CASE STUDY

CAMPBELL SCIENTIFIC
WHEN MEASUREMENTS MATTER

Washington AgWeatherNet

Large network of Campbell weather stations serves growers and researchers


AgWeatherNet station

Case Study Summary

Application:
Statewide agriculture weather network

Location:
Washington, USA

Responsible Agency:
Washington State Univ, (WSU)

Contributor:
Dirk Baker, Campbell Scientific

Products Used:
CR1000, 107, HMP45C

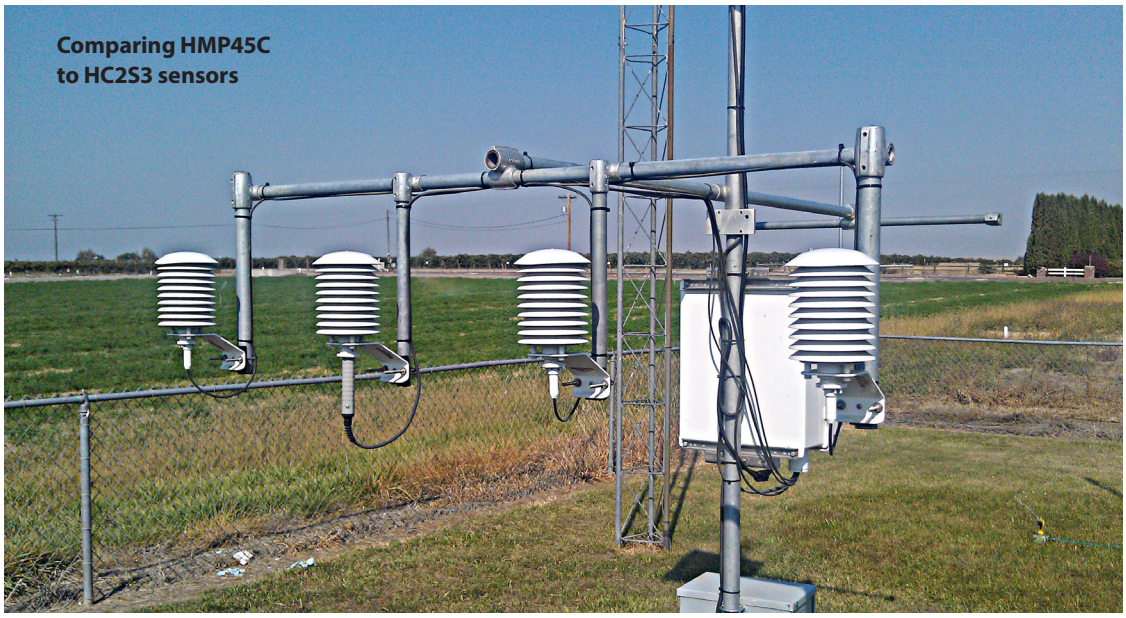
Measured Parameters:
Air temperature, humidity, dew point, soil temperature, rainfall, wind speed, wind direction, solar radiation, leaf wetness

Washington State University's AgWeatherNet (AWN) is a large automated network composed almost entirely of Campbell Scientific products. AWN's purpose is to provide current and historical weather observations from across the state. These observations, along with advisories, weather-data products, decision-support systems, and models, are designed to help improve agricultural production and product quality, optimize resource use, and reduce environmental impact.

There are currently 138 stations in the AWN, primarily located in the irrigated regions of eastern Washington State. They continue to expand this network, with the ultimate goal of having at least one station in every county. The first station was installed in 1988, and the network expanded in western Washington and into the arid regions of the state. All of the stations have a standard set of variables, including air temperature, relative humidity, dew-point temperature, soil temperature (at 8 inches), rainfall, wind speed, wind direction, solar radiation, and leaf wetness, with some stations having additional sensors such as barometric pressure. Variables are logged at 15-minute intervals, based on a 5-second scan rate. All of the stations have CR1000s and are solar charged.

All but one of the stations have cellular modem telemetry. The data, along with the models and tools based on the data, is continuously updated on their website (weather.wsu.edu).

The team behind this network is based at the WSU Irrigated Agriculture Research and Extension Center in Prosser, Washington, and has links



Comparing HMP45C to HC2S3 sensors

Comparison array testing 107-L temperature sensors

to the research, extension, and instruction efforts conducted by all departments and research and extension centers of WSU's College of Agriculture, Human, and Natural Resource Sciences.

AgWeatherNet is supported most strongly by tree-fruit growers. For about $7,000, AWN will add a station to their network (e.g., if a producer wants a station on his property). This is roughly $5,000 for the hardware and $2,000 for the labor. AWN will perform all of the maintenance for about $50 per year and, if the station is damaged, AWN bear all costs of replacement.

AWN has a very well-developed maintenance program. Every piece of hardware is independently bar-coded and its entire history tracked. They always have spares so that they can quickly replace malfunctioning equipment. When a sensor comes in, it is either repaired or replaced and rotated into the inventory for later deployment. They perform their own calibrations and do extensive testing. For instance, they have an array of 107s they have colocated to look at precision among the sensors. They have been using the HMP45C for a long time, and when Campbell Scientific introduced the HC2S3 as a replacement, they promptly purchased several and have a test set up to compare data from three HC2S3 sensors to a colocated HMP45C. They have equipment to test and calibrate temperature, humidity, and wind speed and direction.

One of the key distinguishing features of AgWeatherNet is that it not only provides data, but also decision-support models and tools based on that data for specific interests. For instance, rainfall on ripe cherries can cause them to split, so growers have asked for text and email alarms when more than 0.1 in. of rain has occurred overnight. Additional models include cold hardiness for grapes and pollen tube growth for apples, among others.