



EUMETNET
EUROPEAN METEOROLOGICAL SERVICES NETWORK

The SRNWP-EPS Project

Bartolomé Orfila

35th EWGLAM meeting and 20th SRNWP meeting

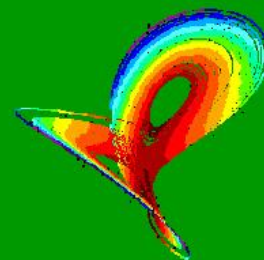
30 September-3 October 2013, Antalya (Turkey)

Outline

1. ETEPS presentation in Helsinki
2. AEMET answer to the project proposal
3. Progress in 2013
 - 3.1 Workshop on PHY-EPS
 - 3.2 Meeting of representatives
4. Revision of Actions and Deliveries
5. Steps in course
6. Next steps to completion of the Activity

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Presentation by Chiara Marsigli,
Helsinki, 2012



The SRNWP-EPS Project

Expert Team on Predictability and EPS

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SRNWP-EPS

**SRNWP cooperation on Limited-area Ensemble
Prediction systems:
preparatory phase on the time scale 2013-2015**

Part of the Forecasting Programme

The project proposal has been approved by the
EUMETNET Assembly (May 2012)

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Motivation

Enhancement of cooperation on LAM-EPS was recognized as a high priority goal by EUMETNET members. A 2-phase approach to tackle this task was outlined in the Forecasting Roadmap

Phase 1: preparatory phase. Make a feasibility study to formulate how capabilities for convection-permitting ensembles can be strengthened through cooperation between the European countries

The preparatory phase is needed due to the broad ranges of priorities for Members and the relatively new scientific and technical issues to handle

define the ground for cooperation to address scientific and technical issues, optimising the use of resources

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Why a dedicated project

The actual project proposal (Phase II) will be determined by the needs of the NMs participating to the Phase I

-> all relevant interests should be represented

A good definition of scientific and technical issues to be tackled rely on the expertises involved

-> a broad range of expertises is needed!

expertise will depend on the participation to the project!

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SRNWP-EPS - Phase 1

The phase 1 focuses on:

Review the status of ensemble developments in the NMSs in Europe

Prepare an analysis/overview of the plans in the NMSs in Europe and identify common issues

Make a proposal for a research plan aiming to develop the next generation ensemble system

Identify major technical open issues

Prepare a shared and long-term SRNWP-EPS project proposal from 2014 onwards

enable joint planning to use resources for challenging problems

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SRNWP-EPS - Phase 1

- Aim of the project (Phase 1): to provide a feasibility study, which may include a Project proposal where the Phase II for cooperation in Europe in the fields of LAM-EPS is presented
- **18-month project (1 January 2013 – 30 June 2014)**
- Deliverable (June 2014): Phase II project proposal for the EUMETNET Advisory Committees, where a strategy for future cooperation is designed



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Concluding remarks

evaluation of bidding proposals has been completed
the STAC/PFAC has recommend to the Assembly that the project proceeds
actual project start is subject to Members committing to participate
decision at the November Assembly

ensure (human and financial) resources to the project

Key assumptions of AEMET response

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They follow closely the previous **proposal in 2007** and its **amendment in 2011** prepared by the expert team on SRNWP on EPS.

The **Phase I pursues a feasibility study** by mid 2014 taking into account the essential requirement listed under '2.5.8 Essential requirements' of the Invitation for submission of proposals.

The **TIGGE LAM Plan** provides **guidance for identification** of the **major research issues** that need to be addressed in Phase II and beyond.

AEMET will take over the responsibility of **co-ordinating actions** among members and eventually of **preparing the foreseen deliverables**.

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WP1

Assessment of priorities from Members and user needs

WP1.1

Provide a comprehensive (scientific and technical) overview of presently accessible ensemble systems and know-how, with special focus on the convection-permitting ensembles

WP1.2

Perform an analysis of the ongoing activities and plans for operational ensembles at 10-20 km grid mesh, including ECMWF

WP1.3

Review the plans of all the involved NMSs in the field of ensemble forecasting, identifying common needs and areas where improvements can be achieved by cooperation/collaboration, also considering user needs

WP2

Identification of the major research issues that needs to be addressed in Phase II

WP3

Strategic planning of the actions which may be shared among participants, which may increase the possibilities of success towards the development of LAM-EPS capability in the participating NMSs

WP3.1

Perform an analysis of the technological infrastructure needed for systems development, i.e. evaluate the data transfer needed for receiving boundary conditions, evaluate the timeliness of the different possible solutions, evaluate the required computer power to run the systems; identify possible cooperation

WP3.2

Define the common requirements towards third partners (ECMWF, EUMETNET)

WP3.3

Assess the financial and resource needs

WP4

Preparation of the LAM-EPS project requirements for the second half of the new EUMETNET phase (2015-2017)

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ACTIONS

- **A1:** Review the state-of-the-art of LAM-EPS, both in EUMETNET Member States and in the rest of the world
- **A2:** Describe the plans of the EUMETNET Members related to ensemble forecasting
- **A3:** Explore the scientific methodologies suitable to build a very high-resolution ensemble
- **A4:** Analyses of the available and expected future computer resources (both at the Meteorological Services and at ECMWF)
- **A5:** Establish an explicit link with TIGGE-LAM.
- **A6:** Identify the 2020 goals, the R&D road map and write the SRNWP-EPS Phase II project proposal for the Assembly.

DELIVERABLES

- **D1:** A document presenting a comprehensive review of the present status of SRNWP-EPS
- **D2:** A document describing all the relevant scientific, technical and possible operational-related issues. It should include a R&D roadmap towards an operational convective-permitting LAMEPS system
- **D3:** A document listing the available computer resources
- **D4:** A document describing the plans of the Meteorological Services
- **D5:** A document describing the users needs and the 2020 goals for convection permitting probabilistic forecasts.
- **D6:** A document describing the relation with the WMO TIGGE-LAM plan.
- **D7:** The detailed SRNWP-EPS project plan with the vision of what the resulting operational system should look like.

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List of Programme Participants, and representatives to the EUMETNET SRNWP-EPS Activity

	Organisation	Country	Name
1	ZAMG	AUSTRIA	Won Yang
2	RMI	BELGIUM	Jean Nemeghaire
3	DHMZ	CROATIA	Stjepan Ivatek-Sahdan
4	CHMI	CZECH Rep.	Brozkova Radmila
5	DMI	DENMARK	Henrik Feddersen
6	FMI	FINLAND	Juha Kilpinen
7	OMSZ	HUNGARY	Mihály Szucs
8	IMO	ICELAND	Theodor f. Hervarsson
9	Met Eireann	IRELAND	Ray McGrath
10	USAM	ITALY	Chiara Marsigli
11	Met.no	NORWAY	Jørn Kristiansen
12	RHMSS	SERBIA	Ljiljana Dekic
13	EARS	SLOVENIA	Neva Pristov
14	AEMet	SPAIN	Bartolomé Orfila Estrada
15	SMHI	SWEDEN	Mats Johansson
16	MeteoSwiss	SWITZERLAND	Philippe.Steiner
17	UKMO	UK	Warren Tennant

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Observers to the EUMETNET SRNWP-EPS Activity

	Organisation	Country	Name
1	Météo-France	FRANCE	Gwenaëlle Hello
2	SML	LUXEMBURG	Jörg Bareiss
3	HMZCG	MONTENEGRO	Angel Marcev
4	KNMI	NETHERLANDS	Jan Barkmeijer
5	IMGW	POLAND	Andrzej Mazur
6	HMS	The FYROM	Maja Kojdovska

Representative in the Forecasting Programme

	Organisation	Country	Name
1	EMHI	Estonia	Taimi Paljak
2	DWD	Germany	Thomas Kratzsch
3	HNMS,	Greece	Panagiotis Skrimizeas
4	LEGMC	Latvia	Mr Andris Viksna
5	IMP	Portugal	Nuno Moreira
6	CYPRUS Met Service	Cyprus	Ms Ketí Savvidou

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- **Kick-off meeting on 18 February 2013**
- **Questionnaire on**
 - *Action A1* (State of the art of EPS in Member states and in Consortia)
 - *Action A2* (Plans related to ensemble forecasting in Member states)
 - *Action A4* (expected future computing resources available)
- **Workshop on Phy-EPS, (18-20 June 2013)**
- **Meeting of the Activity representatives on 20-21 June 2013**

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Workshop on PHY-EPS, Madrid 18-20 June 2013

Presentations, questions and conclusions:

<http://srnwp-eps.aemet.es>

Questions posed to the Workshop

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- Are current stochastic schemes perturbing the right spatial and temporal scales? Which experiments (computational or experimental/observational) would help the development of the spatio-temporal characteristics?
- Do our models represent physical processes correctly or are there fundamental flaws (e.g. modelling turbulent kinetic energy behind an obstacle as wave "drag")? Also: when introducing stochasticity around (in principle) well established deterministic solutions, are we still creating something that another 'optimal' model would be able to reproduce or are we violating too much some principles for it to be conceptually possible?
- Are there untouchables, e.g. perturbing orography, gravity constant or other fundamentally known functions?
- Should there be stochasticity in the deterministic model/outside the ensemble forecasting context?
- Should uncertainty representations be developed alongside the physical parameterizations (i.e. by parameterizations experts) or added a posteriori by the ensemble development community. What are the consequences for consistency and performance?
- How can we develop stochastic physical parameterizations in the presence of compensating model errors/heavily tuned models?
- **Which priority project would/should we choose as community at this point in time?**

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Priority Action Recommended by the Workshop on PHY-EPS

- **Plan an action** following the suggestion of the physics group
- **It could be scientific experiments** in the framework of the second phase of the SRNWP-EPS Project
- **Experiments** should be planned with a **common aim and view**, but then specialised **according** to the **available modelling systems**.
- **Clever evaluation tools** are needed, not (only) standard verification.
- **Results** could be **presented** and **discussed** in a successive **workshop**.

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Agenda

- 1.- Working **arrangements** and **documentation**
- 2.- **Information** from **Institutes** and **C-SRNWP Consortia** about **state of EPS** in **their organizations** (*Action A1*), future plans (*Action A2*) and computing capacity available (*Action A4*).
- 3.- **Explore** the **scientific methodologies** suitable to build very **high resolution ensemble** (*Action A3*).
- 4.- **Identify 2020 Goals**, the **R&D road map**, and **items of the Phase II project proposal** (*Action 6*) to be entered in the Deliverables
- 5.- Look **consensus** on
 - i) **Role** of the **SRNWP ET-EPS**.
 - ii) **Involvement** of the **NMS**.
 - iii) **How coordination** will actually **take place**?
 - iv) **Who will decide** the **targets** of **Phase II** and **how**?
- 6.- **Distribution of tasks** among a few **working groups** expected to be set up during the meeting.
- 7.- Any other business:
 - **Establish** an explicit **link** with **TIGGE-LAM**.
 - A **document describing** the **users needs** and the **2020 goals** for **convection permitting**.

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Outstanding conclusions and recommendations (I)

Like it currently happens with DA and EPS, it was proposed that **SRNWP EPS** would eventually **be a test bed for understanding Physics**. This should be pursued as an intermediate step towards an operational European EPS system instead of skipping it and going directly to an operational European EPS for 2020.

Several participants of the Activity argued that the **elements of the Project** in preparation **should all have a scientific component**, and be **oriented to run ensemble experiments** (more experiments as more NMS participate) to see the importance of the different methods in the production of EPSs and how the study of the physics could obtain a benefit of them.

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Outstanding conclusions and recommendations (II)

During the meeting four **topics** have been chosen to be part of the Project in preparation (Phase II):

- i) *Interaction of EPS with data assimilation* in the convection-permitting scale.
- ii) *Modelling and data assimilation* of ground surface properties.
- iii) *Accounting for model uncertainties* and how EPS could help understanding model sensitivities
- iv) *Use and interpretation of probabilistic products.*

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Outstanding conclusions and recommendations (III)

Four Working Groups established with the following **persons involved** :

WG1: Inger Lise-Frogner (leading), Pau Escriba, Lucio Torrisi, Jelena Bojarova, Trond Iversen, Jonathan Flowerdew

WG2: Theresa Gorgas (leading), Mihaly Szucs, Yong Wang.

WG3: Alex Dickmyn Leading, Chiara Marsigli, Warren Tennant, Alfons Callado.

WG4: Dick Blaauboer (leading), Henrik Feddersen, Mats Johansson, Juan Simarro, Chiara Marsigli

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Outstanding conclusions and recommendations (IV)

The **four WG's** should **describe** their **topic concisely** (1-2 pages) **without many details** and understandable for STAC. A template should be used for the description.

Starting point should be the standard EUMETNET project form, i.e. no funding except for the responsible member (Project manager).

topic	<name of the topic, 1 out of 4 defined>
purpose	<describe in one or two sentences why this topic is important to be included>
objectives	<give the objectives of this topic>
deliverables	<describe the “physical” outcomes/results of this topic>
description	<describe the topic concisely, without many scientific details, aiming at convincing STAC members about its importance>
resources	<describe what is needed to perform this topic in terms of manpower (fte’s), money; keep in mind that resources should be found within the participating members; add, as a separate scenario, what could be done if more (external) budget would be available>
time	<assess the time, turnaround, would be needed to perform the topic>

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Outstanding conclusions and recommendations (V)

Dick and Gergely will consult the Secretariat about **possible additional funding** and how the Activity could **benefit from the SESAR WP11.2 deployment plans**.

Bartolomé will explore the **chance** that **some of the NMS** that are **not participating in Phase I** could **eventually be involved in Phase II**.

A **workshop** or a **meeting** to deal with **progress achieved on scientific aspects** related to EPS topics should be considered. This event should take place well **before June 2014**.

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ACTIONS

- **A1:** Review the state-of-the-art of LAM-EPS, both in EUMETNET Member States and in the rest of the world
- **A2:** Describe the plans of the EUMETNET Members related to ensemble forecasting
- **A3:** Explore the scientific methodologies suitable to build a very high-resolution ensemble
- **A4:** Analyses of the available and expected future computer resources (both at the Meteorological Services and at ECMWF)
- **A5:** Establish an explicit link with TIGGE-LAM.
- **A6:** Identify the 2020 goals, the R&D road map and write the SRNWP-EPS Phase II project proposal for the Assembly.

DELIVERABLES

- **D1:** A document presenting a comprehensive review of the present status of SRNWP-EPS
- **D2:** A document describing all the relevant scientific, technical and possible operational-related issues. It should include a R&D roadmap towards an operational convective-permitting LAMEPS system
- **D3:** A document listing the available computer resources
- **D4:** A document describing the plans of the Meteorological Services
- **D5:** A document describing the users needs and the 2020 goals for convection permitting probabilistic forecasts.
- **D6:** A document describing the relation with the WMO TIGGE-LAM plan.
- **D7:** The detailed SRNWP-EPS project plan with the vision of what the resulting operational system should look like.

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A1: Review the state-of-the-art of LAM-EPS, both in EUMETNET Member States and in the rest of the world

- forecasting
- **A3:** Explore the scientific methodologies suitable to build a very high-resolution ensemble
- **A4:** Analyse the Meteorological data
- **A5:** Establish a common framework for the development of the EPS
- **A6:** Identify the key issues for the development of the EPS Phase II

They **progress well** according to the received answers to the Questionnaire.

- **D1:** A document presenting a comprehensive review of the present status of SRNWP-EPS
- **D2:** A document describing all the relevant scientific, technical and possible operational-related issues. It should include a R&D roadmap towards an operational convective-

D1: A document presenting a comprehensive review of the present status of SRNWP-EPS

system should look like.

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A2: Describe the plans of the EUMETNET Members related to ensemble forecasting

- A2: Describe the plans of the EUMETNET Members related to ensemble forecasting

Both deliveries can be initiated from the answers to the questionnaires, but **the vision is still incomplete and more information on users is needed**. It is expected that the set up group 4 deals with it.

- D2: A document describing all the relevant scientific, technical and possible operational-related issues. It should include a R&D roadmap towards an operational convective-

D4: A document describing the plans of the Meteorological Services

D5: A document describing the users needs and the 2020 goals for convection permitting probabilistic forecasts.

system should look like.

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A3: Explore the scientific methodologies suitable to build a very high-resolution ensemble

- **A2:** Describe the plans of the EUMETNET Members related to ensemble forecasting



DELIVERABLES

- **D1:** A document presenting a comprehensive review of the present status of SRNWP-EPS

D2: A document describing all the relevant scientific, technical and possible operational-related issues. It should include a R&D roadmap towards an operational convective-permitting LAMEPS system

- **D7:** The detailed SRNWP-EPS project plan with the vision of what the resulting operational system should look like.

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ET-EPS contribution for Action A3

Explore the scientific methodologies suitable to build a very high-resolution ensemble

This document is intended to provide a framework for the exploration of the scientific methodologies to build very high-resolution ensemble systems, resolving the convection-permitting scale phenomena.

The main open issues for scientific research are outlined and briefly described, with the aim of providing a basis for planning the future work in the field which may be organised at the EUMETNET level,

and benefits of exchanges of e.g. information, results, code, methodologies, among the European Meteorological Institutions.

Outstanding conclusions and recommendations (IV)

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Deliverable D2 (referring to the document describing all the relevant scientific, technical and possible operations-related issues) is **limited to include the results of exploring the scientific methodologies.**

The other aspects of D2, i.e. the relevant technical and possible related operational issues should be entered only if eventually the STAC and PFAC consider they should be included related to the further goal of the implementation of a Europe wide EPS.

It will be **made clear** to STAC and PFAC that preparing a full road map to an **operational convection permitting LAMEPS system** by 2020 would **need** substantial **resources for experimentation and implementation** as the meeting discussions had stressed. If budget allows they could still be considered Phase II objectives.

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A4: Analyses of the available and expected future computer resources both at the Meteorological Services and at ECMWF

- A2: Describe the plans of the EUMETNET members related to ensemble forecasting
- A3: Explore the scientific methodologies suitable to build a very high-resolution ensemble
- A4: Analyse the available and expected future computer resources both at the Meteorological Services and at ECMWF
- A5: Establish a common framework for the project
- A6: Identify the key deliverables and milestones for the project

Some information is already available from the Questionnaire, but still more information needs to be gathered either from ECMWF and other NMS

- D2: A document describing all the relevant scientific, technical and possible operational-related issues. It should include a R&D roadmap towards an operational convective-permitting LAMEPS system
- D3: A document listing the available computer resources
- D7: The detailed SRNWP-EPS project plan with the vision of what the resulting operational system should look like.

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A5: Establish an explicit link with TIGGE-LAM.

- forecasting
- **A3:** Explore the scientific methodologies suitable to build a very high-resolution ensemble
- **A4:** Analyses of the available and expected future computer resources (both at the Meteorological Service of the State and at EUMETNET)
- **A5:** Establish an explicit link with TIGGE-LAM
- **A6:** Identify the operational system to be developed in Phase II project

They are **postponed** until the October Antalya meeting

DELIVERABLES

- **D1:** A document presenting a comprehensive review of the present status of SRNWP-EPS
- **D2:** A document describing all the relevant scientific, technical and possible operational

D6: A document describing the relation with the WMO TIGGE-LAM plan.

- probabilistic forecasts.
- **D6:** A document describing the relation with the WMO TIGGE-LAM plan.
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A6: Identify the 2020 goals, the R&D road map and write the SRNWP-EPS Phase II project proposal for the Assembly

- **A2:** Describe the plans of the EUMETNET Members related to ensemble forecasting

Need consideration by the STAC and PFAC and perhaps by the Assembly in their Autumn meetings. There was an insistent view of the representatives in the meeting that it had to be made clear to STAC and PFAC that to undertake such tasks **needs substantial resources for experimentation as the discussions stressed.**

- **D2:** A document describing all the relevant scientific, technical and possible operational-related issues. It should include a R&D roadmap towards an operational convective-permitting LAMERS system

D7: The detailed SRNWP-EPS project plan with the vision of what the resulting operational system should look like.

1. ETEPS presentation in Helsinki
2. AEMET answer to the project proposal
3. Progress in 2013
 - 3.1. Workshop PHY-EPS
 - 3.2. Meeting of representatives
4. Revision of Actions and Deliveries
5. Steps in course
6. Next steps

Steps in course

- Meeting of the SRNWP ETEPS
 - Express a view on the SRNWP-EPS Activity
 - Boundary condition activity
 - TIGGE-LAM
 - A3 report
- Meeting of the WG leaders and participants to deal with WG activity progress

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Next steps

(Last 2013 Quarter, early 2014)

- Look for the STAC and PFAC outputs
- Sketch the Phase II project proposal and look for consensus
- Preliminary evaluation of Costs
- Report to the Forecasting Programme, to the meeting of EUMETNET Managers and to the EUMETNET Secretariat
- Organize 2nd meeting of Activity representatives

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THANK YOU FOR YOUR ATTENTION