

Winds, ARs, and the Sierra

Using Enhanced DSS Wording For Aviation

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Picture: Joe Justice

Diverting to KRNO? During an AR? Who's idea was this?

- **February 13, 2019**
- **Flight from KSNA to KSEA**
- **Severe Turbulence over the Sierra**
- **Beverage cart launched into the ceiling**
- **5 injuries, 3 had to be taken to the hospital**

<https://twitter.com/JoeJustice0/status/1095792526609371136>



RBossK ✈️🍕☁️ @rbossk757 · Feb 13

Replying to @JoeJustice0 and @Delta

Did the cart go vertical? Trying to figure out how this happened. Glad nobody got seriously hurt



joe justice @JoeJustice0 · Feb 13

It went all the way up to the ceiling, roughly, more than once, as did the flight attendant. You can see the coffee across the ceiling.



1 more reply

14:42



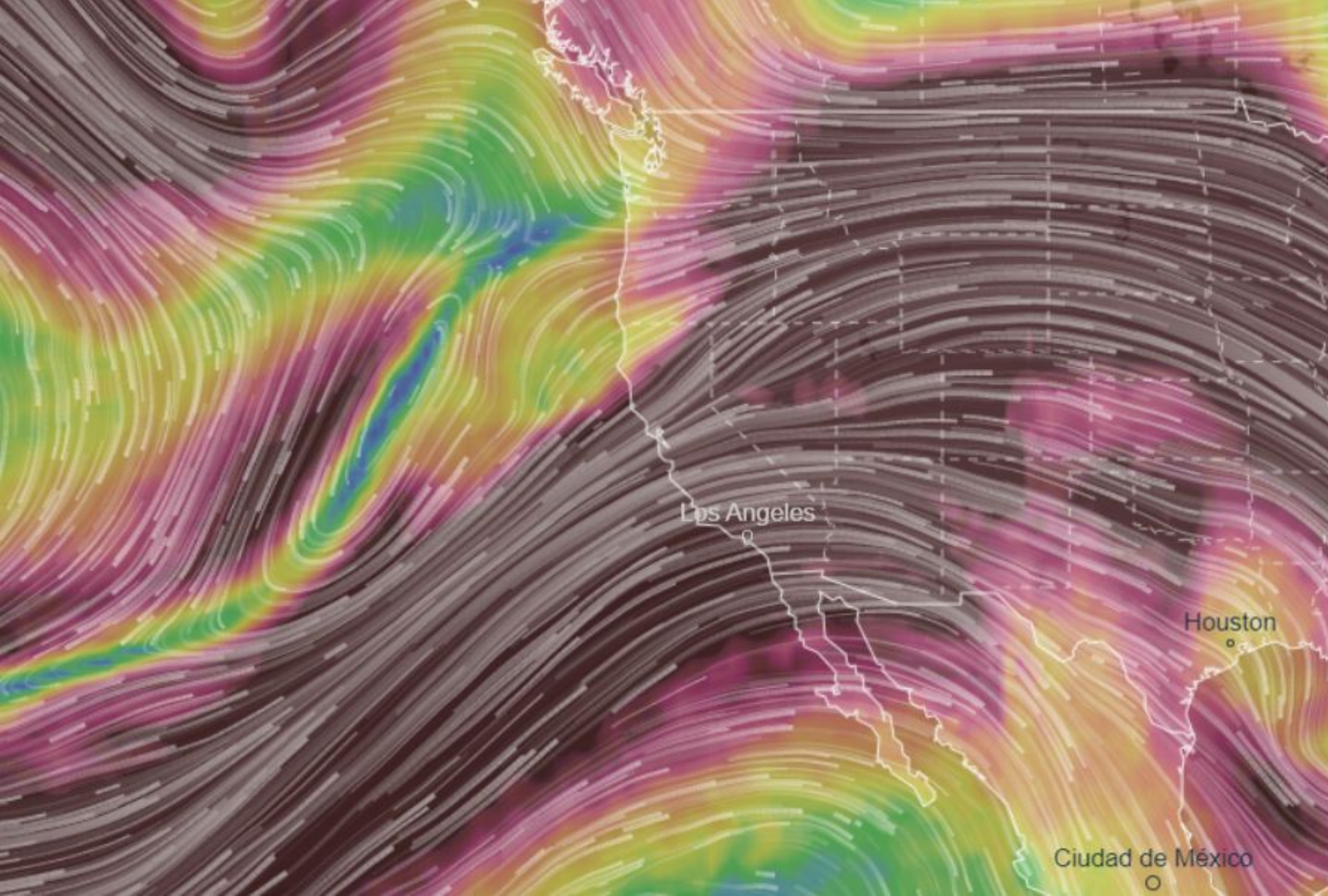
flightradar24

RENO (RNO)



DL5763





mph

90

80

70

60

50

45

40

35

30

25

20

15

10

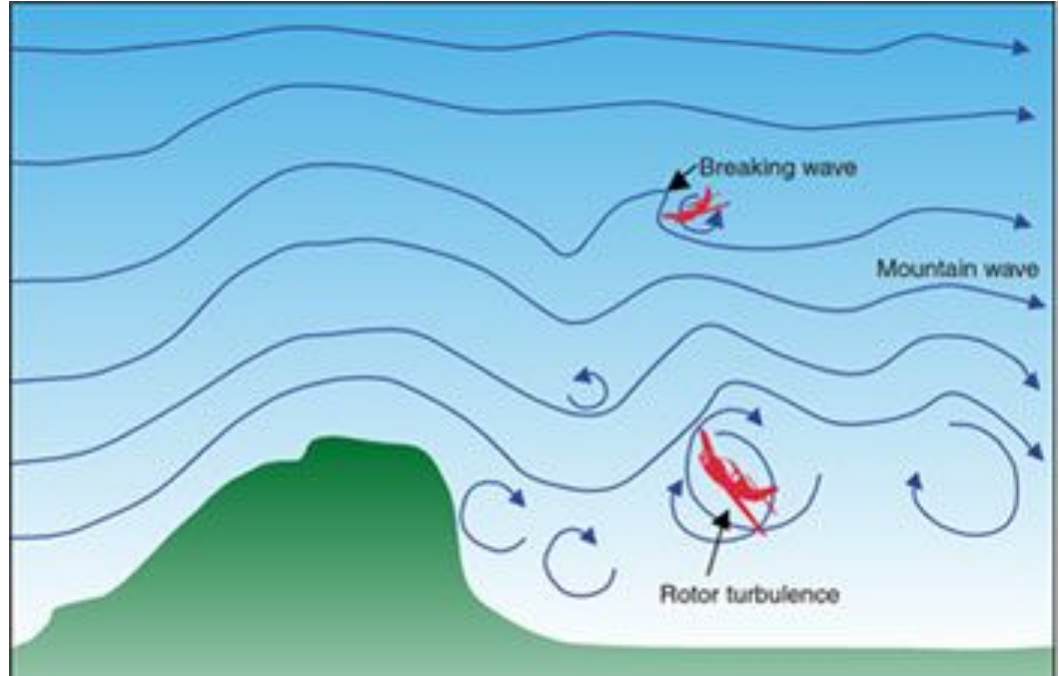
5

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<https://www.ventusky.com/?p=45.1;-140.7;3&l=wind-300hpa&t=20190213/2100>

Atmospheric Rivers - Winds Perpendicular to Sierra

- Mountain Waves
- Turbulence
- Potential for strong winds and LLWS at the surface



Winds 100+ MPH...Hold on!



- 100+ mph gusts across the Sierra are fairly common during winter storms, especially ARs
- This particular event, gusts were around 130 mph
- [Inaugural CA wind speed record](#) set 2 years earlier during an AR - 199 mph, Ward Peak 8643'. February 20 2017 at approximately 11 pm.

How Often Do ARs Produce Significant Winds?

Study done by Jim Wallmann at WFO Reno

- Identified “significant” and “extreme” events based on the following criteria
 - 25% or more locations with wind gusts > 50 mph
 - 5 or more reports of gusts > 70 mph (4 before 2005)
 - 3 or more reports of wind damage
- Significant events, 1 of 3
- Extreme events, all 3



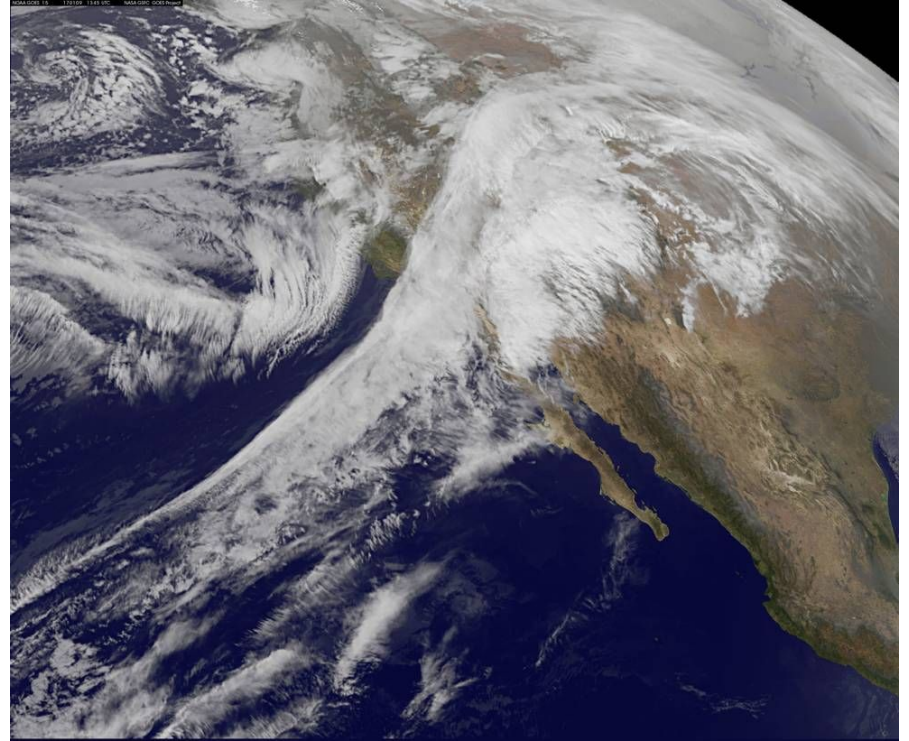
~86% of cases were AR related!

52 significant events - 45 associated with an AR

14 extreme events - 12 associated with an AR



Trucks “napping” on side of the Highway





Plethora of Aviation Impacts -- How do we Message?

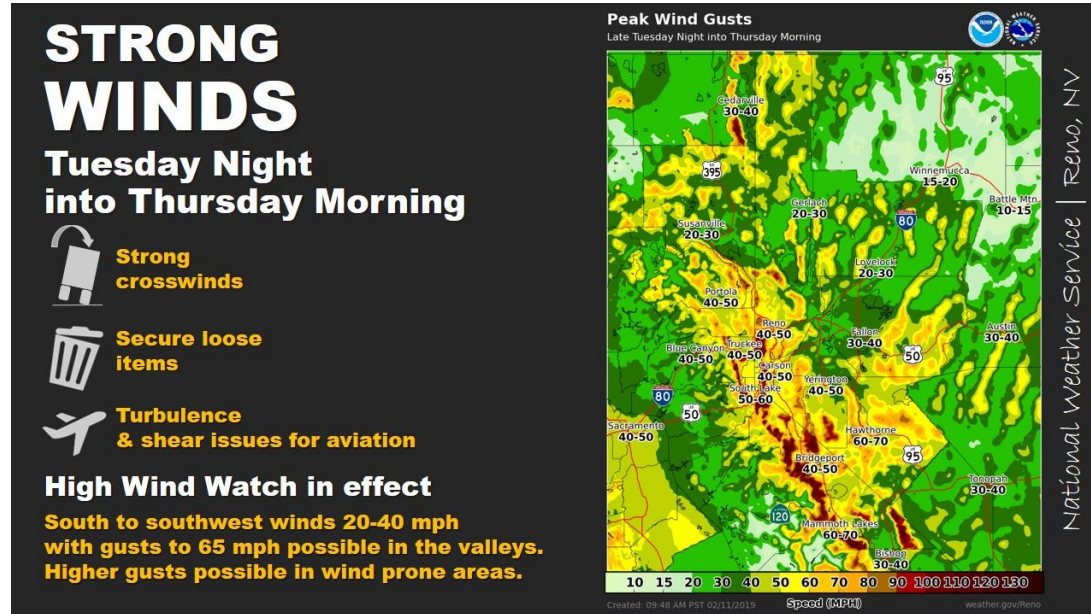
Get your message out in as many ways possible!

AvnAFD

Partner messaging

Aviation Graphics

Remember that CWSUs will often share/retweet





Major Storm to affect the Sierra & Western NV

Wednesday February 13 - Friday February 16, 2019

All Areas

- Delays/cancellations possible for all regional airports
- Urban flooding and small stream rises - clear snow covered drains/gutters
- Dry, cold snowpack will hold a lot of new water before runoff occurs
- Rises on terminal lakes. Minimal main river flooding

Mountains & Foothills

- Strong damaging winds with ridgetop wind gusts 85-150+ mph & gusts 50-70+ mph possible for areas below 7000 ft
- Do not travel within the Sierra if possible
- Heavy wet snow above 7000-8000 ft
- Heavy rain with periods of snow below 7000 ft
- Heavy snow possible Friday-Saturday

Valleys

- Strong damaging winds with gusts 50-70 mph possible
- Hazardous travel for high profile vehicles
- Small stream flooding. Ponding water likely
- Light snow possible early Wed before a transition to heavy rainfall
- Snow possible Friday-Saturday

Extreme Winds/Severe Turbulence - Clues

- **Strong Jet Perpendicular to the Sierra**
- **Anticyclonic exit region of a jet streak** - severe turbulence likely
- **Wind speeds accelerated over the Sierra** as flow is constricted - turbulence and mountain wave activity.
- **Start of AR events** - Winds tend not to mix down to valleys initially, creating areas of low level wind shear.
- Surfacing winds - **downslope wind storms** possible, severe low level turbulence in addition to the turbulence aloft, and rotor activity.
 - Typically we'll see these winds during the shadowed phase of an AR, with wind speeds weakening during the spillover phase.

Don't Be Afraid to Use Strong Language

The wind in western Nevada could cause extensive delays to air traffic and periods of downright dangerous flying conditions with extreme turbulence, very strong low level wind shear, and unpredictable near-surface rotors. A High Wind Warning is in effect Wednesday and Thursday. Ridge top winds in excess of 130+ knots are likely with the jet stream over the Sierra strengthening to 180+ knots as the polar and subtropical jets collide over the region. This is a particularly dangerous situation for aviation in the lee of the Sierra over the next few days.

Snippet from NWS Reno midnight AFD
leading into the day this event happened.



Any Questions?

