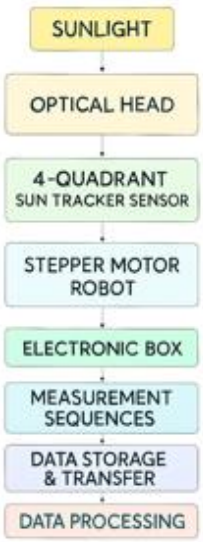
Sun Photometer (Model: CE318)

An Advanced Instrument for Atmospheric Aerosol and Water Vapor Monitoring

INTRODUCTION:

The Cimel CE318 Sun Photometer is a high-precision, automatic, and solar-powered instrument used to measure sun and sky radiance at multiple wavelengths. It is widely deployed globally (notably in NASA's AERONET) to retrieve aerosol optical depth (AOD), water vapor, and ozone column data. The instrument uses spectral filter-based direct sun and sky scanning with motorized sun-tracking for accurate and continuous atmospheric monitoring.

FIGURE & FLOW DIAGRAM



OBJECTIVES:

- Monitoring Aerosol Optical Depth (AOD)
- Retrieval of Water Vapor and Total Column Ozone
- Aerosol Size Distribution & Phase Function
- Support for Satellite Validation
- Climate and Radiative Transfer Studies

DATA OUTPUT:

- Aerosol Optical Depth (AOD)
- Total Column Water Vapor (TCWV)
- Columnar Ozone
- Sky Radiance Data
- Aerosol Size Distribution

KEY SPECIFICATIONS:

- Spectral Range : 340–1020 nm (Sun); 440–1020 nm (Sky)
- Filter Channels : Up to 8 programmable filters
- Bandwidth : 10 nm FWHM
- Field of View : 1.2° (Sun and Sky)
- Detector : UV-enhanced silicon (Sun), silicon (Sky)
- Sun Tracking Accuracy : < 0.1°
- Operating Temp : -30°C to +60°C
- Power : Solar panel or 220V AC (with internal battery backup)
- Data Transfer : Local storage, PC, or Satellite DCS

MEASUREMENT AND WORKING PRINCIPLE:

The CE318 operates using microprocessor-controlled sun tracking in azimuth and zenith planes, guided by a 4-quadrant photodiode. It performs automatic sequences including direct sun, almucantar, and principal plane sky scans. The instrument calculates AOD and other optical properties using multi-spectral radiance data at various scattering angles. During rain events, a wet sensor parks the instrument to protect optics. Real-time measurements are stored in local memory and optionally transmitted via satellites, enabling global coverage except beyond ±80° latitude.

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