

Minutes of 25th Annual Meeting WGCEF

26th , 27th of September 2019 held in Dublin

By Christian Csekits, ZAMG (Chair) and Jos Diepeveen, KNMI (Vice-chair)



List of Participants

Name	Organisation
BLAAUBOER, Dick	Eumetnet
CSEKITS, Christian	ZAMG/Austria
CUSACK, Evelyn	Met Eireann/Ireland
DIEPEVEEN, Jos	KNMI/The Netherlands
DORAN-SHERLOCK, Andrew	Met Eireann/Ireland
GILLET-CHAULET, Bruno	Meteo-France
HANSEN, Janne	DMI/Denmark
HANZLIK, Jozef	Czech Hydrometeorological Institute
HAUSEN, Robert	DWD/Germany
HEWSON, Tim	ECMWF
HOIKKANEN, Marjo	FMI/Finland
JAMESON, Stephanie	UK Met Office/Great Britain
JONASDOTTIR, Elin Björk	VEDUR/Icelandic Met Office
KALIN, Lovro	DHMZ/Meteorological and Hydrometeorological Service of Croatia
LEITAO, Paula	IPMA/Portugal
LETESTU, Andre-Charles	MeteoSwiss/Switzerland
MANCZAK, Piotr	Hydrometeorological Service of Poland
PALJAK, Taimi	Estonian Meteorological and Hydrometeorological Service
PATKAI, Zsolt	OMSZ/Hungary
RALIENE, Vida	Lithuanian Hydrometeorological Service
RAZY, Alissa	Israel Meteorological Service
REY, Jaime	AEMET/Spain
ROE, Nick	UK Met Office/Great Britain
ROULET, Bernard	Meteo-France
SANDEV, Marjan	Czech Hydrometeorological Institute

Session I “Introduction”:

- Opening words by chairs Christian Csekits and Jos Diepeveen.
- Welcome by Met Eireann Director: The old Irish tradition of ‘Meitheal’: where rural communities would gather together to help each other in turn. The tradition it is less common now but not gone and is still relevant for today.
- Welcome to new members and introduction of each individual.

Session II “Updates since the last meeting”:

- Round table: updates of new developments in each NMS.

ZAMG (Christian Csekits)

- Weather forecast division: Christian replacing former boss Klaus.
- ZAMG participating in ARISTOTLE II Project, which is delivering multi-hazard information to the ERCC (Emergency Response Coordination Centre); SW member and EQU lead; single point of contact (alert system); End: December 2019; ARISTOTLE III from 2020 on.
- New international activities from 2020 on (World Bank, e.g. Myanmar).
- Two new female forecasters since 2019 an improvement in diversity.
- Daily web-conference with national crisis management center since end of 2018.
- New APP for weather observers (stakeholders, costumers, public).
- Political project: ZAMG merging with GBA and outsourcing/privatising.
- Joint forecaster training (DACH; November 2019 in Vienna).

Met Eireann (Evelyn Cusack)

- Push notifications of warnings successfully started on ME app.
- Revised warning criteria were published.

- Two eGovernment awards: Universal Design Award for www.met.ie and the Market Social Media Award for Twitter page.

- FD/NDFEM/LA's first annual workshop in Tullamore. Excellent trilateral on MetEireann's warnings and FFC.

- FD management & Facilities engaging with architect and other specialists in preparation for relocation of Forecast office.

- Ongoing voice coaching with broadcasting staff by RTE.

KNMI (Jos Diepeveen)

- EWC ambition: Finance fixed for coming years 44 mE.
- Starting up UWC: From 2023 Supercomputer on Iceland.
- Launch Storm Naming had a lot of media attention.

- KNMI 165 year anniversary.

- KNMI best weather app award.

DMI (Janne Hansen)

- Change in management.

- New Operation center.

- 5 new forecasters start in October.

- Our ISO9001: 2015 certificate is now valid for the Kingdom of Denmark within the scope: Civil Meteorological, oceanographical and Ice services (ICEMETOCEAN).

- Climate atlas – the effects of climate changes in the Danish communes.

- Free data from ultimo October, starting with observations.

- Fire Weather Index to the Emergency management Agency (DEMA).

DWD (Robert Hausen)

- 2 big heat waves with numerous all-time records above 40 degrees (Max. 42.6 °C) last summer.

- Intensified cooperation with disaster and risk

management and the military (focus on extreme events in Germany and all over the world).

- DWD-President Mr. Gerhard Adrian elected as WMO-President.

- Former WGCEF Member and Leader of Forecaster Division Mrs. Sabine Krenovsky retired, successor Mr. Franz-Josef Molé.

FMI (Marjo Hoikkanen)

- Global space weather center will start to operate 7th November and FMI has the lead of the PECA-SUS-Consortium. Forecasters have been training to be able to take over a totally new area of weather.

- Aristotle started again this year and FMI has continued to be a backup leader of Severe Weather group. The concept is being developed and there will be some changes in Aristotle this autumn.

- Small steps are taken to make the warnings more effect based.

- Aviation: Multiple drone weather services both commercial and public (e.g. the Finnish Border Guard) during this year.

- Aviation forecasters will get two new tools (low level product and TAF editor) still during this year and there has been lots of training this autumn.

- Work has been started to consider future workstation solutions.

- Several forecasters have been participating to FMI's international projects and been teaching their colleagues abroad e.g. how to use SmartMet Workstation (e.g. in Vietnam, Nepal, Bahamas).

- Social media (such as twitter, YouTube, periscope) has become part of forecasters' daily work. Some school teachers have found educational YouTube videos very useful.

- Forecasters are working more closely with customers e.g. consulting customers via chat/WebEx or being present at their events (e.g. big outdoor concert during this summer).

- FMI is responsible of EUMeTrain's "Road weather week" which is held online 9 - 13 December 2019. They estimate even up to 100 operational forecasters and researchers participating mainly from Europe.

- Extensive renewal of instruments (including cameras) and AWOS (aviation weather observation system) at airfields. 13/23 airfields done and still 8 coming this year. Software made at FMI. Forecasters have better access to real-time observations and they have the same view as the air traffic controllers.

UKMO (Stephanie Jameson)

- **Weather Challenges** - Storm naming reaches 'Hannah' for the 2018/2019 season. New list of names for 2019/2020 season recently announced – with Met Office and Met Eireann now joined by KNMI. Significant weather over Summer 2019: Highest temperature ever recorded (38.7 Cambridge Botanic Gardens), then heavy rainfall (thousands of residents in Whaley Bridge evacuated).

- **Corporate** - Chief Executive, Professor Penny Endersby (in role since Dec 2018) developing new corporate strategy - being launched Oct 2019.

- **Technology** – Ongoing changes to technology infrastructure – move to Amazon Cloud, implementation of Service Hub, replacement of other support tools (ServiceNow, PIMS). Updates to Met Office website.

- **Operations** – Ongoing resourcing challenges, but these soon to be addressed with recent recruitment of new trainees and the development of a new 'Operational Meteorologist Technician' role.

- **Science** – OS42 went live March 2019 – MOGREPS-UK increased resolution to an 18 member time-lagged ensemble out to T+120, hourly updates. MODE-S data now assimilated in to UK models. Increased number of SST obs. PS43 planned for operational release Nov 2019.

- **Observations** – Overhaul of current land surface observing system, with new system (Surface-Net) being developed, operational early 2021.

- **Climate** – UKCP18 launched in November 2018, providing a significant update to the UK's climate change projections out to 2100.s.

IMO (Elin Jonasdottir)

- Not a lot of changes within the Department of Forecasting and Warnings in the past year, but more drastic changes coming in 2020

- Have acquired 3 new forecasters with MSc. In meteorology along with one currently in school and an second grad student starting in 2020.
- 50% position of remote sensing specialist for monitoring secured, the position goes to workers who are 50% natural hazard specialist.
- Decreased the working hours of shift workers from 38 to 37 hours a week in January, resulting in happier workers with less sickness and better morale.
- IMO will most likely take over TAF for Faroe Islands from DMI in January 2020. TAFs have increased by 4 domestic airports in 2019 – and with this addition we hope to increase to 3 forecasters during the day.

DHMZ (Lovro Kalin)

- Staffing level improved; all young forecasters now fully employed with an age structure change / generation shift.
- Still infrastructural problems (operational room, inadequate facilities) refurbishment project in progress, new building expected 2023?
- IBL VW visualisation in full operational, forecast production 95% new products (tailored, automated end products, tailored diagnostic/forecasting parameters);
- Warnings improvement (more elements, cold waves introduced this winter, demand for County based warnings, automatization, impact based, thresholds improvements... VW Alert Editor module purchased – in customization).
- New web page meteo.hr (last summer), new DHMZ Twitter (this summer).
- Forecasters communicate via Slack, other social networks still wait.
- DHMZ budget cut for 2019, for 2020 cca 7%!
- New Hydrometeorological law enacted.
- Student from Toulouse on summer internship.

IPMA (Paula Leitao)

- Several new heads: of Meteorology and Geophysics Department – Fátima Espírito Santo. Azores Regional Delegation – Carlos Ramalho.

Climate and Climate Change Division – Ricardo Deus. Aeronautical Division – Fernando Rei.

- New bulletin GAMET (21-03UTC) – Low level area forecast for aviation over mainland.
- New RADAR at Madeira started operating on Jan2018. (SELEX – METEOR 735CDP10).
- Upgrade RADIOSONDE at Lisboa, Madeira and Azores (Vaisala MW41) Until December 2019.
- AUTOSONDE AS41 installation at Lisboa.
- Upgrade of the LIGHTNING NETWORK in Portugal mainland and implementation of a lightning network in Madeira (Vaisala LS7002).
- New Weather Display System (SYNERGIE – MFI).
- Better understanding weather role on wildfire development, prevention and fighting close interaction with civil protection, fireman and fire experts. New course on fire weather. New weather products: Dry thunderstorm probability, FWI and sub-index ensemble and more model parameter outputs. New 3 days weather forecast bulletin for strategic fire analysis. IPMA forecaster support at Civil Protection Head Quarter during fire warning periods issued by civil protection.

Meteoswiss (Andre-Charles Letestu)

- Two heat waves with many records broken, many heavy thunderstorm events.
- Forecasting for “la fête des Vignerons” month with many extra shifts scheduled.
- Started Twitter in June (735 followers), 3 accounts for the 3 languages.
- Measure campaign in Geneva, various instruments installed temporally: Cloud radar, wind profiler, lidar, ceilometer, temperature profiler, hemispheric visible camera, hemispheric IR camera. To prepare Automatic METAR 24/7.
- Implementing aviation regulation in order to be compatible with the EU; Take-Off forecast, new limits for the cloud observation, SIGMET new format (polygons).
- 10 forecasters and over 30 assistants to retire by 2025; need of a plan for the replacement.

- 3 new forecaster next spring in Geneva, 1 in Zurich and 1 in Locarno. Job description includes forecasting and NWP development (postprocessing).

- January 2020, forecast for the Youth Olympic Games (Lausanne) 8 sites.

- **Projects:**

ALL4Prob: introduction of probability in the bulletins, App, Web.

ModInterim: new configuration of COSMO-1 model, 10 members, RUC of 3 hours, up to 33 hours (spring 2020).

AMAROC: AutoMetar round the clock.

OWARNA II: developing automatic alerts based on impacts and consolidating existing alerts.

CHAPO: New project for the automatic measurement of pollen.

Postproveri: postprocessing for T, pp, CCC and wind (spacial, probabilistic). Produce a seamless forecast 6h to 14 days with verification.

IMGW (Piotr Manczak)

- June 2018: **ProMet**, new software for issuing warnings, with common data base for all of the offices.

- June 2018: Higher number of smaller warning areas (increase from 63 to 380).

- July – December 2018: **Alert RCB** – governmental project of sending text messages into society with information about different kinds of threats, not only related to weather (since July test phase – alerts for 16 Voivodships, since December now fully operational with alerts for 380 administrative districts). In a dangerous situation all the mobile operators send text messages from the Government Centre for Security to mobile users located in the risk area. IMGW is a provider of meteorological data. An alert is always sent when a red weather warning is issued. When an orange warning is issued, the Government Centre for Security decides if the alert should be sent to the public.

- September 2018 – January 2019: IMGW-PIB restructuring i.e. collective redundancies (150 people, mainly from administration), dissolution of branches (no directors, no administration, only operational, technical, scientific departments).

- January 2019: 3 offices with aviation forecast offices reduced to 2.

- February 2019: Teresa Zawiślak, Head of Meteo Service, retired; Agnieszka Harasimowicz is the new Head, Mateusz Barczyk is the Deputy Head.

- February 2019: intranet forum for cooperation between forecasters and NWP has started.

- June 2019: IMGW on Twitter and Instagram.

- August 2019: tragedy in the Tatra Mountains, 5 people killed by lightning, over 100 injured.

- September 2019: **GAFOR** forecast – test phase.

- October 2019: reorganisation will be continued – NWP and satellite sections are leaving the meteo department.

EMHI (Taimi Paljak)

- Activity in Facebook, Instagram.

- Implementation of Smartmet Workstation.

- Further development of road weather model.

- Cooperation work in HIRLAM consortium (HARMONIE model development).

- Estonian Weather Service app by the end of year.

- Update of Estonian Weather Service web.

- Update to the warning criteria (cooperation work with Rescue Service).

- Full membership in ECMWF.

OMSZ (Zsolt Patkai)

- After last year's 7% (17 person) staff reduction (including 2 forecasters), in 2019 9 more people quit OMSZ (including 2 aviation meteorologists). New colleagues were hired in place of them.

- Starting Open Data policy announced from next year, but its financial implication is uncertain.

- Some reorganization happened: The Weather forecast division formerly consisted of two units: Aviation meteorology and General & Severe weather unit. Now we have three units, Severe weather and General weather forecasting units were divided. There is an interoperability between these.

- Refurbishment of the forecasters room is planned this fall.

LHMS (Vida Raliene)

- Continuation of reorganization. Aviation forecasts subdivision was incorporated into a larger one – Forecasts and Warnings division.
- Direct cooperation with municipalities was initiated. For better mutual understanding we started live video conferences using WebEx. This help us with impact oriented forecasting.
- Automation of the network of observations continued. Five more meteorological stations were fully automatized and left without observers.
- The radar at Vilnius broke down (broken torsion mechanism) in the beginning of the summer. The process of diagnostics, purchase of spare parts and finding a company, that is able to make such repairs took a while and during the period of active convection no information was available.
- This spring (April and May) deficit of rain resulted a drought which had a big influence on the agricultural sector. A high risk of forest fires and hydrological drought was recorded as well.

IMS (Alissa Razy)

- Formation of National Flood Prediction Centre.
- Creating a studio in the forecast center.
- Installing/connecting to dozens of weather cameras.
- Reforming warnings in accordance with Meteoalarm.
- Automatic map analysis.
- Providing extreme weather scenarios for emergency preparation drills.
- New website, mobile friendly.
- Creating social media accounts.
- Rain-gauge-corrected radar now available to the public.
- Purchased new HPC for running local models.

- MoU for technical cooperation, signed with Cyprus and Greece.

- Hosting 18th Informal Conference of South East Europe NMHS Directors.

AEMET (Jaime Rey)

- New Forecasting Offices at Area control centers (ACCs)
 - ◆ 1st phase: Barcelona, Madrid and Gran Canaria.
 - ◆ 2nd phase: Sevilla and Palma de Mallorca.
 - ◆ Barcelona is already working and will be fully operational in January 2020.
 - ◆ On-site advisory, has increased stress of meteorologists working 12 or 16 hours shift but already asked for 24 hours service. Intended to be covered with experienced forecasters but...
- High resolution ensemble (γSREPS)
 - ◆ Multimodel.
 - ◆ Multiboundaries.

Meteo-France (Bernard Roulet)

- New director: Ms Virginie Schwarz.
- New versions of Models with higher resolution.
- New supercomputer with gain x5-6 operational in early 2020.
- Two red vigilances issued for heat waves in June and July.
- Ippc meeting in Toulouse 25-31/8/19.

CHMI (Marjan Sandev)

- With an average temperature deviation +1.7 °C from 1981-2010 (and +2.1° C from 1961-1990), 2018 was extremely abnormal and has become the hottest year by several measure for the Czech Republic since 1775.
- The annual rainfall was heavily below normal and has seen a continuation of a very dry period which began in 2014. Some smaller watercourses completely dried up. Concurrently the highest number of forest fires in the last 30 years was recorded.
- Last year we finalized creation of our new Media department for the whole CHMI which contains: a press agent, product manager, technical and data support and expert consultants. The departments

priority: coordination of warnings to all press channels (nationwide media, regional media, social media, web pages...). When there is no valid warning: minimally one contribution daily (actual weather, interesting topics, education etc).

- **Social Media:** Since last year CHMI has only one common profile at facebook with 25 editors across CMHI (meteo, hydro, air pollution; editors are from center as well as from regional branch offices). New mobile applications from May (Android) and from October (IOS). The first application, which is called CHMI, includes a weather forecast for the Czech Republic for the coming days, alarms for dangerous phenomena and during the season also a forecast of tick activity. The weather forecast can be displayed for the current location as well as for the user-selected and saved locations (municipalities). The second application CHMI+ includes information from several dozen professional weather stations, an estimate of fallen rainfall, water status or the risk of flash floods and mapping of air quality.

- **Prevention of security risks caused by extreme meteorological phenomena project continues-** their specification and innovation of forecasting and warning systems with respect to climate change. The project is financed by the Ministry of Foreign Affairs. Main goals:

- ♦ Analysis of impacts caused by extreme meteorological phenomena.
- ♦ Definitions and Database of Extremes.
- ♦ Impact analysis and draft criteria for issuing impact-based alerts.
- ♦ Evaluation of the success of predictions of dangerous hydrometeorological phenomena.
- ♦ Estimation of the evolution of frequency of dangerous phenomena with regards to climate change.

- After six years of preparation building has started a new Central Forecasting Office.

EUMETNET (Dick Blaauwboer)

An update brief was given followed by a Task Team on storm naming and discussion.

Session III Presentations

- **Tim Hewson: Recent and upcoming events at ECMWF**

- **Janne Hanssen: DMI moving to new operations center**

- **Bernard Roulet MF: Phenomenological approach of ensemble forecast AROME**

As some extreme events are still missed by deterministic models, even high resolution models, a new tool has been developed: high resolution model ensemble.

It is quite easy to build and use automatic products from such ensemble models but how can forecasters use this new tool? It is suggested that a phenomenological approach is used i.e. Human expertise of meteorological features in four dimensions using a knowledge of conceptual models. Some recipes using different products from high resolution model ensembles are emerging from forecaster experiments. Therefore, there is still some place for human expertise in the forecast process, especially if forecasters remain aware that ensemble forecast is far from perfect.

- **Elin Bjork Jonasdottir IMO: Veifying tool for forecasters at IMO**

The idea that forecasters could see model output for point forecasts along with observations for the same station is the premise of SAGA, IMOs new produced for each of the ~ 150 stations in Iceland, and while it provides real time verification of forecasts it also produces scores such as bias and distribution.

The program is run for four parameters; wind, temperature, sea level pressure and hourly precipitation. With a look at all the stations a trend can be seen by a colour scale familiar to the forecasters, and then each station can be examined individually.

SAGA has already proven to be a good tool to facilitate a discussion between modelers and forecasters.

- **Robert Hausen DWD: Extreme weather index Use in operational forecasts**

The Extreme Weather Index (EWI) is the blended product of the Extreme Forecast Index (EFI), the shift of tails (SOT) and the 90% - Percentile of the Ensemble Prediction System (EPS). Actually, it is computed for the following parameters: total precipitation 24h, snowfall 24h, 10m wind maximum gusts 24h - using predefined and experimentally adjusted thresholds of EFI/SOT und 90% Percentile. The EWI is available for the IFS and ICON model and much appreciated by important customers like civil protection organisations, military and internal units. After nearly one year of

(pre-)operational experience, robust (which means widespread and consistent) signals are often sufficient for the estimation and forecast of a likely severe weather event occurrence for worldwide regions.

• **Zsolt Patkai: Weather extremes in Hungary in 2019**

Although the weather this summer can be characterized as generally moderate, we experienced some weather extremes, including heavy precipitation, large hail and strong winds. Based on statistical long-term data, in Hungary generally one or two heavy precipitation events (24h precipitation > 100 mm) occur each year. In spite of this in 2019 it happened at six locations / days. Meteorological conditions were frequently favourable for heavy precipitation: warm, moist air, high instability and convergence also took place. Most of these places are in mountainous area, thus orographic effect also contributed. On 13 of August 126 mm was reported from Varbó. On the same day, not far from Varbó a supercell hit some villages. Up to 7-8 cm hail was reported, which was probably the largest hail ever documented/recorded in our country. As a last example, heavy thunderstorms hit the northeast border on 26 of June. At Sárospatak 126 km/h wind was recorded, Disaster Management Units got more than 1000 damage reports. Road and railway lines were blocked for several hours due to fallen trees. Most of the damages were caused by one giant HP supercell. The meteorological background showed high CAPE values. The Carpathian Mountains slowed down the colder air in lower levels, while in higher levels it ran forward. The dry air in mid-troposphere were also favourable to produce severe wind gusts and large hail as well.

• **Paola Leito: Tropical cyclone Leslie making landfall in Portugal**

Tropical storms often cross Portuguese marine and aeronautic watching regions and Azores Islands. On October 13th 2018 at 21:40 UTC, for the first time, a Tropical Storm made its landfall on the Portugal mainland, 200 km north of Lisbon.

Forecasts for Hurricane LESLIE showed differing intensities and multiple track solutions during its life-cycle (September 23 to October 13, 2018), displaying a high degree of uncertainty of its track, even for short-term forecasting. During its approach to Portuguese coast, it began to lose its tropical characteristics, as it was being assi-

lated by a trough and interacted with a frontal system. After NOAA stopped tracking the storm it weakened to pos-tropical cyclone 190 km from Lisbon, less than 4 hours before landfall and still with near hurricane force wind forecasted.

The satellite and radar images show Leslie when it made landfall at Figueira da Foz;

In those images a hook-shaped pattern is visible related to the presence of a low-level jet stream associated with a sting jet. In landfall region, 113 km/h 10 m wind speed and 176 km/h gust were recorded, causing extensive damage within a 50 km area: damage to infrastructure, power outages, destruction of trees, loss of crops and disruption of transportation.

• **Alissa Razy: Flash Flood forecasting**

In Israel's arid regions, flash floods occur annually in the normally-dry river beds known as wadis due to heavy precipitation. Issuing forecasts and warnings of flash flood risk is a matter of life-and-death, as seen in the "Nahal Tzafit disaster" of April 2018, when the IMS's warnings were ignored and ten teenagers were killed in a flash flood. While this was a well-forecast event with information being properly disseminated to the public, it highlights the potential value of a dedicated national flood prediction centre, instead of having separate flood warnings from the Meteorological Service and the Hydrological Service. Presently, the Water Authority is hiring hydrologists/hydrometeorologists to be trained during the upcoming 2019-2020 rainy season, working alongside the operational meteorologists at the Met Service. The joint collaboration between the IMS, the Water Authority, the National Emergency Management Authority and the National Security Council is intended to generate a fully-functional flood prediction centre solely in charge of the production of flood forecasts and warnings by the start of the 2020-2021 rainy season in autumn 2020. The aim is to have the hydrologists/hydrometeorologists working with the meteorologists on rain forecasts, who will then take into account the relevant hydrological aspects in order to produce flood forecasts and warnings for the various relevant authorities at a higher resolution than is presently available.

• **Jos Diepeveen: 3 cases of severe convection during June 2019**

In this presentations three June cases were described. The first two cases were reasonably well

predicted by the numerical models and also forecasters support by means of ingredient based forecasting, which resulted in orange warnings for thunderstorms being successfully issued. However, the last case of 7th of June 2019 was rather disastrous. High res. Models (HARMONIE) gave a clear indication for the kind of gust front associated with a Multi-Cell Line. According to the model parameter output, but also based by the ingredient based methods, forecasters were rather sure about this forecast. This was also supported by the HARMONIE-EPS data. However when the orange warning was issued, model signals were gradually weakening. It is difficult how to communicate and explain such a message to the general public. In the end the warning was a typical false alarm.

• **Piotr Manczak: Extreme large hail in the western part of Poland 11th June 2019**

In the evening on 11 June a few supercell thunderstorms developed over western Poland close to the German border. They produced large hail, up to 12 cm in diameter. It was the largest measured hail in Poland. The biggest hailstones were connected with the supercell in the area of Gorzów Wielkopolski town.

Those thunderstorms developed in southerly flow generated by cut-off low over north-western France. Tropical airmass advection was observed in central Europe. A surface convergence line over the Polish-German border was the most important lifting mechanism and embedded upper short waves moving from the Alps northward were a factor which supported convection.

There were very good conditions for convection in that area, which you could see clearly on the Lindenberg soundings (eastern Germany), e.g. from 12UTC to 18UTC CAPE increased from about 2250 J/kg to almost 4800 J/kg, precipitable water from 35 mm to 39 mm, 0-6 km bulk shear from about 15 m/s to 20 m/s and CIN layer was reduced.

In the radar images you could recognise supercell characteristics: on the radial velocity data - rotation (mesocyclone), on the reflectivity data - hook echo shape and on the cross section – bounded weak echo region. In the satellite images overshooting tops were visible and they were well correlated with hail locations.

• **Andre-Charles Letestu: Severe thunderstorms on 15th of June**

On the 15 June 2019 a severe squall line crossed Lake Geneva during, the "Bold'Or" yacht race in which more than 500 boats took part.

During that day, a cold front associated with a strong temperature gradient was stationary in the vicinity of Western Switzerland while a short wave trough, visible at 500 hPa moved from Spain to Eastern France, while relaxing. A strong jetstream was visible over Northern Spain at 00z on the 15th, which moved northwards, splitting into two parts. At 9z, the "Massif Central" was underneath the warm entrance of one of the branches of the jetstream creating a cyclonic development and generating a convective system which led to the formation of the squall line over Lake Geneva and supercells in the Grenoble region where the CAPE was high. The diagnostic parameters for heavy thunderstorms presented high wind shear values between the ground and 6 km, whilst, the values of CAPE, lifting index, precipitable water and dew point, were not extreme.

The various model outputs (COSMO 1) between 00z to 15z forecasted the intensity of this event quite accurately but with different timings for the arrival of the squall line. The gusts were overestimated by COSMO 1 but the probability for winds above 100 km/h from COSMO E were slightly underestimated.

The recorded gusts during this event reached, 79 km/h in Geneva and 111 km/h further east of the lake. Heavy showers with large hail stones were observed near Geneva but the heaviest hailstorm affected the region south of Chambéry, in France.

A heavy thunderstorm watch was issued in the morning for Western Switzerland and an imminent thunderstorm warning was issued around 30 minutes before the event. The flashing warning beacons around the lake were switched on to warn the sailors of winds reaching 33 kt or more.

After some showers early in the morning, the race started at 9 am with a clear sky and light winds conditions. Many teams declined to enter the race due to the alarming forecast which was elaborated by MeteoSwiss in the days prior to the event. During the storm, much damage occurred, including boats wrecked and dismantled.

- **Christian Csekits: New Philosophy in warning severe thunderstorms in ZAMG**

Before 2018 the operational forecasting division at the Austrian Meteorological Service (ZAMG) issued only thunderstorm warnings for big and widespread convective phenomena like MCSs or line convection. However, smaller thunderstorms can have high impact, e.g. slowly moving or even stationary cells that can produce extremely high rain amounts.

A new procedure and decision tree was developed to support the forecaster in warning for all different types of thunderstorms with potential severe impacts. Convective cells with high rain rates can be differentiated from thunderstorms with hail or strong wind gusts. While the first cell type occurs mainly when you have high CAPE values at rather low vertical temperature gradients ($< 7\text{K/km}$) and vertical wind shear is rather small. Thunderstorms with high probability of hail or strong wind have high CAPE values at strong vertical temperature gradients ($> 8\text{K/km}$). Vertical wind shear for this thunderstorm type is high.

As a consequence of this new implemented scheme the operational procedure for issuing severe thunderstorm warnings was harmonized. Thus such warnings are better and easier to understand for the public as well as for private costumers.

- **WGCEF discussion forum**

During this interactive discussion three subjects were discussed:

- * Automatization of warnings
- * Harmonizing warning strategy in Europe
- * Forecasting and verification of impact
- * Who has responsibility in cases of wrong warnings (questions from Piotr)?

- **WGCEF concept and request session: ideas/modifications/changes about the WGCEF (annual meeting, newsletter, webpage, etc.)**

- **Decision for the location and date of next meeting**

Next meeting in 2020 will be held in Tallin. Thanks given for the great hospitality of Taimi and EMHI. Exact dates have yet to be decided.

- **Agree actions.**

- **Meeting closure.**