

Applications and Verification

Work Plan

Prepared by:	Area Leader Doina-Simona Taşcu	
Period:	2023	
Date:	March 2023	

Introduction and background

The main activities within the “Applications and Verification” area are to collect information and identify LACE members needs and create an action plan to systematically manage, organize and control the changes in the software codes. Furthermore, to maintain a documentary fund which should help the NWP colleagues.

Goals

The primary goal is to develop and adapt/use different specific applications into user-friendly mode. Many tools and software products were developed along the years for meteorological parameters. These days, it is imperative to have easy to use applications, maybe to find and to identify the operational activities, to make a common way for saving time and manpower resources. Nowadays, it is important to make the applications easy to implement without too much cost and to make a common way for saving time, computer costs and manpower. It is a big challenge to identify and to merge all the beneficial technical approaches and applications for all countries.

Main R&D activities

It is well known that the verification of numerical models is an important tool in order to ensure a better use of the meteorological products for operational and research usage. The main activities are the following:

- HARP implementation and verification for deterministic and probabilistic forecasts
- HARP linked to OPLACE database
- Multiple verification methods
- Panelification
- Post-processing of model output
- RC-LACE gitlab platform
- Database of cases
- Trainings

1 Action: HARP implementation and verification for deterministic and probabilistic forecasts

Description and objectives: Despite the fact that many efforts were involved along the years within RC-LACE in the development of LAEF verification, the development of it can be considered frozen for the moment. The main idea is that each member should start to use the HARP common tool.

Proposed contributors: Polly Schmederer (1 pm), Christoph Zingerle (1 pm), Florian Weidle (0.5 pm), Iris Odak Plenković (1 pm) - MQA2

2 Action: HARP linked to OPLACE database

Description and objectives: At the last LSC meeting most participants mentioned the importance of using OPLACE database as input for HARP verification. An interface was already created in order to link HARP to OPLACE database. For a first step, the new obsoul format is adapted. In case that the old format is still needed, the work can continue on this. Further investigations will be made in order to decide if is necessary to have separated historical OPLACE database or we should take into consideration to have in one country one storage devoted for a very long archive.

Proposed contributors: Martin Petras (MQA1.2 – 1 pm)

3 Action: Multiple verification methods

Panelification

Description and objectives: This topic was started in Austria also for precipitation verification and visualization. The idea was to calculate a number of scores and present them together with the visualized field, such that humans can quickly have a look at the fields and the scores in one single place. It also comes with some rankings, but those are to be taken with a grain of salt.

In **Austria**, the work on spatial lightning and hail verification using Panelification is still ongoing.

Proposed contributor: Phillip Scheffknecht (2 pm), Christoph Wittmann (0.5 pm)

In **Hungary**, the main activity was to implement the post-processing methods developed in 2021 into the operational system. OMSZ provides forecasts from numerical weather prediction models to support partners producing renewable energy. With statistical post-processing, errors of global radiation and near-surface wind forecasts can be reduced. As part of a project, mathematician colleagues

developed machine learning and EMOS (ensemble model output statistics) methods applicable to AROME and AROME-EPS ensemble forecasts in 2021.

For the next step the evaluation of the obtained results is required, and if it is necessary the modifications in the neural network training configurations will be made. If sufficient data are available it is possible to use a longer training period or expand the post-processing to more locations.

Proposed contributor: Dávid Tajti (1 pm)

5 Action: Post-processing of model output

Description and objectives: In 2021, in Hungary, work was started on post-processing of AROME and AROME-EPS outputs. The main objective is to improve the forecasts for global radiation and 100-meter wind speed. It will be decided if this topic can be kept for the future plans and extended to all the countries.

Proposed contributors: Dávid Tajti (1 pm - MQA2), Boglárka Tóth (1 pm - MQA2), Katalin Jávorné Radnóczy (1 pm - MQA2)

6 Action: RC-LACE Gitlab platform

Description and objectives: The Gitlab server is available for exchanging tools within LACE.

Proposed contributors: -

7 Action: Database of cases

Description and objectives: Further investigations will be made for selections of the most suitable common database for different purposes and files.

Proposed contributors: Christoph Wittmann (0.5 pm), Simona Tascu (0.5 pm)

8 Action: Trainings

A good opportunity to benefit more efficiently and rapidly from using meteorological products in various formats. This part of training is essential for the new employees and more than useful for the others, to save time.

Proposed contributors: -

Summary of resources [PM]

Subject	Manpower	LACE stays	ACCORD stays (MQA?)
HARP implementation and verification for deterministic and probabilistic forecasts	3.5		
HARP linked to OPLACE database	1	1	
Multiple verification methods	3.5		
Post-processing of model output	3		
RC-LACE gitlab platform	-		
Database of cases	1		
Trainings	-		
Total	12	1	