



Optical Extinction Analyzer

(OEA) Open-Path Optical Extinction Analyzer



Optical Extinction Analyzer

Air Quality Monitoring



Fast, Accurate Measurements of Visibility (MOR) with No Calibration and No Consumables



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information



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- ➔ Nikira Labs' Open-Path Optical Extinction Analyzer (OEA) is a next generation instrument for accurate measurements of visibility, meteorological optical range (MOR), and aerosol optical extinction. The OEA uses open-path cavity ringdown spectroscopy to measure the total optical extinction of aerosols from first principles. By periodically closing the cavity and purging it with filtered air, the OEA measures the optical loss with and without aerosols. Subtracting these measurements provides the absolute optical extinction due to ambient aerosols from first-principles with no calibration (or self-calibration, if you prefer). Due to its high data rate (up to 10 Hz), the analyzer can be used for both routine monitoring and eddy covariance studies



What does the OEA Measure?

The OEA measures total optical extinction due to aerosols at a specific wavelength without sample handling losses or calibration.

Total optical extinction is directly related to the meteorological optical range (MOR) or visibility, and the OEA measured both quantities with high-accuracy.

The OEA can be used to estimate PM2.5 or PM10 for air quality monitoring.

What is Optical Extinction, Meteorological Optical Range and Visibility?

Optical extinction is the amount of light lost over a given distance. The OEA directly measures the optical extinction coefficient (beta in the equation below) in Mm^{-1} .

The Meteorological Optical Range (MOR) is related to beta and is how far a person can actually see (called the image visual range).

Visibility is the same as MOR, but is a more commonly used term.



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Applications for the OEA:

- Airports
- Highways with a history of low visibility
- Highway Tunnels
- Military Applications
- Air Pollution Monitoring
- Air Quality
- Urban Pollution Monitoring
- Aerosol Research Community
- Environmental Research Networks
- Climate Change Research National Parks
- Forest Areas
- Volcanic Areas
- Desert Areas
- Ecophysiology Research Chemical Manufacturing and Research
- Semiconductor Fab and Research
- Clean Rooms

Advantages of the OEA:

- Measure optical extinction and visibility directly from first principles
- Self-calibration and drift correction enables long-term field deployment
- Open Path sampling provides more accurate results
- No consumables which results in lower operating costs
- Very low maintenance costs and down time
- No external pump means lower required power and lower operational costs
- Can measure multiple wavelengths



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Specification Sheet

Measurement Technology	Open Path Cavity Ring-Down Spectroscopy
Wavelengths Available	520 nm (Std), 450 nm, 632 nm, 780 nm, 850 nm, 1065 nm (Std). Other wavelengths available upon request.
Dynamic Range	0 to >10,000 Mm ⁻¹
Accuracy / Precision	+/- 1 Mm ⁻¹ (nominal)
Data Rate	1Hz & 10Hz (Eddy Covariance application)
Sample Flow Rate	160 SLPM
Ambient Operating Temperature Range	0°C to 45°C
Ambient Humidity Range	< 99% R.H. non-condensing
Outputs / Connectors	UART (for data logger), USB-3 / HDMI
Network Access	Built-in WiFi
Sample Tubing Adaptor	2" Tubing Connection
Purge Line Fitting	¼" push-to-connect
Dimensions	49 cm x 33 cm x 18 cm (19.3" w x 13" d x 7" h)
Weight	7.7 kg (17 lbs)
Power Consumption	35W (user-supplied battery or wall plug operable)
Internal Data Storage	SD Card (32GB); Can store >1M readings (equivalent to 2yrs of continuous data collection)
Calibration	Self-calibrating
Consumables	Periodic replacement of external gas purge filter (Inlet Filter).

