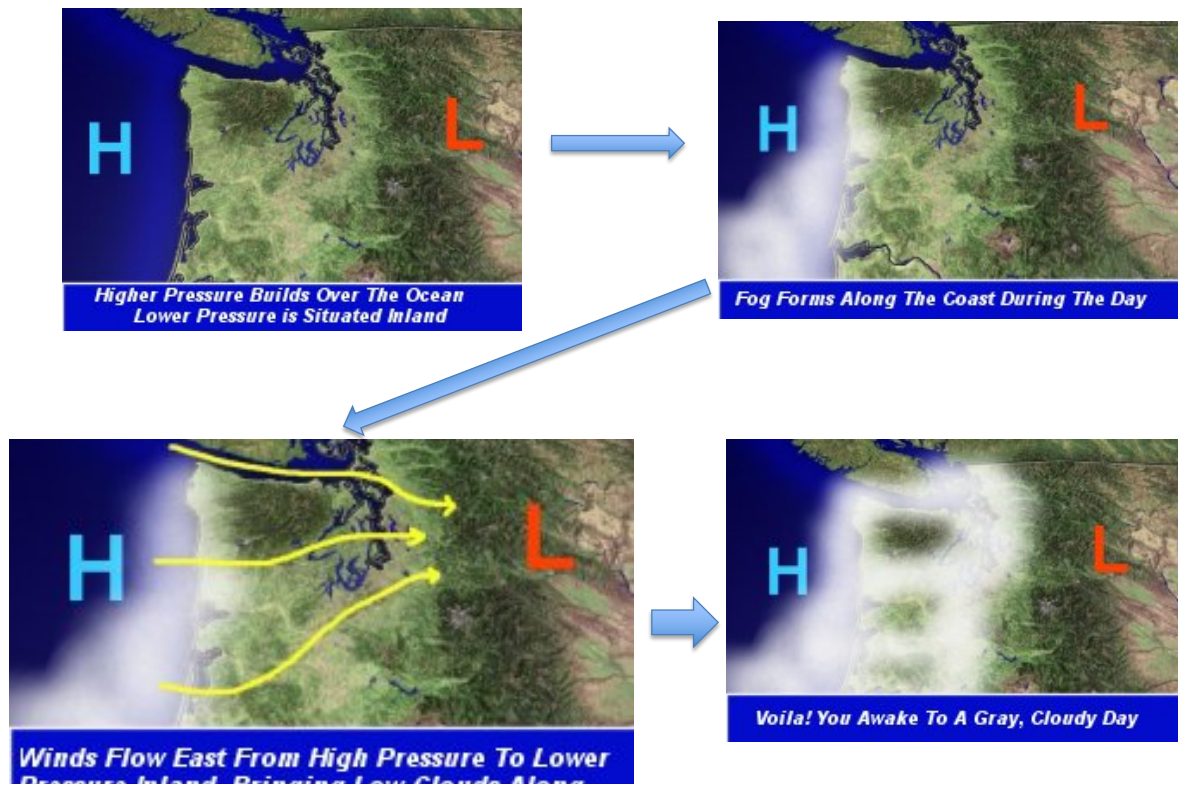


Marine Push



Marine Push Case Study May 15-17 1985

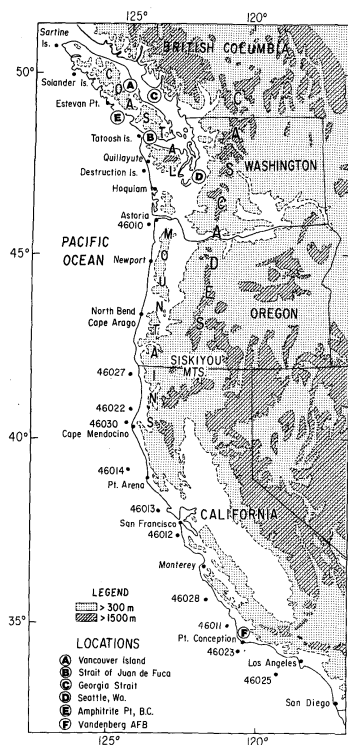


FIG. 1. Topography and important geographical locations along the west coast of North America from California to British Columbia.

Visible Image

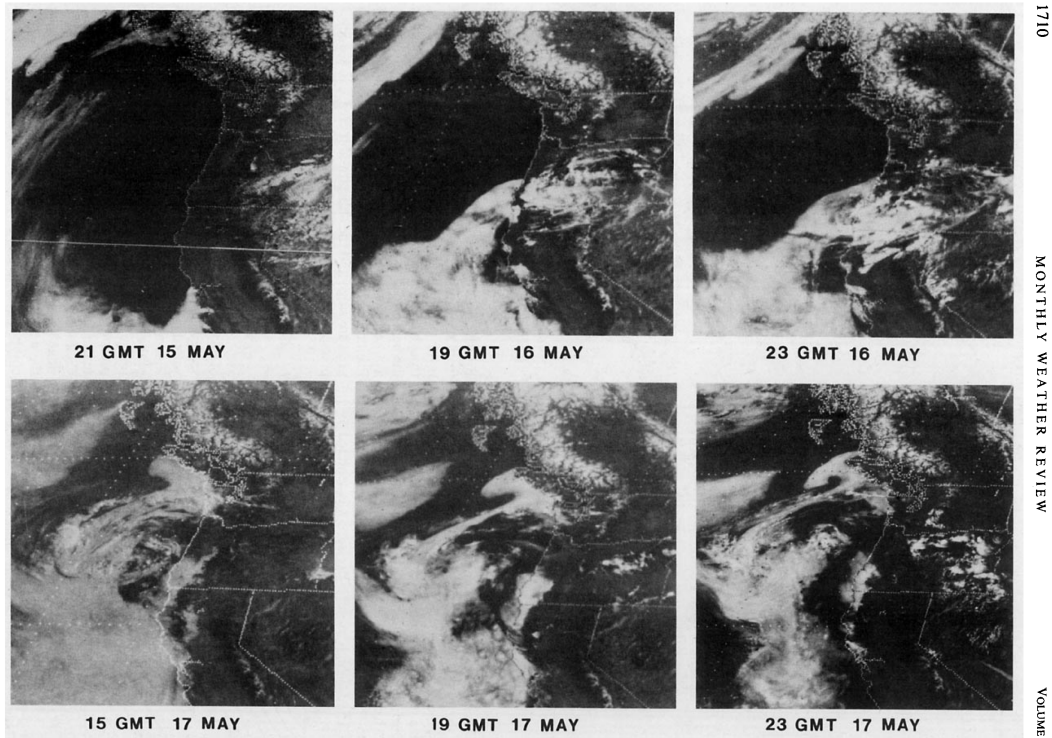


Fig. 4. GOES visible satellite imagery of the western United States and Canada for 21 UTC 15 May through 23 UTC 17 May 1985.

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Sea Level Pressure

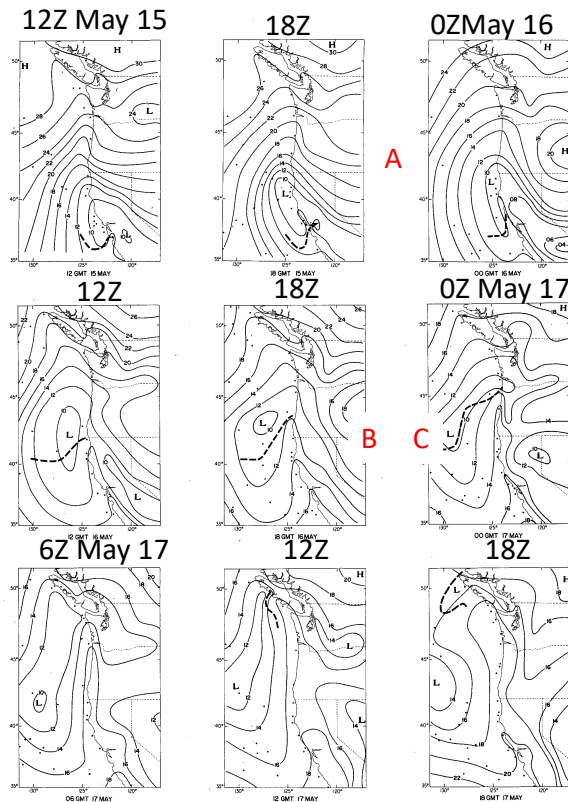
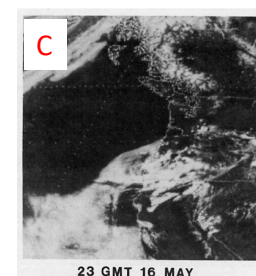
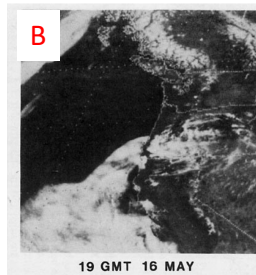
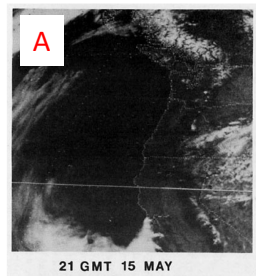


FIG. 9. Mesoscale sea level pressure analyses for 12 UTC 15 May through 18 UTC 17 May 1985. Heavy dashed lines are the northern boundaries of the coastal stratus, based on GOES satellite imagery. Isobars are 10xx mb. Observations over the Pacific Ocean are indicated by solid dots.



Front edge

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Blow up of SLP (plus winds)

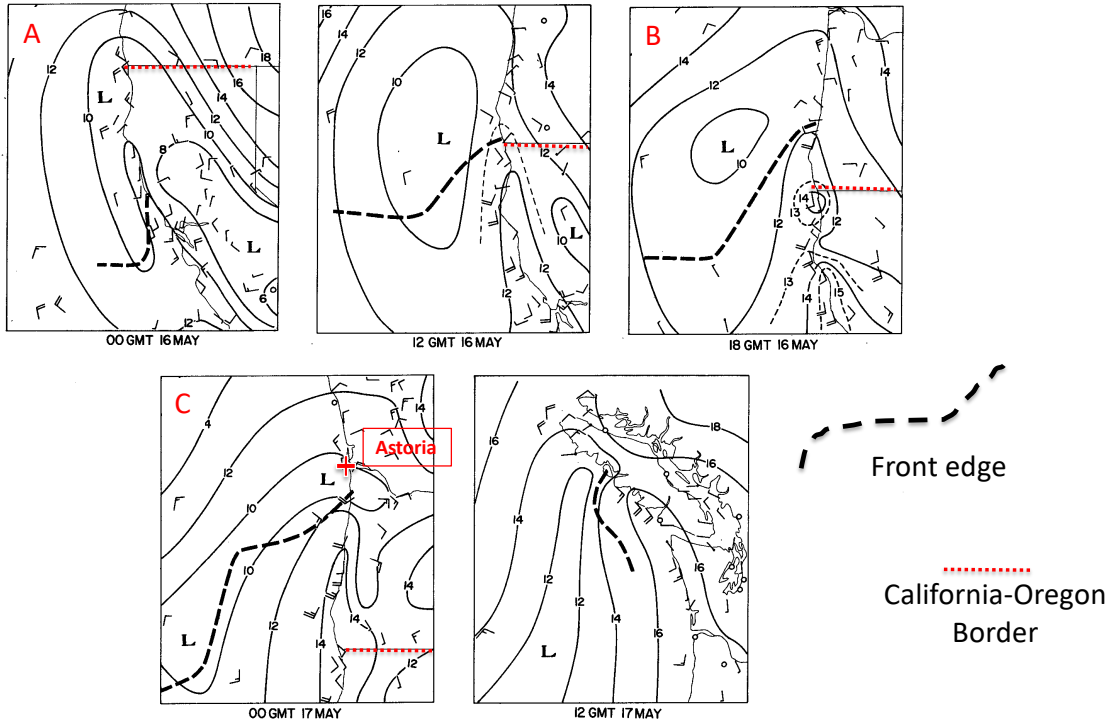


FIG. 10. Mesoscale sea level pressure analyses and surface winds in the immediate area surrounding the coastal surge for 12 UTC 15 May through 18 UTC 17 May 1985.

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Marine Push – As seen from Astoria Oregon

1987

CLIFFORD F. MASS AND MARK D. ALBRIGHT

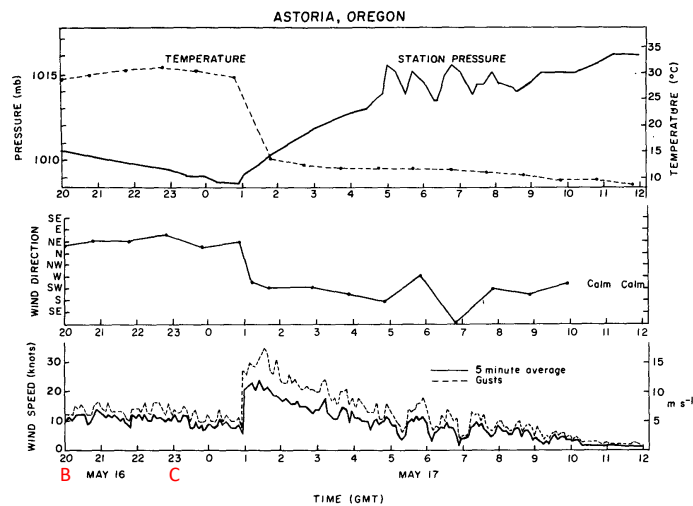


FIG. 2. Temperature, station pressure and winds at Astoria, Oregon from 20 UTC 16 May through 12 UTC 17 May 1985. Temperature and wind direction are based on hourly observations; station pressure and wind speed are from continuous recorders.

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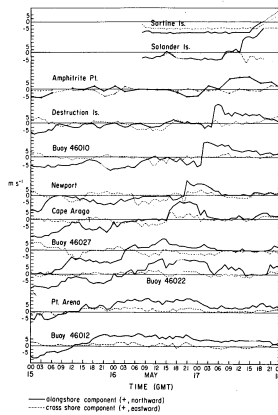


FIG. 15. Time evolution based on hourly observations of the alongshore and cross shore surface wind components for a series of coastal stations. Solid dots indicate three hourly observations and dotted lines indicate missing data. Tick marks represent 5 kt (2.5 m s^{-1}) intervals. The station spacing is approximately proportional to the distance along the coast.

ations of the cross-shore (normal to the local coastline) wind component were relatively small with amplitudes generally remaining below 5 m s^{-1} . Much of that variation can be explained by diurnal circulations.

c. Propagation characteristics

It is important to note that at some locations along the coast there were actually two transitions as northerlies gave way to strong southerlies. These locations first experienced a relatively gradual shift from northerlies to weak southerlies, and then hours later there was a separate surge of appreciably stronger southerlies, usually accompanied by stratus. Figure 16 presents the position of the transition from northerlies to southerlies as a function of time. In southern and central California from Pt. Conception (Buoy 46023) to Pt. Arena, the southerly transition occurred nearly *simultaneously* around 15 UTC 15 May, and then slowly inched up the coast during the next 12 hours. With nightfall (03–06 UTC) the transition seemed to jump northward. Finally, for the remainder of the event the southerly transition moved northward at a slowly accelerating pace.

d. Case discussion

On 15 May 1985 a synoptic low moved southwestward across the western United States and, as shown in a series of north-south 850 mb cross sections (Fig. 17), produced substantial 850 mb height falls over California by 12 UTC 15 May. As the low shifted northwestward during the next 12 hours (through 00 UTC 16 May), accompanying height rises over southern California created an 850 mb height gradient from San Diego to the San Francisco Bay area (Oakland), with higher heights to the south.

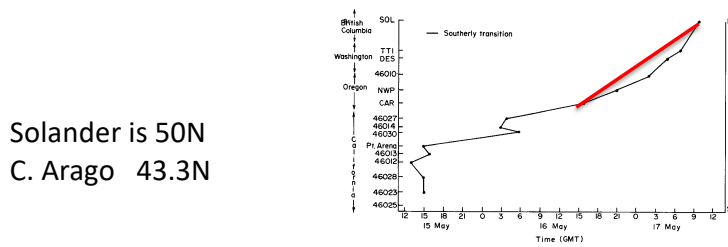


FIG. 16. Positions of the southerly transitions as a function of time.

Solander is 50N
C. Arago 43.3N

$$6.7 \times 110 = 740 \text{ km in } 18 \text{ hr} \rightarrow 11 \text{ m/s}$$

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Other places with a marine push

- Eastern Australia Southerly Burster (Colquhoun et al 1985)
 - Propagates equatorward w/ coast to the left
- South East Africa (Gill 1977)
 - Propagates equatorward

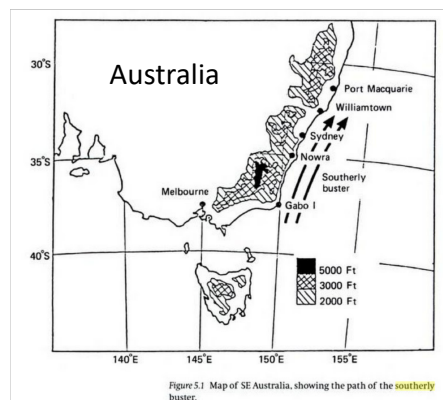


Figure 5.1 Map of SE Australia, showing the path of the southerly buster.

J.E. Simpson "Gravity Currents in the Environment and the Laboratory", 2nd Ed. 1997 Cambridge