



# The Price Is Irrelevant:

## Analyzing Instrumentation at Different Price Points

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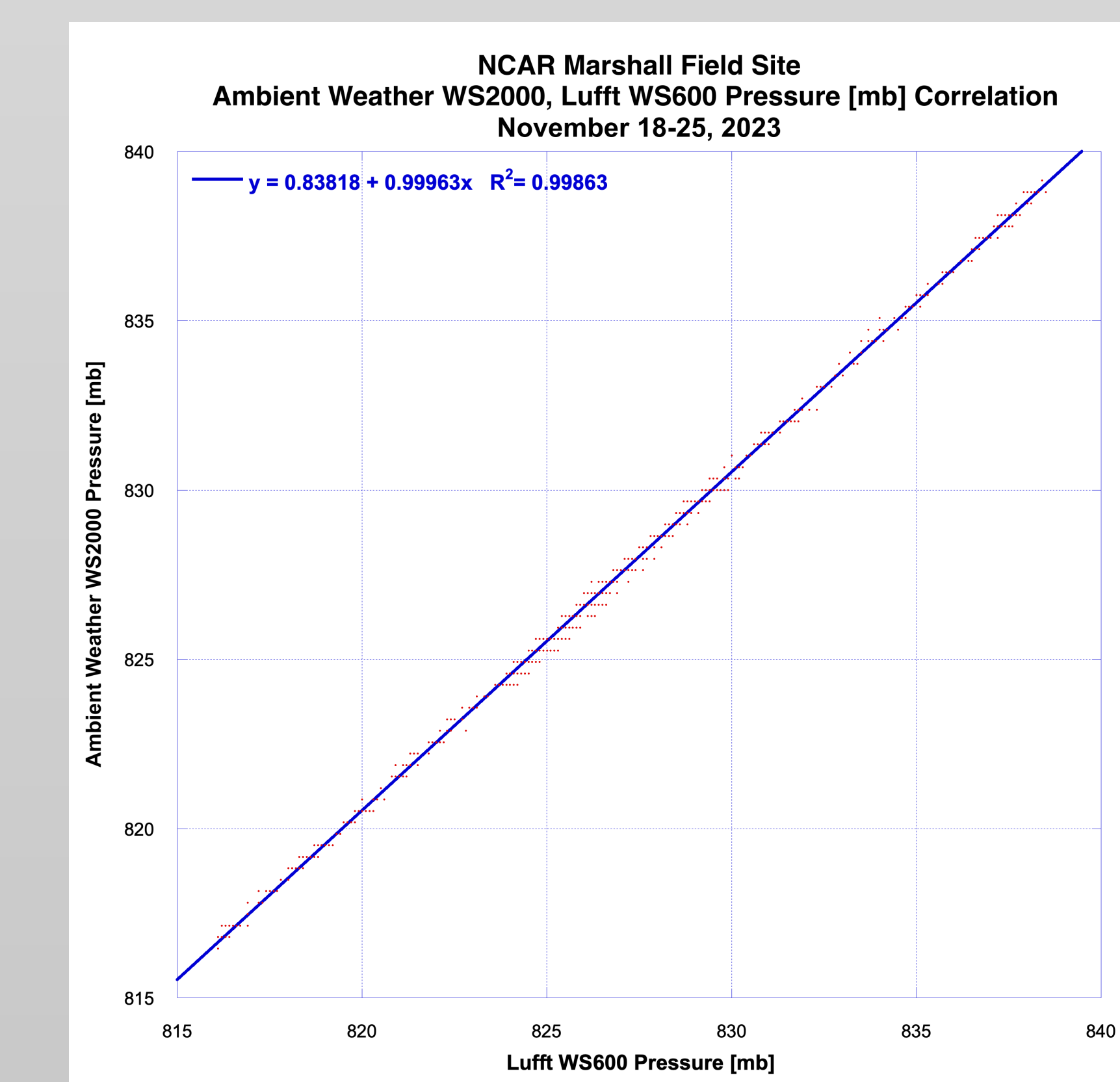
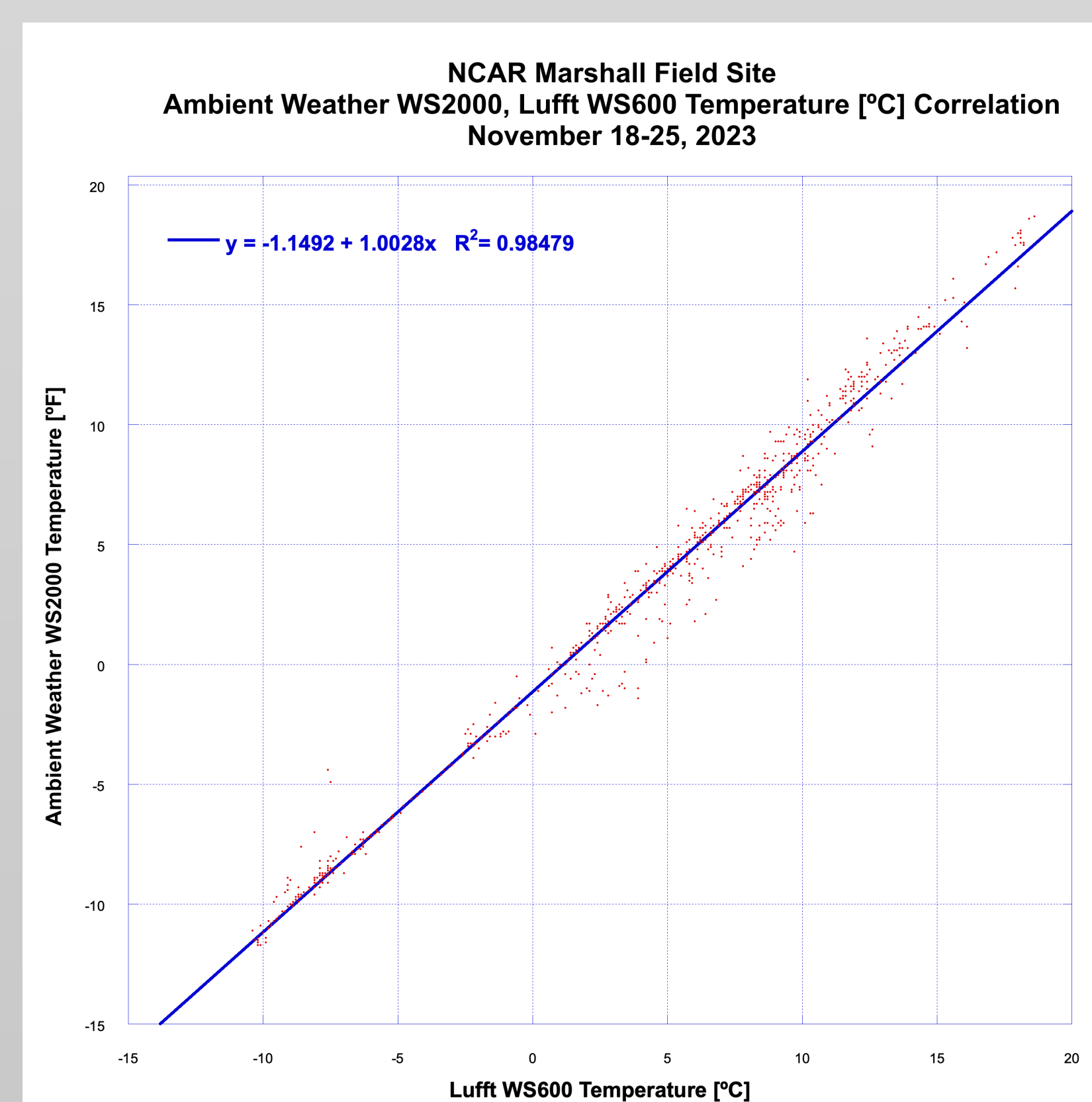
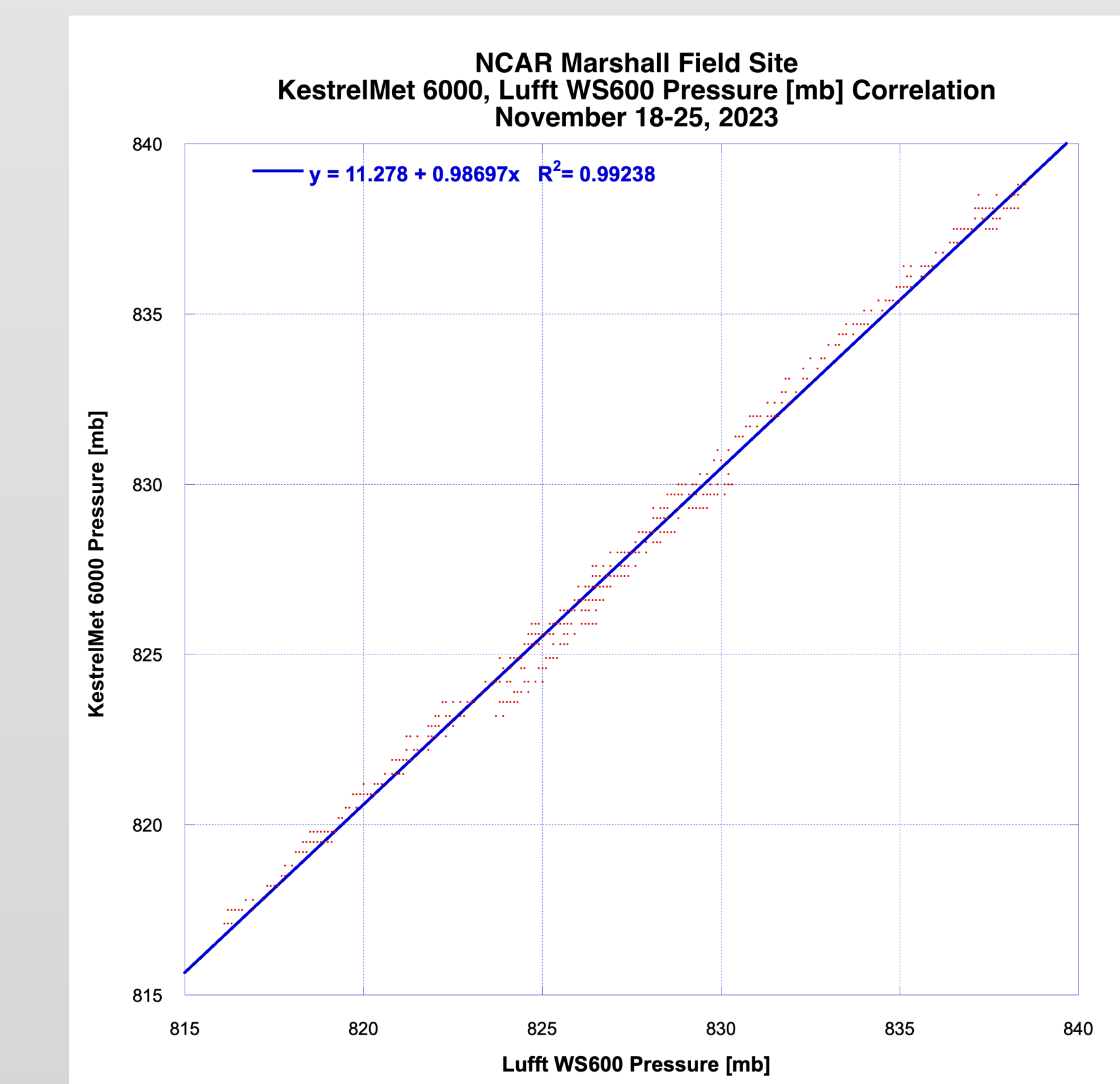
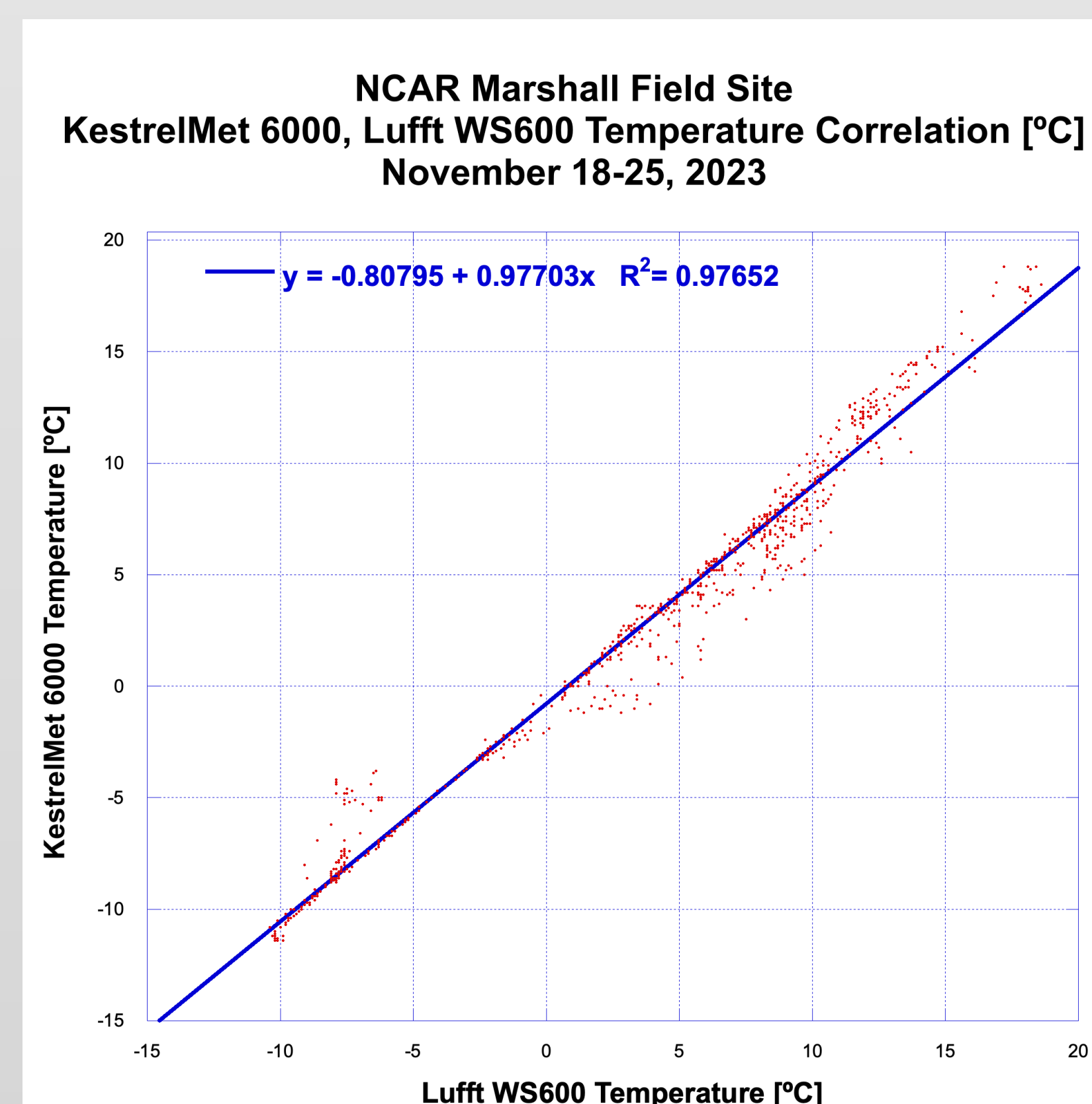
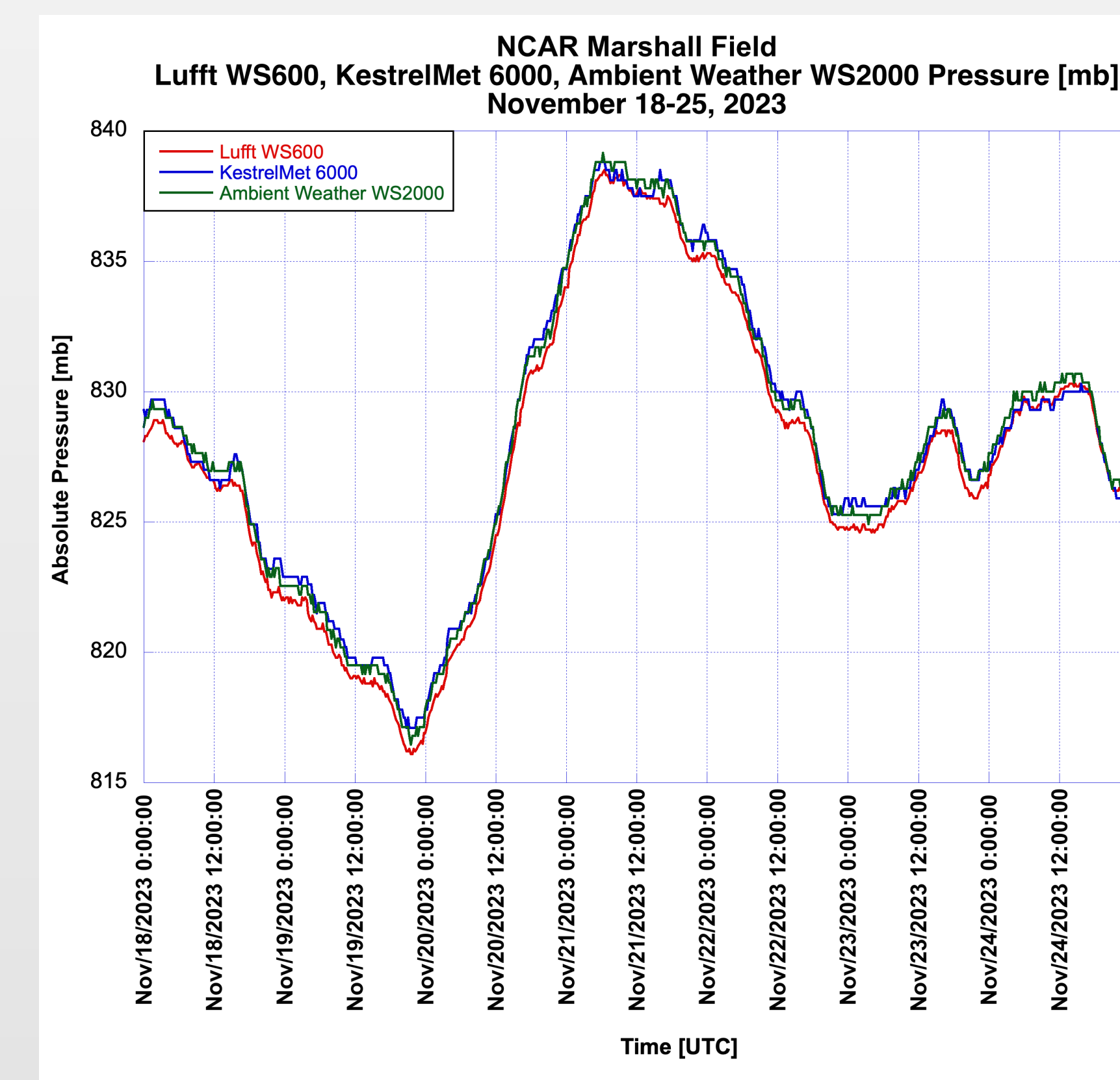
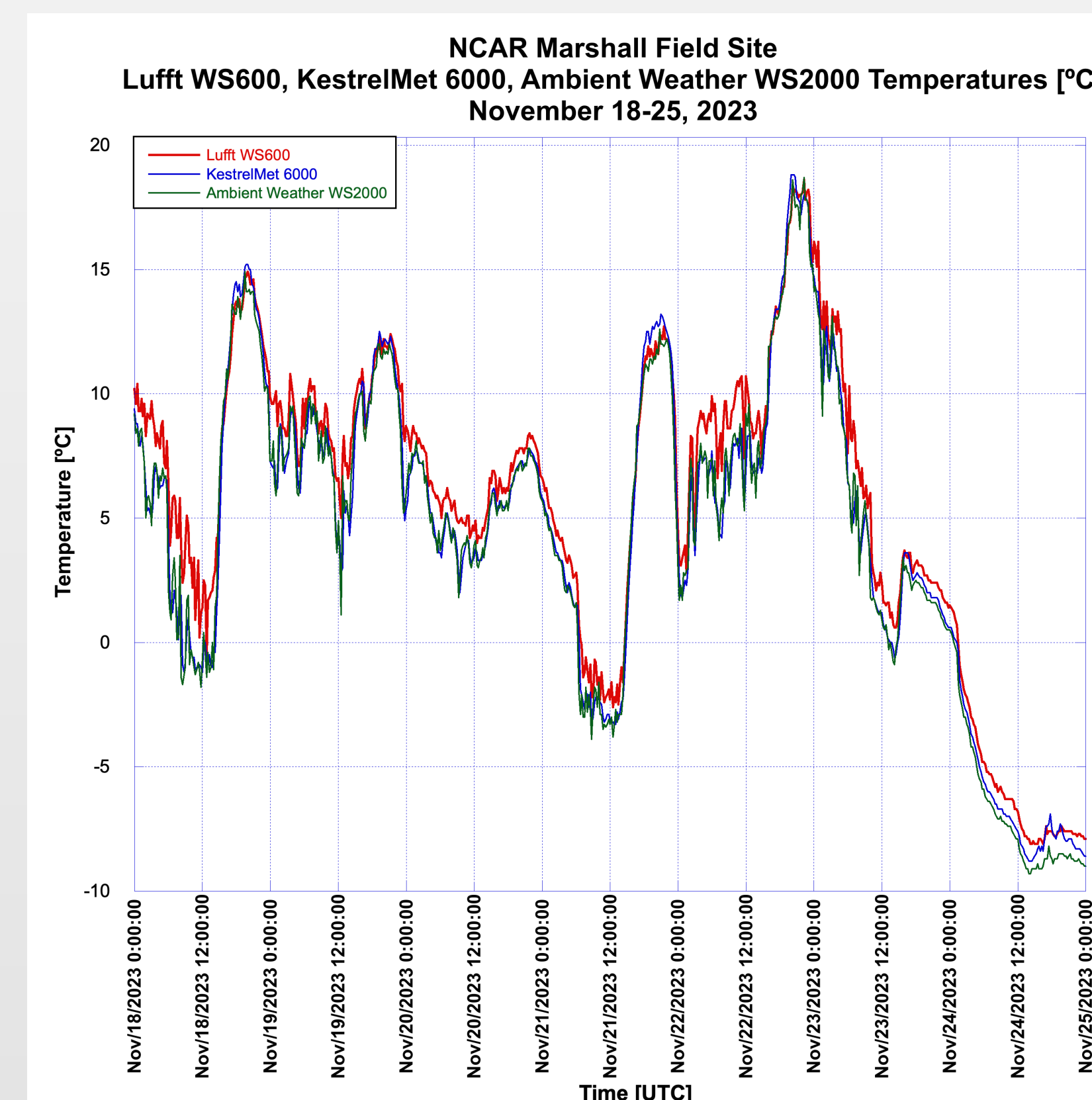
## Introduction

Numerous instruments and methods exist to observe and record meteorological parameters such as temperature, wind speed/direction, and relative humidity. From private industry and research labs to students and weather-aware citizens- a large spectrum of sensors are available. However, instrumentation performance may differ at lower price points or may not record data that is accurate and reliable. A range of compact weather stations were tested, representing different price points and device purposes. Sensor measurements were compared over a period to determine the accuracy of data.

## Methods

- Three sensor arrays were deployed at the NCAR Marshall Field Site- a Lufft WS600, KestrelMet 6000, and Ambient Weather WS2000.
- The Lufft WS600 was used as a control, due to its permanent installation at the NCAR site.
- These stations were priced anywhere between \$200-\$4000.
- A one-week period was chosen, containing a large range of conditions from November 18-25, 2023 where a frontal passage occurred.
- Temperature and pressure were selected as parameters to study since they used separate sensors.
- Correlation plots from instantaneous observations were made to compare the KestrelMet and Ambient Weather stations against the control station (Lufft WS600).

## Data



## Analysis

- The Kestrel and Ambient sensors correlated near perfectly against the Lufft sensor, with R<sup>2</sup>-values approaching 1.
- Temperature correlation decreased at temperatures above 0°C.
- There were no significant differences between the Kestrel and Ambient sensors.
- The period covered saw a frontal passage, as seen in the time plots for temperature and pressure.

## Conclusions

Both test stations correlated with the Lufft WS600 at R<sup>2</sup>-values of ~0.98. There is no evidence to suggest either station is less accurate than the Lufft WS600. Therefore, with regards to these models of stations, price point does not meaningfully reflect accuracy.

## Acknowledgements

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