

Working Area Predictability

Work Plan

Prepared by:	Theresa Gorgas
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1 Introduction and background

ALADIN-LAEF has been run operationally at the ECMWF-HPC since 2011. A revised version with enhanced resolution, optimized multi-physics and ensemble data assimilation for surface parameters has become operational in July 2013. Tests proved that the new system outperforms the old version of ALADIN-LAEF. Despite these achievements further optimization of the system is planned for 2014: Further improvement of the multi-physics scheme, SPPT for soil/surface and upper air, tests with more members. A future plan is to enhance the resolution of ALADIN-LAEF to 5km. First tests for this further development shall be started during 2014. At OMSZ, also the 8km ALARO-EPS shall be further developed.

A special focus will be on the development of convection-permitting EPS. This will be done in close collaboration of ZAMG and OMSZ. It is planned to set up a full EDA scheme for 2.5km AROME-EPS and test its performance compared to alternative approaches. Questions concerning the preferred coupling model shall also be solved. Further emphasis will be on model error representation (multi-physics and SPPT).

2 Goals

The goals for 2014 are directed towards the optimization and further evaluation of the operational LAEF (11km) at ZAMG and ALARO-EPS (8km) at OMSZ. A special focus will be on the development of convection permitting ensemble systems, AROME-EPS (2.5km), at ZAMG and OMSZ. Experiments will be devoted to the design of initial condition perturbations, ensemble data assimilation and stochastic physics and multi-physics. Further, the question of the most suitable coupling model will be addressed. Also the idea of a higher resolution version of ALADIN-LAEF (~5km resolution) will be pursued.

Further issues for 2014 are further developments on evaluation tools, contributions to the FROST14 project for the Olympic winter games in Sochi, enhanced collaboration with other modelling areas (DA & PHY).

3 Main R&D activities

1 Action/Subject: Optimization of ALADIN-LAEF (ZAMG)

Description and objectives: ALADIN-LAEF

Further optimization of ALADIN-LAEF multi-physics (less aggressive members). The multi-physics shall be combined with a stochastic physics scheme. Investigation of the impact of the member size. Further evaluation of current and optimized system. Comparison with probabilistic ECMWF. Set up of a new version with 5km resolution.

Proposed contributors & Estimated efforts: 8 person months (4 months LACE stay); Florian Weidle, Yong Wang, Christoph Wittmann, Martin Bellus, Simona Tascu, Theresa Gorgas

Planned timeframe and deliverable: New evaluation results, improvement of current system (whole year), reports

2 Action/Subject: Development of AROME-EPS

Description and objectives: Study on convective scale predictability in AROME. Activities planned at ZAMG and OMSZ: Tests with different coupling models (PEARP, ECMWF (high and low resolution), ALADIN-LAEF, ALARO-EPS). Show advantages drawbacks of global/limited area EPS models as driving models). Set up of EDA system (surface + atmosphere), compare with simplified centralized EDA approach. Tests with SPPT and multi-physics.

Proposed contributors & Estimated efforts: 15,5 (5 ZAMG+9 OMSZ+1,5 LACE stay at ZAMG) person months, Mihaly Szucs, Florian Weidle, Theresa Gorgas, Florian Meier, Christoph Wittmann, Yong Wang, Gergely Bölöni

Planned timeframe and deliverable: Reports on experiments

3 Action/Subject: Verification

Description and objectives: Further development of the verification tools for EPS. Further scores will be implemented. Also spatial verification methods (Fuzzy methods, SAL, spectral methods) will be involved in the evaluation of EPS for both, ALADIN-LAEF and AROME-EPS forecasts.

Proposed contributors & Estimated efforts: 3 (1 LACE stay), Simona Tascu, Florian Weidle, Theresa Gorgas

Planned timeframe and deliverable: Enhanced verification tools, reports

4 Action/Subject: Contributions to international projects, collaborations

Description and objectives:

- Contributions to the FROST14 project in the framework of the Olympic winter games in Sochi.
- Contributions to PHASES 1/2 of the SRNWP-EPS activities (preparation/submission of proposals for 3-year EPS demonstration project)
- Contributions to workshops concerning the merge of EPS, DA and PHY activities

Proposed contributors & Estimated efforts: 2 person months, Florian Weidle, Theresa Gorgas, Mihaly Szucs

Planned timeframe and deliverable: Implemented products for Sochi, presentations at workshops, reports

5 Action/Subject: Publications

Description and objectives: Publication of the scientific results achieved within the project. The scientific achievements of the project will be presented at international workshops and published in scientific journals.

Proposed contributors & Estimated efforts: 3 person months; Florian Weidle, Yong Wang, Martin Bellus, Simona Tascu, Christoph Wittmann, Geert Smet, Mihaly Szucs, Theresa Gorgas

Planned timeframe and deliverable: Reviewed papers and workshop contributions

4 Summary of resources

Subject	Manpower	LACE	ALADIN	Other
S1: Optimization of LAEF	8	4		

S2: AROME-EPS	15,5	1,5		
S3: EPS - Verification	3	1		
S4: Collaborations	2			
S5: Publications	3			
Total:	31,5	6,5		

5 Meetings and events

- 24th ALADIN Workshop & HIRLAM All Staff Meeting 2014, 7-11 April 2014, Romania
- 36th EWGLAM/21st SRNWP joined meetings, 29 September - 2 October 2014, Offenbach, Germany
- 1-2 international EPS related conferences or workshops (e.g. SRNWP EPS-DA workshop): Florian Weidle, Theresa Gorgas, Mihaly Szucs