

## **Weather Monitoring for Agriculture and Natural Resources**

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The establishment of long-term climate records relies on accurate monitoring of weather data. In the USA, the National Weather Service (NWS) is responsible for weather monitoring and recording. However, most of the detailed records are collected at airport locations, which are mainly situated around larger cities and communities. In many cases these sites are not very representative for agriculture and natural resources management. In addition, the NWS manages the Cooperative Observer Network, which is a larger network that is operated by volunteers who record daily total rainfall and maximum and minimum temperature. Although the Coop network has long-term records, some of which go back for more than a century, there are some problems related to sighting of the stations as well as discontinuation of the stations due to death or retirement of the observers. To support the agricultural communities, several Land-Grant Universities have developed automated weather station networks using more sophisticated data logging devices, electronic sensors, and communications technologies.

The Georgia Automated Environmental Monitoring Network (AEMN) was established in 1991. The AEMN has grown from three stations in 1991 to 74 stations in 2007, with plans for further expansion in 2008. All weather stations have the same core configuration, which includes a data logger, weather monitoring sensors, a battery and solar panel, a tower, and communication equipment. The weather variables that are being recorded include air temperature, relative humidity, precipitation, wind speed and direction, solar radiation, barometric pressure, soil moisture and soil temperature. All sensors are scanned at a one-second frequency and the data are summarized every 15 minutes. At midnight the daily extremes and totals are calculated. Most weather stations have a dedicated land line and modem for communication; while several stations use Wi-Fi or radio telemetry to a computer connected to the internet. A dedicated computer, located at the University of Georgia-Griffin Campus, downloads the data at least every hour, while some stations are downloaded every 15 minutes. After downloading, the data are processed and pushed to a web server. Users can access the data in near real-time from the web site [www.Georgiaweather.net](http://www.Georgiaweather.net). A range of data products and tools has been developed, based on the needs of producers and resource managers. These include, for instance, a degree-day and chilling hour calculator, a rainfall and water balance calculator, first and last frost dates, and short-term temperature predictions. The rainfall data have been used extensively for the current drought in Georgia. The web site has shown to be popular with many users across the State of Georgia; during the month of January, 2008 there were over 500,000 page views.

The data of the AEMN are being archived for further temporal and spatial analysis. This has provided the potential to study long-term climate trends for not only temperature and rainfall, but also other variables that are being monitored by the network. In addition, the popularity of the [www.Georgiaweather.net](http://www.Georgiaweather.net) has provided a mechanism to closely link the dissemination of both weather and climate information and outlooks that are provided by the Southeast Climate Consortium.

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