

AWS ADDITIONS AND MODIFICATIONS TO SUPPORT THE WIND ALERT FORECASTING APPLICATION FOR MCMURDO STATION, ANTARCTICA

A proposal to increase data availability and reliability through placement of operational equipment, and justification of the operational requirements.

13TH WORKSHOP ON ANTARCTIC METEOROLOGY & CLIMATE
JULY 2018

THE GOOD OLD DAYS



SOFTWARE BASED ON STUDY BY AMRC

Utilization of Automatic Weather Station Data for Forecasting High Wind Speeds at Pegasus Runway, Antarctica

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ABSTRACT

Reduced visibility due to blowing snow can severely hinder aircraft operations in the Antarctic. Wind speeds in excess of approximately $7\text{--}13\text{ m s}^{-1}$ can result in blowing snow. The ability to forecast high wind speed events can improve the safety and efficiency of aircraft activities. The placement of automatic weather stations to the south (upstream) of the Pegasus Runway, and other airfields near McMurdo Station, Antarctica, can provide the forecaster the information needed to make short-term (3–6 h) forecasts of high wind speeds, defined in this study to be greater than 15 m s^{-1} . Automatic weather station (AWS) data were investigated for the period of 1 January 1991 through 31 December 1996, and 109 events were found that had high wind speeds at the Pegasus North AWS site. Data from other selected AWS sites were examined for precursors to these high wind speed events. A temperature increase was generally observed at most sites before such an event commenced. Increases in the temperature difference between the Pegasus North AWS and the Minna Bluff AWS and increasing pressure differences between other AWS sites were also common features present before the wind speed began to increase at the Pegasus North site. Many times, changes in one or more of these parameters occurred hours before the wind began to increase at the Pegasus North site. Monitoring of these parameters can lead to an improved 3–6-h forecast of these high wind speed events at Pegasus Runway, Antarctica.

FORECASTING AIDS DEVELOPED

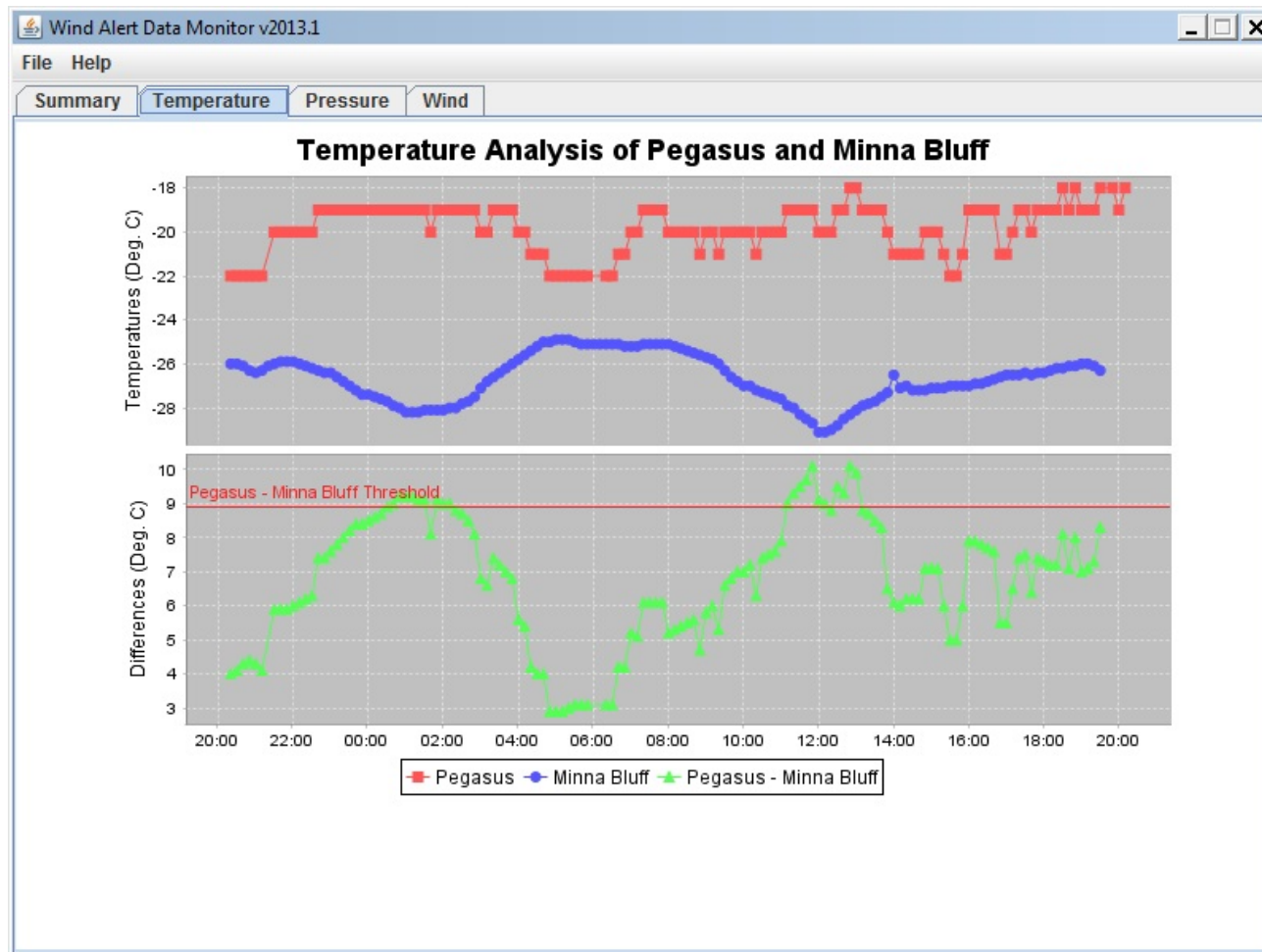
THE FOLLOWING WILL GENERALLY PRECEDE THE ONSET OF HIGH WIND SPEEDS AT PEGASUS BY UP TO 6 HOURS IF THEY OCCUR OVER A PERIOD OF NOT MORE THAN 18 HOURS:

- An increase in the TD (estimated from the temperatures at Minna Bluff and Pegasus North) from inversion conditions (less than 0.08C) to statically unstable conditions (greater than 8.98C):
- Pressure differences—(a) an increase in the Marilyn–Schwerdtfeger pressure difference, usually on the order of 2.5 hPa or greater, and (b) an increase in the Elaine–Marilyn pressure difference on the order of 6.0 hPa or greater: and
- A veering of the wind direction with time, from west or southwesterly to southerly at the Marilyn and/or Schwerdtfeger sites.

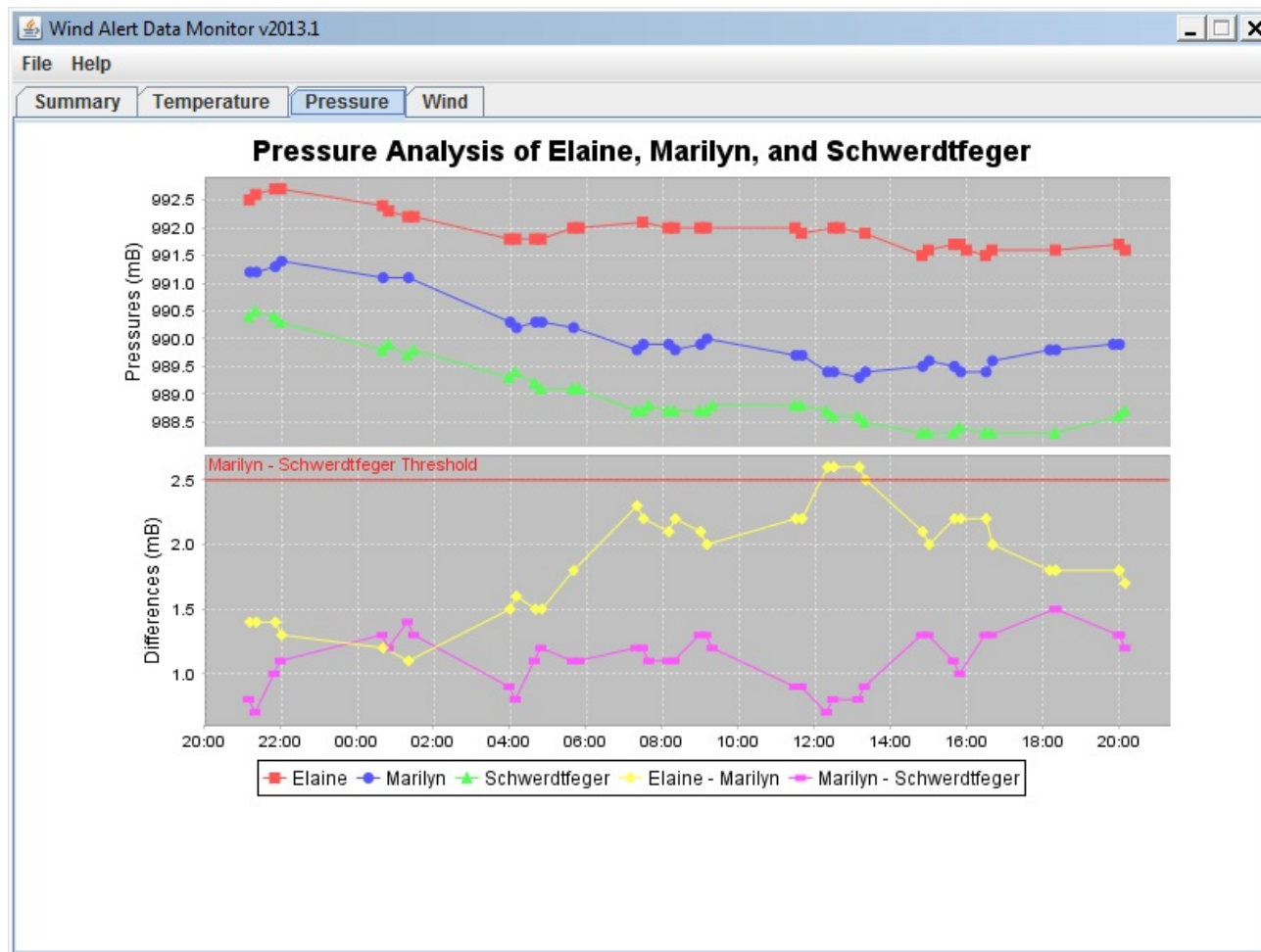
WIND ALERT APPLICATION



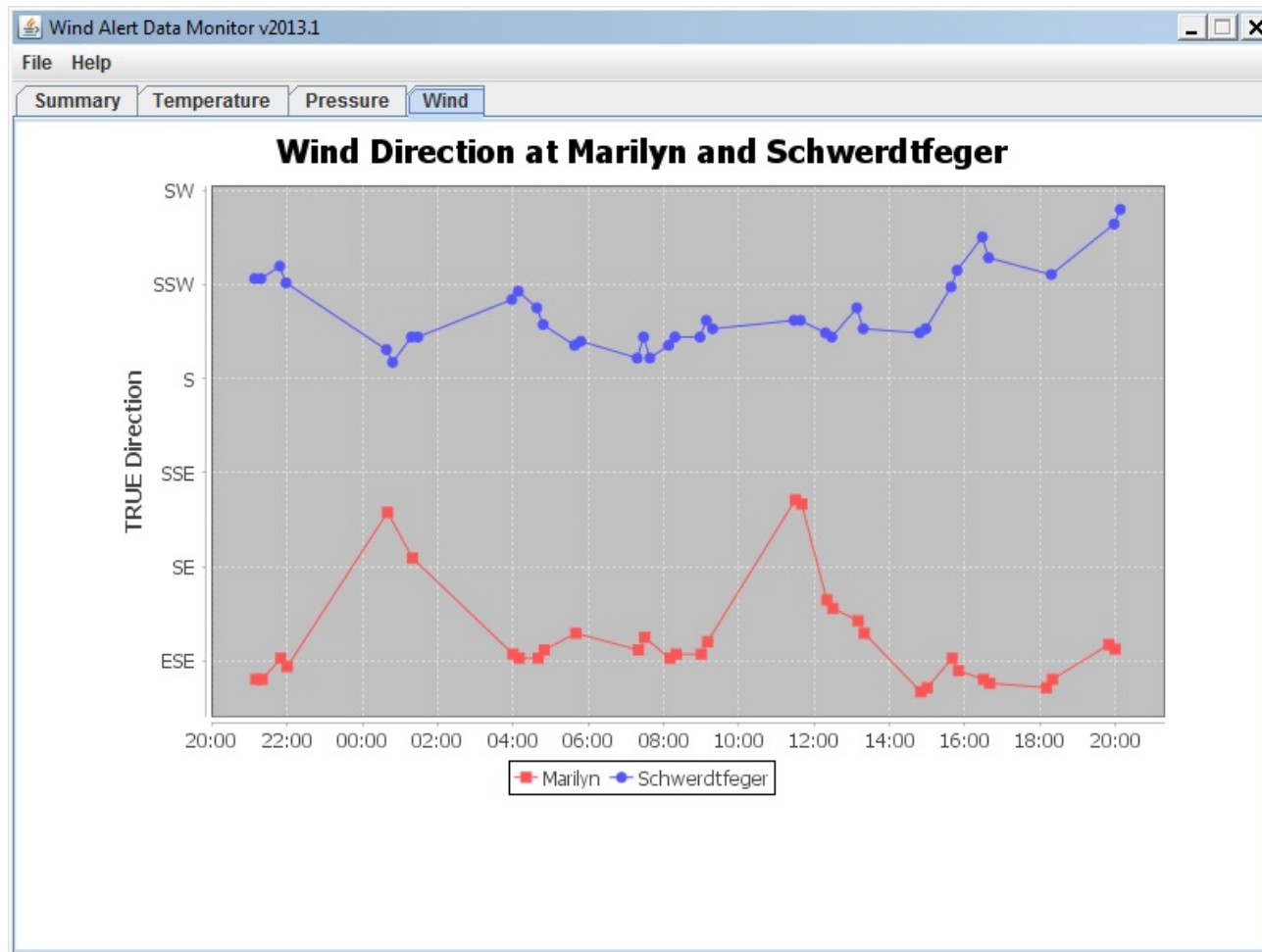
TEMPERATURE



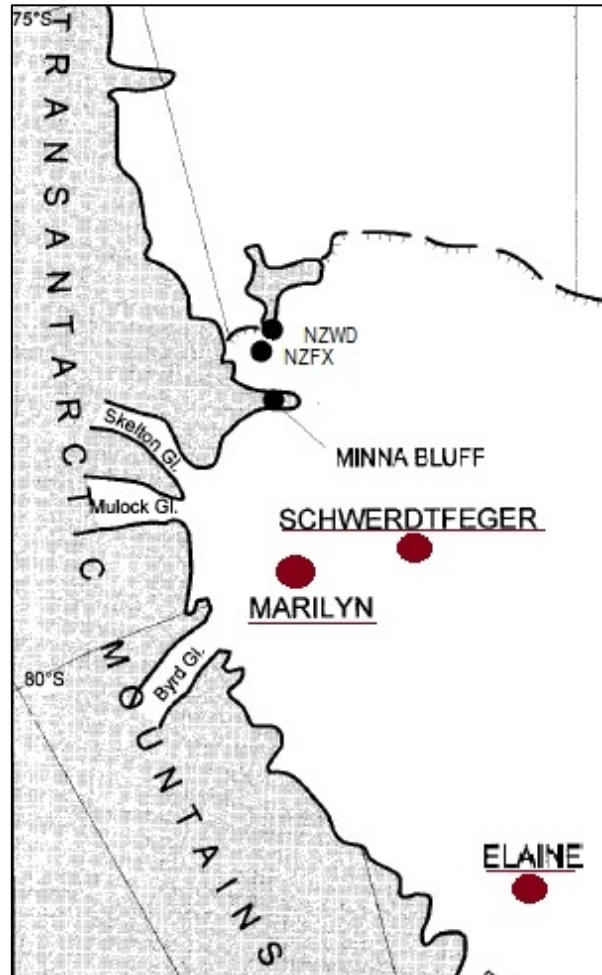
PRESSURE



WIND



PROPOSAL



- Pressure Sensors
 - Elaine
 - Marilyn
 - Schwerdtfeger
- Anemometers
 - Marilyn
 - Schwerdtfeger
- Iridium Short Burst Data
- 10-minute data collection interval
- Austral summer operation

QUESTIONS / COMMENTS