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
14-15 Dec 1977: SLP in Millibars For Coastal Stations
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

Time, PST

Station

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
09-10 Nov 1975: SLP in Millibars For Coastal Stations
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

Time, PST

Station

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.

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

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