

The Climate Change Observation Platform

It is designed for monitoring and observing:

- clouds, precipitation;
- weather parameters;
- bioaerosol;
- boundary layer;
- vertical profiles of meteorological parameters (humidity, temperature and aero-

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The Climate Change Observation Platform

Equipment:

Uses:

- reflectivity (Z_e);
- real-time fog;
- the distribution of the raindrops size;
- ice shape and orientation;
- boundary layer characterization;
- lightning detection;
- propagation effects for satellite links;
- new qualitative estimation of precipitation;
- real-time weather conditions;
- wind determination;
- hydrometeor classification;
- calibration of precipitation and cloud radars, including satellite-based systems;
- estimation of propagation effects for satellite links;
- quantitative estimation of precipitation;
- direct determination and wind speed;
- liquid water profiling;
- microphysical analysis of clouds and precipitation.

Cloud radar RPG-FMCW-94-DP



The Climate Change Observation Platform

Equipment:

Cloud radar RPG-FMCW-94-DP

Technical specifications:

- centre frequency 94 GHz ($\lambda=3.19$ mm) \pm 100 MHz;
- typical IF range 0.35 to 4.5 MHz;
- transmitter power 1.5 W typical (solid state amplifier);
- lower transmitter powers available for reduced prices;
- antenna type Bi-static Cassegrain with 500 mm aperture;
- antenna gain 51.5 dB;
- beam width 0.48° FWHM;
- polarisation V (optional V & H);
- Rx system noise figure 4 dB (400 K system noise temperature);
- typical dynamic range (sensitivity) with 1.5 W transmitter @ 3 s sampling time
 - -60 dBz to +20 dBz (at 500 m height / 5 m resolution)
 - -50 dBz to +20 dBz (at 2 km height / 10 m resolution)
 - -47 dBz to +20 dBz (at 4 km height / 30 m resolution)
 - -36 dBz to +20 dBz (at 10 km height / 30 m resolution)
- ranging 50 m to 12 km typical, 16 km maximum;
- maximum vertical resolution -1 m.



The Climate Change Observation Platform

Equipment:

Uses:

- vertical profiles of atmospheric temperature;
- vertical profile of atmospheric humidity; (relative and absolute humidity);
- Liquid Water Path (LWP);
- Integrated Water Vapor (IWV);
- wet delay;
- dry delay;
- stability indices;
- meteorological observations;
- Numerical Weather Prediction (NWP);
- forecasting,
- now-casting;
- climate monitoring, aviation meteorology, astronomy, geodesy.

Radiometer RPG-HATPRO-G5



The Climate Change Observation Platform

Equipment:

Radiometer RPG-HATPRO-G5

Technical specifications:

- IR radiometer option 9.6-11.5 μm band, accuracy 1 K, noise: 0.2 K RMS;
- LWP Accuracy: ± 20 g/m², Noise: 2 g/m² RMS;
- IWV Accuracy: ± 0.2 kg/m² RMS, Noise: 0.05 kg/m² RMS;
- full sky IWV and LWP maps (only with azimuth positioner)
- optical resolution HPBW (frequency dependent): 3.0° - 4.2° for water vapour, 1.8° - 2.2° for temperature profiler;
- side-lobe level <-30dBc;
- pointing range/ resolution elevation: 0° to 180° (0.15° steps), full s/w control;
- azimuth (optional): 0° to 360° (0.1° steps), full s/w control
- system noise temperatures <400 K typical for 22.2 – 31.4 GHz profiler;
- <600 K typical for 51.4 – 58.0 GHz profiler.



The Climate Change Observation Platform

Equipment:

Ceilometer CHM 15k „NIMBUS“ – Lufft

Uses:

- aerosol backscatter profile, cloud base height, cloud penetration depth, aerosol layer height, cloud cover, vertical visibility, Sky Condition Index;
- weather services (ASOS systems, aviation market, EPA/ Universities)
- environmental studies of fine dust, mixing layer;
- renewable energy market - solar energy (cloud cover) and wind energy (cloud base).



The Climate Change Observation Platform

Equipment:

Ceilometer CHM 15k „NIMBUS“ – Lufft

Technical specifications:

- laser-optical parameters;
- light source Nd:YAG solid state laser;
- wavelength 1064 nm;
- pulse energy 7 μJ ;
- pulse repetition frequency 5 - 7 kHz;
- filter bandwidth 1 nm;
- field of view receiver 0.45 mrad.



The Climate Change Observation Platform

Equipment:

Rapid-E-Real-Time Bioaerosol Detector

Uses:

- analysis of airborne particles ranging between 0.3 and 100 micrometers, including bacteria, fungal spores, viruses, pollen, and other aerosols;
- real-time pollen counting;
- particulate matter monitoring;
- bacterial and fungal spore detection;
- virus aerosol research.



The Climate Change Observation Platform

Equipment:

Rapid-E-Real-Time Bioaerosol Detector

Technical specifications:

- particle size range, micrometers (μm) 0.3 – 100;
- UV laser wavelength, nanometers (nm) 337;
- scattering laser wavelength, nm 445;
- imaging laser wavelength, nm 635;
- number of pixels to measure light scattering 14 + 14;
- fluorescence spectral range, nm 380-580;
- fluorescence spectral ranges of lifetime module, nm 373 – 387, 420 – 520;
- fluorescence decay resolution, nanoseconds (ns): 1.



The Climate Change Observation Platform

Equipment:

Laboratory weather station, CAMPBELL SCIENTIFIC

Uses:

determination of weather parameters: temperature, humidity, pressure, wind direction and speed, amount of precipitation, atmospheric visibility.

Technical specifications:

- temperature and relative humidity sensor: Campbell Scientific HygroVUE™10
- barometer: Campbell Scientific CS106
- anemometer: Thies CLIMA ULTRASONIC ANEMOMETER 2D
- atmospheric Visibility Sensor: Campbell Scientific CS120A
- raingauge: Thies Clima 5.4032.45.008



The Climate Change Observation Platform

Equipment:

Disdrometer, OTT HydroMet, Parsivel²

Uses:

- measurement of precipitation type, intensity, drop size distribution, radar reflectivity.

Technical specifications:

- optical sensor, laser diode;
- wavelength: 650 nm;
- output power (peak): 0.2 mW;
- laser class: 1 (IEC/EN 60825-1:2014);
- measuring surface (W x D): 180 x 30 mm (54 cm²);
- measuring ranges: particle size: liquid precipitation: 0.2 ... 8 mm;
solid precipitation: 0.2 ... 25 mm;
particle velocity: 0.2 ... 20 m/s;
- classification: 32 size and 32 velocity classes;
- measurement accuracy 1: ± 1 size class (0.2 ... 2 mm); ± 0.5 size class (> 2 mm);
- types of precipitation: 8 precipitation types (drizzle, drizzle/rain, rain, mixed rain/snow, snow, snow grains, sleet, hail).



The Climate Change Observation Platform

Equipment:

Pluviometer, Thies Clima, 5.4032.45.008

Uses:

- measuring the amount of precipitation within a certain time interval.

Technical specifications:

- pulse output - with intensity-dependent linearization;
- heating: 113.5 W; 24 V AC/DC;
- collecting area: 200 cm²;
- resolution: 0.1 mm NS;
- intensity: max. 11 mm / min.;
- measurement principle: tipping bucket;
- ambient temperature: 25 ... +60 °C w. heat;
- dimensions: Ø 197 x 445 mm;
- weight: 3.3 kg.

