



Aerodynamic Particle Sizer (APS) - TSI

- Measures aerodynamic particle size, distributions, and number concentrations
- Uses time-of-flight to characterize acceleration of aerosols across two laser beams; can be merged with SMPS electrical mobility data to generate a fine-to-coarse mode aerosol distribution
- **Size range:** 523 nm - 19 μ m
- **Website:** <http://www.tsi.com/>

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Aethalometer - Magee Scientific

- Measures black carbon mass concentration and optical absorption coefficients at 7 wavelengths
- Uses a continuously advancing filter to characterize transmission of light through deposited aerosols; may be cross-compared with PSAP absorption coefficients or combined with nephelometer/PMEx data for determination of single-scattering albedo
- **Spectral channels:** 370, 470, 520, 590, 660, 880 and 950 nm.
- **Website:** <http://www.mageesci.com/>

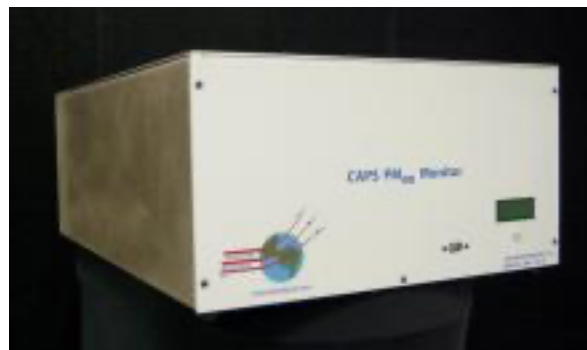
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Beta Attenuation Monitor (BAM-1020) - MetOne Instruments

- Measures aerosol mass concentration at PM_{2.5} and PM₁₀ size-cuts
- Uses a filter-based technique and beta-attenuation to characterize aerosol loading one per hour; can be combined with TEOM to determine fine/coarse mode particle concentrations
- **Website:** <http://www.metone.com>

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CAPS PMex Monitor (Particle Optical Extinction)- Aerodyne Research

- Measures aerosol optical extinction coefficients at three wavelengths
- Uses Cavity Attenuated Phase Shift (CAPS) technique to relate optical extinction to the speed of light as it passes through a mirrored chamber; we can combine extinction information with data from nephelometers, PSAP, or Aethalometer to determine the aerosol single scattering albedo
- **Spectral channels:** 445, 530, and 630 nm
- **Website:** <http://www.aerodyne.com/>

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Cloud Condensation Nuclei Counter (CCN100) - Droplet Measurement Tech

- Measures cloud condensation nuclei size distributions at various supersaturation ratios
- We can use CCN distributions to better understand the hygroscopic properties of *in-situ* aerosols
- **Website:** <http://www.dropletmeasurement.com/products/airborne/CCN>

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Fast Mobility Particle Sizer (FMPS) - TSI Inc

- Measures electrical mobility particle size, distributions, and number concentrations
- Uses a high voltage source to neutralize and charge particles for detection at high time resolution (1Hz); we can merge this fine-to-accumulation mode data with information from SMPS and APS.
- **Size range:** 5.6 – 560 nm

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Nephelometer (TSI Neph)- TSI Inc.

- Measures aerosol total- and backscattering coefficients
- We operate two of these well-characterized nephelometers: one sampling humidified air and one sampling ambient (drier) air, so that we may determine hygroscopic effects of *in-situ* aerosols
- **Spectral channels:** 450, 550 and 700 nm
- **Website:** <http://www.tsi.com>

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Particle Soot Absorption Photometer (PSAP)- Radiance Research

- Measures optical absorption coefficients
- This instrument calculates the decrease in optical transmission (or loss of light) across an aerosol-loaded filter; we can cross-compare its data with the Aethalometer or combine it with nephelometer/PMEx data to determine single-scattering albedo
- **Spectral channels:** 467, 530, 660 nm
- **Website:** http://www.esrl.noaa.gov/gmd/aero/instrumentation/psap_desc.html

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Scanning Mobility Particle Sizer Spectrometer (SMPS)- TSI Inc.

- Measures particle concentration and mobility size spectra
- We operate two of these well-characterized particle sizers: one sampling humidified air and another sampling ambient (dry) air to characterize hygroscopicity effects on aerosols.
- **Size range:** 2.5 nm –1000 nm dependent upon flow settings
- **Website:** <http://www.tsi.com/>

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Tapered Element Oscillating Microbalance (TEOM)- Thermo Scientific

- Measures aerosol mass concentration at PM1 size-cut
- This instrument physically weighs a sample of collected aerosol to determine its mass concentration; we operate it alongside two BAM-1020 instruments to understand fine/coarse mode particle concentrations.
- **Website:** <http://www.thermoscientific.com>

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Total Sky Imager (TSI)- Yankee Environmental Systems

- Collects 360-degree images of sky conditions
- We use this simple but clever instrument to visually confirm if what the radars are telling us is true
- **Website:** <http://www.yesinc.com/>

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Trace Gas Analyzers- Thermo Electron Co.

- Measure the concentration of trace gases such as CO, CO₂, O₃, SO₂, NO and NO_x.
- These monitors use a variety of techniques, including fluorescence and infrared light absorption, to estimate the concentrations of various *in-situ* gases; Air Quality Designs, Inc., modified our NO monitor to allow us to measure NO₂ and NO_x/NO_y concentrations at high time resolutions
- **Website:** <http://www.thermo.com/>

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Weather and Visibility Meter (WVIS)- Optical Scientific

- Measures visibility and temperature
- Used to maintain a record of horizontal visibility to cross-comparison with radar/lidar information
- **Website:** <http://www.opticalscientific.com/>

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Weather Transmitter (WXT520)- Vaisala

- Measures pressure, temperature, relative humidity, wind speed, wind direction and precipitation
- We can use this ancillary data to characterize the atmosphere during a campaign, where reliable meteorological measurements may not be available
- **Website:** <http://www.vaisala.com/>

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