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June Southwest Climate Outlook

Precipitation & Temperature: May precipitation totals in Arizona and New Mexico were average to above average (Fig. 1a), while temperatures were average to below average (Fig. 1b). May is one of the warmest and driest months in the Southwest, so these deviations provided a welcome break from more typical conditions. It takes very little moisture to push the month above average, and cooler-than-average temperatures still feel warm, albeit more desirable than the oppressive heat of mid-summer. June ushered even warmer-than-average temperatures, with most of Arizona and much of New Mexico recording temperatures 4-6 degrees F above normal (Fig. 2), with near-record and record temperatures observed during the first part of the month (June 3–5). Extreme heat is again in the forecast for June 18–19. In contrast to the building heat of summer, precipitation activity in May and early June is sporadic and unpredictable, and influenced by tropical storm activity, cold fronts that interface with surges of tropical moisture, and convective storms tied to the building monsoon.

Drought, Snowpack, & Water Supply: A strong El Niño event was expected to bring above-average precipitation to the region, especially during winter and spring, but water year totals to date reveal a disappointing reality. Precipitation in most of Southern California and Arizona and much of western New Mexico was below average during this crucial timeframe (Fig. 3), and long-term drought persists across the Southwest (Fig. 4). Snowpack continues to dwindle in the upper elevations that feed into the Southwest, and the spring and summer streamflow forecasts for the Colorado and Rio Grande basins were between 50 and 109 percent of average. Lakes Mead and Powell in Arizona and Elephant Butte Reservoir in New Mexico are at 36, 50, and 14 percent of capacity, respectively (see reservoir storage diagrams on p 4). Lake Mead is receiving particular attention, given possible water restrictions if reservoir levels drop below established trigger points.

El Niño / La Niña Tracker: With a return to ENSO-neutral conditions, the El Niño event of 2015–2016 is officially over (see ENSO tracker on p 3). Current forecasts indicate a transition to La Niña conditions with some uncertainty as to the timing, with most forecasts indicating a return to La Niña by late summer or early fall. While strong El Niño events are linked to above-average precipitation during the cool season (this last event notwithstanding), La Niña events are associated with warmer and drier conditions over winter, which could have implications for drought, snowpack, and water supply concerns in the Southwest.

Wildfire: Relatively cooler and wetter-than-average conditions tamped down early-season fire activity, but wildland fire potential is above average for June and July, especially in southern and central Arizona (Fig. 5). Lightning activity tied to the building monsoon increases the risk of wildfire across the region, especially given the abundance of fine fuels stemming from above-average tropical storm activity last fall. There are numerous active wildfire events in Arizona and New Mexico (Fig. 5, inset), but to date, these events are either generally under control or are being managed to reduce fine fuels and the risk of severe wildfire.

Precipitation & Temperature Forecasts: The June 16 NOAA-Climate Prediction Center three-month seasonal outlook calls for equal chances of above- or below-average precipitation for the Southwest (Fig. 6, top) and increased chances of above-average temperatures across the entire western United States (Fig. 6, bottom).

Tweet June SW Climate Outlook CLICK TO TWEET

JUN2016 @CLIMAS_UA SW Climate Outlook - Southwest Climate Summary, Wrapping up El Niño and looking towards La Niña. http://bit.ly/1UYsjYG

ARIZONA CLIMAS Climate Assessment for the Southwest A NOAA RISA TEAM — THE UNIVERSITY OF ARIZONA College of Agriculture & Life Sciences Cooperative Extension — NM STATE UNIVERSITY

June Southwest Climate Outlook

Online Resources

Figure 1
National Weather Service - AHPS
http://water.weather.gov/precip

Figures 2-3
High Plains Regional Climate Center
http://www.hprcc.unl.edu/

Figure 4
U.S. Drought Monitor
http://droughtmonitor.unl.edu/

Figure 5
National Interagency Fire Center
http://www.nifc.gov/

Figure 5 (inset)
Incident Information System
http://inciweb.nwcg.gov/

Figure 6
NWS Climate Prediction Center
http://www.cpc.ncep.noaa.gov/

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www.climas.arizona.edu/media/podcasts

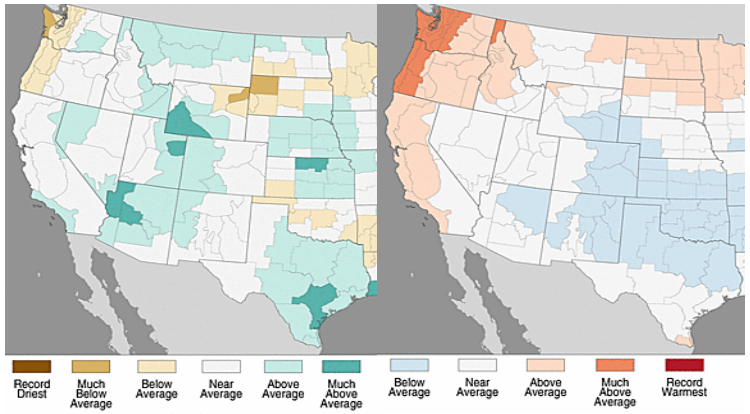


Figure 1: May 2016 Precipitation (a) & Temperature Ranks (b)

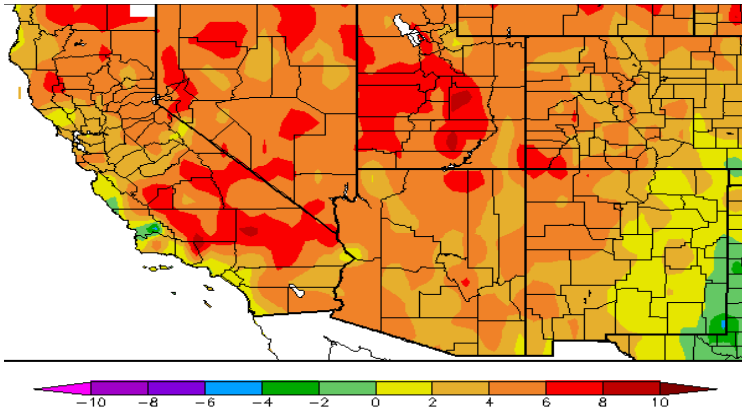


Figure 2: Departure from Normal Temperature June 1 - June 15 2016

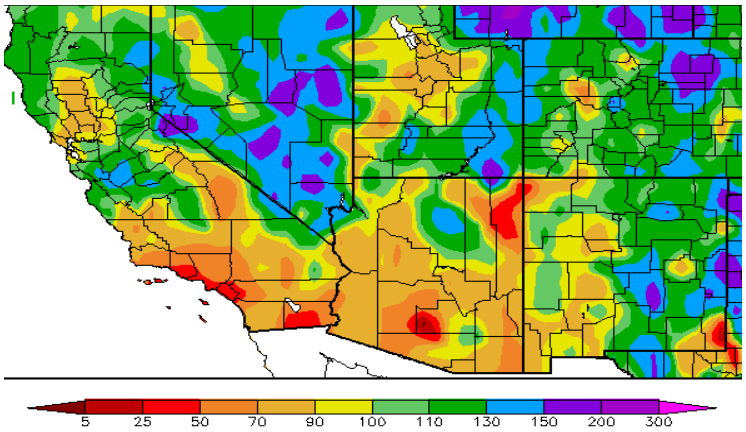


Figure 3: Departure from Normal Precipitation Oct 1 2015 - June 15 2016

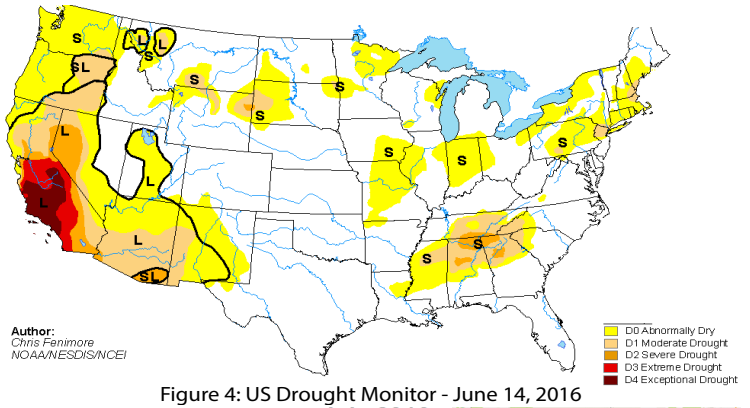


Figure 4: US Drought Monitor - June 14, 2016

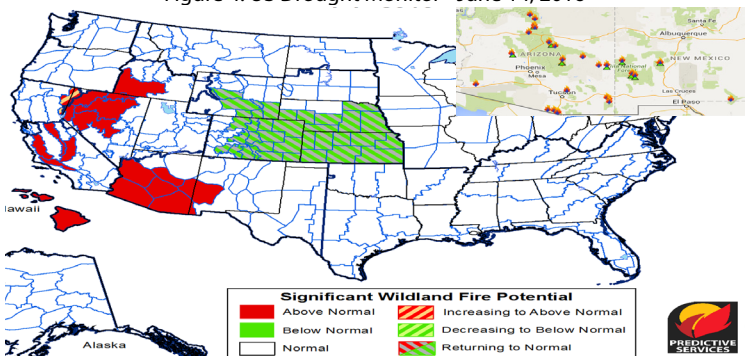


Figure 5: Significant Wildland Fire Potential Outlook - July 2016

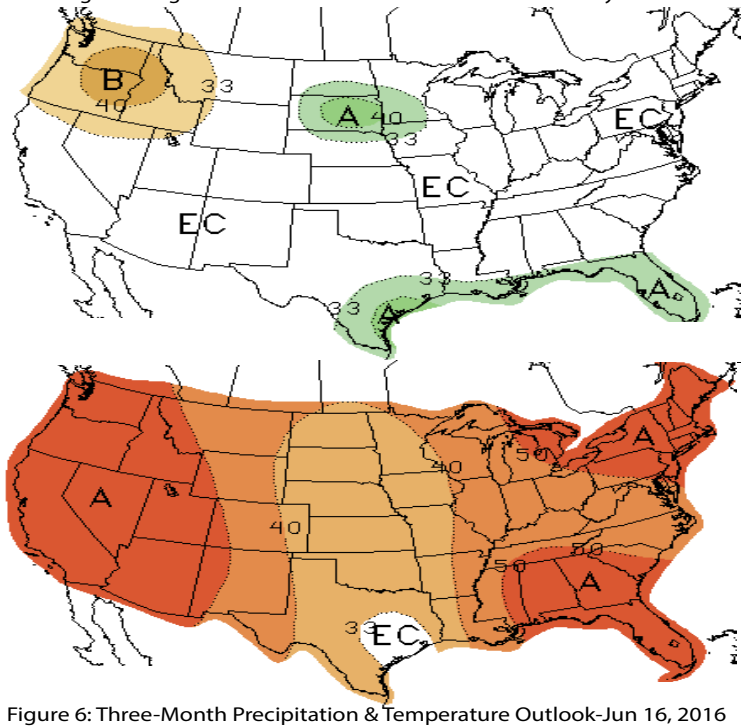


Figure 6: Three-Month Precipitation & Temperature Outlook-Jun 16, 2016

Online Resources

Figure 1
Australian Bureau of Meteorology
http://www.bom.gov.au/climate/enso/index.shtml

Figure 2
NOAA - National Climatic Data Center
http://www.ncdc.noaa.gov/teleconnections/enso/

Figure 3
International Research Institute for Climate and Society
http://iri.columbia.edu/our-expertise/climate/forecasts/enso/

Figure 4
NOAA - Climate Prediction Center
http://www.cpc.ncep.noaa.gov/

El Niño

Information on this page is also found on the CLIMAS website:
www.climas.arizona.edu/sw-climate/el-niño-southern-oscillation

2015–2016 El Niño Tracker

El Niño conditions continued their active decline (Figs. 1-2), and consensus is that they have reached ENSO-neutral status at the time of this writing. Forecast discussions focused on the decline of atmospheric and oceanic anomalies that characterize an El Niño event—convective activity, equatorial sea surface temperatures, and trade winds—and forecasters saw consistent evidence of a return to ENSO-neutral status across these indicators. Seasonal ENSO outlooks coalesced around La Niña conditions emerging by summer or fall 2016, with relatively high certainty that La Niña conditions would be in place sometime by mid-to-late 2016.

On June 7, the Australian Bureau of Meteorology maintained its outlook at La Niña Watch status, noting that the tropical Pacific Ocean was in an ENSO-neutral state, with a 50 percent probability of a La Niña event developing in 2016. On June 9, the NOAA-Climate Prediction Center (CPC) issued a final El Niño Advisory, while maintaining a La Niña Watch. The CPC identified atmospheric and oceanic anomalies as reflecting ENSO-neutral conditions and forecast La Niña conditions would develop over the summer, with a 75 percent probability of a La Niña during fall and winter 2016-2017. On June 10, the Japan Meteorological Agency identified that El Niño conditions ended in late spring 2016, with an increasing likelihood of La Niña developing over summer and into fall. On June 16, the International Research Institute for Climate and Society (IRI) and CPC forecasts identified ENSO-neutral conditions in oceanic and atmospheric indicators, with La Niña emerging by late July or August and lasting through fall and winter (Fig. 3). The North American multi-model ensemble currently shows the decline from strong El Niño status to neutral conditions, as well as a relatively rapid swing to La Niña conditions by summer (Fig. 4).

As very clearly experienced during the El Niño event of 2015–2016, there is no guarantee that a given event will meet expectations (see El Niño tracker in the May 2016 Southwest Climate Outlook for more details). That said, it is important to note that La Niña events are associated with decreased cool-season precipitation in the Southwest. This is a more reliable pattern in terms of forecasts and predictions, with La Niña events being more reliably dry than El Niño events are reliably wet, and considerable variability between wet and dry in ENSO-neutral years. With a La Niña forecast on the horizon for winter 2016–2017, drier-than-average cool-season precipitation totals are a likely outcome, with implications for long-term drought and water storage concerns in the Southwest.

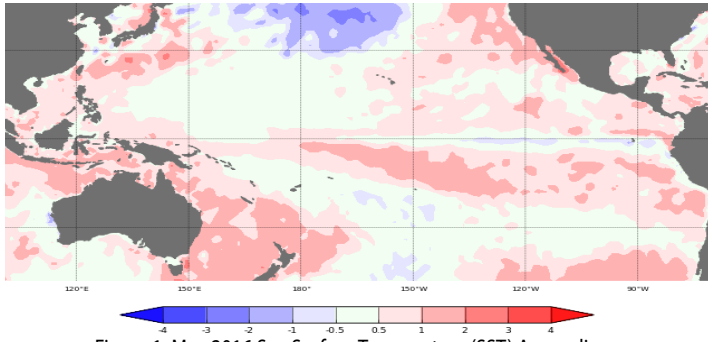


Figure 1: May 2016 Sea Surface Temperature (SST) Anomalies

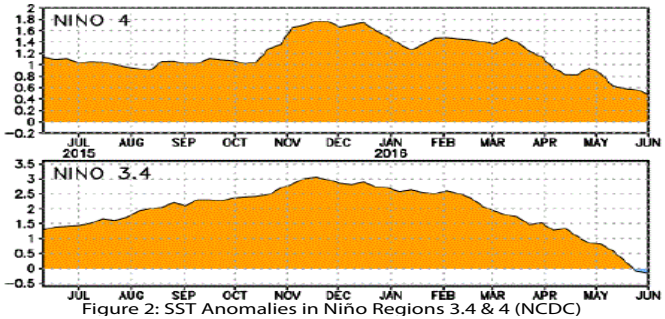


Figure 2: SST Anomalies in Niño Regions 3.4 & 4 (NCDC)

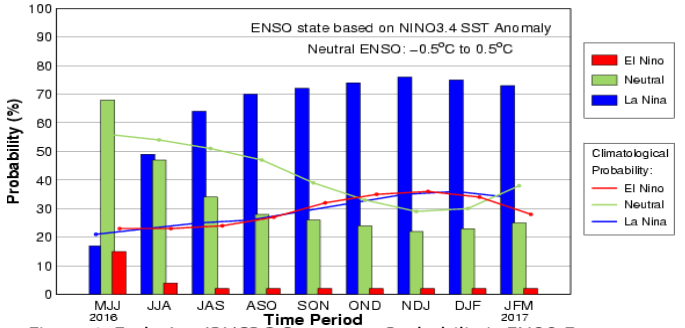


Figure 3: Early-Jun IRI/CPC Consensus Probabilistic ENSO Forecast

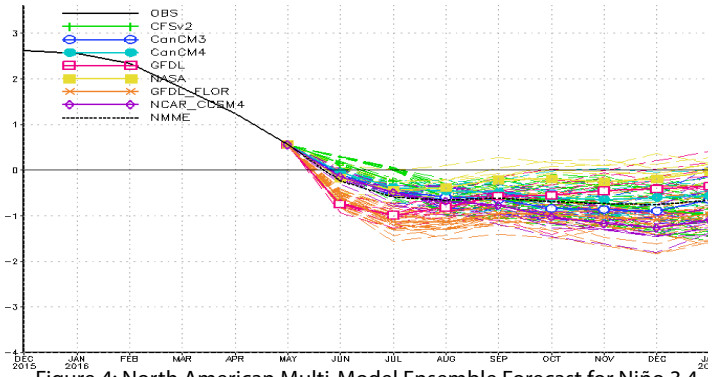


Figure 4: North American Multi-Model Ensemble Forecast for Niño 3.4

Online Resources

Portions of the information provided in this figure can be accessed at the Natural Resources Conservation Service

Arizona: http://1.usa.gov/19e2BdJ

New Mexico: http://www.wcc.nrcs.usda.gov/cgibin/resv_rpt.pl?state=new_mexico

We updated our 'max storage' values for numerous NM reservoirs based on conservation storage vs. maximum flood capacity. This altered the percent full calculations, even while 'current storage' numbers are unchanged.

Contact Ben McMahan with any questions or comments about these or any other suggested revisions.

Notes

The map gives a representation of current storage for reservoirs in Arizona and New Mexico. Reservoir locations are numbered within the blue circles on the map, corresponding to the reservoirs listed in the table. The cup next to each reservoir shows the current storage (blue fill) as a percent of total capacity. Note that while the size of each cup varies with the size of the reservoir, these are representational and not to scale. Each cup also represents last year's storage (dotted line) and the 1981–2010 reservoir average (red line).

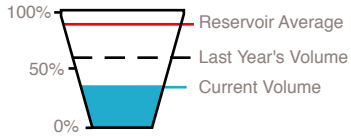
The table details more exactly the current capacity (listed as a percent of maximum storage). Current and maximum storage are given in thousands of acre-feet for each reservoir. One acre-foot is the volume of water sufficient to cover an acre of land to a depth of 1 foot (approximately 325,851 gallons). On average, 1 acre-foot of water is enough to meet the demands of four people for a year. The last column of the table lists an increase or decrease in storage since last month. A line indicates no change.

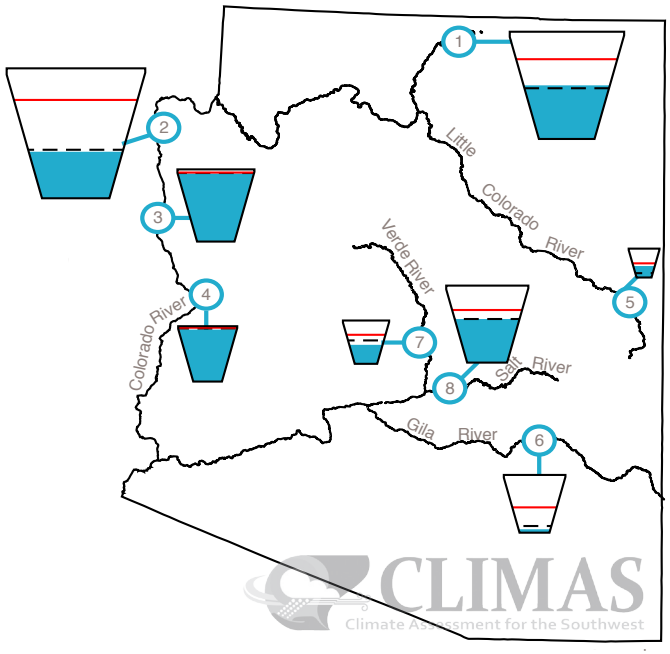
These data are based on reservoir reports updated monthly by the National Water and Climate Center of the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS).

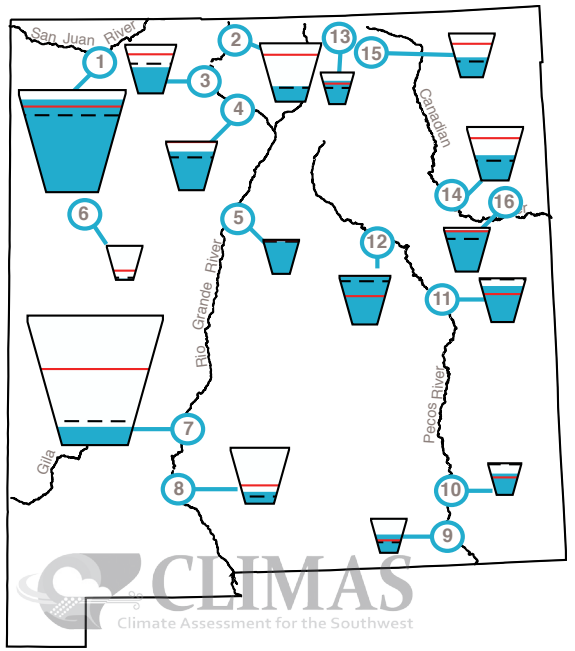
Reservoir Volumes

DATA THROUGH MAY 31, 2016

Data Source: National Water and Climate Center, Natural Resources Conservation Service







Reservoir	Capacity	Current Storage*	Max Storage*	One-Month Change in Storage*
1. Lake Powell	50%	12,080.4	24,322.0	1095.2
2. Lake Mead	36%	9,490.0	26,159.0	-200.0
3. Lake Mohave	94%	1,701.0	1,810.0	-46.0
4. Lake Havasu	94%	583.6	619.0	-15.6
5. Lyman	40%	12.0	30.0	-0.9
6. San Carlos	6%	49.7	875.0	-28.8
7. Verde River System	44%	125.7	287.4	0.2
8. Salt River System	56%	1,141.8	2,025.8	-39.3

*KAF: thousands of acre-feet

Reservoir	Capacity	Current Storage*	Max Storage*	One-Month Change in Storage*
1. Navajo	91%	1,549.4	1,696.0	58.4
2. Heron	26%	105.4	400.0	22.6
3. El Vado	54%	103.6	190.3	12.9
4. Abiquiu	79%	147.1	186.8**	14.9
5. Cochiti	96%	48.2	50.0**	1.5
6. Bluewater	5%	2.1	38.5	0.1
7. Elephant Butte	14%	310.5	2,195.0	-24.1
8. Caballo	21%	70.9	332.0	7.8
9. Lake Avalon	53%	2.4	4.5**	0.0
10. Brantley	67%	28.2	42.2**	3.7
11. Sumner	82%	29.3	102.0**	-10.4
12. Santa Rosa	99%	105.0	105.9**	0.3
13. Costilla	74%	11.8	16.0	0.1
14. Conchas	48%	120.9	254.2	-10.2
15. Eagle Nest	45%	35.4	79.0	1.6
16. Ute Reservoir	94%	188	200	-4.0

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Rio Grande|Bravo

CLIMATE IMPACTS & OUTLOOK

The Rio Grande–Bravo Climate Impacts & Outlook is a monthly product that provides timely climate, weather, and impacts information to stakeholders, researchers, and other interested parties in the Rio Grande–Bravo Basin region of New Mexico, Texas, and Mexico. Each edition recaps conditions over the previous months, including notable events, and then shows forecasts for the next three months for temperature, precipitation, and fire conditions.

The outlook is a product of the North American Climate Services Partnership (NACSP), an innovative trilateral partnership between the U.S., Mexico, and Canada. This partnership was established to respond to an increasing demand for accessible and timely scientific data and information in order to make informed decisions and build resilience in our communities. CLIMAS is an active participant in the NACSP Rio Grande–Rio Bravo Regional Pilot Area. CLIMAS co-produces the Rio Grande–Bravo Climate Impacts & Outlook with NACSP partners and is one of several partners hosting the outlook.

Read more at: http://www.climas.arizona.edu/rgbo

CLIMAS Southwest Climate Podcast
May 2016 - Even More El Niño Disappointment and Looking Towards the Impending "Doom Season"

In this episode of the CLIMAS Southwest Climate Podcast, Mike Crimmins and Zack Guido cover a wide range of topics related to weather and climate in the Southwest, including: 1) the transition from winter into spring so far with a recap of weather over the past month; 2) a deeper dive into the ongoing disappointment that was El Niño; 3) an exploration of the wildfire risk potential for this year and how recent years compare; and 4) an early start to discussing the monsoon, partly because the season is closer than we might think, but also as a way to divert attention from what Zack is calling the "doom season" (hot and dry conditions leading up to the monsoon).

Listen: *http://www.climas.arizona.edu/podcast/may-2016-climas-sw-climate-podcast-even-more-disappointment-re-el-niño-and-looking-towards*

Monsoon 2016

The official start of the monsoon is June 15, but early July is the most common start time for monsoon conditions. We will track the monsoon in the *Southwest Climate Outlook* and on the CLIMAS website *http://www.climas.arizona.edu/sw-climate/monsoon*