

FREE TO ATTEND!

Meteorological Technology World expo Conference 2019

The Meteorological Technology World Expo Conference is a free-to-attend event. Just a visitor pass to the exhibition will gain you access. All you need to do is find a free chair, take a seat and watch as many presentations as you wish.

The conference provides an unmissable opportunity for education, knowledge sharing, debate and networking. It features around 40 leading experts from the global meteorological industry covering everything from early warning systems, numerical weather prediction and lightning risk, to space weather, satellites, flash flooding, remote sensing, ocean monitoring, and much more!

Day 1: Wednesday June 5

MODERATOR: Gary Lezak, founder and CEO, Weather2020, and chief meteorologist, KSHB-TV, USA

10:45 THE OPERATIONAL IMPLEMENTATION OF MPAS FOR GLOBAL, CONVECTIVE-ALLOWING, RAPID-REFRESH NWP ON A GPU-ENABLED HPC SYSTEM

Dr Peter P Neilley, director of weather forecasting sciences and technologies, The Weather Company, IBM, USA

Todd Hutchinson, director of numerical weather prediction, The Weather Company, an IBM Business, USA (co-author)

The Weather Company (TWC), an IBM business, is implementing its next-generation numerical weather prediction (NWP) system to be known as the IBM Global High-Resolution Atmospheric Forecast System, or GRAF. The system incorporates the Model for Prediction Across Scales (MPAS) and the Gridpoint Statistical Interpolation (GSI) data assimilation software to build day-ahead global weather forecasts that range in resolution from 3km (40% of the world) to 15km (rest of world). NCAR and IBM have partnered to port MPAS to GPU-accelerated Power9 systems, achieving a significant speed-up over conventional CPU-only systems.

11:05 THE UN'S CLIMATE SMART PROJECT – A GLOBAL AGRICULTURAL WEATHER PROGRAM

James Block, chief meteorological officer, DTN, USA

The presentation will provide an overview of the progress of the United Nations Climate Smart program, an initiative to expand surface weather and soil observations on farms in rural areas that are not well observed today. The overview will include a description of the project, its sponsors from the private and public sectors, and plans to deploy thousands of weather stations in the next three years. Also included will be an overview of the 5,000-station DTN-Agriculture North American weather network (all built since 2013 and privately funded and operated), along with the types of stations and parameters observed.

11:25 HOW THE CREWS INITIATIVE IS SUPPORTING DEVELOPING COUNTRIES TO IMPROVE THEIR EARLY WARNING SYSTEMS

John Harding, head, Climate Risk and Early Warning Systems (CREWS) secretariat, WMO, SWITZERLAND

The Climate Risk and Early Warning Systems (CREWS) initiative aims to mobilize more than US\$100m by 2020 to strengthen risk information and early warning systems and to leverage financing to protect populations exposed to extreme climate events. It targets least developed countries and small island developing states, where the risk of loss of life from high-impact events such as floods, droughts and tropical cyclones is disproportionately high. It has been operating in 19 countries in Africa, the Caribbean and the Pacific, and is now set to expand to three more beneficiary nations.

11:55 FRAUNHOFER IWES'S LIDAR BUOY AS AN ADVANCED OFFSHORE MEASUREMENT SYSTEM

Alkistis Papetta, research associate, IWES Fraunhofer, GERMANY

Developments in the past few years have shown that floating lidar systems, such as Doppler wind lidar devices mounted on or integrated in floating platforms, are the optimal instruments to measure offshore winds as essential input to the wind resource assessment for an offshore wind project. Fraunhofer IWES has developed a corresponding system that not only meets the requirements of the wind industry, but can also be further extended to serve the needs of other industries and users with high-quality wind measurements at various heights, as well as a great number of further parameters.

12:15 INNOVATIVE WEATHER-INDEX-BASED INSURANCE FOR SMALL GROWERS IN PARAGUAY

Dr Clyde Fraisse, professor, University of Florida, USA

This presentation will describe an innovative weather-index-based insurance product developed with the support of the Inter-American Development Bank to protect small farmers in Paraguay from crop losses due to drought. The index was developed to better reflect crop water stress conditions during the season, and uses a simple soil water balance for a soil profile with evenly distributed roots. Daily updates are based on a robust monitoring system composed of a network of weather stations and gridded weather sources from NOAA and NASA. The insurance product was pilot-tested during the 2017-2018 season and fully commercialized in 2018-2019.

12:35 SPACE WEATHER SERVICES FOR AVIATION

Jaakko Nuottokari, head of aviation and defense, Finnish Meteorological Institute, FINLAND

Space weather (SWX) can affect a number of things, such as GNSS and HF and satellite communications, and can increase exposure to harmful radiation for flight crew. This impact to operations was acknowledged by ICAO in 2011 when the development of CONOPS for Space Weather was started. This process has resulted in the audit and selection of three global space weather centers by the ICAO council in November 2018 and the start of operations planned for November 7, 2019. PECASUS, a consortium of European providers led by FMI, is one of the three global centers (SWXC). This talk covers the international collaboration, phenomena and products for civil aviation users.

12:55 Q&A**13:00 WMO CG-18 SIDE EVENT ON PUBLIC-PRIVATE-ACADEMIC SECTORS ENGAGEMENT**

13:00 – 14:30, Location: Hall 3, Salle W

A high-level roundtable for the launch of the Open Consultation Platform focusing on partnership and innovation for the next generation of weather and climate intelligence. Limited spaces available.

14:30 INDEPENDENT INTERCOMPARISON OF COMPACT, ALL-IN-ONE METEOROLOGICAL OBSERVING SENSOR PACKAGE MEASUREMENTS

Dr Bradley Illston, senior research scientist, Oklahoma Mesonet, USA

Various instrument companies have manufactured compact, all-in-one sensor packages that measure a suite of meteorological variables such as air temperature, wind speed and direction, humidity, pressure and precipitation. These sensor packages allow for observations to be collected while maintaining a small footprint and utilizing low power consumption. Four of these sensor packages from different companies were independently tested alongside reference sensors typically used in full-size weather stations, and the statistical results of the comparisons of their meteorological measurements will be presented.

15:00 CLIMATE SERVICES FOR DECISION MAKING IN AFRICA, THE CARIBBEAN AND THE PACIFIC

Lisa-Anne Jepsen, project officer, climate and water department, WMO, SWITZERLAND

This presentation will look at the WMO's contribution to the EU-funded Intra-ACP Climate Services Program. The Global Framework for Climate Services (GFCS), an international initiative spearheaded by WMO, strengthens climate services. The EU-funded Intra-ACP Climate Services Program will support the implementation of GFCS in 79 African, Caribbean and Pacific countries (2019-2024). WMO, a technical partner, will work with regional and national partners to implement the climate services value chain and thus strengthen the provision and use of climate services.

15:20 CONSTELLATION OF CLOUD CHARACTERIZATION IMAGERS (PLEIADES)

Dr Pete Roming, director, Southwest Research Institute, USA

One of the weather forecasting gaps is the need for cloud characterization (CC). A distributed low-Earth-orbit constellation of visible, near-infrared (NIR), shortwave-infrared (SWIR) and mid-wave infrared (MWIR) imagers offers a rapid, cost-effective response for providing CC. Previous efforts have combined visible, NIR, SWIR and MWIR imagers into one 'exquisite' instrument, thus increasing the size, weight, power and cost (SWaP-C) while increasing instrument complexity and delivery time. Separating the imagers into three different high-performing instruments and flying them on a small-sat constellation enables weather priorities to be met, while providing accelerated responsiveness, reduced SWaP-C and resiliency.

PRODUCT UPDATES

15:40 BEST PRACTICES OF THE NEW LUFFT CHM 8K CEILOMETER

Holger Wille, product manager, Lufft, GERMANY

The Lufft CHM 8k cloud height sensor was officially launched in September 2018. As an alternative to the CHM 15k ceilometer for long measuring distances of up to 15km, the CHM 8k covers applications where measuring ranges of up to 8km are of interest. In this presentation, the product specialist provides a product introduction, distinguishes the product from other ceilometers, and reports on the first realized projects.

15:55 EEC TECHNOLOGY FOR HYDROMETEOROLOGICAL APPLICATIONS – WEATHER RADAR AND QPE

Richard Stedronsky, director, strategic business development and partnerships/meteorologist, Enterprise Electronics Corporation, USA

EEC has developed cutting-edge weather radar technology for monitoring severe weather events, with a specific focus on quantitative precipitation estimation (QPE) and hazard warnings. EEC produces a wide range of Doppler weather radars, which incorporate the latest dual-polarization techniques for accurate detection and retrieval of hydrometeors. Focusing on hydrometeorological applications, EEC radar systems have implemented a suite of QPE algorithms, including the innovative attenuation-based (R-A) algorithm. Recent land-falling hurricanes in the USA have proved how the accuracy of EEC's R-A QPE algorithm, combined with proper alerting tools, is helping to protect people and assets during severe weather events.

16:10 INTRODUCING THE SOILVUE10 – AN ADVANCED TDR SOIL PROFILER

Dr Dirk V Baker, application scientist, Campbell Scientific Inc, USA

Understanding soil water properties is meaningful for scientific research and serves as actionable data to support critical infrastructure and operations affected by climatological and weather hazards such as drought, wildfires and floods. Campbell Scientific introduces the SoilVUE10 complete soil profiler. This unique design combines industry-leading time-domain reflectometry with full waveform analysis and a novel threaded probe. Embedding the waveguides (rods) in the threads at multiple depths mitigates two major drawbacks to smooth-sided profilers – soil contact and preferential flow. Superior soil moisture data combined with fast, easy installation make the SoilVUE10 a powerful tool for researchers and observation networks.

16:25 AN ADVANCED AUTOMATED MET SYSTEM

Martin Gazak, CEO, MicroStep-MIS, SLOVAKIA

MicroStep-MIS within the SESAR research program has proposed a unique solution to mitigate the current drawbacks of automated weather observing (AWOS) systems. The system enables enhanced observation of clouds, visibility and weather phenomena, using integrated dual visible/infrared camera imagery in two ways. First, a human MET observer (even at a remote location) is responsible for the processing of images using a dedicated interface. Second, images are processed automatically using artificial intelligence algorithms. Three months of data collection and parallel reporting of METAR (by an official MET observer), AUTOMETAR from AWOS data only and AUTOMETAR from an advanced automated MET system during validation exercises set a base for preliminary statistical evaluation proving improvement for automatic observations.

16:40 VISUALIZING AND ANALYZING WEATHER AND CLIMATE DATA IN ARCGIS

Dr Nawajish Noman, lead product engineer, Esri, USA

The availability of weather and climate scientific data is increasing exponentially. Exploring and analyzing this data is essential for a better understanding of the impact of global climate patterns. Fortunately, ArcGIS provides functionality for reading, managing, analyzing and visualizing scientific data stored in formats widely used in the scientific community – netCDF, HDF and GRIB. The ArcGIS platform can be leveraged to unleash the full potential of these scientific datasets by providing the information to everyone, whenever and wherever they need it. This paper discusses the capabilities of ArcGIS and some of the best practices using satellite and model-derived Earth science data.

16:55 Q&A

Day 2: Thursday June 6

MODERATOR: John Snow, principal, Snow & Associates LLC, USA

10:15 INTEGRATION OF DOPPLER LIDARS AS MULTIFUNCTION SENSORS IN OPERATIONAL WEATHER

Dr Ludovic Thobois, scientific manager, Leosphere, FRANCE

Upper-air observations in the boundary layer are still rarely used in operational networks in spite of their ability to improve weather forecasts. As remote sensing techniques are now available as operational met equipment, multiple networks have been established with lidar sensors installed, such as the New York State Mesonet network. In this network, 17 WINDCUBE100S lidar systems have been operating for two years. This study will present the chosen configuration and scanning scenarios of the lidars in order to provide products including wind, boundary layer detection and clouds/aerosols layers, at the expected update and accuracy rate.

10:35 BREAK

10:45 HMEI GENERAL ASSEMBLY

The 21st session of the HMEI General Assembly (GA-21) will be held during the Meteorological Technology World Expo Conference. The assembly is open to all exhibition and conference attendees. HMEI will invite the president and secretary general of the WMO to attend, and will also invite the presidents of the WMO Commission for Basic Systems (CBS) and the WMO Commission for Instruments and Methods of Observation (CIMO).

12:10 EUMETSAT'S NEXT-GENERATION PROGRAMS

Stephan Bojinski, MTG applications and user support expert, EUMETSAT, GERMANY

EUMETSAT is about to bring monitoring of the weather and climate from space into a new era with the launch of its next-generation geostationary and polar-orbiting satellites, from 2021 and 2022 respectively. These next-generation programs will be the most complex and innovative meteorological satellite constellations in existence, carrying a payload of next-generation instruments, some of which will be making their world premiere on operational satellites. This means that more and better weather and climate data can be provided to national meteorological services to be used to protect lives, property and economies.

12:40 A LOOK AT THE FLASH FLOOD GUIDANCE SYSTEM (FFGS) WITH GLOBAL COVERAGE

Petra Mutic, FFGS project officer, climate and water department, WMO, SWITZERLAND

The WMO's Flash Flood Guidance System (FFGS) with global coverage project was designed to give trained operational forecasters from national meteorological and hydrological services access to a variety of real-time products to assess the potential threat of occurrence of flash flooding, so that warnings may be issued in a timely manner. The system gives forecasters access to several products, such as mean areal precipitation, soil moisture estimates, flash flood guidance, forecast flash flood threat, forecast mean areal precipitation, snow cover and melt, etc. The FFGS now covers 64 countries with around three billion people.

13:00 WMO CG-18 SIDE EVENT ON PUBLIC-PRIVATE-ACADEMIC SECTORS ENGAGEMENT

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A high-level roundtable for the launch of the Open Consultation Platform focusing on partnership and innovation for the next generation of weather and climate intelligence. Limited spaces available.

14:30 DEVELOPMENTS OF THE EUROPEAN METEOROLOGICAL AIRCRAFT DERIVED DATA CENTRE (EMADDC)

Jan Sondij, senior advisor aviation meteorology, KNMI, NETHERLANDS

The developments of the SESAR deployment project EMADDC are presented. ATC surveillance technology such as ADS-B and Mode-S offer great potential to either obtain or derive wind direction, wind speed and temperature observations in numbers unprecedented in Europe. As of 2019, EMADDC v1.0 is operational, processing surveillance data of Eurocontrol MUAC every 15 minutes. The output is made available and used for various purposes. The presentation will focus on the latest developments and use cases of the EMADDC deliverables. Included are a promising new method for individual aircraft correction, geographical expansion and opportunities to move from batch toward near real-time processing.

14:50 R3M: OCEAN MONITORING NETWORK INITIATIVE IN THE MACARONESIA REGION

Dr Carlos Barrera, head - ocean vehicles, Oceanic Platform of the Canary Islands - PLOCAN, SPAIN

Despite the fact that ocean monitoring has been significantly improved during the last two decades with new platforms, sensors and telemetry systems, there are still many unsolved gaps regarding coverage, data quality and sustainability becoming relevant in regions like Macaronesia, which is made up of archipelagos that are situated far away from each other. A multidisciplinary group of companies and institutions is aiming to consolidate a regional initiative under the name of R3M (Macaronesian Marine Monitoring Network), as a reference framework to gather, manage and display the information provided by all existing in-situ observing platforms (fixed and mobile) in the area, according to the needs of specific end users and the general public.

15:10 NEW SENSING METHODS WITHIN THE TWIGA PROJECT

Nick van de Giesen, professor, Delft University of Technology, NETHERLANDS

The TWIGA project is funded under the EU H2020 program and connects 10 European and eight African partners. The main goal of TWIGA is to develop new geo-services for Africa, based on innovative in-situ observations of water, weather and climate. A wide range of new services has been proposed, from relatively simple spray advice, to complex services surrounding seed germination insurance. The types of sensors vary from simple existing sensors being 'hacked' for new applications, to micro-scintillometers for field-scale sensible heat flux measurements. The aim is to strengthen the in-situ component of the Global Earth Observation System of Systems (GEOSS).

15:30 MODERNIZATION OF HYDROMET SERVICES: THE CASE OF A LEAST DEVELOPED COUNTRY

Yvette Ramos, international consultant to the WMO and project manager for NIRAS in a World Bank project, DENMARK

A national meteorology and hydrology service (NMHS) should have the capacity to deliver cost-effective and user-driven services and products that are sustainable and can be operated and maintained in the long term, and not disrupted by external shocks such as weather events, blackouts, and so on. NMHS's objectives are, in general, to mitigate the effects of natural disasters; promote safety, comfort, efficiency and regularity of air, land, sea and inland water transportation; facilitate sustainable development of natural resources; and ensure data is available to stakeholders for the robust and well-engineered design of diverse water-related infrastructure. These so-called 'strategic objectives' are nice on paper, but what is there behind them? Based on experience in promoting modernized management tools in LDCs from Africa and Southeast Asia, this presentation will highlight key challenges in delivering hydromet services, and explore opportunities for developers.

15:50 ACTUAL RESULTS OF THE FIRST SERIES OF SWISENS POLENO BIOAEROSOL MONITOR

Erny Niederberger, CEO, Swisens AG, SWITZERLAND

Pollen allergy is among the most prevalent non-contagious diseases, with about a quarter of the European population sensitive to various atmospheric bioaerosols. Today's available pollen data is always delayed by several days. Real-time data is needed for better pollen information, forecast and prevention. The optimized first series of Swisens Poleno addresses this need. It is an automatic real-time measurement and identification device for different pollen species and other bioaerosols such as spores. The device is optimized for long-term monitoring. Performance of Swisens Poleno in the field and the capabilities of measuring additional aerosol particle classes will be shown.

16:10 APPLICATIONS AND CHALLENGES OF DEVELOPING THE GNSS-REFLECTOMETRY REMOTE-SENSING TECHNOLOGY

Randy Rose, staff mission and spacecraft systems engineer, Southwest Research Institute, USA

Recent developments in small satellites and modeling techniques have enabled a new class of cost-effective, Earth remote-sensing capability applicable to hydrology and meteorology. Using GNSS-based reflectometry performed by a small-sat constellation enables remote sensing of wave, wind, ice, soil moisture and wetland data with unprecedented temporal resolution and spatial coverage across the full dynamic range of atmospheric conditions. This paper provides a summary of applications enabled by GNSS reflectometry, technical insight into instrument accommodation requirements, unique challenges of applying this sensing technique to its wide array of applications, and associated solutions being developed.

16:30 ENHANCED PRECIPITATION AND VISIBILITY MEASUREMENTS BY COMBINED FORWARD SCATTERER AND DISDROMETER

Tommi Linna, product manager, Vaisala Oyj, FINLAND

Conventional sensors miss the lightest precipitation events or fail in identification too often. Traditional forward scatterers suffer from limited sensitivity, and disdrometers suffer from limited precipitation identification. This introduces safety risk in weather-critical operations. By utilizing light sheet, high sampling rate and powerful processors, we take detection and identification performance to the next level. A new sensor detects 100% of precipitation. Particle-by-particle analysis enables superior precipitation type assessment. Significant enhancement of drizzle, freezing rain, hail and ice pellet identification improves safety and efficiency. It is big leap toward AUTO-METAR. All-in-one visibility, precipitation identification/intensity/accumulation and disdrometer features provide significant cost-saving potential.

16:50 Q&A

Day 3: Friday June 7

MODERATOR: Mark Harvey, CEO, Resurgence, UK

10:15 IMPROVED MAPPING FOR ARCTIC TRANSPORT

Betty Bonnardel, CEO, AB5 Consulting, UK

This presentation will look at a new technology to provide added-value hydrographic mapping in Arctic polar regions, via connected bathymetry mobile stations. Based on an interface between data collection sensors and transmission to onshore facilities, it will rely on mega-constellation satellites, which allow the transfer of large amounts of data. User terminals could be placed on portable bathymetry buoys, on survey ships or airplanes; otherwise, unmanned user terminals combined with GPS receivers could be installed on major ice floes. Arctic bathymetry devices will be tailored to specific needs, such as those of governmental organizations, emergency services, sea transportation companies and cruise lines, and local users.

10:35 BUILDING THE NWP SYSTEM OF THE FUTURE

William Cottay, director of cloud services, Penguin Computing, USA

With petabytes of data now available to modern weather forecasters, much more accurate models can be created for full Earth systems. However, numerical weather prediction (NWP) cannot exist without high-performance computing (HPC), and there are many hurdles to developing a reliable and operational NWP system. Historically, the high capital cost of owning and the challenges of operating and managing HPC assets have put them beyond the reach of many forecasting organizations, both private and public. Today, however, new solutions are available that can help address deep technical issues, from data integration to post-processing, as well as organizational constraints.

10:55 LEO-BASED SATELLITE-IOT SERVICES: NEXT-GEN CONNECTIVITY FOR THE METEOROLOGICAL WORLD

Hub Urlings, innovation and ESA program manager, Hiber, NETHERLANDS

During the conference in Amsterdam in 2018, the European Space Agency's presentation gave an overview of current and new satellite-IoT connectivity providers. Emphasis then was on the launch of a number of LEO-based systems at the end of 2018. In 2019, however, these systems will be operational and this presentation will provide an overview of the running services these systems provide alongside existing sat-IoT operators. The presentation will consist of: an overview of the satellite-IoT operators; a focus on the new space LEO sat-IoT players; and a meteo use case via LEO sat-IoT.

11:15 VISION-BASED VISIBILITY MEASUREMENT DURING THE NIGHT

Harald Ganster, key researcher, Joanneum Research Forschungsgesellschaft mbH, AUSTRIA

Visibility measurement based on camera images has already been established, with high performance during the daytime proved by ongoing evaluations in ATM scenarios and synoptic meteorological applications. The present proposal addresses night-time scenarios, which pose challenges on a camera-based measurement system, such as light sensitivity of the sensor or availability of representative landmarks. The Vislvis system can automatically detect most suitable areas for visibility estimation within the camera-covered range, automatically tunes its detection parameters, and derives representative visibility measures to report in customized or standard formats (e.g. METAR). Performance during the night will be presented, together with examples from different scenarios.

11:35 GCOS: TOWARD A GLOBAL LAND SURFACE CLIMATE FIDUCIAL REFERENCE MEASUREMENTS NETWORK

Tim Oakley, GCOS secretariat, WMO, SWITZERLAND

Caterina Tassone, GCOS secretariat, WMO, SWITZERLAND

By implementing and maintaining a stable and metrologically well-characterized global climate reference network, future generations will have access to a set of long-term observations of essential climate variables that will enable them to make more rigorous assessments of climate change and variability, and provide the strong evidence basis that is essential to inform adaptation decisions, and to monitor and quantify the effectiveness of internationally agreed mitigation steps. The Global Climate Observing System's (GCOS) Atmospheric Observations Panel on Climate agreed on the creation of a dedicated task-team to scope a potential GCOS global surface reference network (TT-GSRN). The GSRN will provide the reference element of a tiered network that includes other existing surface observing networks in the WMO system, and it will follow WMO Observing Network Design Principles. The adoption of common terminology and measurement procedures will benefit the ongoing discussions within GCOS and within CIMO for the improvement and revision of best-practice guidelines.

11:55 WMO RECOGNITION OF CENTENNIAL OBSERVING STATIONS

Peer Hechler, scientific officer, data management applications division, climate and water department, WMO, SWITZERLAND

WMO implemented a recognition mechanism for centennial observing stations to mark the outstanding importance of stable, long-term observations for meteorological applications and research. More than 150 observing stations worldwide have been certified so far and many more are expected in the future. Station recognition is used by WMO Member States to celebrate publicly the importance of long-term observations, thereby encouraging decision and policy makers to further protect these sites. Meteorological instruments and their evolution from historic past to the future play a key role in long-term observations. This presentation will highlight, from a climatologist's point of view, instrument-related recognition criteria in particular, thereby encouraging proper instrumentation standards to underpin long-term observations.

- 12:15 A CLOUD-BASED SCIENCE GATEWAY FOR ENABLING OPEN AND REPRODUCIBLE SCIENCE**
Dr Mohan Ramamurthy, director, UCAR/Unidata, USA
 Unidata, a cyber-infrastructure facility, has been deploying data infrastructure and data-proximate scientific workflows and analysis tools using cloud computing technologies for accessing, analyzing and visualizing geoscience data. Specifically, Unidata has developed techniques that combine access to well-documented datasets with easy-to-use tools, using workflow technologies. In addition to fostering the adoption of virtual machines through Docker containers and Jupyter notebooks, computational and analytic methods are enabled via Software as a Service and Data as a Service techniques with the deployment of the Cloud IDV, AWIPS servers and the THREDDS data server in the cloud to enable open and reproducible science.
- 12:45 HOW RAIN AND HAIL INFLUENCE THE PERFORMANCE AND STRUCTURAL INTEGRITY OF WIND TURBINE BLADES**
Hans Verhoef, project manager, wind energy, ECN - part of TNO, NETHERLANDS
 Leading-edge erosion (LEE) is a phenomenon that is detrimental to the aerodynamic performance and structural integrity of wind turbine blades. In fact, the increase in surface roughness due to the erosion of the leading edge of blades has a significant detrimental effect on the performance of wind turbines. Recent studies show that reduction in the annual energy production (AEP) resulting from eroded blades can vary from 5% to 25% depending on the severity of the damage. This presentation will focus on local precipitation conditions with respect to degradation due to the leading-edge erosion of the wind turbine blades.
- 13:05 USING SMALL UNMANNED RESEARCH AIRCRAFT FOR ATMOSPHERIC-TURBULENCE WIND-ENERGY RESEARCH**
Jens Bange, university professor, Eberhard Karls University of Tübingen, GERMANY
 Small unmanned aircraft systems (UAS) are very appropriate instruments for atmospheric measurements. They are very flexible during operation, very mobile and can be operated in remote areas. UAS are very suitable measurement systems with regard to atmospheric turbulence and the turbulent transportation of energy, momentum, gases and particles. This presentation will discuss the pros and cons of small UAS. Due to the requirements of turbulent wind measurements, the presentation will focus on fixed-wing aircraft, and will discuss an exemplary research UAS with an emphasis on turbulent wind vector measurement. Finally, results obtained in boundary-layer meteorology and wind-energy research will be shown.
- 13:25 DATA SERVICES TO ASSESS AND MITIGATE LIGHTNING RISK**
Dominique Lapeyre de Chavardès, president, Météorage, FRANCE
 Being the only real real-time weather information, lightning became essential to NMSs for nowcasting, especially with the 'lightning jump' characterization of severe thunderstorms. But almost all sectors are lightning risk dependent, for human safety and for properties. Thus, sharing the cost between economic actors, data services are efficient to mitigate the lightning risk, creating a win-win situation. As lightning detection networks use remote sensing equipment, their field validation requires specific attention. Depending on its requirements for critical operations, each end user will establish its own SLA based on criteria such as IC/CG classification, availability, timeliness or location accuracy.
- 13:45 MEETING THE HYDROMET REQUIREMENTS OF LEAST-DEVELOPED COUNTRIES**
John Snow, principal, Snow & Associates LLC, USA
 Hydromet observations drive the production of credible environmental data essential to the making of many decisions. There have been numerous efforts to enhance hydromet services across Sub-Saharan Africa. Many of these efforts failed to learn from prior experiences. This presentation is part of an effort to disseminate the experiences, good and bad, encountered in the United Nations Development Program on Climate Information for Resilient Development in Africa. This program's goal was to enable 11 least-developed countries in Sub-Saharan Africa to increase their capacity to produce reliable hydromet decision-support information.
- 14:05 METEOTRACKER – A PROJECT FOR A NETWORK OF CONNECTED MOBILE WEATHER SENSORS**
Juri Iurato, CEO, Iotopon Srl, ITALY
Timoteo Galia, co-founder and CTO, Iotopon Srl, ITALY
 Meteotracker is a project aimed at building a network of connected mobile weather sensors, exploiting cars as traveling weather stations. The key elements are: a compact, light, portable multisensor device endowed with a patent-pending system for radiation error correction for accurate temperature measurement; a mobile app; a software infrastructure for real-time data upload to the cloud; and a web app for data analysis, visualization and processing. The project is funded by the European PO FESR 2014-2020 program and is currently at an advanced working prototype level.

14:25 WIGOS STATION IDENTIFIERS (WSI): CRITICAL COMPONENTS OF THE WMO INTEGRATED GLOBAL OBSERVING SYSTEM

Luís Nunes, scientific officer, WIGOS Project Office, observing and information systems department, WMO, SWITZERLAND

The WMO's Integrated Global Observing System (WIGOS) is set to become operational from 2020. It is a framework for integrating all data from observing systems, addressing the observing needs of the weather, climate, water and environmental services of WMO members. The main WIGOS technical systems, namely the Observing Systems Capability Analysis and Review (OSCAR) tool and the WIGOS Data Quality Monitoring System (WDQMS), have been developed and will continue to progress. The OSCAR/Surface database is the global repository of WIGOS metadata for all surface-based observations; it is where all the observing stations are registered using the WIGOS Station Identifiers (WSI). Previously, all observing stations were registered using five-digit WMO identifiers. However, many countries have now run out of numbers within their allowable ranges. The new WIGOS Station IDs (WSIs) were created with a structure of four blocks, using digits and alphanumeric characters that will allow essentially an unlimited number of stations to be registered in WIGOS. The implementation of WSIs is mandatory for members and a critical step they have to take to become WIGOS operational. This presentation will address how members need to carefully plan and implement the transition process from the traditional five-digit WMO IDs to the new IDs.

14:45 INNOVATION IN MITIGATION OF METEOROLOGICAL IMPACTS ACROSS THE CARIBBEAN

Damien Prescod, instrumentation specialist, Caribbean Institute for Meteorology & Hydrology, BARBADOS

As quality management frameworks continue to become an integral component of the operation of NMHSs, the maintenance and calibration of hydrometeorological recording equipment and sensors will continue to be a key area of focus at CIMH and its affiliated member organizations. In this regard, CIMH continues to play a valuable role regionally by supporting the sustainable expansion of national and regional observational early-warning networks and ensuring the observation equipment is well managed, maintained and calibrated. Technical utilization of training, calibration and awareness programs can significantly aid in the mitigation of hydromet impacts.

15:05 PILOT PROJECTS FOR AERONAUTICAL METEOROLOGY IN THE RUSSIAN FEDERATION

Artem Korchagin, specialist, flight safety department, Aviamettelecom of Roshydromet, RUSSIA

This presentation will look at the Aviation Nowcasting System (ANS) at Pulkovo Airport, which is a pilot project that is being undertaken as the part of WMO's Aviation Research Demonstration Project, and the SIGMET coordination project. The ANS project is focused on aviation weather nowcasting, including the respective uncertainty/confidence estimation over the Terminal Control Area for the next 0-6 hours. The system at Pulkovo generates four-hour forecasts to assist meteorologists when issuing forecasts. The near-future plan is to implement this system into ATC for decision-making support. SIGMET messages contain information on different weather conditions that may affect flight safety. In accordance with ICAO requirements, states with common borders have to agree on proposed content, horizontal location, vertical depth, boundaries and speeds of movement of any SIGMETs affecting, or expected to affect, both states' FIR regions of responsibility. Since 2016, the Russian Federation has actively taken part in the given process at international level. The coordination process gives an opportunity for the states to exchange the best practices of SIGMET content.

15:25 Q&A

Vendor Technology Workshop

DAY 2, June 6, 2019

10:30 - 12:30

Stevens Water

HYDRAPROBE SOIL PHYSICS WORKSHOP



Knowledge of soil moisture and the measurement of soil moisture can help society answer important questions about drought forecasting, flood warning and forecasting, greenhouse gas emissions, water supply forecasting, food security and crop production. In order to address these important issues, a more quantitative approach is required for the analytical measurement of in-situ soil moisture.

The HydraProbe soil sensor, the leading and most quantitative soil sensor used in scientific research and environmental monitoring networks, appears in hundreds of peer-reviewed scientific studies. For more than 20 years, major governmental organizations such as the USDA, NOAA and NASA, and hundreds of universities and research institutions, have relied on and standardized on the HydraProbe soil sensor.

Based on two decades of experience, this workshop will bring an applications-in-the-field perspective to a more theoretical approach, providing insights, information and tools for users who want to add soil moisture sensors and soil moisture data to their projects.

By the end of the workshop, you will have a clearer understanding of the analytical measurements of in-situ soil moisture, and an insight into how to interpret soil moisture data to gain a better understanding of the behavior of water in soil.