

EUMETNET SRNWP-EPS

Phase 2019-2023

41st EWGLAM - 26th SRNWP Meeting
30th September – 3rd October
Sofia/Bulgaria



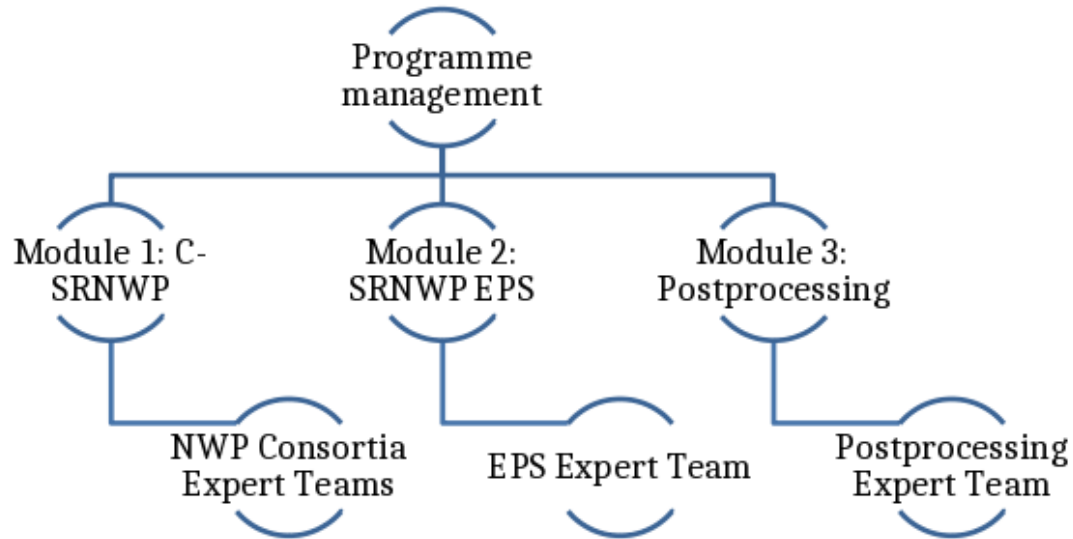
EUMETNET
EUROPEAN METEOROLOGICAL
SERVICES NETWORK

Alfons Callado Pallarès,
Francesca Marcucci and
Stéphane Vannitsem

EUMETNET Forecasting Programme

NWP Cooperation Programme

The **cooperation** on Short Range Numerical Weather Prediction (SRNWP) over Europe is essentially organized **around consortia** (ALADIN, COSMO, HIRLAM, LACE, SEECOP, UKMO) that develop high-resolution prediction models.



Transversal activities through all the consortia landscape are organized in the context of EUMETNET in order to **share scientific** and **technical** issues that are common to all consortia, with the ultimate goal of **improving the forecast skill** at these short time scales.

Management of the SRNWP EPS module (2019-2023)

The management of the programme/module is organised through an agreement (MoU) between partners:



• **AEMET**

→ The Spanish Meteorological Agency
Alfons Callado Pallarès



• **ItAF-REMET**

→ The Italian Air Force Meteorological Service
Francesca Marcucci



• **RMI**

→ The Royal Meteorological Institute of Belgium
Stéphane Vannitsem

Phase II (2015-2018)

ARPAE-SIMC was in the management (Chiara Marsigli).

→ **RMI** has joined in the current phase.

3 **SRNWP EPS** → Short Range Numerical Weather Prediction Ensemble Prediction System



SRNWP-EPS GOAL

The **enhancement of cooperation on LAM-EPS** (Limited-area Ensemble Prediction Systems) was recognised as a **high priority goal by EUMETNET** members when composing the Forecasting Roadmap for the current phase. This is motivated by the fact that the development of **convection-permitting** ensemble prediction capabilities in Europe is **crucial for forecasting a range of weather phenomena** and in particular for **IMPROVING HIGH IMPACT WEATHER PREDICTION**.

SRNWP-EPS MAIN OBJECTIVES

1/2

I) Application oriented objective (R2O) → (Partly) funded **SW** development

- **Calibration** focused on **extremes** (AEMET): T2m, Wind gust 10m, etc.
- Development of **derived/post-processing products** (ItAF-REMET): wind gusts, icing, severe convection, wind storms and turbulence.

→ Variables of both could be redefined, e.g. by PP survey recommendations

II) Research oriented objective → **Workshops** and **members** in-kind contribution

- Representation of **model uncertainties** relevant for forecasting high impact weather phenomena
- Organise coordinated testing relevant **LAM-EPS perturbations**

→ To be discussed/organised in next **Workshop on “LAM-EPS prediction of high impact weather and extremes” 22-24 October 2019, Madrid (Spain)**



SRNWP-EPS OBJECTIVES

2/2

III) End-users oriented objective → **User Group** through **members** in-kind contribution, but only NtH

- Engage through NM(H)Ss' to end-users and forecasters needs/requirements
- Get Forecasting programme feedbacks: e.g. PP
- Be aware of the requirements of potential end-users into the social economic sectors in Europe: e.g. Renewable Energy Sector → Participation in dedicated Workshops

EMERGING ISSUES AND RISKS

The more relevant risk in the short range (1st year) could be some delays due to the change into the managing:

- **Module manager:** from José Antonio G-M to Alfons Callado
- **Scientific coordination:** from Chiara Marsigli to Francesca Marcucci and A.Callado
- **RMI:** new into the managing

SRNWP-EPS MAIN OBJECTIVES

2/2

III) End-users oriented objective → [NtH ⇔ optional] **User Group** through **members in-kind contribution**

- Internal → Engage through NM(H)Ss' to end-users and forecasters needs/requirements
 - Getting Forecasting programme feedbacks: e.g. PP
- External → Be aware of the requirements of potential end-users into the social economic sectors in Europe: e.g. Renewable Energy Sector → Participation in dedicated Workshops

KEY ISSUE: COOPERATION BETWEEN NWP MODULES

C-SRNWP module → Cooperation yet well established in previous phase 2015-2018

- *Chair* (Chiara Marsigli) and participation into Expert Team on Predictability and EPS
- Participation in **EWGLAM**/SRNWP meetings
- Synergies from overall improvement of LAM-NWP models: e.g. RADAR data from OPERA for assimilation/verification
- EWGLAM: coordination in ECMWF/IFS Boundary Conditions' requests

Post-processing module → Join EPS/PP annual workshop in 2020

- EPS_11: *Close coordination required*
- EPS_0: *Definition for standards for probabilistic products to be developed for high-impact weather forecasting based on a **survey** between participants **in collaboration with PP***
- EPS_2: *Development of post-processing products **in collaboration with PP***
- Participation into PP Workshops: December 2019

SRNWP-EPS 2019-2023 *versus* Phase II 2015-2018

Between **continuity** and **new issues**, but moving more to:

- Forecast **severe weather (~extremes)**
- **R2O** applications/SW (R20 → Research to Operations)

	Phase II	Phase 2019-2023
Calibration	<i>T2m, W10m and AccPcp</i>	<i>Focused on extremes</i> <i>New parameters: e.g. Tmax/min</i>
Post-processing products devoted to high impact weather forecasting	<i>Fog and thunderstorms</i>	<i>New products about: gusts, icing, severe convection, wind storms, etc.</i>
Research on improving the model uncertainties and LAM-EPS perturbations (in-kind contribution)	<i>Focused on Planetary Boundary Layer</i>	<i>In general</i> <i>Workshop discussions</i>
Close cooperation with PP (post-processing) module	-----	<i>Post-processing outcomes</i>
Additional NtH tasks	-----	E.g. develop methodologies for defining an EFI and SOT

SRNWP-EPS Phase II (2015-2018)

**A taste of activities
(Not comprehensive)**

SRNWP-EPS Phase II (2015-2018)

CALIBRATION

CALIBRATION T2m and W10m (AEMET, 2015-2018)

User's Manual



SRNWPEPSII_v1.1User's Manual

Report about the installation of the
required software for calibration of
ensemble outputs

EUMETNET portal

→ [Forecasting Programme](#)
→ [SRNWP-EPS](#)
→ [Deliverables](#)

ECMWF ecgate

[/perm/ms/es/imp/
SRNWP_EPS_public/CALIBRATION](#)

→ Unfinished AccPcp
calibration: it runs
but not enough
tested



CALIBRATION T2m and W10m (AEMET, 2015-2018)

User's Manual

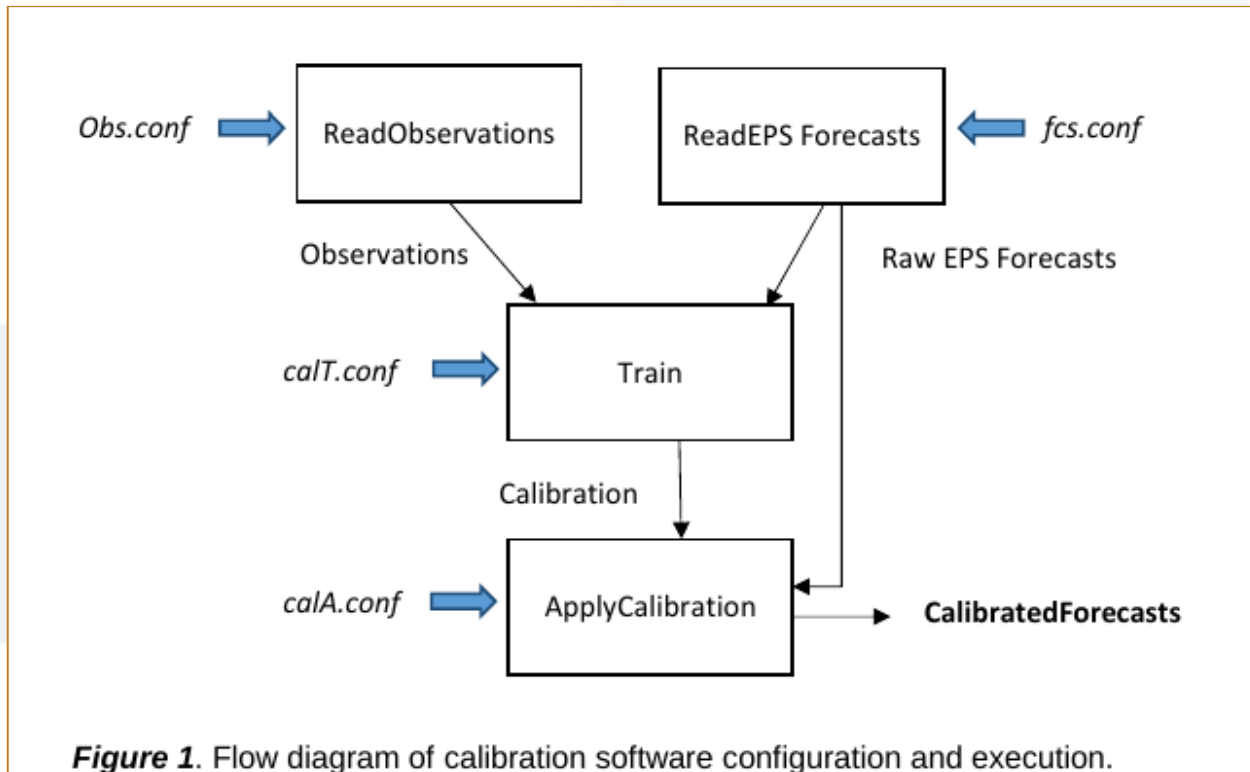


Figure 1. Flow diagram of calibration software configuration and execution.

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- [SRNWP-EPS](#)
- [Deliverables](#)

ECMWF ecgate

[/perm/ms/es/imp/
SRNWP_EPS_public/CALIBRATION](/perm/ms/es/imp/SRNWP_EPS_public/CALIBRATION)

- Unfinished SW TEST with all LAM-EPS of participants
- Try to be done in current phase

CALIBRATION T2m and W10m (AEMET, 2015-2018)

Some key SW features:

- Based on HIRLAM/ALADIN calibration
- Coded in Python and R package
- Own execution environment

SRNWP-EPSII Framework

GOBIERNO DE ESPAÑA
MINISTERIO DE AGRICULTURA Y PESCA, ALIMENTACION Y MEDIO AMBIENTE
AEMet
Agencia Estatal de Meteorología

Calibration

- Calibration tasks based on NGR, courtesy HIRLAM/ALADIN by Bremnes & Nipen & Deckmyn

Python	R (Calibration)
Pandas	RSQLite
rpy2	Reps
	Rcpp
	Rgrib2
	Rgrib2test
	Gamlss
	Compare
	methods

```
classDiagram
    class Calibration {
        train()
        apply()
    }
    class GlamepsCalibration {
        train()
        apply()
    }
    Calibration <|-- GlamepsCalibration
```


CALIBRATION T2m and W10m (AEMET, 2015-2018)

SRNWP-EPSII Framework


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AEMet
Agencia Estatal de Meteorología

ROI (Region Of Interest)

- Filtering a list of coordinates
"area" :{"type":"list","points":
[["LAT":52.37,"LON":- 4.9] ,
[["LAT": 50.86,"LON": 4.33] ,
[["LAT": 51.51,"LON": -0.13]]}]
- Filtering a rectangular área
"area" :{"type":"polygon","points":
{"NW":{"LAT":70.6, "LON":-25.4},
"SE":{"LAT":50.3,"LON":33.5}}},
- Filtering a polygon
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[["LAT":51.08,"LON":2.4], ["LAT":48.97,"LON":8.0],
[["LAT":43.88,"LON":7.83],["LAT":42.63,"LON":2.8],
[["LAT":43.67,"LON":-3.3], ["LAT":48.59,"LON":-4.75]]},



SPAIN'S CLIMATE ZONES



Legend:
Oceanic
Mountain
Continental
Mediterranean
Arid

SRNWP-EPS Phase II (2015-2018)

FORECASTING TOOLS FOG and THUNDERSTORMS

FOG forecasting tool (ItAF-REMET, 2015-2018)

- **Input:**

standard GRIB1/GRIB2 output from different NWP models (defined by configuration namelist)

- **Output:**

horizontal visibility [m] at surface computed with different algorithms
+ precipitation reduction (**optional**)

- **Methods**

- **Boudala et al., 2012** (minimum set of input parameters ... only surface fields T, T_d, P_{surf}, u, v)
- **LWC** (surface fields + T, Q, P, u, v fields at lowest model level + q_i, q_c, q_r, q_s, q_g)
- **Zhou, 2011** (surface fields + T, Q, P, u, v vertical information at least in the first 500 m)
- **UPS approach** (surface fields + T, Q, P, u, v vertical information at least in the first 1200 m +
0-24 hours fcst of T_{d2m} and T_{2m})
- **combined methods + correction for visibility reduction by precipitation**

FOG forecasting tool (ItAF-REMET, 2015-2018)

Status of the «FOG» code :

- Fog code + documentation available ✓
- Test on intel, gnu and cray environment of ECMWF ✓
- Tests with outputs from deterministic model (COSMO-IT 2.2 km) ✓
- Tests with outputs from hi-res EPS (COSMO-IT EPS 2.2 km) ✓
- Tests with outputs from other EUMETNET's partner (only sfc fields) ✓
 - ALARO
 - AEMET
 - *HARMONIE*

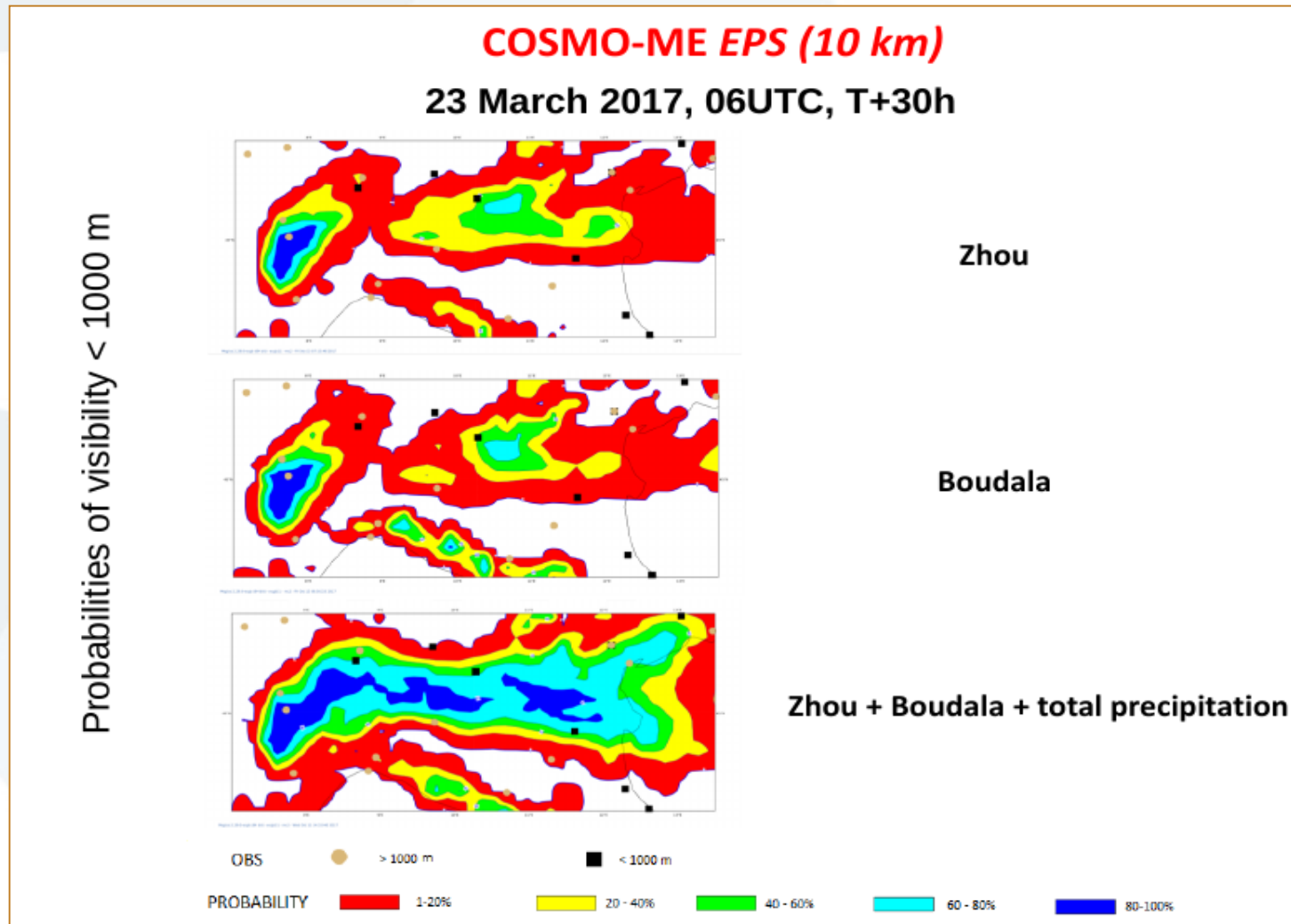
ECMWF ecgate machine
/scratch/ms/it/mc2/public/code_fog_2.0

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→ [Forecasting Programme](#)
→ [SRNWP-EPS](#)
→ [Deliverables](#)

18 **POLICY:** SW could be used for research purposes (*not operationally*) by non-EUMETNET

FOG forecasting tool (ItAF-REMET, 2015-2018)

Reps. F. Marcucci
Mario Pappa
Raffaele Golino



THUNDERSTORM forecasting tool (ItAF-REMET, 2015-2018)

- Code: *FORTRAN*

- Input:

Standard GRIB1/GRIB2 outputs from different NWP models (defined by configuration namelist)

- Output:

Weather phenomenon «Thunderstorm» grib files codified as follow:

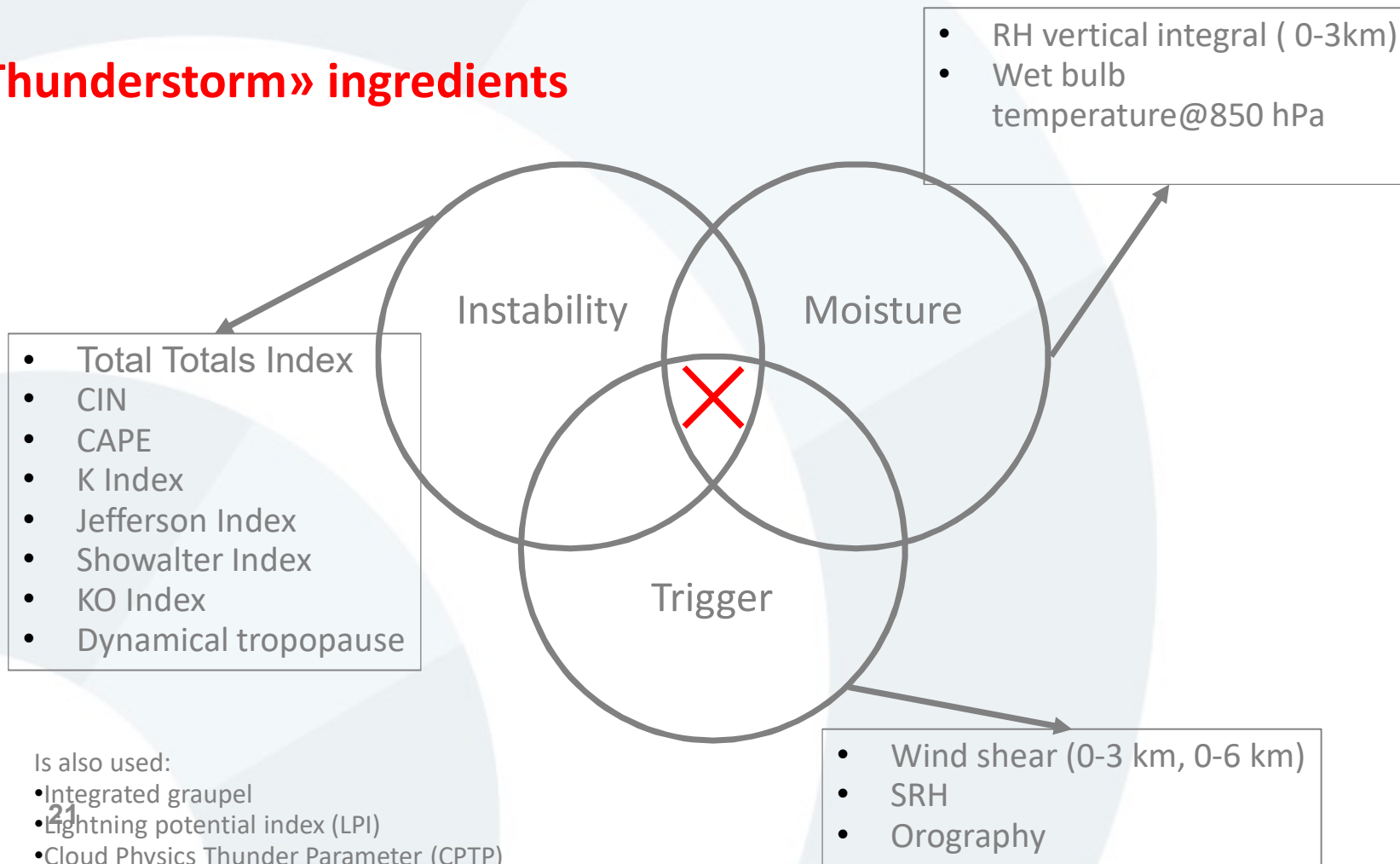
WMO CODE TABLE 4677

Code Figure	
80	Rain shower(s), slight
81	Rain shower(s), moderate or heavy
82	Rain shower(s), violent
83	Shower(s) of rain and snow mixed, slight
84	Shower(s) of rain and snow mixed, moderate or heavy
85	Snow shower(s), slight
86	Snow shower(s), moderate or heavy
87	Shower(s) of snow pellets or small hail, with or without rain or rain and snow mixed
88	
89	Shower(s) of hail, with or without rain or rain and snow mixed, not associated with thunder
90	
91	Slight rain at time of observation
92	Moderate or heavy rain at time of observation
93	Slight snow, or rain and snow mixed or hail at time of observation
94	Moderate or heavy snow, or rain and snow mixed or hail at time of observation
95	Thunderstorm, slight or moderate, without hail
96	Thunderstorm, slight or moderate, with hail
97	Thunderstorm, heavy, without hail but with rain and/or snow at time of observation
98	Thunderstorm combined with duststorm or sandstorm at time of observation
99	Thunderstorm, heavy, with hail at time of observation

- *EditionNumber = 1;*
- *IndicatorOfParameter = 140;*
- *Table2Version = 202 ;*
- *indicatorOfTypeOfLevel = 1;*
- *Value= WMO code (table 4677)*

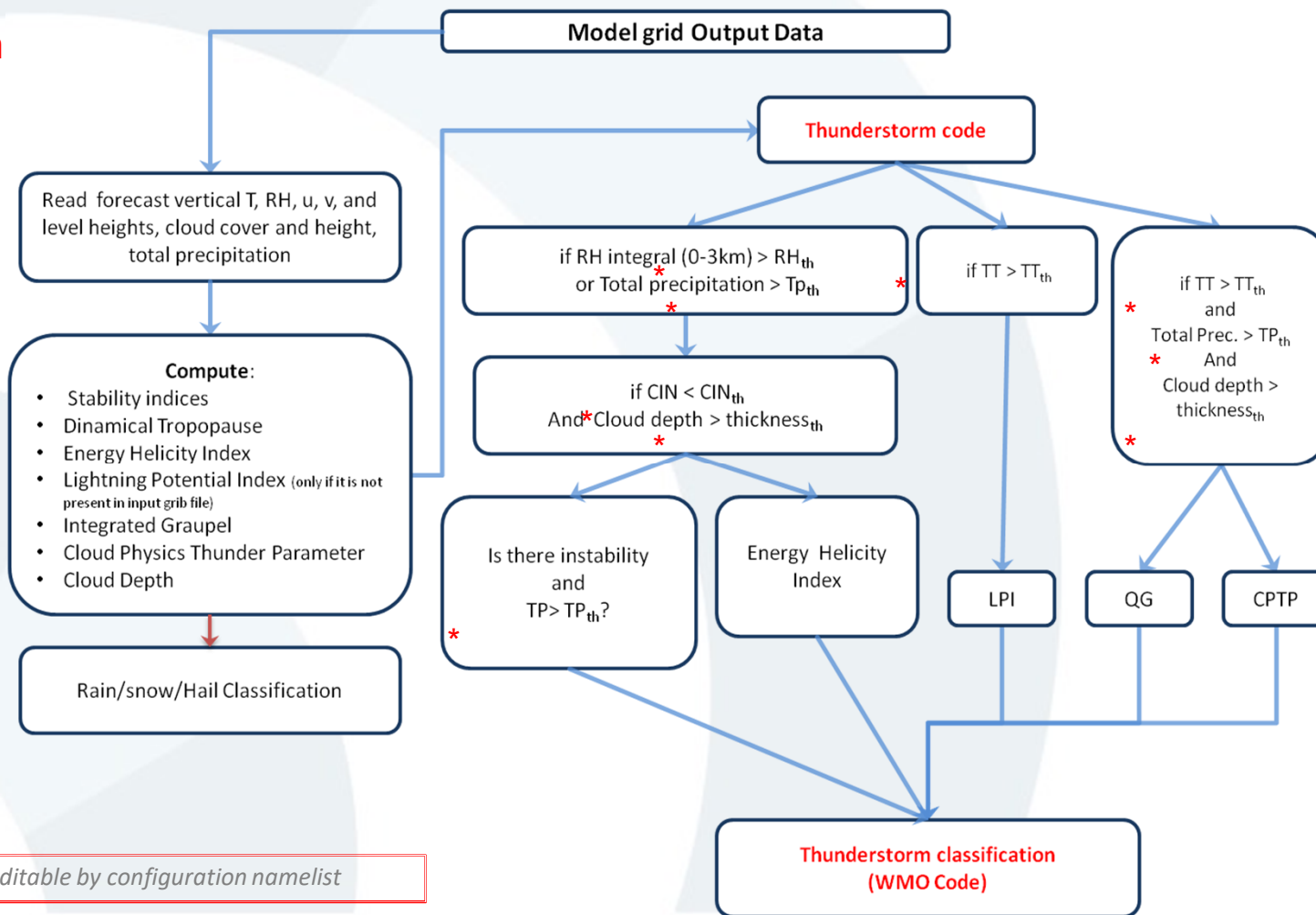
THUNDERSTORM forecasting tool (ItAF-REMET, 2015-2018)

«Thunderstorm» ingredients



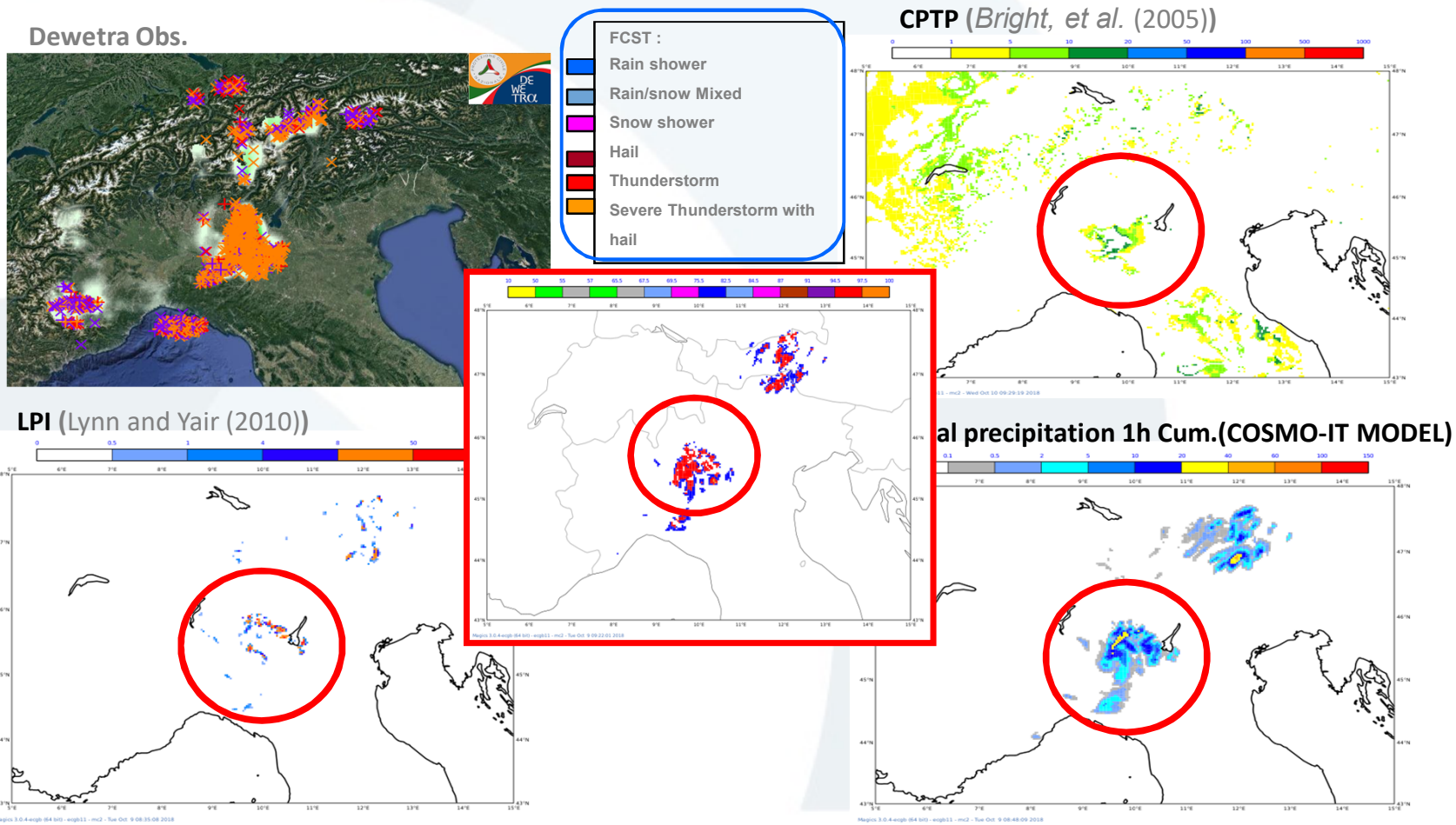
THUNDERSTORM forecasting tool (ItAF-REMET, 2015-2018)

Logical Thundestorm Tree



THUNDERSTORM forecasting tool (ItAF-REMET, 2015-2018)

Results with regional NWP model outputs: COSMO-IT (2.8 km, Italian domain) 29 Jul 2017, 00UTC, T+21h



SRNWP-EPS Phase II (2015-2018)

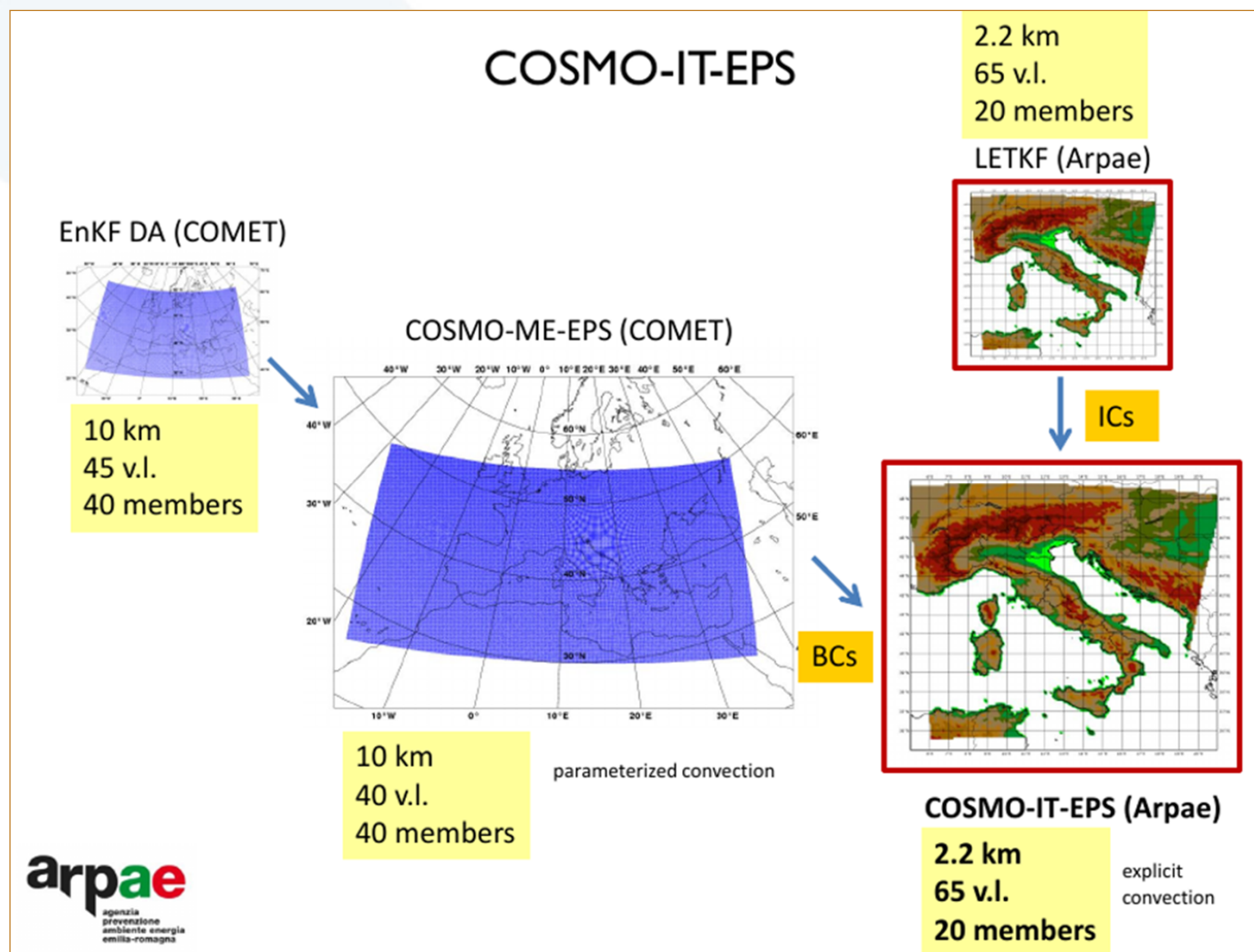
LAM-EPS RESEARCH

Very successful !!!

Scientific Research (Phase II 2015-2018)

LAM-EPS perturbations to take into account NWP model errors and uncertainties

- SPPT
- Parameter perturbations



Scientific Research (Phase II 2015-2018)

LAM-EPS perturbations to take into account NWP model errors and uncertainties

- SPPT
- Parameter perturbations

Impact of model physics perturbation on autumn precipitation

Model perturbations:

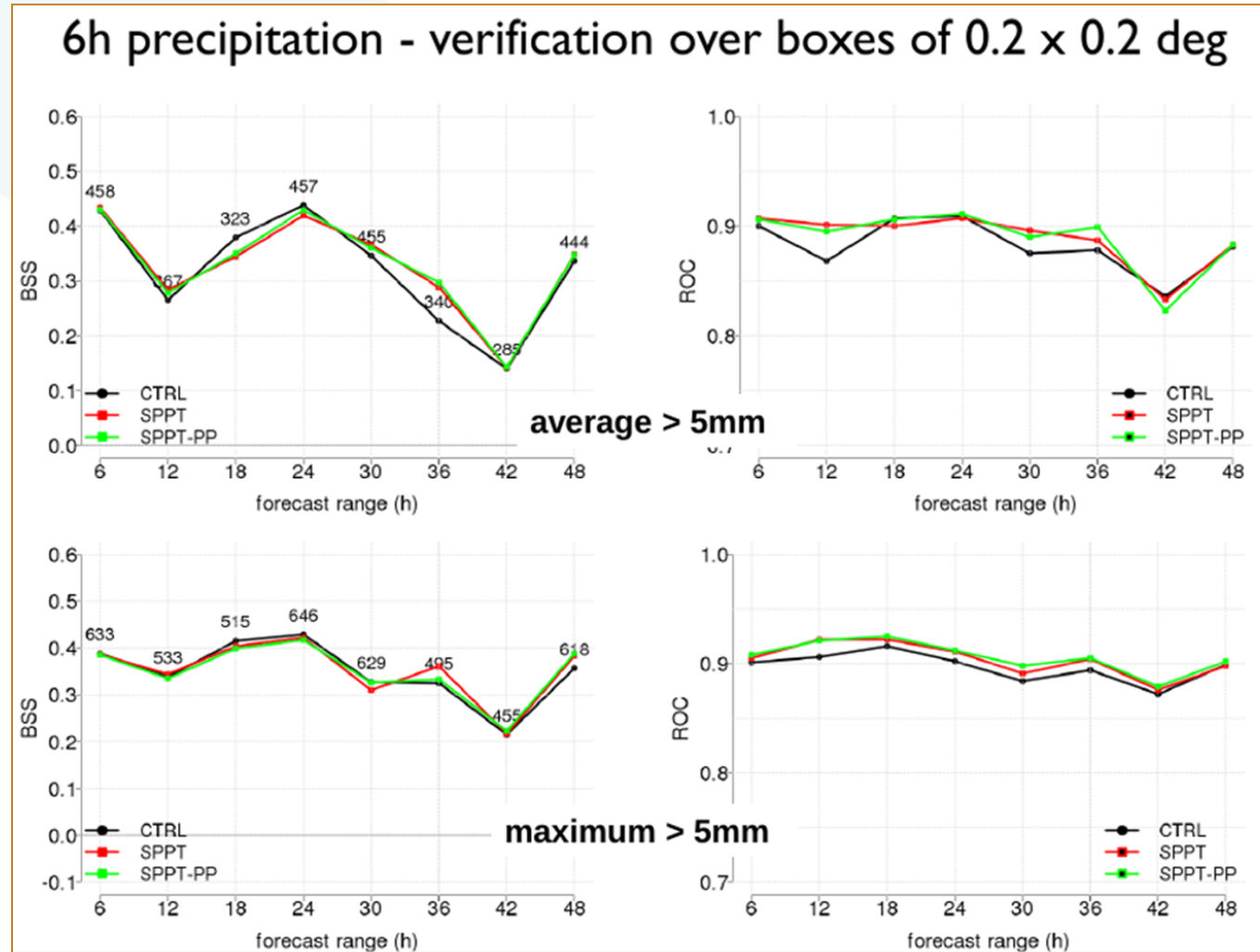
- Exp1: no model perturbation (CTRL)
- Exp2: SPPT
- Exp3: SPPT + Parameter Perturbation

October 2015

Scientific Research (Phase II 2015-2018)

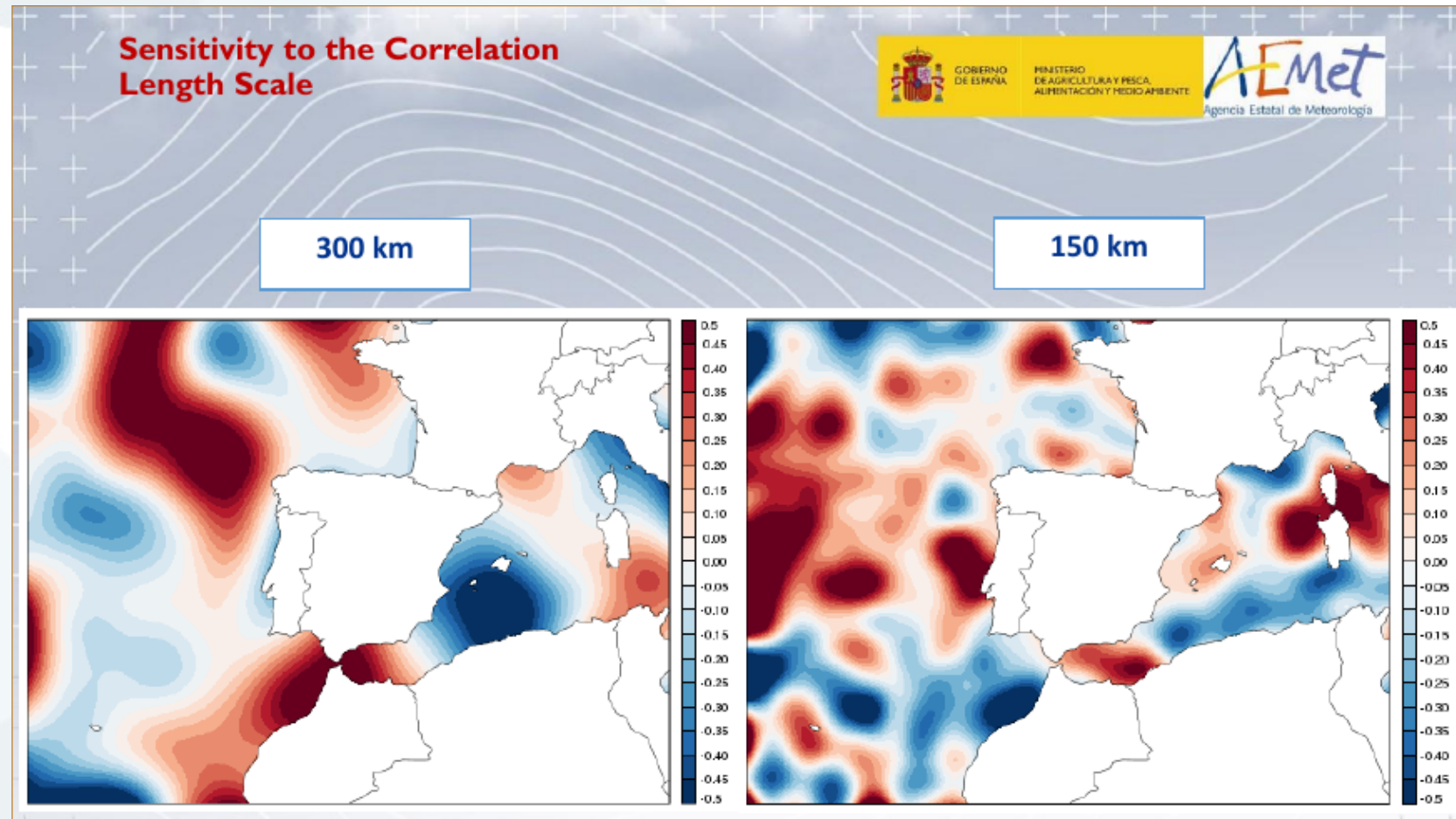
LAM-EPS perturbations to take into account NWP model errors and uncertainties

- SPPT
- Parameter perturbations



Scientific Research (Phase II 2015-2018)

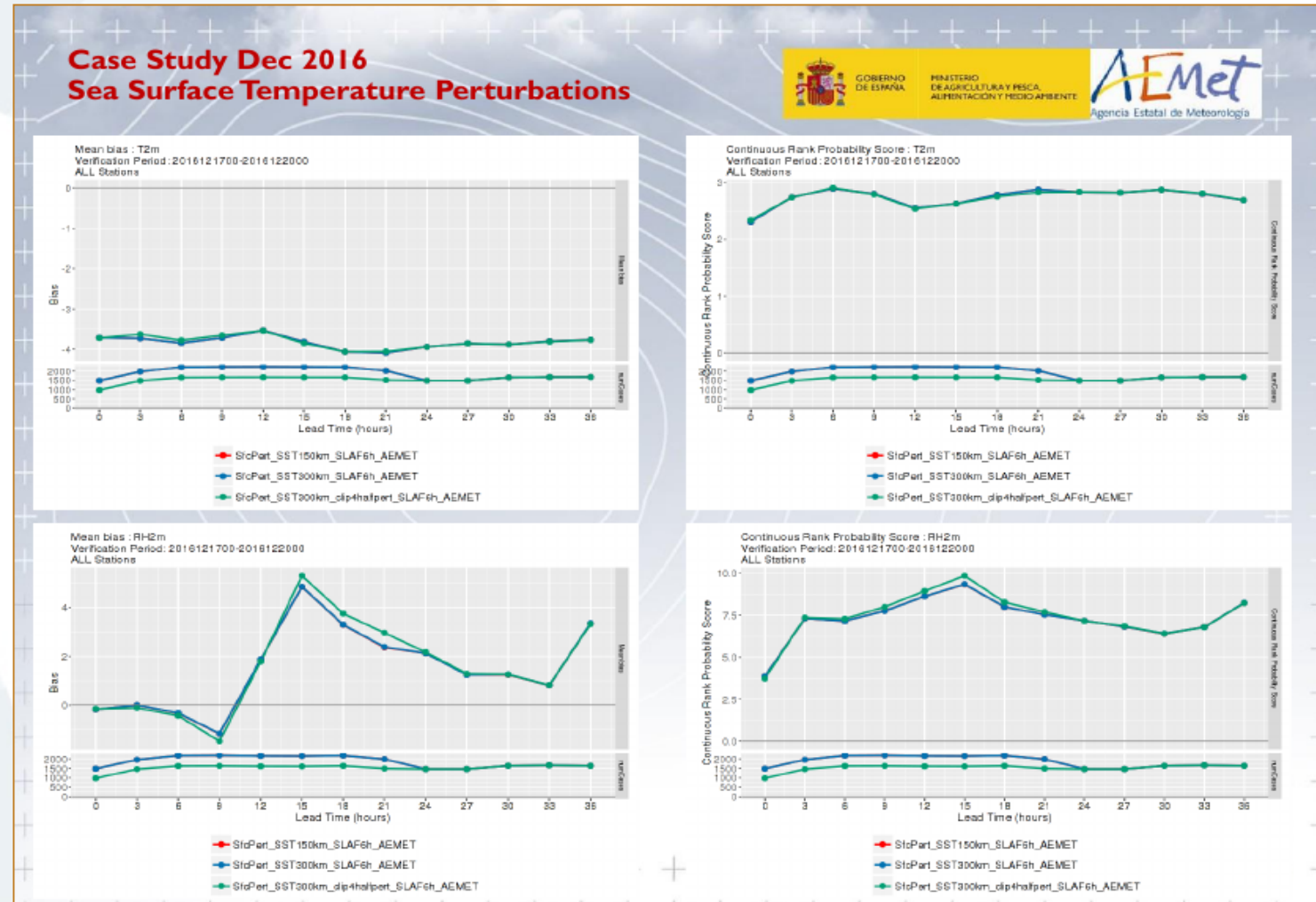
Sensitivity analysis (of AccPcp) to the perturbation to Sea Surface Temperature



Scientific Research (Phase II 2015-2018)

Sensitivity analysis to the perturbation to Sea Surface Temperature

- Result: very small impact



TECHNICAL PROPOSAL

In detail

TECHNICAL PROPOSAL

1/3

<u>req#</u>	Description	M, RU, NtH***
<u>EPS_0</u> ItAF-REMET + AEMET	Definition of standards for probabilistic products to be developed for high-impact weather forecasting, through a survey among the participants (specifying needed variables and thresholds) and also taking into account the outcome of the Post-Processing Module.	M Report 12 months
<u>EPS_1</u> AEMET	Develop tools for the calibration of LAM ensembles for forecasting <u>extremes</u> (10m winds, precipitation, 2m temperatures, maximum and minimum temperatures). Variables should be defined by <u>EPS_req0</u> .	M SW deliverables User Guide 60 months
<u>EPS_2</u> ItAF-REMET	Develop products for post-processing using specifically outputs from LAM ensemble systems and devoted to high impact weather forecasting (e.g. <u>gusts, icing, fog, severe convection, wind storms, turbulence</u>). Products should be defined by <u>EPS_req0</u> and from the outcome of the Post-processing Module.	M SW deliverables User Guide 60 months

SURVEY
Post-Processing module

PRODUCT
Funded manpower

PRODUCT
Funded manpower

* Partner responsible

** Deliverables / timing

EPS_0 SURVEY

To get information from the Members participating to the project about their status, plans and need on the topics that have to be addressed in the Application Tasks of the project.

- To be put in common / discussed next SRNWP-EPS Annual workshop
- **10 members** have yet answered (27th September)

EUMETNET SRNWP- EPS 2019-2023

Survey on products to be developed for high-impact weather forecasting (#req. EPS_0)

Aim of this document.

The aim of this survey is to get information from the Members participating to the Project about their status, plan and needs on the topics that have to be addressed in the Application Tasks of the project: develop tools for the calibration of LAM ensembles for forecasting extremes (#req. EPS_1) and develop products for post-processing using specifically outputs from LAM ensemble systems and devoted to high impact weather forecasting (#req. EPS_2). Moreover the survey includes a preliminary inquiry about some additional Really Useful Tasks to be developed during 2021-2023 period. The general purpose is to get a clear picture of the requirements of the NMSs with respect to the Project.

1. General questions about ensemble systems (update since last survey on 2015).

These questions trying to understand the status of the work on LAM ensemble systems at your NMS. If you run (or plan to run) more than one ensemble system, please provide the info for all the systems separately, with special focus on convection-permitting ensembles.

1.1 Is your NMS running (or planning to run) an ensemble system? If yes, please specify, in short:

- Horizontal and vertical resolution
- Number of members
- Domain extension and size (please add a figure showing the domain)
- Boundary conditions (cold start, Global EPS, etc.)
- Kind of assimilation (without assimilation, LETKF, 3DVAR, EDA, etc.)
- Approaches/perturbations to deal with initial conditions uncertainties
- Approaches to take into account model errors/uncertainties (SPPT, multi-model, multi-physics, etc.)
- Specification of the output grid (rotated lat/lon, gaussian, other)
- Output format (grib1, grib2, other)
- Standard outputs parameters (real-time) and type of vertical levels
- Standard output parameters (archived) and type of vertical levels
- Forecast range and output leadtimes frequency
- Status (planning, development, operational)
- Is the system running in cooperation with other NMSs?

1.2 Is your NMS using ensemble systems for operational activities (e.g. ECMWF ENS)? Which ones?

TECHNICAL PROPOSAL

2/3

<u>req #</u>	Description	M, RU, NtH ^{***}
<u>EPS_3</u> AEMET (ItAF-REMETS)	<u>Organise cooperation between members on improving the representation of model uncertainties relevant for forecasting high-impact weather phenomena.</u> Organise coordinated testing of relevant perturbations on different domains with different LAM ensemble systems. Mainly in-kind work.	M Workshops Reports 60 months
<u>EPS_4</u> ItAF-REMETS (AEMET)	<u>User-oriented verification of probabilistic products for high-impact weather.</u> Define suitable observations for verification and methods to verify products with a focus on high-impact weather. Coordination with the Observation Programme on the availability of observations should be established. Coordination with the <u>WMO JWGFVR</u> is also required.	M Reports Guidelines 60 months
<u>EPS_5</u> RMI	Coordination with the <u>Nowcasting project</u> to provide guidelines on <u>Short Range Probabilistic Forecasting Tools and seamless nowcasting and short-range forecasting.</u> Following the outcome of the <u>workshop</u> organised by both projects in <u>May 2018</u> .	M Reports Guidelines 36 months

EXPERT TEAM
In-kind contributions

With Chiara Marsigli
(DWD) support

Nowcasting



* Partner responsible

** Deliverables / timing

*** M → Mandatory RU → Really Useful NtH → Nice to Have

TECHNICAL PROPOSAL

3/3

<u>req #</u>	Description	M, RU, NtH ***
<u>EPS_6</u> RMI	Coordinate with the E&T Programme regarding the <u>interpretation of probabilistic forecasts</u> .	M Reports 36 months
<u>EPS_7</u> AEMET	Develop tools for the calibration of LAM ensembles to produce <u>postprocessed parameters</u> (e.g. <u>radar reflectivity</u> , <u>satellite pseudo-imagery</u>)	RU Reports SW 24-60 mths
<u>EPS_8</u> AEMET	Develop methodologies for defining an Extreme Forecast Index (EFI) and Shift of Tales Index (SOT) for LAM EPS.	RU Reports SW 24-60 mths
<u>EPS_9</u> ItAF-REMET	" <u>EPS member selection methodology</u> " (i.e. Selective ensemble-mean technique)	RU Reports SW 36-60 mths
<u>EPS_10</u> AEMET	Identify the most relevant <u>end-users</u> of probabilistic products for high-impact weather forecasting, through the <u>NMHSs</u> , and create a User Group.	NtH Reports 60 months
<u>EPS_11</u> RMI (AEMET)	<u>Close cooperation with the post-processing Module</u> is required, as mentioned also in the previous requirements.	M

EDUCATION+TRAINING

PRODUCT
Partly extra
funded manpower
2021-2023

USER GROUP

Post-
Processing
module



* Partner responsible

** Deliverables / timing

34

*** M → Mandatory RU → Really Useful NtH → Nice to Have

Extra budget for 3 Really Useful requirements

A “**B. Partial delivery of the three requirements**” budget scenario has been approved by Assembly with an extra 0.2 FTE during 2021-2023 period (112.5 K€) in order to fund 1 or 2 of the next 3 **R20 RU**:

- **EPS_7**: the MEPS tools to produce post-processed parameters as radar reflectivity and satellite pseudo-imagery
- **EPS_8**: develop tools for defining **Extreme Forecast Index (EFI)** and Shift of Tales Index (SOT) for MEPS
- **EPS_9**: MEPS member selection methodology

→ **Members will have to agree during the course of 2020 which of these requirement they wish to prioritize**

Extra budget for 3 Really Useful requirements

1/2

Due to interest between participants about 3 *R2O* Really Useful requirements and the limitations to achieve them just only *in-kind* contribution, more funded manpower was asked (see next slide for details)

Table SRNWP EPS.2: Mandatory + Really Useful + Nice to Have requirements.

All costs are annual totals in K€	2019	2020	2021	2022	2023	TOTAL
Project/Programme /Operational Management Costs	20 k€	20 k€	28€	28 k€	29 k€	125 k€
Other staff costs	70k€	70k€	99 k€	99k€	99.5 k€	437.5 k€
Travel costs	13 k€	13 k€	13 k€	13 k€	13 k€	65 k€
Workshop costs	7 k€	7 k€	7 k€	7 k€	7 k€	35 k€
Sub-Total	110k€	110k€	147k€	147€	148.5 k€	662.5k€

Extra budget for 3 Really Useful requirements

2/2

A “**B. Partial delivery of the three requirements**” budget scenario has been approved by Assembly with an extra 0.2 FTE during 2021-2023 period (112.5 K€) in order to fund 1 or 2 of the next 3 **R20 RU**:

- **EPS_7**: the MEPS tools to produce post-processed parameters as radar reflectivity and satellite pseudo-imagery
- **EPS_8**: develop tools for defining **Extreme Forecast Index (EFI)** and Shift of Tales Index (SOT) for MEPS
- **EPS_9**: MEPS member selection methodology

→ **Members will have to agree during the course of 2020 which of these requirement they wish to prioritize**

Extra budget for LAM-EPS EFI ?

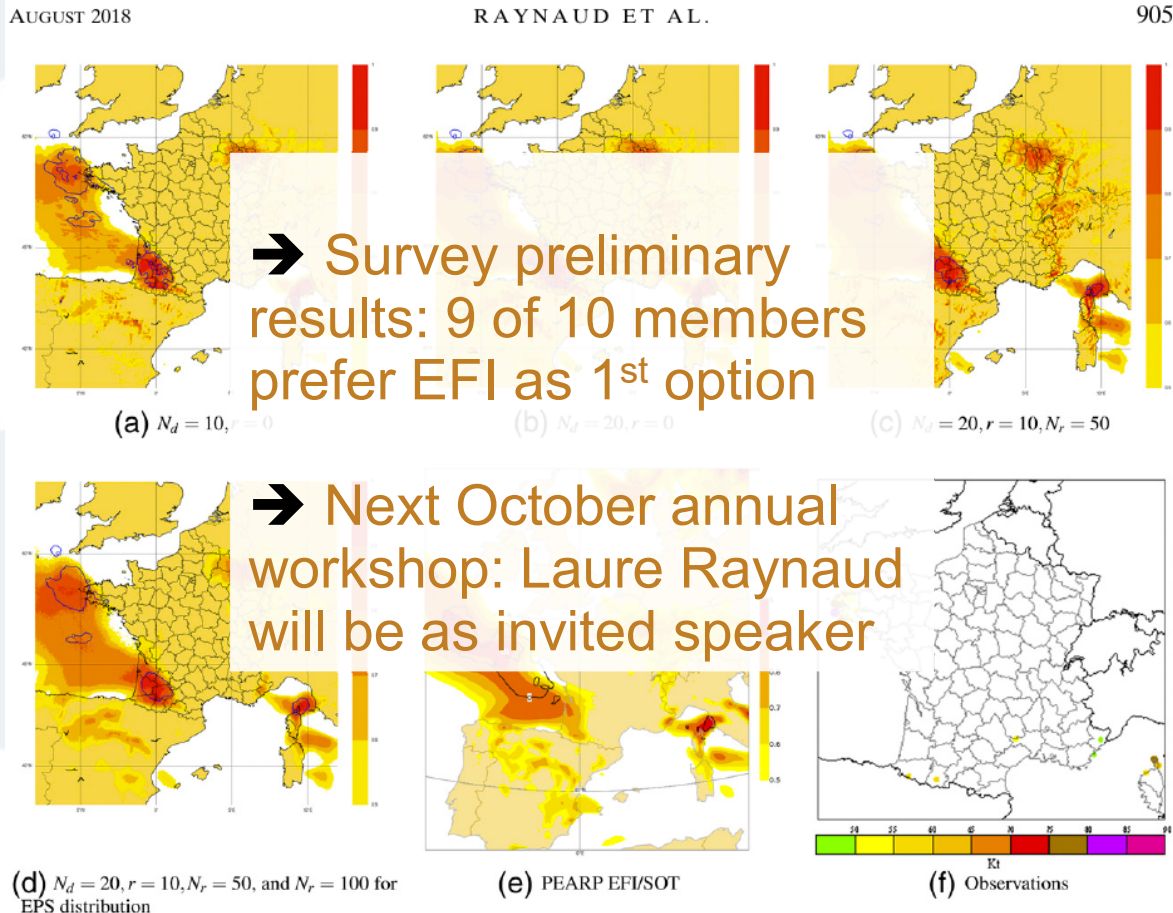


FIG. 3. (a)–(d) EFI (colors) and SOT90 (contours) maps for different climate and AROME-EPS configurations, valid at 0600 UTC 6 Mar 2017. (e) EFI and SOT90 computed from the large-scale PEARP EPS. (f) Observations of 10-m wind gusts (kt).

MétéoFrance EFI and SOT from AROME-EPS

To be operational during 2019

R20: climate model is the key issue → they show it could be done *without EPS re-forecast* but from LAM-EPS archiving data but with a spatial/temporal *relaxation*


Raynaud, L., B. Touzé, and P. Arbogast, 2018: *Detection of Severe Weather Events in a High-Resolution Ensemble Prediction System Using the Extreme Forecast Index (EFI) and Shift of Tails (SOT)*. *Wea. Forecasting*, **33**, 901–908, <https://doi.org/10.1175/WAF-D-17-0183.1>

CONTRACTS

Calibration (AEMET)

- Vacant position to be applied for **any UE citizen** in October (BOE, Official Spanish Bulletin) for 3 years in Barcelona (Spain)
- Salary: **~1600 euros / month** (14 pays per year) after Spanish taxes.

ANEXO IV				
RELACIÓN DE PLAZAS CONVOCADAS				
Categoría: TITULADO SUPERIOR DE ACTIVIDADES TÉCNICAS Y PROFESIONALES				
Grupo profesional: 1				
Área funcional: 2- ACTIVIDADES TÉCNICAS Y PROFESIONALES				
Convenio aplicable: IV Convenio Único para el personal laboral de la A.G.E.				
Ámbito geográfico	Especialidad o Actividad principal	Núm. de plazas	Titulación	Funciones y tareas principales
Barcelona	Investigación, implementación y mantenimiento de programas de investigación.	Una	Doctor, Licenciado, Ingeniero, Arquitecto o equivalente.	<ul style="list-style-type: none"> - Desarrollo de software para la calibración de variables de sistemas de Predicción por Conjuntos (<i>Ensemble Prediction Systems</i> – EPS) de mesoescala, con enfoque hacia los fenómenos extremos. - Comprobación de software para la generación de productos de postproceso útiles para la predicción de fenómenos meteorológicos adversos. - Desarrollo y mantenimiento de una base de datos de predicciones de EPS y observaciones para su uso en la aplicación de diferentes técnicas de calibración. - Verificación de las predicciones probabilistas, directas y calibradas. - Divulgación de resultados referidos a los trabajos anteriormente indicados en congresos internacionales y en publicaciones científicas.


 GOBIERNO DE ESPAÑA
 MINISTERIO DE CIENCIA, INNOVACIÓN Y TURISMO
 AEMET
 SERVICIO NACIONAL DE METEOROLOGÍA

Resolución 143/2016 para gestión,
 seguimiento y control de proyectos y
 contratos de investigación
 RELACION PLAZAS CONVOCADAS

Versión: 2
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CONTRACTS

Calibration (AEMET)

- Vacant position to be applied for **any UE citizen** in October (BOE, Official Spanish Bulletin) for 3 years in Barcelona (Spain)
- Salary: ~1600 euros / month (14 pays per year) after Spanish taxes.

Post-processing forecasting tools (ItAF-REMET)

- It has begun in June (Raffaele Golino).

Additional products: e.g. LAM-EPS EFI/SOT (AEMET)

- 3-years vacant position (2021-2023) to be applied at the end of 2020

SRNWP-EPS annual meeting

Interested to assist e-mail to:

Alfons Callado (AEMET)

acalladop@aemet.es

Francesca Marcucci (ItAF-REMET)

francesca.marcucci@aeronautica.difesa.it

INVITED Speakers



→ **Laure Raynaud**
(CRNM/MétéoFrance):

→ **EFI**



Workshop → **Isidora Jankov** (NOAA,
Colorado University):

→ **LAM-EPS perturbations**

In the framework of the SRNWP-EPS 2019-2023 module into the programme NWP Cooperation (NWP-C) of EUMETNET the first current phase "High Impact Weather and Extremes" is organized in 2019 following the guidelines of workshops in the previous SRNWP-EPS Phase II.

The Workshop will take place from the 22nd to 24th of October 2019. Tentatively, the Workshop will start on the 22nd at 13:30 CET and it will end on the 24th at 12:30 CET.

The general aim of the Workshop is to bring together the participants in the EUMETNET SRNWP-EPS 2019-2023 module/project as well as scientists working in the field and discuss the work to be carried out in next years into the module so far with a focus on LAM-EPS methodologies dealing with high impact weather and extremes.

→ **François Bouttier**
(CRNM/MétéoFrance):

→ **Thunderstorm forecasting**

General meeting to set the project main guidelines.

- Calibration/post-processing products/tools
- Research on LAM-EPS uncertainties/perturbations



SRNWP-EPS annual meeting

The workshop will be organized mainly with two branches: the application and the research ones.

From the application point of view, the results' summary of the "Survey on products for high-impact weather forecasting" will be presented and later discussed between the participants in order to get a clear picture of the requirements of the NM(H)Ss. In this way, it will be addressed and set the main guidelines of the two Application Tasks of the project to be developed: tools for the calibration of LAM ensembles for forecasting extremes (#req. EPS_1) and products for post-processing using specifically outputs from LAM-EPS devoted to high impact weather forecasting (#req. EPS_2). Moreover a preliminary discussion will take place about preferences of possible additional Really Useful tools to be developed during 2021-2023 period.

From the research point of view, results and future project guidelines from experiments / operational activities on improving the representation of model uncertainties relevant for forecasting high-impact weather phenomena will be shown and discussed. It is expected to organise a first testing experiment (2-3 years) focussed on EPS perturbations to deal with model uncertainties.

The Workshop will be structured in presentations by invited speakers and participants, posters and discussion sessions.

Participants are invited to submit abstracts, mainly on the topics:

- Probabilistic prediction of high-impact weather (e.g. gusts, icing, fog, severe convection, wind storms, lightning, turbulence) and extremes
- Ensemble approaches to deal with model uncertainties: methods, results of experiments and open issues
- Plans for ensemble forecasting, including development of new products, new calibration, new post-processing approaches, new verification methods, and so on.

Finally a User Group will be tentatively established in order to provide a permanent guidance to the development of products in relation to the most relevant NM(H)Ss end-users for high-impact weather forecasting (#req. EPS_10).

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General meeting to set the project main guidelines.

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**The LAM-EPS probabilistic products
are the future of high impact weather forecasting**

Thank you for your attention

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