

December 1-4 2007 Meteorological Analysis

By
Greg Sinnett
DNR Chief Meteorologist



December 2007 Storm Event

The December 1-3 storms offered nearly every winter season hazard ...

- Snow
- Strong Winds
- Heavy Rainfall
- Major Flooding
- Landslides
- Avalanches
- High Coastal Surf
- Coastal Flooding

NWS Seattle, Washington 19 December 2007.

UW MM5-NAM 36km Domain

Init: 00 UTC Mon 03 Dec 07

Fcst: 0 h

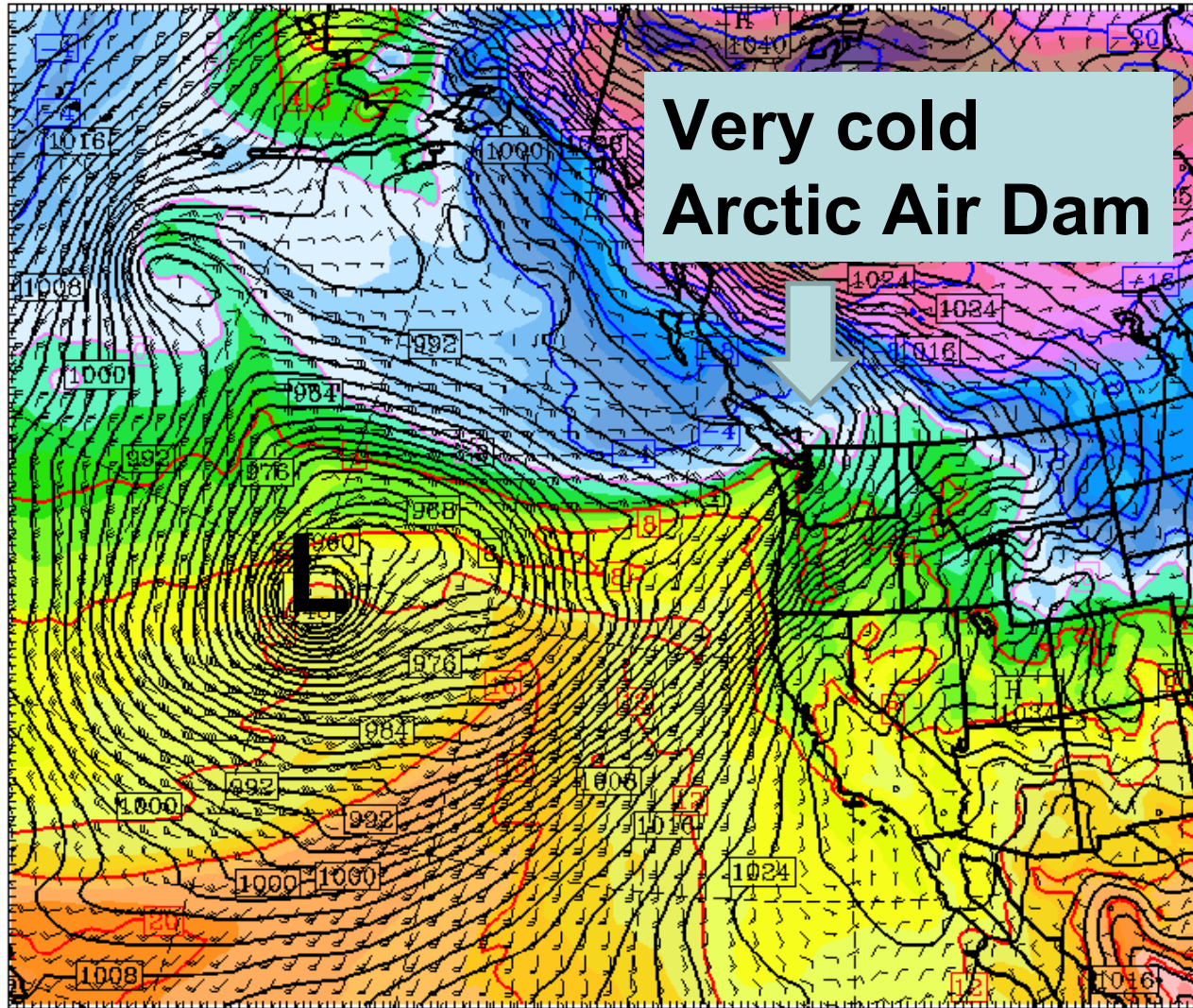
Valid: 00 UTC Mon 03 Dec 07 (16 PST Sun 02 Dec 07)

Temperature at 925 mb (°C)

Sea Level Pressure (hPa)

Wind at 10m (full barb = 10kts)

180 170 W 160 W 150 W 140 W 130 W 120 W 110 W 100 W 90 W



**Very cold
Arctic Air Dam**

**4 pm Sun
Dec 2**

**Since
Friday...
Snow and
or mixed
Snow and
Rain ...**

**Variable
Snow
Amounts**

CONTOURS: UNITS=hPa LOW= 950.00 HIGH= 1042.0 INTERVAL= 2.0000
CONTOURS: UNITS=°C LOW= -28.000 HIGH= 24.000 INTERVAL= 4.0000



Model info: V3.6.3 Kain-Frsch MRF PBL Simple ice 36 km, 37 levels, 108 sec

UW MM5-NAM 36km Domain

Init: 00 UTC Mon 03 Dec 07

Fcst: 6 h

Valid: 06 UTC Mon 03 Dec 07 (22 PST Sun 02 Dec 07)

Temperature at 925 mb (°C)

Sea Level Pressure (hPa)

Wind at 10m (full barb = 10kts)

180 170 W 160 W 150 W 140 W 130 W 120 W 110 W 100 W 90 W

10 pm Sun Dec 2

60 N
50 N
40 N
30 N

CONTOURS: UNITS=hPa LOW= 968.00 HIGH= 1044.0 INTERVAL= 2.0000
 CONTOURS: UNITS=°C LOW= -28.000 HIGH= 24.000 INTERVAL= 4.0000

Model info: V3.6.3 Kain-Frsch MRF PBL Simple ice 36 km, 37 levels, 108 sec

UW MM5-NAM 36km Domain

Init: 00 UTC Mon 03 Dec 07

Fcst: 12 h

Valid: 12 UTC Mon 03 Dec 07 (04 PST Mon 03 Dec 07)

Temperature at 925 mb (°C)

Sea Level Pressure (hPa)

Wind at 10m (full barb = 10kts)

180 170 W 160 W 150 W 140 W 130 W 120 W 110 W 100 W 90 W

4 am Mon Dec 3

60 N
50 N
40 N
30 N

CONTOURS: UNITS=hPa LOW= 960.00 HIGH= 1046.0 INTERVAL= 2.0000
 CONTOURS: UNITS=°C LOW= -28.000 HIGH= 20.000 INTERVAL= 4.0000

Model info: V3.6.3 Kain-Frsch MRF PBL Simple ice 36 km, 37 levels, 108 sec

UW MM5-NAM 36km Domain

Init: 00 UTC Mon 03 Dec 07

Fcst: 18 h

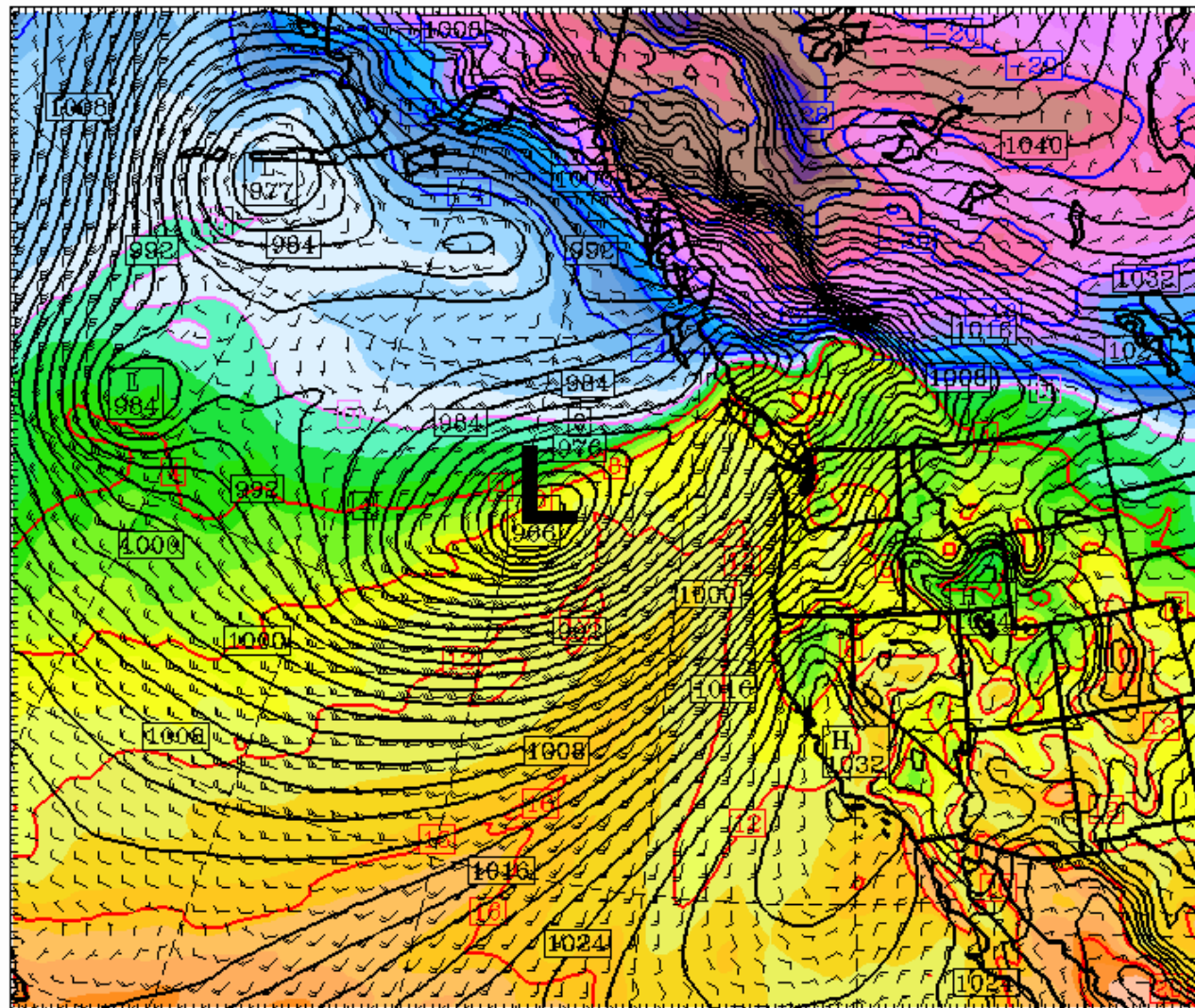
Valid: 18 UTC Mon 03 Dec 07 (10 PST Mon 03 Dec 07)

Temperature at 925 mb (°C)

Sea Level Pressure (hPa)

Wind at 10m (full barb = 10kts)

180 170 W 160 W 150 W 140 W 130 W 120 W 110 W 100 W 90 W



10 am Mon
Dec 3

60 N
50 N
40 N
30 N

CONTOURS: UNITS=hPa LOW= 968.00 HIGH= 1048.0 INTERVAL= 2.0000
 CONTOURS: UNITS=°C LOW= -28.000 HIGH= 20.000 INTERVAL= 4.0000



Model info: V3.6.3 Kain-Frsc MRF PBL Simple ice 36 km, 37 levels, 108 sec

UW MM5-NAM 36km Domain

Init: 00 UTC Mon 03 Dec 07

Fcst: 24 h

Valid: 00 UTC Tue 04 Dec 07 (16 PST Mon 03 Dec 07)

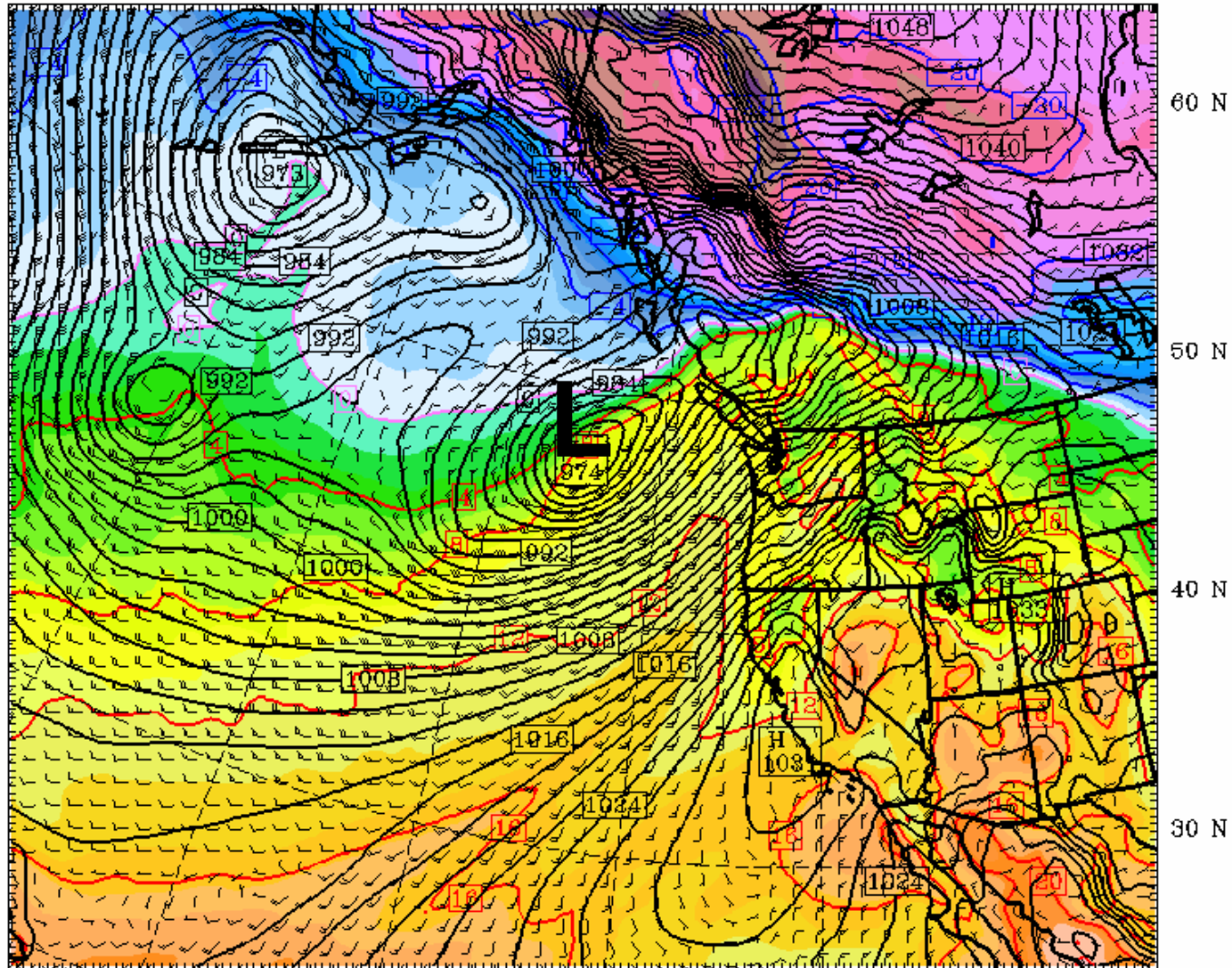
Temperature at 925 mb (°C)

Sea Level Pressure (hPa)

Wind at 10m (full barb = 10kts)

180 170 W 160 W 150 W 140 W 130 W 120 W 110 W 100 W 90 W

**4 pm Mon
Dec 3
24 hours**



CONTOURS: UNITS=hPa LOW= 974.00 HIGH= 1048.0 INTERVAL= 2.0000
 CONTOURS: UNITS=°C LOW= -28.000 HIGH= 24.000 INTERVAL= 4.0000



Model info: V3.6.3 Kain-Frsc MRF PBL Simple ice 36 km, 37 levels, 108 sec

UW MM5-NAM 36km Domain

Init: 00 UTC Mon 03 Dec 07

Fcst: 30 h

Valid: 06 UTC Tue 04 Dec 07 (22 PST Mon 03 Dec 07)

Temperature at 925 mb (°C)

Sea Level Pressure (hPa)

Wind at 10m (full barb = 10kts)

180 170 W 160 W 150 W 140 W 130 W 120 W 110 W 100 W 90 W

10 pm Mon Dec 3

The figure is a meteorological map showing sea level pressure (SLP) contours and temperature fields. The map covers a domain from 180°W to 90°W longitude and 30°N to 60°N latitude. The SLP contours are labeled with values such as 984, 992, 1000, 1008, 1016, 1024, and 1032. The temperature field is color-coded, with a legend at the bottom showing a scale from -31.5°C to 36°C. Wind vectors are shown as small arrows. The map also includes latitude markings (30 N, 40 N, 50 N, 60 N) and longitude markings (180, 170 W, 160 W, 150 W, 140 W, 130 W, 120 W, 110 W, 100 W, 90 W).

CONTOURS: UNITS=hPa LOW= 972.00 HIGH= 1046.0 INTERVAL= 2.0000
 CONTOURS: UNITS=°C LOW= -32.000 HIGH= 24.000 INTERVAL= 4.0000

A horizontal color scale legend for temperature in degrees Celsius. The scale ranges from -31.5 to 36, with major ticks every 4.5 units. The colors transition from dark purple/blue for the lowest temperatures to red and white for the highest temperatures.

Model info: V3.6.3 Kain-Frsch MRF PBL Simple ice 36 km, 37 levels, 108 sec

UW MM5-NAM 36km Domain

Init: 00 UTC Mon 03 Dec 07

Fcst: 36 h

Valid: 12 UTC Tue 04 Dec 07 (04 PST Tue 04 Dec 07)

Temperature at 925 mb (°C)

Sea Level Pressure (hPa)

Wind at 10m (full barb = 10kts)

180 170 W 160 W 150 W 140 W 130 W 120 W 110 W 100 W 90 W

4 am Tue Dec 4

The figure is a meteorological map showing sea level pressure (SLP) contours and temperature fields. The map covers a domain from 180°W to 90°W longitude and 30°N to 60°N latitude. The SLP contours are labeled with values such as 984, 992, 1000, 1008, 1016, 1024, and 1032. A low-pressure system (L) is centered over the North Pacific, and a high-pressure system (H) is located over the North Atlantic. The temperature field is color-coded, with a color bar at the bottom indicating values from -31.5°C to 36°C. The map also shows wind vectors and other meteorological features.

CONTOURS: UNITS=hPa LOW= 978.00 HIGH= 1044.0 INTERVAL= 2.0000
 CONTOURS: UNITS=°C LOW= -28.000 HIGH= 24.000 INTERVAL= 4.0000

A horizontal color scale bar representing temperature in degrees Celsius. The values are: -31.5, -27, -22.5, -18, -13.5, -9, -4.5, 0, 4.5, 9, 13.5, 18, 22.5, 27, 31.5, 36. The colors transition from dark purple/blue for the lowest temperatures to red and white for the highest temperatures.

Model info: V3.6.3 Kain-Frsc MRF PBL Simple ice 36 km, 37 levels, 108 sec

UW MM5-NAM 36km Domain

Init: 00 UTC Mon 03 Dec 07

Fcst: 42 h

Valid: 18 UTC Tue 04 Dec 07 (10 PST Tue 04 Dec 07)

Temperature at 925 mb (°C)

Sea Level Pressure (hPa)

Wind at 10m (full barb = 10kts)

180 170 W 160 W 150 W 140 W 130 W 120 W 110 W 100 W 90 W

10 am Tue Dec 4

The figure is a meteorological map showing sea level pressure (SLP) contours and temperature fields. The map covers a domain from 180°W to 90°W and 30°N to 60°N. The SLP contours are labeled with values such as 992, 1000, 1008, 1016, 1024, 1032, and 1040. The temperature field is color-coded, with a color bar at the bottom ranging from -31.5°C (dark blue) to 36°C (dark red). Wind vectors are shown as small arrows, with a reference vector for 10 kts. The map also shows a low-pressure system over the North Pacific and a high-pressure system over the North Atlantic.

CONTOURS: UNITS=hPa LOW= 978.00 HIGH= 1040.0 INTERVAL= 2.0000
 CONTOURS: UNITS=°C LOW= -28.000 HIGH= 24.000 INTERVAL= 4.0000

-31.5 -27 -22.5 -18 -13.5 -9 -4.5 0 4.5 9 13.5 18 22.5 27 31.5 36 °C

Model info: V3.6.3 Kain-Frsch MRF PBL Simple ice 36 km, 37 levels, 108 sec

UW MM5-NAM 36km Domain

Init: 00 UTC Mon 03 Dec 07

Fcst: 48 h

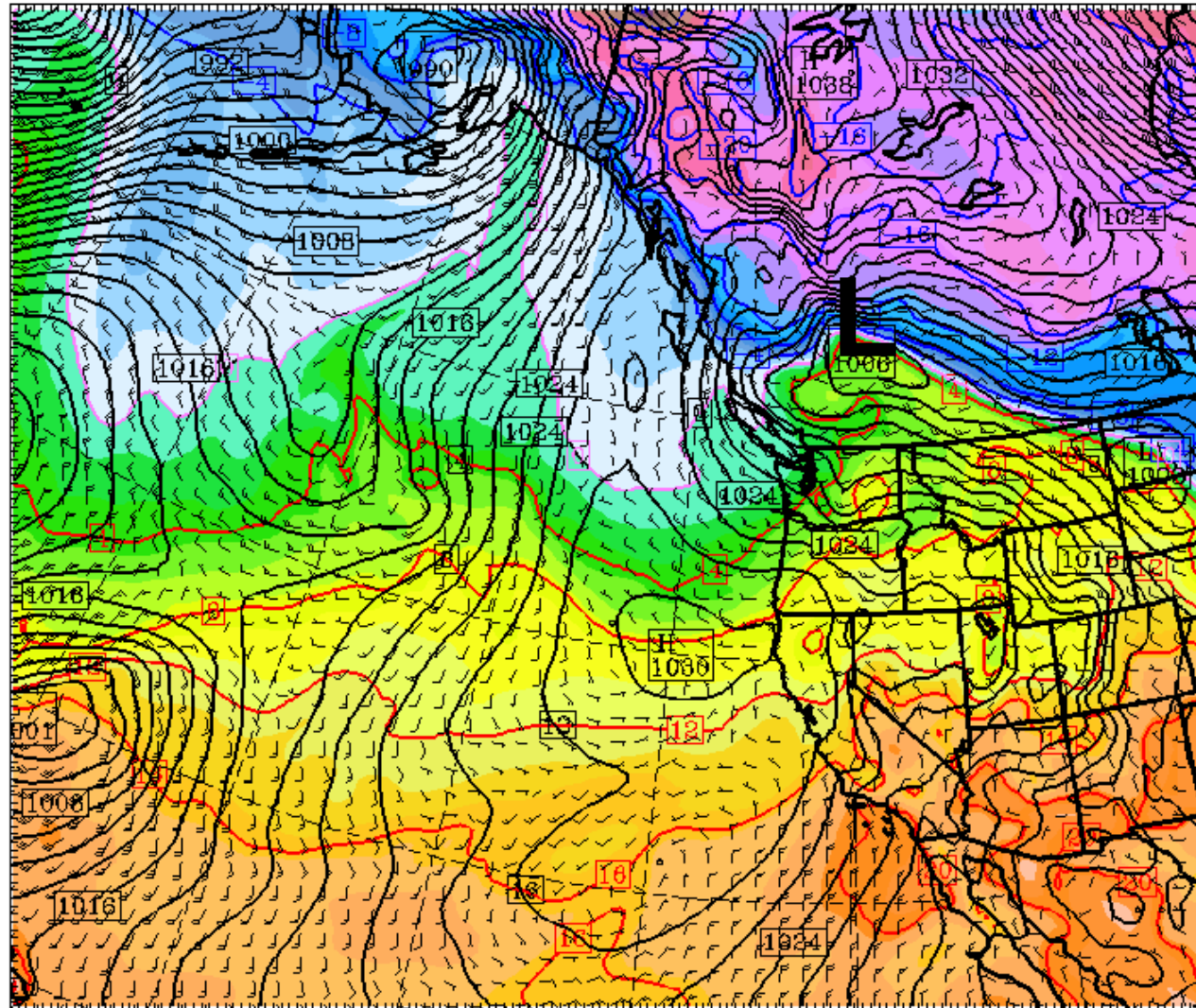
Valid: 00 UTC Wed 05 Dec 07 (16 PST Tue 04 Dec 07)

Temperature at 925 mb (°C)

Sea Level Pressure (hPa)

Wind at 10m (full barb = 10kts)

180 170 W 160 W 150 W 140 W 130 W 120 W 110 W 100 W 90 W



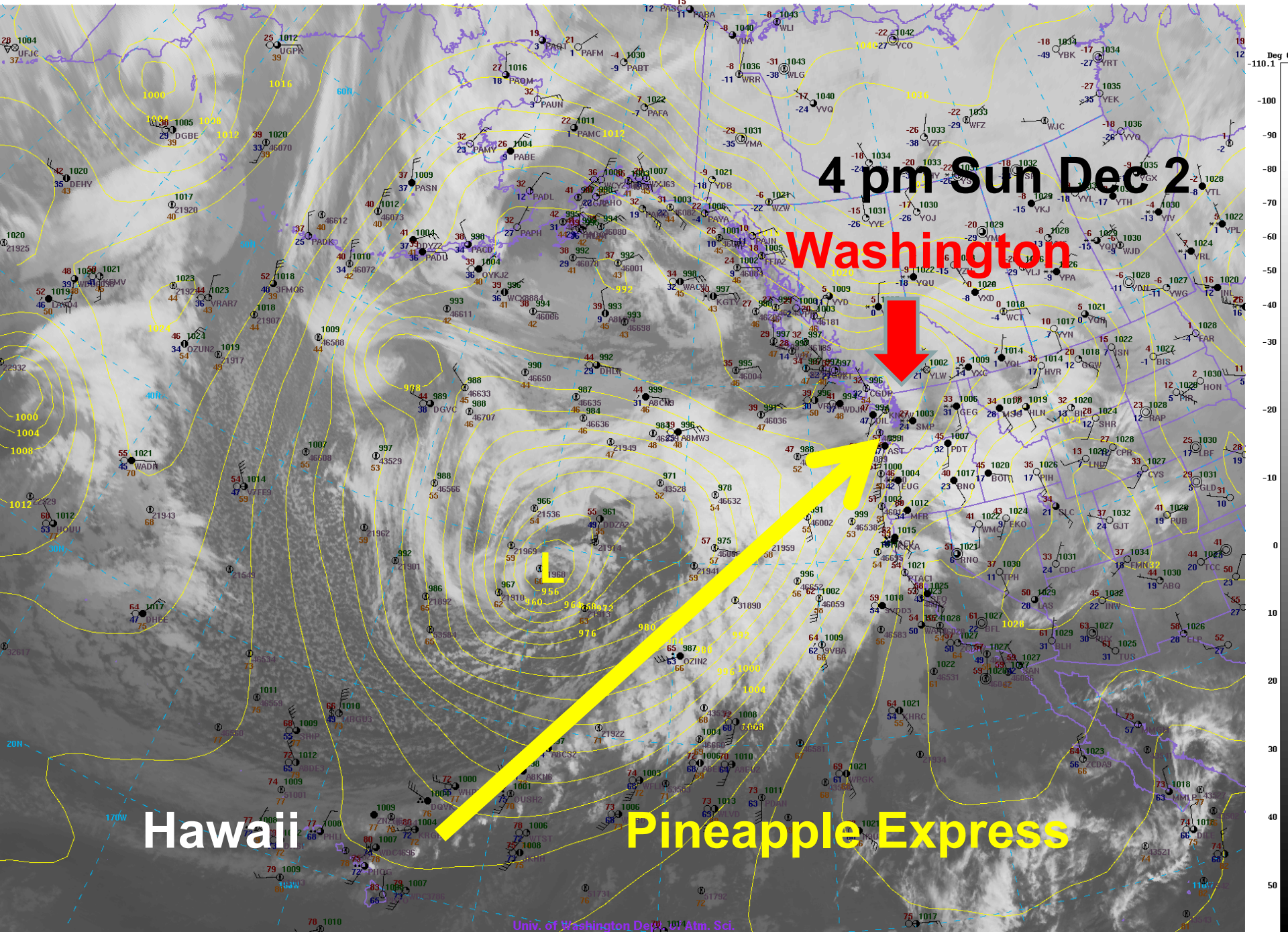
4 pm Tue
Dec 4

48 hours

CONTOURS: UNITS=hPa LOW= 968.00 HIGH= 1036.0 INTERVAL= 2.0000
 CONTOURS: UNITS=°C LOW= -28.000 HIGH= 24.000 INTERVAL= 4.0000



Model info: V3.6.3 Kain-Frsch MRF PBL Simple ice 36 km, 37 levels, 108 sec

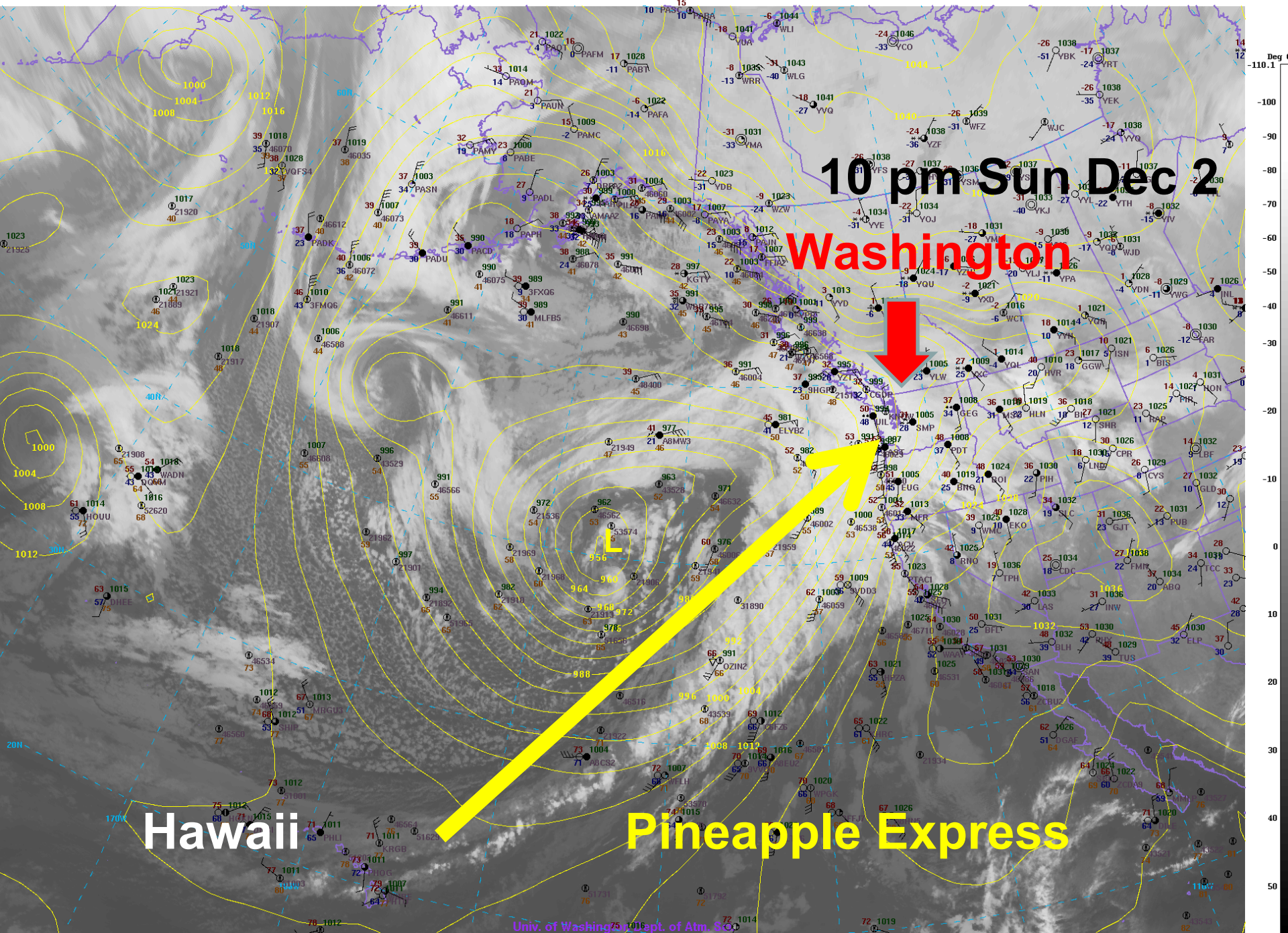


4 pm Sun Dec 2.

Washington

Hawaii

Pineapple Express

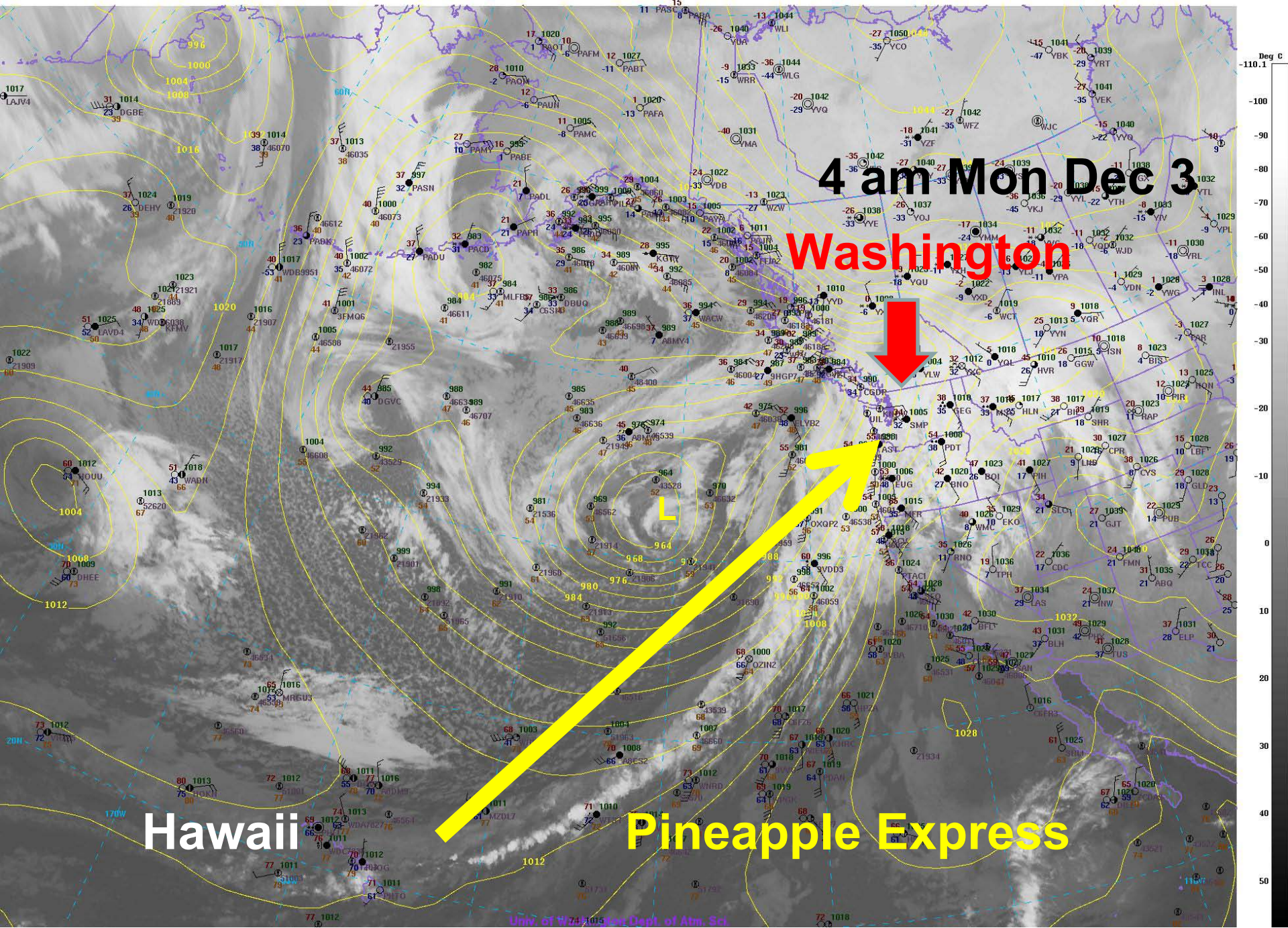


10 pm Sun Dec 2

Washington

Hawaii

Pineapple Express

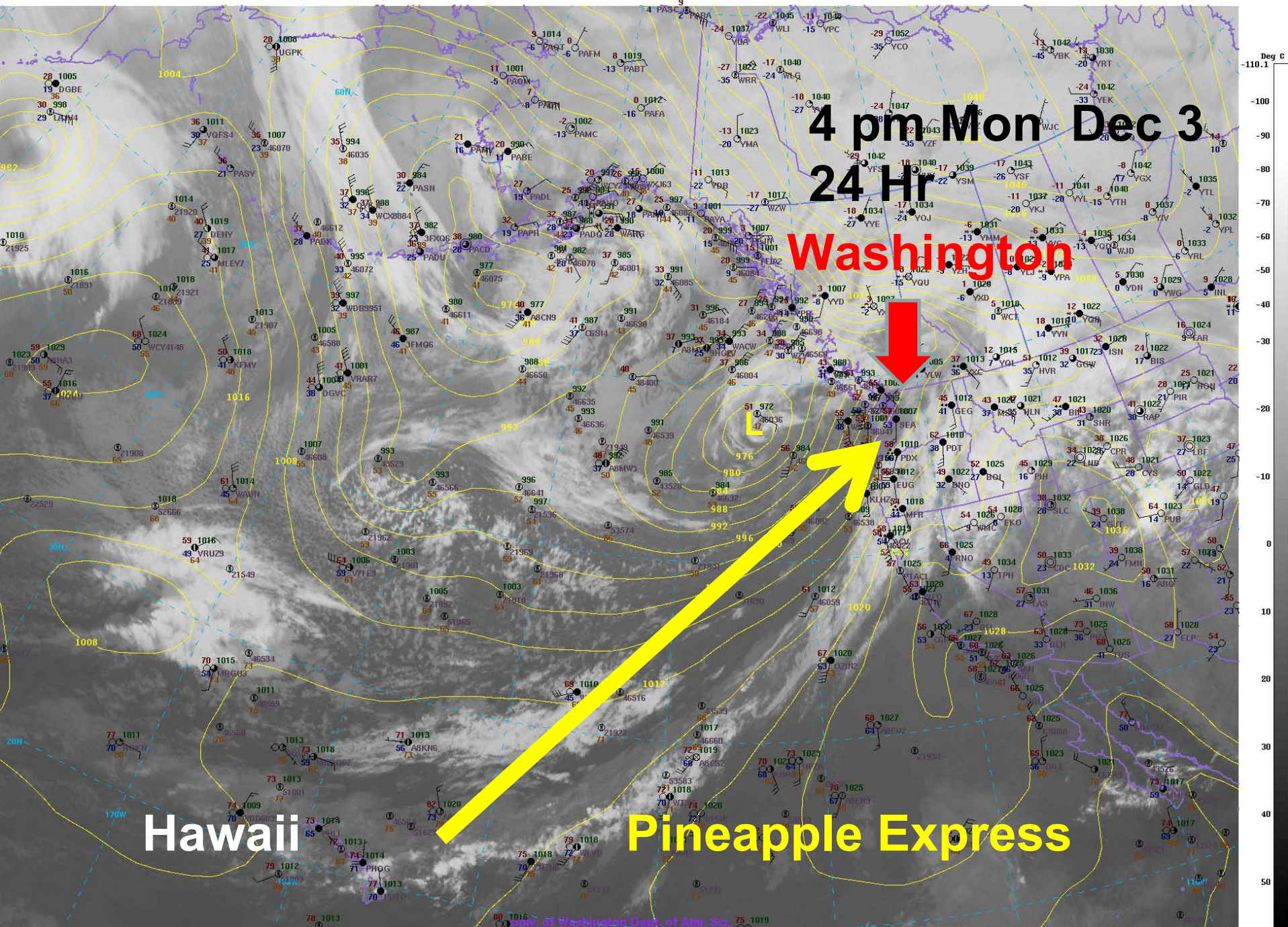


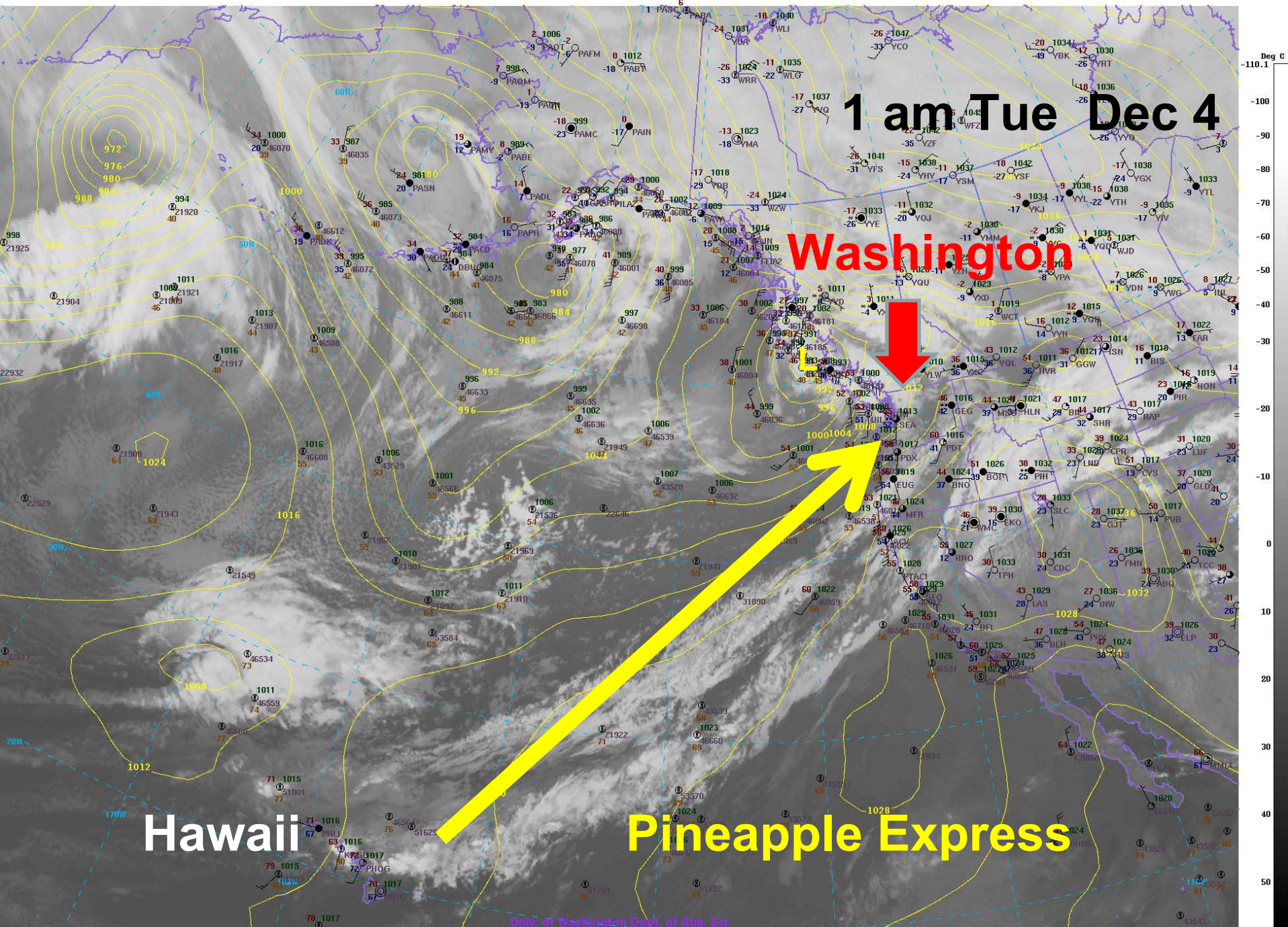
4 am Mon Dec 3

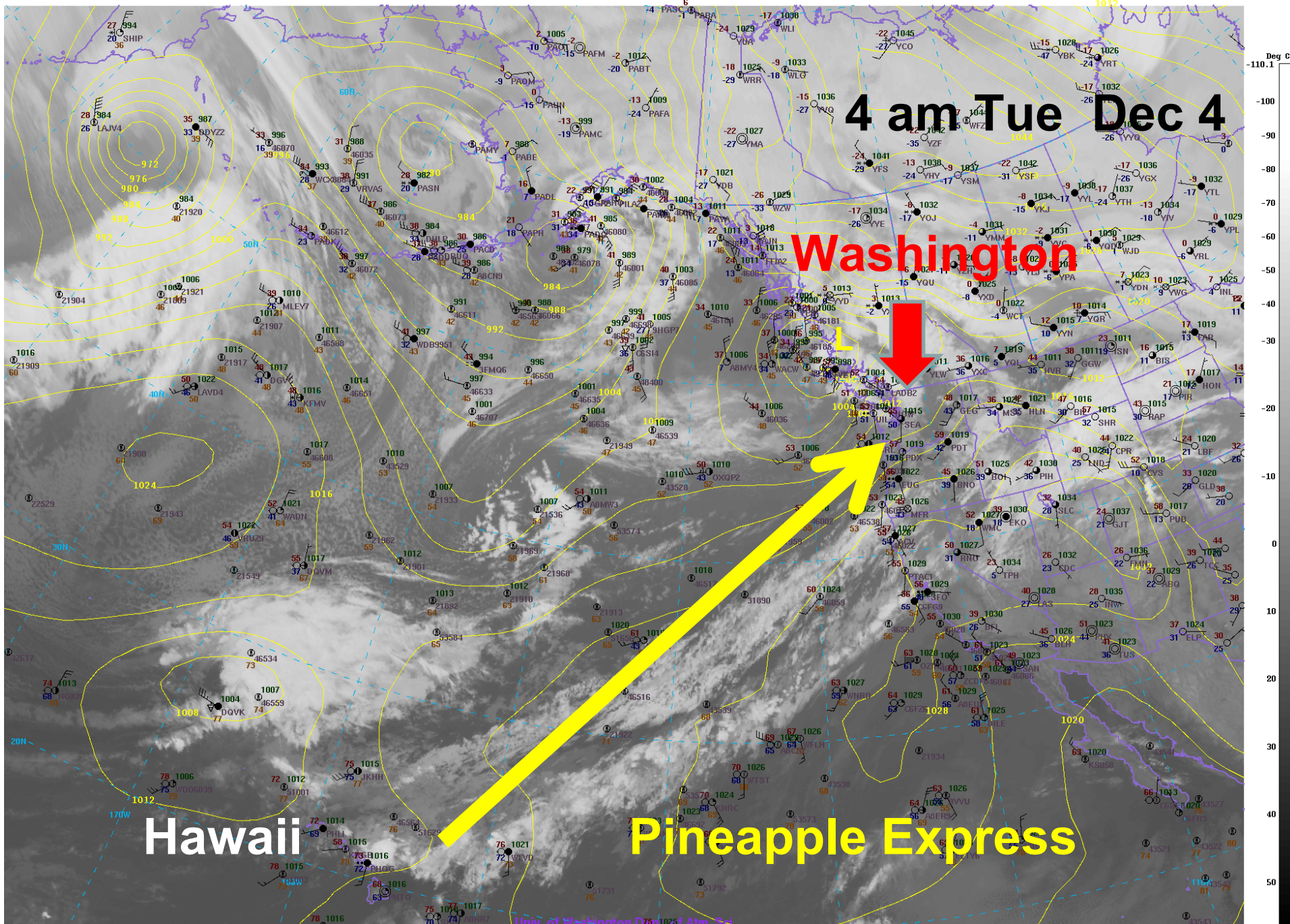
Washington

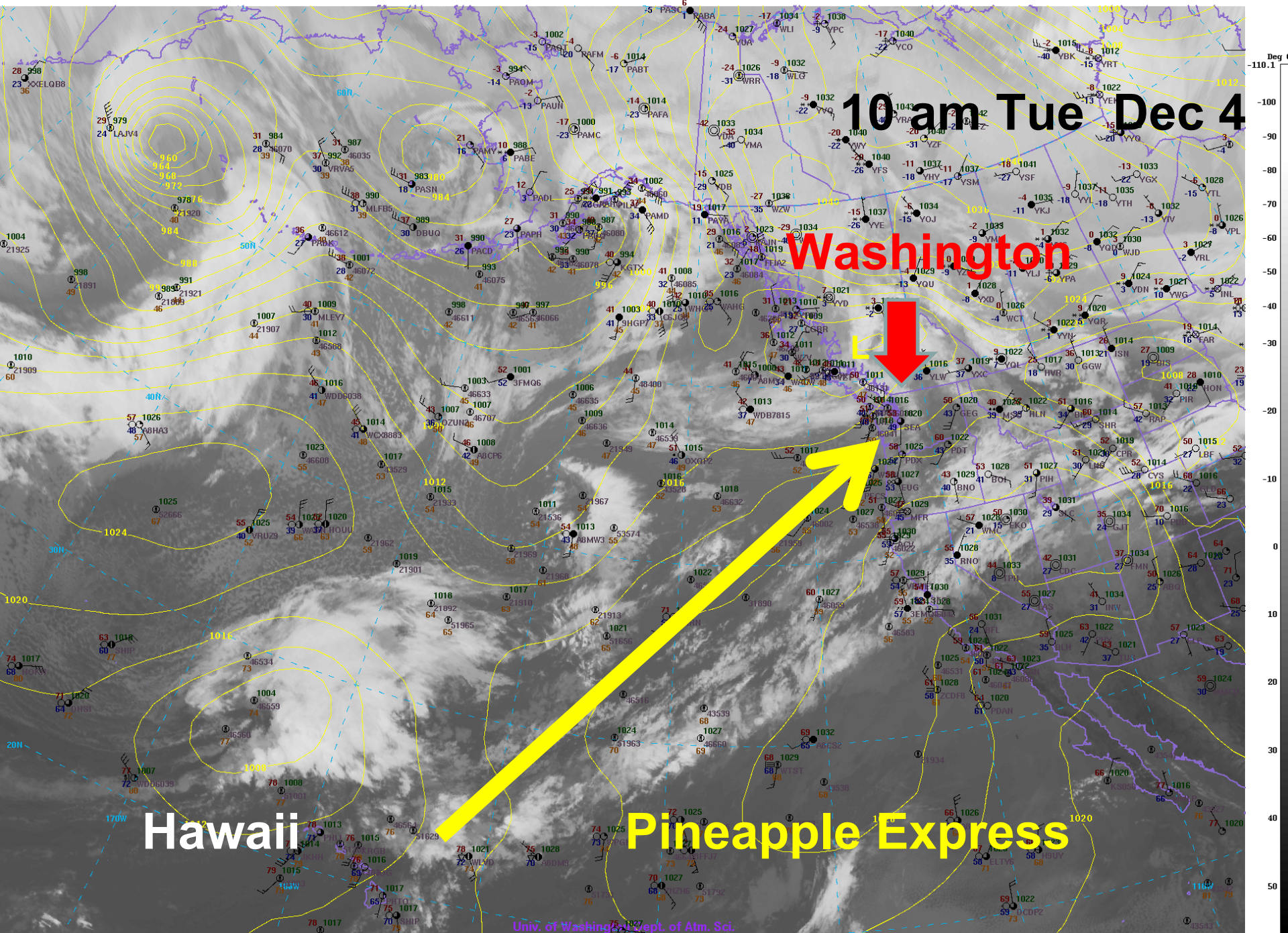
Hawaii

Pineapple Express







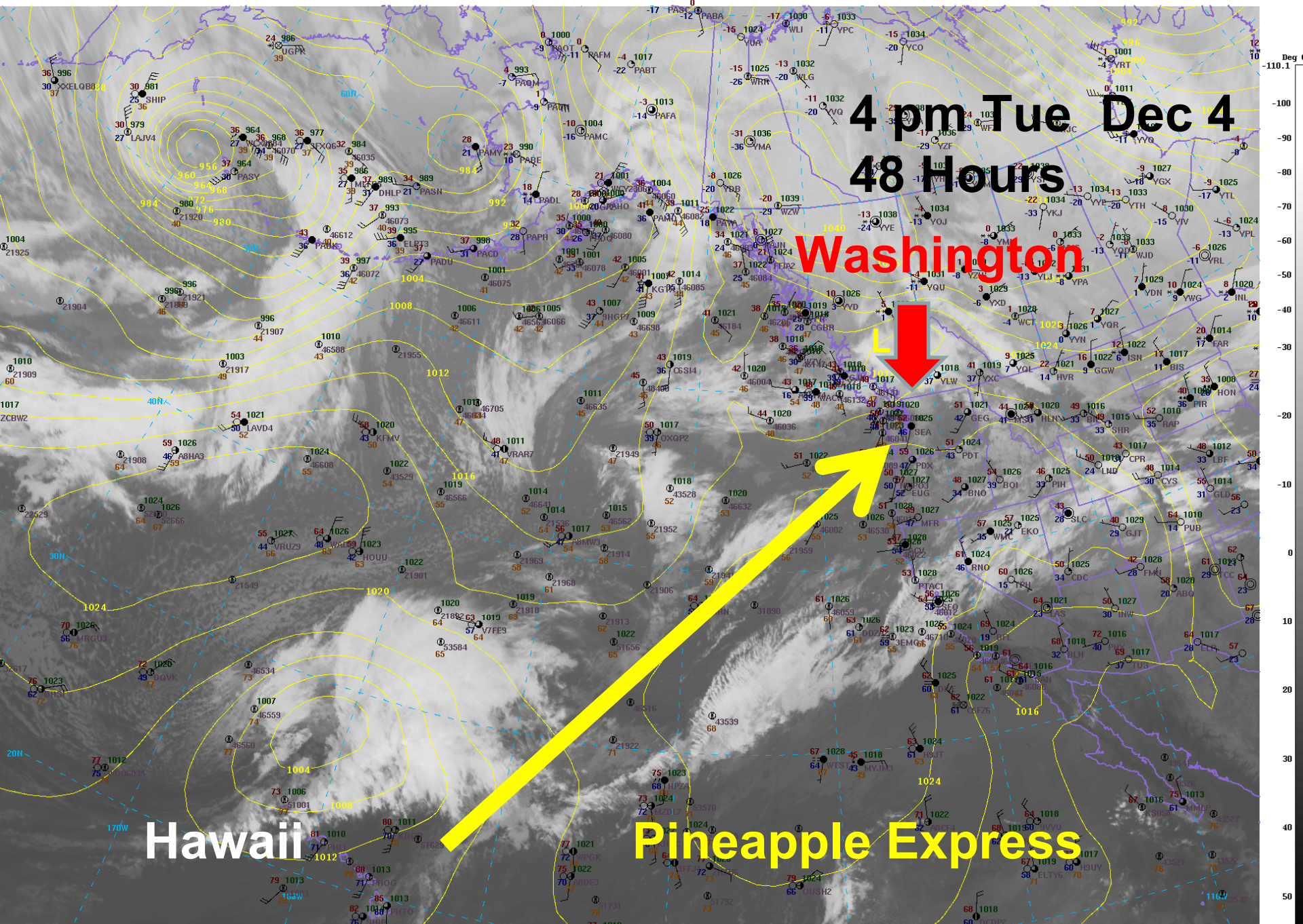


10 am Tue Dec 4

Washington

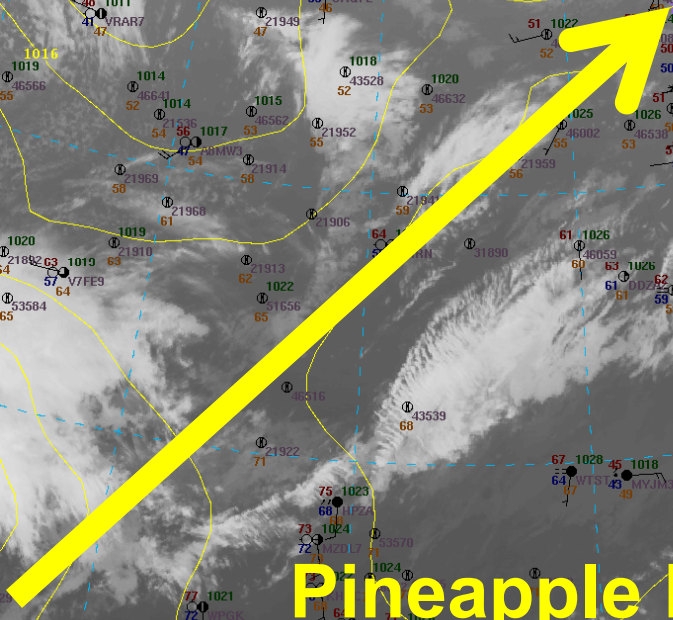
Hawaii

Pineapple Express



4 pm Tue Dec 4
48 Hours

Washington

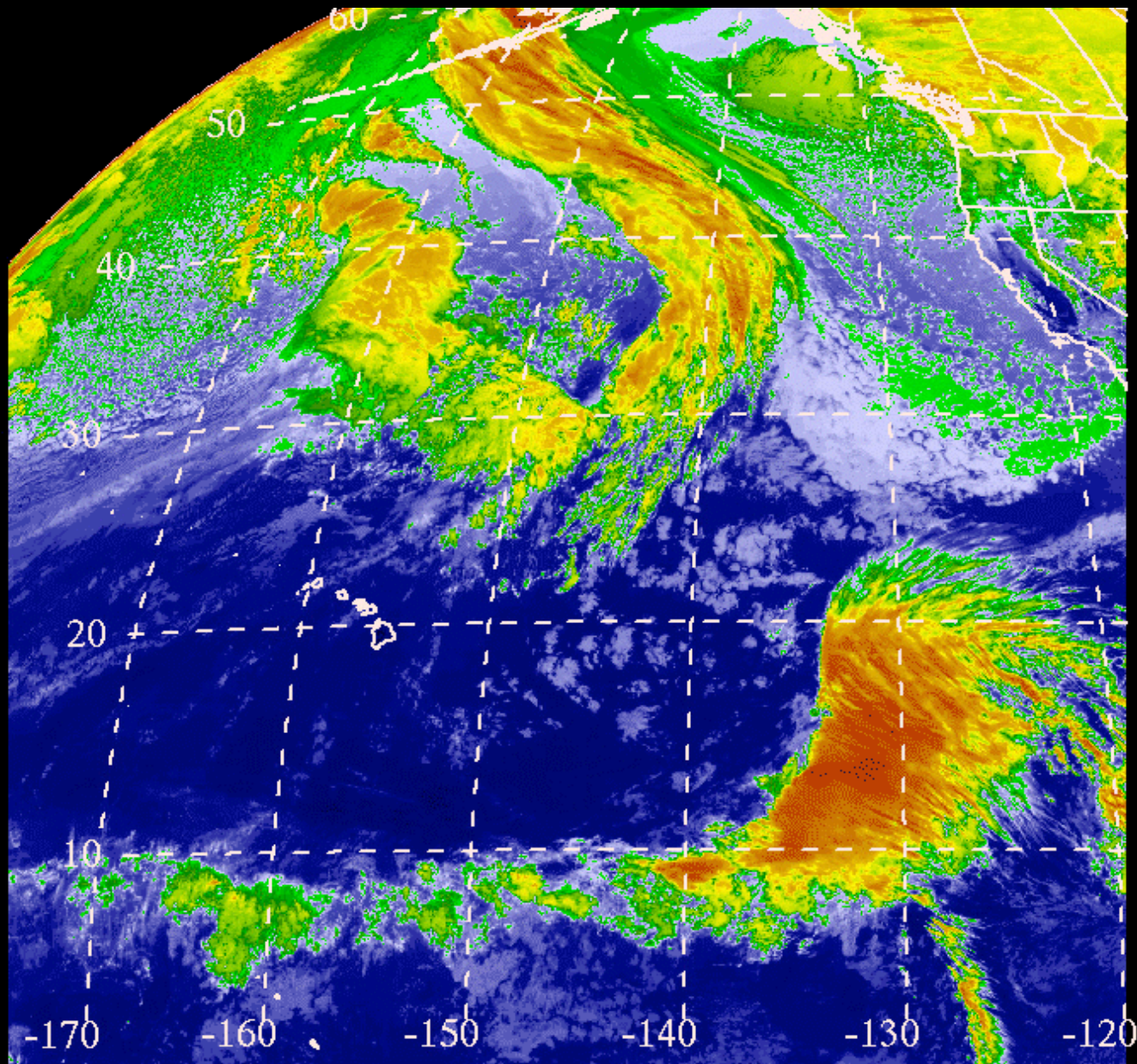
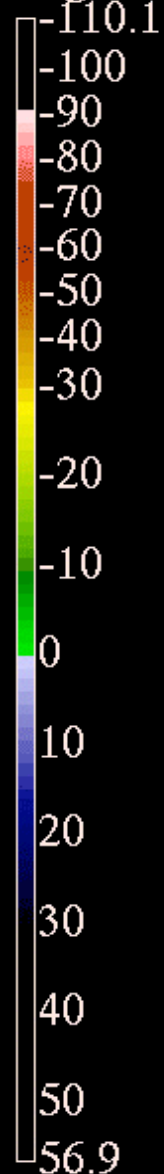


Hawaii

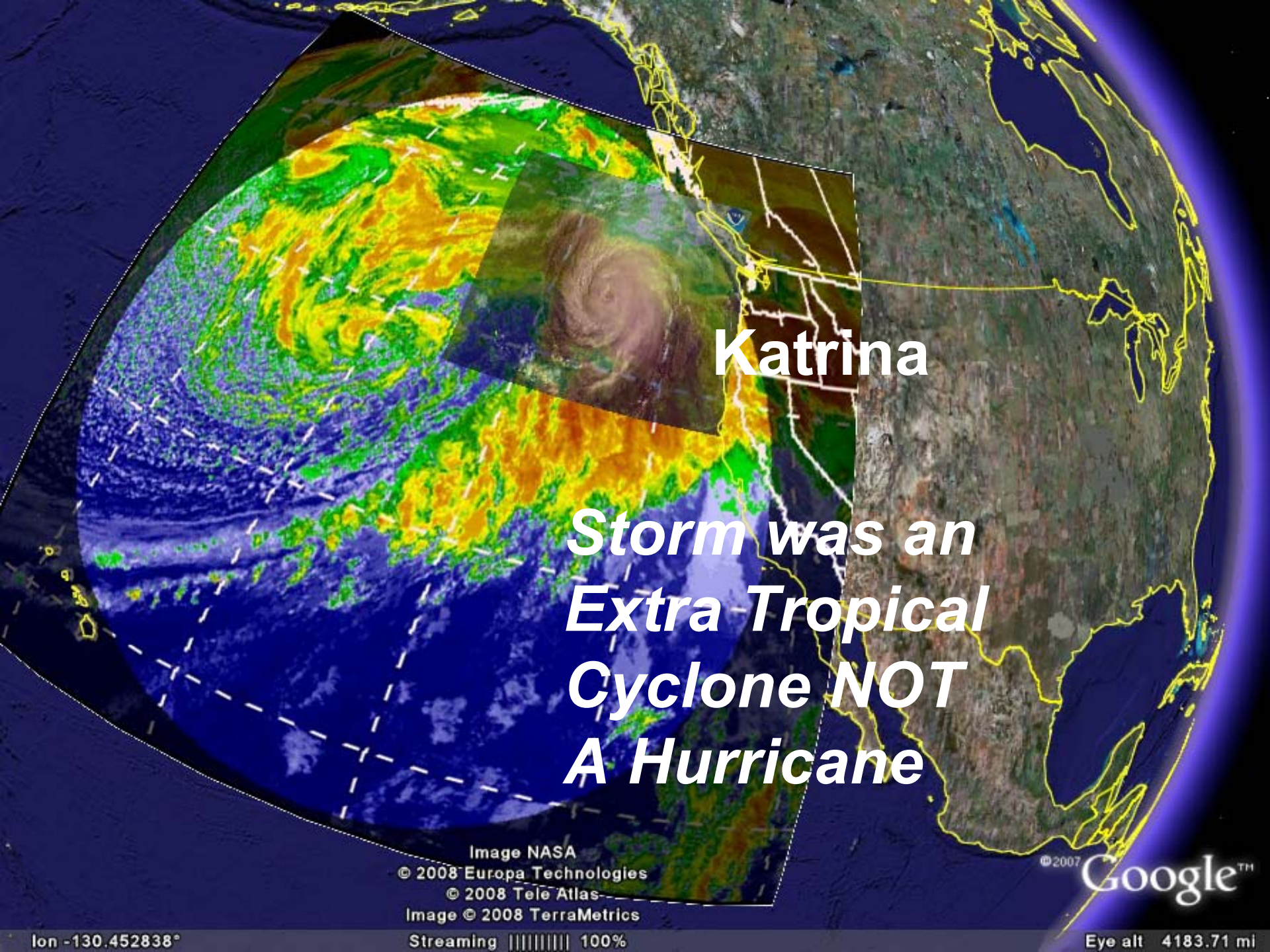
Pineapple Express

Mauna Kea Weather Center

Deg C



goeswest IR 10:00 am HST Sat 01 Dec 2007 (2000 UTC Sat 01 Dec 2007)



Katrina

***Storm was an
Extra Tropical
Cyclone NOT
A Hurricane***

Image NASA

© 2008 Europa Technologies

© 2008 Tele Atlas

Image © 2008 TerraMetrics

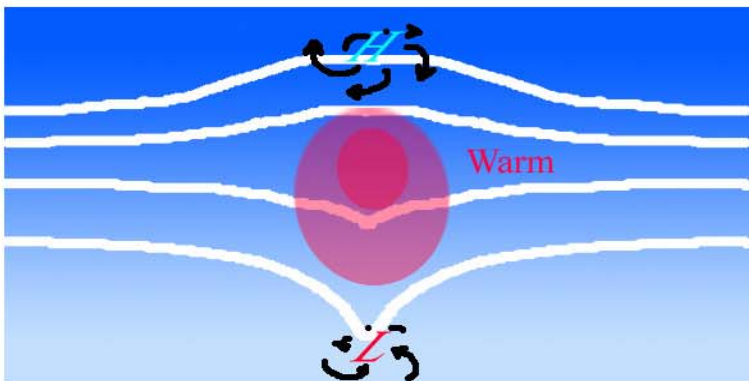
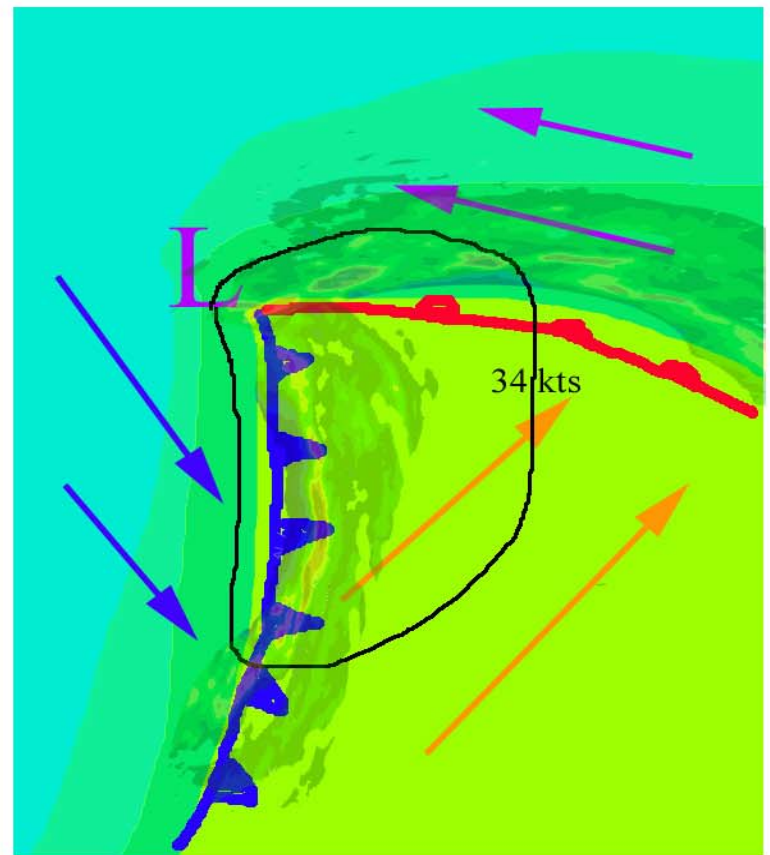
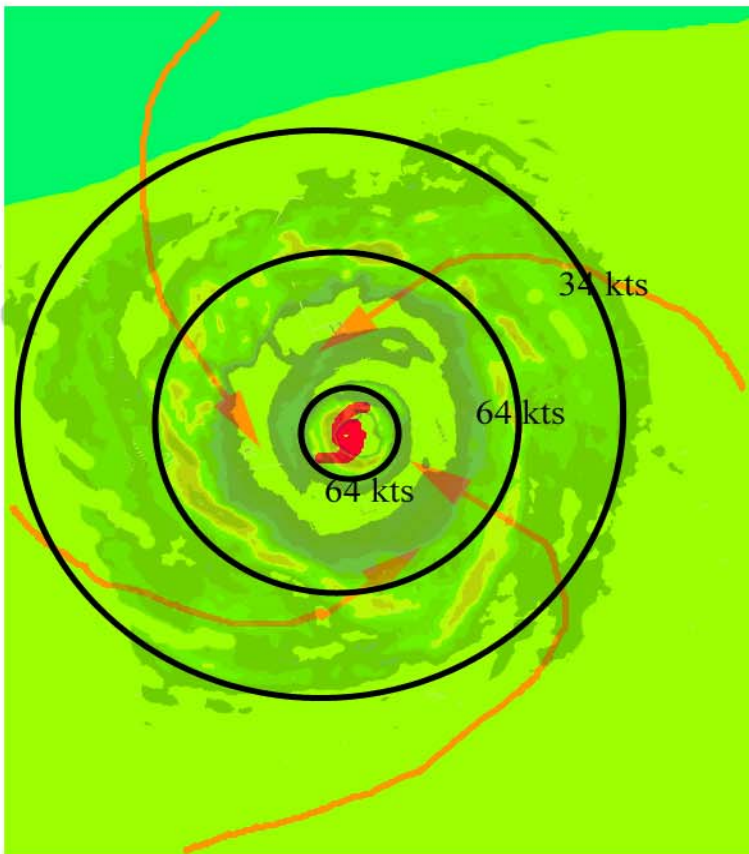
Streaming ||||| 100%

© 2007

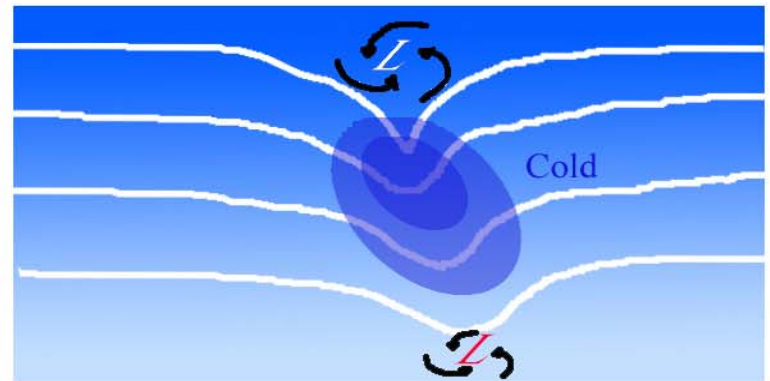
Google™

lon -130.452838°

Eye alt 4183.71 mi



Tropical Cyclone



Extratropical Cyclone

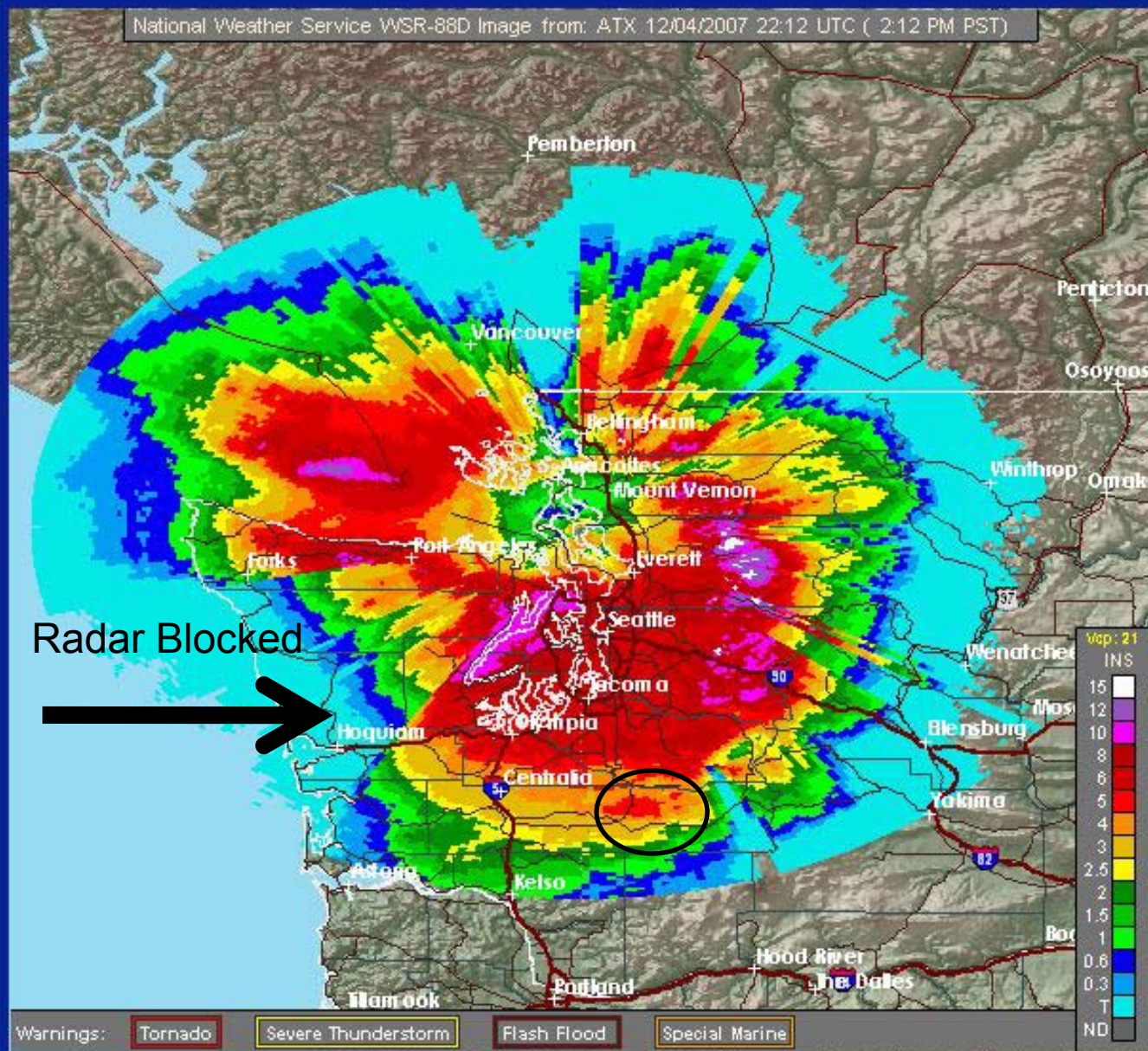
Storm Total Precipitation

Radar Precip Est From 08:54 PM PST Fri Nov 30 2007

to 02:12 PM PST Tue Dec 04 2007

NWS Seattle/Tacoma, WA

National Weather Service WSR-88D Image from: ATX 12/04/2007 22:12 UTC (2:12 PM PST)



Seattle Radar Estimated Precipitation

9pm Friday thru 2pm Tuesday

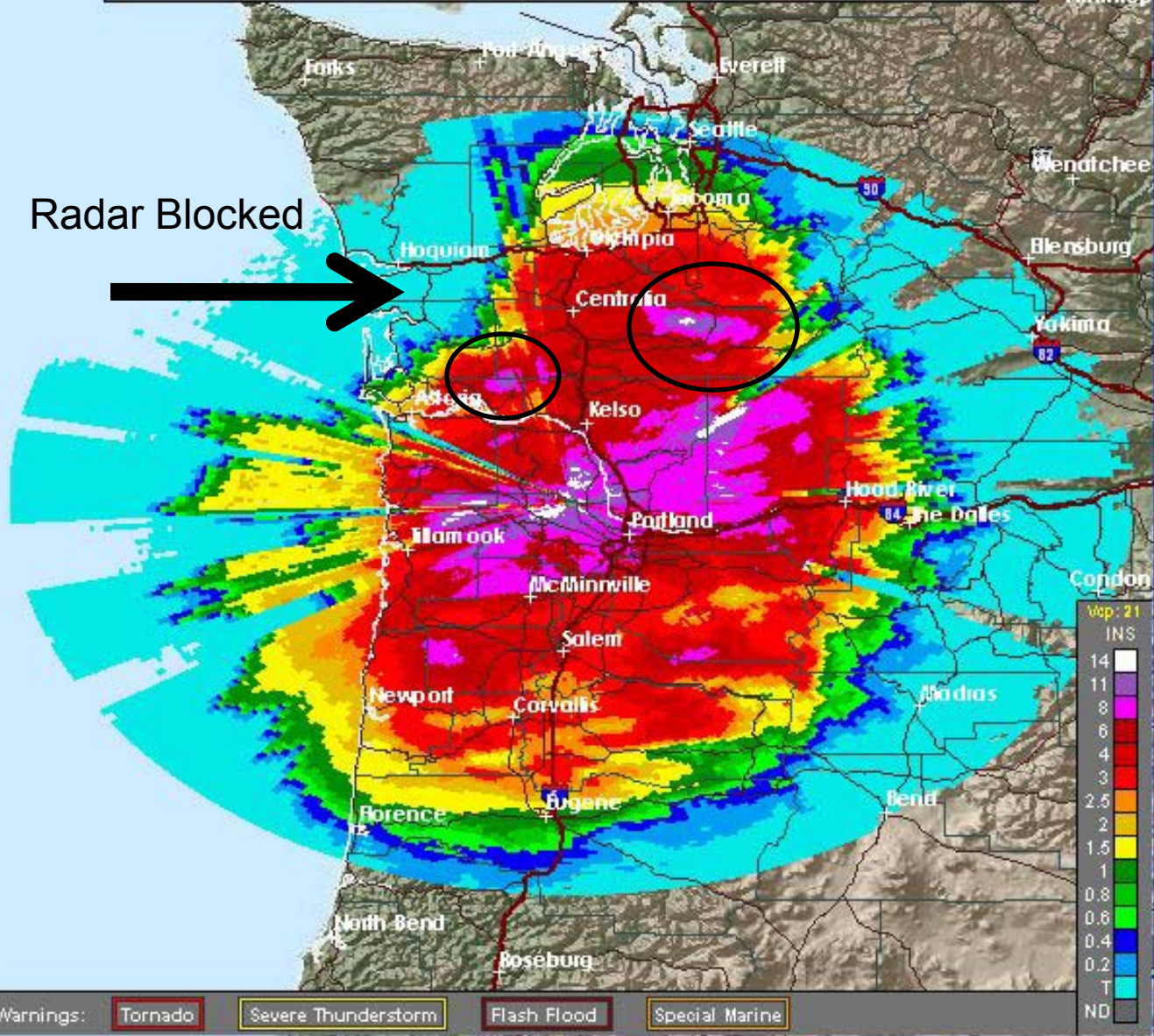
89 hours

Storm Total Precipitation

Radar Precip Est From 10:52 PM PST Fri Nov 30 2007
to 02:17 PM PST Tue Dec 04 2007

NWS Portland, OR

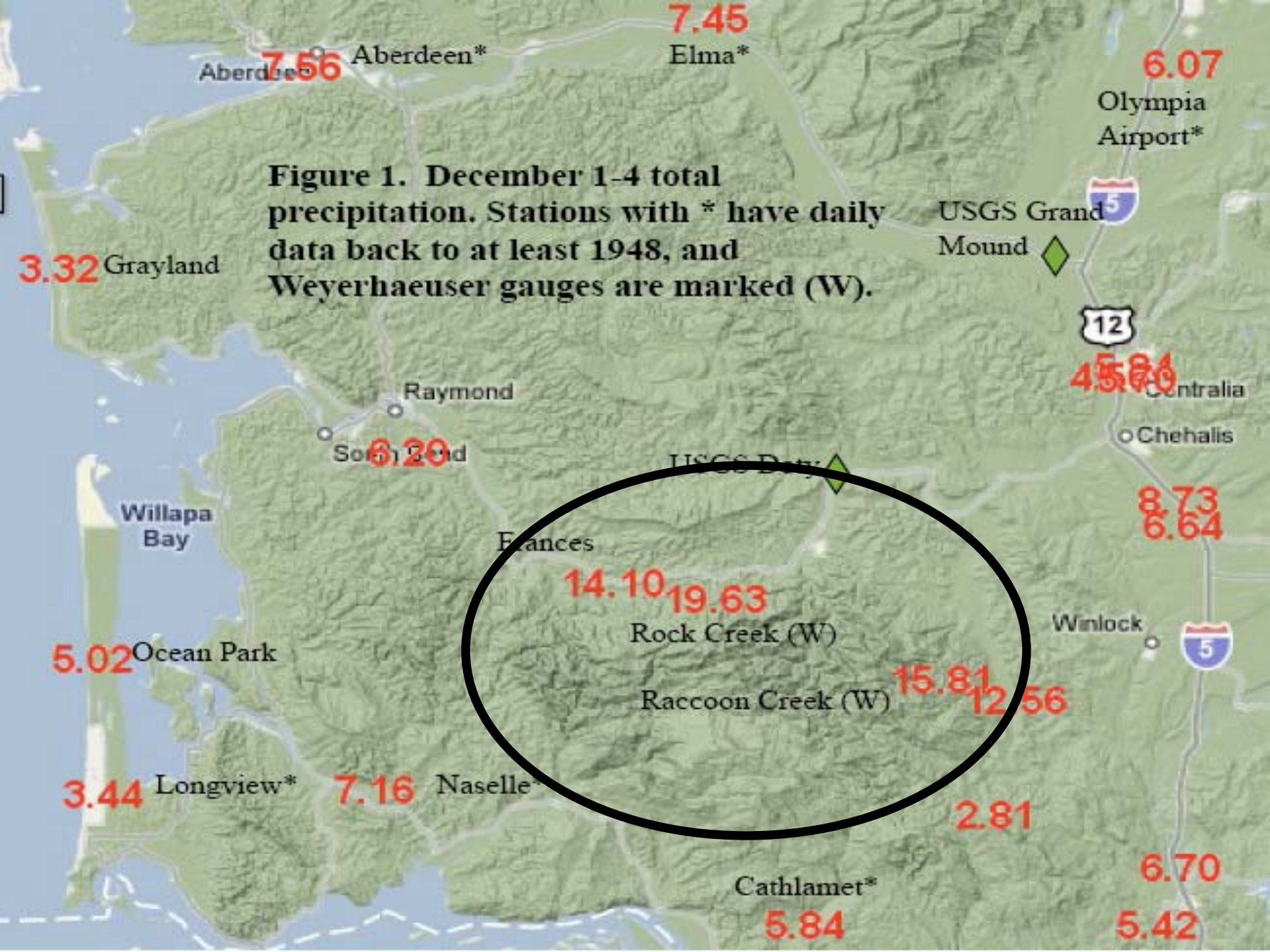
National Weather Service WSR-88D Image from: RTX 12/04/2007 22:17 UTC (2:17 PM PST)



Portland Radar Estimated Precipitation

11pm Friday thru 2pm Tuesday

87 hours





UW MM5-NAM 12km Domain

Init: 00 UTC Mon 03 Dec 07

Fcst: 0 h

Valid: 00 UTC Mon 03 Dec 07 (16 PST Sun 02 Dec 07)

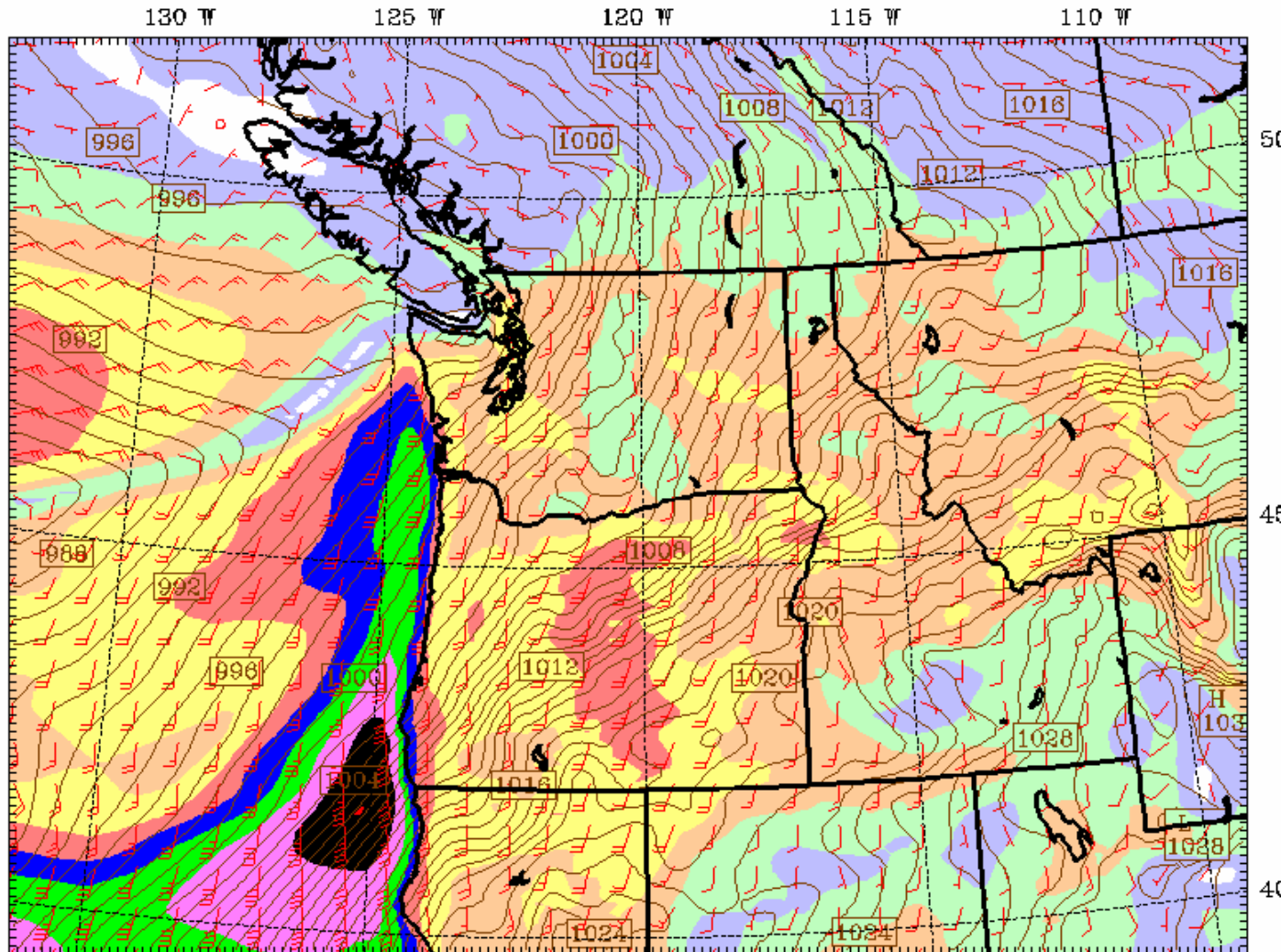
10m Wind Speed (knots)

Wind at 10m (full barb = 10kts)

Sea Level Pressure (hPa)

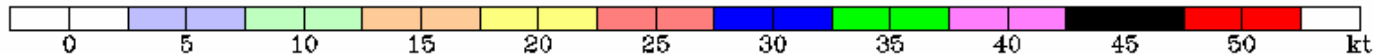
4 pm Sun Dec 2

Surface Wind Speeds



60 mph

CONTOURS: UNITS=hPa LOW= 987.00 HIGH= 1032.0 INTERVAL= 1.0000



Model info: V3.6.3 Kain-Frsc MRF PBL Simple ice 12 km, 37 levels, 36 sec

UW MM5-NAM 12km Domain

Init: 00 UTC Mon 03 Dec 07

Fcst: 6 h

Valid: 06 UTC Mon 03 Dec 07 (22 PST Sun 02 Dec 07)

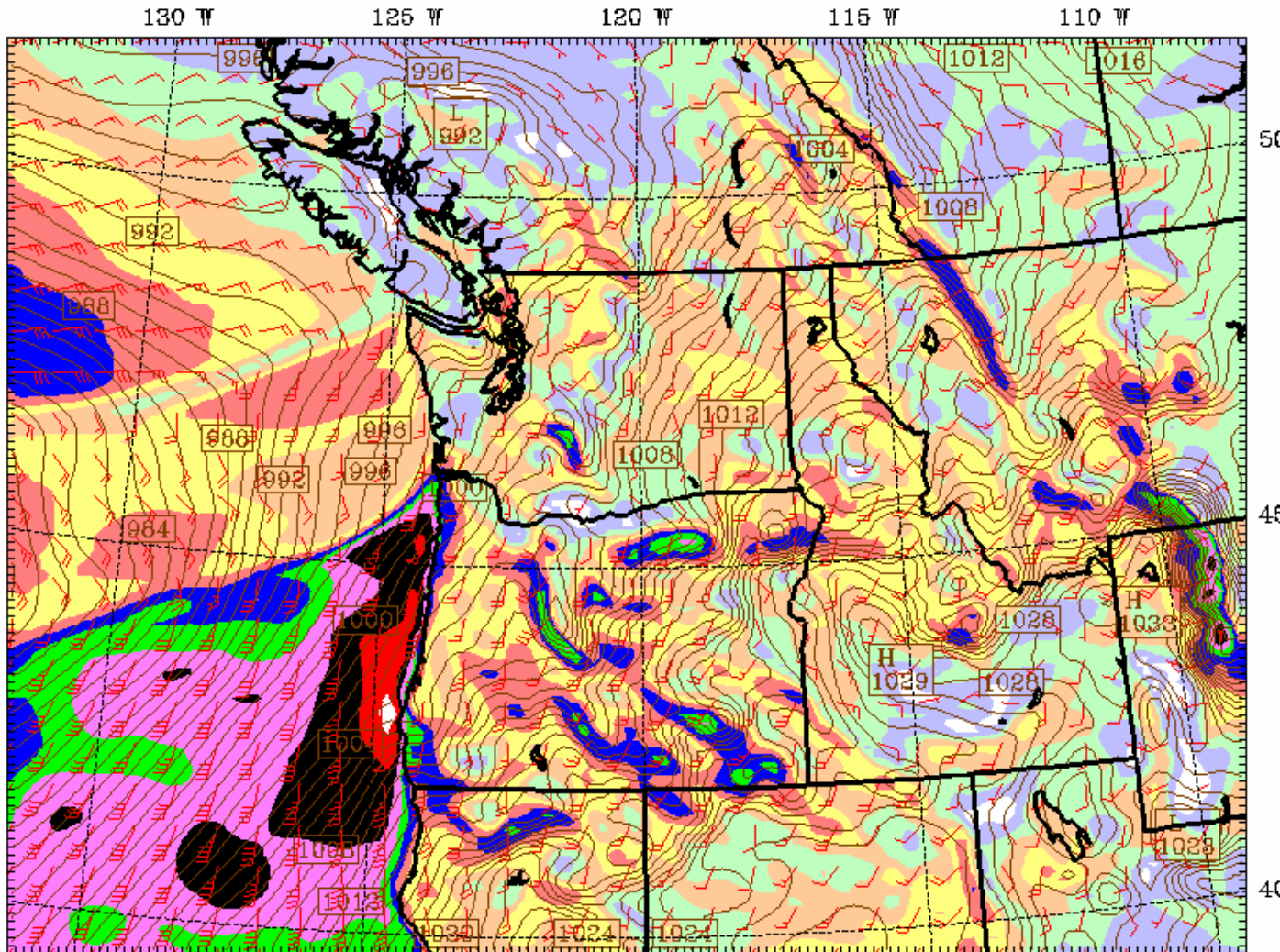
10m Wind Speed (knots)

Wind at 10m (full barb = 10kts)

Sea Level Pressure (hPa)

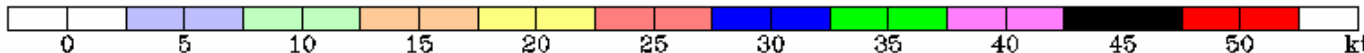
10 pm Sun Dec 2

Surface Wind Speeds



60 mph

CONTOURS: UNITS=hPa LOW= 979.00 HIGH= 1033.0 INTERVAL= 1.0000



Model info: V3.6.3 Kain-Frsch MRF PBL Simple ice 12 km, 37 levels, 36 sec

UW MM5-NAM 12km Domain

Init: 00 UTC Mon 03 Dec 07

Fcst: 12 h

Valid: 12 UTC Mon 03 Dec 07 (04 PST Mon 03 Dec 07)

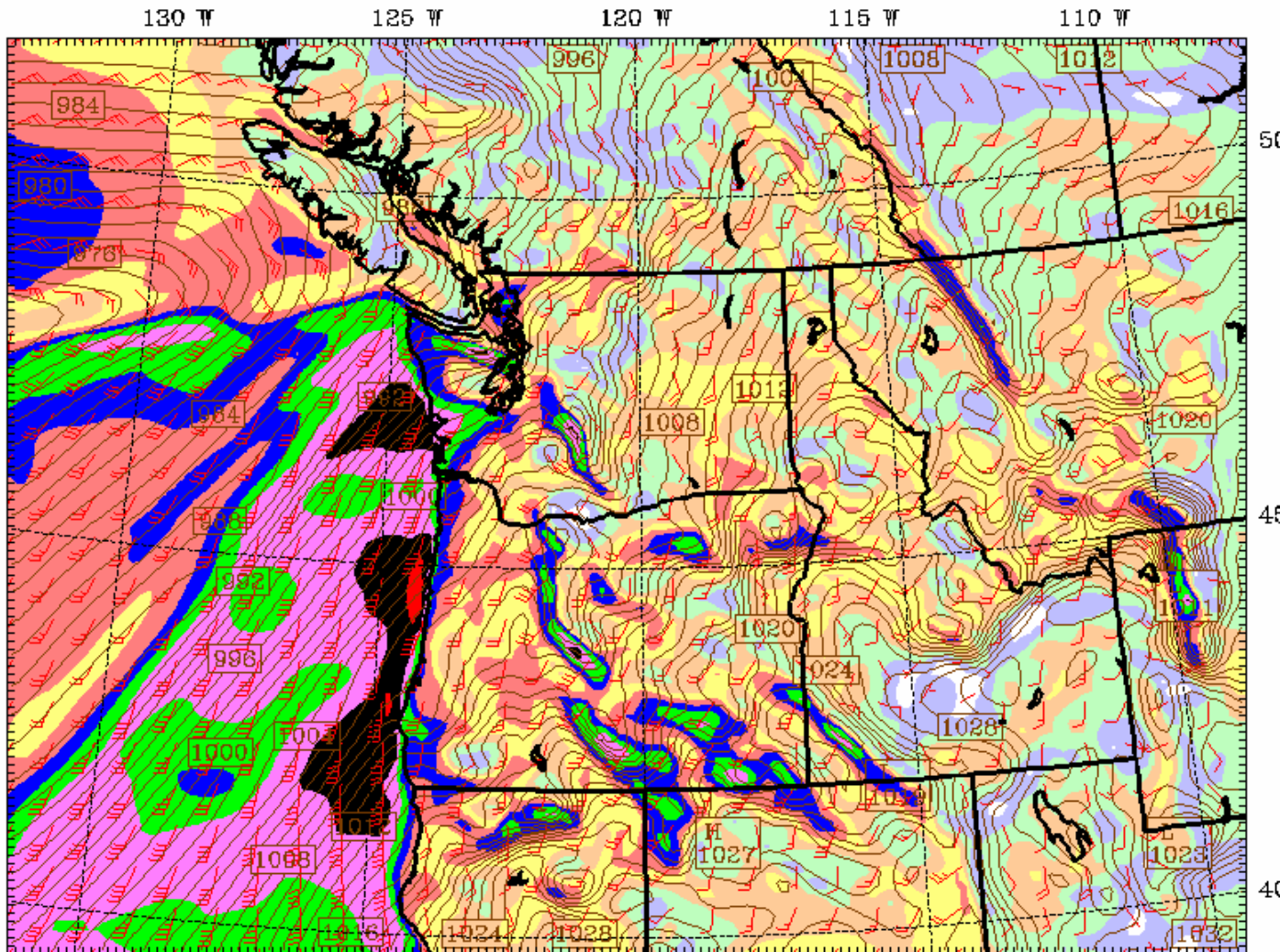
10m Wind Speed (knots)

Wind at 10m (full barb = 10kts)

Sea Level Pressure (hPa)

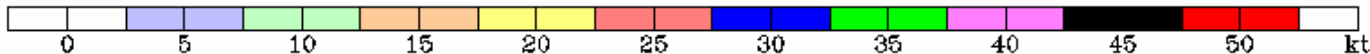
4 am Mon
Dec 3

Surface
Wind
Speeds



60 mph

CONTOURS: UNITS=hPa LOW= 973.00 HIGH= 1034.0 INTERVAL= 1.0000



Model info: V3.6.3 Kain-Frsch MRF PBL Simple ice 12 km, 37 levels, 36 sec

UW MM5-NAM 12km Domain

Init: 00 UTC Mon 03 Dec 07

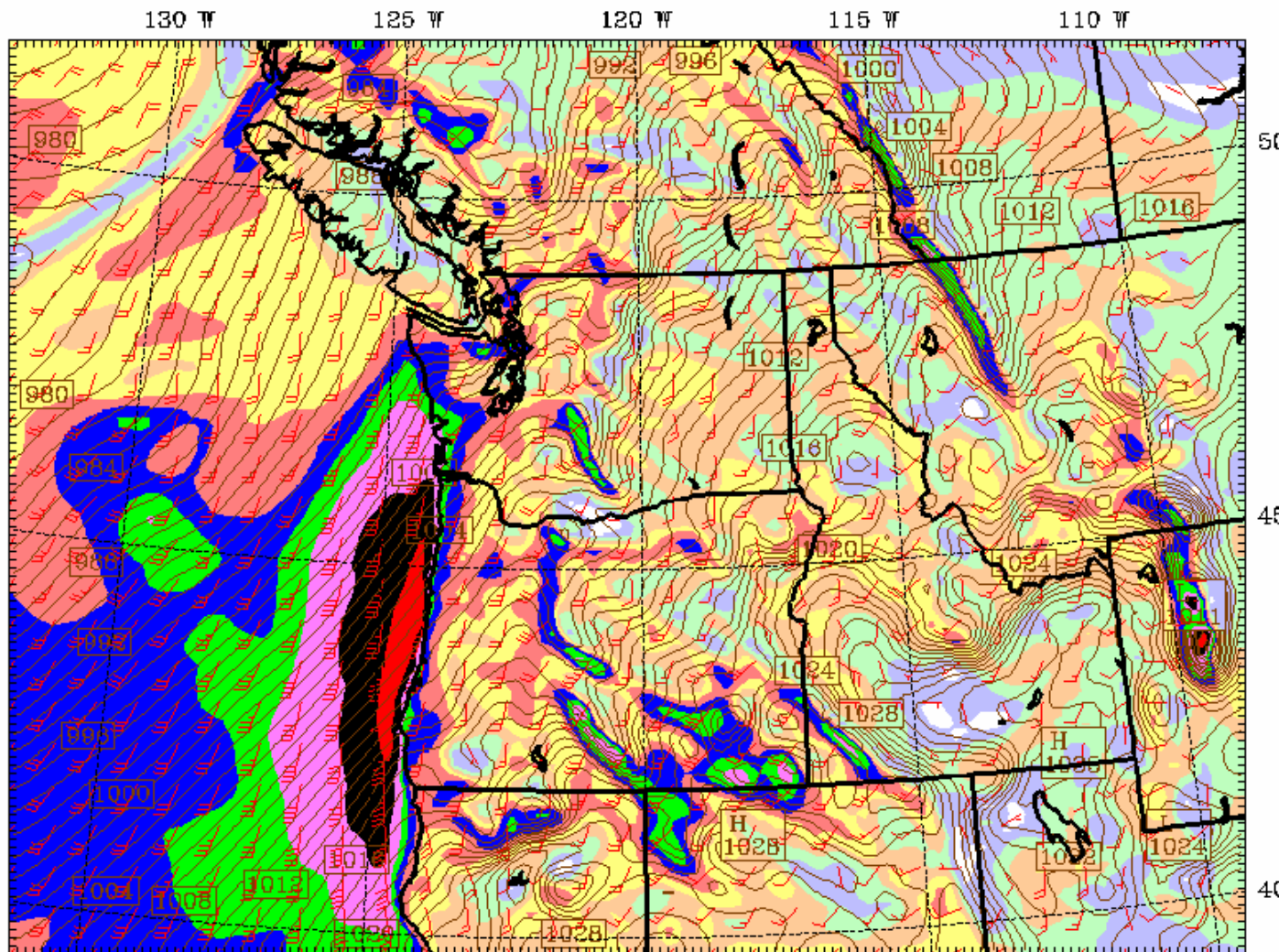
Fcst: 18 h

Valid: 18 UTC Mon 03 Dec 07 (10 PST Mon 03 Dec 07)

10m Wind Speed (knots)

Wind at 10m (full barb = 10kts)

Sea Level Pressure (hPa)

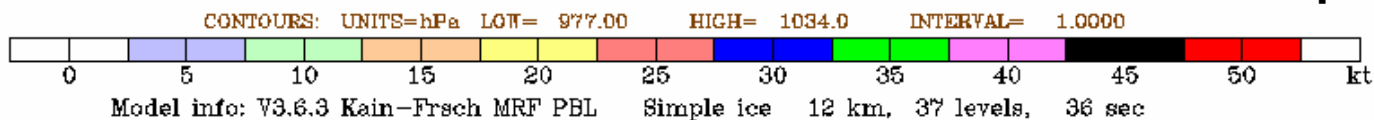


**10 am Mon
Dec 3**

**Winds
Along the
Beach...**

**70mph...
Gusts to
84+ mph**

60 mph



UW MM5-NAM 12km Domain

Init: 00 UTC Mon 03 Dec 07

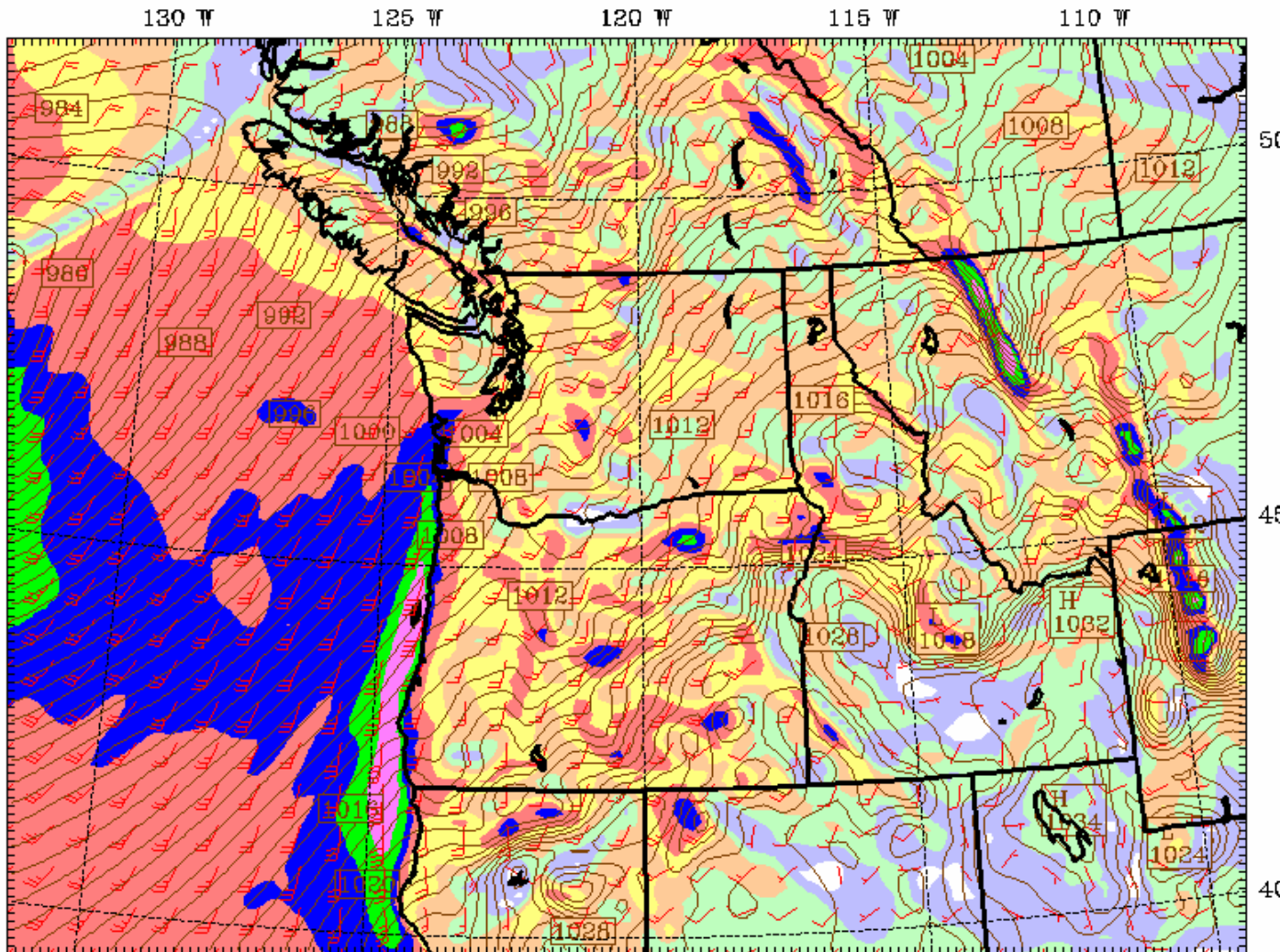
Fcst: 24 h

Valid: 00 UTC Tue 04 Dec 07 (16 PST Mon 03 Dec 07)

10m Wind Speed (knots)

Wind at 10m (full barb = 10kts)

Sea Level Pressure (hPa)



**4 pm Mon
Dec 3**

24 hours

HQM

51+mph

Gusts to

84mph

Power

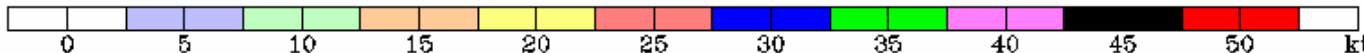
Lost...

Record

Winds

60 mph

CONTOURS: UNITS=hPa LOW= 978.00 HIGH= 1034.0 INTERVAL= 1.0000



Model info: V3.6.3 Kain-Frsch MRF PBL Simple ice 12 km, 37 levels, 36 sec

UW MM5-NAM 12km Domain

Init: 00 UTC Mon 03 Dec 07

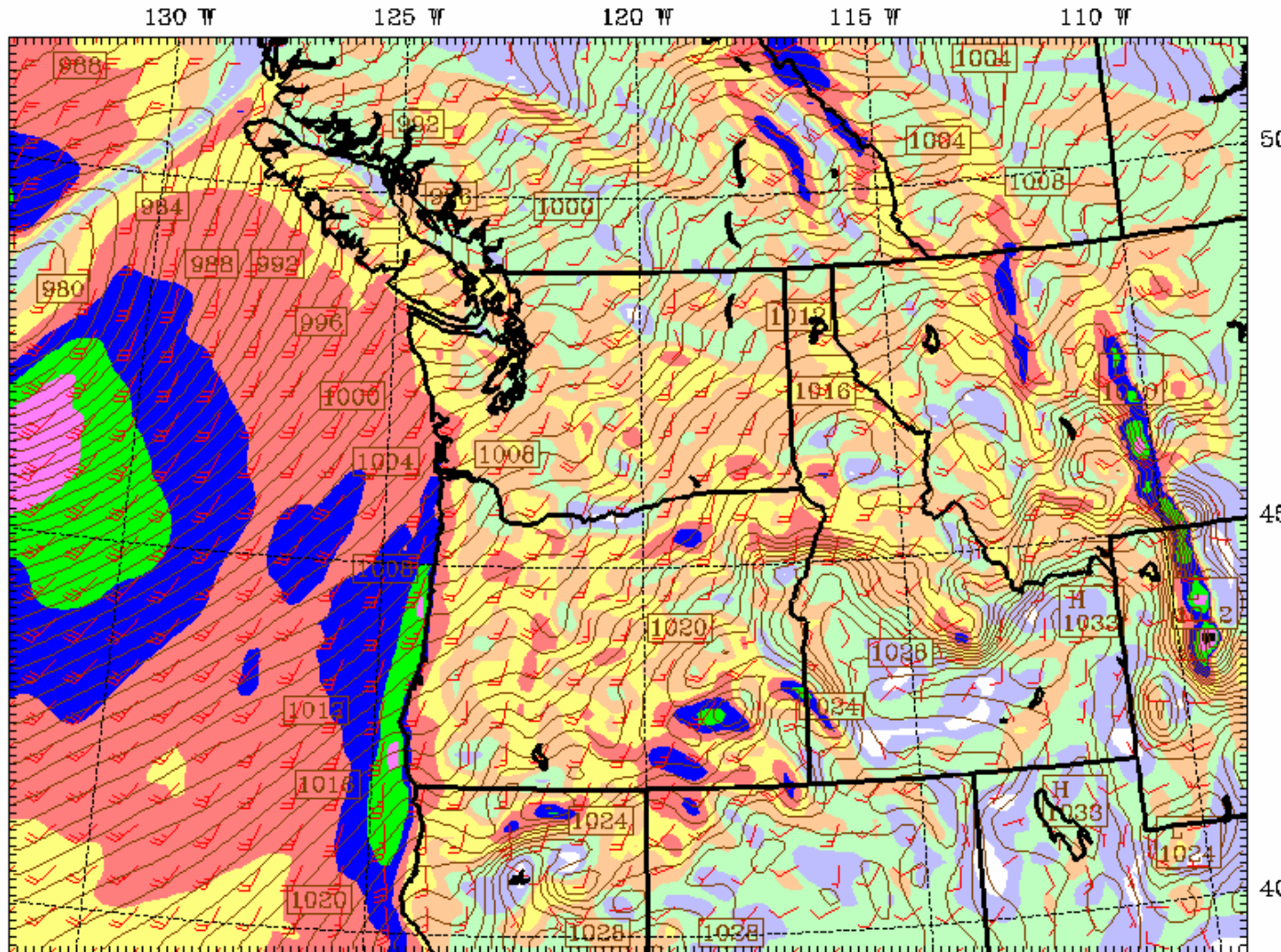
Fcst: 27 h

Valid: 03 UTC Tue 04 Dec 07 (19 PST Mon 03 Dec 07)

10m Wind Speed (knots)

Wind at 10m (full barb = 10kts)

Sea Level Pressure (hPa)



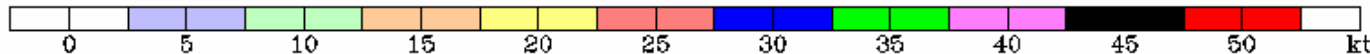
**7 pm Mon
Dec 3**

30+ hours

**Constant
Strong
Winds...**

60 mph

CONTOURS: UNITS=hPa LOW= 980.00 HIGH= 1032.0 INTERVAL= 1.0000



Model info: V3.6.3 Kain-Frsch MRF PBL Simple ice 12 km, 37 levels, 36 sec

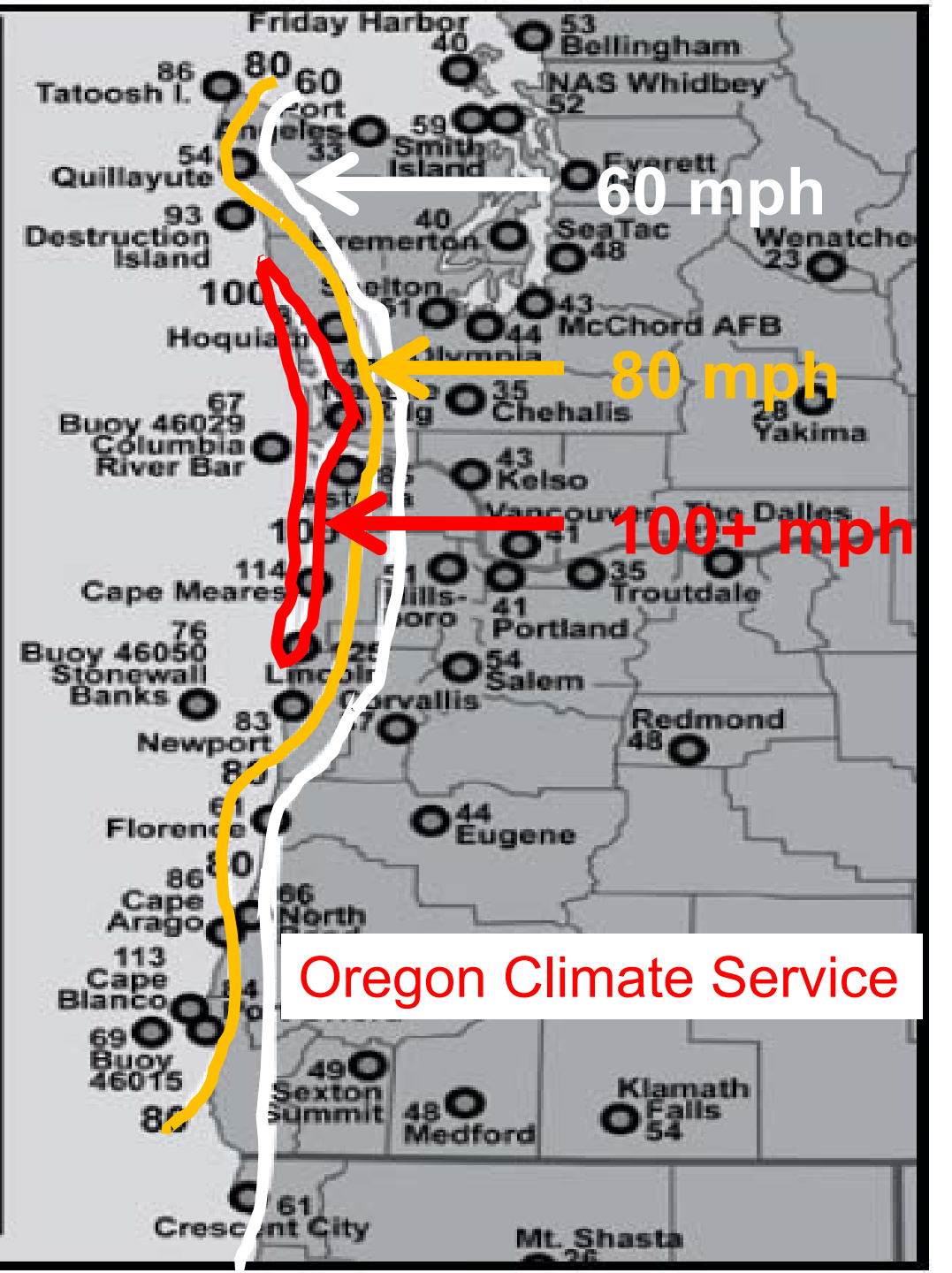
December 01-03, 2007: Peak Gusts, mph

Based on maximum wind gusts, the stretch of coast from about Newport, OR, to Hoquiam, WA, received the strongest gale since the great Columbus Day Storm of 1962. Factor in the extremely long duration of the coastal wind event, and the Dec 2007 windstorm becomes unprecedented. Add in extreme precipitation and major flooding in WA and OR, and this storm will likely go down in history as one of the great natural disasters in the Pacific Northwest.

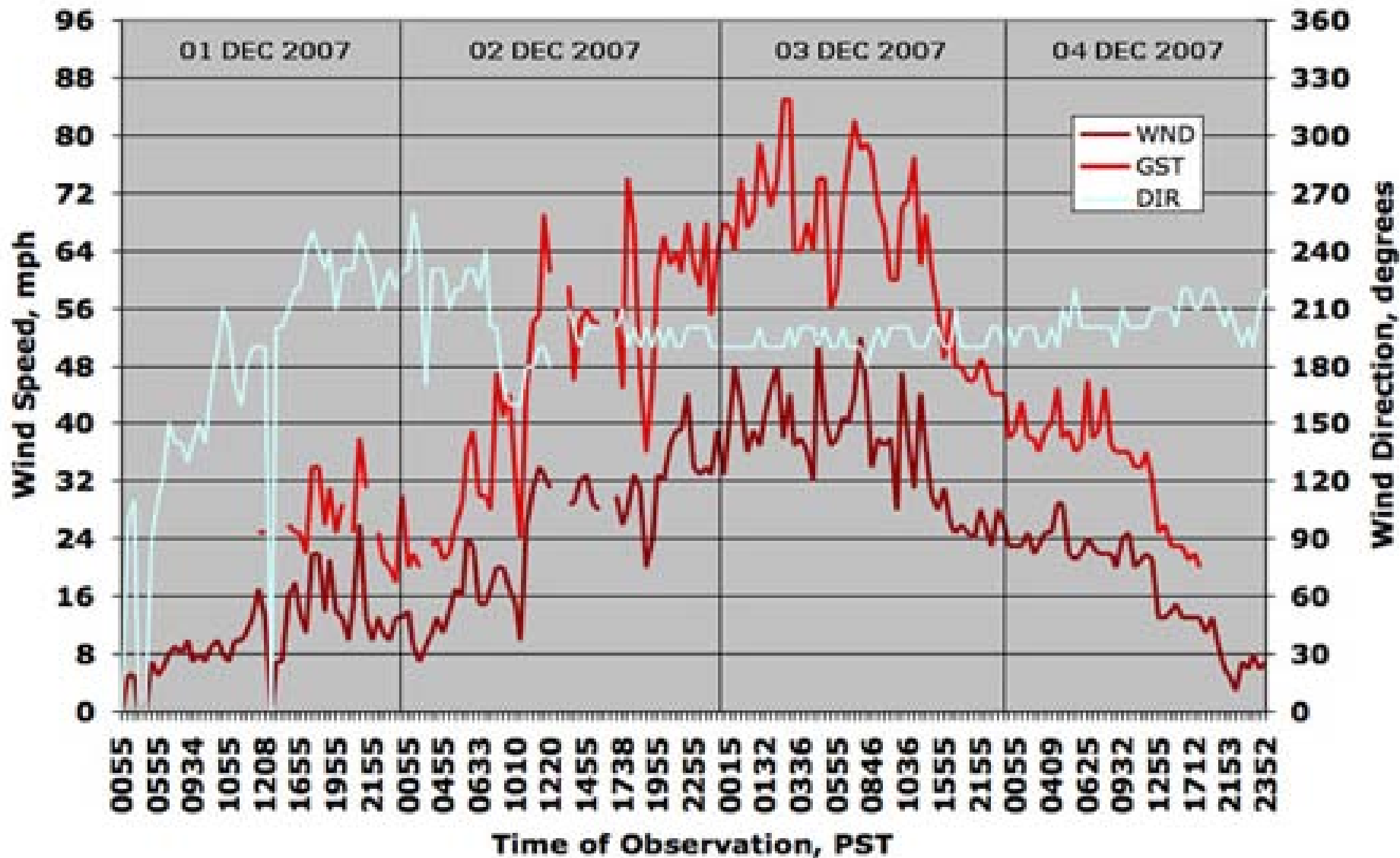
This map lists the peak gusts for the entire duration of the storm event, covering the days December 1st through 3rd. The gale arrived in two surges, with the 1st triggered by the familiar scenario of a low moving into the Olympic Peninsula. The 2nd surge of wind arrived about 12 hrs later, and was stronger in some areas.

Sources: National Weather Service, raw METAR reports and Public Information Statements, and National Data Buoy Center, raw reports.

Some readings left off this map due to space constraints include 47 mph at Fort Lewis, WA, 52 mph at the Tacoma Narrows Airport, 37 mph at Renton, 39 mph at Boeing Field, 52 mph at West Point in Seattle, 39 mph at Mt Vernon, 137 mph at Holy Cross in Pacific County, 88 mph at the Yaquina Bridge in Newport, OR, 82 mph at NWPO3 C-MAN station, Newport, 54 mph at TMKO3 Tillamook, 76 mph at the TPUD office in downtown Tillamook, 129 mph at Bay City (suspect), 71 mph sustained wind at Clatsop Spit, 91 mph gust at Mt. Hebo, 72 mph at Rockhouse RAWs (Central Coast Range), 49 mph at McMinnville, 44 mph at Aurora.



Wind and Gust at Astoria, OR, With Wind Direction 01 Dec 2007 to 04 Dec 2007



Storm Event	Peak Gust at Astoria, OR (mph)	Other Name
12-Oct-62	96	Columbus Day Storm
03-Dec-07	85	"Great Coastal Gale"?
14-Dec-06	82	Hanukkah Eve Storm
15-Jan-51	80	
16-Jan-00	78	
03-Mar-99	78	
13-Feb-79	76	Kitsap Blowdown
17-Dec-61	76	
20-Dec-61	76	
16-Jan-86	75	
03-Nov-58	75	
15-Dec-95	74	Big Blast
15-Dec-97	74	
20-Jan-93	72	Inauguration Day Storm
27-Apr-62	71	
27-Dec-02	70	
26-Mar-71	70	
09-Jan-53	70	
14-Nov-81	68	Friday-the-13th Storm
07-Jan-53	66	
27-Oct-50	65	

Note: Peak gusts from 1995-2006 are adjusted upward to account for a 5-second averaging period. Source Oregon Climate Service





EXIT 77
6 WEST
Pe Ell
Raymond

Walmart





I-5 Chehalis, Wa

