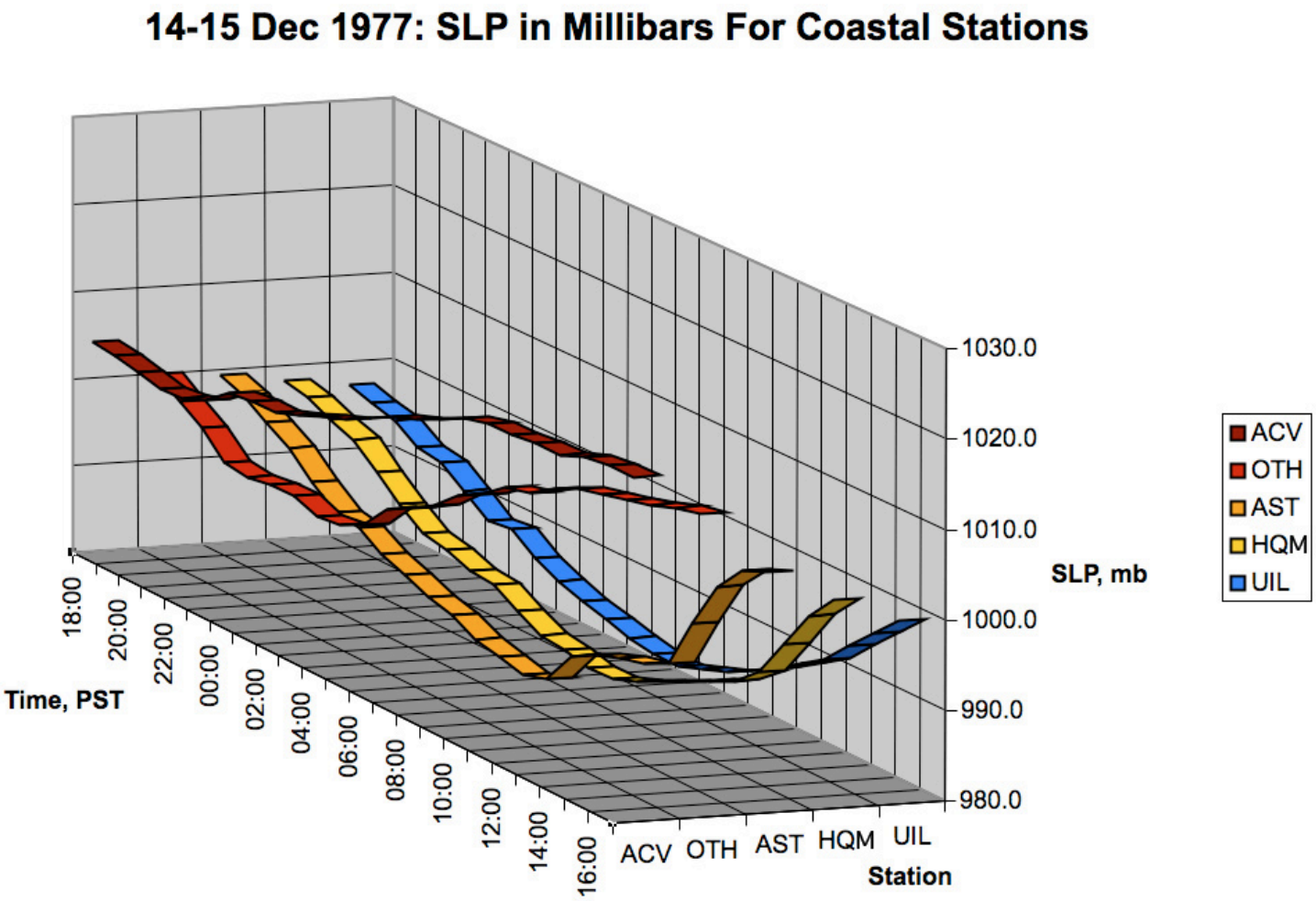
A special class of intense Pacific-Northwest windstorm generated by extratropical cyclones in the explosive development phase at landfall

Wolf Read

Washington Department of
Natural Resources

15 Dec 1977


14-15 Dec 1977: SLP in Millibars For Coastal Stations
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Station
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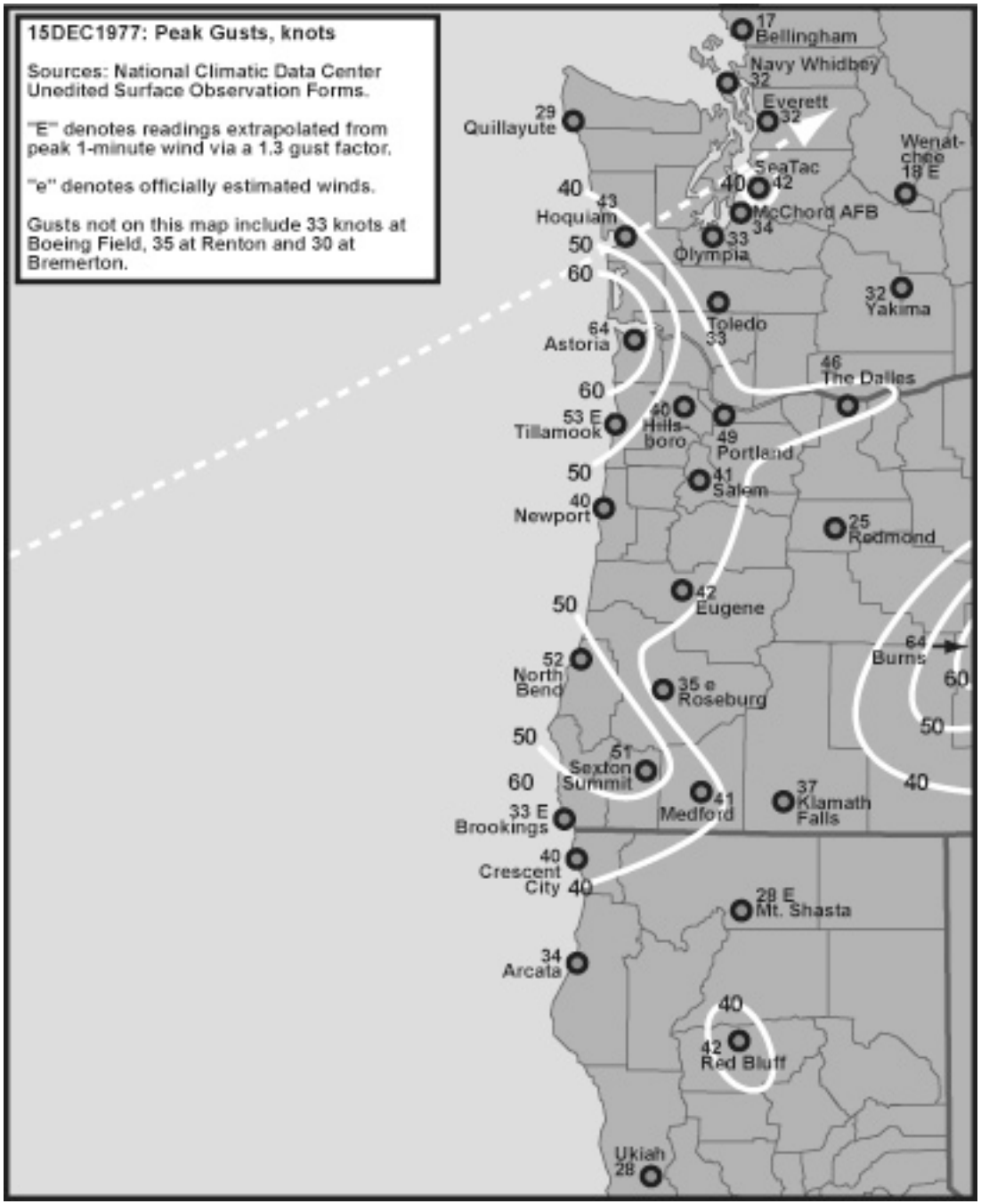
OTH
AST
HQM
UIL
SLP, mb
1030.0
1020.0
1010.0
1000.0
990.0
980.0
ACV
OTH
AST
HQM
UIL

982 mb Cyclone Moves NE over Hoquiam

Highest gust coast:
64 kt @ AST

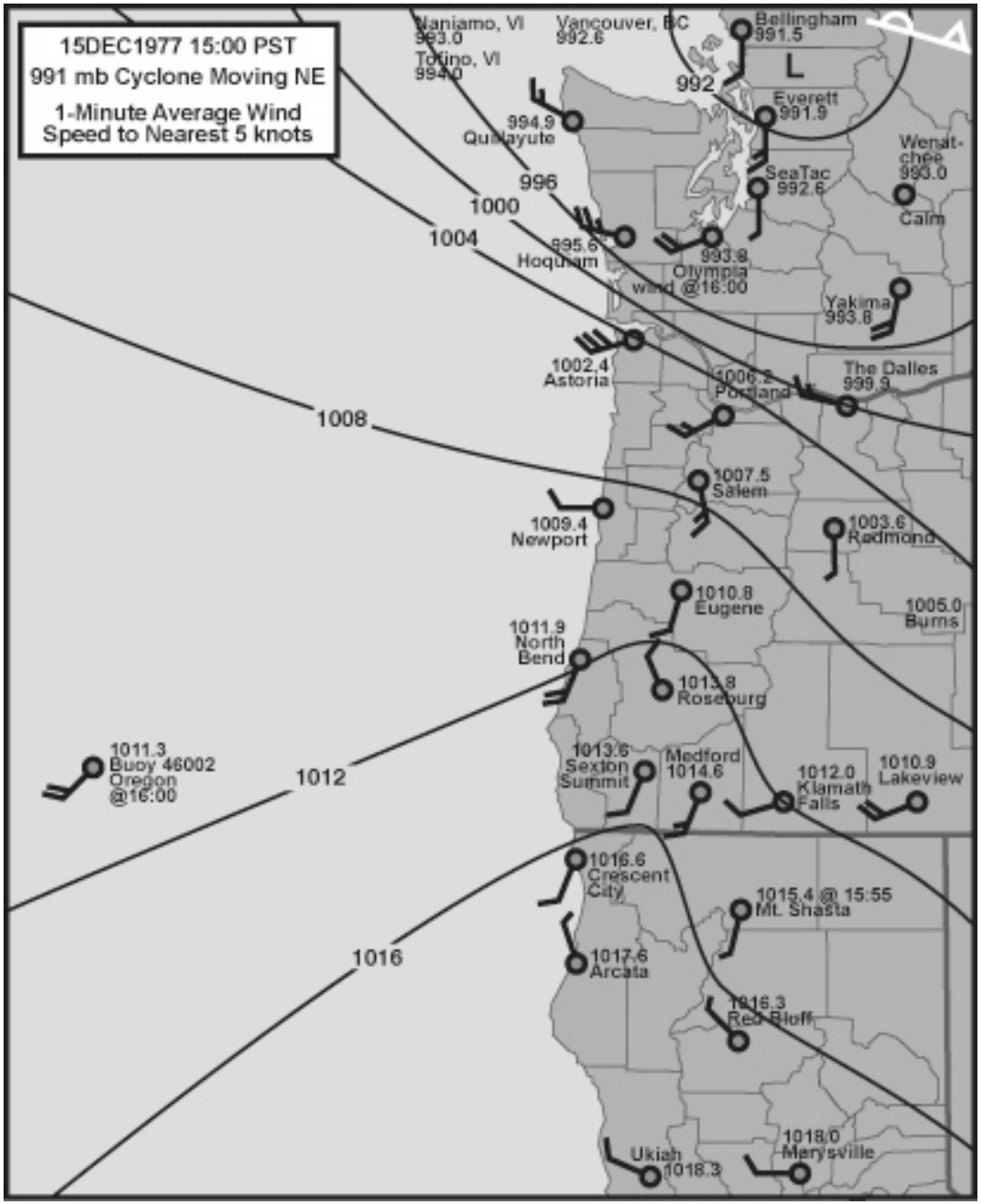
Highest gust interior:
49 kt @ PDX

Fairly intense winds, but other storms have done better!

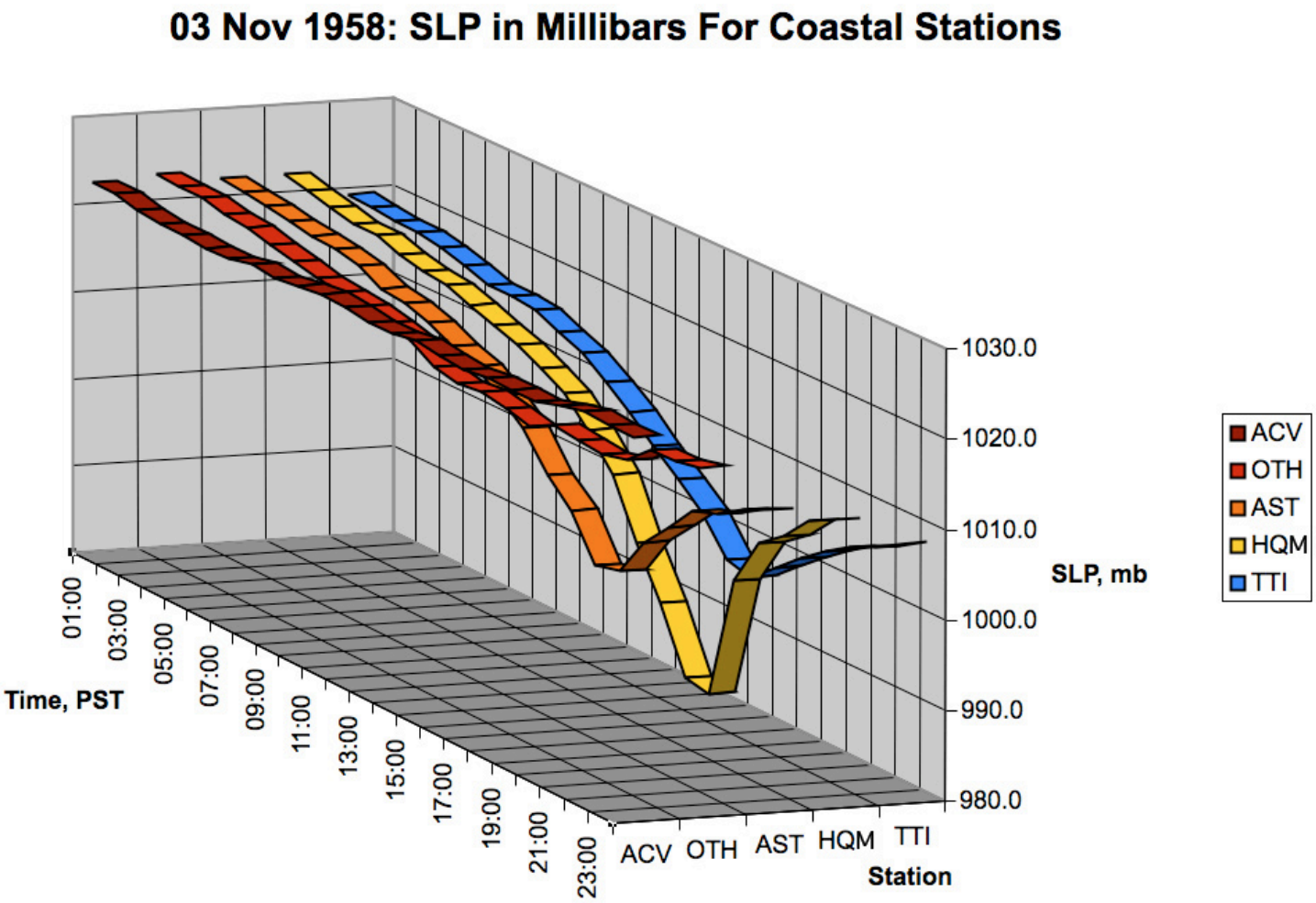


982 mb Cyclone Moves NE over Hoquiam

- Broad center: Mature, degrading, low
- Narrow band of tight gradient far south of storm center somewhat unique



03 Nov 1958


03 Nov 1958: SLP in Millibars For Coastal Stations
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ACV
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AST
HQM
TTI
Station
1030.0
1020.0
1010.0
1000.0
990.0
980.0
SLP, mb
ACV
OTH
AST
HQM
TTI

985 mb Cyclone Moves ENE over Hoquiam

Highest gusts coast:

70 kt @ HQM

65 kt @ AST

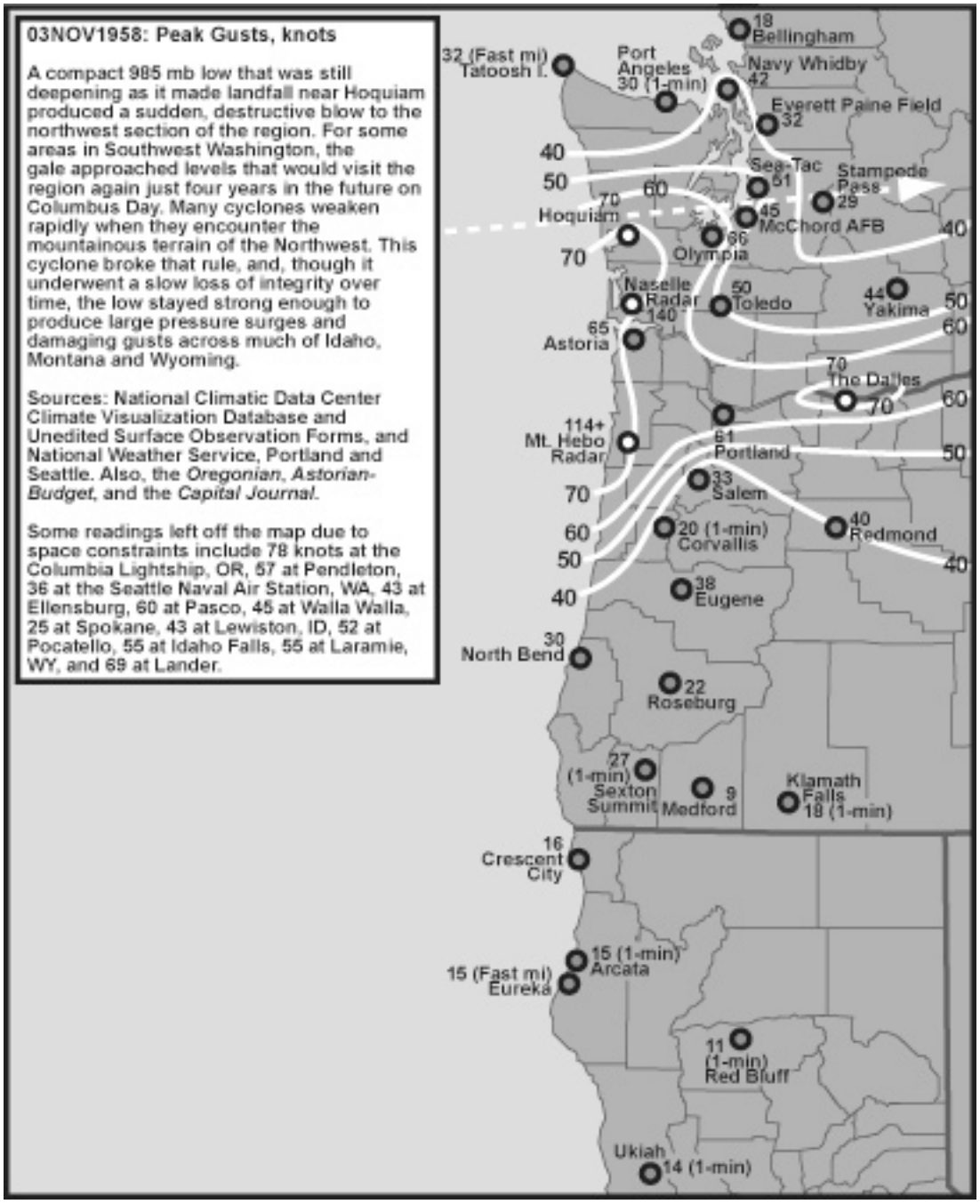
Highest gusts interior:

70 kt @ DLS

66 kt @ OLM

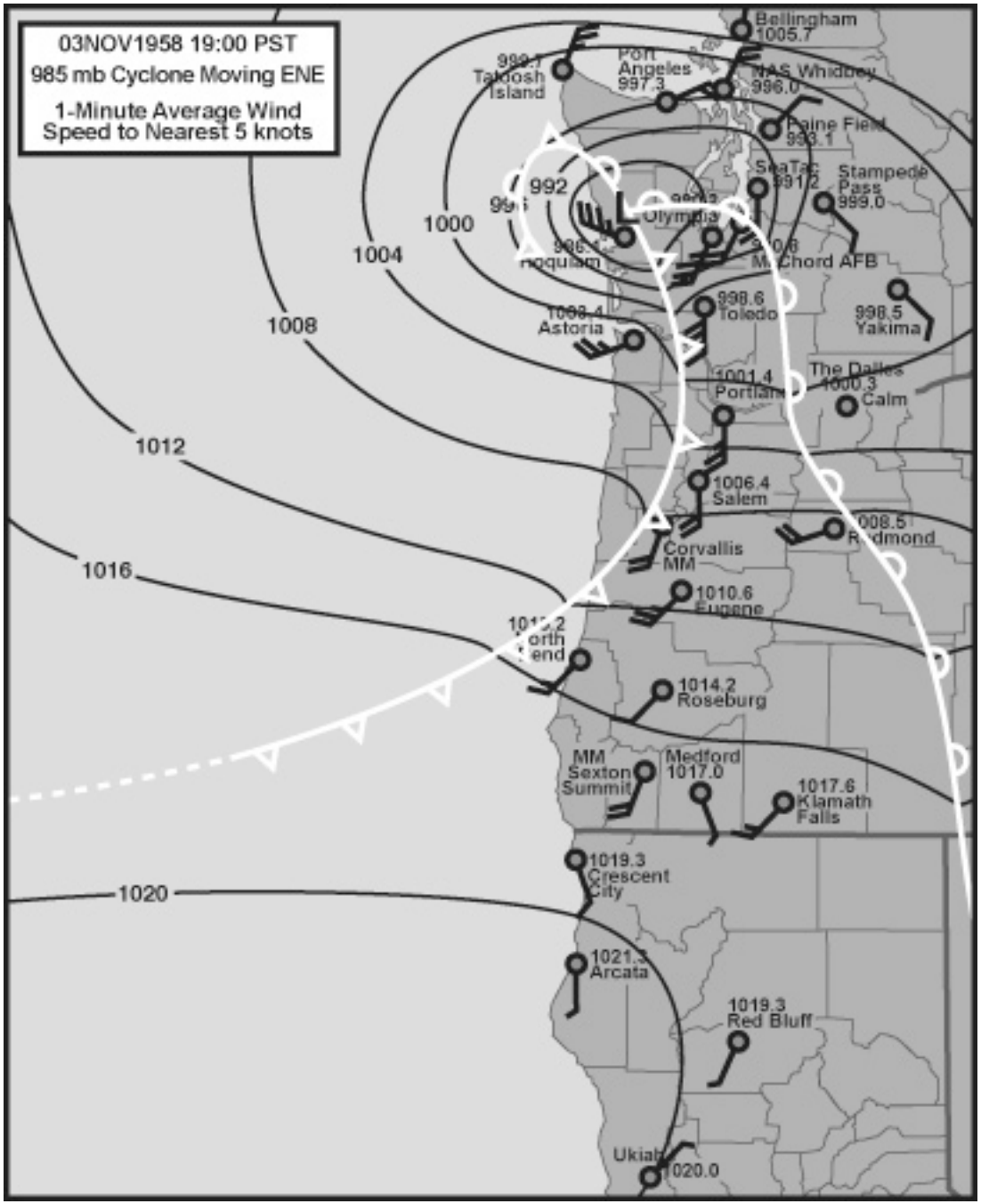
61 kt @ PDX

1-minute winds of 45 to 52 kt at coastal and interior stations!

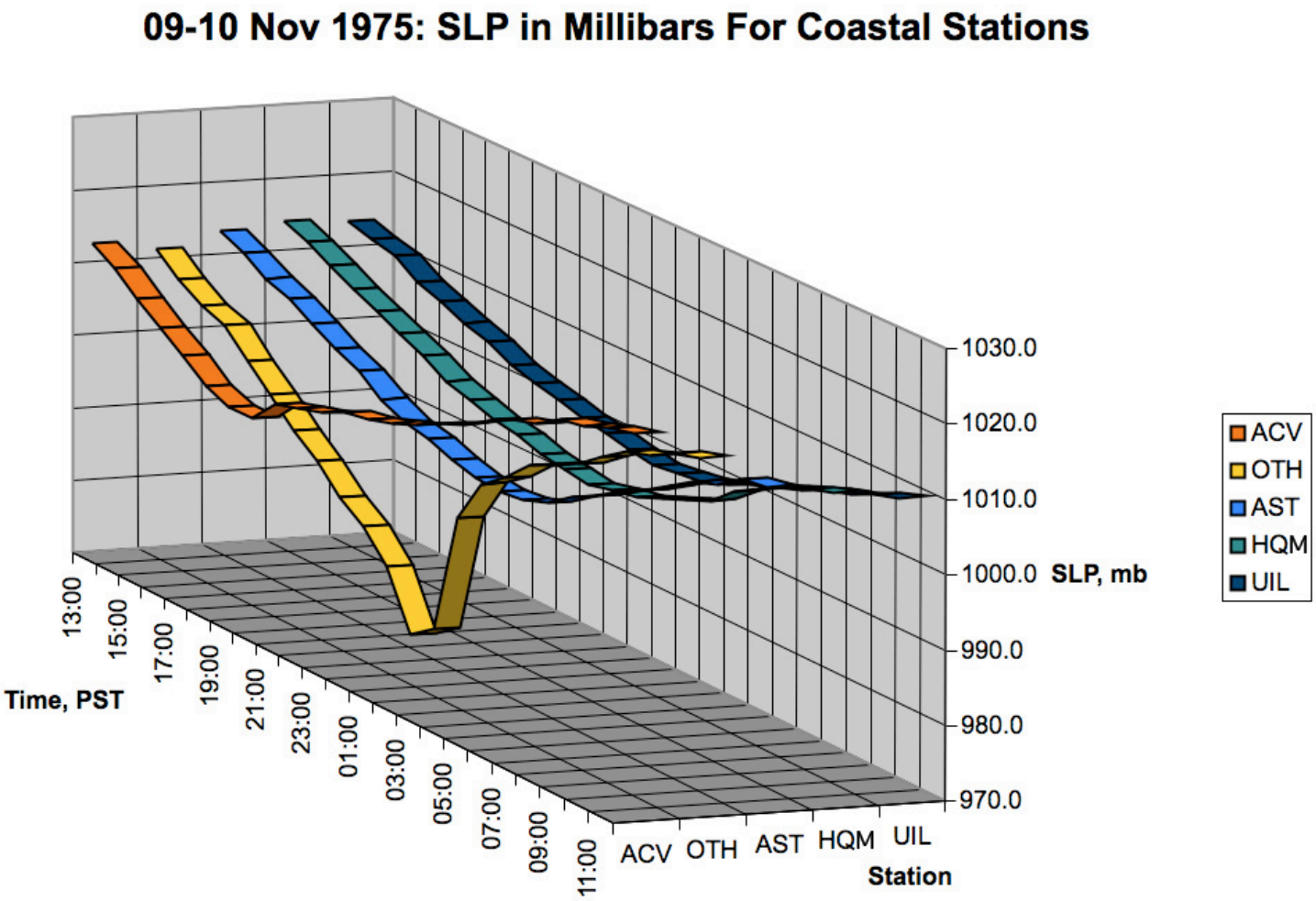


985 mb Cyclone Moves ENE over Hoquiam

- Compact center, well-defined frontal boundaries: Explosively developing low
- Intense gradient in all directions around low center, like a hurricane



10 Nov 1975


09-10 Nov 1975: SLP in Millibars For Coastal Stations
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970.0
SLP, mb
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UIL
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01:00
03:00
05:00
07:00
09:00
11:00
Time, PST
ACV
OTH
AST
HQM
UIL
Station

975 mb Cyclone Moves NE over North Bend

Highest gusts coast:

65 kt @ OTH

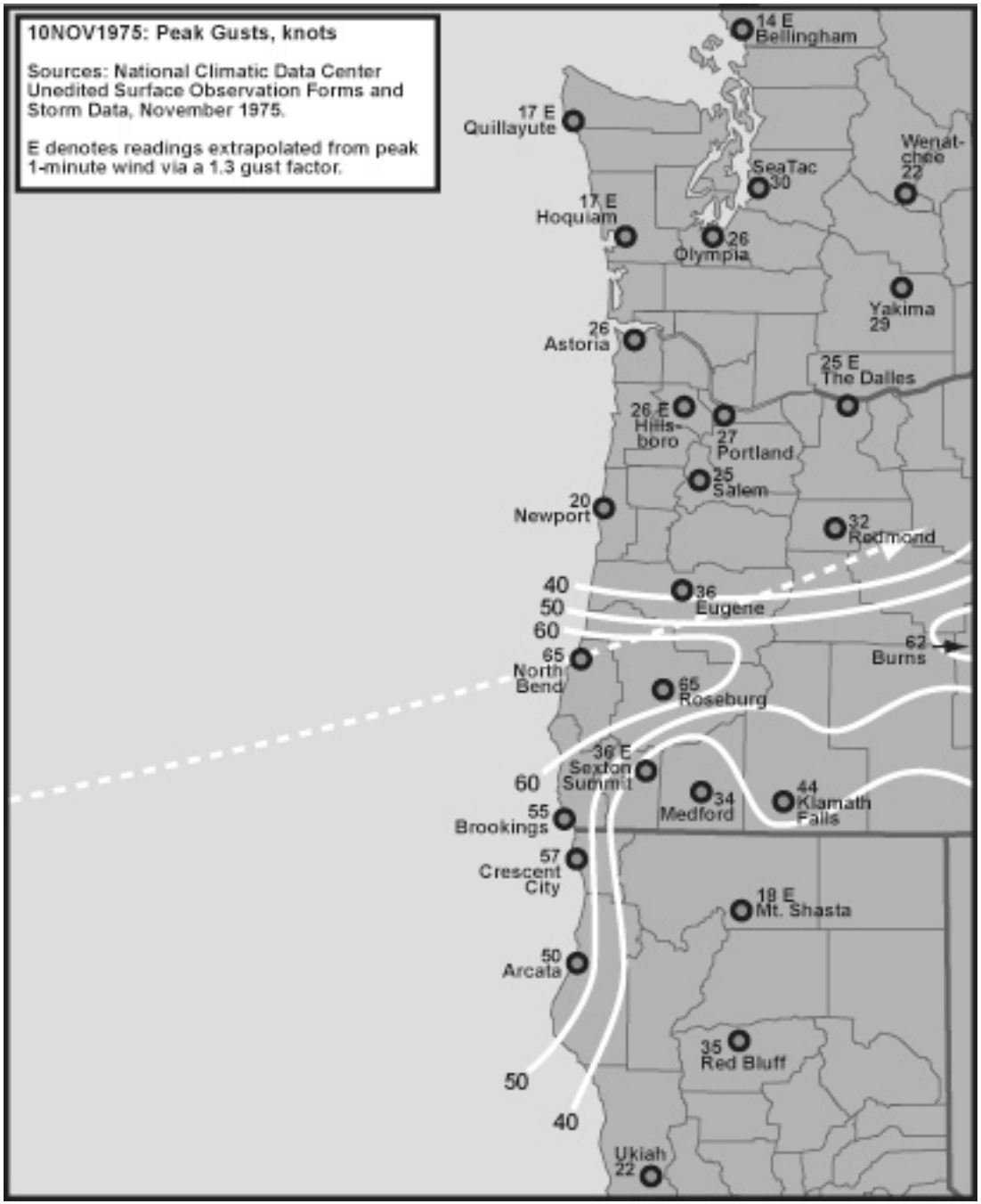
57 kt @ CEC

Highest gusts interior:

65 kt @ RBG

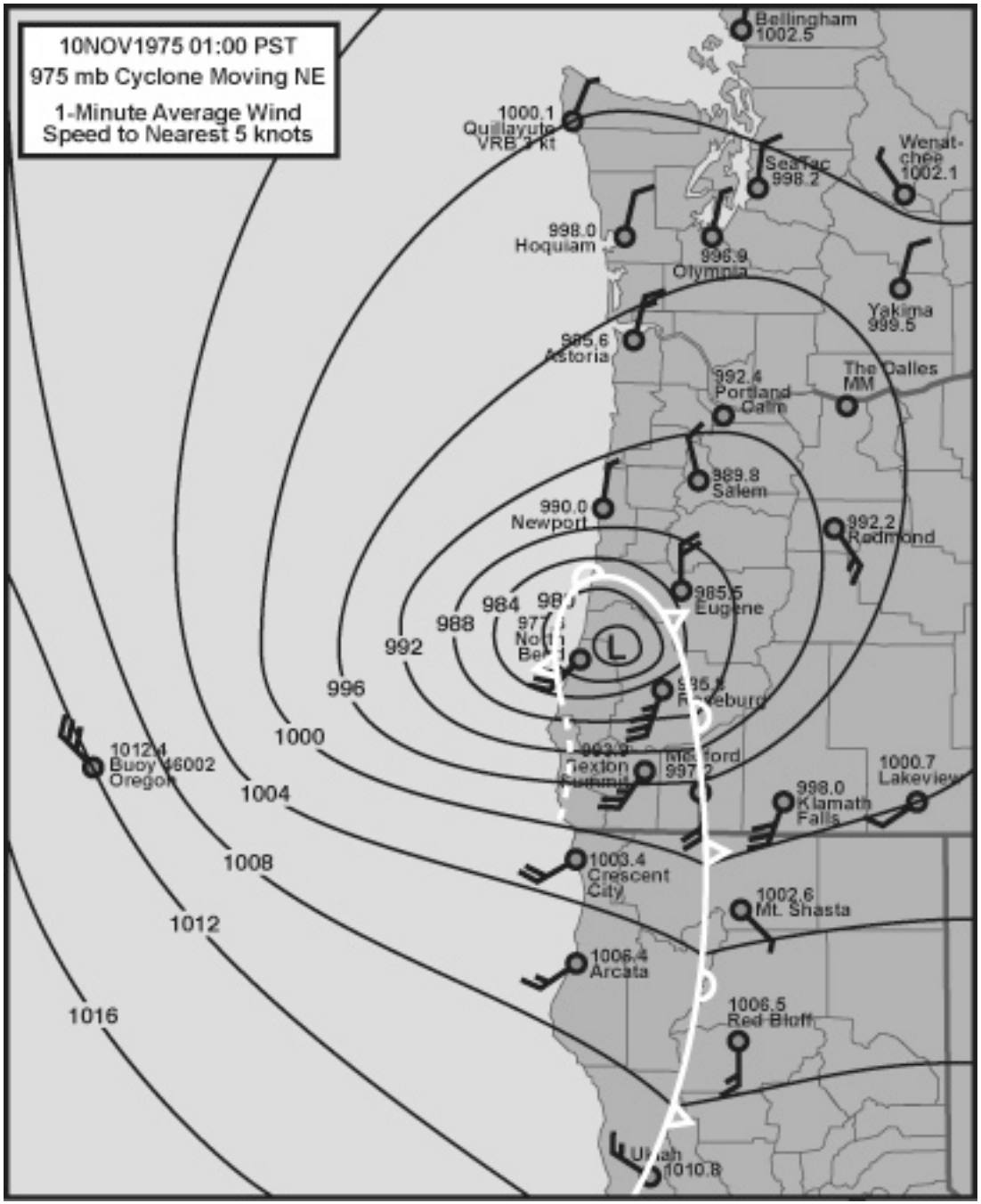
62 kt @ BNS

1-minute winds of 50 kt at OTH. Unofficial gusts of 85 kt on SW OR coast.

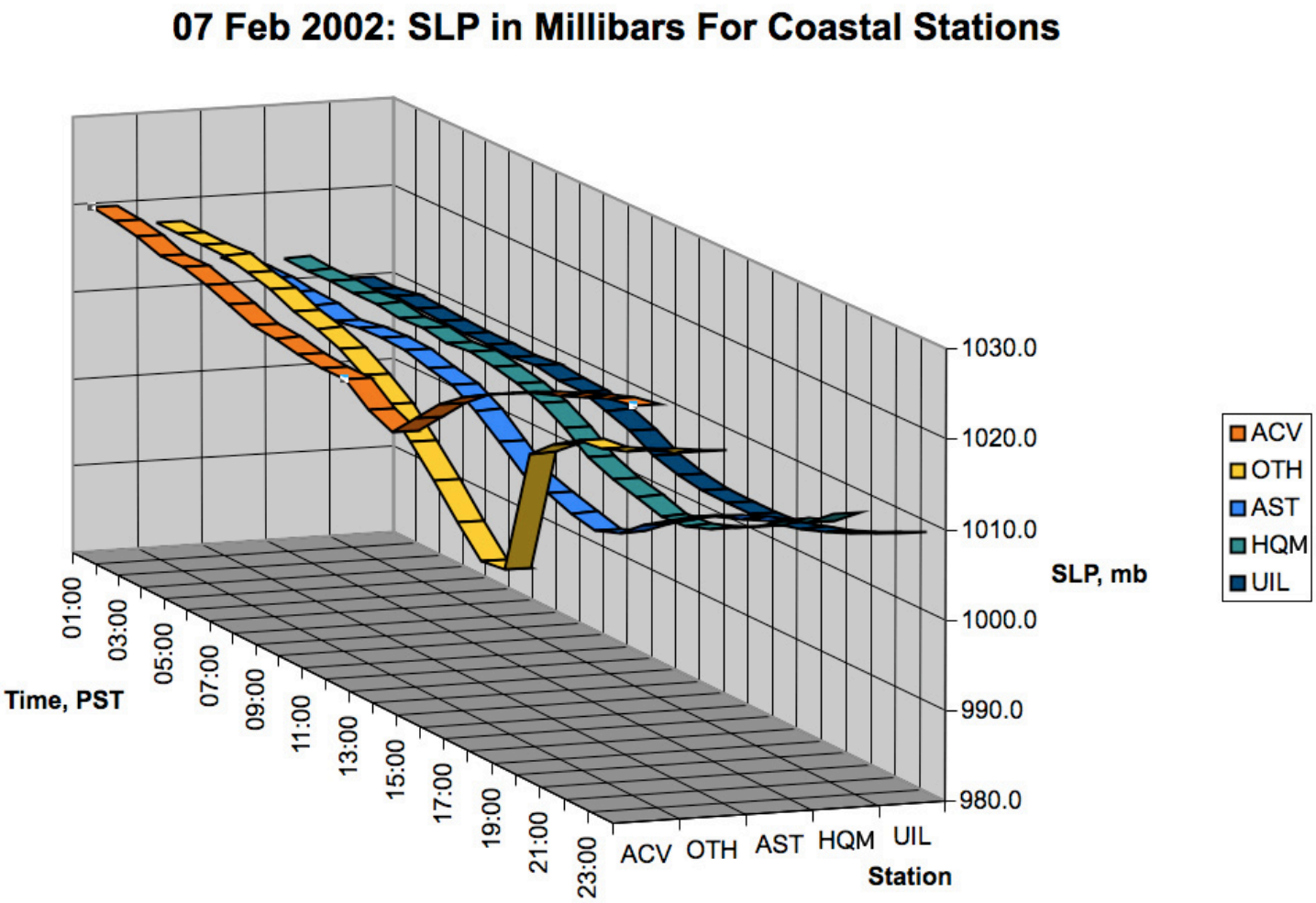


975 mb Cyclone Moves NE over North Bend

- Like 03 Nov 1958: compact center, but frontal components not as well-defined: Still, an explosively developing low
- Intense gradient in all directions around low center, like a hurricane



07 Feb 2002


07 Feb 2002: SLP in Millibars For Coastal Stations
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23:00
ACV
OTH
AST
HQM
UIL
Station
1030.0
1020.0
1010.0
1000.0
990.0
980.0
SLP, mb
ACV
OTH
AST
HQM
UIL

994 mb Cyclone Moves NE over North Bend

Highest gusts coast:

80 kt @ CARO3

77 kt @ Bandon*

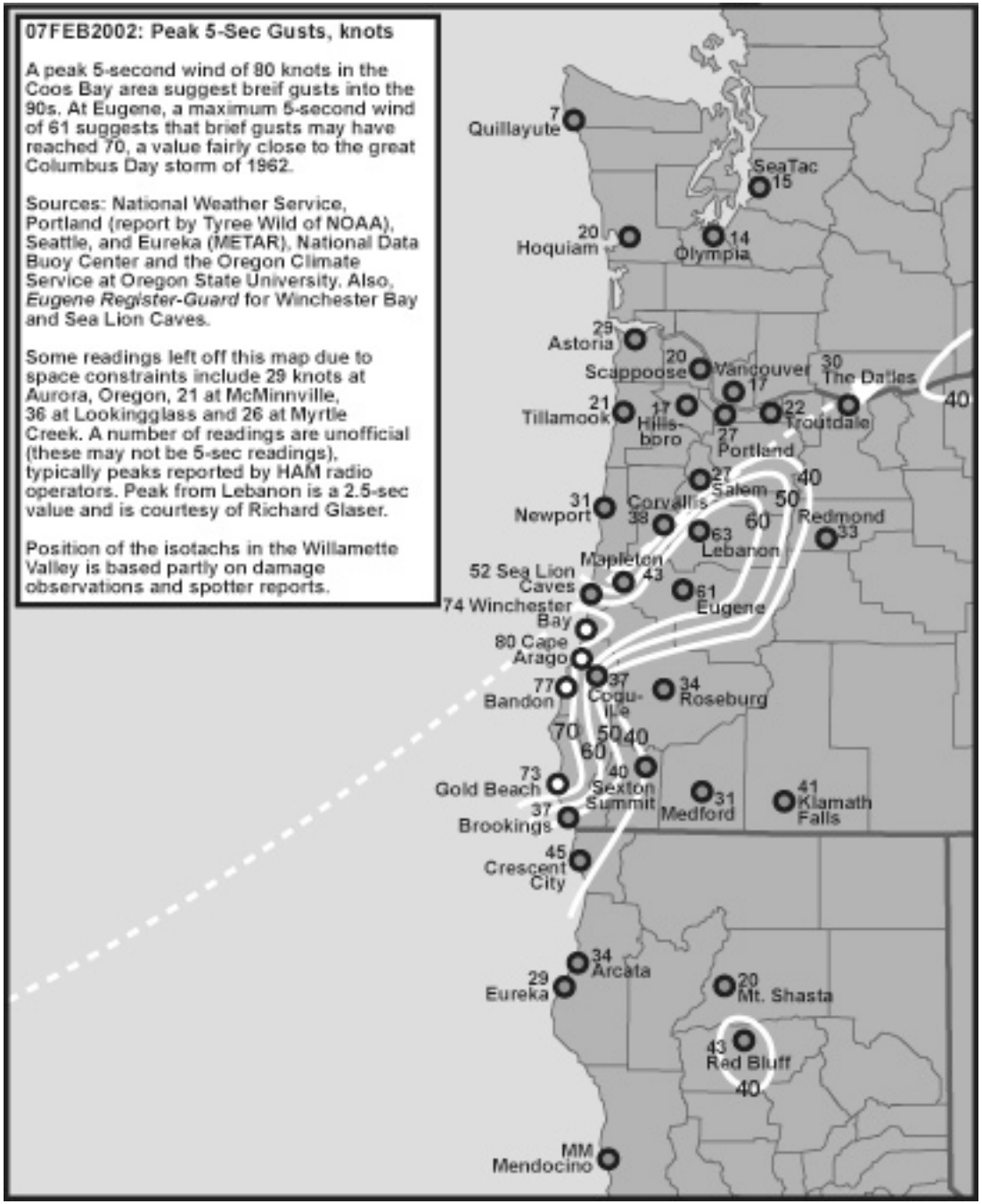
Highest gusts interior:

63 kt @ Lebanon*

61 kt @ EUG

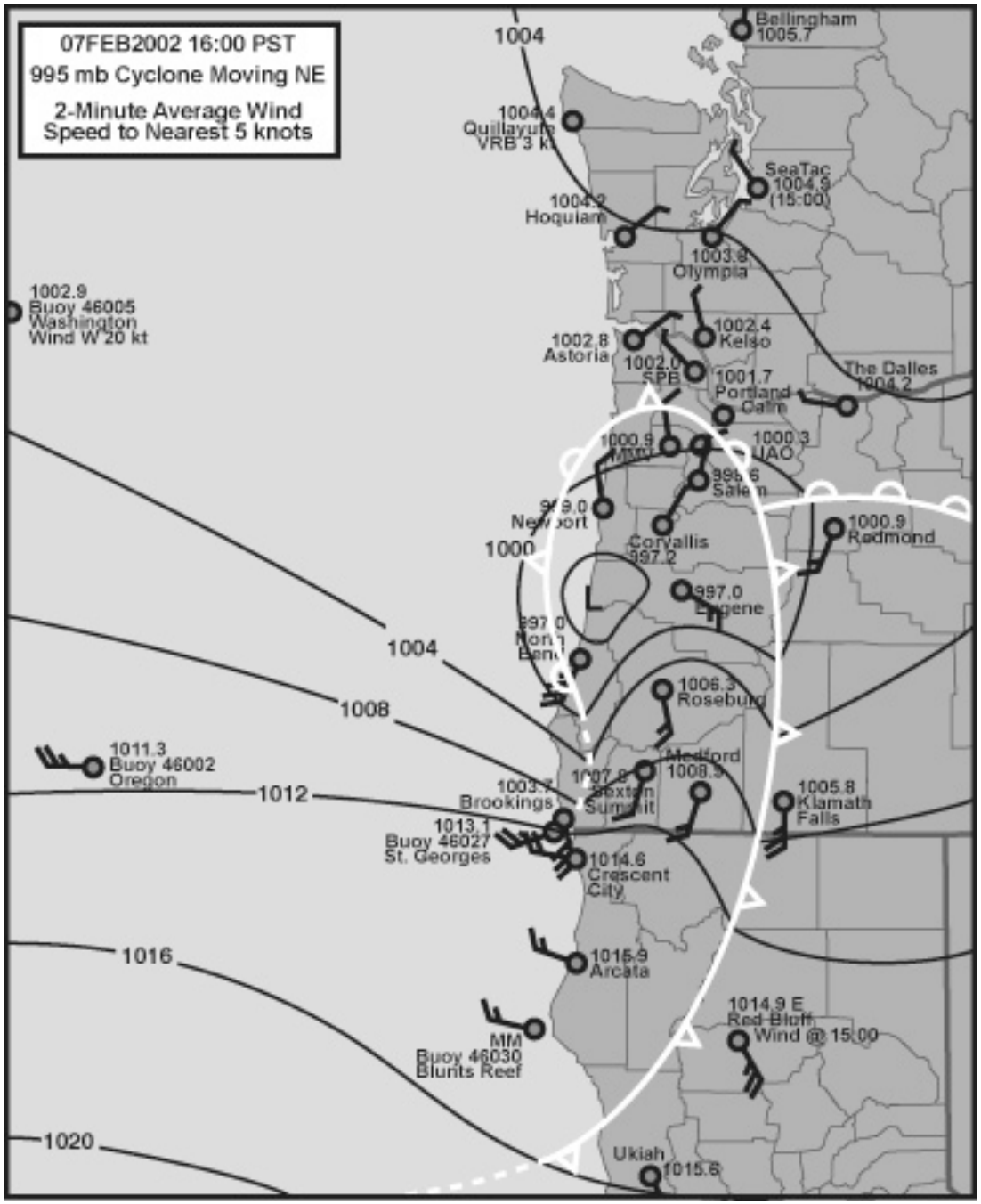
2-minute wind of 65 kt at CARO3, 43 kt at EUG. 30-minute wind 43 kt at Lebanon.*

** Unofficial.*



994 mb Cyclone Moves NE over North Bend

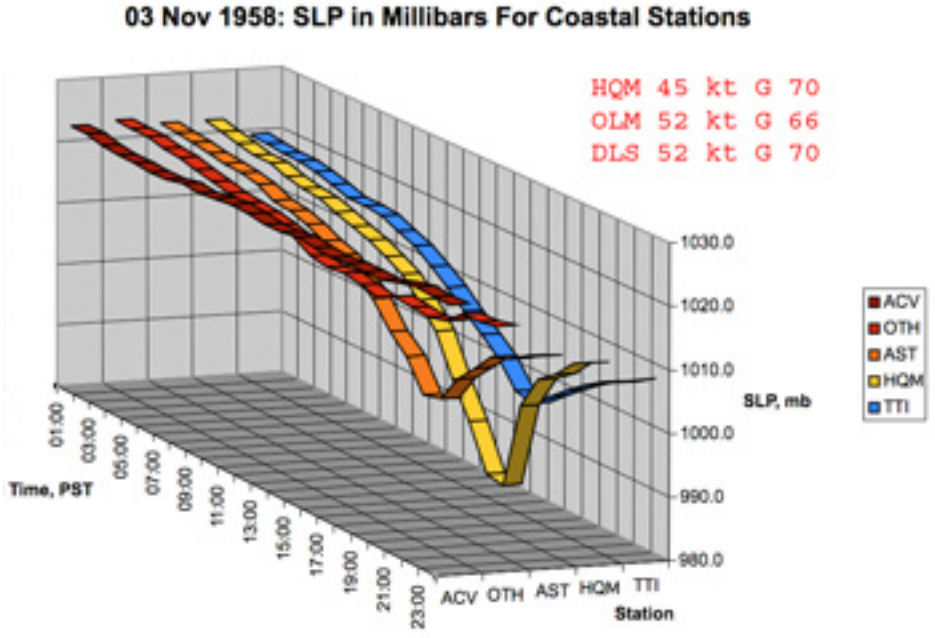
- Nearly an open wave, but: compact center, cyclonic flow, and frontal components well-defined
- An explosively developing low in fairly early stage
- Intense gradient mainly on south side of low, broad trough north



Pressure tendencies during explosively developing landfall cyclones generally stand out above all other high-wind-generating events.

Storm	Location	Max 1-hr fall	Max 1-hr rise
10 Nov 1975	North Bend	-7.7 mb	+16.6 mb*
03 Nov 1958	Hoquiam	-7.1 mb	+13.9 mb*
07 Feb 2002	North Bend	-3.4 mb	+14.2 mb*
15 Dec 1977	Astoria	-2.6 mb	+5.8 mb
12 Oct 1962	North Bend	-5.0 mb	+8.8 mb

** These 1-hr values are comparable to the 3-hr tendencies of many intense PNW storms!*


03 Nov 1958: SLP in Millibars For Coastal Stations
HQM 45 kt G 70
OLM 52 kt G 66
DLS 52 kt G 70
1030.0
1020.0
1010.0
1000.0
990.0
980.0
SLP, mb
ACV
OTH
AST
HQM
TTI
Time, PST
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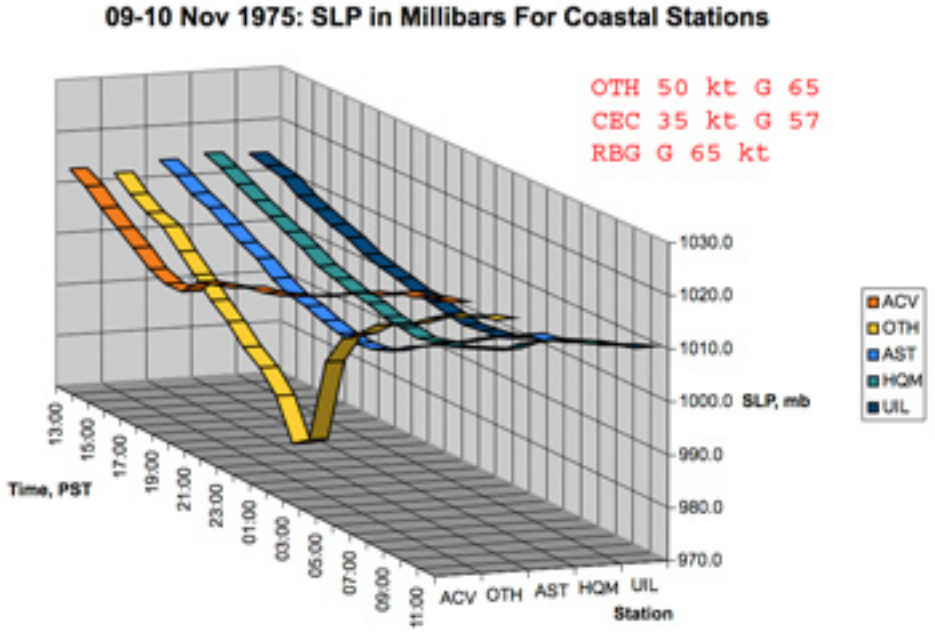
23:00
ACV OTH AST HQM TTI
Station


09-10 Nov 1975: SLP in Millibars For Coastal Stations
OTH 50 kt G 65
CEC 35 kt G 57
RBG G 65 kt
1030.0
1020.0
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1000.0
990.0
980.0
970.0
SLP, mb
ACV
OTH
AST
HQM
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Time, PST
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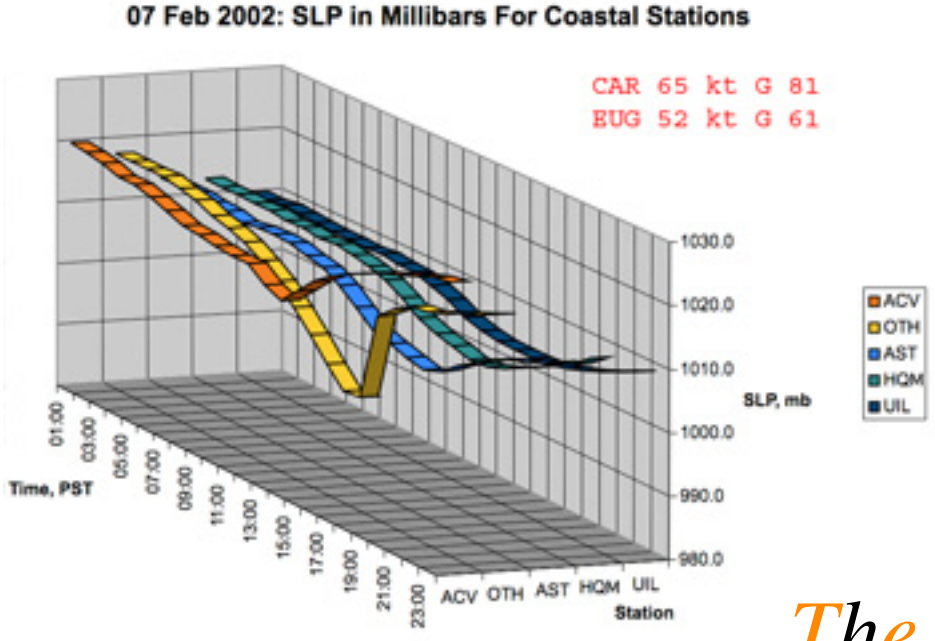
ACV OTH AST HQM UIL
Station


07 Feb 2002: SLP in Millibars For Coastal Stations
CAR 65 kt G 81
EUG 52 kt G 61
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1000.0
990.0
980.0
SLP, mb
ACV
OTH
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HQM
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Time, PST
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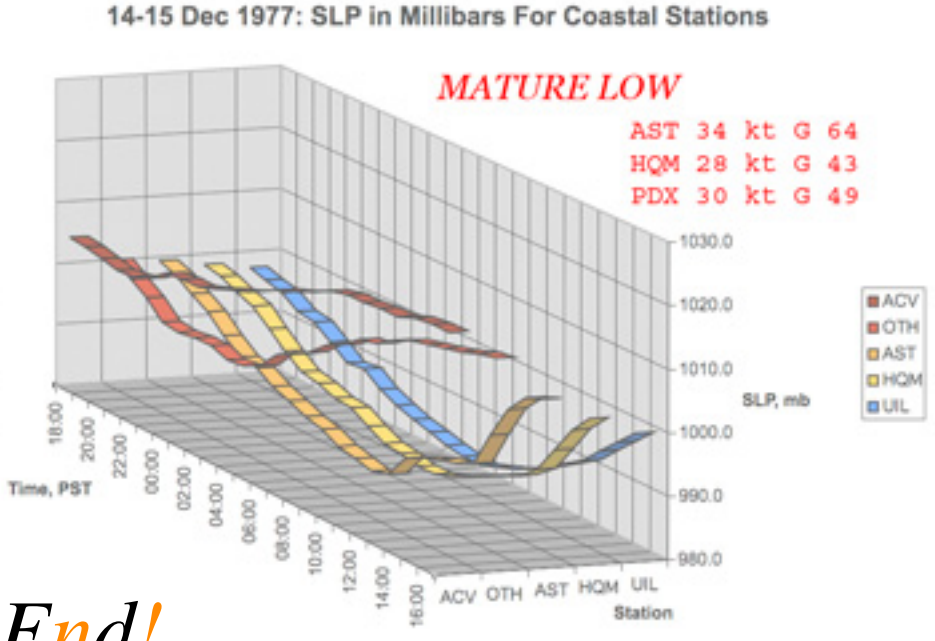
ACV OTH AST HQM UIL
Station


14-15 Dec 1977: SLP in Millibars For Coastal Stations
MATURE LOW
AST 34 kt G 64
HQM 28 kt G 43
PDX 30 kt G 49
1030.0
1020.0
1010.0
1000.0
990.0
980.0
SLP, mb
ACV
OTH
AST
HQM
UIL
Time, PST
18:00
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02:00
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06:00
08:00
10:00
12:00
14:00
16:00
ACV OTH AST HQM UIL
Station

The End!