

## **High Wind Events - Boise and the Upper Treasure Valley**

John Jannuzzi (2004)

### **Synopsis**

Wind speed data from the Boise airport was examined to determine the frequency of "high wind" events in the Upper Treasure Valley, and to identify weather patterns that produce strong wind events from other than northwest winds. Observational data for a nine year period, 1990-1995 and 2000-2002 were used for the study. "High Winds", as defined by the NWS (sustained winds >40 mph) virtually never occur at the Boise airport. Convective wind gusts in excess of 40 mph have been observed for periods covering less than one hour, but there were no occurrences of sustained winds greater than 40 mph during the period of study. Wind events that exceed Wind Advisory criteria (>30 mph) occur about seven times per year at Boise, with northwest wind events occurring twice as frequently as non-northwest wind events. On rare occasions, wind advisory conditions can occur with wind direction from the south or southwest, but most non-northwest wind events are with southeast wind.

### **Wind Advisory Analysis**

For the purposes of this study, a Wind Advisory event was one where the Boise airport had winds of 25 mph for two or more consecutive hours. The threshold of 25 mph was used instead of 30 mph with the assumption that Boise is not always the strongest wind in the area, especially when compared to Mountain Home which often has winds about 5 mph stronger than Boise.

### **Wind Events - Northwest Wind**

Map types were not created for the northwest wind events. These occur twice as often as southeast wind events and are more generally understood. Typically they occur with the passage of a cold front, with strong winds aloft (700 mb) aligning with the valley (west or northwest direction), and often have strong surface pressure rises behind the front.

### **Wind Events - Southwest Wind**

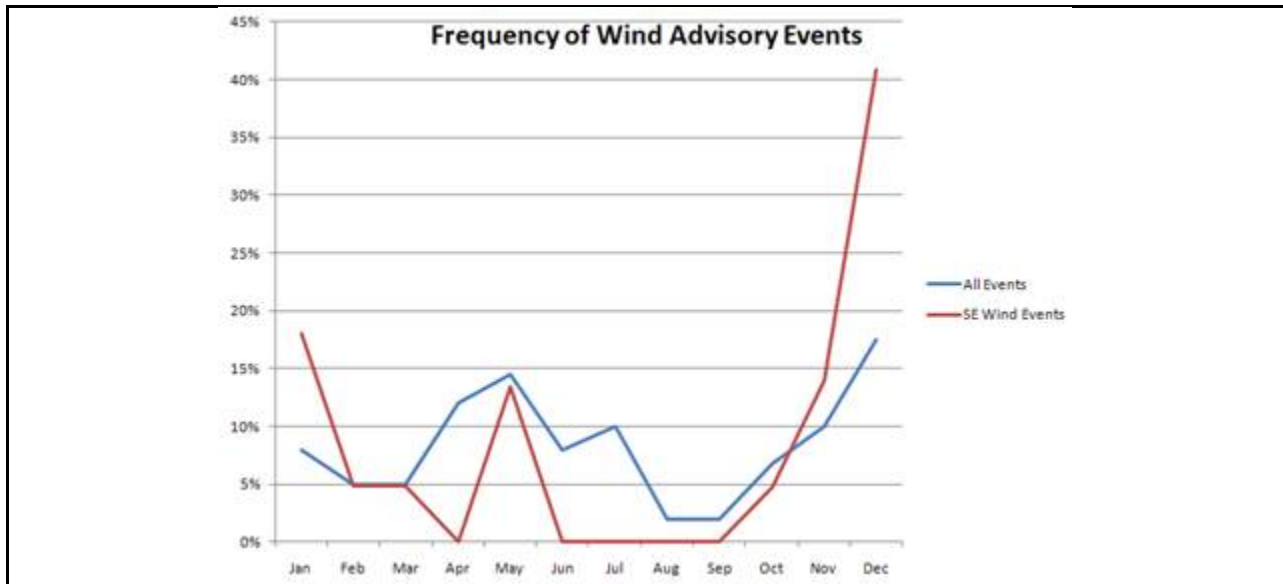
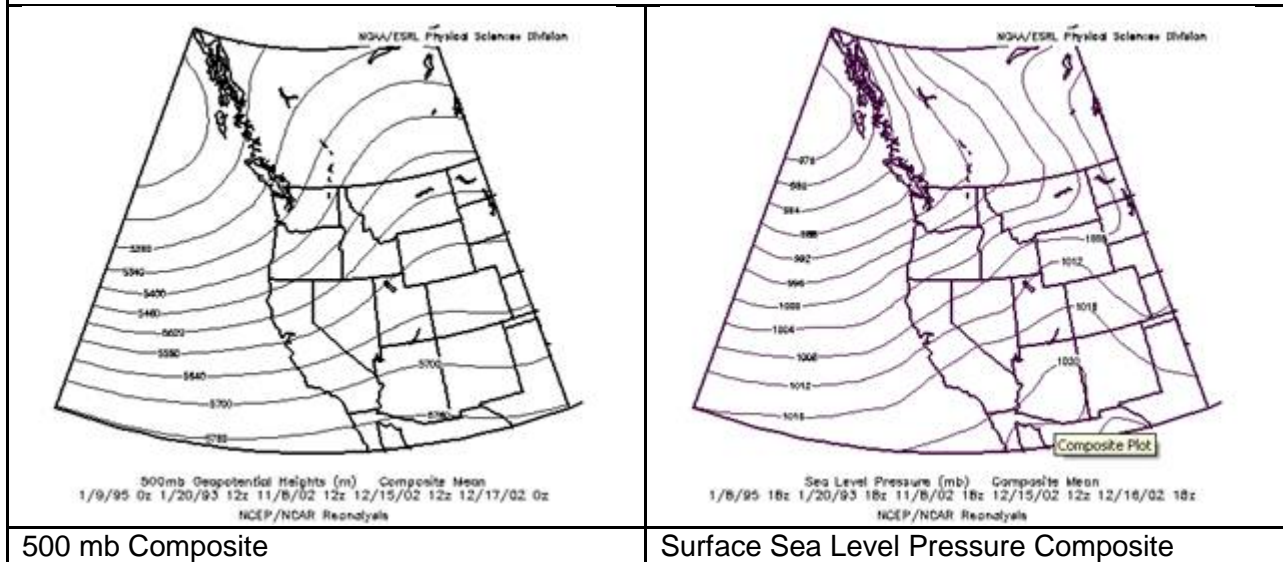


Figure 1. Frequency of Wind Advisory Events. Wind Advisory conditions can occur any month of the year, and are most frequent in mid-winter and the late-spring/early summer. Advisory events with southeast winds were not observed in the summer, and have a distinct maximum November - January.

**Map Types for Other Than Northwest Wind Events (500 mb and surface patterns)**

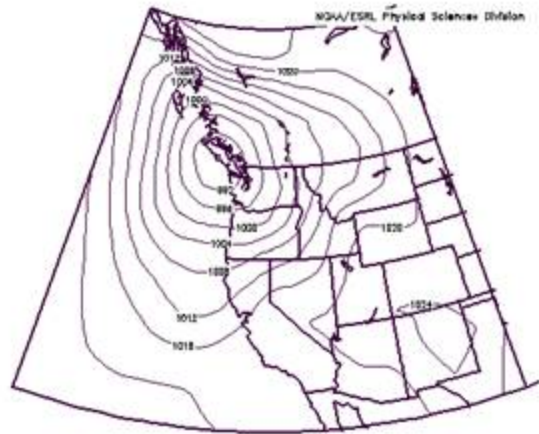
**Type 1 - Southeast Wind Events** - Broad, Deep Trof in the Gulf of Alaska with an ejecting shortwave into the Pacific Northwest



**Type 2 - Southeast Wind Events** - Upper Trof near 130W with varying meridional extent



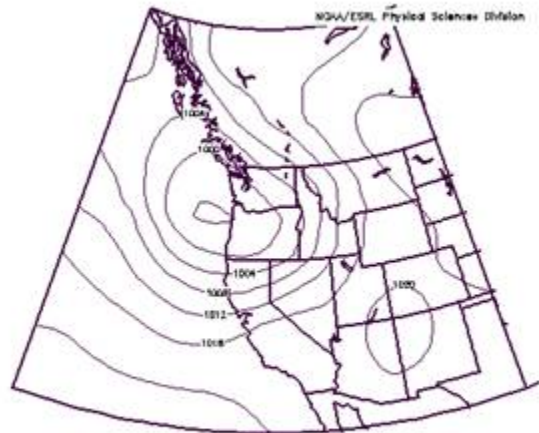
500mb Geopotential Heights (m) Composite Mean  
11/22/92 Oz 12/17/92 Oz 11/29/01 Oz  
NCEP/NCAR Reanalysis



Sea Level Pressure (mb) Composite Mean  
11/22/92 Oz 12/17/92 Oz 11/29/01 Oz  
NCEP/NCAR Reanalysis



500mb Geopotential Heights (m) Composite Mean  
12/31/92 12z 1/22/93 Oz 5/3/93 12z 12/12/85 12z  
NCEP/NCAR Reanalysis



Sea Level Pressure (mb) Composite Mean  
12/31/92 12z 1/22/93 Oz 5/3/93 18z 12/12/85 18z  
NCEP/NCAR Reanalysis



500mb Geopotential Heights (m) Composite Mean  
1/3/92 12z 5/12/93 Oz 5/11/93 Oz 11/23/01 Oz 3/5/01 Oz  
NCEP/NCAR Reanalysis

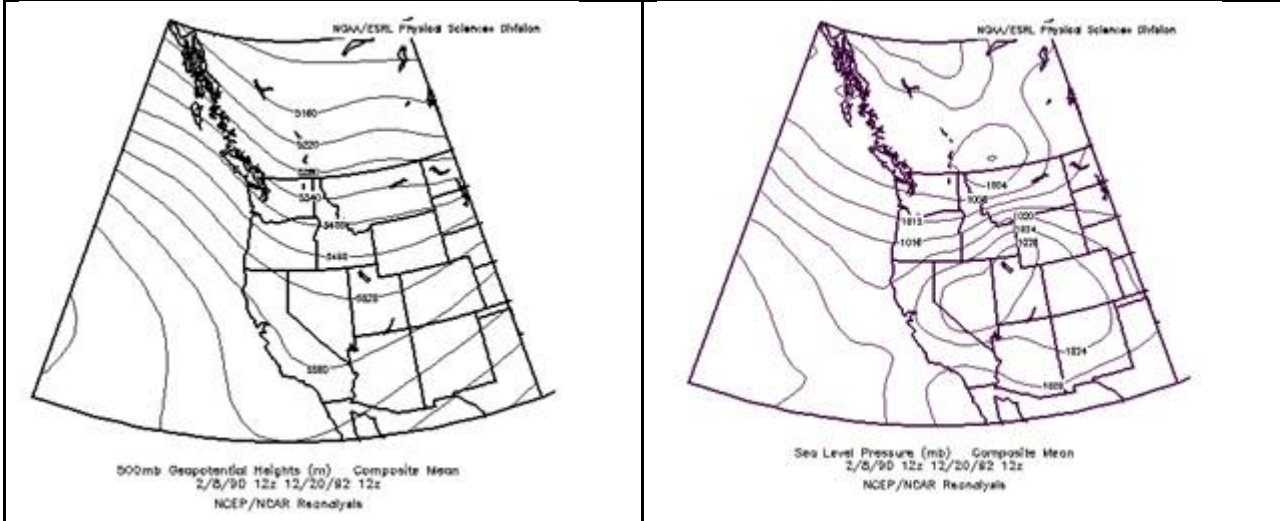


Sea Level Pressure (mb) Composite Mean  
1/5/92 18z 5/11/93 18z 5/10/93 18z 11/23/01 Oz 3/5/01 Oz  
NCEP/NCAR Reanalysis

500 mb Composites

Surface Sea Level Pressure Composites

**Type 3 - South-Southwest Wind Events** - Northwest upper flow, and a strong south-north surface gradient



500 mb Composite

Surface Sea Level Pressure Composite