

Relevant ALADIN inter-GA events

MoU4. For the evolution of the content:

- Better balancing management entities: LTMs more active in planning and reporting, CSSI more involved in applications.
- Harmonisation with HIRLAM, including the possibility to temporarily and jointly activate “task-forces”.

Strategic prospective.

- The Brac-HR workshop (jointly organised with HIRLAM and RC LACE) brought mixed-type outcomes.
- The ALADIN PAC nominated an HARMONIE working-group for ‘ironing out’ the difficulties.
- The work is complex and hence still on-going. The ALADIN PAC tried to reorientate it towards (i) more separated challenges and (ii) a more ‘work-plan-type’ orientation.
- The next strategic workshop will take place late-April 2011 in Finland.

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□ The workshop took place in Brač (HR) 17-20/5/10, in HARMONIE configuration.

□ From the point of view of the organisation and of the preparation it was a big success:

- 27 attendants (with participation of ECMWF, COSMO & MO);
- 21 preparatory papers and 6 volunteered key-note lectures of high quality;
- Focuses coming from all preparatory steps on anything else than ‘run-of-the mill’ topics (‘dynamics’, in its various aspects, was well targeted as a core issue);
- Correct balance between the plenary and WG sessions (6 of them, but not just in mirror of the key-note lectures).

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□ Adoption of the ALADIN 2010 workplan and of a new procedure for a more timely elaboration of the 2011 follow-on (with more interactions with HIRLAM in the set-up).

□ Common 2011 work-plan between HIRLAM and ALADIN (prepared by J. Onvlee and P. Termonia):

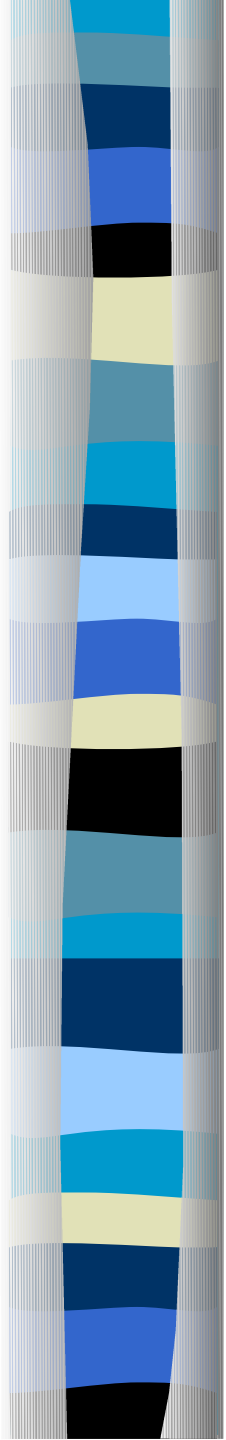
- The procedure is still a bit chaotic but the aim of a common and stabilised document has become a reality.
- The ALADIN PAC expressed its satisfaction to see this milestone having been reached.

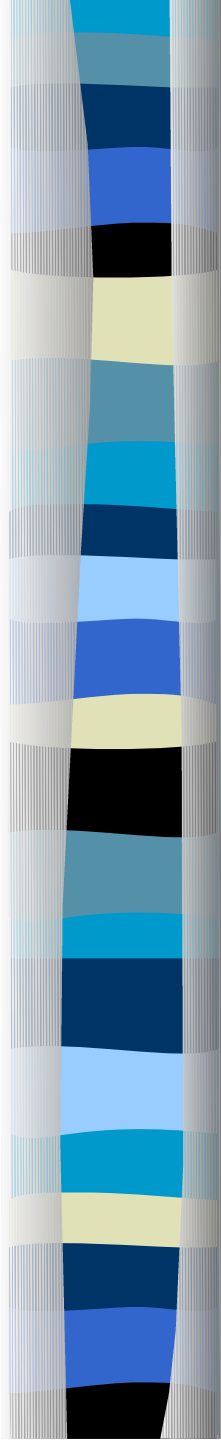


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- Links between the ALADIN work and the EU COST-ES0905 action (on better theoretical basis for convective parameterisation) are shaping the evolution of ALARO-0 towards ALARO-1. Some HIRLAM scientists are involved in this ‘attempt at a better synthesis between theory and application’.
- On the HIRLAM side, the most spectacular involvement is an attempt at a better synthesis between theory and application for ‘Cellular Automata’ (CA), by Lisa Bengtsson-Sedlar (SMHI).

About CA

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- In short a Cellular Automaton is a 2D (horizontal only) model, run with a higher horizontal resolution than its ‘parent’ 3D NWP model and having:
 - A ‘game of life’ (stochastic rules of lateral propagation) for the ‘free evolution’ of its ‘cells’;
 - The possibility to capture some information coming from the 3D model in order to ‘orientate’ its ‘live cells’ towards e.g. convectively active regions (in the ensuing example);
 - A mechanism to feed back on the 3D model, via the value of its ‘averaged’ activity at the grid-size of the NWP model; this mechanism can only touch vertical integral quantities (in our example the closure equation for convective updrafts).



ES0905 WG3 (High resolution limit)

Prague, 18-19/11/2010

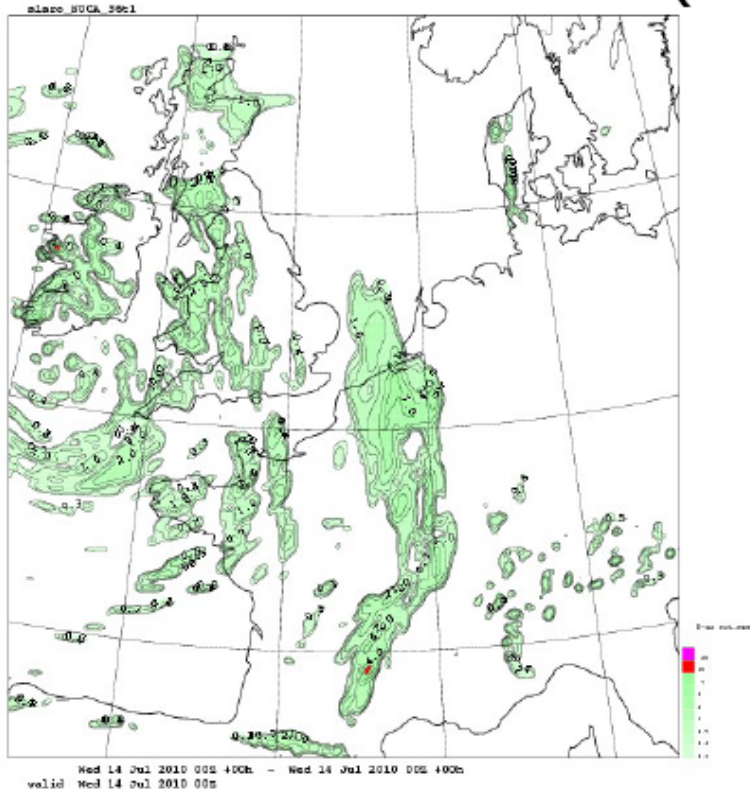
- The previous ES0905 main workshop (Warsaw, spring 2010) identified three key-issues for moist-subgrid parameterisation at high resolution (typically 1-3 km mesh-sizes):
 - Laterality (one must start having some 3D-turbulent aspects in the models);
 - Memory ('static' closure assumptions go out of their domain of validity when one reaches such resolutions);
 - Stochasticity (the parameterisations are too dispersive and this creates a need for 'back-scattering' energy in the finest model scales; this cannot however be done in a deterministic manner).
- Stochasticity, memory, laterality => Are CA, the optimum tools ?
 - The Cellular Automata are stochastic tools by construction;
 - Their 2D model keeps track (at a higher resolution) of past influences from the selected events within the 3D model;
 - The finer mesh of the 2D 'model' accelerates lateral communication of information for the 3D full model.



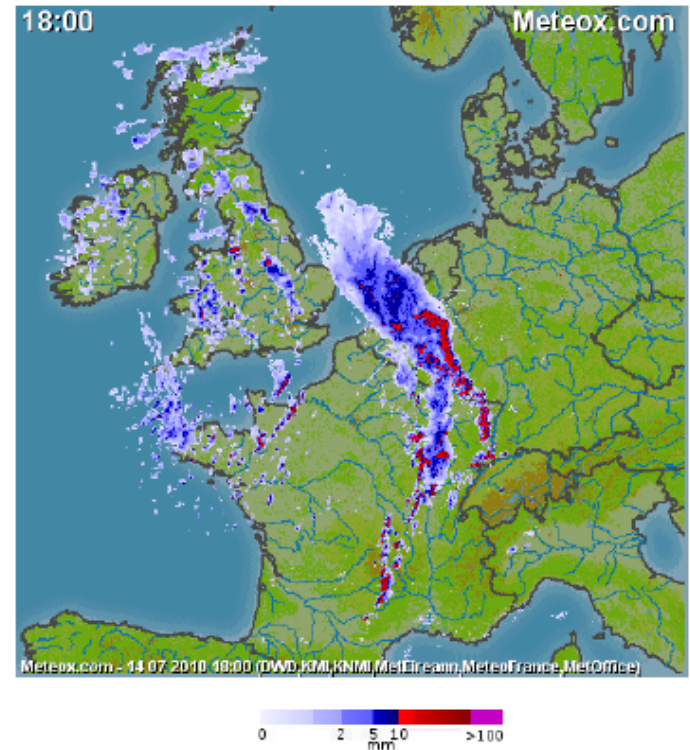
The experimental set-up

- The host model is an ALARO-0 version, run at 5km mesh-size, i.e. in the ‘grey-zone’ range of scales.
- The CA has been added by L. Bengtsson and tuned to give stationary averaged ‘life’ properties under the forcing by a convective activity index.
- The CA values (average number of ‘live’ cells) do modulate the prognostic convective closure of 3MT.

Radar image, squalline 14/7-10 16 UTC (or 18 CET)



ALARO 36h1.1, total 1h precip.
(No data assimilation, cold start)

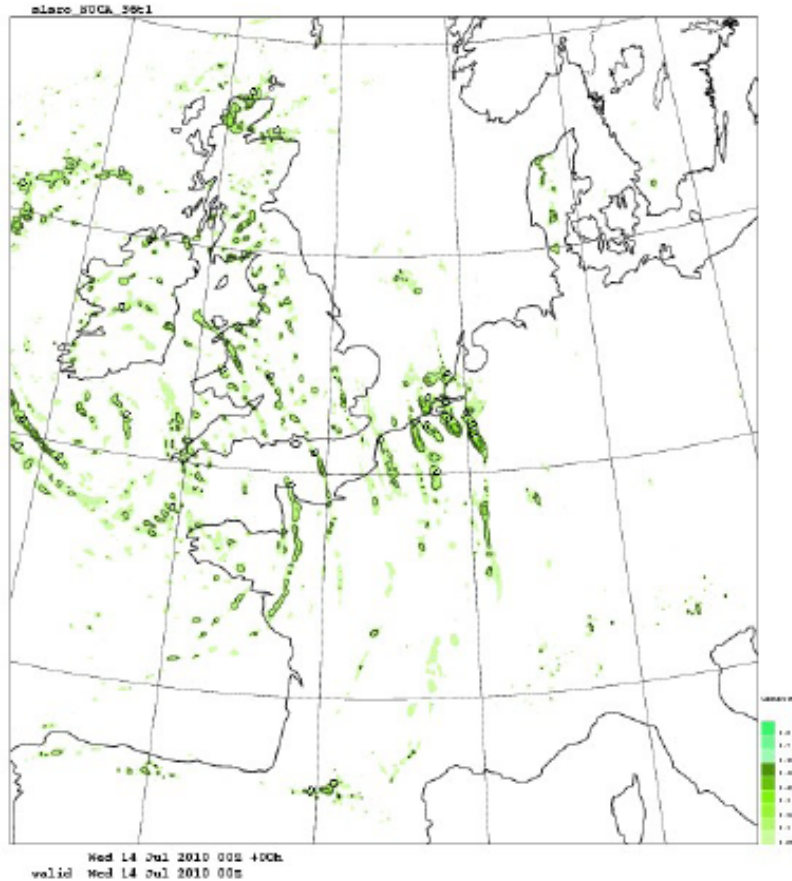


1 hour precip from radar image.

The model is 'late' but nevertheless creates a strong cold front, without however signs of the observed squalline. The 3MT parameterisation shows hardly any sign of 'grey-zone-noise'.

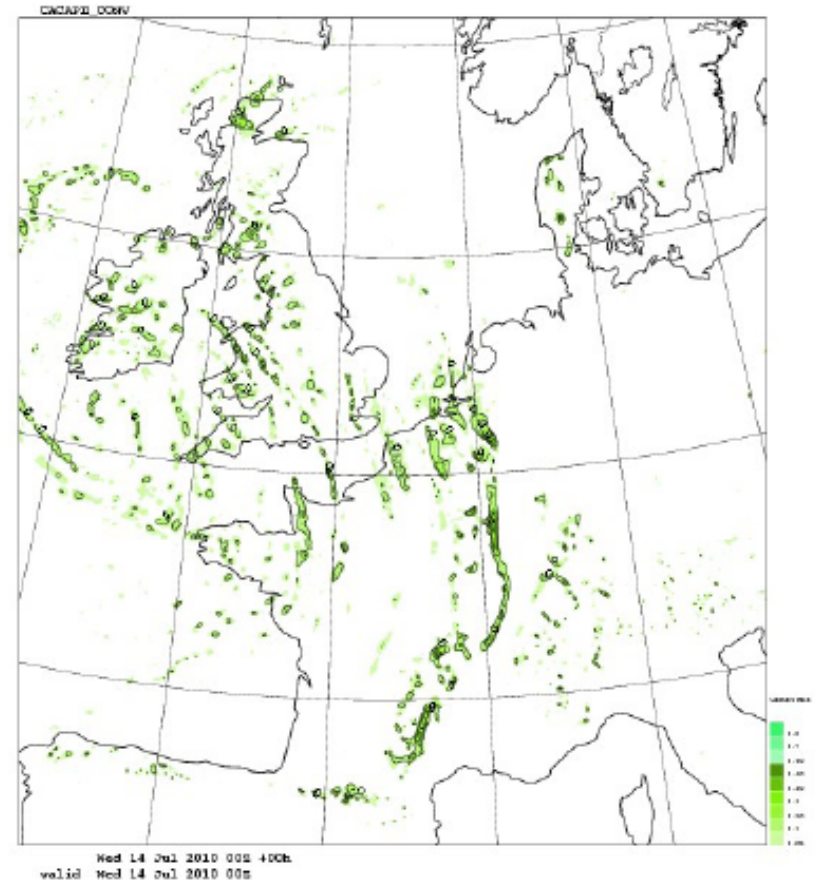
Updraught mesh fraction, 2010-07-14, 16 UTC

ALARO reference, 36h1.1



16 UTC

ALARO CA-CAPECONV, 36h1.1

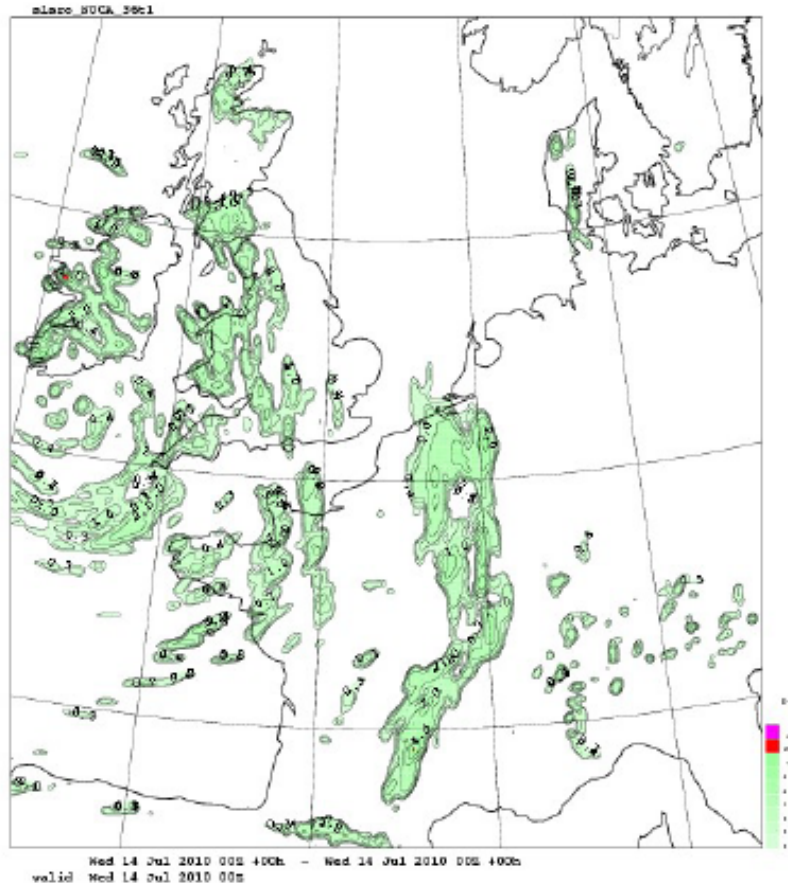


16 UTC

Introducing the CA immediatly ‘marks’ the position of the squalline in terms of convective mass-flux = **quite promising**

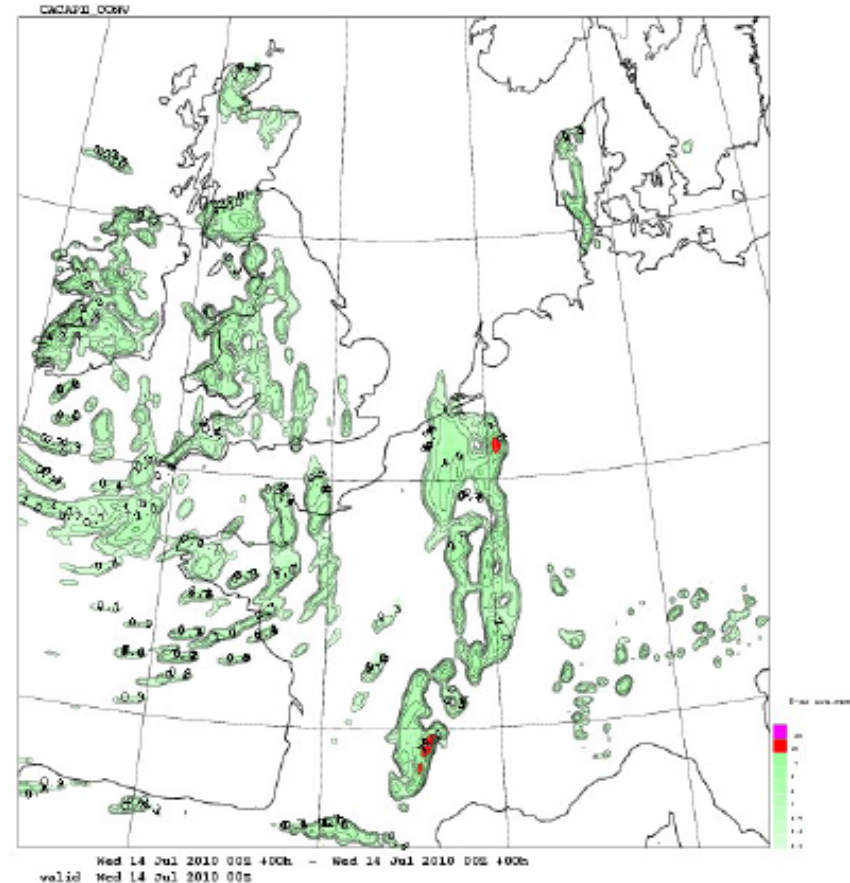
Sub-grid precipitation, 2010-07-14, 16 UTC

ALARO reference, 36h1.1



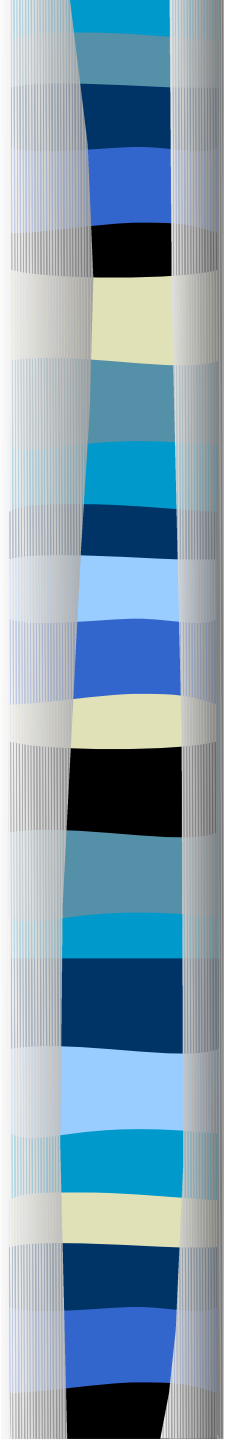
16 UTC

ALARO CA-CAPECONV, 36h1.1



16 UTC

Unfortunately this does not translate into a structured increase of precipitations (only spots) => *more work still needed*



Hopefully we shall see confirmation of the hope we now have in the coupling of ALARO and a CA.

Additionally we would like to have many more such ambitious ‘coupled’ HARMONIE actions.