

Parameter	Instrument	Time resolution	PI	Scientific Objectives
Particle extinction coefficient (K_{ext})	CAPS (CAI)	1 sec	LA (M. Mallet)	Aerosol characterization
Particle number concentration	Condensation Particle Counter (CAI)	1 s	CNRM (G. Roberts)	Aerosol characterization
Particle Size distribution ($10 < D < 500$ nm)	Scanning Mobility Particle Sizer (CAI)	90 s	LAMP (A. Schwarzenboeck)	Fine aerosol particle characterization
Refractory particle size distribution ($10 < D < 500$ nm)	Volatility-SMPS (CAI)	90 s	LAMP (A. Schwarzenboeck)	Fine aerosol particle characterization
Refractory particle size distribution ($0.25 < D < 20$ μ m)	Volatility-OPC (CAI)	1 s	LAMP (A. Schwarzenboeck)	Coarse aerosol particle characterization
Particle absorption coefficient (K_{abs})	PSAP 3- λ (CAI)	10 s	LAMP (A. Schwarzenboeck)	Aerosol optical properties
Size resolved BC concentration	Single Particle Soot Photometer (CAI)	30 s	CNRM (G. Roberts)	Fine aerosol particle characterization
CCN concentration and spectra (0.1 to 0.6% S_c)	Mini CCN chamber (CAI)	1 to 180 s	CNRM (G. Roberts)	Aerosol characterization
Aerosol elemental concentration (TSP fraction)	Bulk filter sampling and X-ray fluorescence analysis (AVIRAD)	~ 20 - 40 min	LISA (P. Formenti)	Aerosol apportionment and mixing state
Aerosol soluble fraction (TSP fraction)	Bulk filter sampling and ion chromatography analysis (AVIRAD)	~ 20 - 40 min	LISA (P. Formenti)	Aerosol apportionment and mixing state
Aerosol carbon concentration (PM10 fraction)	Bulk filter sampling and thermo-optical analysis (AVIRAD)	~ 20 - 40 min	LISA (P. Formenti)	Aerosol apportionment and mixing state
Size-segregated elemental concentration (PM10 fraction)	Cascade impactor sampling and X-ray fluorescence analysis (AVIRAD)	~ 1H	LISA (P. Formenti)	Aerosol mixing state and mass size distribution
Dust mineralogy (TSP fraction)	Bulk filter sampling and X-ray diffraction analysis (AVIRAD)	~ 20 - 40 min	LISA (P. Formenti)	Characterisation of dust composition in the coarse and reactivity with respect to the gas phase
Individual particle dust composition (PM10 fraction)	Cascade impactor sampling or bulk filter sampling and scanning/transmission electronic microscopy analysis (AVIRAD)	~ 20 min - 1H	LISA (P. Formenti)	Characterisation of dust composition and mixing state
Particle size distribution ($250 < D < 32000$ nm)	GRIMM OPC 1.109 (AVIRAD)	6 sec	LISA (P. Formenti)	Aerosol characterisation
Spectral scattering coefficient (K_{scat})	Nephelometer 3- λ (AVIRAD)	1 sec	LISA (P. Formenti)	Aerosol optical properties
Spectral absorption coefficient (K_{abs})	Aethalometer 7- λ (AVIRAD)	1 min	LISA (P. Formenti)	Aerosol optical properties
Aerosol optical depth	PLASMA	15 sec	LOA (D. Tanré)	Aerosol optical properties

Broadband fluxes	SW/LW spectrometers	1 sec	SAFIRE	Aerosol optical properties and flux divergences
Trace gas concentrations	CO, O3 commercial analysers	1 sec	SAFIRE	Atmospheric composition
Number size distribution ($D < 20 \mu\text{m}$)	FSSP 300	1 sec	SAFIRE	Aerosol characterisation
Number size distribution ($0.1 < D < 3 \mu\text{m}$)	PCASP 100X	1 sec	SAFIRE	Aerosol characterisation

Table 1. Instrumentation installed on board the ATR-42 aircraft.