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Contact

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

2015 and Beyond

We're in a new year, a good time to look back and also to look forward.

2014 was an exciting year at Kipp & Zonen. Ben Dieterink retired, the ownership of Kipp & Zonen changed, and also many things in the world around us are changing. We are still facing a global financial crisis, although situations differ from one country to another. Overall the results for Kipp & Zonen have been satisfactory, mainly due to a world where governments nowadays understand better that renewable energy is not an option anymore, but a 'must'.

Also our traditional customer, the scientific community, is still very active. The interest in ozone and spectral UV is still very much alive; we delivered 8 new Brewers in 2014 to some new and existing users. We're happy to have many loyal customers in the scientific community. 'Passion for Precision', the scientific community demands the best instruments available, and this is what we deliver.

We are also thinking about what Kipp & Zonen should look like in 5 to 10 years. Traditionally, Kipp & Zonen is a sensor manufacturer, but our sensors are rarely used in stand-alone configurations. There is almost always a data logger, visualization of data is required, automatic processing of data is needed, and customers prefer one-stop shopping for all the equipment. Something we cannot ignore. Diversification? Depending on one specific business segment makes a company vulnerable. Solar energy is still largely dependent upon public funding, there are no guarantees that the growth will continue.

Last, but not least important, technological developments make us rethink the future generations of sensors. In meteorology and solar energy, automation is becoming more and more important. At Kipp & Zonen we have to accommodate the wishes of our customers, meaning that we have to stay on top of the innovations required by the market.

Finally I want to thank our customers for the trust they are continuously giving us, our sales offices and all of our distributors for their efforts, their hard work and their commitment in supporting our customers. I wish everybody nice Holidays and all the best for a beautiful and healthy 2015!

Foeke Kuik - C.E.O.
Kipp & Zonen B.V.

SOLYS 2 Sun Tracker Instruction Video

By Clive Lee, Kipp & Zonen - After many requests we are proud to release a comprehensive instruction video for the SOLYS 2 sun tracker. It not only features the SOLYS 2 and the accessory sun sensor kit, but also the shading ball assembly and the instruments to build a complete solar monitoring station, including the CVF4 ventilation unit.

For most customers the manual is sufficient to set up a SOLYS 2. However, sometimes it's just easier to see it demonstrated rather than scrolling through the many pages of diagrams on a laptop, or it helps to clarify steps from the manual. Either way, it's a great addition to our product information.

The video is produced as a series of chapters to make it easy to find the exact procedure you're looking for. Whether it's the installation of the shading ball assembly, or mounting the pyrheliometer onto the tracker, you can skip the rest and get right to the procedure you need.

The sections on mounting a pyranometer, pyrgeometer or CVF4 ventilation unit show the shading ball assembly mounting plate as the support platform. However, the procedures are the same when mounting the instruments on any suitable horizontal, stable surface.
Please remember that the video is an aid to assembly and installation. It is not a substitute for reading the manuals!

The SOLYS 2 video is available on our YouTube channel www.youtube.com/kippzonen or visit our Customer Services webpage to find all our instruction videos.
www.kippzonen.com/customer-services/instruction-videos ■

A Dedicated Website for the Brewer

By Kelly Dalu-Karlas, Kipp & Zonen - Kipp & Zonen is pleased to announce the launch of a website dedicated to the Brewer Spectrophotometer. The Brewer MkIII Spectrophotometer is a sophisticated optical instrument providing near-simultaneous observations of the Total Ozone Column (TOC) and Sulphur Dioxide (SO_2) between the instrument and the sun. It can also make high resolution spectral measurements of the ultraviolet (UV) radiation in the direct sun beam or from the whole sky.

www.kippzonen-brewer.com offers information on the instrument and its maintenance and operation in the field; for existing and prospective Brewer users and for students and scientists interested in measurement of the total Ozone column and Ultraviolet radiation.

The website features articles on atmospheric Ozone, Ultraviolet (UV) solar radiation, the history of the Brewer, how it works and practical tips from the Kipp & Zonen Brewer team. You can find news, user stories, pictures and videos.

228 Brewers of all types have been delivered since 1982 and most are still in operation. They are in over 40 countries around the world from the Tropics to the Arctic and Antarctic. An interactive map on the website shows an overview of Brewer locations around the world. We encourage users to send in more details and information about their Brewer locations that we can add to the map.

Our scientist Keith Wilson says: "I am very pleased that we have managed to get together all the Kipp & Zonen disciplines with knowledge of the Brewer to provide a platform that offers an extensive database of practical information. This is a great development, giving Brewer users around the world a site where we can all share our common interest in the instrument and the research performed with the Brewer."

Kipp & Zonen encourages the involvement of third parties specialised in the fields of Ozone and UV measurement, climate research and the Brewer instrument. We welcome articles, pictures, research results, questions or any other related material for publication ■

Tackling Solar Energy's Dust Problem

By Dmytro Podolskyy, Kipp & Zonen - Due to the increasing interest in renewable energy resources around the world, solar plants are more frequently being installed in challenging conditions. Many of the locations are arid, desert-like areas, as they provide very high solar irradiance and the land is rarely used for other purposes. Examples of such sites are in the USA, North Africa, the UAE, Saudi Arabia, the Atacama Desert in Chile, Australia and India.

In such areas soiling by dust and sand is a serious issue that affects the efficiency of the plant and understanding it is crucial for the whole process of calculating the viability of a project. Soiling-related issues need to be studied to understand output losses, schedule maintenance, calculate life-cycles of components and evaluate bankability.

Soiling is a complex process that strongly depends on the local environment. Surface conditions, wind patterns, humidity and the temperature of the air are the main natural parameters that affect soiling. Anthropogenic factors also play important roles; agricultural activities, traffic and air pollution contribute to deposition of dust and pollutants on PV panels, CPV lenses and CSP plant mirrors.

The causes of soiling

In solar energy projects the main contributors to soiling are the following:

- Dust, pollen, sand and other airborne particles naturally accumulate on the surfaces of PV modules, concentrating mirrors and lenses. This reduces the energy output of solar plants, particularly those located in arid areas with agricultural activities and loose soil.
- Airborne pollutants such as vapours, smog, and soot can form a surface layer that is harder to clean than dust or sand. This is especially relevant in urban and industrial areas.
- Deposition of sand and dust in arid areas can be increased by night dew as the dust and sand sticks to wet surfaces. During the day the dust dries out and is baked on by the sun and the next night more accumulates on the dew-damp surface. The process repeats, forming a thick layer of dust that can completely block the light.
- Dirt often accumulates on the lower part of PV panels that have a raised mounting frame, providing partial shading and reducing the efficient area of the PV module. This is especially relevant in areas close to the equator as the panels are usually installed with low tilt angles to receive the maximum amount of solar radiation during the day.
- Mould can grow on the surface of PV panels in warm and wet areas. The heat accumulated during the day and the humidity during night-time provide ideal conditions for microorganisms to proliferate and form an opaque layer on the surface of PV modules.
- Bird droppings (guano) in some locations can be sufficient to provide partial blocking of cells in modules. This affects the current flow in the modules and usually causes a drop of efficiency of the module or of a complete string. It also affects the efficiency of mirrors.

The relative significance of the various contributors to soiling at any given location will vary throughout the year due to the local climate and weather processes.

How soiling is measured

Soiling can be estimated in a number of ways, depending upon the required precision and the practical application. As it is hard to estimate soiling theoretically, due to its local and variable nature, a number of empirical methods are used by researchers and solar plant operators.

In smaller projects the effect of soiling is often estimated by using a reference PV cell or module that is subject to the same environment as the rest of the installation. The output of the module is compared to the expected theoretical reference output and the soiling rate is calculated. This method separates the measurements of the efficiency of the plant from the soiling measurements to provide independent data for analysis. However, it can miss the influence of several variable parameters such as the available irradiance, degradation of the modules, and the effects of temperature and wind.

Prospecting of new sites before deciding to embark upon a large scale commercial solar park requires a more comprehensive study of potential soiling issues. Such a study needs to take into account several aspects; differences between soiling rates on PV modules with different tilt angles, varying PV technology characteristics, effectiveness of anti-soiling coatings, efficiency of cleaning methods, soiling of concentrating mirrors for CSP plants, etc.

The variation in effects at different times of the year are very important for calculating the return on investment of future projects and need to be monitored. For such studies researchers use specially designed scientific stations that monitor soiling, solar radiation and meteorological parameters.

In the Atacama Desert in Chile, Patricia Darez, the Energy Analysis Group Manager of Mainstream Renewable Power, uses an experimental soiling monitoring station which includes measurement of the electrical output of four panels with different cleaning patterns, as well as using an anti-soiling coating to study its efficiency. The station includes two CMP 11 pyranometers one horizontal and one tilted, ventilated with the CVF 3. This pioneering research provides an understanding into the conditions in this remote region, which is not yet well modelled but has very high potential for solar development.

Mainstream Renewable Power soiling research station in the Atacama Desert

In Kuwait irradiance levels are high and soiling is being studied by Dr. Hassan Qasem, a research scientist at the Energy and Building Technologies Department of the Kuwait Institute for Scientific Research (KISR). The research is based on laboratory testing of dust samples' physical and optical properties as well as on outdoor testing. To monitor irradiance and weather conditions a meteorological station is installed at the site.

Tilted and horizontal solar irradiance pyranometers

The station includes two CMP 11 pyranometers (to measure horizontal and tilted global irradiance), wind speed and direction, ambient temperature, relative humidity, precipitation and a data logger.

Soiling is especially critical for CPV and CSP projects as these work by focusing the direct beam of light from the sun. Researchers from the German Aerospace Center (DLR) and the Mohamed Premier University in Oujda, Morocco in collaboration with CSP Services and Plataforma Solar de Almeria studied the soiling levels of concentrating solar power mirrors. This resulted in a system called TraCS (Tracking Cleanliness Sensor) that compares the direct normal irradiance (DNI) measured by a reference CHP 1 pyrheliometer mounted on an automatic sun tracker to the output of a second CHP 1 pyrheliometer mounted on the same SOLYS 2 sun tracker and aimed at a mirror so that it sees the reflection of the sun.

A TraCS system measures the soiling effects on mirror reflectivity in real-time

The various methods of measuring soiling have one thing in common; they use high quality instruments for reliable studies. A good monitoring system that is properly maintained will lead to reducing the losses resulting from soiling and other environmental parameters and will improve the return on investment of solar energy projects ■

Encouraging Solar Energy in South Africa with SAURAN

By Prof. Wikus van Niekerk, Director of the Centre for Renewable and Sustainable Energy Studies, University of Stellenbosch

Six universities from South Africa, and one each from Île de la Réunion and Botswana, are cooperating in the Southern African Universities Radiometric Network, SAURAN, to promote the use of solar energy in the Southern Africa Development Community (SADC) countries and to improve the quality of satellite-derived solar data available for the area.

The network consists of 12 radiometric measurement stations in Southern Africa and one on Reunion Island, all equipped with high resolution instrumentation to measure the solar irradiance as well as other meteorological parameters. The data are made publically available for free download. In early 2015 three more stations will be added to the SAURAN network. One located in Namibia and the other two in South Africa.

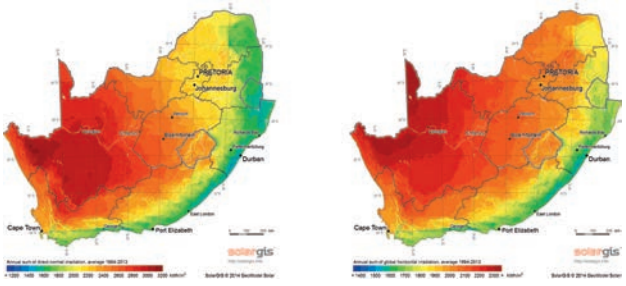
The measurement network was initiated by the Universities of Stellenbosch and KwaZulu-Natal. The network was further extended to Port Elizabeth, Pretoria, Graaff-Reinet, Vryheid, Bloemfontein, Vanrhynsdorp, Richtersveld and more. Some of the stations are installed at University campuses whilst others are located on private farmland. In 2014 the station at the University of Reunion was installed.

The main purpose of placing the measured data in the public domain is to make it possible for companies and members of the public to obtain accurate, measured solar data in the areas where the stations are deployed. In addition the data will be made available to institutions who predict solar irradiance through satellite imagery to recalibrate their estimation models so that the overall quality of satellite-derived solar data will improve. At present it is possible to obtain solar data for periods of up to 20 years from some of these sources. Now, the accuracy of these satellite-derived data sets can be verified against actual local measurements of solar radiation.

Most of the ground stations in the SAURAN network use Kipp & Zonen SOLYS 2 sun trackers fitted with CMP 11 pyranometers for global and diffuse horizontal irradiance measurements, and CHP 1 pyrheliometers for direct normal irradiance. All radiometric data are time-averaged over 1-minute, hourly and daily periods. Instruments are subject to regular maintenance and all glass domes and windows are cleaned multiple times each week.

As the local distributor of Kipp & Zonen, Campbell Scientific Africa has supplied a number of the SAURAN solar radiation monitoring stations. ”The requirements were very clear for these stations. Low hourly and daily uncertainties are critical for the credibility of the captured dataset, which made the CMP11 a natural choice” says Johan Visagie of Campbell Scientific. The majority of the stations were installed, and are maintained, by GeoSUN Africa, a spin-off company from the University of Stellenbosch; http://geosun.co.za

Through a project at Stellenbosch University, six of the SAURAN stations were funded by the German Federal Enterprise for International Cooperation (GIZ). GIZ also funded updated Direct Normal Irradiance and Global Horizontal Irradiance solar resource maps based on the data from these and the additional six stations. GeoModel Solar of Slovakia provided the satellite modelling on which the maps are based ■



More maps, data and information can be accessed at www.sauran.net

Kipp & Zonen France and PTS Mesures; a Long History of Cooperation

By Kamal Sabra, Branch Manager of Kipp & Zonen for France, the Middle East & North Africa - PTS Mesures is specialized in the fields of measurement sensors, system integration, data acquisition and data transmission. In France, the cooperation between Kipp & Zonen and PTS Mesures has been ongoing for more than 15 years, during which PTS has installed and serviced our instruments in various fields, such as; meteorology, industry, defense, agriculture and renewable energy. Since 2009, PTS Mesures has sold a large number of compact weather stations including our pyranometers and mounting accessories.

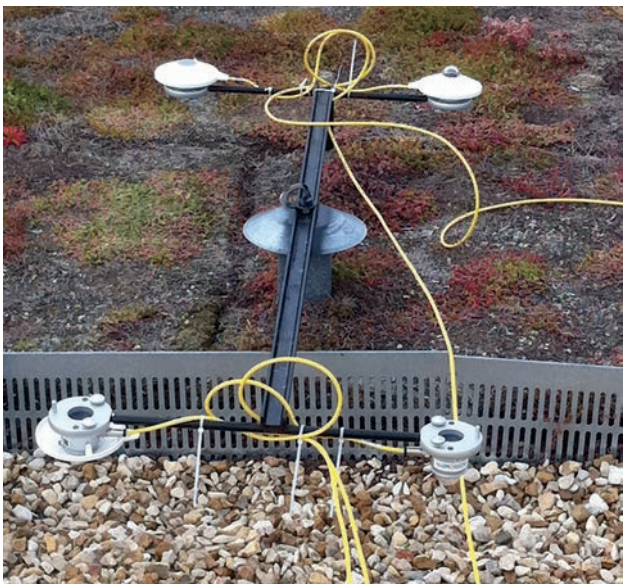
When we first demonstrated the new CMP10 pyranometer to Mr. Thierry Simon, founder of PTS Mesures, he immediately expressed his appreciation of the quality of the instrument. He considers the fact that the CMP10 combines ISO Secondary Standard performance with minimal maintenance as most impressive.

”We have installed the CMP10 in many PV plants across France“, he says, “in order to quantify the received energy from the sun over the solar panels. This way the performance ratio can be calculated. The CMP10 is also used as a reference to correlate the readings from silicon cells, which are used as irradiance measurement sensors too. The importance of a pyranometer is crucial as the calculated performance ratio can vary depending on the characteristics of the silicon sensors.”

CMP10 pyranometers measuring horizontal and tilted global radiation

Most of PTS Mesures customers ask for two CMP10 pyranometers, one horizontal and one tilted at the same angle as the solar panels. Mr. Simon also mentions how robust and practical the Kipp & Zonen mounting accessories are. PTS Mesures uses CMF 1 mounting fixtures and CMB 1 mounting brackets for almost every sensor.

PTS Mesures does not only serve solar energy customers but also, for example, research into the efficiency of buildings. Recently they have installed two pairs of CMP 3 pyranometer and CGR 3 pyrgeometer over a rooftop test site separated into two areas. The goal of this project is to monitor the heat exchanges between the roof and the atmosphere for different types of vegetation and mineral roof coverings.



CMP 3 pyranometers and CGR 3 pyrgeometers mounted over the test site

We thank PTS Mesures for their long cooperation with Kipp & Zonen and especially Thierry Simon for sharing his experiences with our instruments.

More information can be found at www.pts-mesures.com

Fairs & Events

AMS Annual Meeting • Phoenix • AZ • USA	4 - 8 January
World Future Energy Summit • Abu Dhabi	19 - 22 January
PV America • Boston • MA • USA	9 - 10 March
Intersolar China • Beijing • China	1 - 3 April

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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