# The Arizona Hurricane Rosa Heavy Rainfall Event For Late September to Early October 2018

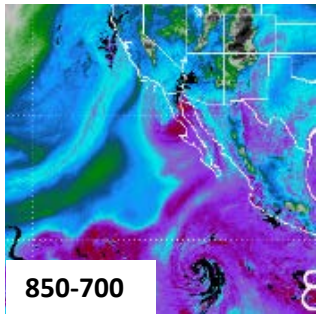
# Remains of Hurricane Rosa Giving Historical Rainfall to Phoenix, AZ Area

AP Photo/Ross D. Franklin.

## Experimental CIRA Advected Layered Precipitable Water for 06 UTC 2 October 2018

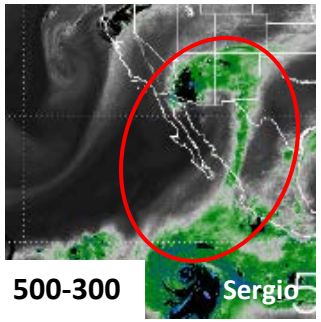
ftp://ftp.cira.colostate.edu/ftp/Forsythe/LPW/Anim_GIF/2018Oct0221Advect_LPW_ALT_anim.gif

Sfc-850



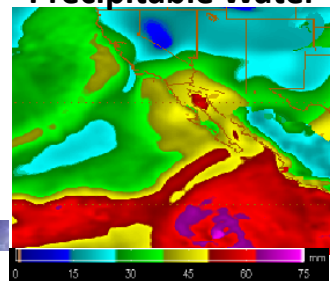
850-700

700-500

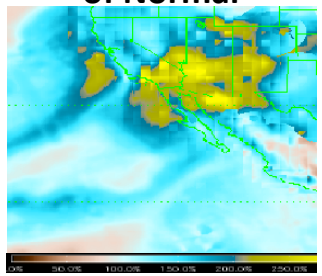



500-300

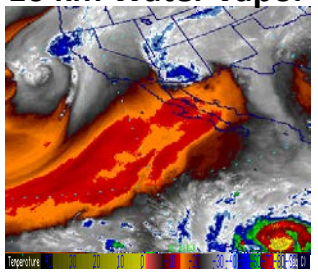

Blended Total Precipitable Water



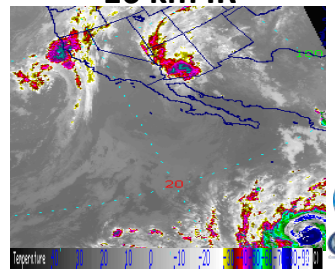
Blended TPW % of Normal



GOES-15 16 km Water Vapor

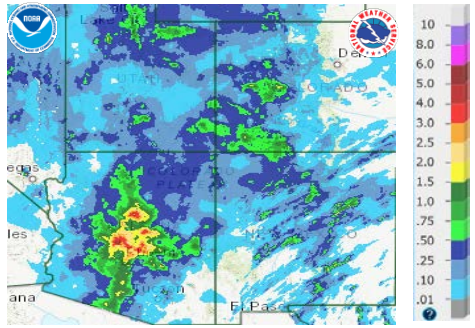


GOES-15 16 km IR



~ 06 UTC 2 October 2018

## 24-h Rainfall ending 12 UTC 3 October 2018



Phoenix – 2.36" for Oct 2
Phoenix – 2.68" for Oct 1-2
Scottdale – 3.31" for Oct 2
Scotsdale – 3.55" for Oct 1-2

*Analysis and discussion by*
*Sheldon Kusselson,*
*CIRA Research Associate*

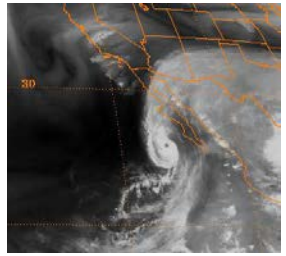
**Commentary: What I found fascinating about this case was the comma-like precipitable water "atmospheric river" of moisture in the 500-300 hPa layer with origins from the tropics and maybe to near the northern edge of Hurricane Sergio. Maximum precipitable water (PW) values there are only 6-7 mm. But along with a similar comma-like moisture at 700-500 hPa layer with max PW value 16 mm, this may have been one reason Phoenix broke their all-time October one-day rainfall record and other stations nearby had up to 6" of rainfall.**

**Bob Henson, Weather Underground, also said,**
**"The remnants of former Hurricane Rosa made their presence felt across far northwest Mexico and the Southwest U.S. on Tuesday, October 2. Phoenix picked up 2.36", which makes Tuesday the wettest October day in the city's 123 years of weather records (beating 2.32" from October 14, 1998). Oct 2 also ranks as the eighth-wettest calendar day on record in Phoenix. Totals of 2" – 3" across the Phoenix metro area led to widespread flash flooding, and there was a CoCoRaHS report of 3.45" just south of Flagstaff. The largest rain total from Rosa's remnants through 3 am EDT Oct 3 was 6.89" at Towers Mountain, Arizona—still well short of the state record for storm totals associated with a tropical cyclone (12.01" from Nora in 1997). See the weather.com article for more on Rosa's impacts. "**

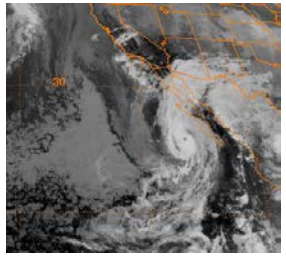
# Comparison Between Hurricane Nora (1997) and Hurricane Rosa Before Affecting Arizona

Nora
~ Sept 16-26, 1997

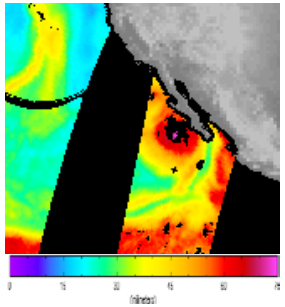
1500 UTC
24 Sep 1997
GOES-9 WV



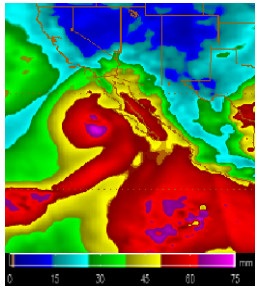
1500 UTC
24 Sep 1997
GOES-9 IR



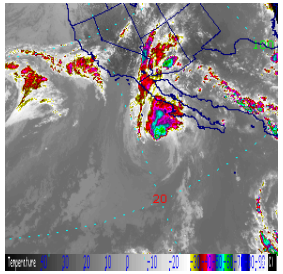
1348 UTC
24 Sep 1997
SSMI F-13



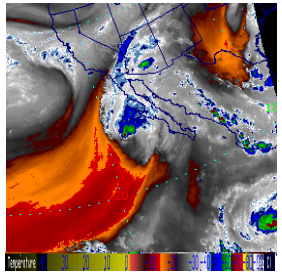
01 UTC 1 Oct 2018
Blended TPW



2330 UTC
30 Sep 2018
GOES-15 IR



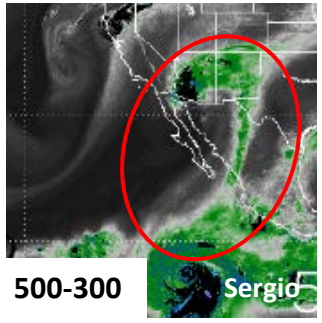
2330 UTC
30 Sep 2018
GOES-15 WV



Rosa
~ Sept 25-Oct 3, 2018

***Some Commentary: Nora in 1997 helped break the Arizona state record for rainfall at 12.01". Rosa only helped produce a maximum rainfall of 6.89", well short of that state record. As can be seen above, both storms had high amounts of total precipitable water two days before affecting Arizona. But it appears Nora had slightly more. So, how can we explain Phoenix, AZ breaking their all time daily record for rainfall. Maybe one reason was the addition of that higher layer (see below) of relative maximum precipitable water with origins from the tropics and maybe even as far south as the northern edge of Hurricane Sergio, which could have gone unnoticed without the CIRA Advected Layered Precipitable Water product.***

**Experimental CIRA Advected Layered Precipitable Water (ALPW) for**
**06 UTC 2 October 2018**




700-500 500-300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