Link with applications: status and plans

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- Scope and dilemma’s
- The chosen approach
- Topic 1: Enhance usefulness of NWP in support of nowcasting
- Topic 2: Information content and interpretation of mesoscale models

Reminder: A very wide field…

- Many application areas of NWP
- Many types of applications (statistical and physical postprocessing, coupling with follow-on models, …)
- Using a wide variety of techniques (both deterministic and probabilistic)
- Involving potentially many types of expertise other than NWP (some “close” to NWP, others not)
- Many user communities with widely different characteristics (NWP knowledge) and interests
- Different levels of involvement of the NMS’s
- Types of use: non-profit or commercial?
- And so on…

Reminder: Dilemma's/considerations for the ET

- How to make scope manageable? When are activities still within the remit of SRNWP, when not?
  - Where does postprocessing cease to be NWP?
- Cooperation in what?
  - Concentrate on NWP aspects only (feedback, value), or on applications themselves? If the latter, then focus on few areas?
  - Information exchange or application development?
- Applications usually "organized" at national, not consortium level, and often by people outside NWP => how to get the right expertise / knowledge / permissions?
- Links with other ET's

Initial choices

- Start with a specific, limited application, still within NWP scope (wind gusts), information exchange, see where it gets you
- Proposed later to alter course, because:
  - Approach too fragmented
  - Of too little general, shared interest
  - Expert team on consortium basis unable to capture variety of (nationally-based) application forms
  - For applications farther away from NWP: expertise within ET would be insufficient

New approach:

- Select “generic” topics, seeking improvements to NWP which would benefit a broad class of applications
- Stay close to the heart of NWP (our area of expertise, and also of more interest to our consortia)
- Suggested topics:
  - The use of meso(km)scale models by users (esp. forecasters) and how to improve this
  - Enhance usefulness of NWP as tool to support nowcasting
  - Enhance usefulness of NWP as tool for regional climate projections

- Proposal: start with two topics:
  - The use of meso (km)scale models by users (esp. forecasters) and how to improve this
  - Enhance usefulness of NWP as tool to support nowcasting
- Regional climate application: topic big enough to warrant an ET of its own?
- Start planning ET-activities along these lines
- Ask AC to:
  - confirm and endorse this scope
  - consider ET-regional climate modelling?
  - reconsider ET-membership according to redefined scope

NWP in support of nowcasting:

Aspects:

- Very strong time constraints for NWP in nowcasting, may ill fit with other SR NWP applications
- Nowcasting often requests “difficult” weather parameters which are not routinely provided or verified by NWP
- Need for blending smoothly with observation extrapolation and/or other nowcasting techniques within the 0-3h range
- Spatialization nowcasting techniques like INCA very relevant
- More to do for NWP than just apply rapid update cycling…
  - Maybe specific DA methods/settings required for application to nowcasting?
  - Knowledge of physical processes sufficient?
  - How to evaluate and compare VSR NWP vs nowcasting? Nowcasting often done for point locations, observations used are often not automated (e.g. octa’s) and difficult to relate to model.
  - How to apply probabilistic techniques to nowcasting?

Strengths / Weaknesses

	Classical Nowcasting	NWP-Nowcasting
Strengths	Analysis close to observation Computationally cheap Near real-time availability	Physically derived Includes intensity changes Consistency between fields
Weaknesses	No physics (Mostly) no intensity changes No use beyond 3-4 hours	Analysis between obs and 1st guess Time delay due to assim, DFI, integration Spin-up effects

‘Classical‘ nowcasting vs. NWP

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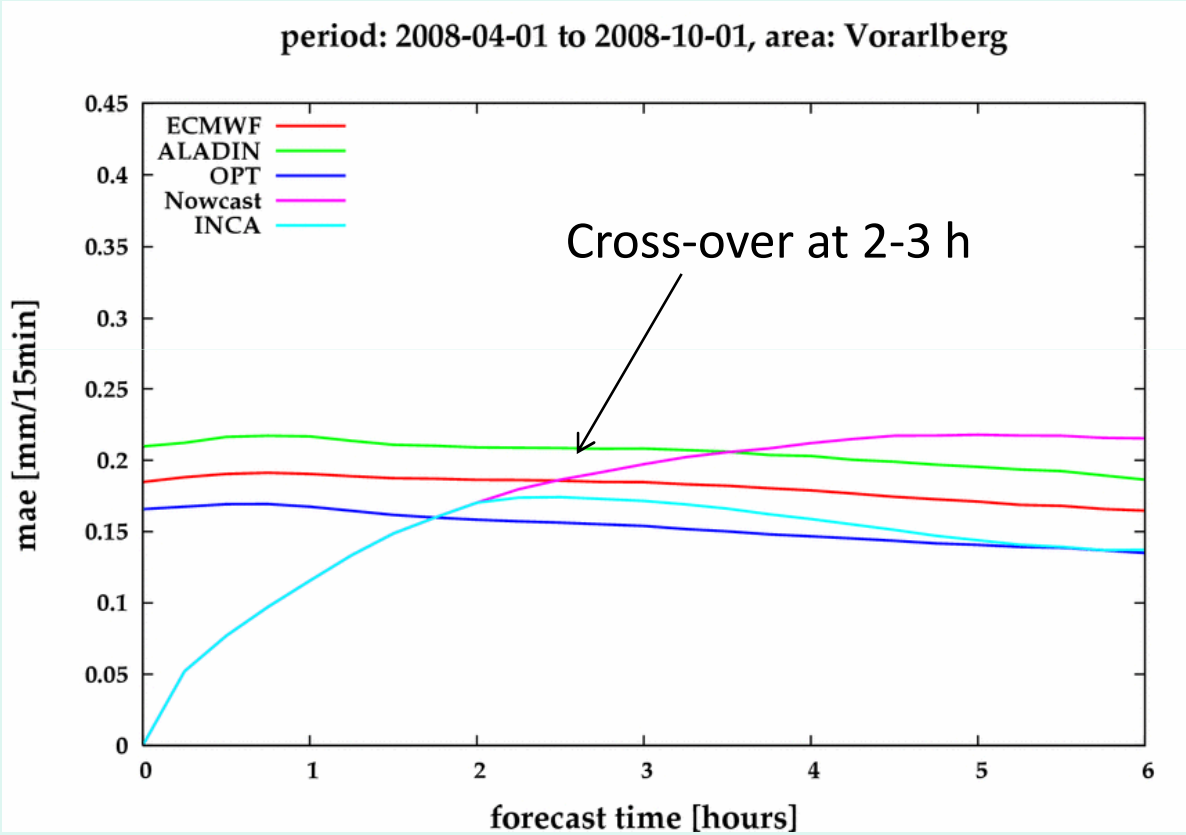
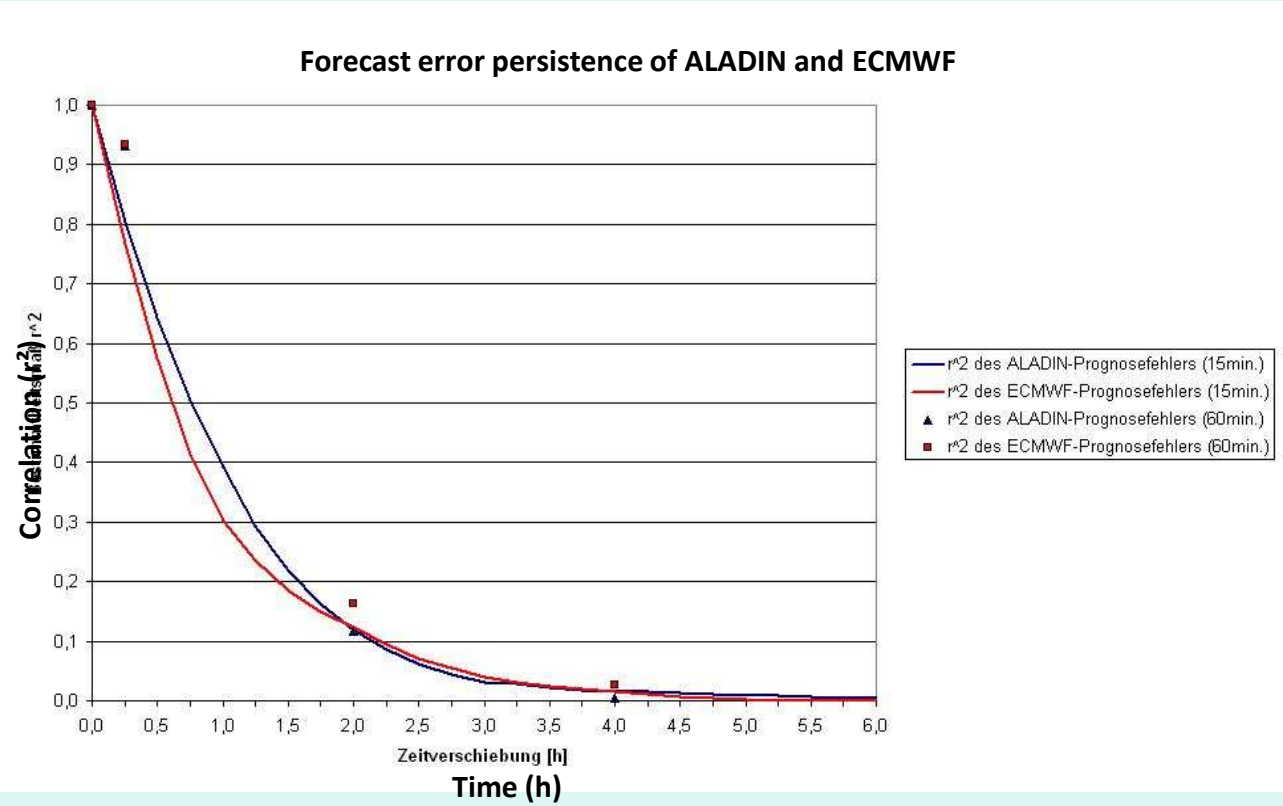


Time of cross-over (averaged over at least a few weeks) is 2-3 h, remarkably independent of season and geographic location

Simple combination

2 hours is the typical time-scale of precipitation error persistence in NWP models → correcting the NWP forecast based on latest obs will give improvement only in this forecast range



WSN09 Nowcasting Symposium, Whistler, Sep 2009

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Some conclusions:

- Convective intensity changes biggest unsolved problem

  → Approach from two sides

  Classical nowcasting: use additional information (CAPE, CIN, ..)

  NWP nowcasting: improve radar data assimilation, physics description of convective processes in full and linearized model

  Use blending techniques to create smooth transition

- Probabilistic nowcasting (incl estimates of obs uncertainty) considered to be of increasing importance

More than just convection

Other important nowcasting weather parameters:

- Visibility, low clouds and fog (aviation!)
- Low level winds
- Winter weather conditions (precipitation type, temperature behaviour under stable conditions, etc.)

- Whistler: winter nowcasting is young field. Vancouver Winter Olympics may provide great testbed for NWP and nowcasting intercomparisons

Possible aspects to study:

- Data assimilation: Improve assimilation of radar data, surface and boundary layer observations. Consider/test ways to make rapid update cycling (1 hr) as efficient as possible. Which DA techniques most appropriate to use?

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- Predictability: Consider appropriate methods to use probabilistic NWP techniques for nowcasting

NB The ET will need to closely liaise with several other ET's on these issues.