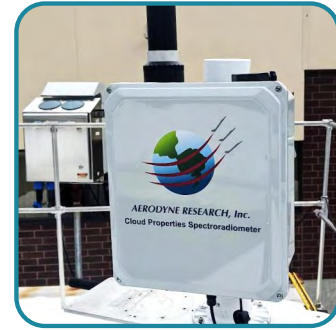# TWST-CPS Sensor

Accurate and Precise Continuous Monitoring of Cloud Properties: Optical Depth, Effective Radius, Phase

- *Measures VIS spectra (400-1700 nm)*
- *Provides 1 Hz sample rate*
- *Resolves thick/thin cloud ambiguity*

Attributes

- High Temporal Resolution; Typical SNR (530 nm) > 1000 at 1 Hz

- Proven radiometric stability under harsh field conditions; frequent recalibration not required

- Sealed IP65, IP66, IP67, IP68 enclosure

- Includes radiometric calibration and a laptop computer fully loaded with executable software for control, data processing and user calibration

- Demonstrated agreement with co-located AERONET sensors within 1% when comparing in-band solar radiance at 440 and 870 nm

Applications

- Accumulation of COD, Phase, and R_{eff} data for inclusion in climatology models

- Capture of cloud edges and fast evolution of cloud properties

- Study of cloud-aerosol interaction effects

- Collecting ground truth measurements for space-based earth-observing sensors

- Real-time measurement of COD for any event requiring a 'GO – NO GO' decision based upon knowledge of local cloud conditions

Results: Cloud Properties Retrievals

SGP 24 Nov 2021 — SAIL 16 Aug 2022
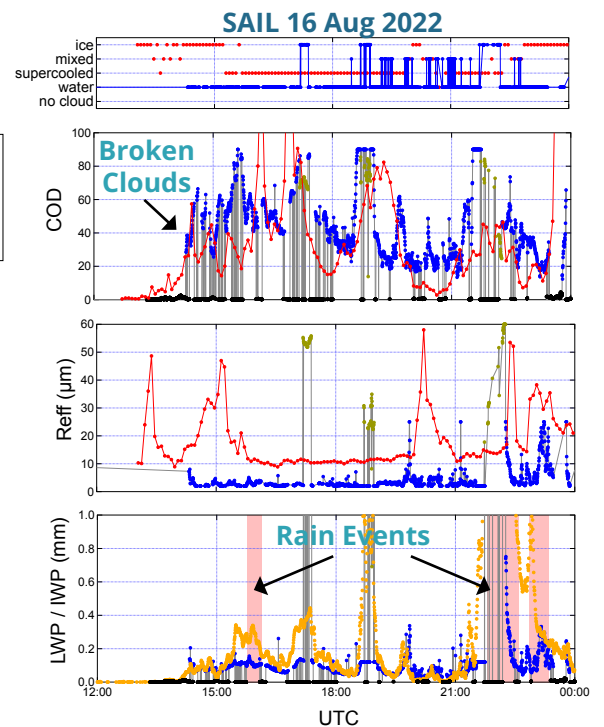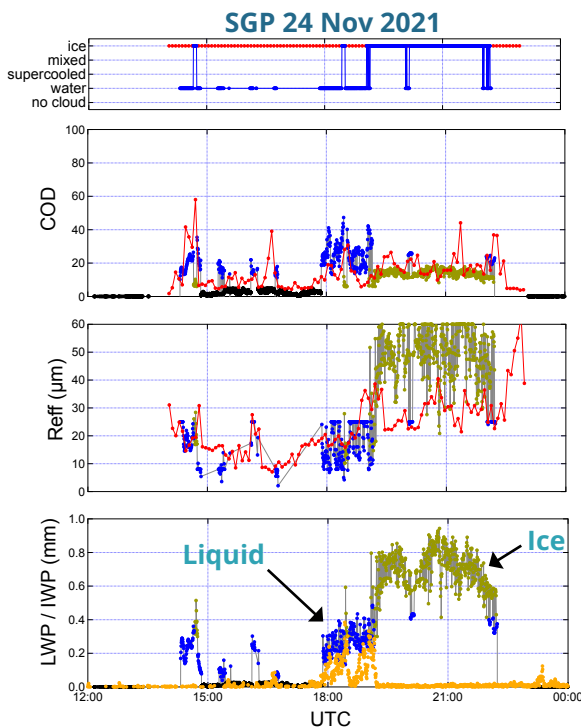
TWST-CPS Sensor

Specifications

MEASUREMENT SPECIFICATIONS	
Spectral Range	400-1000 nm / 950-1700 nm
Spectral Resolution	~2 nm / ~6 nm
Field of View	0.5 deg. FWHM
COD Precision	1% (typical, depends on update rate)
Operating Range	Clear sky to COD > 100
Data Logging Rate	1 Hz (typical), variable sampling internal from 1 to 60 seconds
Phase Designations	Ice, Mixed, Liquid

1 Year Manufacturer's Warranty

Physical Specifications

Weatherproof Box: IP65, IP66, IP67, IP68 sealed enclosure with desiccant

Temperature Range: -10 ℃ to +40 ℃

Precipitation: Slanted optical window design drains water effectively; requires periodic cleaning with distilled water or isopropanol

Power Usage: 5 VDC, 500 mA via USB cable to spectrometer

Weight: 9 kg (20 lbs)

Size: Box: 38 cm x 33 cm x 18 cm (L x W x H) [15" x 13" x 7"]
Baffle: 30 x 5 cm (L x W) [12" x 2"] tube

Data Output

Communication: USB 2.0 connection to host computer for power and data; net CDF4 file format

Display: Simple, effective browser interface

REFERENCES

"Application of oxygen A-band equivalent width to disambiguate downwelling radiances for cloud optical depth measurement". Edward R. Niple, Herman E. Scott, John A. Conant, Stephen H. Jones, Frank J. Iannarilli, and Wellesley E. Pereira. Atmos. Meas. Tech., 9, 4167–4179 (2016)