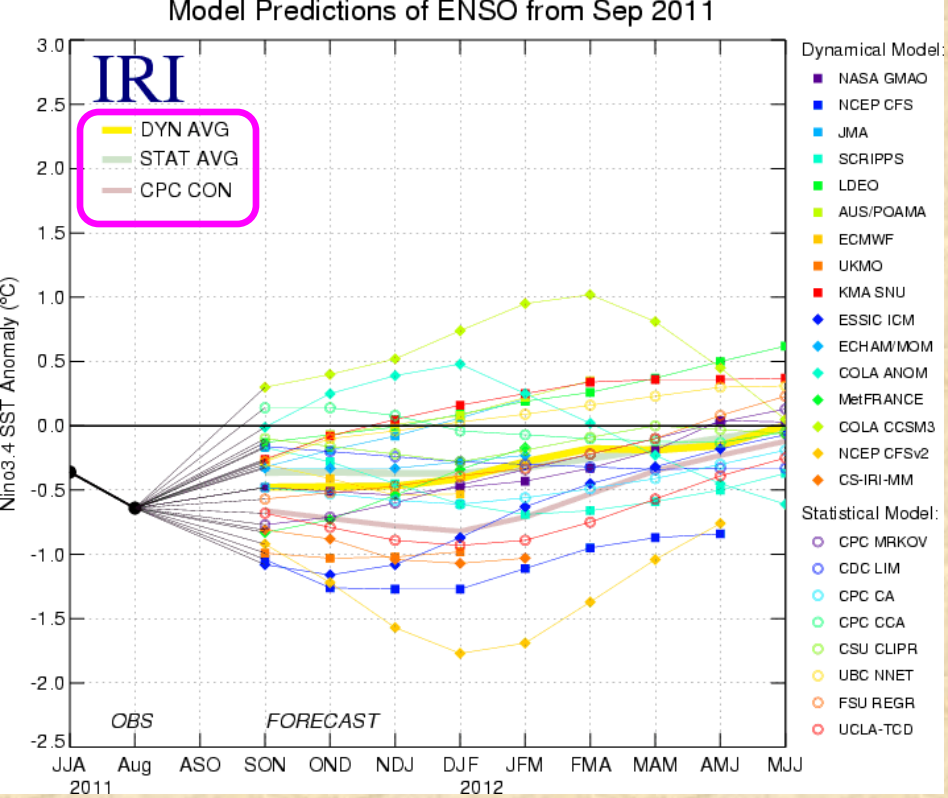






European 'forecast plume' of Niño 3.4 from this month (top) predicts continued La Niña conditions into early 2012. While the early summer forecasts 'underestimated' the tendency of the 2011 La Niña to stage a comeback (top right), the September forecast was quite similar to this month's forecast.

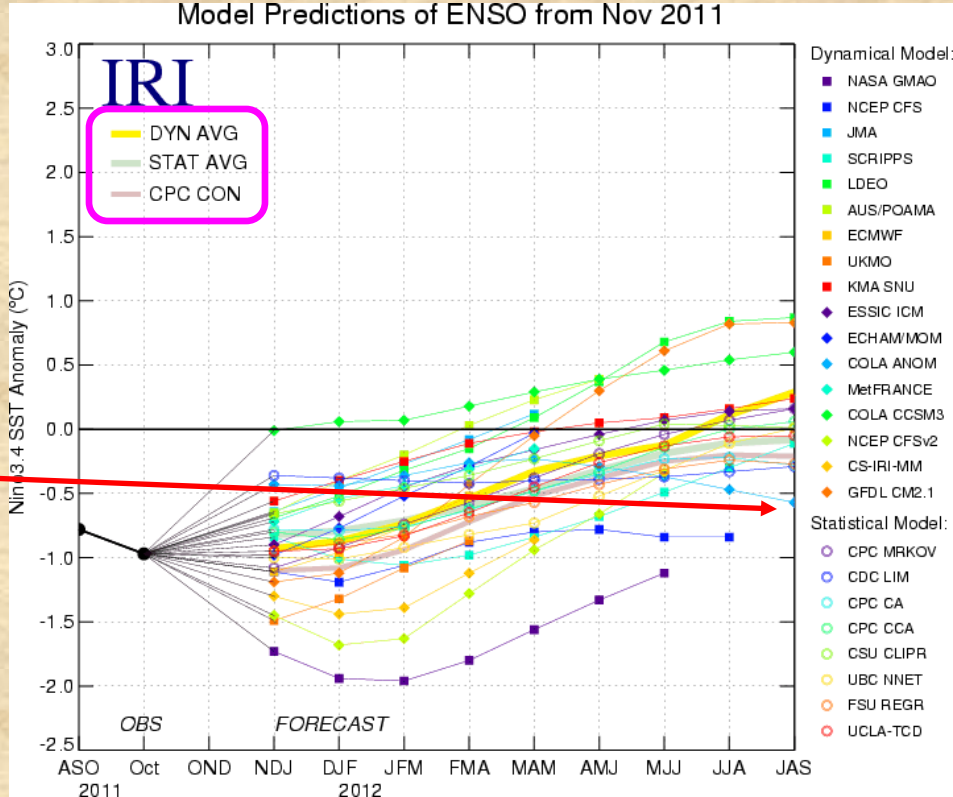
A soon-to-be published paper that has evaluated every available model over the last decade has confirmed the ECMWF model as the'Gold Standard'.



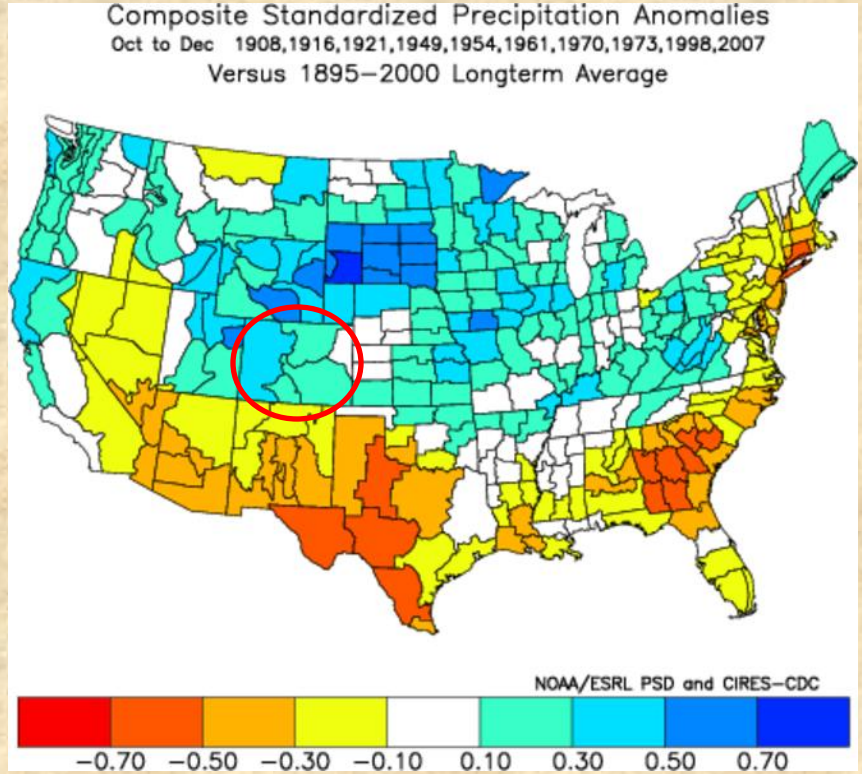
ENSO forecasts from 16 dynamical & 8 statistical forecast models two months ago (left): leaning towards La Niña, especially the two CFS models.

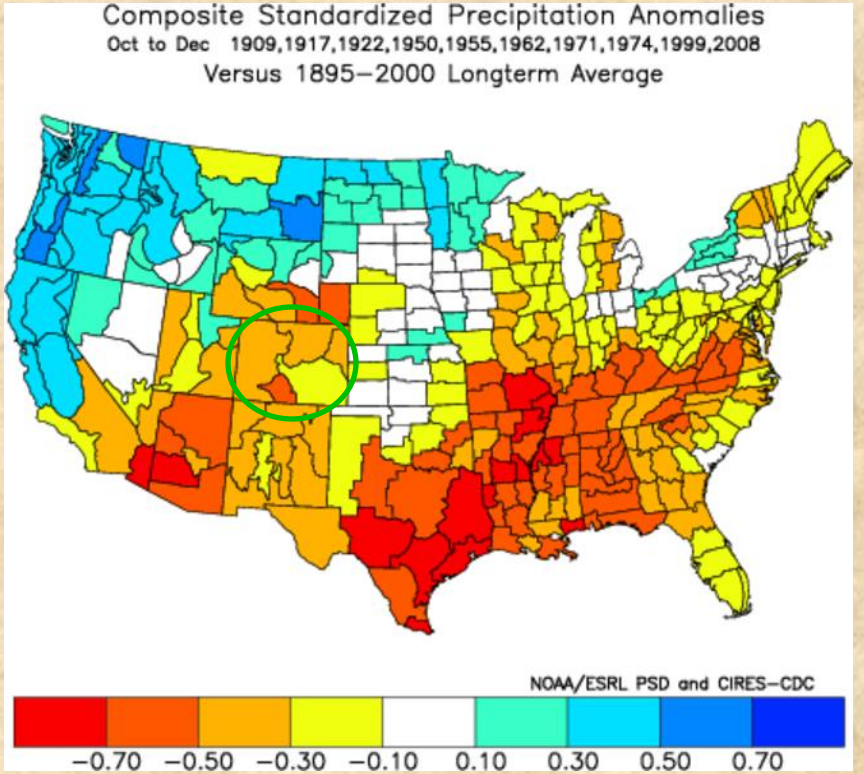
On average, dynamical models quite similar to statistical models, with CPC being systematically cooler due to CFS models.

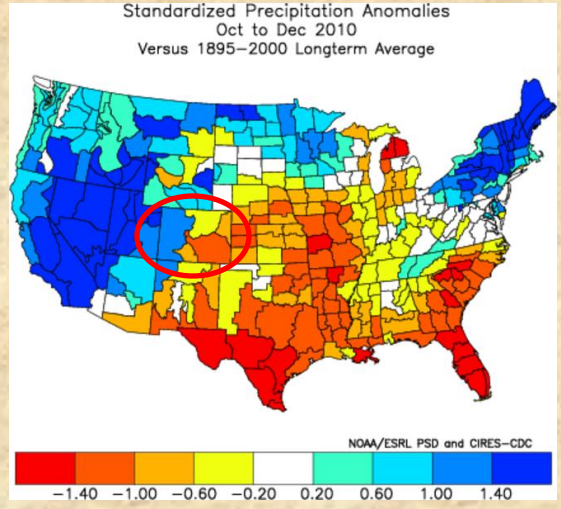
The most recent IRI plume (right) shows fading La Niña by next spring, with CFS 1 indicating persistent La Niña until JJA'12, while COLA anomaly model shows returning La Niña by JAS'12. Moderate threshold of -1C is hit by 9 dyn. and 4 stat. models in near-term, but only 3 models (all dynamical) go as lows as -1.5C. {Mention Frontier model}



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

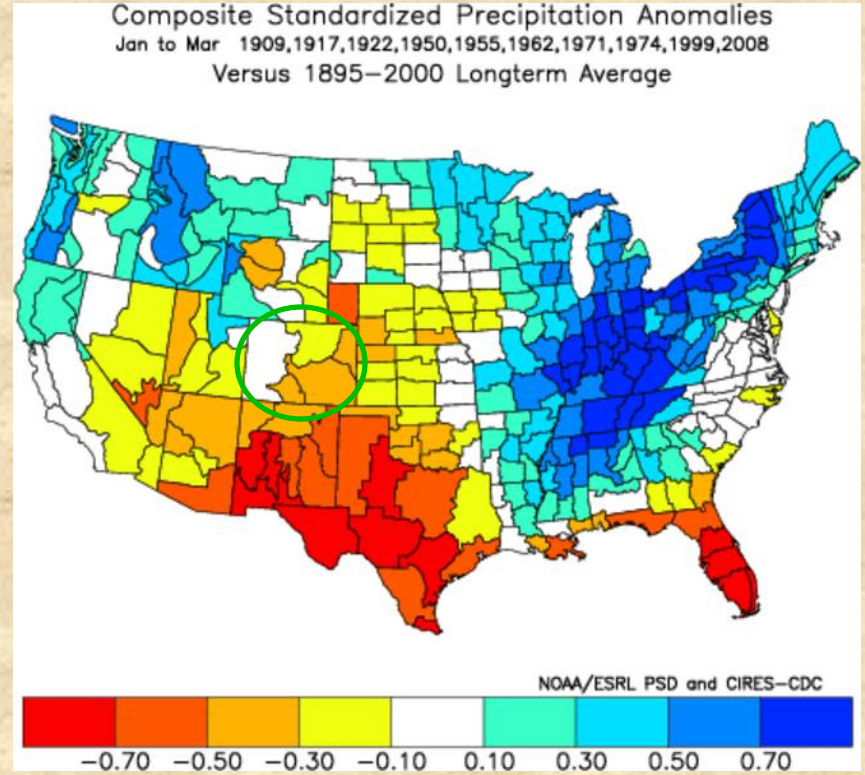


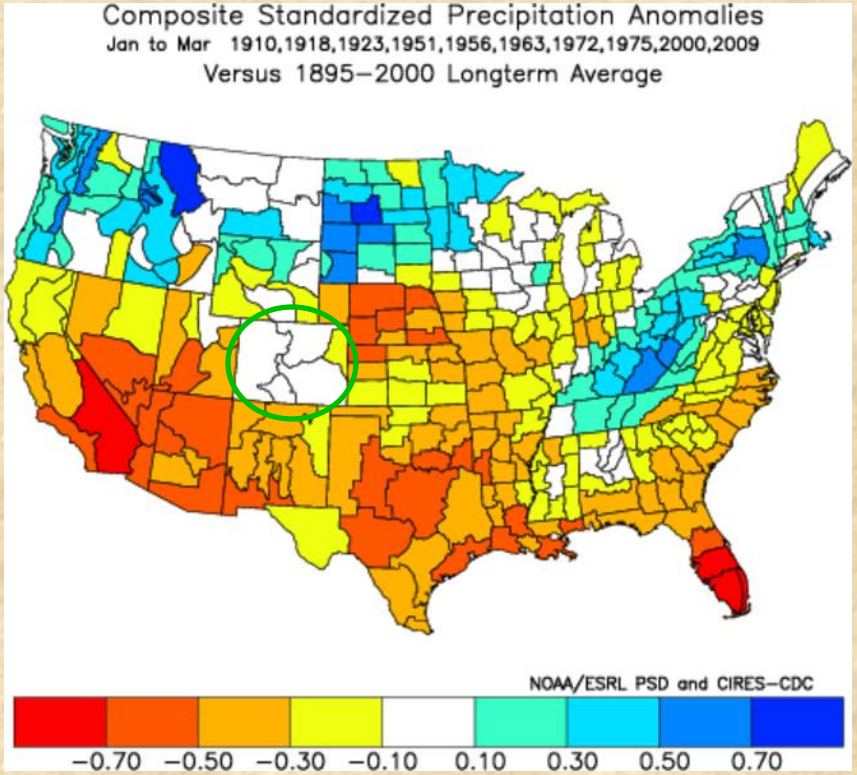


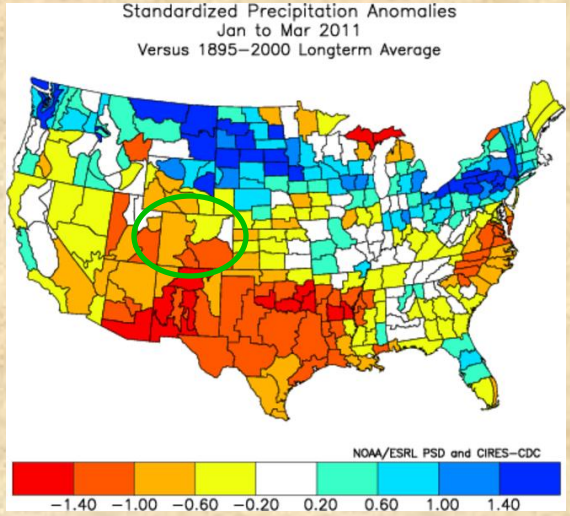


Compared to the typical outcome of La Niña fall seasons (top left), Oct-Dec 2010 (bottom left) ended up with the same preference for wet conditions on the west slope of CO, while drought conditions were more severe than is typical for La Niña. The current fall season may end up drier than last year's for much of our state (top right). This is based on same set of double-dip Las Niñas as presented in October 2010 in anticipation...

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

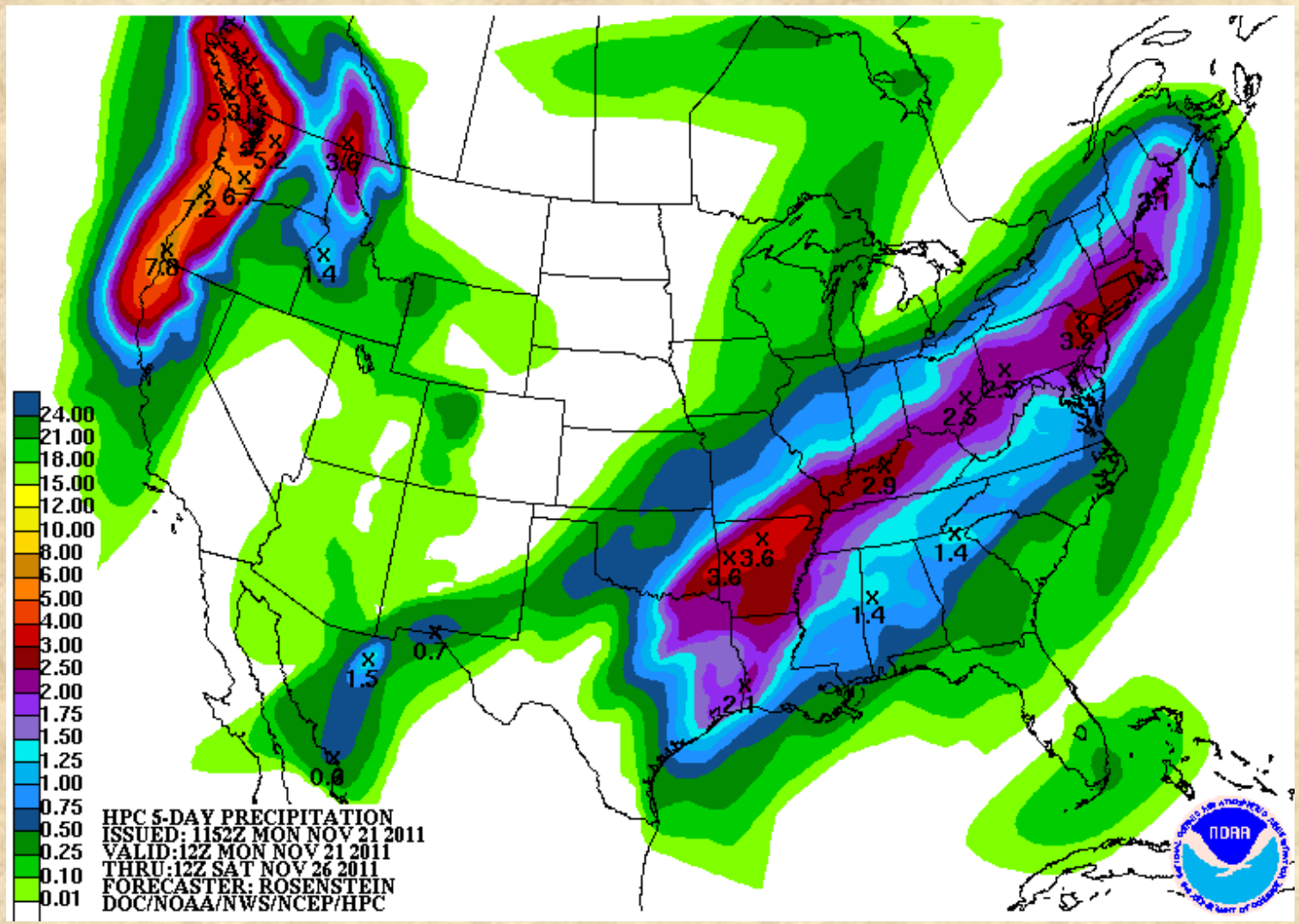






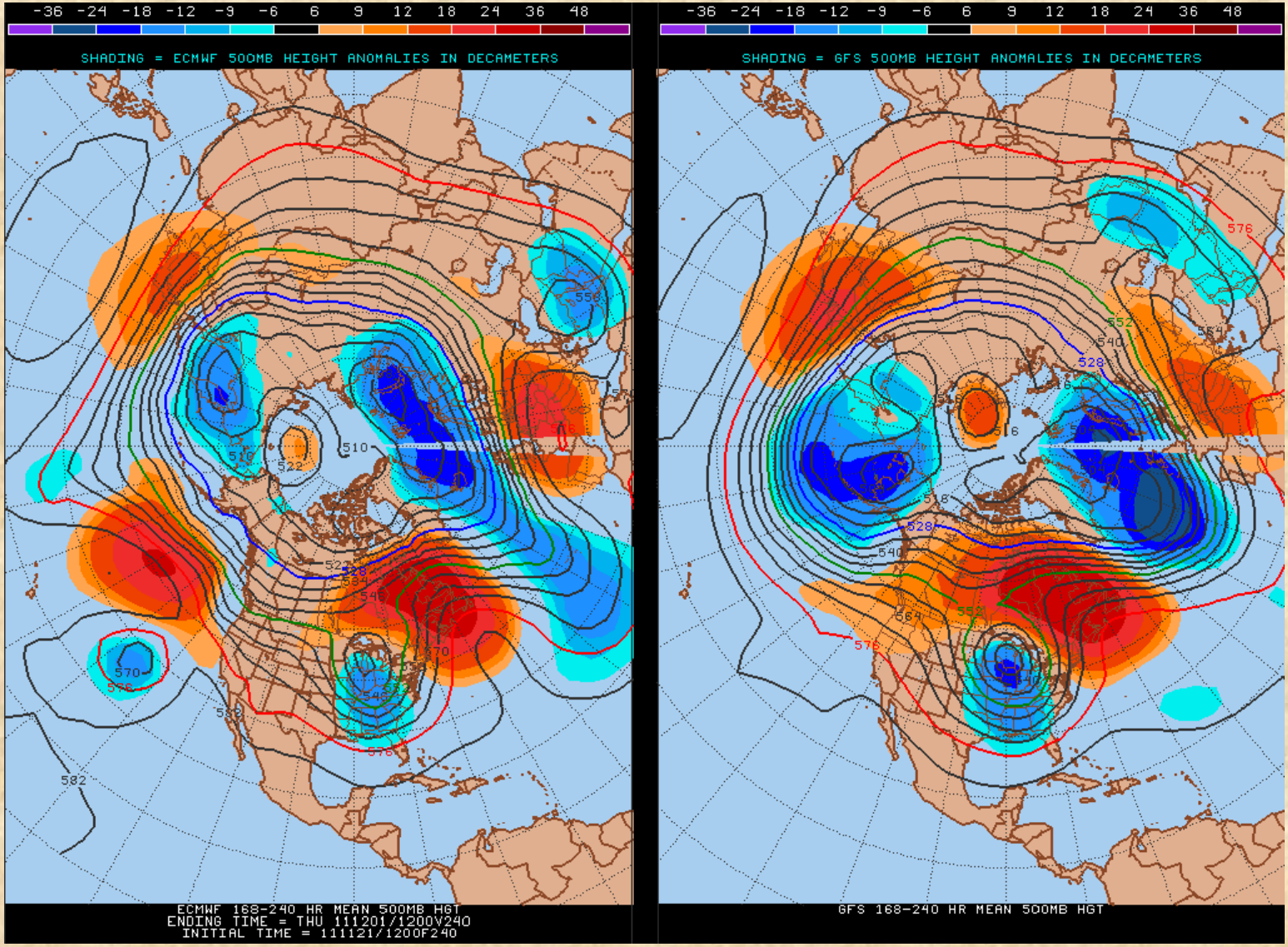
Compared to the typical outcome of La Niña winter seasons (top left), Jan-Mar '11 (bottom left) ended up close to expectations for dry conditions, especially in SE CO. The upcoming winter season shows no signal (top right), which may be our 'opening' for a possible rebound after a dry fall. *Climate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

What can we expect in the next five days?



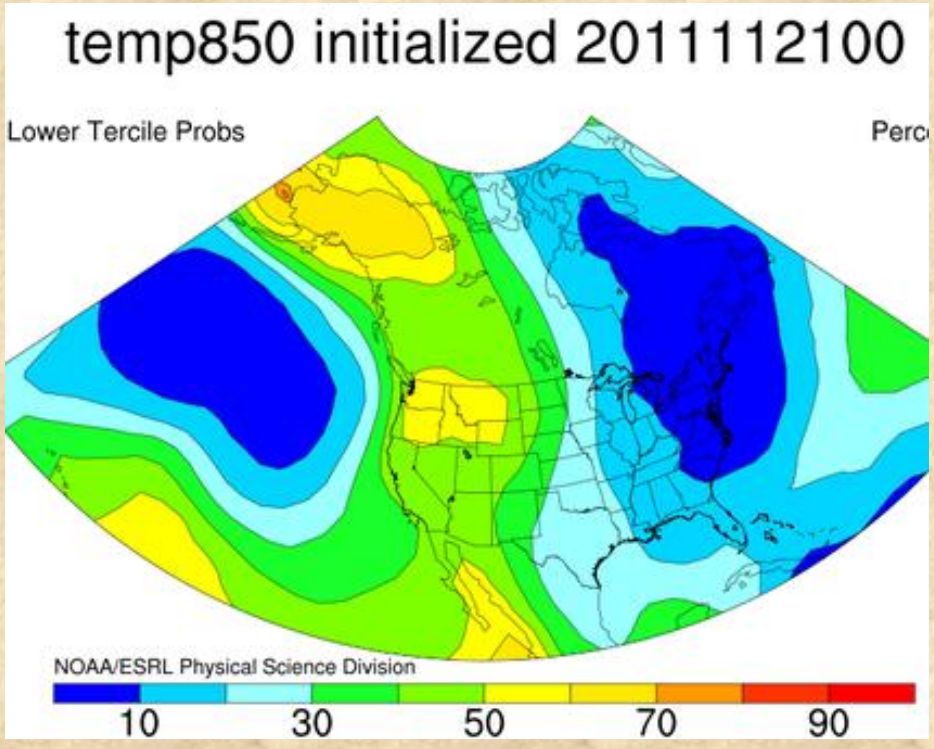
Expected total precipitation for the next five days, according to Hydrological Prediction Center (NOAA-HPC) –sure looks dry for Thanksgiving on this side of the Divide...

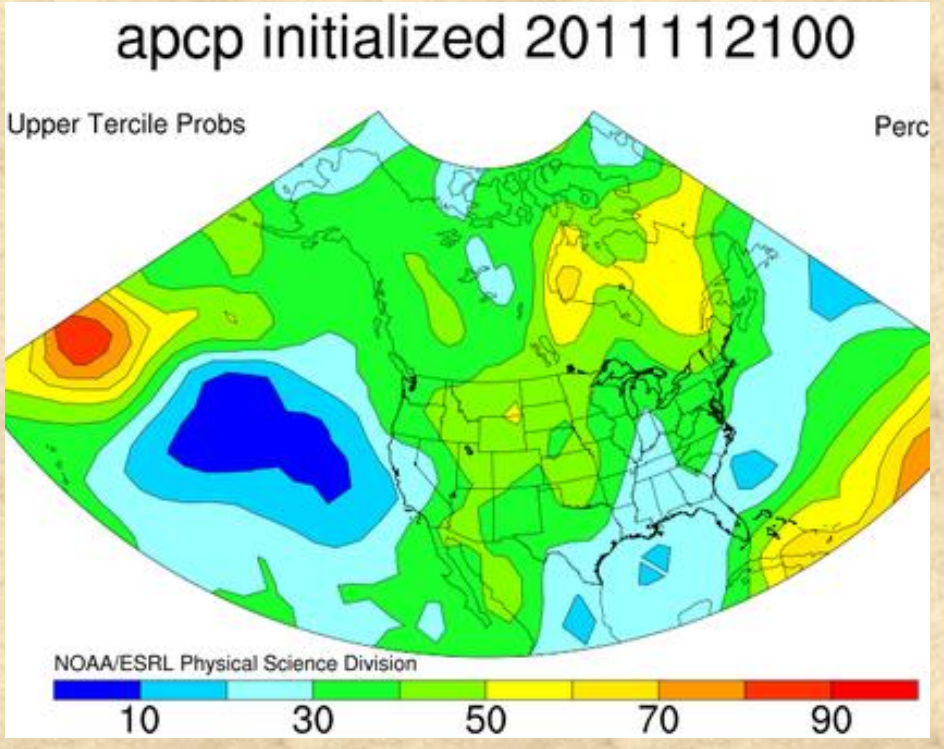
What can we expect next week and beyond?



European vs. American model 7-10 days out from this morning – looking somewhat unsettled, but neither too dry nor wet in both models (that have bigger disagreements over North Pacific

What can we expect beyond next week?

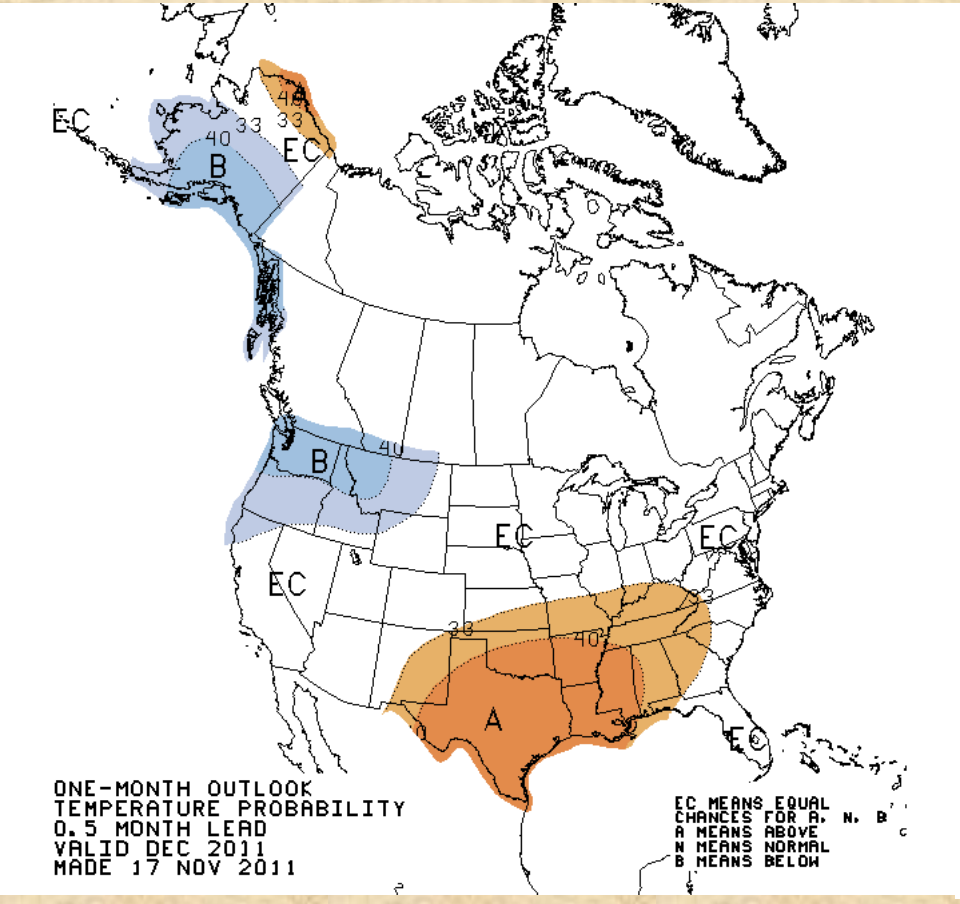


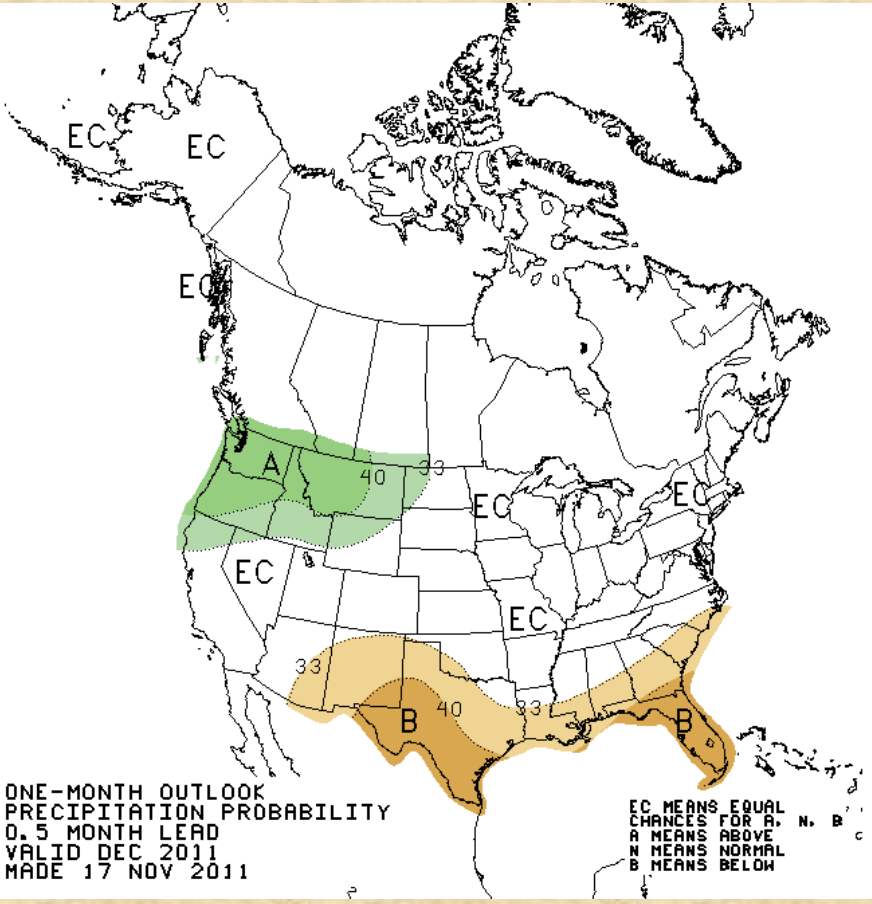


Reforecast outlook into early December (8-14 days) gives us a return of cool and slightly enhanced precipitation chances!

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

Climate Prediction Center Forecasts

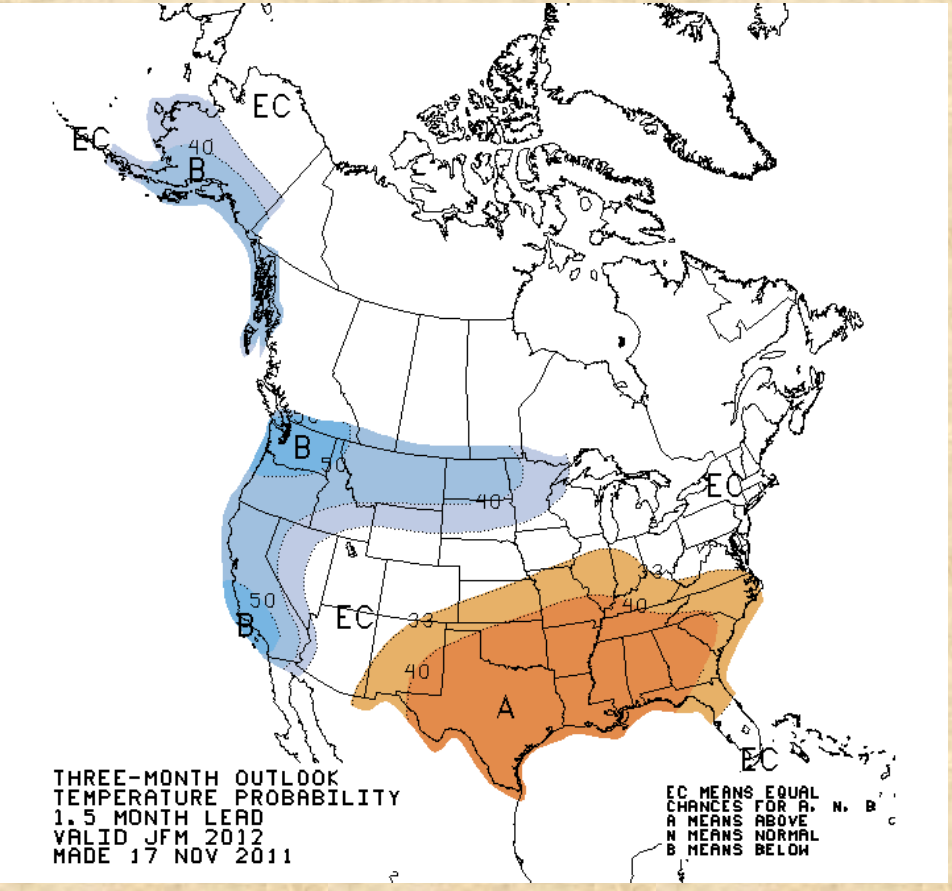


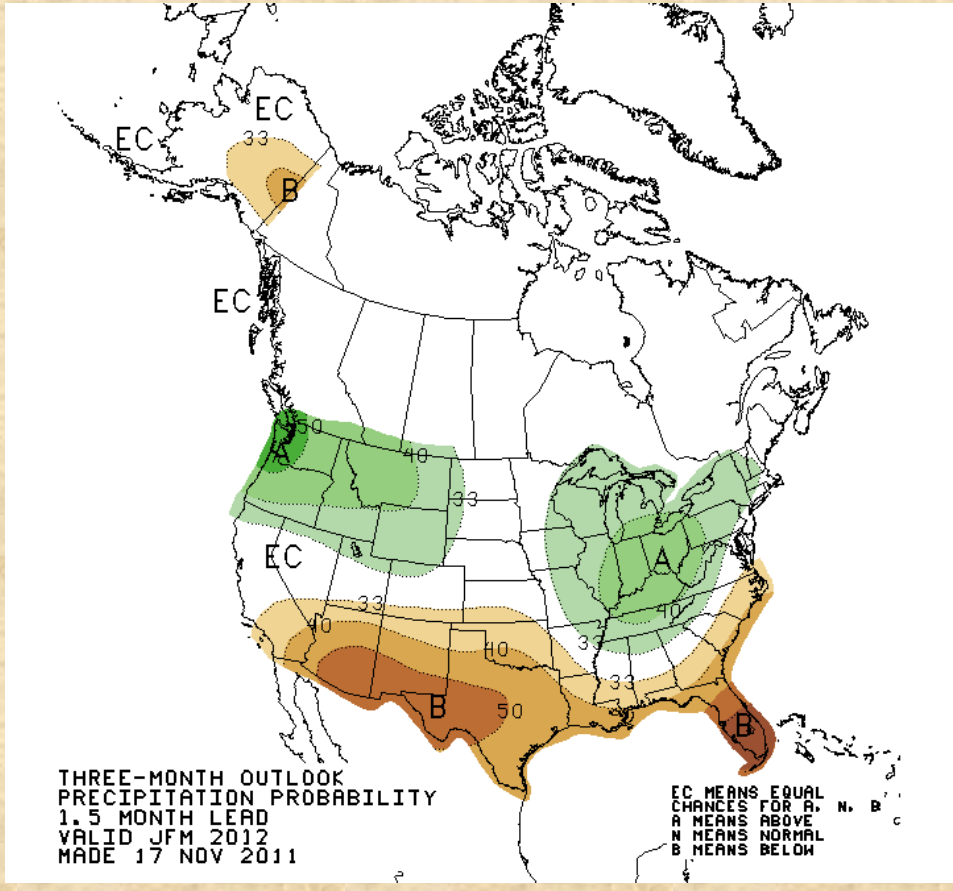


CPC's Dec (left) temperature forecast expects warmth to our southeast, and cold to our northwest, leaving CO 'EC'. Their precipitation forecast (right) keeps Colorado also in between dryness to our south and wetness to our northwest, more or less consistent with La Niña-based expectations.

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

Climate Prediction Center Forecasts

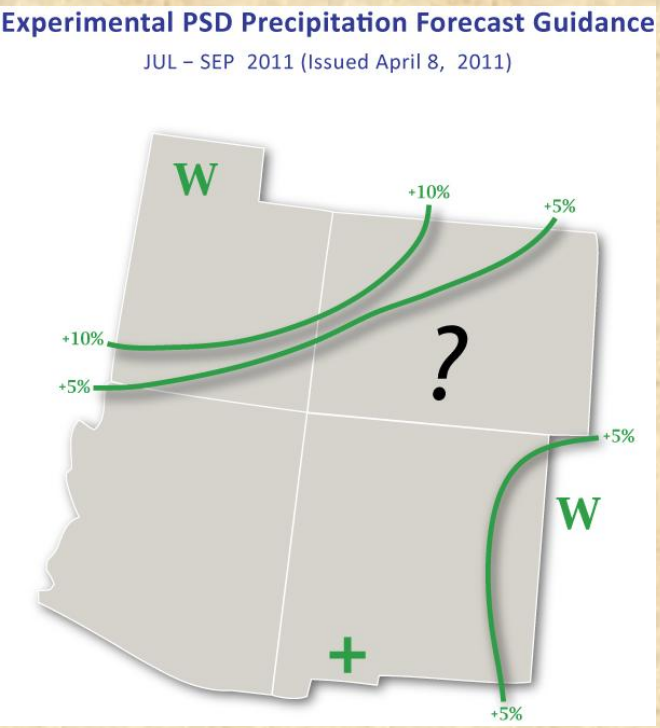


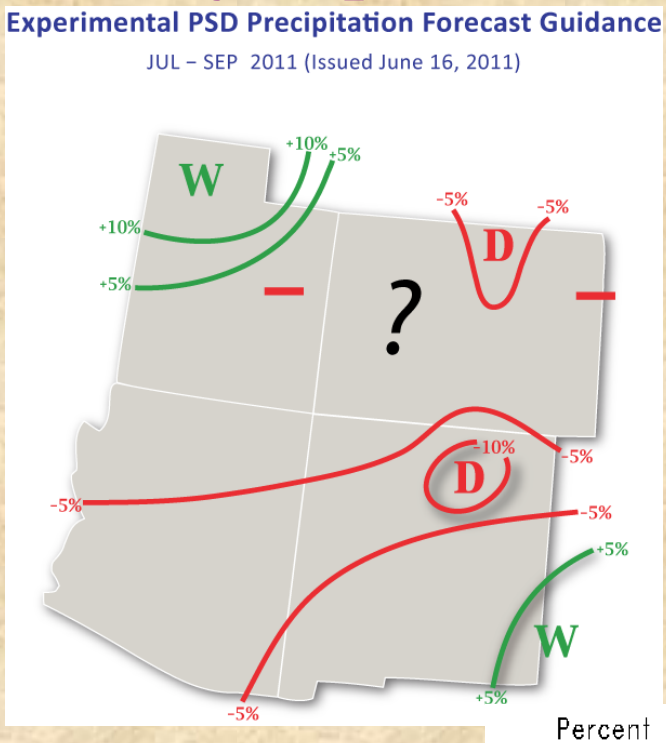


CPC's Jan-Mar '12 (left) temperature forecast expects CO to continue straddling warm anomalies to our southeast and cold anomalies to the north. A similar picture transpires for precipitation (enhanced odds for wetness clipping northern CO, dryness clipping our south), consistent with La Niña-based expectations.

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

Statistical Forecast for July-September 2011



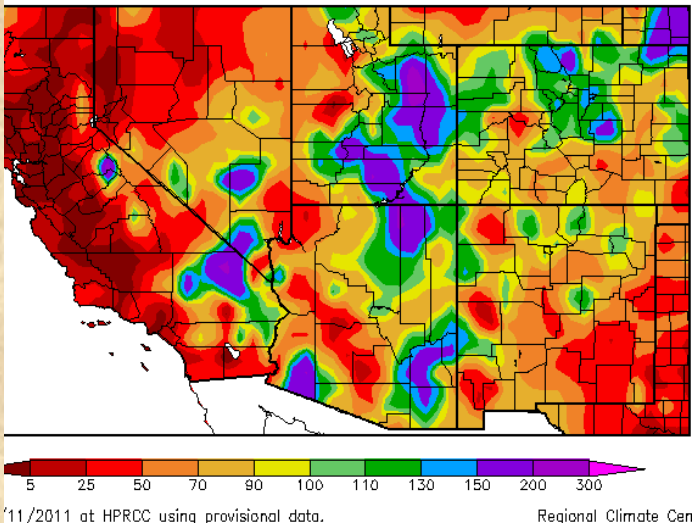


Skill map (below) shows poor skill over SW CO, but better skill over E and NW CO.

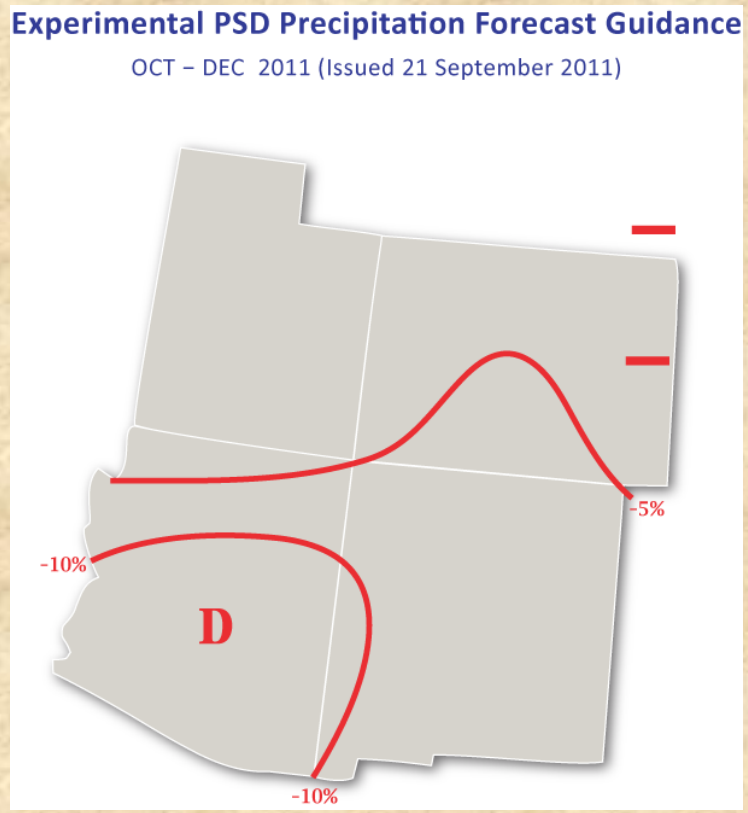
The April forecast for July-September 2011 (left) was optimistic for northwestern CO, and undecided for the rest of the state. The June forecast (top right) was significantly drier, including my 1st dry summer forecast for the eastern plains in more than one decade.

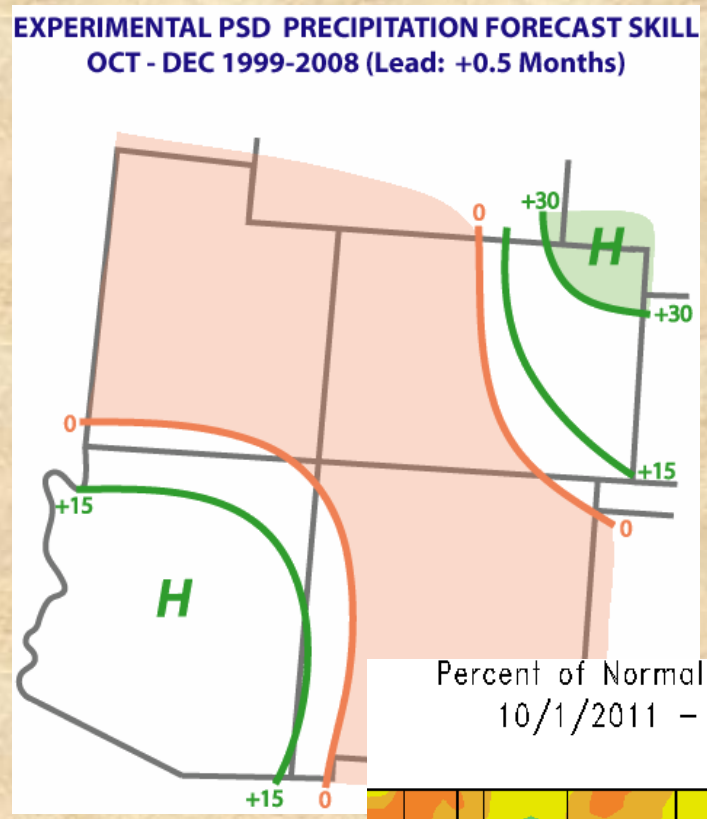
Dry conditions did indeed prevail in much of eastern CO, especially in the Arkansas Valley which was already carrying drought conditions. Early July wetness (plus a couple of storms in September) kept the northern Front Range wetter than expected.

Percent of Normal Precipitation (%)
7/1/2011 – 9/30/2011



Statistical Forecast for Oct-Dec 2011





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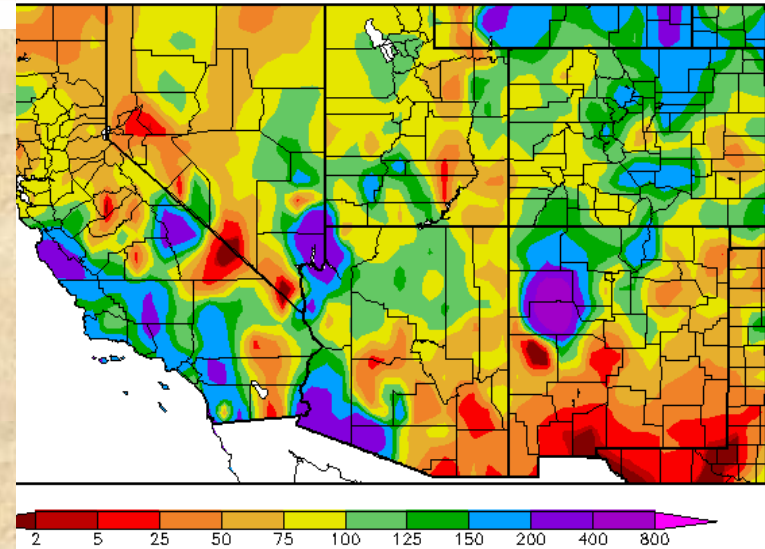
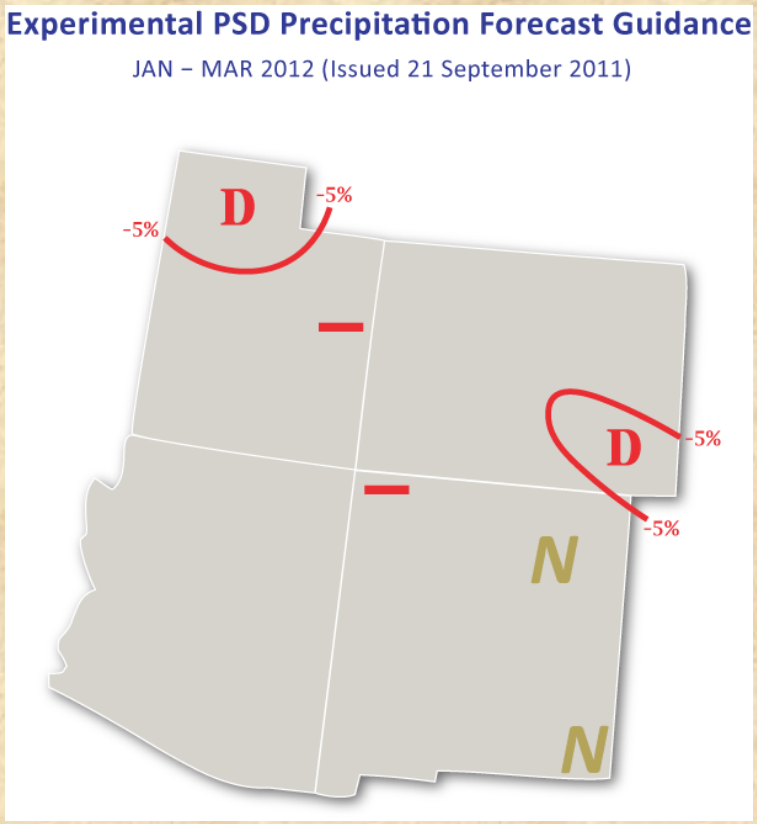
COLORADO WATER CONSERVATION BOARD
STATE OF COLORADO
1876
1937

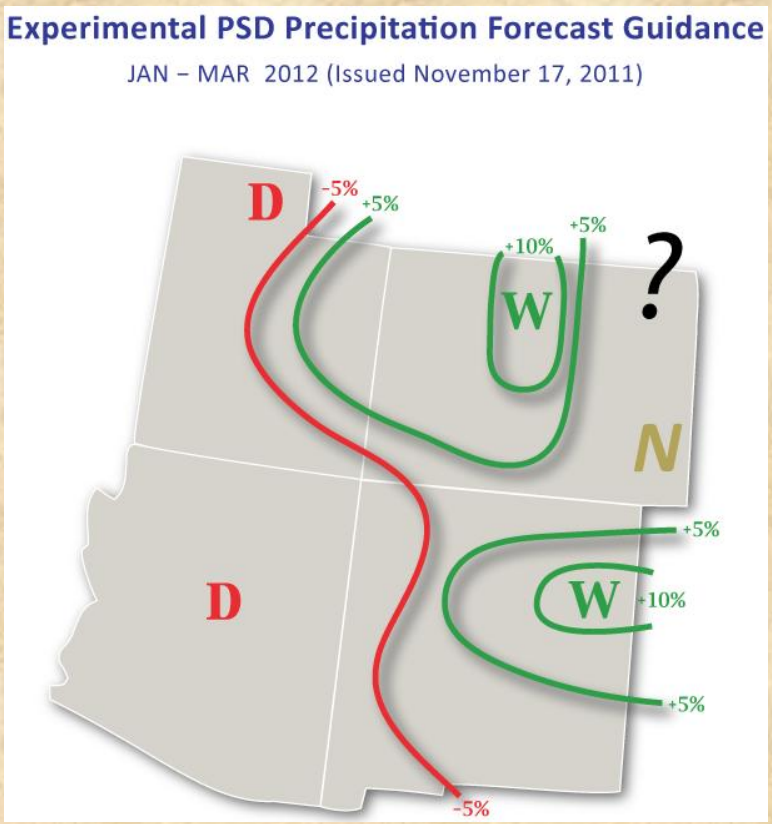
Percent of Normal Precipitation (%)
10/1/2011 – 11/20/2011



My forecast for October-December 2011 (left) was leaning towards dry conditions over southern and eastern CO, leaving the West slope and mountains under climatological odds. If verification statistics over the last decade hold up (right), they show skill over the dry northeastern plains of CO, but not to the west. *So far, this season has been somewhat wetter than expected…*

Statistical Forecast for January-March 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 updated forecast (right) is 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.

Last year (no forecast issued), my forecast for JFM'11 would have been dry for eastern CO, and wet for the north-central mountains of Colorado (verified √).

Executive Summary (22 September 2011) – *klaus.wolter@noaa.gov*

1. **La Niña has made a come-back, confirming my long-lead statements from last year. It probably will end up weaker than last winter, but that is less important for impacts than in the El Niño case.**

1. **Last month featured more snow than is typical for La Niña cases. In fact, my 20" snowstorm in late October was the biggest La Niña-October snowstorm in my record, even though it did not come close to what fell in the El Niño falls of 2009 and 1997. Windstorms held back until November, but then hit with a vengeance. Mountain snowpack is off to a good start which could become key to the overall performance in WY'12 (*42% variance of CO River runoff is related to fall moisture*)…**

1. **In the near future, we can expect dry and fairly mild weather through the weekend, only to be followed by a return to more unsettled, wintery weather in early December.**

2. **My forecast for early next year is more optimistic than in September for our north-central mountains, not for the Four Corners region. The Arkansas Valley has better prospects (near-normal moisture) than is typical for La Niña, while northeastern Colorado has no clear preference for dry or wet this winter.**

1. **Bottomline: Considering that 2nd year La Niña seasons tend to be drier than during the 1st year, the current outlook for early next year is benign (close to normal or even above-normal in our north-central mountains). While we will not see a repeat of last year's record snow season, the most likely outcome is still more favorable than in many other La Niña seasons for much of our water supply.**