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If you have a news item for the newsletter or want to share your experiences with Kipp & Zonen applications and contribute to our next issues, please e-mail the editor: kelly.dalu@kippzonen.com

Global Solar Energy Market Expanding

Just before the summer holiday season Kipp & Zonen attended the InterSolar conference and exhibition in Munich, Germany. The conference was a great success and during the three days of the exhibition we welcomed hundreds of visitors. At the peak we had six Kipp & Zonen representatives on the booth; from Germany, France and the Netherlands. This is one of the indicators that the solar energy market is growing rapidly; many observers even say that it is booming.

One of the driving forces is the market for photovoltaic energy production. Around the World scientists and technicians are working on improving materials, better inverters and controls, and refining the competing technologies of thin-film or crystalline solar cells, in order to squeeze out the last point of efficiency. Concentrating Photovoltaic (CVP) systems are now becoming more cost-effective. In addition, Concentrated Solar Power (CSP) thermal energy systems are also becoming more widely used.

Many of the people involved in the industry have little knowledge of solar radiation and its measurement and want to buy high quality, reliable equipment from a well-known and respected manufacturer. Kipp & Zonen has the products and expertise to provide solutions for the accurate measurement of solar radiation in all aspects of the development, location and operation of commercial solar energy installations. In line with this, we will continue to expand our range of guides and information aimed at the market.

Of course, we also continue to be very active in the meteorology and climatology markets and in other sectors, such as agriculture and water management. An example of this is the new PQS 1 PAR Quantum Sensor that is featured in this newsletter.

During the remainder of 2010 Kipp & Zonen will continue to exhibit at Meteorology and Solar Energy events in Europe and the USA. We hope to meet you there.

Yours sincerely,

Ben Dieterink, President
Kipp & Zonen B.V.

Calibration Facility for Pyrgeometers

For many years we have been manufacturing the CFR Calibration Facility for Radiometers. The CFR offers customers with a network of instruments the means to perform regular factory-standard calibrations of pyranometers and albedometers without the need to return them to Delft, saving time and money.

The procedure used complies with Annex A.3 of international standard ISO 9847 “Calibration of Field Pyranometers by Comparison to a Reference Pyranometer”, that refers to “Calibration Devices Using Artificial Sources”.

Now, we have designed the CFI ‘Calibration Facility Infrared’ accessory for the CFR. This allows the indoor calibration of pyrgeometers using the same method as the factory calibration. This procedure is similar to that used for pyranometers and albedometers, but the Metal Halide lamp is turned off. Instead, an infrared hot plate is mounted onto the pillar below the lamp.

The hot plate has a precise, stabilized, temperature control unit and there is a heat shield for the shading mechanism. The test CG 1, CG 4, CGR 3 or CGR 4 can be mounted directly onto the standard CFR turntable next to a reference pyrgeometer. An adaptor is required for the CG 3, and the albedometer turntable is required for the CG 2.

The uncertainty of the complete calibration process from the pyrgeometer reference group at the World Radiation Centre in Davos, Switzerland (which includes two Kipp & Zonen CG 4 instruments) to the field pyrgeometer on the CFI, is typically in the range of 5-6 %.

The sensitivity transfer uncertainty can be improved by calibration outdoors, under clear skies, over a number of days and nights. All CGR 4 pyrgeometers are calibrated this way. However, this is very dependent upon the sky and weather conditions, so all other pyrgeometers are normally calibrated indoors, as described.

The CFI is available now, for both new and installed CFR calibration facilities ■

Surya Design Characterises CPV Modules with Kipp & Zonen Instruments

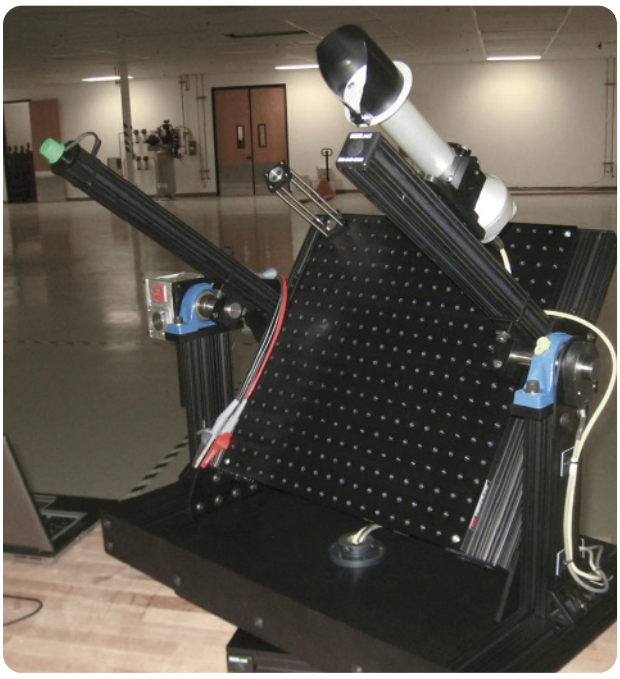
The Surya Design CPV (Concentrated Photovoltaics) Test Suite includes all the hardware and software required to characterize the performance of CPV modules. Along with other parameters, this characterization requires measurement of both the direct normal solar irradiance seen by the sun-tracking CPV systems and the global solar irradiance.

Surya Design has selected the Kipp & Zonen CHP 1 pyrheliometer and CMP 3 pyranometer to measure the direct and global radiation respectively.

Surya Design is an independent consultancy, based in San Francisco, California and owned by Sandheep Surendran. They offer design, engineering and operations services to the clean technology industry with a focus on photovoltaics and concentrated photovoltaics.

Sandheep Surendran says: ”Kipp & Zonen has a well-established reputation in the CPV industry. More importantly, the product specifications meet and/or exceed the requirements of our application.”

For further information about the CPV Test Suite visit Surya Design at www.suryadesign.com



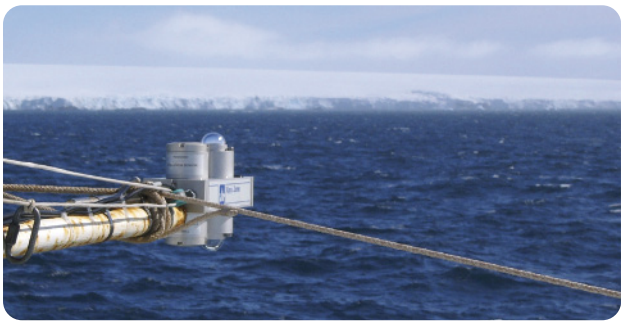
The Kipp & Zonen Award goes to Alexey Sinitsyn, Research Scientist at the P.P. Shirshov Institute of Oceanology

Every year, at the annual meeting of the European Meteorological Society (EMS), we grant the Kipp & Zonen Award for Boundary Layer Research to a young aspiring scientist. This year Alexei Sinitsyn was the selected winner for his paper "New parameterization of surface short-wave radiation based on highly accurate in-situ measurements in the Atlantic Ocean."

His major area of research is ocean-air interaction and, specifically, air-sea short-wave radiative flux measurements and parameterizations. These are generally less widely measured and researched than effects on land. During the last few years Alexey has developed a new insight into short-wave radiation fluxes at the sea surface by merging the advantages of high quality field measurements, numerical modeling and carefully designed laboratory experiments.

Alexey's work targets the major source of uncertainties in the existing models of solar radiation at the sea surface, namely, the large variation of the atmospheric transmission factor upon cloud cover of different cloud types. In order to overcome this problem and to discriminate between different cloud type conditions he designed, planned, and personally carried out, a 4-year (2004-2007) in-situ measurement campaign aboard research vessels. The ships traveled along meridional sections in the Atlantic Ocean from 60N to 60S in different seasons.

A Kipp & Zonen CNR 1 net radiometer was used to measure sea surface incoming and reflected short-wave radiation during the cruises. Cloud cover and cloud type and other meteorological data were recorded. The compiled database of in-situ measurements consisted of about 130 daily time series of measurements. For all samples an analysis of the impact of platform rolling on the accuracy of radiative measurements was performed. The collected data were used for the development of a new parameterization of short-wave radiation at the sea surface.



The new model demonstrates a clear improvement in the accuracy of computation of short-wave radiation fluxes compared to the traditional schemes based exclusively on the total cloud cover. This new approach is especially effective under conditions close to completely overcast, when the accuracy may be 20% better. Under other cloud conditions the improvement is not so drastic, but nevertheless significant. These results provided the basis of Alexey's PhD thesis in 2009 at the P.P. Shirshov Institute of Oceanology, Russian Academy of Sciences.

The new parameterization probably represents the upper limit of complexity that can be achieved with bulk parameterizations of radiative fluxes along with standard meteorological observations, and considers separately, for the first time, the dependencies of the atmospheric transmission factor upon cloud cover of different cloud types.

Our congratulations go to Alexey! The award was presented to him at EMS by Ben Dieterink ■

New and Improved PAR Quantum Sensor - PQS 1

We proudly present our latest development for light measurement in agronomy and horticulture; the PQS 1 PAR Quantum Sensor. An improved and user-friendly instrument for the measurement of Photosynthetically Active Radiation. PAR is that part of the light spectrum which plants use for growth processes and is an important parameter for horticultural and forestry applications.

PQS 1 features a much improved responsivity, providing an excellent match to the ideal PAR spectrum. This significantly increases the measurement accuracy over its predecessor the PAR Lite, and rivals the best competing instruments.

An integrated base with leveling screws, bubble level and fixing holes makes it even easier to install and maintain. A screw-in mounting rod is available as an accessory. Moreover the instrument is fitted with our familiar yellow captive cable, available in lengths of 5 m or 15 m.

Within greenhouses our PAR sensors have been used for many years to monitor lighting levels for crop yield optimization. Using the instrument's measurement of PAR, lighting levels are controlled in an efficient way. This optimizes crop growth and minimizes power consumption.

Combined with the METEON hand-held read-out unit and the optional 30 cm long mounting rod, PQS 1 is the ideal instrument for gathering real time PAR measurements at any location.

For long term measurements with low power consumption requirements, up to eight PQS 1 sensors can be connected to our LOGBOX SD low power data logger. This solution provides many months of data storage without the need for an external power supply. Data is collected on a standard SD memory card and can easily be read by virtually any PC or laptop.

For applications requiring a voltage or 4 to 20 mA output, we offer the AMPBOX amplifier. Each AMPBOX is adjusted to a standard output range in $\mu mol/m^2 \cdot s$ allowing for even easier installation and sensor exchange.

For more information please visit the PQS 1 product page at our website ■

The Kanzelhöhe Observatory in Austria

The Kanzelhöhe Observatory for Solar and Environmental Research is located on the Gerlitzen, a mountain near Lake Ossiach and the city of Villach in Carinthia, the southernmost state of Austria. The observations take place at the western edge of the Klagenfurter Basin at 1526 m above sea level, roughly 1000 m above the valley bottom.

As knowledge about radio propagation evolved it became obvious that the earthly Ionosphere is affected by solar activity. The Observatory was founded in the early nineteen-forties to study these effects and since this time the Sun has been systematically observed every day. The full disk images of the Photosphere (Sun Spots) and the Chromosphere (Flares) are also provided to international observation networks and the internet.

From the beginning classical meteorological observations have also been carried out at the Kanzelhöhe Observatory. With the increasing scientific and public interest in climate change the fields of research were extended to cover this subject, especially with regard to solar radiation and its interaction with the atmosphere.

Kanzelhöhe Observatory is the only observatory in Austria covering these fields of interest and is affiliated to the Institute of Physics at the University of Graz; specifically the Department of Geophysics, Astrophysics and Meteorology. The observing programmes are defined by the scientific objectives of the working groups of the institute. At the Observatory the instruments and observing methods are developed, the measurements and observations are performed, and validation and archiving of data is done.

Due to its isolated location the observatory has an independent infrastructure, from an independent emergency power generating system to a well equipped workshop that enables the staff to perform all necessary mechanical, electrical, and electronic work. Today almost all of the observations and measurements are obtained and saved in digital formats, therefore it is possible to provide access to real-time data via the internet from all over the world.

In the field of atmospheric physics direct, global and diffuse solar irradiance and downwards infrared radiation are measured continuously. For this purpose Kipp & Zonen instruments are operated on a SOLYS 2 sun tracker. The sun tracker carries a pyrheliometer (CHP 1), two ventilated pyranometers (CM 22), and a ventilated pyrgeometer (CG 4). With this instrument setup it is possible to achieve the quality requirements of the Baseline Surface Radiation Network (BSRN).

As part of the Austrian UV measurement network the SOLYS 2 also carries two UVS-AB-T radiometers, for global and diffuse UVA and UVB. In addition there is a CSD 3 sunshine duration sensor.

Kanzelhöhe Observatory is also involved in projects investigating the potential of photovoltaic systems on the basis of an ideal infrastructure combined with the high quality measurement of solar radiation.

For more information about the Kanzelhöhe Observatory please visit http://www.kso.ac.at ■

Recomatic Electronics Handelsgesellschaft GmbH is the exclusive distributor for Kipp & Zonen in Austria and Kanzelhöhe Observatory would like to thank Recomatic for exceptional support and interest in its research requirements.

SOLYS 2 Sun Tracker at CNIM's Solar Concentrator Module

Originally named Constructions Industrielles de la Méditerranée, CNIM has an active environmental division that specialises in energy production from the treatment of household and industrial waste and biomass. Now the company is expanding into Concentrated Solar Power (CSP) systems. CNIM designs, develops and produces turn-key solutions. In July 2010 their prototype CSP module was installed at La Seyne sur Mer in the South of France.

The concentrator module uses Fresnel mirror technology that takes a large area of sunlight, concentrates it, and directs it towards a specific target in order to produce steam, and thus energy. The energy produced is renewable, storable, and easily integrated into the existing electrical networks. The CNIM technology is eco-friendly thanks to its low carbon footprint and the use of recyclable and non-polluting fluids and materials. The large and powerful stand-alone module has a 50 m x 20 m footprint and 720 m² of mirrors that can produce steam at up to 100 bar pressure.

The SOLYS 2 sun tracker and CHP 1 pyrheliometer from Kipp & Zonen are used to accurately measure the Direct Normal Irradiance (DNI) in order to determine the solar concentrator module performance. Thanks to the continuous measurement with Kipp & Zonen instruments, CNIM is able to calculate the energy output of its module and enhance its productivity and efficiency.

On July 26th 2010 CNIM inaugurated its solar concentrator installation in the presence of Mr Christian Estrosi, the French Government Minister of Industry.

Kipp & Zonen SARL is working closely with a number of power companies in France to provide instruments for solar energy applications.

Find out more about CNIM at www.cnim.com ■

Fairs & Events

Solar Power International 10 Los Angeles, California, USA	12 - 14 October 2010
AGU 2010 Fall Meeting San Francisco, California, USA	13 - 17 December 2010
91st AMS Annual Meeting Seattle, Washington, USA	23 - 27 January 2011

Passion for Precision

Kipp & Zonen is the leading company in measuring solar radiation and atmospheric properties. Our passion for precision has led to the development of a large range of high quality instruments, from all weather radiometers to complete measurement systems.

We promise our customers guaranteed performance and quality in: Meteorology, Climatology, Hydrology, Industry, Renewable Energy, Agriculture and Public Health.

We hope you will join our passion for precision.

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