METAS: Meteorological Station for Solar Technologies

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METAS (Meteorological Station for Solar Technologies) is the result of collaboration between CIEMAT and DLR. It is a joint facility that aims the development of activities related with measurement and characterization of solar radiation for energy applications. The complementarity between the CIEMAT-PSA-BSRN radiometric station and DLR-AERONET station improves existing capabilities and enable a better understanding of atmospheric attenuation and evolution of cloud cover, crucial for the management, operation and efficiency of solar power plants.

METAS is located at the Plataforma Solar de Almería (PSA-CIEMAT, www.psa.es), the largest European research, development and test center devoted to solar concentration technologies (South-East of the Iberian Peninsula, 37.09ºN, 2.36 ºW).

Main instrumentation available at METAS

	Instrument	Manufacturer	Model
PSA-BSRN Station	Pyranometer	Kipp & Zonnen	CM21
	Pyranometer	Kipp & Zonnen	CM21
	Pyranometer	Kipp & Zonnen	CM11
	Pyrheliometer	Kipp & Zonnen	CH1
	Pyrheliometer	Kipp & Zonnen	CHP1
	Pyrheliometer	Kipp & Zonnen	CH1
	Pyrheliometer	Eppley Labs.	NIP
	Pyrheliometer	Kipp & Zonnen	CH1
	Absolute Cavity Radiometer	PMO	PMO6
	Pirgeometer	Eppley Labs.	PYR (PT100)
	Tracker	Kipp & Zonnen	2AP
	Sunsensor	Kipp & Zonnen	2AP
	UV radiometer	Eppley Labs.	TUV
	Barometer	Thies	DL16 (Integrated)
	Datalogger	Thies	DL16
	Pluviometer	Young	52203
	Wind speed/direction	Herter Instruments	
DLR-AERONET Station	Sunfotometer	Cimmel	CE-318N EBS9
	SAM	Visidyne	
	Ceilometer	Jenoptik	CHM 15k
	Lidar	Raymetrics	LB100-D200
	Transmissometer	Optec	LPV4
	Transmissometer	Degreane	TR30AC
	Visibility Sensor	Vaisala	FS11
	Sky Camera	Mobotix	Q24
	Absolute Cavity Radiometer	PMO	PMO6

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METAS objective

Develop jointly activities related to solar irradiance measurements for energy assessment. METAS started within the framework of a **collaboration agreement** that was signed in 2012.

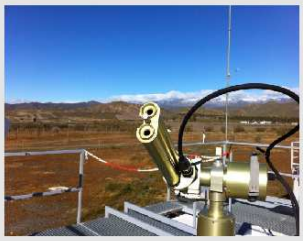
Main activities

Coordinating the use of measuring equipment included in the METAS installation.

Production of reference meteorological datasets.

- ✓ Analysis of DNI spatial variation.
- ✓ Creation of Typical Meteorological Years (TMY) and/or Representative Radiation Years (ASR), etc.
- ✓ Standardization and integrating procedures for data bankability, data quality control and treatment, integration of data sources, and evaluation of meteorological parameters.

Pyranometer and pyrheliometer calibration with absolute cavity radiometers (ACRs) following international standards.



DLR-SF instruments

Meteorological information is essential for the design, operation and qualification of CSP plants and their components. DLR's Institute of Solar Research determines the meteorological parameters that are relevant for CSP.

Accurate measurements of DNI are crucial for the uncertainty of the overall efficiency measurement of a CSP collector. This type of measurements is obtained by thoroughly calibrated pyrheliometers.

DLR investigates robust irradiance measurement instruments as Rotating Shadowband Irradiometers, that require less maintenance and are often used at remote sites for solar resource assessment.

Advanced measurands for solar resource assessment (i.e. the sunshape, atmospheric extinction, soiling of plant component) and CSP qualification under harsh desert conditions are also investigated.

CIEMAT-PSA instruments

PSA is one of the most relevant research facilities for CSP in the world.

In 1988 PSA's meteorological station was established for measuring solar radiation (global, direct and diffuse radiation) as well as generic weather variables.

The station has been a full member of the World Meteorological Organization's Baseline Surface Radiation Network, whose directives it follows since October 2005.

The main interests of the solar radiation characterization at PSA are related to: analyze relationships between solar variables, assessment of low-cost atmospheric attenuation devices, improve estimations from satellite images, analyze the spectral distribution of solar radiation under different conditions and testing the international standards for the calibration of solar irradiance sensors.

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