

Plains Elevated Convection at Night (PECAN)  
WeatherPak 2000  
A Component of Millersville University Atmospheric Research and Aerostat Facility (MARAF)

**Authors:**

Dr. Richard Clark  
717-871-7434  
richard.clark@millersville.edu

**Data Set Overview:**

This dataset contains data from the Millersville University WeatherPak located at 38.9361°N, 99.5592°W at 646 meters above sea level from 1 June 2015 to 15 July 2015.

**Instrument Description:**

The WeatherPak 2000 measuring surface observations. For more information visit:

<http://www.coastalenvironmental.com/downloads/WP-2000.manual.NW.pdf>

**Barometer:**

3 hPa accuracy (-30°C to + 65°C)  
Range: 0 -1200 hPa  
Resolution: 1 hPa reported  
Accuracy: +/- 1 mBar at 22°C  
              +/- 2 mBar from 0°C to + 65°C  
              +/- 3 mBar from -30°C to + 65°C

**Compass:**

Compass accuracy, 0.5 deg RMS Level Heading,  
1° Typical RMS accuracy < ± 30°, 1.5 ° < ±60°,  
0.1 Degree Resolution  
Roll & Pitch full rotation operation,  
Typical 1° accuracy < ± 30° tilt  
Tilt-compensated (electronically gimbaled)

**Wind Monitor:**

Helicoid Propeller:  
Range: 0 to 100 m/s  
Threshold: 1.0 m/s (2.0 Kts) (2.2 mph)  
0.5 m/s (1.0 Kts) (1.1 mph) - with special  
bearings  
Distance Constant: 2.7 m (8.9 ft) (63% recovery)  
Signal Output: sine wave—90 Hz / 8.8 m/s  
Resolution: 0.1 m/s (0.2 Kts) (0.2 mph)  
Accuracy: +/- 0.3 m/s (0.6 Kts) (0.7 mph)

**Vane:**

Range: 360° mechanical, 355° electrical  
Resolution: 1°  
Accuracy: +/- 3° (2° optional)  
Survival: 100 m/s (194 Kts) (224 mph)  
Threshold: 1.1 m/s (2.1 Kts) (2.4 mph)  
0.6 m/s (1.2 Kts) (1.3 mph) - with special  
bearings  
Delay Distance: 1.3 m (4.3 ft) (50% recovery)  
Environmental:  
Temperature Range: -60°C to +70°C

**Humidity and Temperature Probe:**

Accuracy with «Standard» adjustment profile: at 23 °C and 10, 35, 80 % rh ± 0.8%rh / ± 0.1 K  
Accuracy with «High Precision» adjustment profile: at 23 °C and 10, 20, 30, 40, 50, 60, 70, 80, 90 % rh ± 0.5%rh / 0.1 K  
Accuracy with custom adjustment profile: at 3 freely selectable temperatures between -10 and 70 °C and 20 freely selectable %rh values (10...90%rh) ± 0.5 %rh / 0.1 K  
Resolution RH: Typically 0.2 %rh, 0.01 K  
Long-term stability: < 1 % rh, 0.1 °C / year  
Humidity response time t 63: 3....12 seconds, depending on probe type  
Measurement range: 0...100 %rh, -50...200 °C depending on probe type

Electronics operating range: -50...100 °C and 0...100 %rh  
Analog output signals (standard, user scaleable): 0...1 V = 0...100 %rh 0...1 V = -40...60 °C  
Sensor diagnosis function: Yes (programmable, factory default = off)  
Alarm function: Yes, analogue & digital, programmable  
Audit trail & electronic records: FDA 21CFR Part 11 and GAMP compliant  
Power supply & consumption: 3.2...5 VDC  $\pm$ 0 % / typically 4 mA  
Filter: Polyethylene insert, polycarbonate cage  
Norms: CE-compliant 2007/108/EG

**Data Collection and Processing:**

These data were averaged over 1 min time intervals and assimilated over 24 hour time intervals, using Microsoft Excel. All parameters are in .pdf format as daily files.

**Data Format:**

Individual Parameters include:

Measured Parameters:

Wind speed, Wind direction, Sigma Theta, Air temperature, Air pressure, Relative Humidity, Longwave radiation, Shortwave radiation

Assimilated Parameters:

Wind speed, Wind direction, Sigma Theta, Air temperature, Air pressure, Relative Humidity, Longwave radiation, Shortwave radiation

Graphs each day are also available which include:

Measured and assimilated parameters:

Wind speed, Wind direction, Air temperature, Air pressure, Relative Humidity, Longwave radiation, shortwave radiation

\*Wind direction is measured in degrees and Wind speed in meters per second

**Data Remarks:**

Around 18:55 UTC every day a shadow from a pole is covering the radiation sensor. It is more evident on clear days but is present every day. We opted not to remove it from the QA'd data.

Instrumentation recording error occurred on 15/06/29 between 13:02:04 and 13:18:04 and data was removed.