



Meteorological Monitoring Program

A Comprehensive Observational Resource

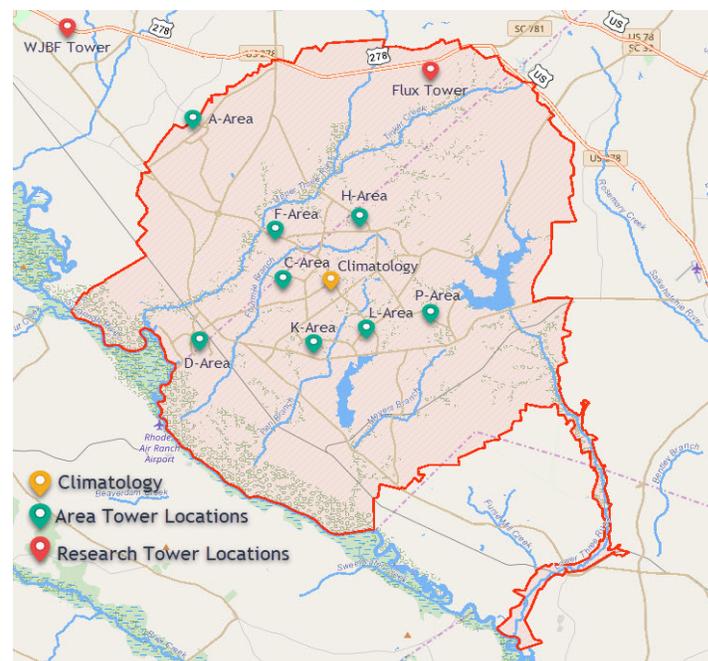
The SRNL's Atmospheric Technologies Group (ATG) manages a comprehensive meteorological monitoring program supporting a variety of operational, regulatory, and research needs. The primary system consists of a highly resilient network of instrumented towers that provides reliable, real-time data for Savannah River Site emergency response and workforce safety. Special monitoring systems supporting ATG research provides additional observations for characterizing the atmospheric boundary layer (ABL), performing ground-truth studies, or examining fluxes of CO₂ within terrestrial ecosystems. SRNL has extensive experience with meteorological instrumentation and data acquisition systems and welcomes partnerships with government agencies and academic institutions to support specific data collection needs.

Primary Monitoring Network

A network of eight meteorological towers across the SRS are instrumented at a height of 61 meters (m) above ground to measure three-dimensional (3D) wind, turbulence, temperature (T), and relative humidity (RH). Winds are measured using fast response sonic anemometers operating at 10 Hz. A ninth 61-m tower, Central Climatology, is located near the center of SRS. Central Climatology records data from instruments mounted at 2 m (T and RH), 4 m (3D wind), 18 m, 36 m, and 61 m above ground (3D wind, T, and RH). Additional instrumentation located at ground level near the tower measures precipitation, solar and terrestrial radiation, barometric pressure, soil temperature and evaporation. All instrument performance specifications, maintenance, and data management protocols meet or exceed industry standards. For redundancy, standard 15-min reports from each tower are transmitted simultaneously over secure network connections for archival on geographically independent data servers. In addition, monitoring system infrastructure has been designed to mitigate damage from lightning, extreme wind and ice loads. Archived data includes averages, variances, and all instantaneous measurements used to compute derived quantities such as vertical fluxes of heat and momentum within the ABL.



Instrument specialist performing field calibrations on a temperature and humidity probe



Primary meteorological tower locations



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We put science to work.™



Aiken AmeriFlux tower

Specialized Observation Platforms

Aiken Site AmeriFlux Tower

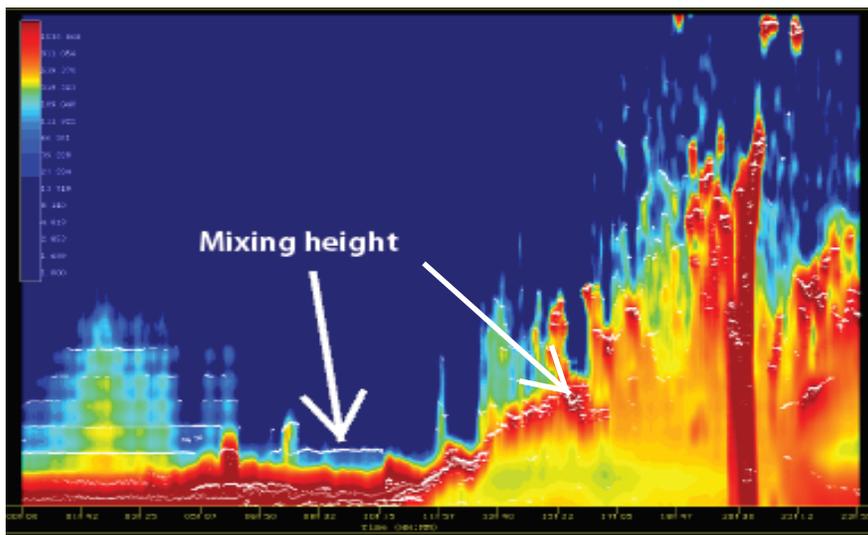
The ATG built and operates the "Aiken Site" as part of the national AmeriFlux network for carbon flux measurements. This 100 ft walk-up tower is situated in a uniform, managed pine forest on SRS and was developed with DOE Office of Science funding to study the interactions of atmospheric carbon dioxide and water vapor with the surrounding terrestrial ecosystem. Four levels of 3-D wind, water vapor and carbon dioxide instruments are used to produce the high frequency (20Hz) measurements.



Shadowband radiometer at the solar facility

Solar Monitoring Facility

A solar irradiance monitoring facility operates in conjunction with a solar energy demonstration site at SRNL's Advanced Research Center. This facility is equipped to measure direct, diffuse, and global solar radiation, wind, temperature, relative humidity, and output from a demonstration solar panel.



Ceilometer display of mixing height

Tall Tower Monitoring Site

Fast-response 3D wind, T, RH, and water vapor/carbon dioxide instruments located at 34, 68 and 330 meters above ground on a local television transmitting tower are used to support regional observational and modeling programs. In addition ATG has partnered with NOAA's Global Monitoring Division to establish the "South Carolina Tower" (SCT) site for measuring CO, CO₂, and approximately 50 other trace greenhouse gases at the three measurement levels. Additional gas analyzers can be installed for special investigations. This unique monitoring facility is the only one of its kind in the Southeast.



Instrumentation on the Tall Tower facility

Ceilometer / Visibility Sensors

A ceilometer and visibility sensors located on three of the SRS towers, provide real-time observations of cloud cover and visibility critical to SRS security force helicopter flight operations. The ceilometer's aerosol backscatter also provides information in the ABL which is useful input for atmospheric dispersion models.

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