Virtual Event: Using ECMWF's Forecasts (UEF2020)

Report of Contributions

Contribution ID: **1**   Type: **Oral presentation**

Utilising ECMWF seasonal hindcast data from a European windstorm insurance loss perspective

Wednesday, 3 June 2020 09:45 (20 minutes)

Daily ECMWF maximum gust forecasts from the Copernicus C3S seasonal hindcast project have been used to develop diagnostics directly relevant to the insurance industry.

Firstly, by converting wind gusts into losses through simple insurance exposure considerations and damage functions, we are able to identify the spatial characteristics of the largest industry loss events as well as looking for any "grey swan" events that may not have been experienced before.

European windstorm loss forecasts from seasonal hindcasts are also contrasted with historical loss data from the past 25 years to assess the potential for using seasonal forecasts in the insurance industry.

Primary author: Dr DIXON, Richard (CatInsight, Dept. of Meteorology, University of Reading)

Presenter: Dr DIXON, Richard (CatInsight, Dept. of Meteorology, University of Reading)

Session Classification: Thematic area: Novel products and services

Track Classification: UEF2020

Contribution ID: **2**　　　　　　　　　　　　　　　Type: **Oral presentation**

Linkage from Research to Operational activity

Tuesday, 2 June 2020 10:00 (20 minutes)

The topic and aim is how can work the improved know how transfer from research in theoretical meteorology to apply in operational practise (synoptical approach). And the opposite case - providing of case studies with meaningful results from behalf of synoptic, meso- and subgrade scale and their interpretation with different conceptional models as well as current model physics and parametrisations in global and high resolution models. In short this means double feedback from theoretical and practical meteorology and use of synergies between conceptional models on the one hand and applying the state of art on behalf of model physics on the other hand. Such approach can lead to discover of new (external) or adaptation of existing parameters, related to enhancement of operational forecast through differential analysys and interpretation of synoptical deviations and nonhomogeneties (discovered and approved with case studies) with the support of physics and mathematics. Results can be p.e. enhanced parametrisation or new explicit model calculations (i.e. different or adapted forcings) and so improved weather forecasting (for short and medium range weather forecast) and also better understandig of physical and chemical processes in the atmosphere and ocean as well as the complexe interactions between it and within it.

Primary author:　Dr BONEWITZ, Jens (DWD)

Presenter:　Dr BONEWITZ, Jens (DWD)

Session Classification:　Thematic area: Research to Operations or Operations to Research

Track Classification:　UEF2020

Contribution ID: **3**   Type: **Oral presentation**

Towards a sub-seasonal agricultural drought forecast

Wednesday, 3 June 2020 10:25 (20 minutes)

Insufficient precipitation and subsequent water stress for crop production are among the biggest risks in agriculture. Especially the past two years (2018, 2019) in central Europe show that dry and hot summers enhance the probability of harvest failures due to long term drought situations. Hence, a better prediction of long-term crop water stress situations could improve the resilience and adaptation of agriculture. One important indicator for agricultural drought is the plant available water in the top soil (0-60 cm). This soil moisture is a storage parameter which depends not only on the meteorological input but also on the vegetation cover and soil properties. In comparison to precipitation the soil moisture changes slowly with moderate variability, due to its buffer capacity for incoming rainfall. Here we try to take advantage of this persistence behaviour by performing long range soil moisture forecasts for Germany based on sub-seasonal forecasts. Therefore we combined the ECWMF extended range forecasts with a 1-D hydrological model AMBAV, which is capable of parameterizing regional soil properties and crop growth. Reasonable skill for predicting low soil moisture under winter wheat in early summer can be found with a 3-4 week forecast lead time. Therefore, a forecast of the hot and dry summer in 2018 was possible. The soil moisture forecasts had lower mean absolute error rates and higher rank correlation skill than regarding the precipitation directly as drought predictor, though the precipitation forecast is used as input for the subsequent hydrological modelling. However, further analyses are necessary in order to evaluate forecast skills for less extreme soil moisture situations. Nonetheless these results could be a first step towards an improved sub-seasonal agricultural drought forecast system for Germany and should be able to be adapted in other European countries.

Primary author: LEPPELT, Thomas (Deutscher Wetterdienst)

Co-authors: Dr BRAUCH, Jennifer (Deutscher Wetterdienst); Dr PAXIAN, Andreas (Deutscher Wetterdienst)

Presenter: LEPPELT, Thomas (Deutscher Wetterdienst)

Session Classification: Thematic area: Novel products and services

Track Classification: UEF2020

Contribution ID: **4**   Type: **Poster presentation**

Towards impact-based warnings

Impact-based warnings have been gaining the attention of National Meteorological and Hydrological Services to assess their potential to provide a more effective collaboration with disaster reduction and civil protection agencies, as well as to better inform the public and stakeholders. It is currently a common practice to analyze the hazardous meteorological and hydrological components together with the vulnerability of the targeted exposure to assess weather related impacts and resulting warnings. Advanced quantitative processes involving impact models using geolocated vulnerability and exposure datasets are still a challenge for many agencies due to missing data and validation strategies.

In this work we evaluate an impact model that quantifies expected damage to infrastructure using probabilistic wind gust forecasts combined with an infrastructure distribution model based on nightlight intensities and population distribution (LitPop model developed by Eberenz et al 2019). The COSMO-E wind forecast adjusted for the Swiss topography developed at MeteoSwiss is tested against the raw IFS model for Burglind's winter storm and its reported damages in Switzerland. This is done using the CLIMADA (Aznar-Siguan & Bresch 2018) framework and the vulnerability function defined by Schwierz et al 2010.

Eberenz, S., Stocker, D., Röösli, T., and Bresch, D. N.: Exposure data for global physical risk assessment, Earth Syst. Sci. Data Discuss., https://doi.org/10.5194/essd-2019-189, in review, 2019.

Aznar-Siguan, G. and Bresch, D. N.: CLIMADA v1: a global weather and climate risk assessment platform, Geosci. Model Dev., 12, 3085–3097, https://doi.org/10.5194/gmd-12-3085-2019, 2019.

Schwierz, C., Köllner-Heck, P., Mutter, E. Z., Bresch, D. N., Vidale, P. L., Wild, M. and Schär, C.: Modelling European winter wind storm losses in current and future climate, Clim. Change, 101(3), 485–514, doi:10.1007/s10584-009-9712-1, 2010.

Primary author: Dr AZNAR SIGUAN, Gabriela (MeteoSwiss)

Co-authors: Mr RÖÖSLI, Thomas (ETH/MeteoSwiss); Prof. BRESCH, David N. (ETH/MeteoSwiss)

Presenter: Dr AZNAR SIGUAN, Gabriela (MeteoSwiss)

Track Classification: UEF2020

Contribution ID: **5**   Type: **Oral presentation**

Improving the Research to Operations process at ECMWF

Tuesday, 2 June 2020 09:15 (45 minutes)

Mike Sleigh and myself would like to either co-chair a workshop or give a joint presentation on the work going on at ECMWF to improve the R2O process. We would like to discuss this more with the organiser(s) to see what would fit best into the programme. Topics to include:
- Overview of the current R2O process at ECMWF
- Identifying ways we can improve the process
- Our current focus to improve R2O, including the development of a d-suite
- Options for the future, would it be better to do more frequent smaller updates rather than the big cycle upgrades?
We would welcome feedback and ideas from the attendees, hence we are open to the idea of more of a workshop, or panel discussion rather than just a presentation.

Primary authors: ROURKE, Jenny (ECMWF); SLEIGH, Michael (ECMWF)

Presenters: ROURKE, Jenny (ECMWF); SLEIGH, Michael (ECMWF)

Session Classification: Thematic area: Research to Operations or Operations to Research

Track Classification: UEF2020

Contribution ID: **6**   Type: **Poster presentation**

Development of Global Heatwave Risk Alert using EPS products

Effective global risk early alert products for high-impact weather are useful for decision-making and timely deployment of resources in humanitarian aid missions among other international operations. In this study, we investigated the feasibility of producing objective risk alert maps up to 10 days ahead based on model reanalysis data and ensemble prediction system (EPS) outputs, using heatwave as an example. We first analysed the relationship between heat-related mortality and "excess heat index"(EHI), a metric representing both the severity and duration of hot weather, in major heatwave historical events. A risk matrix based on the probability of exceedances for various EHI thresholds was then devised. Heatwave risk maps could then be produced using the probability of EHI threshold exceedances derived from model EPS outputs. Retrospective forecast risk maps based on ECMWF EPS outputs for previous heatwave events in Europe were found to correspond well with areas of elevated heat-related mortalities.

Primary authors: Dr HO, Chun-Kit (Hong Kong Observatory); Mr YEUNG, Hon-Yin (Hong Kong Observatory); Mr YEA, Sui-shing (The Chinese University of Hong Kong)

Presenter: Dr HO, Chun-Kit (Hong Kong Observatory)

Track Classification: UEF2020

Contribution ID: 7   Type: **Poster presentation**

The Flash Floods Use Case in the "MISTRAL" project: Methodology and Verification

Ideally, weather forecasts should be provided for points and not for the large regions represented by global model grid boxes. This mismatch problem, which can be particularly acute for rainfall that can exhibit large local variability, can be addressed using either high resolution limited-area models, or by post-processing global model output, as in "ecPoint-rainfall", a new ECMWF probabilistic post-processing technique to improve precipitation forecasts for points across the world.

MISTRAL (Meteo Italian SupercompuTing poRtAL) is an EU-funded project, which ECMWF participates in to improve probabilistic 6-h rainfall forecast products, to help with the prediction of flash floods in Italy and nearby Mediterranean regions. One objective is exploiting the CINECA supercomputer facilities in Bologna to extract maximum benefit from ecPoint-Rainfall and a 2.2km resolution COSMO limited area ensemble. To do that we apply a new and innovative scale-selective neighbourhood post-processing technique, with the primary aim of identifying and preserving the most reliable heavy rainfall signals, and then blend that output with ecPoint output, to combine the most skilful aspects of the two systems. To do this, new 6-h ecPoint Rainfall forecasts were developed, building on pre-existing developments that now deliver 12-h ecPoint-rainfall forecasts to ECMWF customers in real-time. The final MISTRAL product comprises, for lead times of 1-10 days, for 6-h accumulated rainfall and for each COSMO gridbox, percentiles (1, 2,..99) and probabilities of threshold exceedance. The blending approach exploits the strong points of the two forecasting systems, to improve forecast quality generally, and to support decisions regarding weather alerts related to flash flood prediction. So we provide forecasts with enhanced quality and resolution, for Italy and nearby regions.

In this presentation we will introduce the methodologies applied to create the final probabilistic product and will show verification results for each forecast system, with and without applying the corresponding post-processing.

Primary authors: GASCON, Estibaliz (ECMWF); MONTANI, Andrea (ECMWF); HEWSON, Tim (ECMWF); PILLOSU, Fatima (ECMWF)

Presenter: GASCON, Estibaliz (ECMWF)

Contribution ID: **9**   Type: **Poster presentation**

eGAFOR

The eGAFOR project arose from the general aviation user's need to have harmonised weather information available for flights planned over several countries. In order to meet their requirements, users were included in all phases of the project.

Therefore, eGAFOR will be a uniform graphical route forecast of meteorological phenomena hazardous for general aviation such as cloudiness, visibility, CB clouds, turbulence and freezing precipitation. The forecast will be a result of collaborative work of aviation forecasters from the countries participating in the project –CCL (Croatia), ARSO (Slovenia), BHANSA (Bosnia and Herzegovina), OMSZ (Hungary), ROMATSA (Romania), SHMU (Slovakia) and SMATSA (Serbia). Industrial partner in the project is IBL (Slovakia). The new system will increase safety and efficiency in the area covered in the lower air space and has the potential to be extended to more countries in the future. The eGAFOR project is funded by INEA (Innovation and Networks Executive Agency) –2016 Connecting Europe Facility Transport Calls for Proposal.

Primary authors: Mrs FRANKOVIC, Biserka (Crocontrol Ltd);   Mr SLABAJNA, Saso (aviation forecaster)

Presenter: Mrs FRANKOVIC, Biserka (Crocontrol Ltd)

Track Classification: UEF2020

Contribution ID: **11**   Type: **Oral presentation**

Using ECMWF Ensemble Products in Tropical Cyclone Field Program Planning

Tuesday, 2 June 2020 13:00 (20 minutes)

Over the past fifteen years, during and after the THORPEX era, several novel experimental products based on ECMWF ensemble data have been developed for use during tropical cyclone field campaigns. The products include guidance for targeted observations; track probabilities; probabilities of tropical cyclogenesis and related environmental quantities; and diagnostics related to tropical cyclone outflow. New diagnostic tools related to tropical cyclone structure and intensity change will be trialled for use during the 2020 Atlantic and Western North Pacific field campaigns. A review of the utilization of these products and key results will be presented.

Primary author: Prof. MAJUMDAR, Sharanya (University of Miami)

Presenter: Prof. MAJUMDAR, Sharanya (University of Miami)

Session Classification: Thematic area: Novel products and services

Track Classification: UEF2020

Contribution ID: **12**   Type: **Oral presentation**

Future French severe weather warnings system

Tuesday, 2 June 2020 12:40 (20 minutes)

Météo-France is working on a new severe weather warnings system that will be ready in 2021. It will be more precise, more understandable, more efficient.
The main novelties are to overcome the administrative district "Département" and to display two distinct warnings maps for today and tomorrow.

The goal is to improve the consideration of local vulnerabilities and communication with exposed populations.

Primary author: TRAJAN, Alexandre (Météo-France)

Presenter: TRAJAN, Alexandre (Météo-France)

Session Classification: Thematic area: Novel products and services

Track Classification: UEF2020

Contribution ID: **14**

Type: **not specified**

Virtual arrival

Monday, 1 June 2020 13:30 (30 minutes)

Contribution ID: **15**   Type: **Oral presentation**

Welcome from ECMWF Director General

Monday, 1 June 2020 14:00 (10 minutes)

Presenter: RABIER, Florence (ECMWF)

Contribution ID: **16**　　　　　　　　　　　Type: **Oral presentation**

Virtual Housekeeping

Monday, 1 June 2020 14:10 (5 minutes)

Presenter:　HEMINGWAY, Becky (ECMWF)

Contribution ID: **19**   Type: **Poster presentation**

Virtual Poster Session A

Monday, 1 June 2020 16:20 (40 minutes)

Presenter: HEMINGWAY, hosted by Becky (ECMWF)

Session Classification: Afternoon session

Contribution ID: **21**　　　　　　　　　　　　Type: **not specified**

Virtual arrival

Tuesday, 2 June 2020 08:45 (15 minutes)

Contribution ID: **22**   Type: **not specified**

Day 2 Welcome and Housekeeping

Tuesday, 2 June 2020 09:00 (5 minutes)

Presenter: HEMINGWAY, Becky (ECMWF)

Contribution ID: **25**

Type: **Poster presentation**

Virtual Poster Session B

Tuesday, 2 June 2020 10:20 (40 minutes)

Presenter: HEMINGWAY, hosted by Becky (ECMWF)

Contribution ID: **28**   Type: **Oral presentation**

User Voice Corner

Tuesday, 2 June 2020 13:50 (20 minutes)

The User Voice Corner at UEF2020 provides an opportunity for everyone who uses ECMWF data, products and services to provide feedback on these, discuss improvements and suggest ideas for the future. Due to the virtual nature of this year's UEF the User Voice Corner will all be held online through a combination of presentations, breakout groups and forums.

The User Voice Corner will begin with a presentation by Tim Hewson (Forecast Performance and Products) summarising the responses to the User Voice Survey, which all registered UEF attendees had the opportunity to complete. Tim will highlight where work related to your feedback, ideas and suggestions is underway and if it is in future plans. Some topics will be chosen to be discussed further in the breakout groups.

The breakout groups will be led by ECMWF experts in the relevant topic areas. Links to 'virtual breakout rooms' will be provided to all attendees so they can join the breakout group/s they are most interested in. Forums for each topic area will also be available for comments and text discussions between attendees. During the breakouts the topic will be discussed in detail, this is where you as users are key, we would like your input and suggestions to improve products and services related to the topic.

After the User Voice Corner breakout group leads will post summaries of the discussions onto the forum for further comment.

We strongly encourage participation and look forward to your feedback and engagement during the discussions!

Presenter: HEWSON, Tim (ECMWF)

Session Classification: User Voice Corner

Contribution ID: **30** Type: **not specified**

Virtual arrival

Wednesday, 3 June 2020 07:15 (15 minutes)

Contribution ID: **31** Type: **not specified**

Day 3 Welcome and Housekeeping

Wednesday, 3 June 2020 07:30 (5 minutes)

Presenter: HEMINGWAY, Becky (ECMWF)

Contribution ID: **32**   Type: **not specified**

Welcome from ECMWF Director General (repeat)

Wednesday, 3 June 2020 07:35 (10 minutes)

Presenter: RABIER, Florence (ECMWF)

Contribution ID: **33**　　　　　　　　　　　　　　　　Type: **not specified**

ECMWF product development, research plans and new model cycle (repeat)

Presenter: ECMWF

Contribution ID: **34**   Type: **not specified**

How well do you know ECMWF? - Post coffee quiz

Presenter: HEMINGWAY, Becky (ECMWF)

Contribution ID: **35** Type: **not specified**

ECMWF Forecast Performance (repeat)

Wednesday, 3 June 2020 09:25 (20 minutes)

Presenter: HAIDEN, Thomas (ECMWF)

Session Classification: Repeat session

Contribution ID: **37**   Type: **not specified**

Ask ECMWF Q&A

Presenter: ECMWF

Contribution ID: **39**   Type: **Oral presentation**

Speakers' Corner - Ivan Tsonevsky: Revision of CAPE and CIN parameters provide as a model output from the IFS, Cihan Sahin: Updates to Meteograms, Fernando Prates: Tropical Cyclone Radius, Ivan Tsonevsky: Extended-range products

Wednesday, 3 June 2020 12:40 (1h 5m)

Presenters: TSONEVSKY, Ivan (ECMWF); SAHIN, Cihan (ECMWF); PRATES, Fernando (ECMWF)

Session Classification: Thematic area: Integrating new products in established processes / Research to Operations and Operations to Research

Contribution ID: **40**

Type: **not specified**

Virtual arrival

Thursday, 4 June 2020 07:15 (15 minutes)

Contribution ID: 41　　　　　　　　　　　　　　　　　Type: **not specified**

Day 4 Welcome and Housekeeping

Thursday, 4 June 2020 07:30 (5 minutes)

Presenter:　HEMINGWAY, Becky (ECMWF)

Contribution ID: **42**   Type: **Oral presentation**

Copernicus Climate Change Service (C3S), Copernicus Atmosphere Monitoring Service (CAMS) and Copernicus Emergency Management Service (CEMS) in focus

Presenter: ECMWF

Contribution ID: **43**　　　　　　　　　　　　　　Type: **not specified**

Copernicus services in focus (follow on session)

Contribution ID: **44** Type: **Oral presentation**

Supporting communities around the world with our data

Contribution ID: 45   Type: **Oral presentation**

Concluding remarks and feedback poll

Thursday, 4 June 2020 10:50 (10 minutes)

Presenter: ECMWF

Session Classification: Morning session

Contribution ID: **46**   Type: **Poster presentation**

FloodMage

Floods cause injury and loss of life, substantial economic costs, and damage to the environment and cultural heritage. THey have become more frequent in Europe: in recent years, more than twice as many flash floods of medium to large magnitude have been registered as in the late eighties. The primary driver of such increase is the relentless sprawl of urbanisation on floodplains. Climate change is an aggravating factor, triggering changes in precipitation and weather patterns, as well as sea level rise. Consequently, more frequent and severe floods are expected in the future. In this context, it is important to understand the future trends of extreme events, as it is to understand the trends of slow-onset events caused by climate change. Access to proper climate information is crucial for setting appropriate adaptation priorities and strategies addressing existing and emerging risk.

FLOODMAGE is a DRR climate service aimed to estimate the potential economic losses triggered by flood events of different kinds (pluvial, fluvial and coastal) in relation to medium to long term climate conditions. The service adapts to different spatial scales and builds upon seasonal meteoclimatic downscaling, high resolution exposure mapping, hydrodynamic and hydrostatic hazard modelling, and multi-variable risk assessment. The service is oriented to a variety of users, including the public administration, river basin authorities, land reclamation boards, asset managers, and insurers. FM provides insights on the economic and financial impacts linked to extreme event scenarios and draws a comprehensive outlook on how such impacts may change due to increased climate variability.

Primary authors: AMADIO, Mattia (CMCC); ESSENFELDER, Arthur (CMCC and Ca Foscari University of Venice)

Presenters: AMADIO, Mattia (CMCC); ESSENFELDER, Arthur (CMCC and Ca Foscari University of Venice)

Track Classification: UEF2020

Contribution ID: **47**   Type: **Oral presentation**

Smart Climate Hydropower Tool: An artificial intelligence based service for hydropower production seasonal forecast

Wednesday, 3 June 2020 10:05 (20 minutes)

Smart Climate Hydropower Tool is an innovative web-cloud-based service that implements a set of data-driven methods for river discharge. An application for two catchments in South America is discussed (test cases), where management of hydropower plants can benefit from knowledge of incoming discharge forecasts up to 6 months in advance.

SCHT has been developed inside H2020 project "CLARA - Climate forecast enabled knowledge service" and exploits several Artificial Intelligence algorithms, evolving by R&D activity to test new available ones.

Although tangible results using AI have been published (i.e. Callegari, et al., 2015, De Gregorio et. al 2017) challenges remain for seasonal lead times and rainfall dominated catchments, where forecast of meteorological variables plays a critical role.

In this contribution we show results of application of different AI algorithms (from supervised learning regression techniques, to artificial neural networks). Each algorithm is trained over past decades datasets of recorded data, forecast performances are then evaluated using separate test sets with reference to benchmarks (historical average of discharge values and simpler multiparametric regressions).

Major operative advantages of AI with respect to mechanistic hydrological models include limited to none a priori knowledge of involved physical phenomena, high level of flexibility when managing heterogeneous sets of variables related to discharge, and quick setup time of the forecast. Major efforts are requested to identity informative input features ranging from earth observation to gauging stations data, to public meteorological forecasts (i.e Copernicus Climate Change Service-C3S). Using AI techniques many combinations of features can be tested together, to predict river discharge to the reservoirs, choosing the best performing one and tailoring the service to the catchment of interest. Once trained, each algorithm just needs to retrieve online data to perform forecasts, with limited maintenance (i.e. annual re-training to consider new available hydrological data).

For demonstrational purposes we prototyped a cloud-based service, for immediate visualization, through a common browser, of both past and forecasted data, and get on fly performance metrics calculation of the forecasts.

Primary authors: Dr BAGLI, Stefano (GECOsistema srl); Mr MAZZOLI, Paolo (GECOsistema srl); MYSIAK, Jaroslav (Euro-Mediterranean Centre on Climate Change); ESSENFELDER, Arthur (CMCC and Ca Foscari University of Venice)

Presenter: Mr MAZZOLI, Paolo (GECOsistema srl)

Session Classification: Thematic area: Novel products and services

Track Classification: UEF2020

Contribution ID: 48   Type: **Poster presentation**

IRRICLIME: A Climate Smart Irrigation Tool

The threats posed by Climate Change, the continuously increasing pressure on agri-soils in order to fulfil food demand and the request in terms of environmental sustainability and products quality, requires advanced tools and methodologies for efficiently manage water resources and optimize agricultural and irrigations practices.

Under this view, the increasing availability in terms of Open-Big-Data (Copernicus) and forecasting tools (soil water balance and climate models) for simulating meteorological variables, soil hydrology phenomena and crops phenology represent a possibility in order to save water resources and maximize yield and quality of agri-products

IRRICLIME is an open-source web mapping application to spatially and temporally predict, on a monthly, decadal or daily basis, core water budget variables and other agri-variables (hydro-climatic balance BIC, Soil Water Content SWC, Evapotranspiration ET etc.).

Aimed at promoting a Climate Smart Agriculture and Climate-proof Irrigation, this service provides forecasts from seasonal long term to climate change conditions.

Users (Irrigation Boards, farmers, big farming companies) has beed guided in designing climate-proof irrigation system and identifying the best mitigations and adaptation options for facing seasonal and climate challenges in agriculture.

The service, developed through effective codesign process with end users, exploits Copernicus C3S ensemble climate change scenario and seasonal forecast data, together with local agri-meto data, irrigation and crop specific informations.

The service tackles the needs of the following users:

- Water resources and infrastructures managers: support the efficient administration of water distributed to farmers, by helping operators understanding the adequacy of their current and planned infrastructures. In the short-run, operators may plan an increasing number of basins, while also informing the farmers about potential risks they are facing. This will eventually affect their farming practices.

- Farmers: the service can be used to understand how damaging can their farming practices be in the short, medium and long run. Given the information they receive, they may change the cultivated crops shifting towards less water-intensive ones.

- Insurance companies (potential): these are private actors who may be interested in IRRICLIME to change the value assigned to crop yields. These users are only potential ones: not really tackled by the project itself but coming at later stages.

The IRRICLIME is be made available as a Web-mapping service (www.gecosistema.com/irriclime) where a dedicate Web-Wizard will guide the users in performing long-term and seasonal climate analysis of irrigation needs and climatic risk, with the possibility to assess the economic damages and supporting the selection of the best mitigation and adaptation options.

The tool is actually developed under EU H2020 funded project called CLARA (EU FP7 project No 730482) coordinated by CMCC (http://www.clara-project.eu//) with the support of Consorzio di Bonifica della Romagna.

Primary authors: Dr BAGLI, Stefano (Gecosistema srl);   Mr MAZZOLI, Paolo (GECOsistema srl)

Presenter: Dr BAGLI, Stefano (Gecosistema srl)

Track Classification: UEF2020

Contribution ID: 49   Type: **Poster presentation**

WRI - A climate service for seasonal and weekly predictions of agricultural irrigation needs

Water management is a crucial issue in Mediterranean countries, especially in summer, when precipitation is at its climatological minimum and water resources are needed by economic activities and civil use. This conflict is expected to increase, according to future climate change impact studies, as more frequent and intense drought periods will likely occur. This will bring remarkable effects on agriculture because of losses in terms of income and yield to farmers. To address this adaptation issue, stronger and innovative technical support is needed by irrigation water management authorities (e.g. water procurement and allocation agencies). Climate services, based on longer time scales than standard weather services forecasts, are available and can be applied to improve irrigation water use and reduce related energy demand.

On this regard, the climate service Water Requirements for Irrigation (WRI), developed within the CLARA project, addresses these needs by providing, on a GIS platform, seasonal and 7 day forecasts of irrigation needs for the actual crops in the fields. WRI foresees the use of different technological tools and data: I. early crop classification maps obtained from satellite data; II. downscaled seasonal forecasts combined with local weather and climate data; III. 7-day numerical forecasts and IV. technical data and soil map of study areas.

The strength of WRI is that early seasonal irrigation forecasts make water managers aware of the expected seasonal demand anomaly allowing them to manage the irrigation demand at mid-term. Repeated forecasts during irrigation season can help them in fine tuning water procurement and distribution to farming districts in order to better set up supply and distribution of water to irrigation districts.

Primary authors: VILLANI, Giulia (ARPAE); Dr TOMEI, Fausto (ARPAE); PAVAN, Valentina (ARPAE-SIMC); Dr PIROLA, Alessandro (ARPAE); MARLETTO, Vittorio (ARPAE Emilia-Romagna)

Presenter: MARLETTO, Vittorio (ARPAE Emilia-Romagna)

Track Classification: UEF2020

Contribution ID: **50**　　　　　　　　　　　　　　Type: **Oral presentation**

Market is king: climate services for whom?

Wednesday, 3 June 2020 12:00 (20 minutes)

Accelerating climate adaptation and boost climate mitigation practices is strictly linked to the provision of science-based and policy-relevant climate information. The timely production and delivery of climate services is promoting innovation with the objective of building a climate-smart society. Theorizing and understanding the mechanisms through which innovation takes place is vital to overcome bottlenecks and improve the uptake of these tools. In this work, I discuss the importance of service innovation on a theoretical and empirical base. First, I frame climate services as part of a new service-dominant economy. This involves a neo-Schumpeterian approach built upon improved products, processes, markets, inputs and organizational structures. On the empirical side, I analyse the critical factors for climate services innovation using business models as tools to understand how value is created, retained and delivered. I collected data through semi-structured interviews with fourteen climate services operating at seasonal and decadal scale. Findings were used to build an original taxonomy of business models for climate services, based on a recent contribution from the management literature (Lüdeke-Freund et al., 2018). Hence, I present and discuss the main barriers threatening each business model type, by grouping them according to the different neo-Schumpeterian innovation dimensions. Findings prove the essential role of value network and partnerships, as well as the critical importance of technologies in boosting the uptake of climate services. Lack of adequate market research, obsolete processes and financial constraints are, instead, threatening the full development of climate services market.

Primary author: LAROSA, Francesca (Ca' Foscari University of Venice; Euro-Mediterranean Center on Climate Change (CMCC))

Presenter: LAROSA, Francesca (Ca' Foscari University of Venice; Euro-Mediterranean Center on Climate Change (CMCC))

Session Classification: Thematic area: Integrating new products in established processes / Research to Operations and Operations to Research

Track Classification: UEF2020

Contribution ID: **51**   Type: **Poster presentation**

DATACLIME, an interactive multi-user platform for designing your climate solution

CLIME is a climate service developed by Regional Models and geo-Hydrological Impacts (REMHI) division of CMCC Foundation (Euro-Mediterranean Center on Climate Change). CLIME service can be used to evaluate several high-resolution climate data for different goals that can be supporting users with different expertise and requirement in their climate analysis and improving understanding of climate impacts through different solutions designed together users. In the framework of CLARA project (funded by European Commission, Horizon 2020), the new release of CLIME has been designed as an interactive multi-user platform obtained by introducing several functionalities and additional climate data made available by different data providers.

One important aspect of this service is the ability to manage the whole information production chain: from the climate data collection/storage since processing of climate data according to user needs. The processing of climate data includes bias correction and climate analyses using the high resolution climate projections. CLIME is also able to provide climate data in support of different impact studies (e.g. floods, drought, landslides, heat waves, wind storm). The release of CLIME service is constituted by a web flexible platform, whose main functionality are: easy access to different climate data with user guide step-by step; customized climate analysis on different temporal and spatial scale; the possibility to have output in different format to be easily readable by other software.The functionalities are continuously updated in agreement with the standard of scientific community, CMCC finding and users requirements. Currently CMCC has a dedicated email (clime@cmcc.it) and a webpage (www.dataclime.com).

This platform is targeted to different user's typologies, mainly working in the field of climate change adaptation: researcher, consultancy companies, private firms and policy makers. CLIME can support public local administration in an easier integration of climate change conditions and effects into plans and programs

Primary authors: Dr BARBATO, Giuliana (Fondazione CMCC, REMHI Division); Dr MERCOGLIANO, Paola (Fondazione CMCC, REMHI Division); Dr VILLANI, Veronica (Fondazione CMCC); Dr ZOLLO, Alessandra Lucia (Via Maiorise s.n.c, 81043 Capua (CE) Italy)

Presenter: Dr BARBATO, Giuliana (Fondazione CMCC, REMHI Division)

Track Classification: UEF2020

Contribution ID: **52**   Type: **Poster presentation**

Clara-PWA: a knowledge service for water management

PWA (Parma River Basin Water Assessment) service has been developed within H2020 Clara Project related to application of Climate Services; this service aims to integrate climate, hydrological, water quality and habitat observations and simulations, including climate projections. PWA has been implemented in the Parma river basin, and has a special focus on water quality, habitat evaluation, sediment transport and water allocation. The service will support actors involved in land and water design, management and planning activities, being able to compare different scenarios deriving from observations, forecasts and climate change impact projections. PWA service, developed with attention to market opportunities and stakeholders needs, will be demonstrated through a multiservice platform, where an interactive system enables data discovery, data access and sharing of results according to international standards. Future enhancement of current activities and further developments, will contribute to a better knowledge of water bodies and priorities of action along water courses and within river basins in all their complexity.

Primary authors: Mr AGNETTI, Alberto (Arpae); Mrs ALESSANDRINI, Cinzia (Arpae); Mr BOR-DINI, Fabio (Arpae); Ms COMUNE, Elisa (Arpae); Mr DEL LONGO, Mauro (Arpae); Dr TONELLI, Fabrizio (Arpae); Ms ZICCARDI, Selena (Arpae); Mr BRIAN, Marco (AdB Po); Dr LEONI, Paolo (AdB Po); Ms MONTECORBOLI, Chiara (AdB Po); Dr PECORA, Silvano (Adb Po); Mr RICCIARDI, Giuseppe (Arpae); Ms DELL'AQUILA , Valentina (Arpae)

Presenter: Ms COMUNE, Elisa (Arpae)

Track Classification: UEF2020

Contribution ID: **53**   Type: **Poster presentation**

AQCLI: a CLARA Service for Air Quality in future CLImate

The AQCLI service provides an assessment of how climate change will affect air quality, especially for Particulate Matter (PM10), one of the main pollutant during winter, and Ozone (O3), the main pollutant during summer. The service covers a 150 km x 150 km area centered around the city of Bologna in northern Italy. The assessment will be representative of urban background concentration. The analysis represents both present conditions and a future scenario and it relies on meteorological scenarios produced within the CLARA project. The service produces the maps of number of days favorable to pollutant accumulation according to meteorological conditions and evaluates the impact of future climate conditions for every municipality inside the study area. The results are available as open data or they can be visualized on a web platform as maps and elaborations. The service is addressed to decision makers involved in air quality management that need to evaluate the meteorological component in future climate scenario in order to plan effective actions to reduce air pollution.

Primary authors: Dr AMORATI, Roberta (ARPAE); Dr STORTINI, Michele (ARPAE); Dr GIOVANNINI, Giulia (ARPAE)

Presenter: Dr AMORATI, Roberta (ARPAE)

Track Classification: UEF2020

Contribution ID: 54   Type: **Poster presentation**

Planning and management of solar photovoltaic plants through a climate service

The electric system is rapidly evolving toward the diversification of distributed energy resources (DERs), leading to an increase in the use of renewable energy sources (RES). This change in the energy sector will involve new opportunities for the integration of these into the whole power system.

The main challenge for RES to participate in the energy market is their strong dependence on the weather. Forecasting is needed to plan and maintenance the supply of these variable resources. Predict the weather variations in the coming hours, days, or weeks will allow decision-makers to anticipate the purpose of the energy, helping to the participation of the RES collectively and on time. In contrast medium-range forecasts, from weeks to months, provide knowledge that can be used to improve situational awareness, evaluate multiple potential network scenarios, optimize economic results, leverage smart statistics, and improve plans.

Within the framework of renewable energies, photovoltaic is one of the technologies with the greatest future projection. However, the fluctuating, unpredictable, and unmanageable character of renewable generation systems, subject to intermittent atmospheric conditions, increases the difficulty of ensuring the reliable and stable management of the electricity systems. This is one of the main disadvantages of this type of renewable facility, especially in the energy market. It is necessary to redefine the planning, management, and operation of this type of facility. In the framework of the H2020 project CLARA (Climate forecast enabled knowledge services) the University of Cordoba has developed one tool for automating both spatial and operational assessment of utility-scale photovoltaic (PV) power plants. This paper presents the SEAP service which gives a global simulation to determine solar radiation and energy produced, providing forecasts from short-term to long-term to climate change conditions.

Primary authors: Dr MORENO-GARCIA, Isabel M. (Universidad de Córdoba); Dr LÓPEZ-LUQUE, Rafael (Universidad de Córdob); Dr VARO-MARTÍNEZ, Marta (Universidad de Córdoba); Dr FERNÁNDEZ-AHUMADA, Luis M. (Universidad de Córdoba); Dr RAMÍREZ-FAZ, José C. (Universidad de Córdoba); Prof. CASARES DE LA TORRE, Francisco (Universidad de Córdoda)

Presenter: Dr MORENO-GARCIA, Isabel M. (Universidad de Córdoba)

Track Classification: UEF2020

Contribution ID: 55　　　　　　　　　　　　　　　Type: **Poster presentation**

A climate service for small hydropower plants operation and management

The operation planning of run-of-river (RoR) plants is subject to the water availability, which presents a very high interannual variability, being even more significant in mountainous Mediterranean areas with snow cover. In this context, seasonal forecast constitutes an added source of information that may help to narrow down the operational options inferred from historical data sources.

In the framework of the H2020 project CLARA (Climate forecast enabled knowledge services) a climate service was developed in a co-generation process. This methodology leads to a correct scale of the forecast information and the right tools to convey it, which results in a more effective knowledge system but also a more robust knowledge and contextual applicability of the seasonal climate forecast.

The proposed climate service, SHYMAT (Small Hydropower Management and Assessment Tool), provides monthly river inflow forecast 1 to 6 months in advance as an indicator of water availability in a RoR hydropower system. Users can take advantage of the forecast in order to anticipate: (1) Periods in which there will be enough water to turbinate; and, on the other hand, (2) periods in which there will be an inadequate amount of water to turbinate, and maintenance tasks can be planned. Moreover, having knowledge of the possible water excess discharges coming from snowmelt, which may result in the spilling of water, gives managers the opportunity to quickly tune up additional turbines. Finally, great value comes from the prediction of energy production, which is clearly valuable information for market issues, and the minimum environmental river flow, to comply with the environmental requirements.

SHYMAT has been tested in southern Spain, but it is a scalable solution, which helps to bring the C3S information to other sites in Europe, while also contributing to the bloom off climate services as an emerging market.

Primary authors: CONTRERAS, Eva (Fluvial Dynamics and Hydrology Research Group-Andalusian Institute for Earth System Research, University of Cordoba); Dr HERRERO, Javier (Fluvial Dynamics and Hydrology Research Group-Andalusian Institute for Earth System Research, University of Cordoba); Prof. AGUILAR, Cristina (Fluvial Dynamics and Hydrology Research Group-Andalusian Institute for Earth System Research, University of Cordoba); Prof. POLO, María José (Fluvial Dynamics and Hydrology Research Group-Andalusian Institute for Earth System Research, University of Cordoba)

Presenter: CONTRERAS, Eva (Fluvial Dynamics and Hydrology Research Group-Andalusian Institute for Earth System Research, University of Cordoba)

Track Classification: UEF2020

Contribution ID: **56** Type: **Poster presentation**

ROAT: Building a climate service as a tool for managing multipurpose reservoirs

The operational feasibility of water infrastructures is subject to the river inputs, which also depend on rainfall variability. This fact is particularly relevant in a Mediterranean environment, where snow cover and snow processes have a great influence on the quantity and timing of water availability. This is the case of multipurpose reservoirs, where management has to meet the competitive needs of water, demanded not only for human consumption, but also for irrigation, power generation, flood regulation, always complying with environmental flow requirements.

In the framework of the H2020 project CLARA (Climate forecast enabled knowledge services), the climate service ROAT (Reservoir Operation Assessment Tool) has been designed to support the management of reservoirs by using seasonal forecasting information to anticipate the availability of water for the supply of demands. The tool has been developed in a cogeneration process, bridging the gap between climate data providers and managers and policy makers. The climate service has been tested in the south of Spain, in a Mediterranean high mountain area where water is a limited resource and decisions have a great media and social impact.

ROAT combines measurements and modelling with the most advanced seasonal forecast that currently exists at the European level. It is conceived as an online application that shows real-time hydrological modeling of the river basin and seasonal flow forecasting for the next 7 months to assist in the daily operation of multipurpose reservoirs. The service supports the decision-making process of water resource managers by anticipating the real risk of drought based on forecasts, optimizing the timing of water resource allocation and obtaining a comprehensive view of the current hydrological status of the basin.

Primary authors: Dr HERRERO, Javier (Fluvial Dynamics and Hydrology Research Group-Andalusian Institute for Earth System Research, University of Cordoba); Dr CONTRERAS, Eva (Fluvial Dynamics and Hydrology Research Group-Andalusian Institute for Earth System Research, University of Cordoba)

Co-authors: Prof. AGUILAR, Cristina (Fluvial Dynamics and Hydrology Research Group-Andalusian Institute for Earth System Research, University of Cordoba); Prof. POLO, María José (Fluvial Dynamics and Hydrology Research Group-Andalusian Institute for Earth System Research, University of Cordoba)

Presenter: Dr HERRERO, Javier (Fluvial Dynamics and Hydrology Research Group-Andalusian Institute for Earth System Research, University of Cordoba)

Track Classification: UEF2020

Contribution ID: **57** Type: **Oral presentation**

ECMWF Future Plans: Reading, Bologna and Global Forecasting

Monday, 1 June 2020 14:35 (20 minutes)

ECMWF provides its users around the world with predictions for days, weeks and seasons ahead at a level of accuracy and reliability second to none. The Centre owes this leading position to a combination of collaborative principles, top-level professionals, powerful HPC capacities and a strong user focus.

This talk will present ECMWF plans and provide updates on ongoing work programmes. Current progress and timeline for the Bologna Our New Datacentre will be shown, and an overview of operational plans will be given. Updates on model and software developments including the new model cycle 47r1 and new and updated ECMWF products and services including Copernicus will be presented.

Presenter: PAPPENBERGER, Florian (ECMWF)

Session Classification: Afternoon session

Contribution ID: **60** Type: **not specified**

Virtual Soirée - How well do you know ECMWF? Quiz

Tuesday, 2 June 2020 15:00 (1 hour)

In previous years the UEF dinner has been an opportunity to have fun and network with colleagues in an informal environment. Unfortunately this year we are unable to do the dinner however we'd like to bring a bit more fun to UEF2020 so during this year we will be holding a Virtual Soiree where we will be hosting a 'How well do you know ECMWF?' quiz.

Details on joining the quiz will be available shortly, we look forward to seeing you there!

Presenter: HEMINGWAY, Becky (ECMWF)

Contribution ID: **62**   Type: **not specified**

Introduction to reforecasting and extended range forecasts

Wednesday, 3 June 2020 13:45 (5 minutes)

Presenter: VITART, Frederic (ECMWF)

Session Classification: Thematic area: Integrating new products in established processes / Research to Operations and Operations to Research

Contribution ID: **63**
Type: **not specified**

Interactivity with a chance of clouds

Wednesday, 3 June 2020 10:45 (15 minutes)

Presenter: HEMINGWAY, Becky (ECMWF)

Session Classification: Thematic area: Novel products and services

Contribution ID: **65**   Type: **Oral presentation**

Causes of systematic errors forecasts of near-surface weather parameters and prospects for reducing them (repeat)

Wednesday, 3 June 2020 08:25 (20 minutes)

Presenter: SANDU, Irina (ECMWF)

Session Classification: Repeat session

Contribution ID: **66**   Type: **Oral presentation**

ECMWF Future Plans: Reading, Bologna and Global Forecasting (repeat)

Wednesday, 3 June 2020 08:05 (20 minutes)

ECMWF provides its users around the world with predictions for days, weeks and seasons ahead at a level of accuracy and reliability second to none. The Centre owes this leading position to a combination of collaborative principles, top-level professionals, powerful HPC capacities and a strong user focus.

This talk will present ECMWF plans and provide updates on ongoing work programmes. Current progress and timeline for the Bologna Our New Datacentre will be shown, and an overview of operational plans will be given. Updates on model and software developments including the new model cycle 47r1 and new and updated ECMWF products and services including Copernicus will be presented.

Presenter: PAPPENBERGER, Florian (ECMWF)

Session Classification: Repeat session

Contribution ID: **67**   Type: **not specified**

ECMWF Product Development (repeat)

Wednesday, 3 June 2020 07:45 (20 minutes)

Presenter: RICHARDSON, David (ECMWF)

Session Classification: Repeat session

Contribution ID: **77**   Type: **Oral presentation**

ECMWF Forecast Performance

Monday, 1 June 2020 16:00 (20 minutes)

An update is given on the evolution of forecast skill of the IFS in the medium and extended range. It is shown that the implementation of model cycle 46r1 in June 2019 has had a significant positive impact on both upper-air and near-surface variables. Causes of persistent systematic errors in near-surface forecasts are discussed and recent steps undertaken for reducing them are outlined. Geographical variations in the evolution of upper-air skill over the last decade are presented. The inclusion of observation error in ensemble verification, which has already been in place for upper-air variables, has now been extended to near-surface variables, and the latest results are discussed.

Primary author: HAIDEN, Thomas (ECMWF)

Presenter: HAIDEN, Thomas (ECMWF)

Session Classification: Afternoon session

Track Classification: UEF2020

Contribution ID: **78**   Type: **Oral presentation**

Virtual icebreaker

Monday, 1 June 2020 15:45 (15 minutes)

Primary author: HEMINGWAY, Becky (ECMWF)

Presenter: HEMINGWAY, Becky (ECMWF)

Session Classification: Afternoon session

Track Classification: UEF2020

Contribution ID: **79**   Type: **Poster presentation**

Building cloud-based data services to enable earth-science workflows across HPC centres

Weather forecasts, climate reanalyses and air quality information produced by ECMWF act as a vital input for many downstream simulations and applications. Transferring, storing and locally modifying large volumes of such data before integration currently presents a significant challenge to users. The key aim for ECMWF within the H2020 HiDALGO project (https://hidalgo-project.eu/) is to migrate these tasks to the cloud, thereby facilitating fast and seamless application integration. ECMWF and its partners in the HiDALGO project aim to implement a set of services that enable the simulation of complex global challenges. The pre-/post processing tasks of HiDALGO use-case workflows generally demand no more than a few cores to compute and are therefore good candidates to run in a cloud environment. Enabling, managing, and orchestrating the integration of both HPC and cloud environments to improve overall performance is the key goal of HiDALGO. This poster will present two HiDALGO Pilot Applications that use ECMWF data as well as ECMWF's role in the project. Particular focus will be given to how cloud data and services will couple with the test pilot applications to improve overall workflow performance and enable easier access to the data for the pilot users.

Primary authors: VUCKOVIC, Milana (ECMWF); HANLEY, John (ECMWF); SIEMEN, Stephan (ECMWF); HAWKES, James (ECMWF); QUINTINO, Tiago (ECMWF); PAPPENBERGER, Florian

Presenters: VUCKOVIC, Milana (ECMWF); HANLEY, John (ECMWF)

Track Classification: UEF2020

Contribution ID: **80**   Type: **Oral presentation**

Capgemini's AsSISt airline maintenance service, powered by CAMS

Thursday, 4 June 2020 10:20 (20 minutes)

AsSISt is the solution led by Capgemini in collaboration with INERIS and Barcelona Supercomputing Center to offer aircraft maintenance improvement via the related impact of particles during flights and on ground.

The service provides indicators to help airlines companies, aircraft manufacturers with a precise monitoring of the plane exposure to harmful particles and then allowing them to potentially optimize aircraft maintenance plans.

AsSISt delivers indicators such as corrosion, abrasion and blockage, supporting maintenance and repair overhaul services taking into account any disturbance of the environment, enabling a near real time monitoring along the flight track or for an ensemble of flight tracks, for past of future flight in forecast mode.

AsSISt does not require any instrumentation over aircraft, and the tool is based only on flight paths data set and on the Copernicus Atmospheric Monitoring Services related information.

Primary authors: SAÜT, Carine (Capgemini); Mr ESTIVAL, Nicolas (Capgemini)

Presenters: SAÜT, Carine (Capgemini); Mr ESTIVAL, Nicolas (Capgemini)

Session Classification: Morning session

Track Classification: UEF2020

Contribution ID: **82**   Type: **Oral presentation**

ERA5-Land, dedicated land surface reanalysis

Thursday, 4 June 2020 10:40 (10 minutes)

ECMWF is currently producing the next generation of European Reanalysis ERA5. Among others, it will make it possible to better understand the processes and interactions between different components of the Earth System which has derived into the climate from 1950 until present. The core of ERA5 is the ECMWF Integrated Forecasting System in combination with a powerful 4D-VAR data assimilation system. The description of the land surface component is also part of the ERA5 portfolio. However, with the objective of serving (primary) the land surface community and other communities focused on land applications, an enhanced offline version of the land component is also under production, resulting into the ERA5-Land dataset. For example, a well-defined spin-up strategy has proved to provide a much better hydrological consistency over all the available period. ERA5-Land dataset is a unique dataset of its kind that provides a global scale description of the most important land variables through a single simulation driven by near-surface atmospheric fields from ERA5, with thermodynamical orographic adjustment of temperature. The synchronization with ERA5T mode will also make it possible to provide NRT updates. One of the added values of ERA5-Land with respect to the ERA5 atmospheric reanalysis is a global projected horizontal resolution of approximately 9 km (around 4 times finer resolution than ERA5), matching the ECMWF TCo1279 operational grid, and therefore providing consistent input for Numerical Weather Prediction and climate studies involving land water resources, but also for accurate hydrological and agricultural modeling. The offline nature of land reanalysis allows to incorporate forefront model developments before the production phase. For example, ERA5-Land benefits from a revision of the soil thermal conductivity, making it more accurate the heat transfer through the vertical dimension.
This presentation will provide an overview of the ERA5-Land dataset and its main features.

Primary author: MUNOZ-SABATER, Joaquin (ECMWF)

Presenter: MUNOZ-SABATER, Joaquin (ECMWF)

Session Classification: Morning session

Track Classification: UEF2020

Contribution ID: **83**

Type: **Oral presentation**

Copernicus Services at ECMWF: An Overview

Thursday, 4 June 2020 07:35 (5 minutes)

This presentation will provide an overview of Copernicus Services at ECMWF.
ECMWF is indeed the entrusted entity for the European Union's Copernicus Climate Change Service and the Copernicus Atmosphere Monitoring Service. The Copernicus Climate Change Service responds to environmental and societal challenges associated with human-induced climate change. The service will give access to information for monitoring and predicting climate change and will, therefore, help to support adaptation and mitigation. The Copernicus Atmosphere Monitoring Service provides continuous data and information on atmospheric composition. The service consists of daily global forecasts of atmospheric composition, daily forecasts of European air quality, global and regional reanalyses, as well as services on solar radiation, greenhouse gases and emissions.

Primary author: THEPAUT, Jean-Noel (ECMWF)

Presenter: THEPAUT, Jean-Noel (ECMWF)

Session Classification: Morning session

Track Classification: UEF2020

Contribution ID: **84**   Type: **Oral presentation**

Recent activities of the Copernicus Climate Change Service (C3S) and plans for the next phase

Thursday, 4 June 2020 07:40 (20 minutes)

The Copernicus Climate Change Service, one of the six thematic services of the European Programme on earth's observations Copernicus, is managed by ECMWF on behalf of the European Commission. The service, which has been operational for only a couple of years, can now count on nearly 45 000 users towards whom it delivers some 50 TB of data per day. This short talk is to describe the current status of the programme and present some of the most significant development that are expected for the next few months and years.

Primary author: BUONTEMPO, Carlo (ECMWF)

Presenter: BUONTEMPO, Carlo (ECMWF)

Session Classification: Morning session

Track Classification: UEF2020

Contribution ID: **85**   Type: **Oral presentation**

CAMS, high-quality information about air composition in support of COVID-19 R&D

Thursday, 4 June 2020 08:00 (20 minutes)

CAMS is the Copernicus Atmosphere Monitoring Service. It is implemented by ECMWF on behalf of the European Commission and delivers information about atmospheric composition, emissions and surface fluxes as well as solar radiation and climate forcing based on Earth Observation. CAMS products are delivered both by ECMWF and by a wide range of contractors distributed in Europe. They are open and free-of-charge and most can be accessed through the Atmosphere Data Store (http://ads.atmosphere.copernicus.eu). This talk will discuss the main CAMS products, their performance and how they can be used especially in the context of the current COVID-19 crisis both in Europe and worldwide.

Primary author: PEUCH, Vincent-Henri (ECMWF)

Presenter: PEUCH, Vincent-Henri (ECMWF)

Session Classification: Morning session

Track Classification: UEF2020

Contribution ID: **86**   Type: **Oral presentation**

Machine Learning for Weather

Wednesday, 3 June 2020 14:20 (40 minutes)

Machine Learning refers to a set of techniques for developing software routines by reverse engineering them from data. With this approach, it is possible to develop capabilities beyond those we can build by hand. Using these techniques, we can improve all aspects of the numerical weather prediction pipeline. In this presentation, I will review some of the main ideas behind machine learning and describe breakthroughs which have been or may be achieved. Examples include autonomous sensors, intelligent in-painting and down-scaling, inverse modeling, acceleration of data assimilation, improvements to model parameterizations, model-free nowcasting, detection of severe weather, and many more. It is important for scientists to understand both the potential and limitations of these techniques as machine learning is here to stay, and it has the potential to revolutionize science over the coming decades.

Primary author: HALL, David (Nvidia)

Presenter: HALL, David (Nvidia)

Session Classification: Thematic area: Integrating new products in established processes / Research to Operations and Operations to Research

Track Classification: UEF2020

Contribution ID: **87**   Type: **Oral presentation**

Developing applications for climate and meteorology in the CDS Toolbox - interactive session

Thursday, 4 June 2020 09:30 (30 minutes)

The Copernicus Climate Data Store (CDS) aims to bring climate data to a wide audience of users. From users with a skilled technical background who would like access raw model and observation data for research purposes, to higher level users that would like to access the final product to help inform decisions.

The CDS achieves this by acting as the gateway to the data which is hosted on servers around the world, and providing the online processing tools so that users can process the data to meaningful and understandable results. This reduces the amount of resource lost through data transfer and hosting, and improves transparency as all users access the data via the same entry point.

This session will give an introduction to the objectives and architecture of the CDS, and a short interactive session where attendees can begin to develop their own applications to explore the data hosted on the CDS

Primary author: COMYN-PLATT, Edward (ECMWF)

Presenter: COMYN-PLATT, Edward (ECMWF)

Session Classification: Morning session

Track Classification: UEF2020

Contribution ID: **88**
Type: **Oral presentation**

Forecasting floods and wildfires - overview of Copernicus Emergency Management Service (CEMS) activities at ECMWF

Thursday, 4 June 2020 08:20 (20 minutes)

This talk will give an overview of the Copernicus Emergency Management Service (CEMS) activities at ECMWF. ECMWF is the computational centres of wildfire and flood for CEMS, and both systems run at European and Global scale. The forecasts for floods and fire are disseminated to a range of users, most importantly the forecast user communities, the European Emergency Response Coordination Centre (ERCC) as well as the European Aristotle project. The latter delivers world leading multi-hazard advice to ERCC. The talk will also point to the latest developments within the services as well as on outline of future developments. It will also give a few examples of how the services are used.

Primary author: WETTERHALL, Fredrik (ECMWF)

Presenter: WETTERHALL, Fredrik (ECMWF)

Session Classification: Morning session

Track Classification: UEF2020

Contribution ID: **89** Type: **Oral presentation**

ECMWF Product Development

Monday, 1 June 2020 14:15 (20 minutes)

The presentation will review forecast product development activities at ECMWF over the past year, in response to user requests and feedback.

New forecast outputs introduced over the last year include a new Extreme Forecast Index (EFI) to highlight the large-scale water vapour transport in the atmosphere, as well as products relating to large-scale weather regimes and extremes in the extended range.

The next model upgrade will introduce several new forecast output fields, including revisions to convective inhibition (CIN) and EFI products for severe convection (CAPE and CAPE-shear). Additions to our tropical cyclone (TC) products will introduce metrics of TC "size" to supplement the existing forecasts of TC track and intensity. These new "wind radii" use mean 10m wind thresholds of 18, 26 and 32 m/s (34, 50 and 64 knots) to denote the furthest distance away from the centre of the TC at which each of the wind speed thresholds are exceeded.

Updates to the ECMWF web charts and to the interactive ecCharts system will also be presented.

Primary author: RICHARDSON, David (ECMWF)

Presenter: RICHARDSON, David (ECMWF)

Session Classification: Afternoon session

Track Classification: UEF2020

Contribution ID: **90**   Type: **Oral presentation**

Data-driven climate communication - the example of the European State of the Climate 2019

Thursday, 4 June 2020 08:40 (20 minutes)

In her presentation, Freja will focus on C3S activities that relate to data-driven climate communication, demonstrating how in an operational chain data is transformed into information products of various types and with different target audiences. The main use case will be the European State of the Climate report for 2019, which was published in April 2020. The presentation will showcase how the report strives towards providing a transparent and traceable chain from the different data sources to the information products within the report. The presentation will also use the results of the report to reflect on how to communicate this type of information to a wide range of audiences. Freja will also briefly discuss how the content of the report is used for further communication activities, such as for the Copernicus media partnerships with Euronews and CNN.

Primary author: VAMBORG, Freja (ECMWF)

Presenter: VAMBORG, Freja (ECMWF)

Session Classification: Morning session

Track Classification: UEF2020

Contribution ID: **91**   Type: **Oral presentation**

Copernicus Climate Change Service (C3S) Sectoral Information System (SIS)

Thursday, 4 June 2020 10:00 (20 minutes)

Climate-sensitive sectors need to have access to reliable data and information products in order to understand and manage risks associated to climate variations and changes. The C3S Sectoral Information System is a credible source of tools, applications and indicators built on high value climate data, providing relevant and accessible information to users together with correct examples on how to pass from climate data to information that is useful in decision making processes. The SIS delivers a set of indicators relevant to specific sectors and it provides a set of interactive downstream applications that are used not only to explore but also to build user-oriented solutions. The SIS component also includes use cases and demonstrators, to show-case the benefits of the CDS and strongly communicate it for further user uptake. This presentation will provide examples on how, through the SIS component of C3S, it is possible to pass from a useful to a usable piece of information, fully built on the CDS technology.

Primary author: CAGNAZZO, Chiara (ECMWF)

Presenter: CAGNAZZO, Chiara (ECMWF)

Session Classification: Morning session

Track Classification: UEF2020

Contribution ID: **92**

Type: **Oral presentation**

Causes of systematic errors in forecasts of near-surface weather parameters and prospects for reducing them

Monday, 1 June 2020 14:55 (20 minutes)

Near-surface forecast biases are the result of a complex interplay between processes parametrized in the atmospheric and surface columns of a model, leading to locally generated errors, and advection processes, which constitute a non-local source of errors. Understanding the leading causes of such errors is necessary to address and reduce near-surface biases in a way that improves the physics of the model. This requires disentangling the role of individual processes by using a range of diagnostics for stratifying and attributing errors. The ECMWF-internal USURF project, which was initiated in 2017, has coordinated efforts in this area, and its main results as well as the necessary model developments to reduce systematic biases in near-surface weather parameters are summarized here.

Primary author: SANDU, Irina (ECMWF)

Presenter: SANDU, Irina (ECMWF)

Session Classification: Afternoon session

Track Classification: UEF2020

Contribution ID: **93**   Type: **Oral presentation**

"Keeping users at the heart of operations": Introducing the theme

Tuesday, 2 June 2020 09:05 (10 minutes)

Users are key to everything that is done at ECWMF. Our goal for over 40 years has been to improve global numerical weather predictions to support our Member and Co-operating States, as well as the broader meteorological communities. "Keeping users at the heart of operations"(this year UEF theme) is one key element to providing successfully products and services to users. The talk will introduce the theme and the focus of this year UEF.

Primary author: GHELLI, Anna (ECMWF)

Presenter: GHELLI, Anna (ECMWF)

Track Classification: UEF2020

Contribution ID: **94**
Type: **Oral presentation**

Radiosonde descent data: quality and next steps

Wednesday, 3 June 2020 12:20 (20 minutes)

In recent years National Meteorological Services have expressed an increasing interest in using the descent phase of operational radiosonde soundings. After a sounding balloon burst, a radiosonde continues measurement and can provide another linked, but still independent profile data measured at a downstream location and about two hours after the launch.

In response reporting of descent data was added to the Vaisala MW41 software. Various NMSs have been looking at the descent data provided from their own radiosonde operations. Some data is already sent on the GTS. In co-operation with meteorological community a radiosonde specific template for descent data has been defined.

Radiosonde descent reports have been monitored in the operational ECMWF system since June 2019. Initial results show station dependent differences against model for stratospheric temperatures. The reason is likely linked to to descent rate of falling radiosonde, that can be highly varied at stratosphere altitudes. For most flights, the raw descent winds show reduced variability compared to the ascent winds.

Recently, in collaboration with ECMWF and NMS's, a better understanding has been obtained on some of the factors affecting the quality of radiosonde descent data. Work continues for calculation and data filtering to get most out of the valuable descent phase measurement data from radiosonde observations. It seems likely that in the near future reports of descent profiles can contribute to improved analyses/forecasts.

Primary author: LEHMUSKERO, Matti (Vaisala Oyj)

Co-authors: INGLEBY, Bruce (ECMWF); JAUHIAINEN, Hannu (Vaisala)

Presenter: LEHMUSKERO, Matti (Vaisala Oyj)

Session Classification: Thematic area: Integrating new products in established processes / Research to Operations and Operations to Research

Track Classification: UEF2020

Contribution ID: **95**   Type: **Oral presentation**

Real-time refinement of ECMWF subseasonal forecast confidence

Tuesday, 2 June 2020 12:00 (40 minutes)

The World Climate Service (please see link at bottom of this page) is a commercial web-based portal designed to enable meteorologists and weather-sensitive enterprises to improve their long-range forecasting process. It provides independent sources of long-range forecast information, including statistical and analog forecast tools, to improve scenario analysis and the communication of future weather risk.

In summer 2019, the World Climate Service released a new statistical temperature forecast product based on success in a subseasonal forecast contest. The statistical scheme, called Sub-R, performed well in winter 2019-2020, and here we present a verification comparison between Sub-R and the ECMWF subseasonal forecasts for specific geographies. While the ECMWF was superior in Europe and Asia, Sub-R outperformed ECMWF over the USA domain. Moreover, in all three domains, the ECMWF performance was substantially better when the Sub-R forecasts agreed than when Sub-R predicted a different outcome.

We conclude that statistical forecast guidance such as Sub-R provides a valuable complement to dynamical model forecasts at subseasonal lead times. The results also suggest that statistical schemes have the potential to identify windows of enhanced predictability when the dynamical models will achieve higher skill than normal. Independent statistical guidance therefore permits real-time refinement of forecast confidence, whether in terms of subjective interpretation by a forecaster, or in terms of new quantitative multi-predictor forecasts. An obvious next step is to perform conditional calibration of the dynamical model forecasts to create probability information that reflects variations in skill and confidence based on statistical inputs.

Primary author: DUTTON, Jan (Prescient Weather Ltd)

Presenter: DUTTON, Jan (Prescient Weather Ltd)

Track Classification: UEF2020

Contribution ID: **96**   Type: **Oral presentation**

ECMWF Future Plans: Reading, Bologna and global forecasting

ECMWF's goal by 2025 is to provide forecast information needed to help save lives, protect infrastructure and promote economic development in Member and Co-operating States through research and operational ensemble-based analyses and predictions.

This session will present ECMWF plans and provide updates on ongoing work programs which will to help achieve this goal. Current progress and timeline for the Bologna Our New Datacentre will be shown, and an overview of operational plans will be given. Updates on model and software developments including the new model cycle 47r1 and new and updated ECMWF products and services including Copernicus will be presented.

Users are a key to everything that is done at ECMWF, so we welcome comments and feedback on the all topics.

Primary author: PAPPENBERGER, Florian

Presenter: PAPPENBERGER, Florian

Track Classification: UEF2020

Contribution ID: 97

Type: **Poster presentation**

Evaluation of GloFAS river discharge reanalysis and forecast skill

The Global Flood Awareness System (GloFAS; http://www.globalfloods.eu/) is a 24/7 supported operational service monitoring and forecasting floods across the world. GloFAS is part of the European Commission's Copernicus Emergency Management Service (CEMS) with ECMWF as the computational centre. Its aim is to complement relevant national and regional authorities and services, and to support international organisations in decision making and preparatory measures before major flood events, particularly in large trans-national river basins. Critical to both forecast end-users and scientific development is evaluation of the river discharge reanalysis and forecast quality. This poster provides the first evaluation of the current operational GloFAS system, version 2.1 (released 5 November 2019). Two products are evaluated: i.) GloFAS-ERA5 reanalysis (1979-present) against a global network of 1801 river discharge stations; and ii.) GloFAS ensemble forecast skill based on 20 year (1997-2016) 11-member ensemble reforecasts against a river discharge persistence benchmark for short, medium, and extended lead times, with respect to GloFAS-ERA5 reanalysis. The GloFAS-ERA5 reanalysis, reforecasts, and real-time forecast data are openly available to users with details on how to access them on the GloFAS documentation: https://confluence.ecmwf.int/display/COPSRV/GloFAS+available+data

Primary author: HARRIGAN, Shaun (ECMWF)

Presenter: HARRIGAN, Shaun (ECMWF)

Track Classification: UEF2020

Contribution ID: **98** Type: **not specified**

User Voice Corner - Breakout Group 1

Tuesday, 2 June 2020 14:10 (10 minutes)

Session Classification: User Voice Corner

Contribution ID: **99**   Type: **not specified**

User Voice Corner - Breakout Group 2

Tuesday, 2 June 2020 14:20 (10 minutes)

Session Classification: User Voice Corner

Contribution ID: **100**　　　　　　　　　　　　　　　　　Type: **not specified**

User Voice Corner - Breakout Group 4

Tuesday, 2 June 2020 14:30 (10 minutes)

Session Classification:　User Voice Corner

Contribution ID: **101**   Type: **not specified**

User Voice Corner - Breakout Group 5

Tuesday, 2 June 2020 14:40 (10 minutes)

Session Classification: User Voice Corner

Contribution ID: **102**   Type: **not specified**

User Voice Corner - Breakout Group 6

Tuesday, 2 June 2020 14:50 (10 minutes)

Session Classification: User Voice Corner