

# Forecast Cutoff/Closed Low Storm: Nov. 17–22, 2019

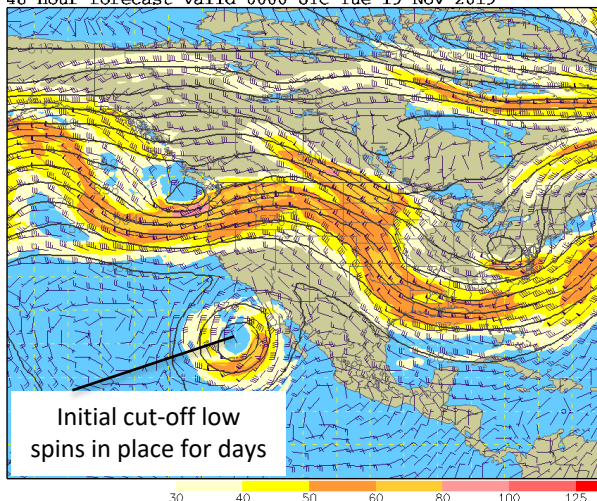
*In Arizona, this 4-day period is predicted to produce 10-25% and even as much as 40-50% of November-April average total precipitation.*

**Synopsis:** A **cutoff low pressure** system off of the Baja Peninsula will transport large amounts of water vapor into the Southwest in the coming week. As this sets up, a separate storm will drop down the coast from the north, with a decaying atmospheric river, and form a strong closed low that will entrain the weakening cut-off low and its tropical water vapor. This will then move into the Southwest, producing widespread 1-3 inches of rain and snow (liquid equivalent) over parts of AZ, UT, and southern NV, with over 5 inches of liquid equivalent in parts of Arizona over roughly 4 days. Higher elevations may see 2-3 feet of snow accumulation. Most of the action will be east of California, where less than 1-2 inches are expected across Southern California and the Southern Sierra Nevada.



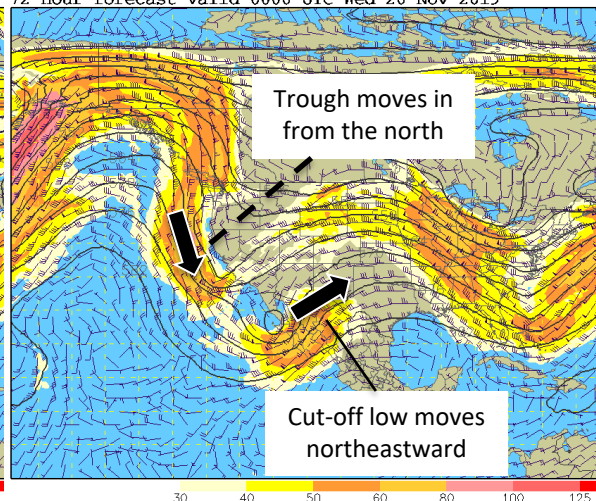
# 500 mb Heights (dm) / Isotachs (knots)

48-hour forecast valid 0000 UTC Tue 19 Nov 2019



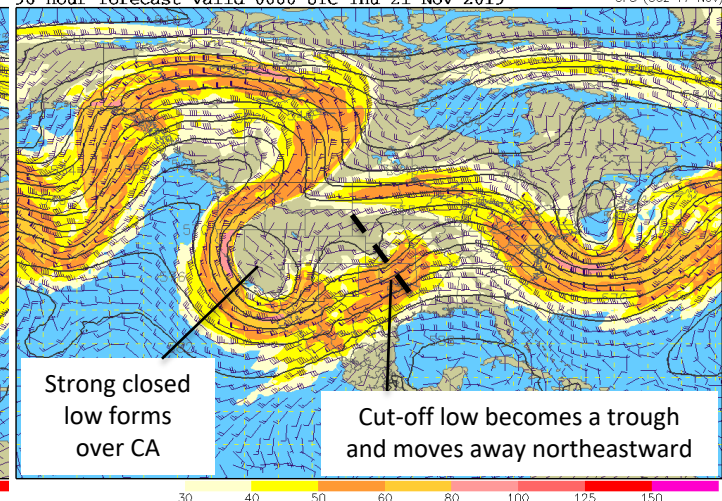
# 500 mb Heights (dm) / Isotachs (knots)

72-hour forecast valid 0000 UTC Wed 20 Nov 2019

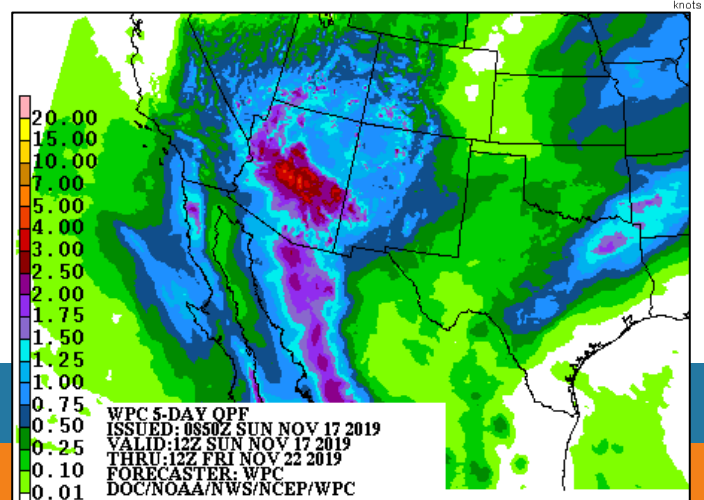
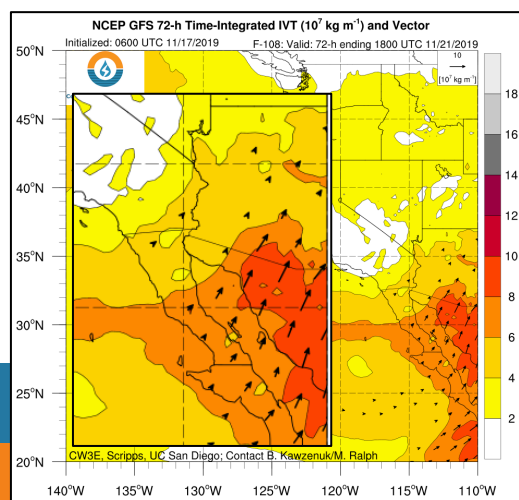
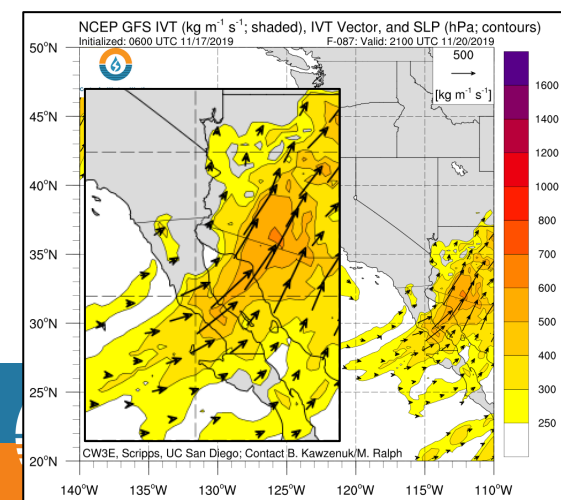


# 500 mb Heights (dm) / Isotachs (knots)

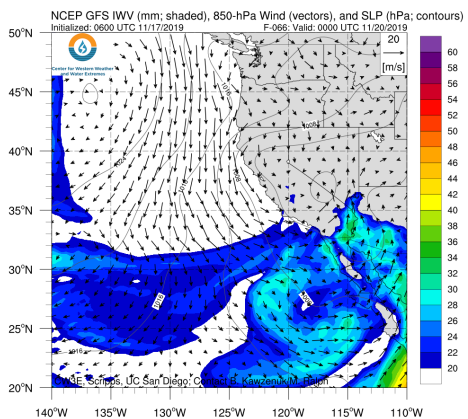
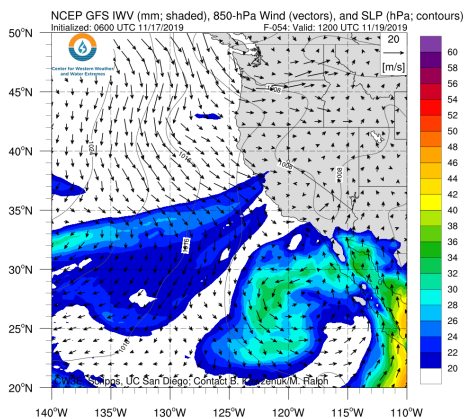
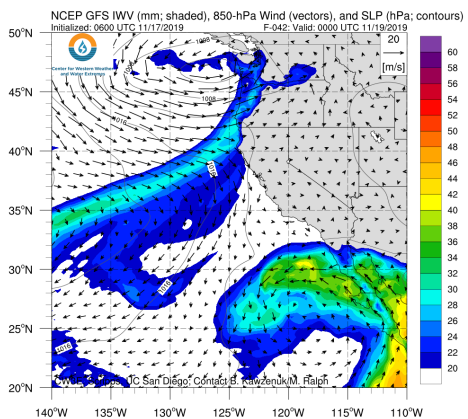
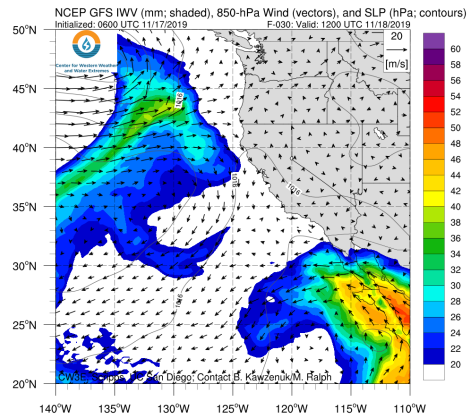
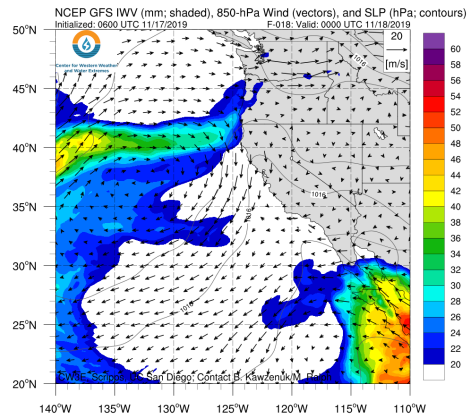
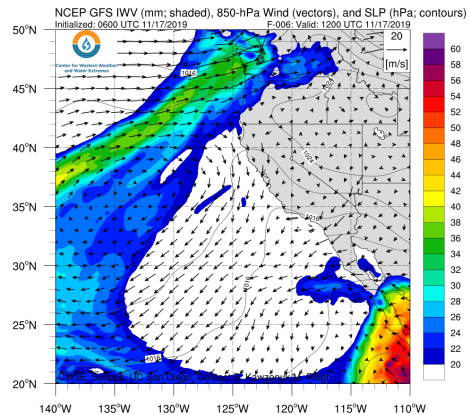
96-hour forecast valid 0000 UTC Thu 21 Nov 2019



GFS (00z 17 Nov)



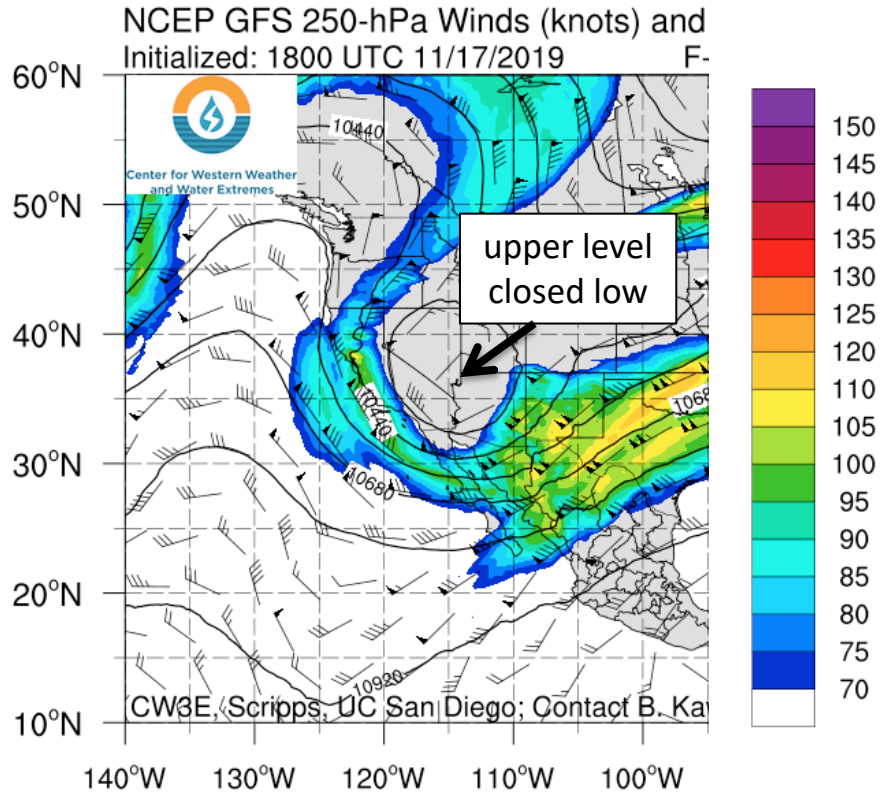
# Tropical Moisture Export Contributed from Near Gulf of California



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# Upper level low becomes “closed” by mid-week, stalling and prolonging precipitation over Southwest



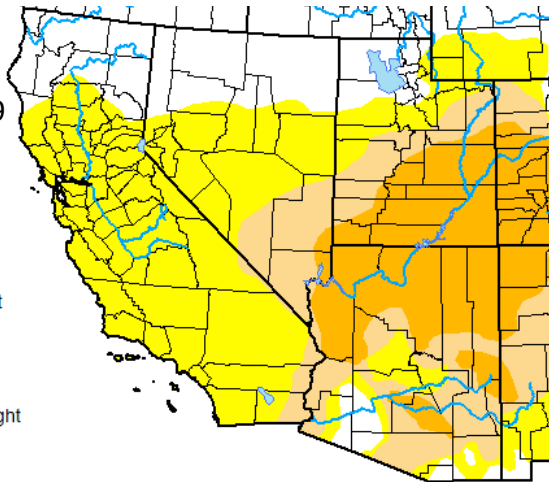
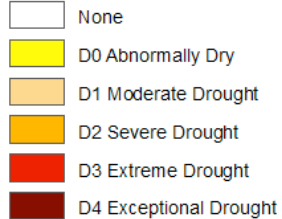
- A cutoff low is a center of low pressure completely detached from the mean westerly flow, while a closed low still attached/embedded.
- Closed/cutoff lows typical for autumn season (e.g. Oakley et al. 2014), often a source of “out of season” precipitation in West.
- Forecast models often struggle to predict timing, movement of these features.
- Cold upper level low combining with low level moist air (e.g., tropical storm remnants here) favorable scenario for instability and precipitation, and in some cases intense thunderstorms.
- AR contribution in this event is weak.



- More than 50-75 mm (2-3 in) of precipitation anticipated in some areas of the Southwest.
- Beneficial precipitation for Four Corners states, where moderate to severe drought present.
- May help increase fuel moisture, reduce potential for wildfire in areas experiencing precipitation.

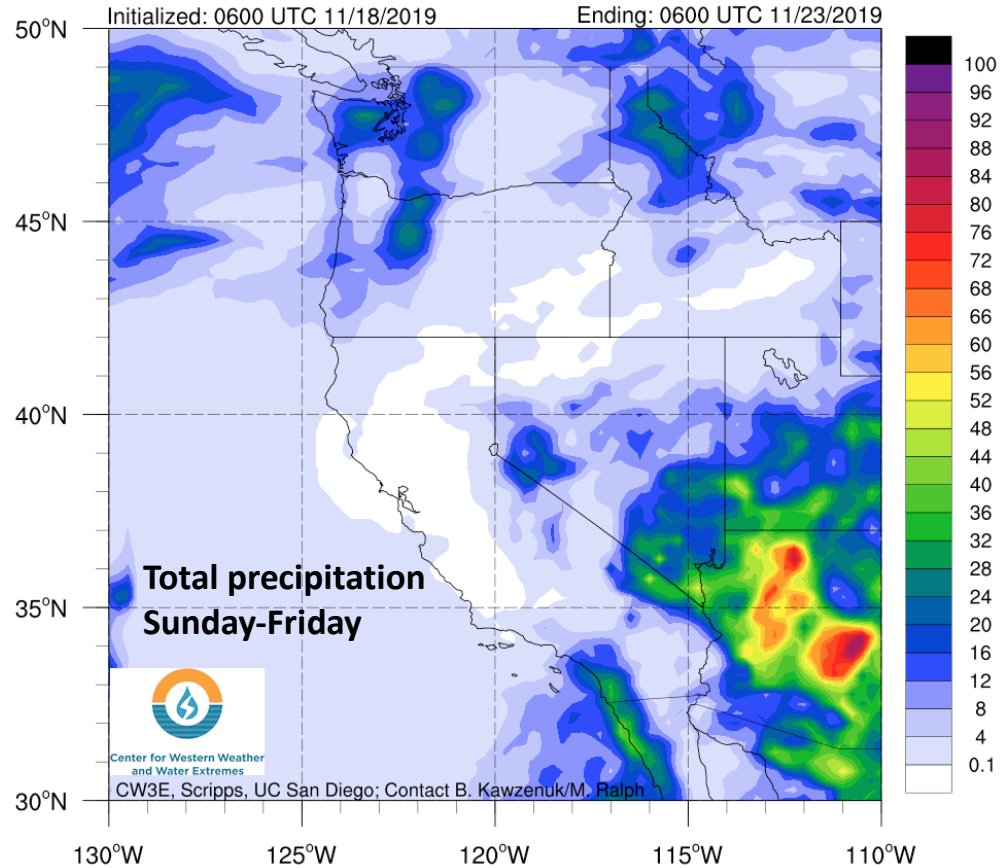
Valid Nov 12 2019

**Intensity:**



US Drought Monitor: [droughtmonitor.unl.edu](http://droughtmonitor.unl.edu)

**GFS 5-day Precipitation Forecast (mm)**



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# Outlook from NWS Tucson



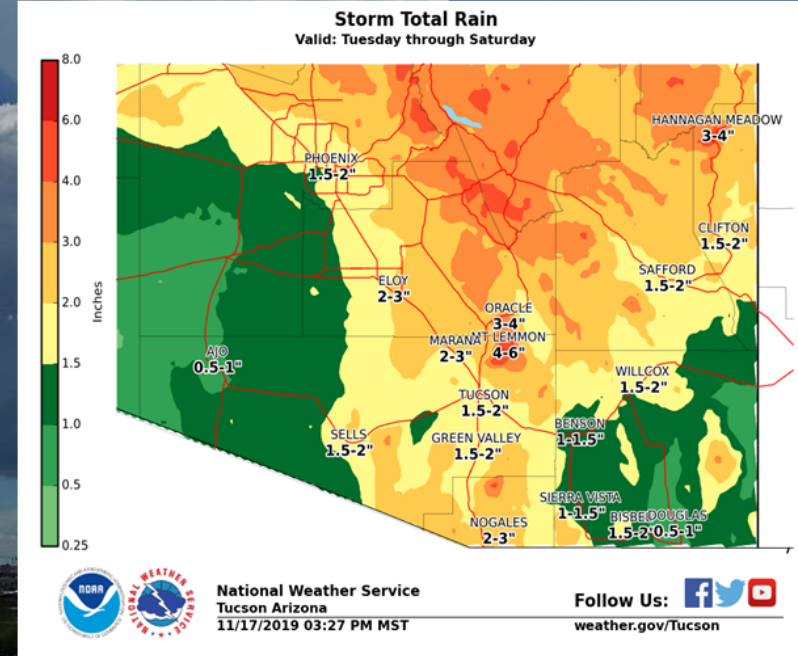
## Widespread Valley Rain and Mountain Snow

### Overview/Timing:

Widespread valley rain/thunderstorms Tuesday. Additional showers Wednesday through at least Friday.

Snow levels begin above mountain tops, lowering Wednesday night into Thursday. Substantial accumulation possible for higher peaks generally above 7500ft.

Expect increased flows in areas washes and rivers due to locally heavy rain.



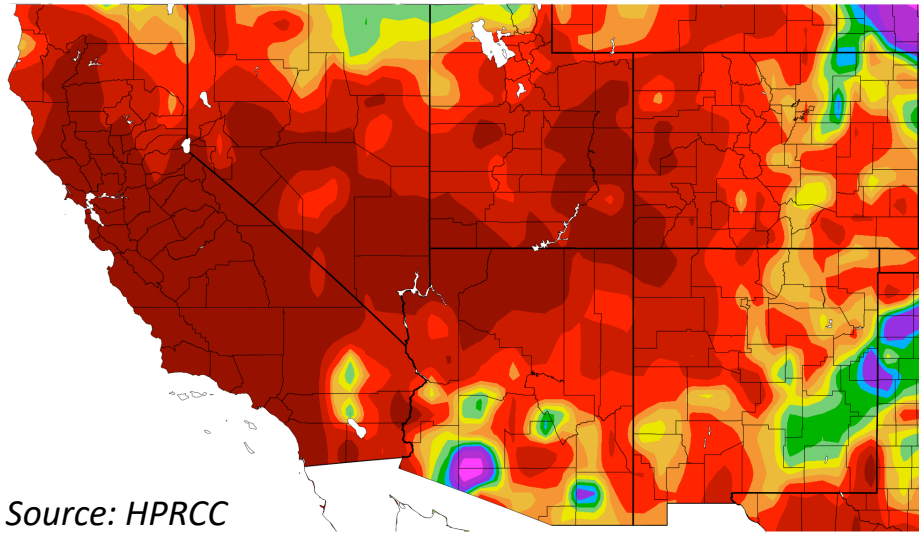
National Weather Service Tucson, AZ



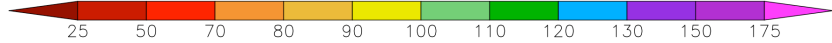
weather.gov/tucson

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Source: HPRCC



Percent of Normal Precipitation July 1-Nov 16

Many areas expected to experience precipitation this week experienced a much drier than normal monsoon season (approximately June 15-Sept 30).

## Impacts

- High elevation snow expected, may cause travel impacts over mountain passes
- Conditions favorable for high-intensity rainfall, may produce localized flash flooding



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# Arizona Precipitation and Snowfall Point Forecasts: From 17/18 Nov

Station Name	Elevation	Forecast Precipitation Estimate (liquid equiv.)	Forecast Precipitation % of Nov-Apr Average*	Forecast Snowfall (snow depth)
Snowslide Canyon	9800 ft	2-3 in/2-3 in	<b>10-15%</b> of 23 in	18-24 in/18-24 in
Workman Creek	6900 ft	4-5 in/4-5 in	<b>20-25%</b> of 23 in	None/2 in
Hannagan Meadows	9000 ft	3-4 in/2-3 in	<b>20-25%</b> of 16 in	20-30 in/10-15 in
Mount Lemmon	9000 ft	5-6 in/3-4 in	<b>40-50%</b> of 12 in	10-15 in/15-20 in

This storm is of hydrological importance for Arizona, with **many locations forecast to receive 10% to up to 50% of average cool season (November-April) precipitation**



\*Nov-Apr averages based on SNOTEL data, except Mount Lemmon is from [www.weather-us.com](http://www.weather-us.com)

\*QPF issued 17 Nov/18 Nov for 4 day precip



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