

GLOBE Approved Microclimate Weather Measurement Systems and Software

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Weather Stations for Education – www.weatherhawk.com





Weather Measurements and the Microclimate

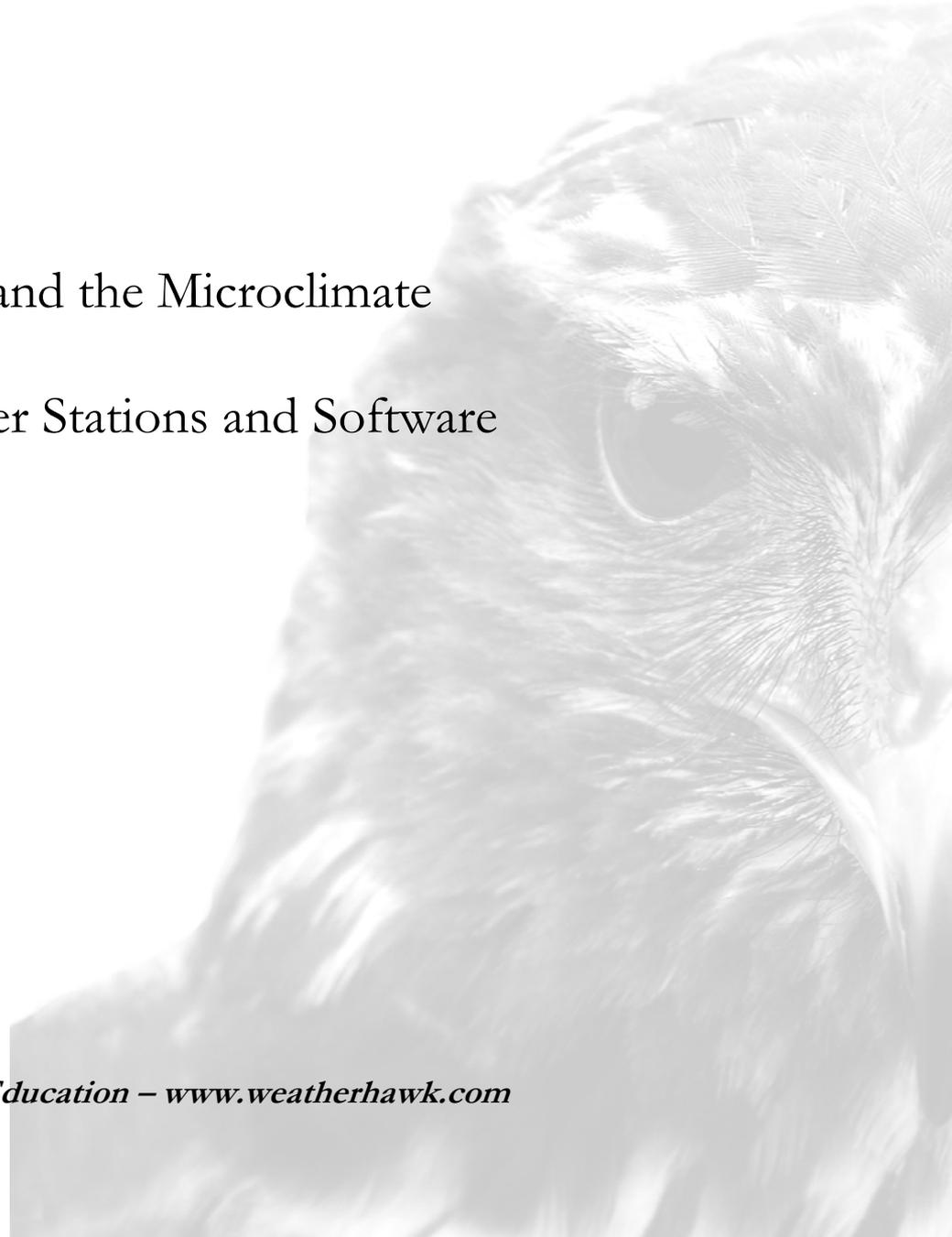
Globe Approved Weather Stations and Software

- Systems
- Software
- Sensor Technology

Issue

- Data Quality - Calibration

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WEATHER is the state of the atmosphere at a specific time and with respect to its effect on life and human activities. It is the short term variations of the atmosphere, as opposed to the long term, or climatic, changes. It is often referred to in terms of brightness, cloudiness, humidity, precipitation, temperature, visibility, and wind.

CLIMATE is the historical record and description of seasonal weather events that help describe a region.

The MICROCLIMATE is climate phenomena in the MICROSCALE, which is the smallest scale of meteorological phenomena that range in size from a few centimeters to a few kilometers. It also refers to small scale meteorological phenomena with life spans of less than a few minutes that affect very small areas and are strongly influenced by local conditions of temperature and terrain.

A weather station measures and records meteorological data at a specific location to create an archive that describes the MICROCLIMATE.



Globe Approved Weather Stations and Software

What is a GLOBE Approved Weather Station?

What companies make GLOBE approved weather stations?

- WeatherHawk – Logan, UT <<http://www.weatherhawk.com/>>
- Davis Instruments – San Leandro, CA <<http://www.davisnet.com/>>
- WeatherBug Schools – Germantown, MD <<http://www.weatherbugschools.com/>>
- Rainwise – Bar Harbor, ME <<http://www.rainwise.com/>>

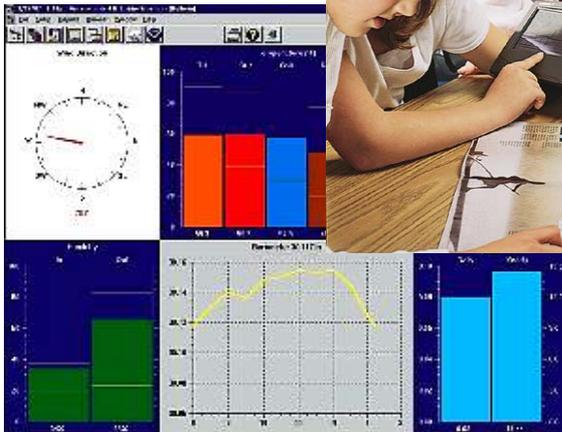
Davis Instruments - *Vantage Pro2*



- Davis' Vantage Pro2 series of automatic weather stations meet all GLOBE specifications



- Stations feature a wireless transmission of data every 2 ½ seconds
- Outside sensors are fully solar powered and easy to set up and maintain
- Inside display console shows all readings at a glance – great for any grade level



Davis Instruments - *Vantage Pro2*

- WeatherLink software includes tools for data analysis and transfer to the GLOBE network
- Weather station is also compatible with most 3rd party weather software programs

The screenshot shows the WeatherLink 5.7 software interface. The title bar reads "WeatherLink 5.7 07/06/07 4:48p: Show - [Browse Records]". The menu bar includes "File", "Setup", "Reports", "Browse", "Window", and "Help". The "Browse" menu is open, showing options: "Choose Date...", "Make a Note...", "Edit...", "Delete", "Copy Records...", "Export Records...", "Delete Records...", "Export Records (GLOBE Format) ...", "Recalculate Daily Values", and "THSW Index...". The "Export Records (GLOBE Format) ..." option is highlighted. Below the menu, a table displays data with columns "Date" and "Time". The first row is highlighted in blue.

Date	Time
3/31/07	4:10p
3/31/07	4:15p
3/31/07	4:20p
3/31/07	4:25p
3/31/07	4:30p
3/31/07	4:35p

Below the table, a data table is partially visible with columns for "THSW Index...".

THSW Index...	THSW Index...	THSW Index...	THSW Index...
70.6	70.6	60	56.0
70.6	70.6	61	56.5

The screenshot shows the "Choose days, months, or years to export" dialog box. It contains the following fields and options:

- School ID: 123
- Site ID: 456
- Include Soil Report
- Soil Site ID: 789
- Days...: 01/14/07, 01/15/07, 01/16/07, 01/17/07
- Months...: 04-04, 10-04, 11-04, 01-05
- Years...: 2003, 2004, 2005, 2006

WeatherBug Schools – Products

WeatherBug Tracking Station

At the heart of the WeatherBug Schools Program is a scientific-grade weather station—a state-of-the-art, weather sensor suite that tracks 27 different variables live from your school rooftop and seamlessly transfers school data into the Globe database.



Wind Sensor — Wind speed and direction

Sensor Shelter — Temperature, relative humidity, heat index, wind chill, barometric pressure, dew point, wet bulb and more

Rain Gauge — Daily, monthly and yearly rain

Camera (optional) — Track your local weather conditions visually with a WeatherBug MotionCam (pictured) or InstaCam camera.



Digital Display — Prominently display your school's live weather conditions for all to see in your front office, main corridor or library. This is a great resource for administrators to check before announcements.



WeatherBug BlueBugBox — The BlueBugBox connects easily to the Internet, provides fast transmission of your weather station data, has a 72 hour battery life and automatically re-boots as needed.

WeatherBug Schools – Content Options



The award-winning, web-based program that integrates your WeatherBug Tracking Station through a rich web-based program of interactive lessons and tools that cover math, science, geography, technology and programming; resulting in improved student achievement.



As partners, GLOBE and WeatherBug encourage teachers to collaborate between disciplines and motivate students by showing the interconnections and meaningfulness in what they are studying.

Data integration and sharing is the key to this partnership and the success of the two programs.

Rainwise

- No data was provided by the manufacturer regarding their hardware or software.



Logan High School Track Meet

Measurements:

- Wind Speed & Direction
- Air Temperature & Relative Humidity
- Barometric Pressure
- Solar Radiation
- Rainfall
- Optional 3 megapixel Netcam

Applications:

- GLOBE
- Community Information – AD FREE webpage
- Athletics
- Microclimate impacts on flora, fauna, human activity

WeatherHawk is a Division of Campbell Scientific

- 35 year old manufacturer of high specification sensor and data logger systems
- 5 International service centers
- Well known and respected in the scientific research community



Sombbrero Marsh Habitat Conservation Area - BVSD



Amboseli Baboon Preserve-Kenya

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GLOBE Approved Weather Stations:



Signature Series



500 Series

GLOBE Approved Software

[WeatherHawk XP/X Webpage](#)

[Virtual Weather Station Webpage](#)

[WeatherHawk District Level Webpage](#)

[InspireData Visualization Software](#)

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Sensor Technologies

- Wind Speed – 3-cup Anemometer
- Wind Direction – Rotating Vane
- Air Temperature – Thermistor
- Relative Humidity – Resistive Thin Film Polymer
- Barometric Pressure - Aneroid Barometer
- Solar Radiation – Pyranometer
- Rainfall – Volumetric Tipping Bucket



Primary Site - Ground or Roof Mounted

Wireless or Directly Connected

- ✓ Installation complexity
- ✓ Safety

Power – Solar or External

Data logging

- ✓ In the station
- ✓ In the Host
- ✓ At an off-site location

Portability

- ✓ On-site investigations
- ✓ Athletics





Data quality is directly related to sensor calibration

In a typical school weather station the sensors of concern are:

- Wind Speed (3-5 year validation)
- Wind Direction (Initial Installation & 5 years)
- Relative Humidity (18-24 months)
- Rain Gauge (Annually at a minimum)
- Solar Radiation (3-5 Years)
- Temperature & Barometric Pressure (5 Year validation)



Thank You

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