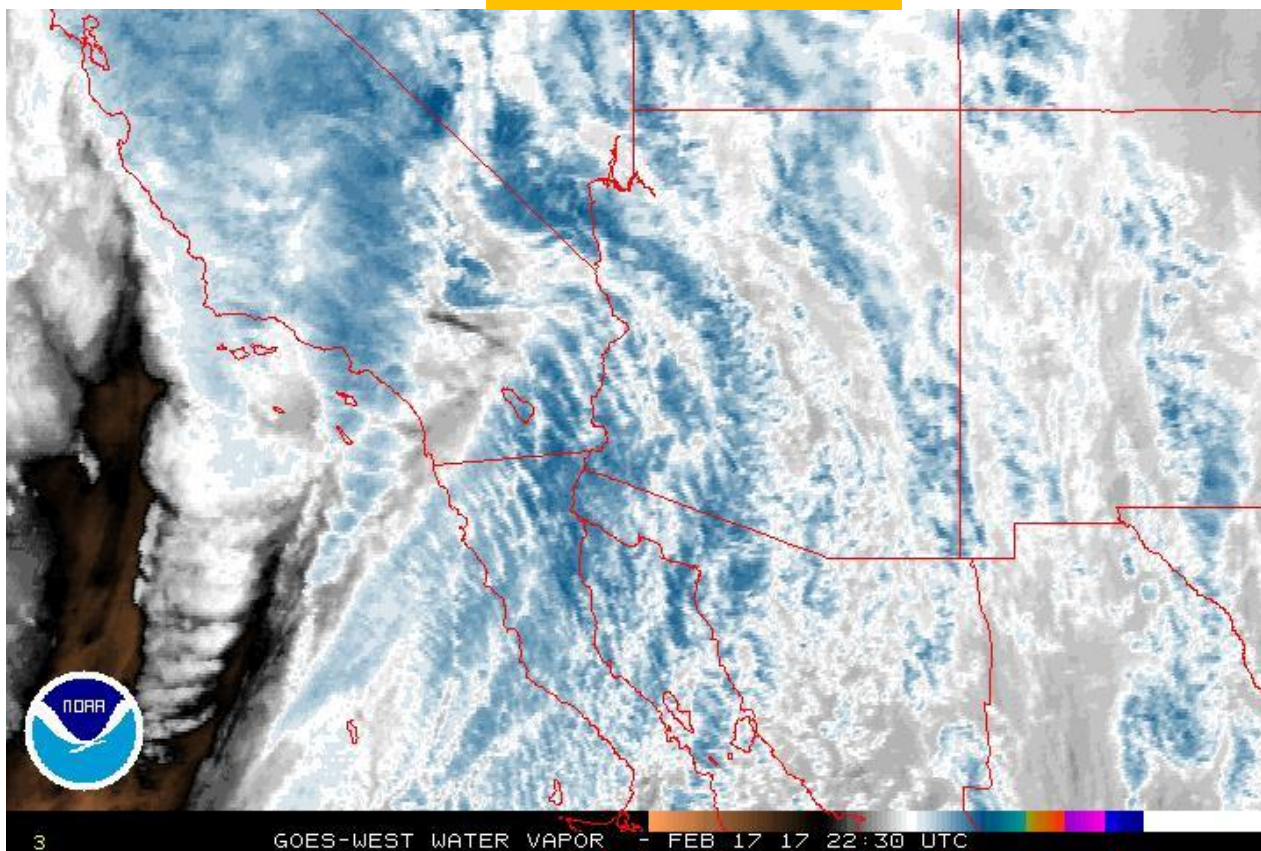
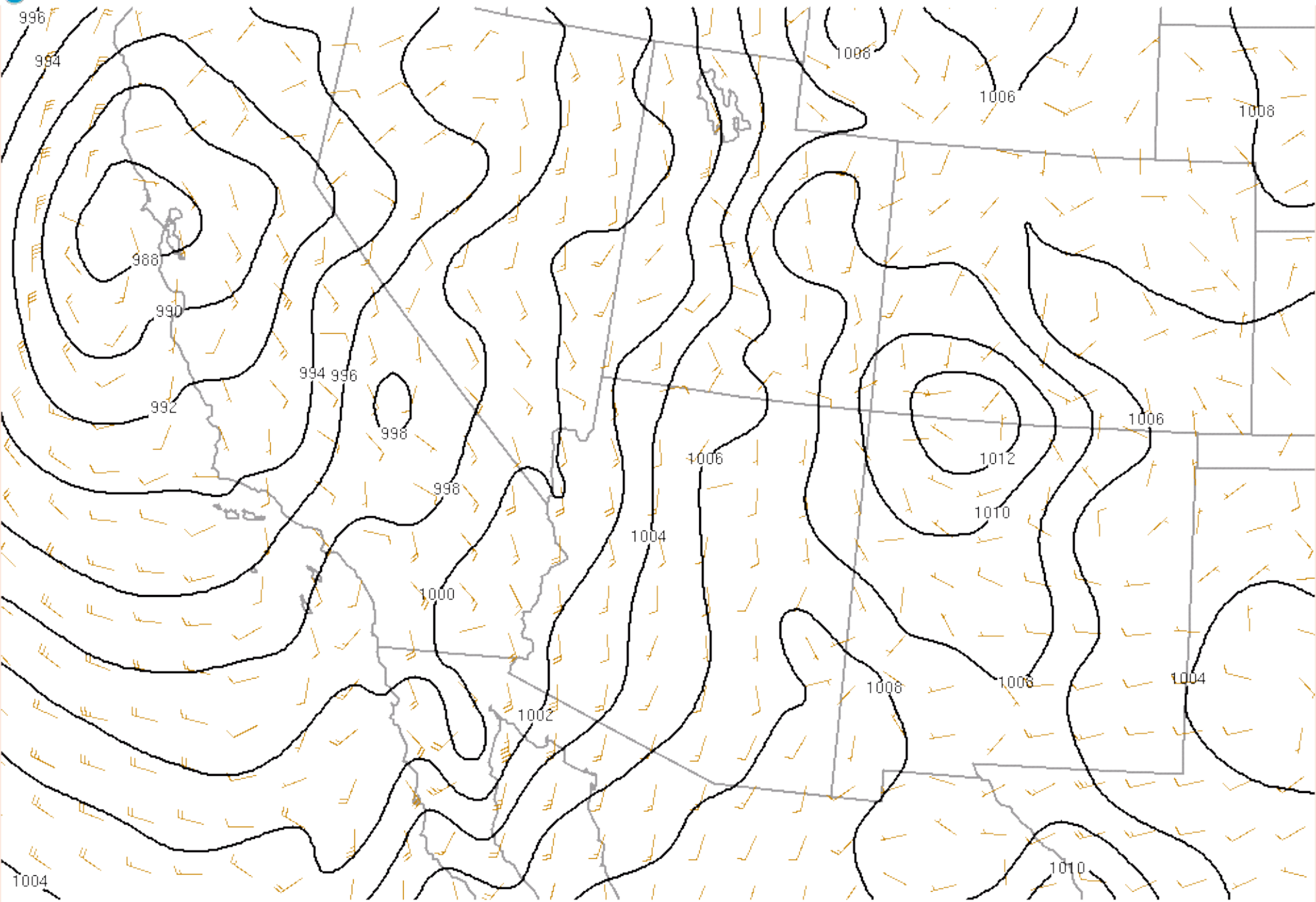


# Using **M-climate and R-climate** for long range forecasting confidence in high impact

February 17, 2017

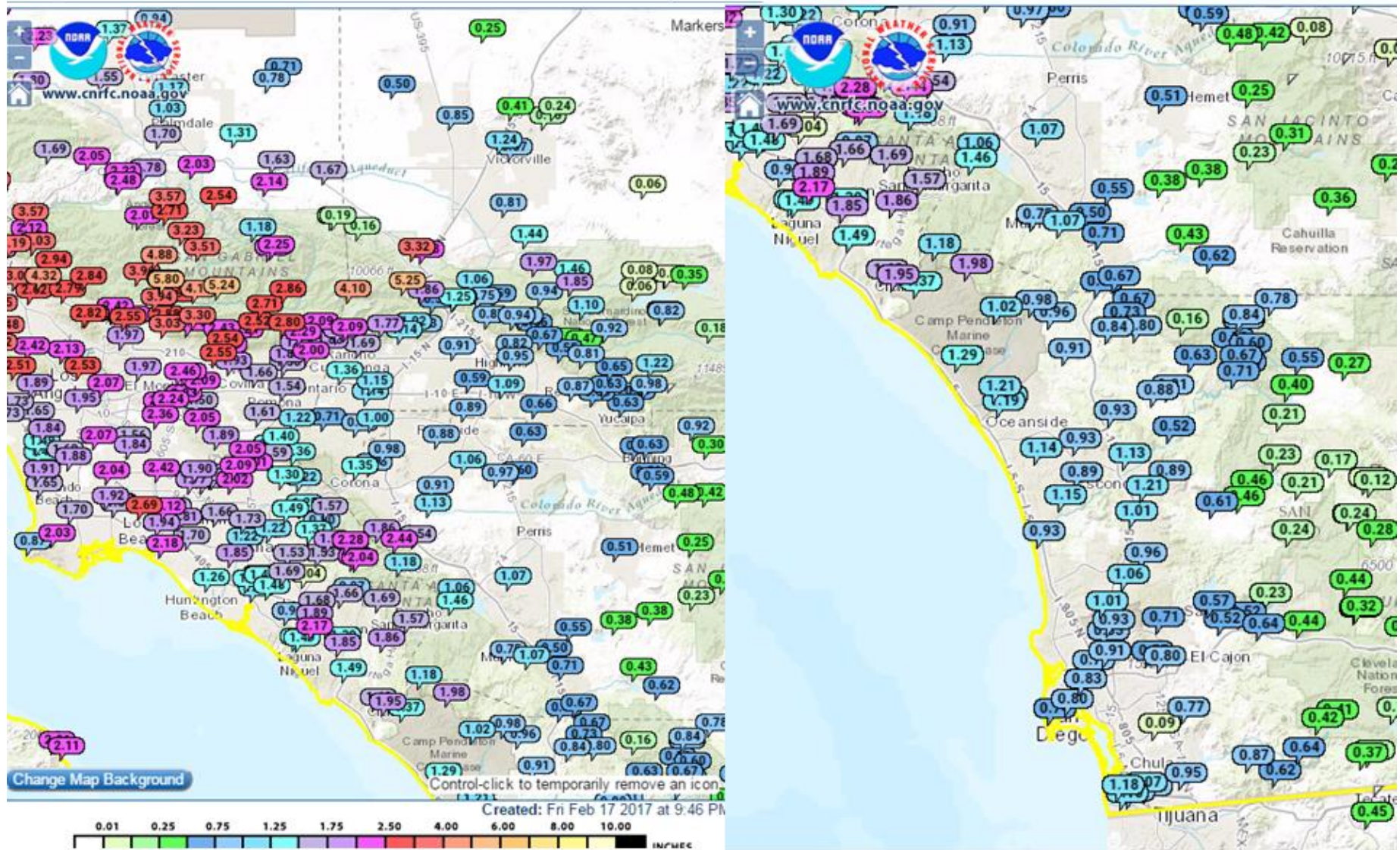


Alex Tardy – NWS San Diego

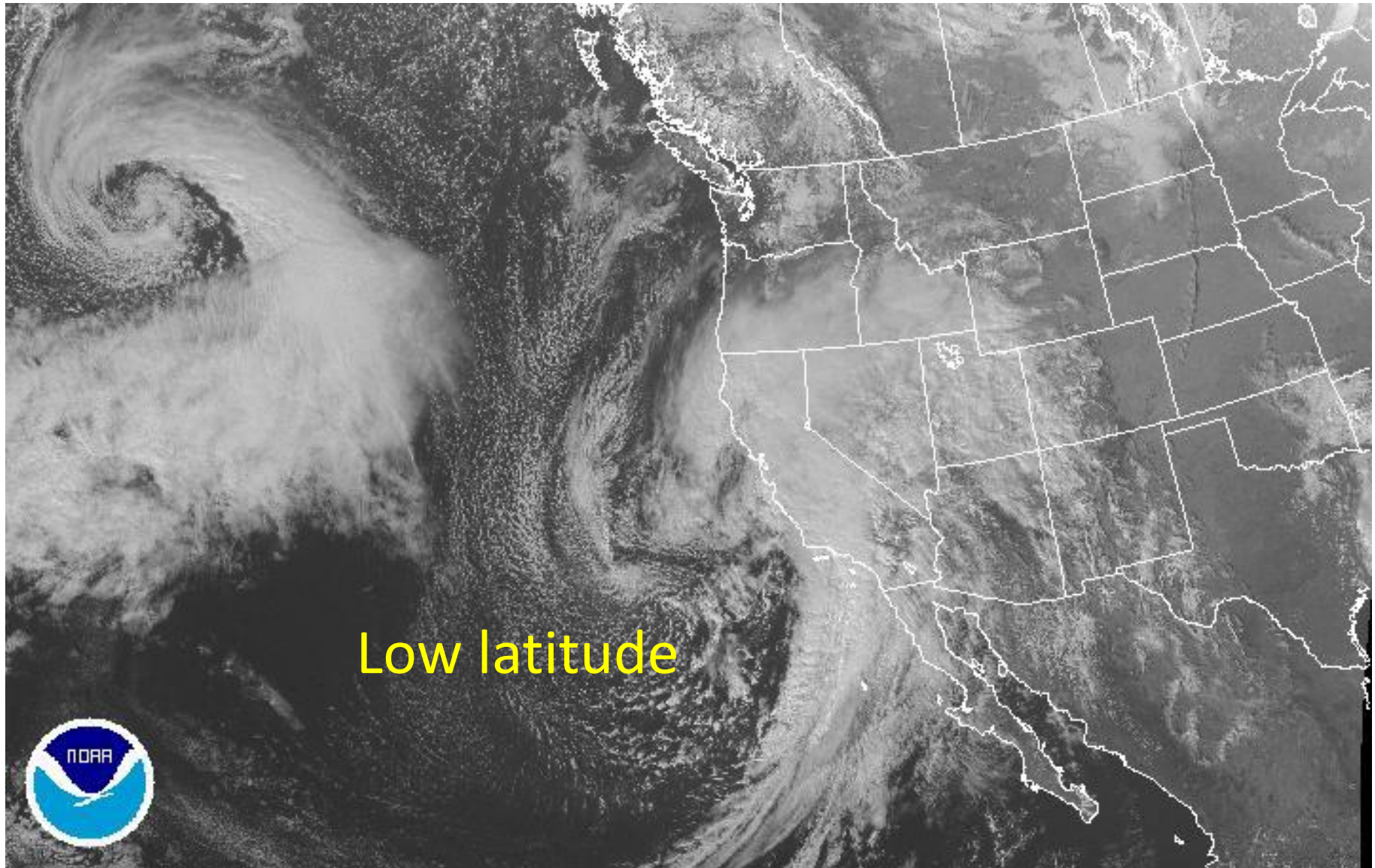


170218/0300 MSL Pressure and surface wind

# Today's Precipitation February 17, 2017



# Intense Pacific Storm February 17-18, 2017



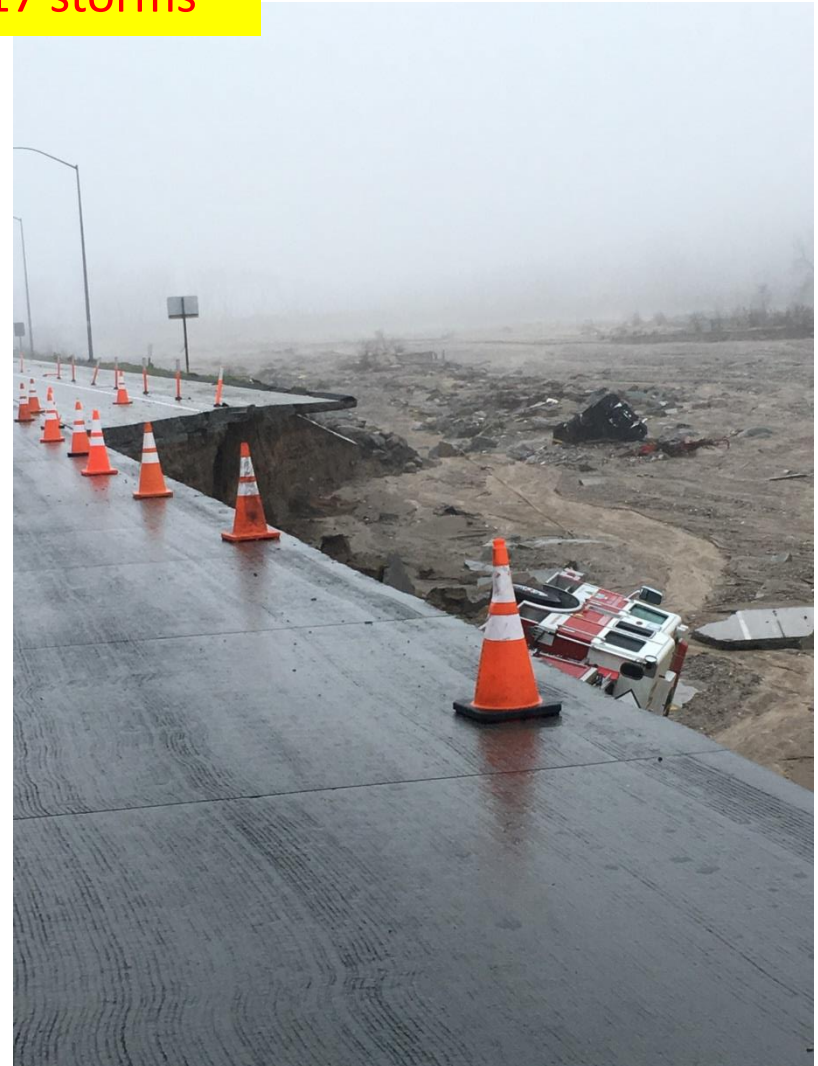
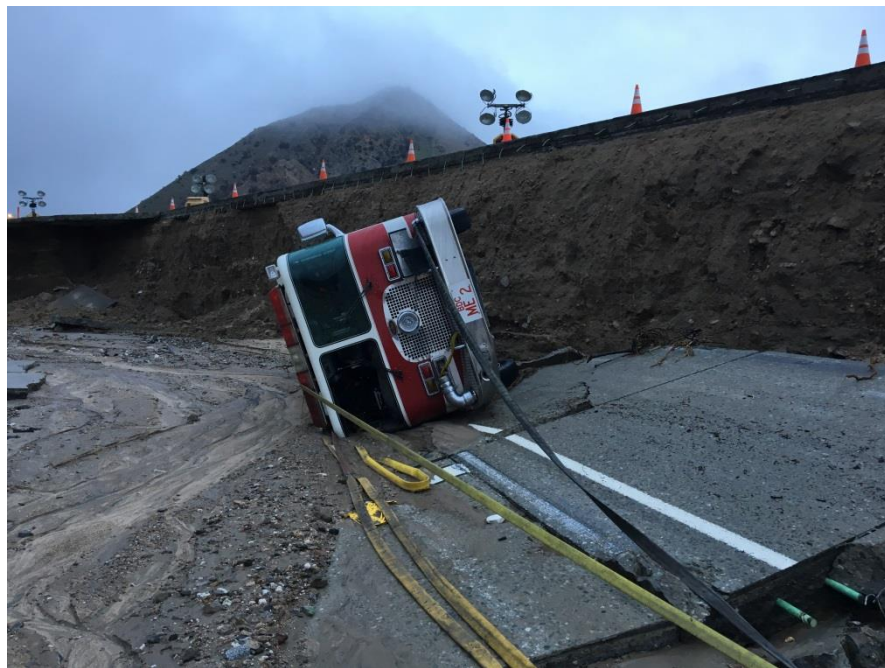
Low latitude



# Caltrans incident on the I-15 Cajon Pass near highway 138

February 17, 2017 storms

Caltrans Photos



4 inches rain in 12 hours  
7000 CFS in Cajon Creek

# NBC7 photos - highway 163 incident

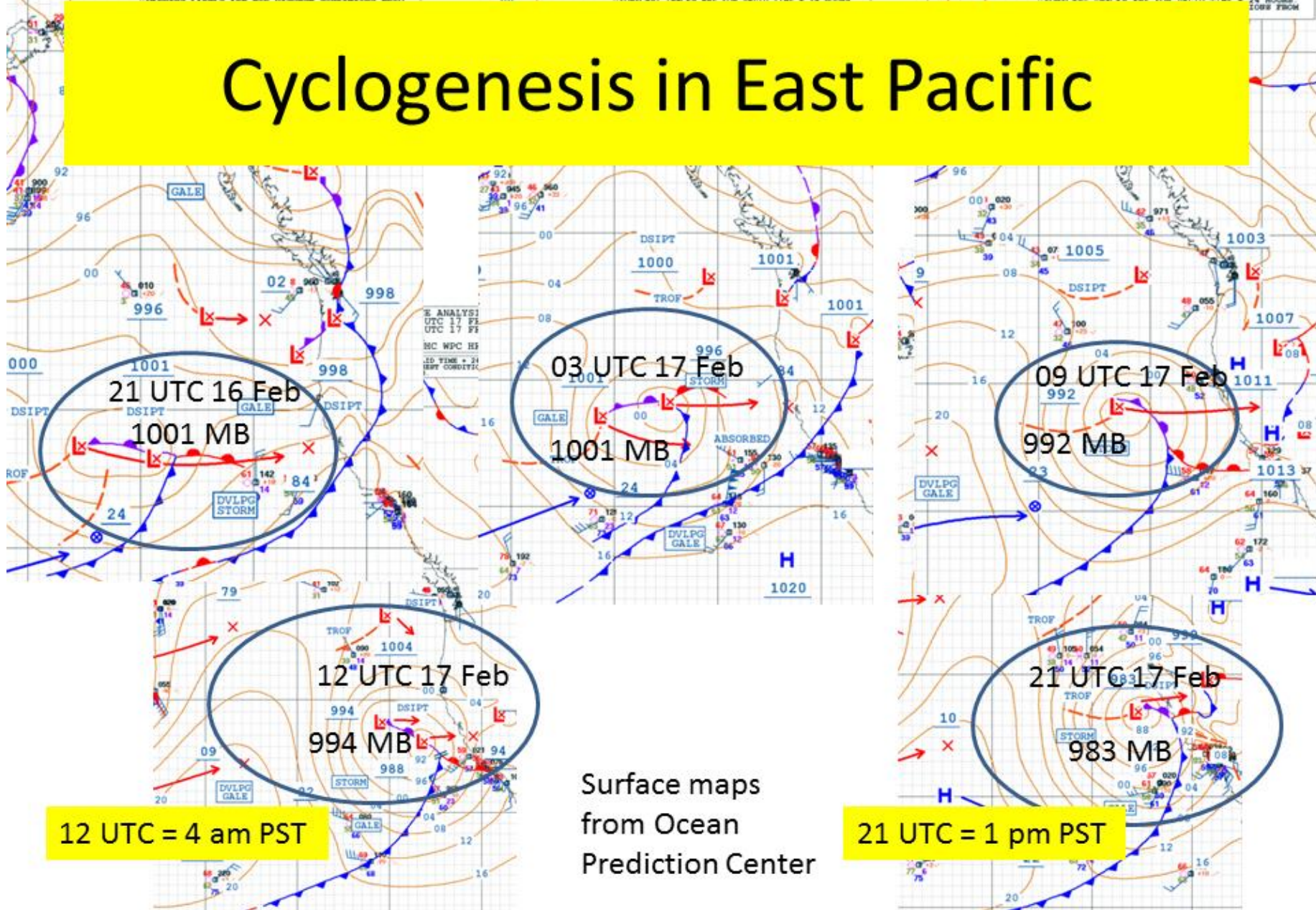


# Cyclogenesis in East Pacific

PACIFIC SURFACE ANALYSIS  
 ISSUED: 21:09 UTC 16 FEB 2017  
 VALID: 18:00 UTC 16 FEB 2017  
 FCSTR: HOLLEY  
 SOURCES: OPC NHC WPC HFO  
 FORECAST TRACKS ARE FOR VALID TIME + 24 HOURS

PACIFIC SURFACE ANALYSIS  
 ISSUED: 02:50 UTC 17 FEB 2017  
 VALID: 00:00 UTC 17 FEB 2017  
 FCSTR: SOMMERVILLE  
 SOURCES: OPC NHC WPC HFO  
 FORECAST TRACKS ARE FOR VALID TIME + 24 HOURS

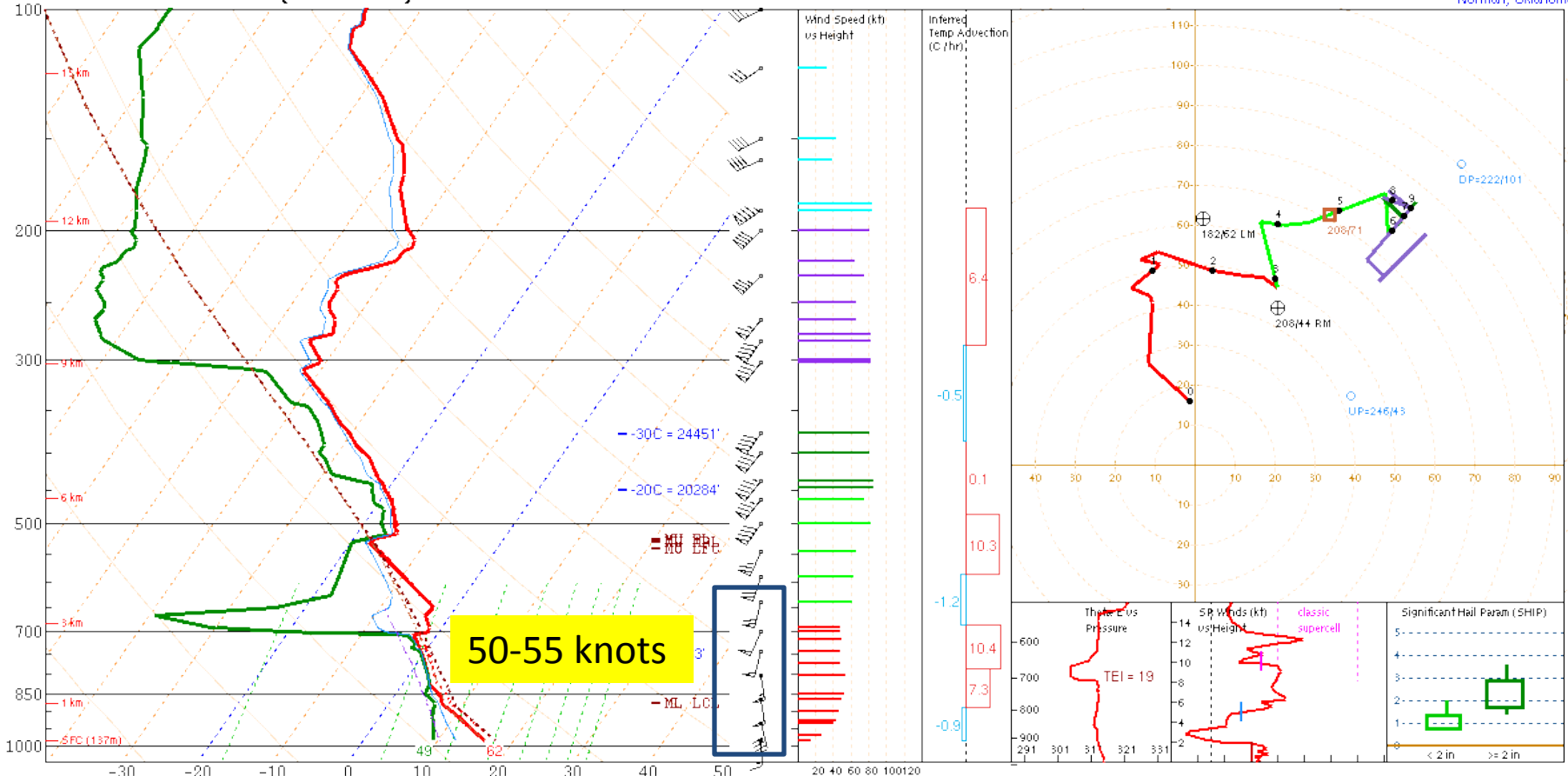
PACIFIC SURFACE ANALYSIS  
 ISSUED: 09:00 UTC 17 FEB 2017  
 VALID: 06:00 UTC 17 FEB 2017  
 FCSTR: SOMMERVILLE  
 SOURCES: OPC NHC WPC HFO  
 FORECAST TRACKS ARE FOR VALID TIME + 24 HOURS



# San Diego weather balloon

NOAA/NWS Storm Prediction Center  
Norman, Oklahoma

NKX 170218/0000 (Observed)



50-55 knots

PARCEL	CAPE	CINH	LCL	LI	LFC	EL
SURFACE	36	-6	883m	5	977m	9159'
MIXED LAYER	17	-1	1001m	5	1288m	9159'
FCST SURFACE	85	-64	1259m	4	4740m	16607'
MU (983 mb)	47	-117	908m	5	4811m	16513'

PW = 0.86 in	3CAPE = 17 J/kg	WBZ = 7328'	WINDG = 0.0
K = 7	DCAPE = 361 J/kg	FZL = 7383'	ESP = 0.0
MidRH = 47%	DownT = 51 F	ConvT = 63F	MMP = 0.93
LowRH = 80%	MeanW = 7.3 g/kg	MaxT = 66F	NCAPE = 0.21
SigSevere = 591 m3/s3			

Sfc-3km Agl Lapse Rate = 6.6 C/km	<b>Supercell = 0.0</b>
3-6km Agl Lapse Rate = 5.5 C/km	<b>Left Supercell = 0.0</b>
850-500mb Lapse Rate = 5.4 C/km	<b>STP (eff layer) = 0.0</b>
700-500mb Lapse Rate = 5.5 C/km	<b>STP (fix layer) = 0.1</b>
	<b>Sig Hail = 0.0</b>

SRH(m2/s2)	Shear(kt)	MnWind	SRW
SFC - 1 km	324	34	163/58
SFC - 3 km	410	38	176/43
SFC - 6 km	66	188/49	124/16
SFC - 8 km	71	193/51	135/14
LCL - EL (Cloud Layer)	34	179/49	114/25

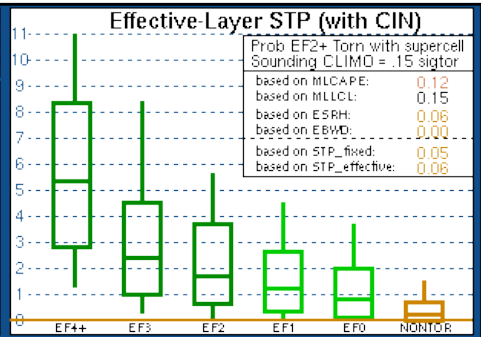
BRN Shear = 87 m/s²
4-6km SR Wind = 211/27 kt
..... Storm Motion Vectors.....
Bunkers Right = 208/44 kt
Bunkers Left = 182/62 kt
Corfidi Downshear = 222/101 kt
Corfidi Upshear = 246/43 kt

\*\*\* BEST GUESS PRECIP TYPE \*\*\*

**Rain.**  
Based on sfc temperature of 61.9 F.

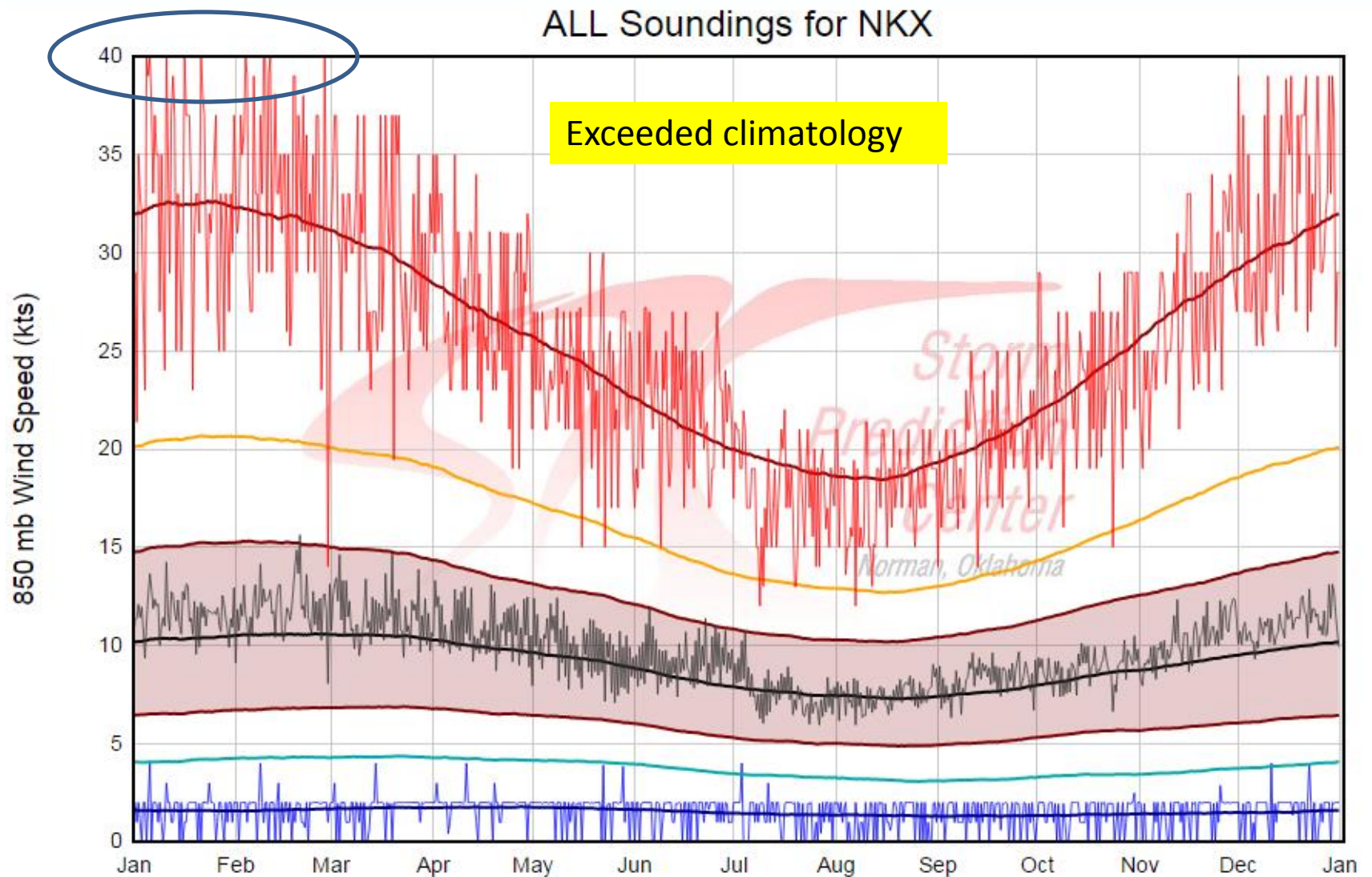
**SARS - Sounding Analogs**

SUPERCCELL	SGFNT HAIL
No Quality Matches	No Quality Matches





# 850 mb wind climatology

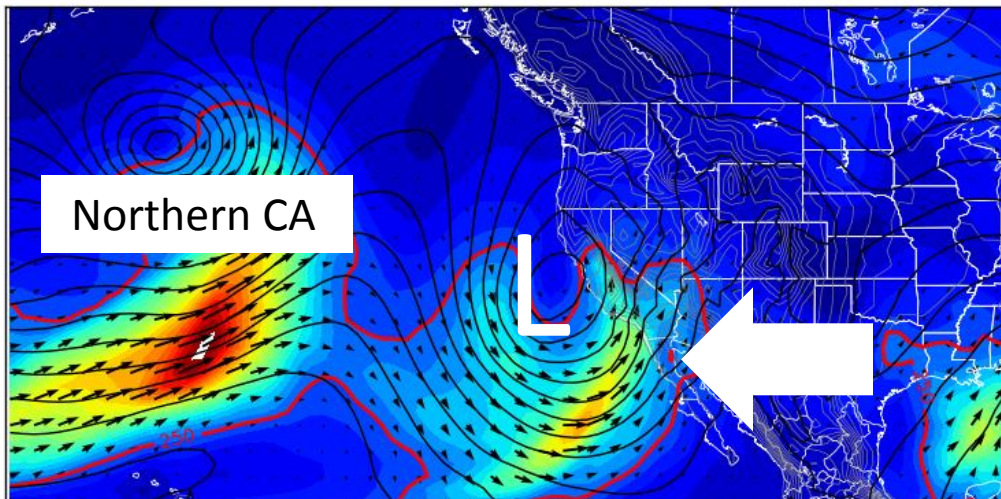


# 72-h forecast near record deep low pressure

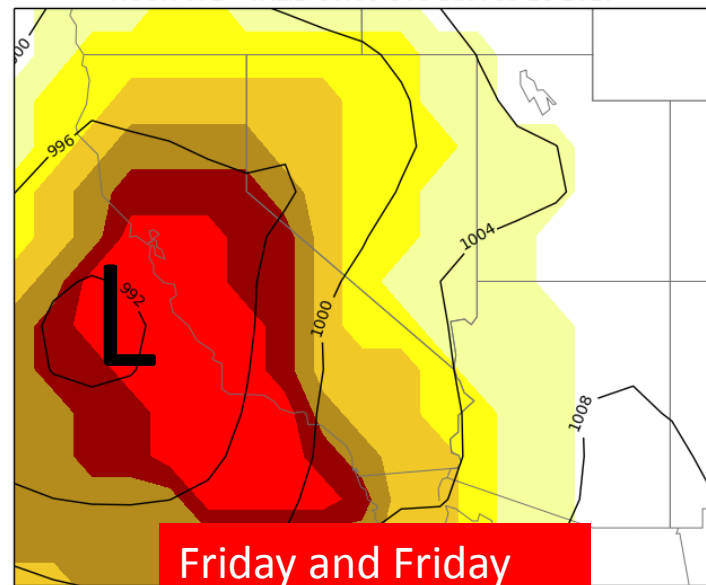
This means unusually strong winds and heavy rain possible

Moisture focused on the immediate coastline

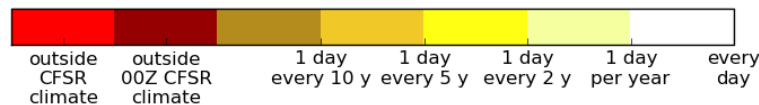
Integrated Water Vapor Transport ( $\text{kg m}^{-1} \text{s}^{-1}$ )  
72-h forecast valid 00:00 UTC Sat 18 Feb 2017



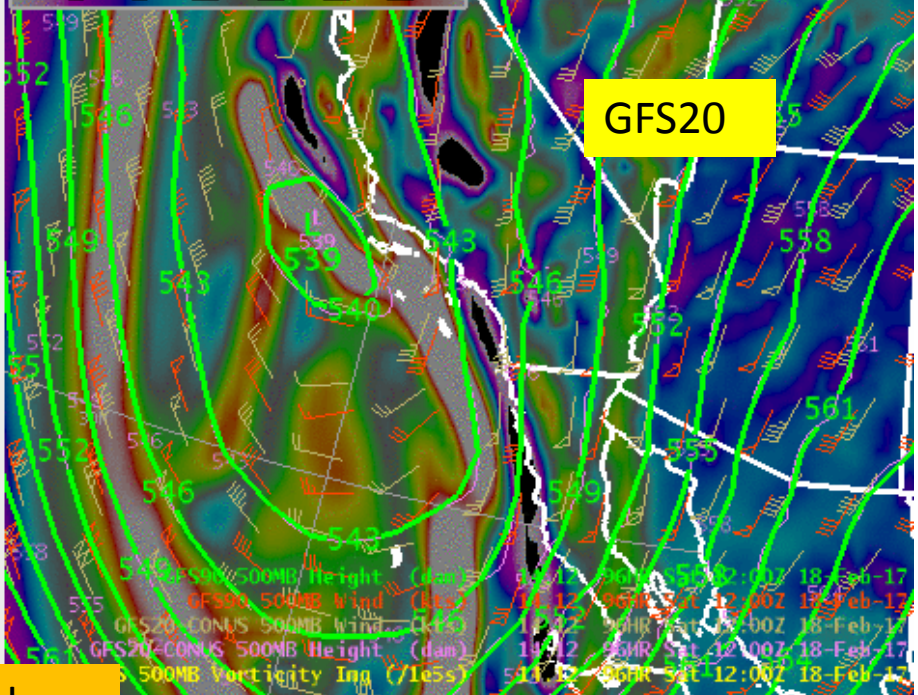
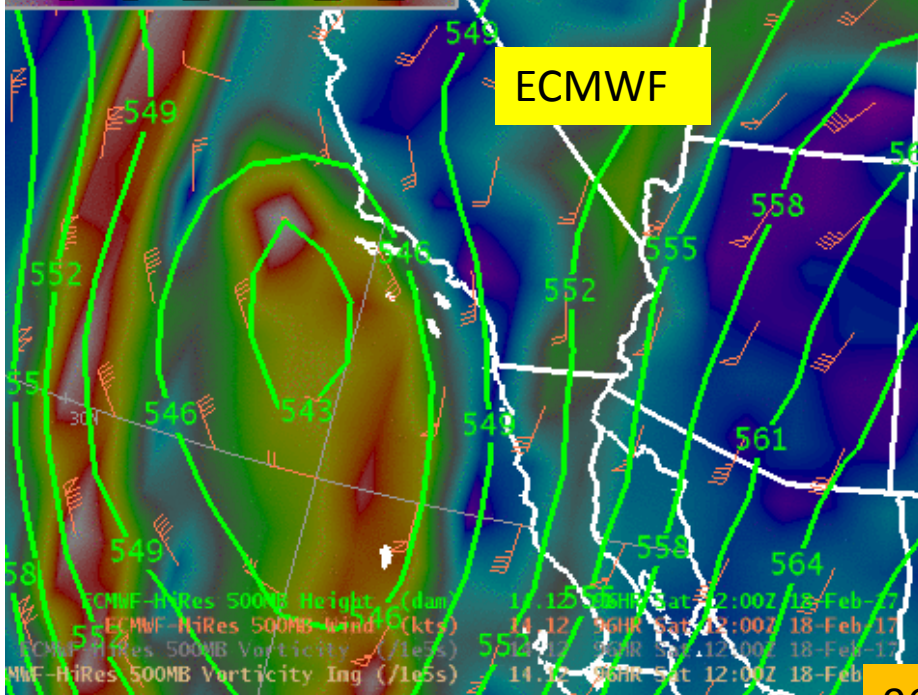
NAEFS Mean MSLP (hPa) and Return Interval  
HOUR 072 - VALID 00:00 UTC Sat Feb 18 2017



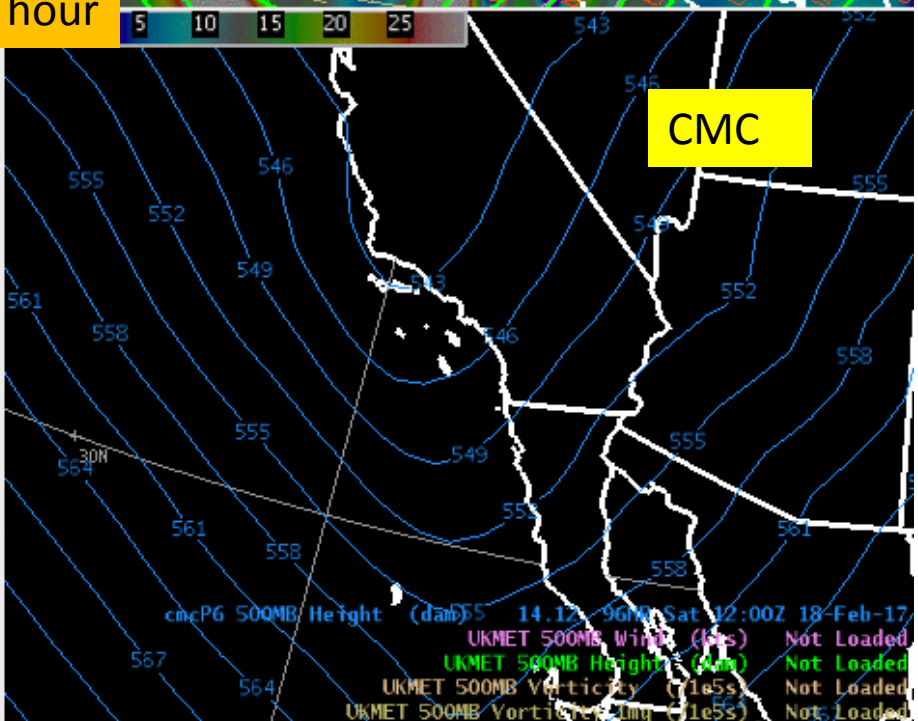
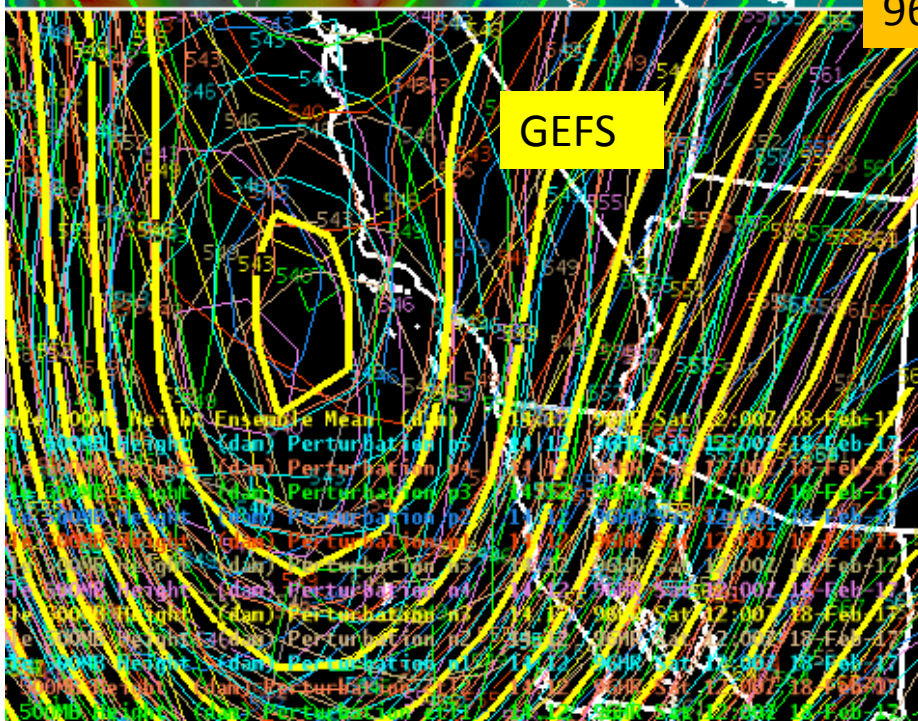
Approximate frequency of occurrence in the  
07-Feb to 28-Feb CFSR climatology (1979-2009)



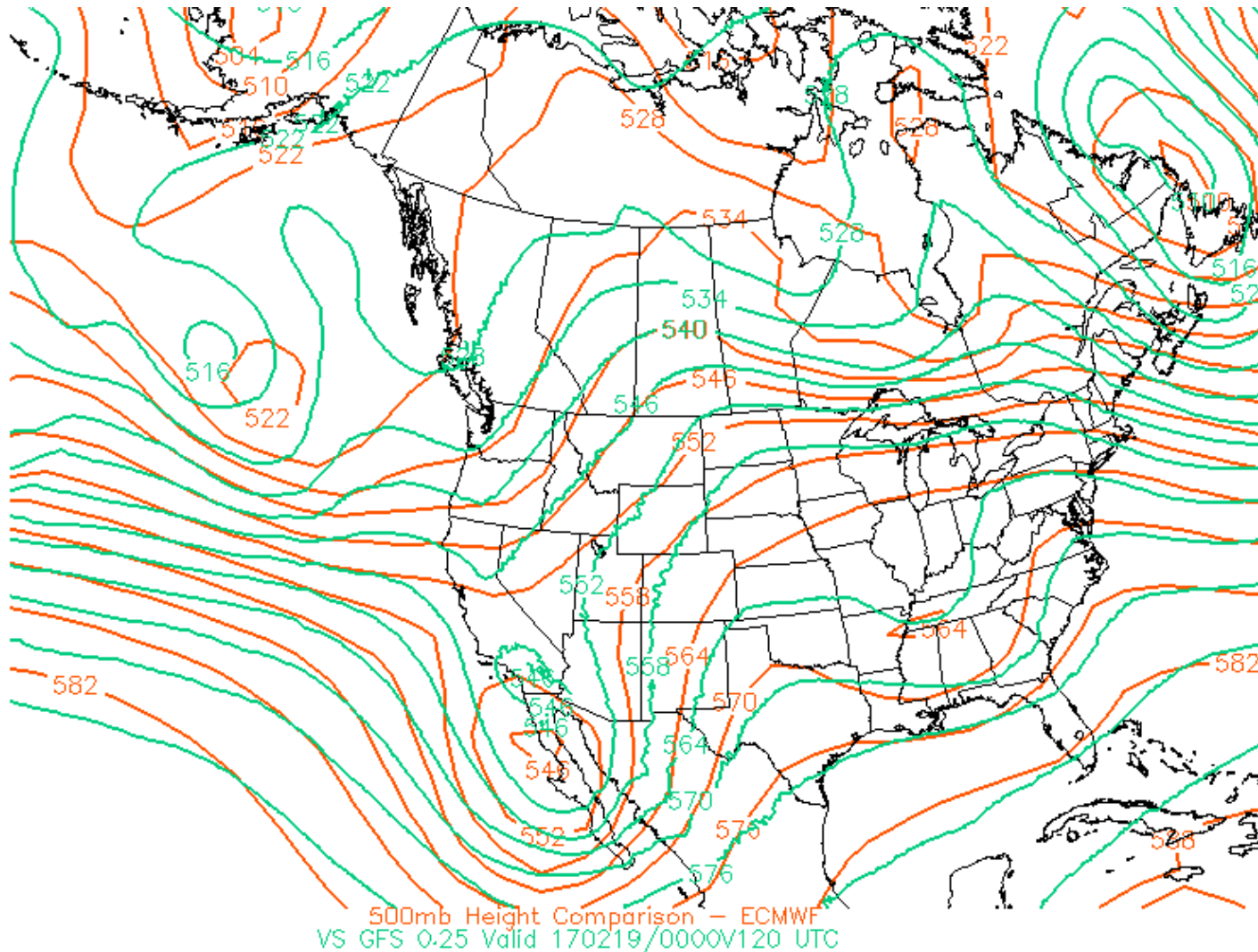
Pressure Exceeds Climatology



96 hour

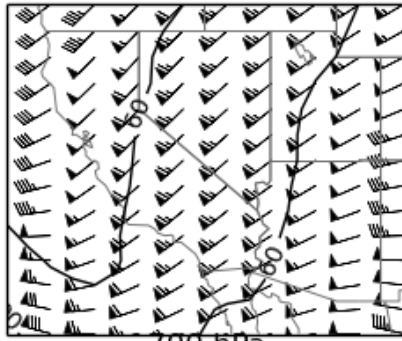


# 120 H GFS and ECMWF

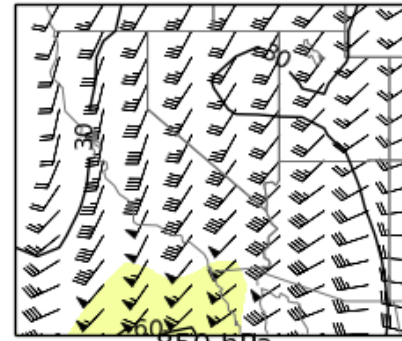


NAEFS Mean Wind Speed (kt) and Standardized Anomaly  
HOUR 084 - VALID 00:00 UTC Sat Feb 18 2017

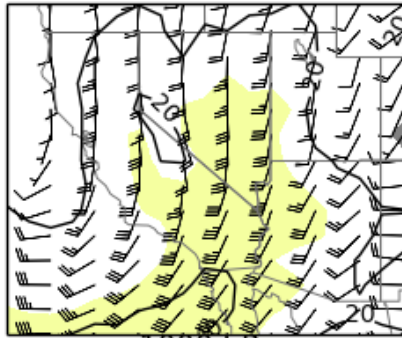
200 hPa



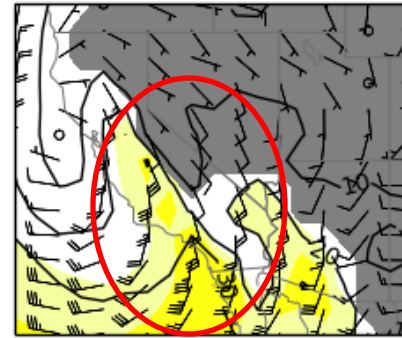
500 hPa



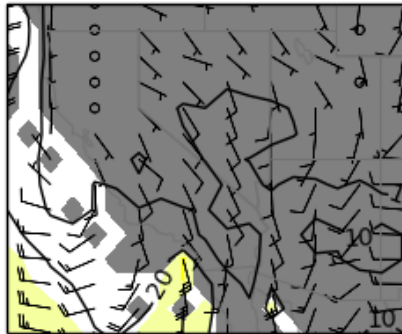
700 hPa



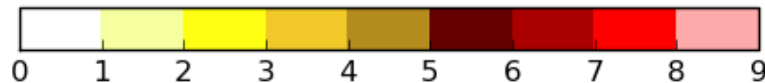
850 hPa



1000 hPa

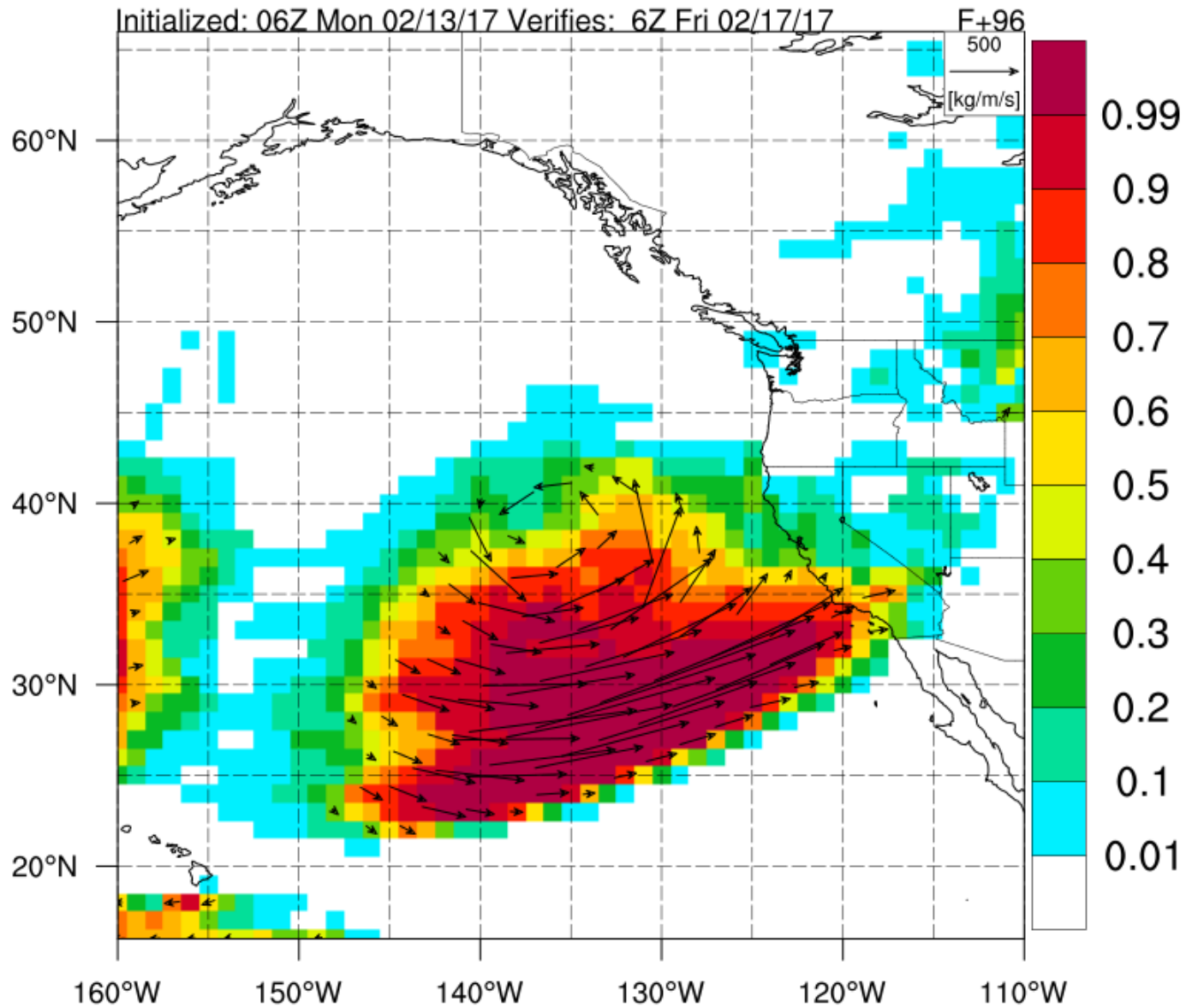


84h wind speed  
anomaly on NAEFS



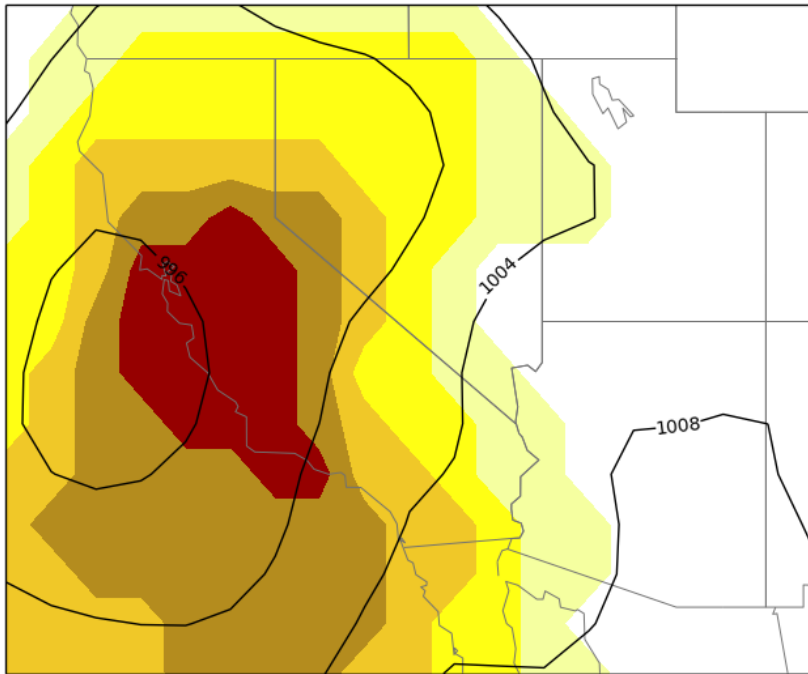
# NCEP GFS IVT Probability >250 kg/m/s

96-h forecast of AR conditions

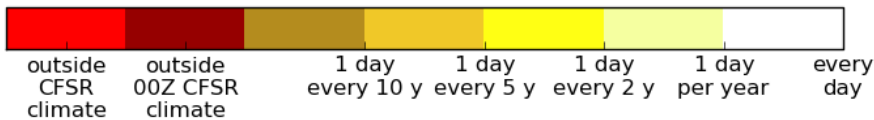


# R-climate and M-climate MSLP return intervals at 84-h

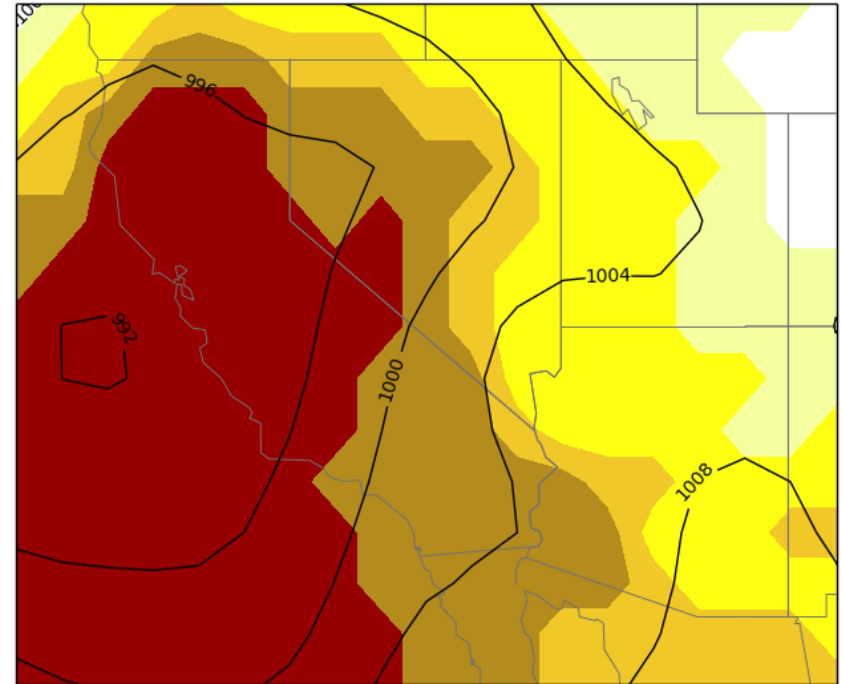
NAEFS Mean MSLP (hPa) and Return Interval  
HOUR 084 - VALID 00:00 UTC Sat Feb 18 2017



Approximate frequency of occurrence in the  
07-Feb to 28-Feb CFSR climatology (1979-2009)



GEFS Mean MSLP (hPa) and M-Climate Return Interval  
HOUR 084 - VALID 00:00 UTC Sat Feb 18 2017

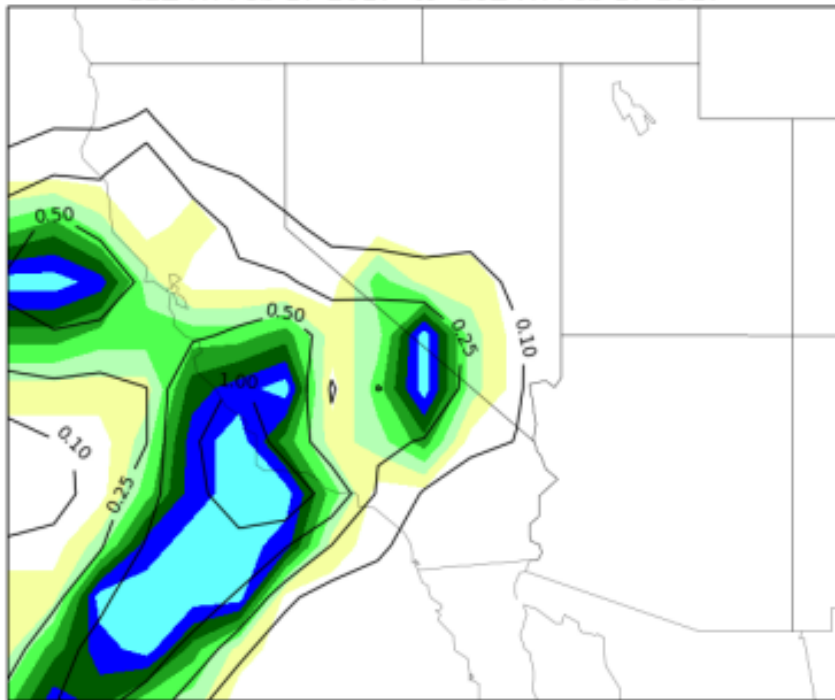


Approximate frequency of occurrence in  
07-Feb to 28-Feb, 84-h GEFS reforecasts (1985-2012):

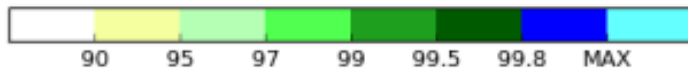


# GEFS model QPF compared to past model forecasts

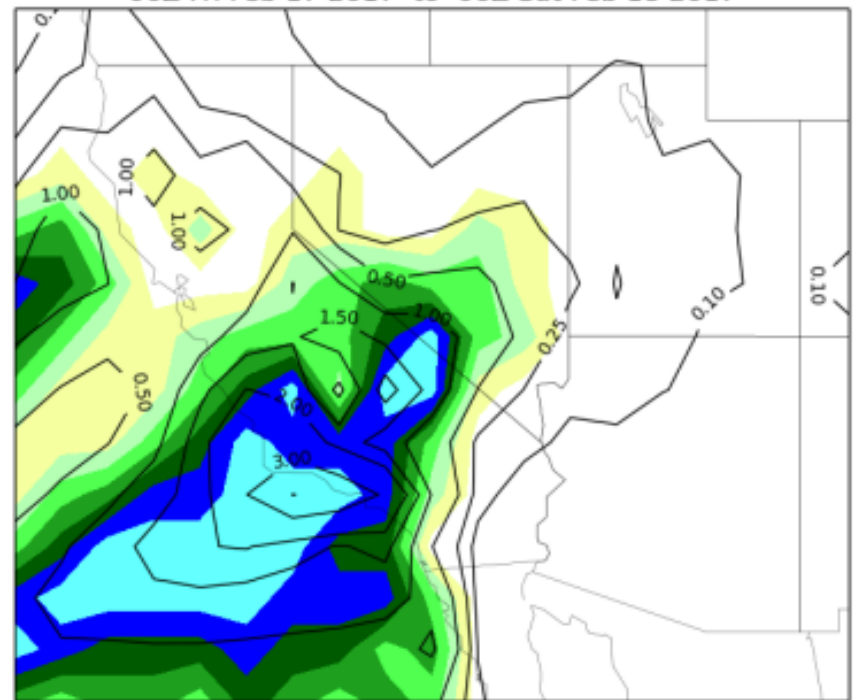
GEFS Mean QPF (in) and M-Climat percentile  
24-30-h forecast valid  
12Z Fri Feb 17 2017 to 18Z Fri Feb 17 2017



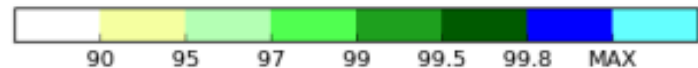
relative to GEFS reforecasts initialized  
02-Jan to 02-Apr (1985-2012)



GEFS Mean QPF (in) and M-Climat percentile  
18-42-h forecast valid  
06Z Fri Feb 17 2017 to 06Z Sat Feb 18 2017



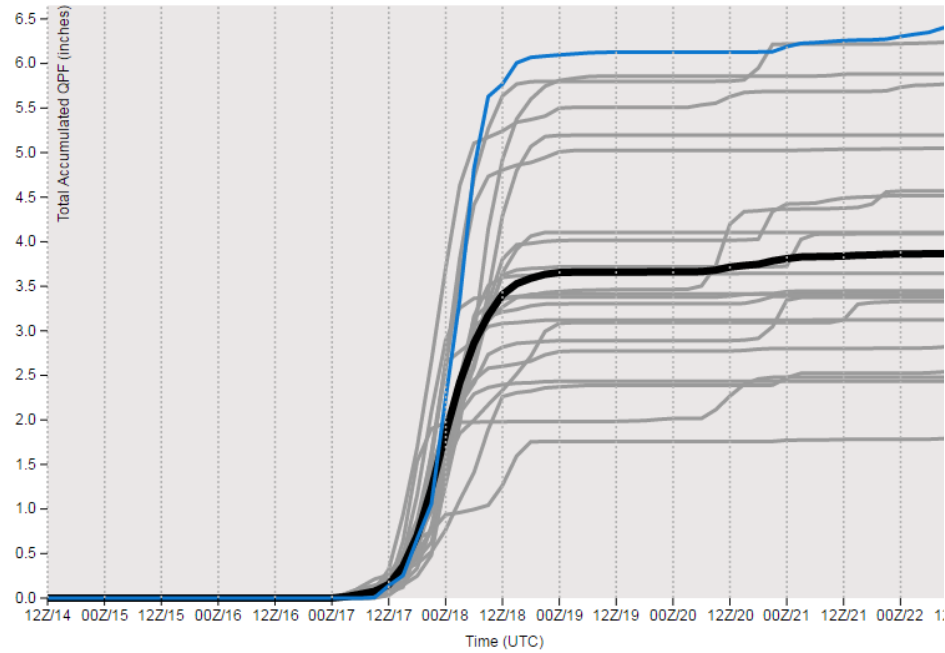
relative to GEFS reforecasts initialized  
02-Jan to 02-Apr (1985-2012)



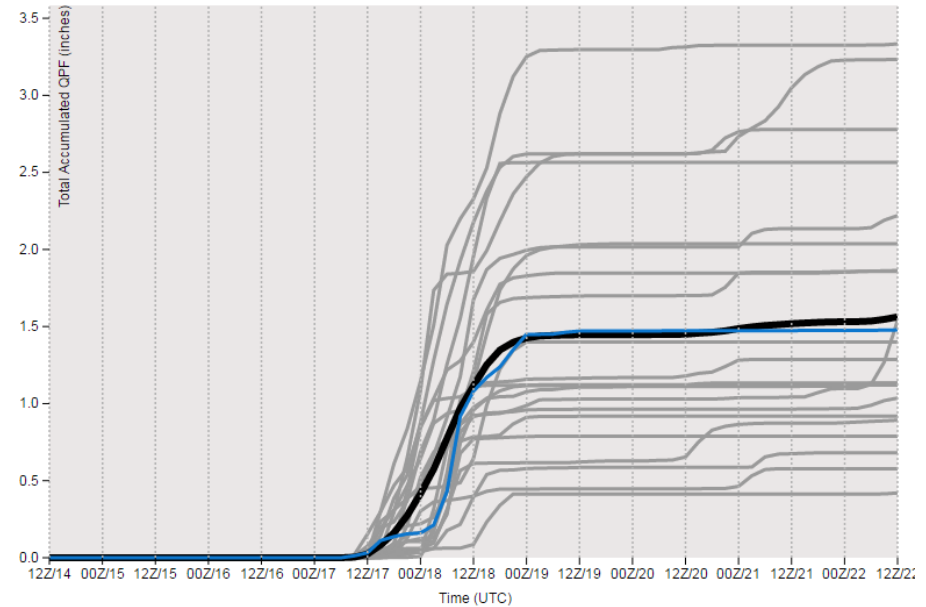


# LAX and SAN plume on GEFS

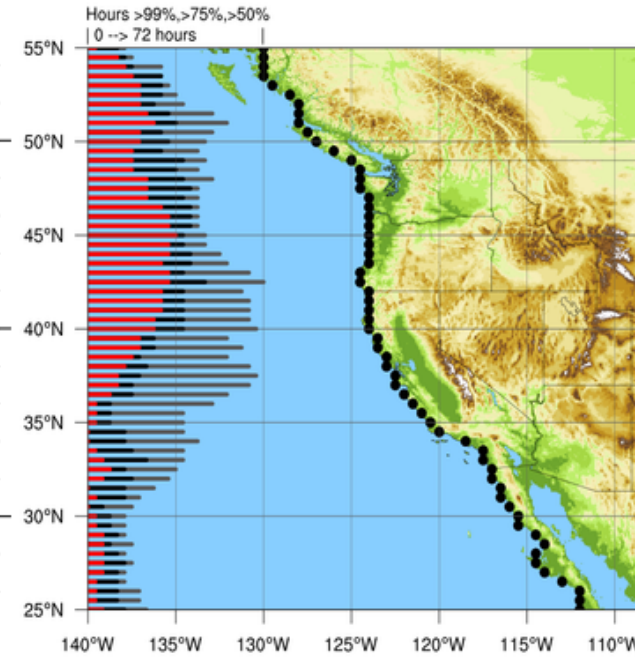
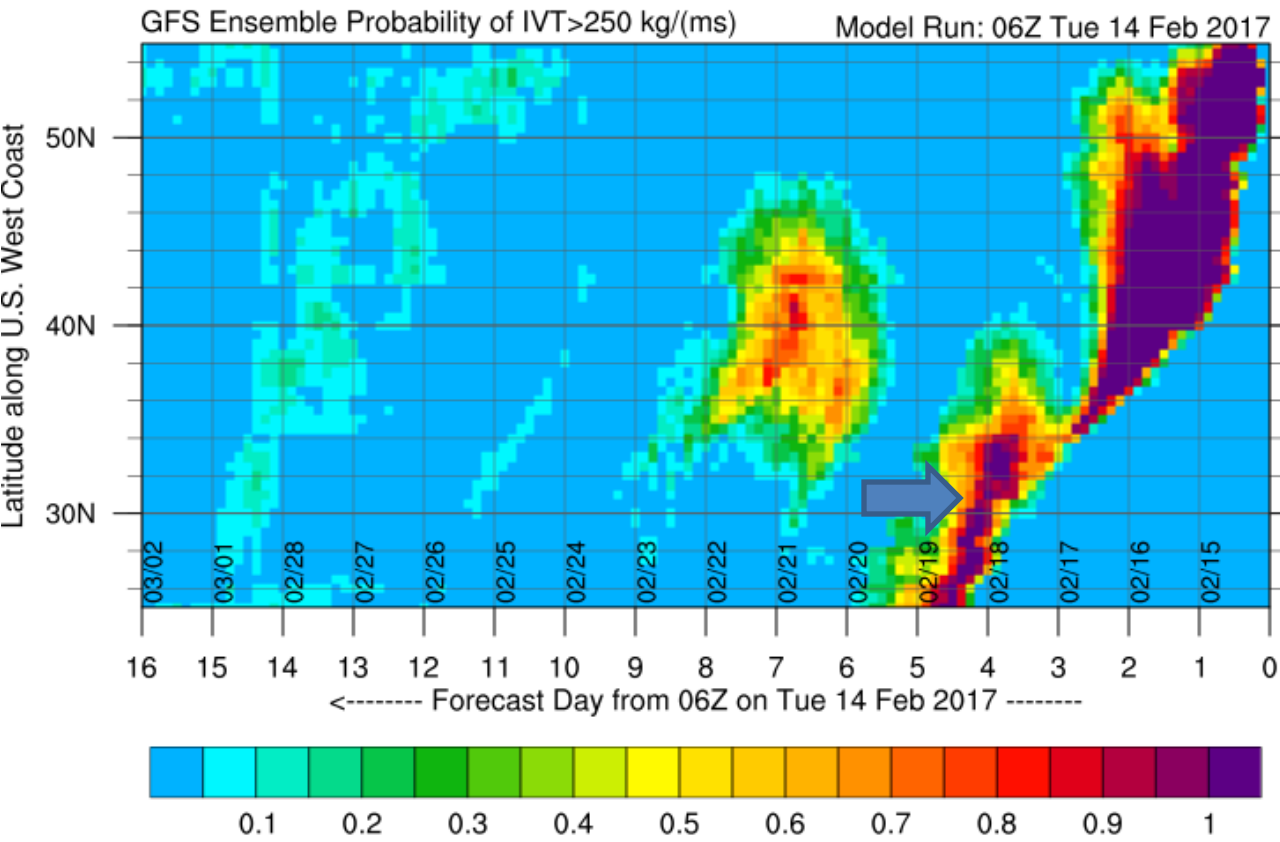
EMC's GEFS plumes for: KLAX  
12 UTC 14 February 2017 cycle



EMC's GEFS plumes for: KSAN  
12 UTC 14 February 2017 cycle



# AR maps

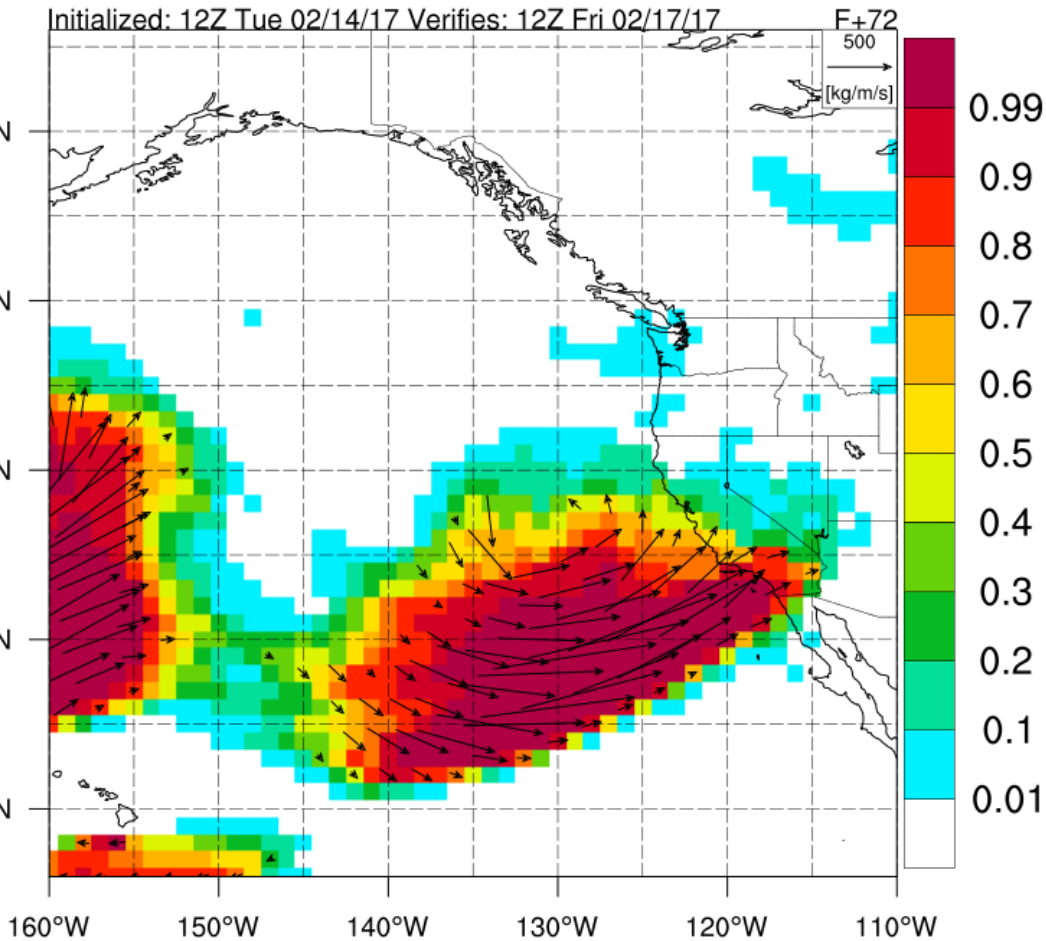


Center for Western Weather  
and Water Extremes  
SCRIPPS INSTITUTION OF OCEANOGRAPHY  
AT UC SAN DIEGO

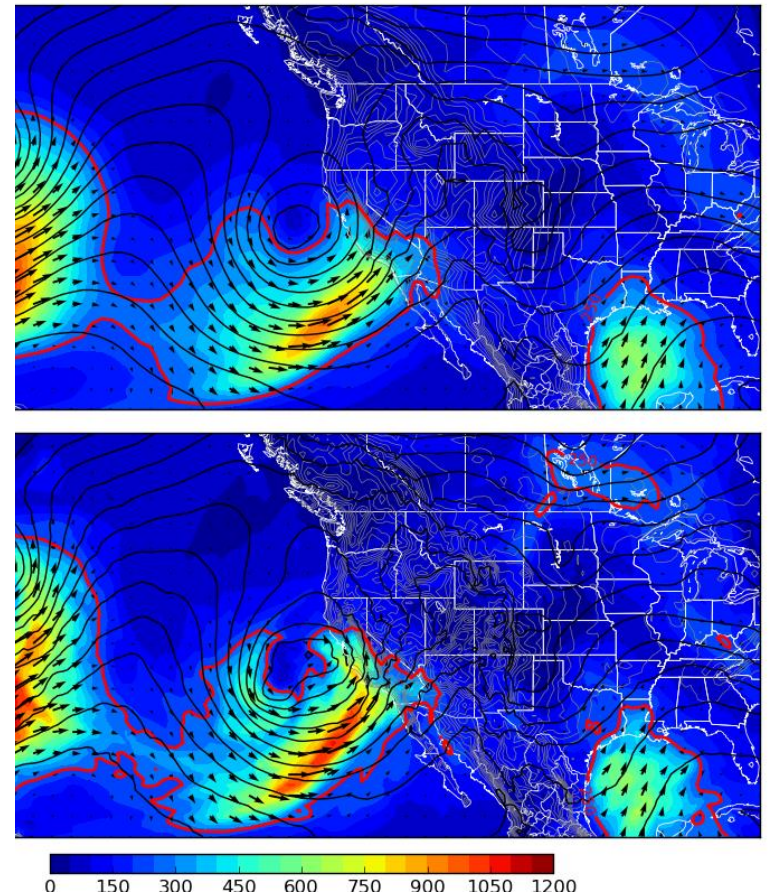


# AR and IVT at 72-78-h

NCEP GFS IVT Probability >250 kg/m/s

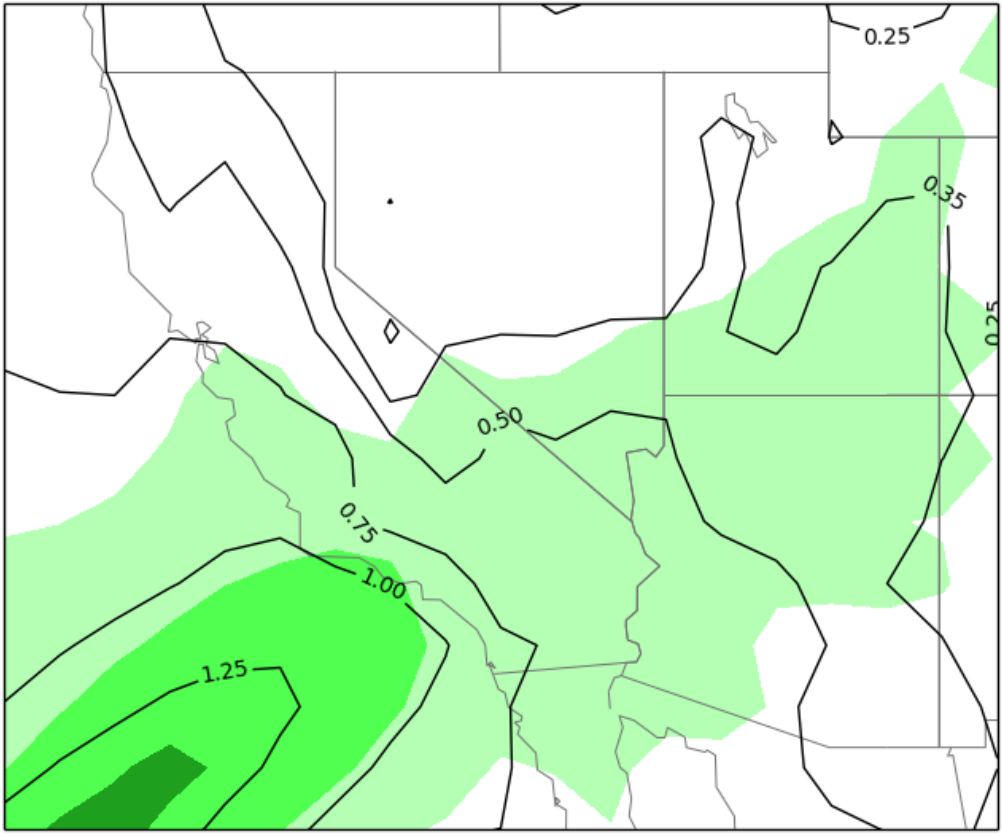


Integrated Water Vapor Transport ( $\text{kg m}^{-1} \text{s}^{-1}$ )  
78-h forecast valid 18:00 UTC Fri 17 Feb 2017

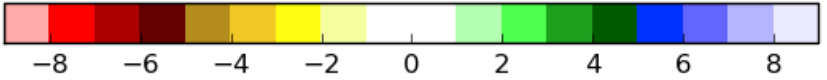


# NAEFS precipitable water 72-h

NAEFS Mean Precipitable Water (in) and Standardized Anomaly  
HOUR 072 - VALID 12:00 UTC Fri Feb 17 2017



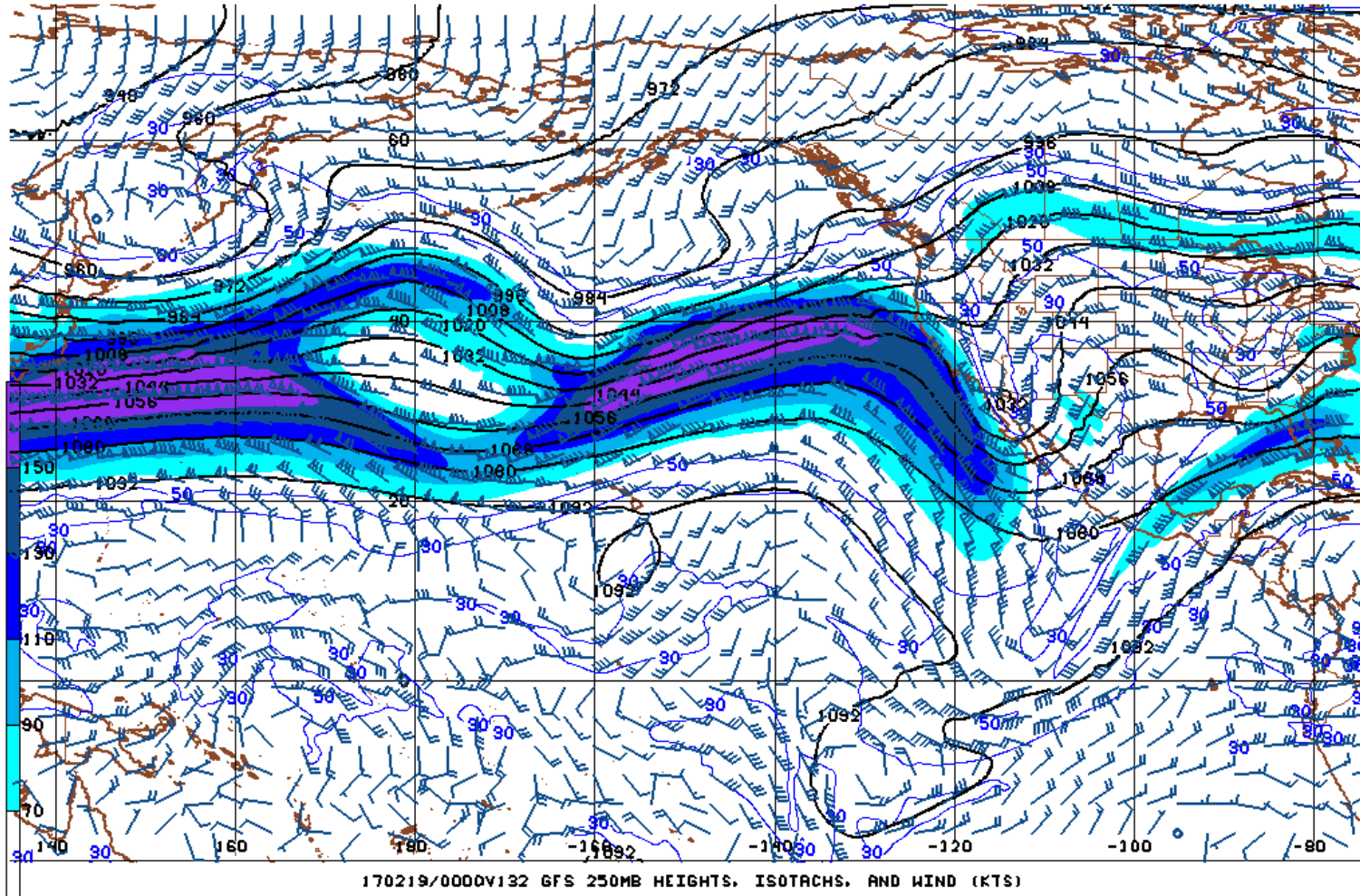
Relative to the 07-Feb to 28-Feb 1979-2009 CFSR climatology



# 132 H GFS 250 mb jet

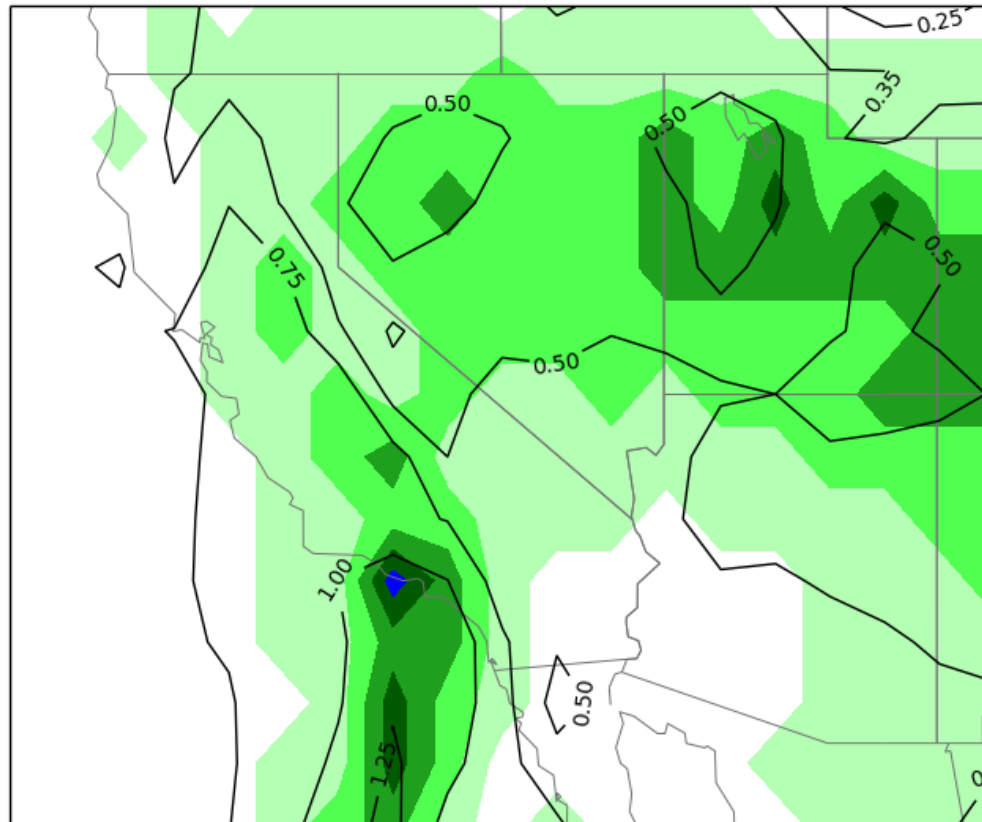


02/13/17 12UTC 132HR FCST VALID SUN 02/19/17 00UTC NCEP/NWS/NOAA

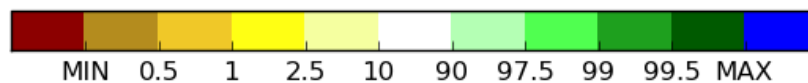


# GEFS M-climate precipitable water at 36h

GEFS Mean Precipitable Water (in) and M-Climate Percentile  
HOUR 036 - VALID 00:00 UTC Sat Feb 18 2017

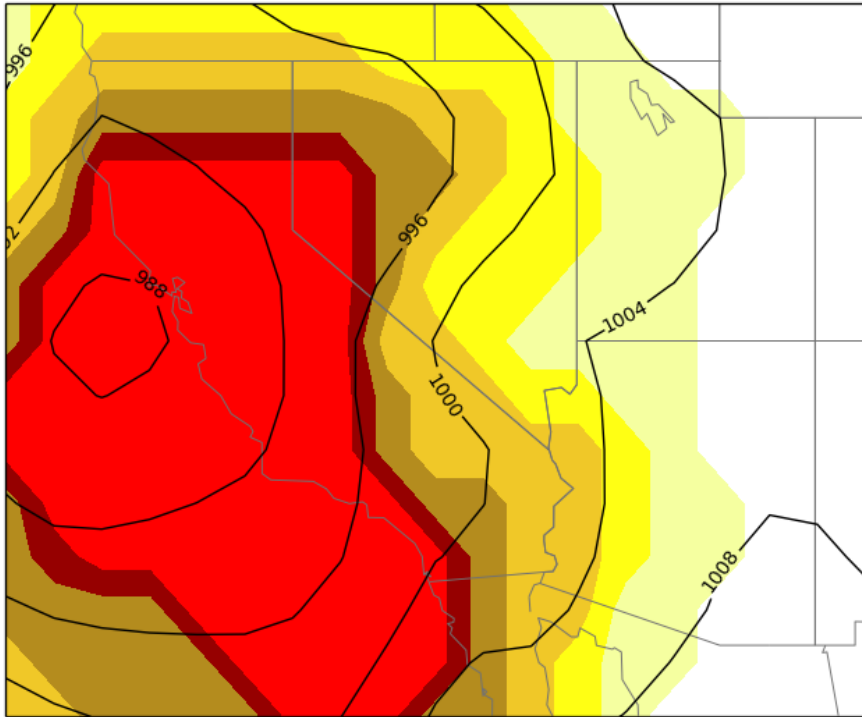


relative to 36-h GEFS reforecasts  
initialized 07-Feb to 28-Feb (1985-2012)

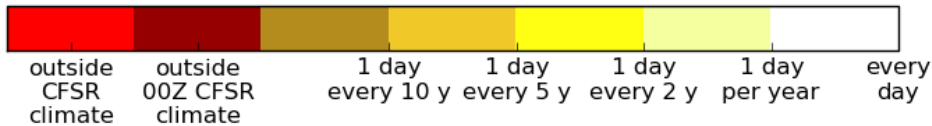


# NAEFS at 36-42h

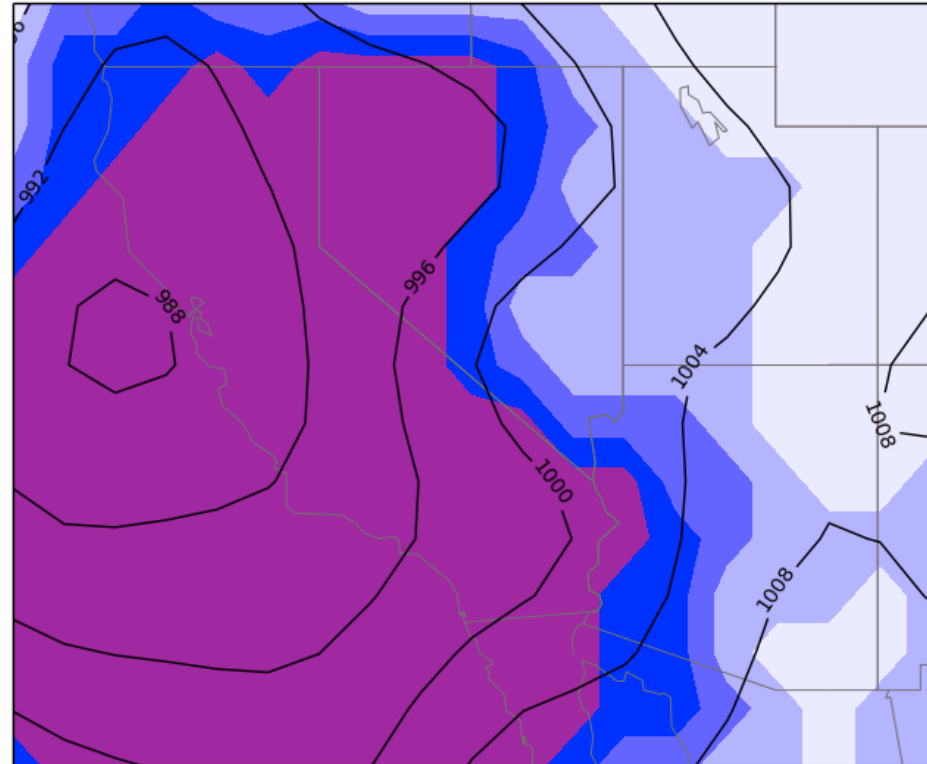
NAEFS Mean MSLP (hPa) and Return Interval  
 HOUR 036 - VALID 00:00 UTC Sat Feb 18 2017



Approximate frequency of occurrence in the  
 07-Feb to 28-Feb CFSR climatology (1979-2009)



GEFS Mean MSLP (hPa) and M-Climate Percentile  
 HOUR 036 - VALID 00:00 UTC Sat Feb 18 2017



relative to 36-h GEFS reforecasts  
 initialized 07-Feb to 28-Feb (1985-2012)

