VALUING INFORMATION FROM HIGH RESOLUTION FORECASTS

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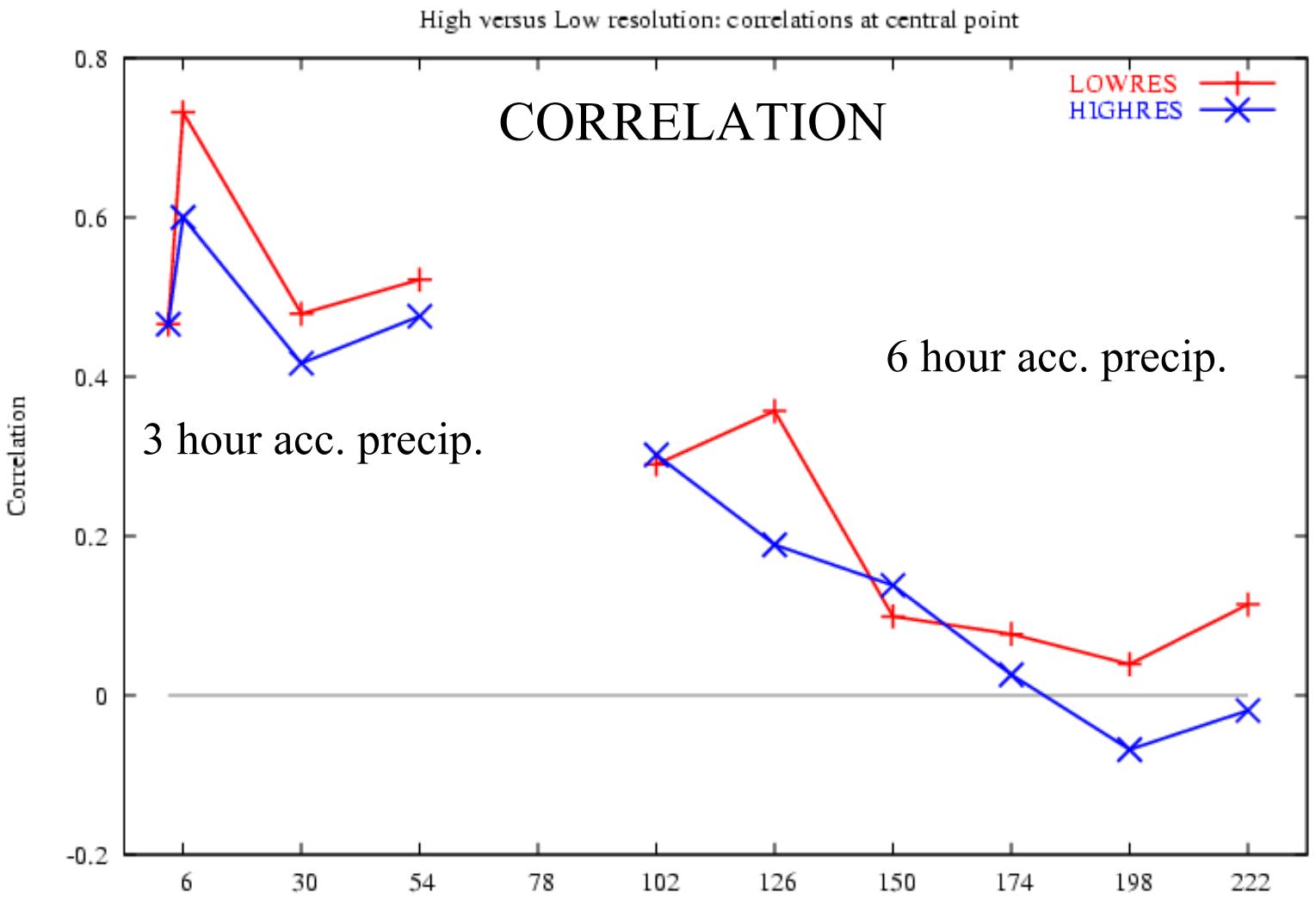
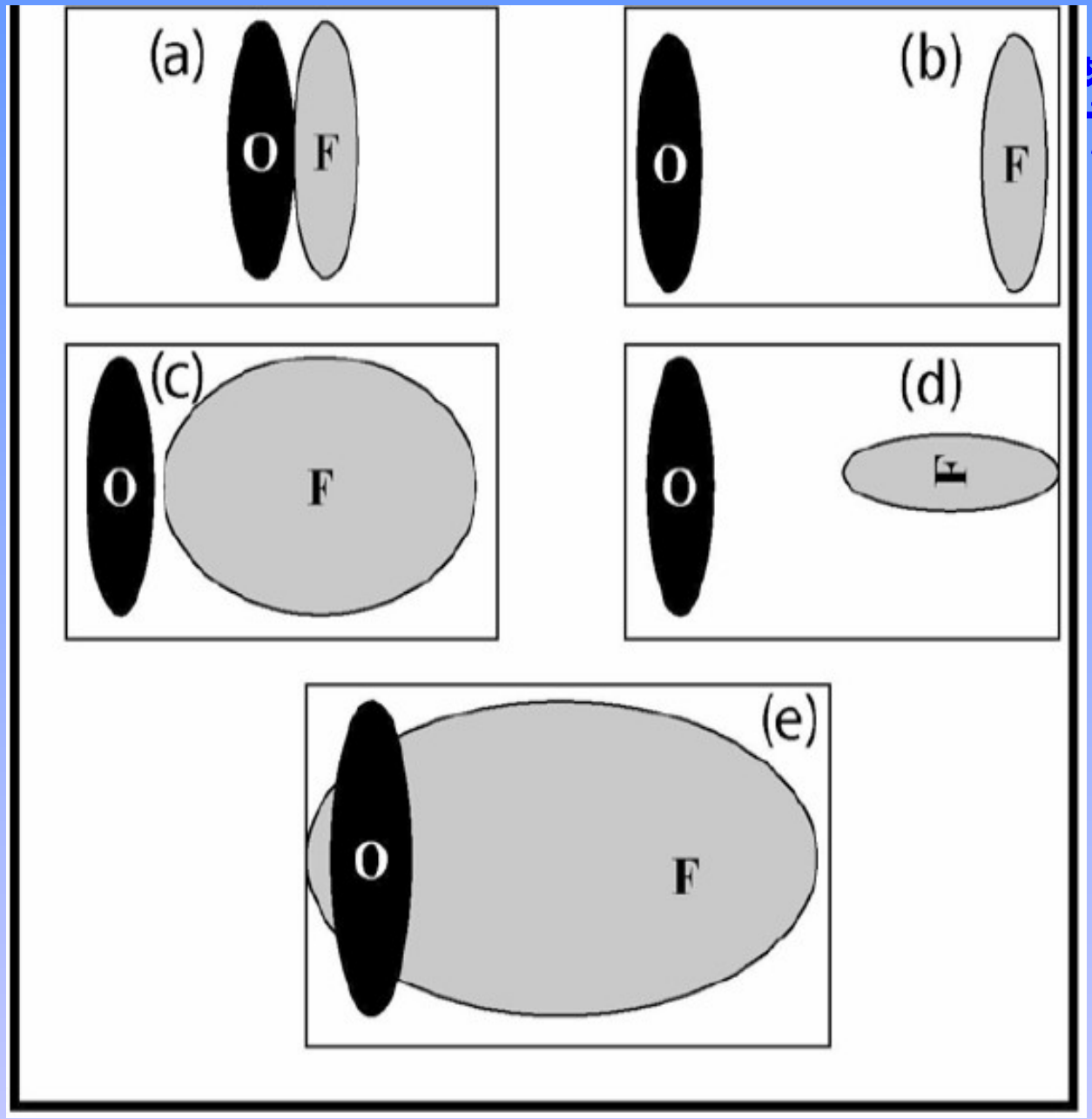
OUTLINE

1. higher resolution → worse scores
2. how to extract and use valuable information
3. illustration on real data (HR vs LR model)
4. conclusions





Davis et al., 2006 (MWR)

Model1
(LRM)

potential predictors

statistical
post-processing

prob. forecast
equation

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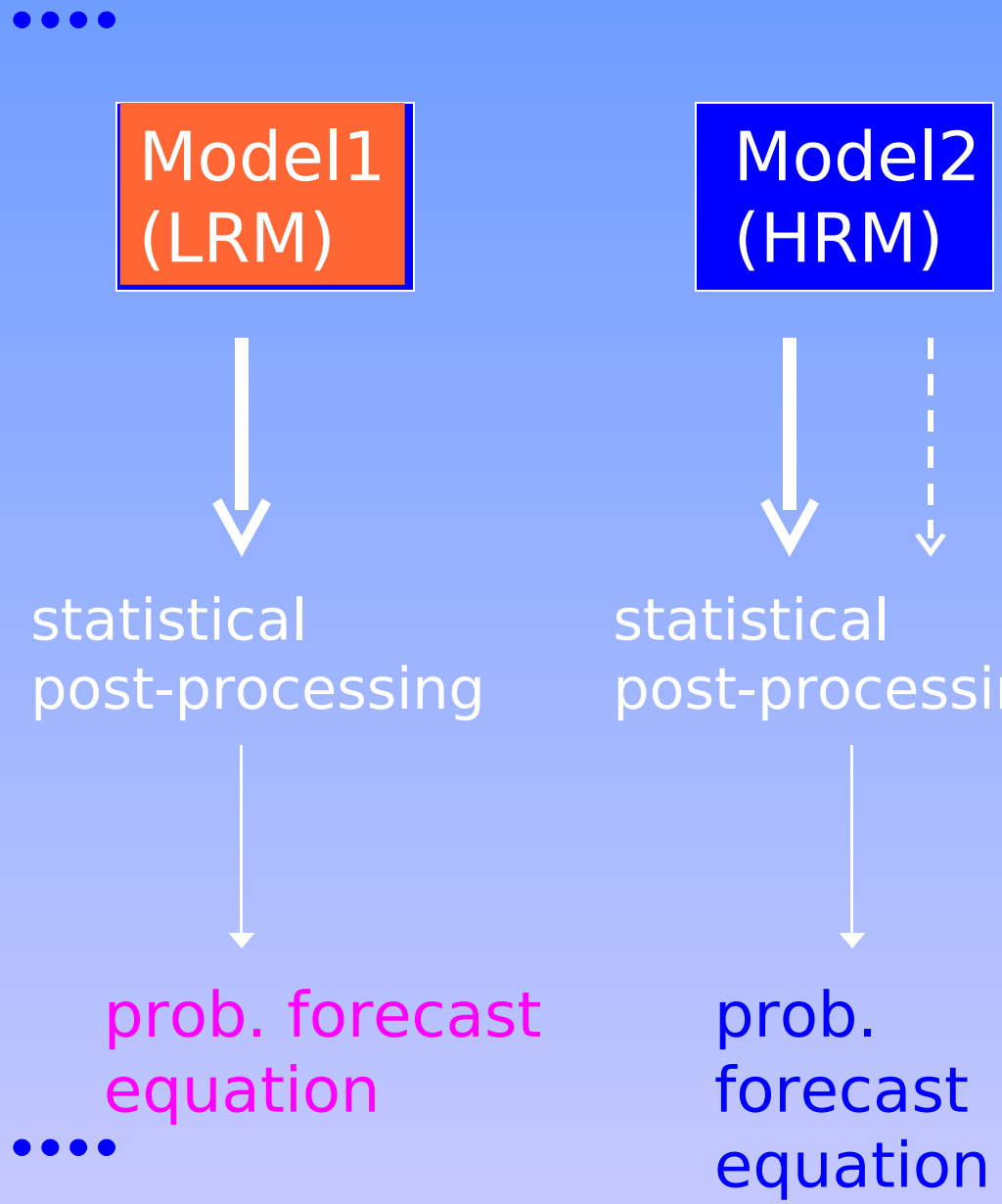
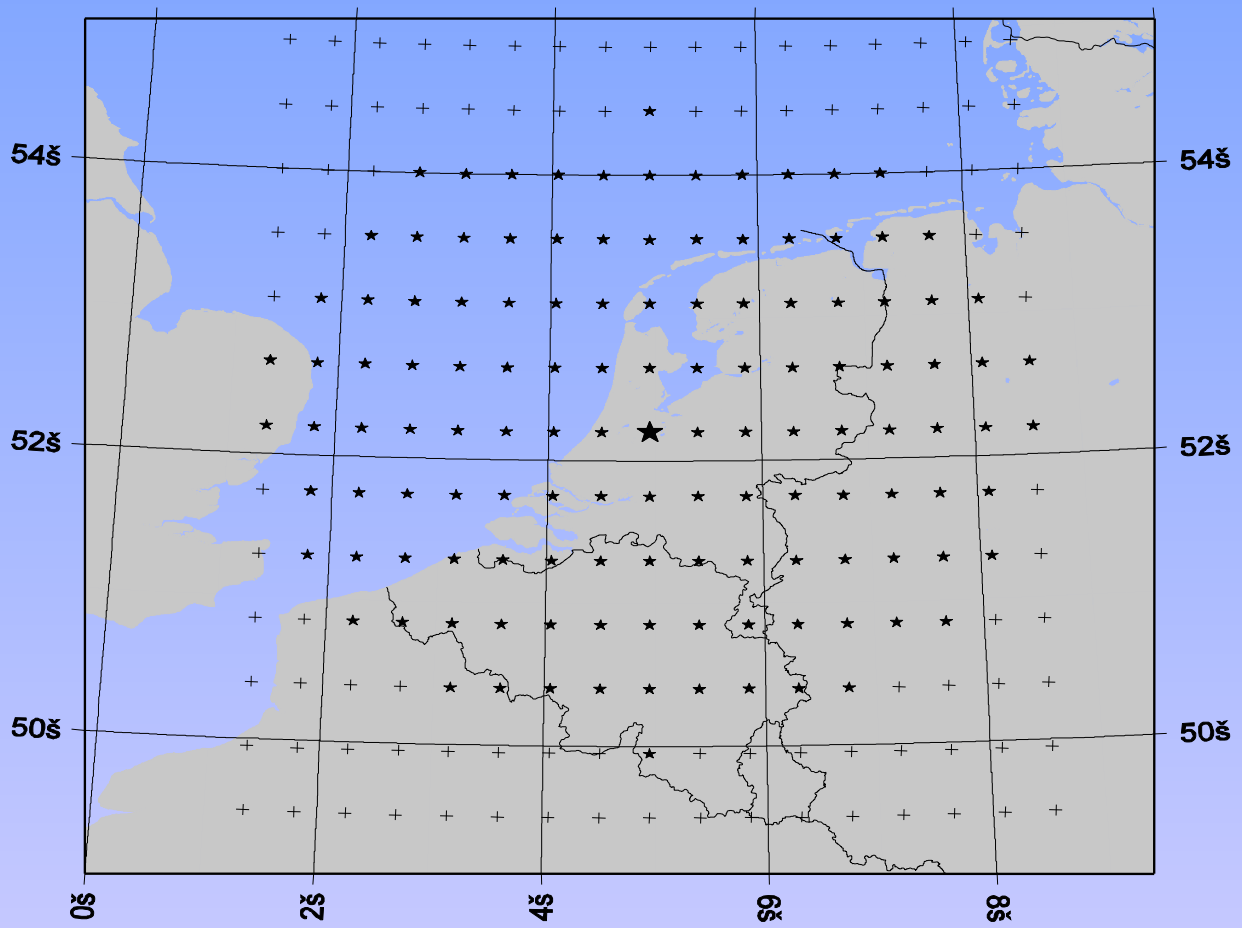


Experimental setup

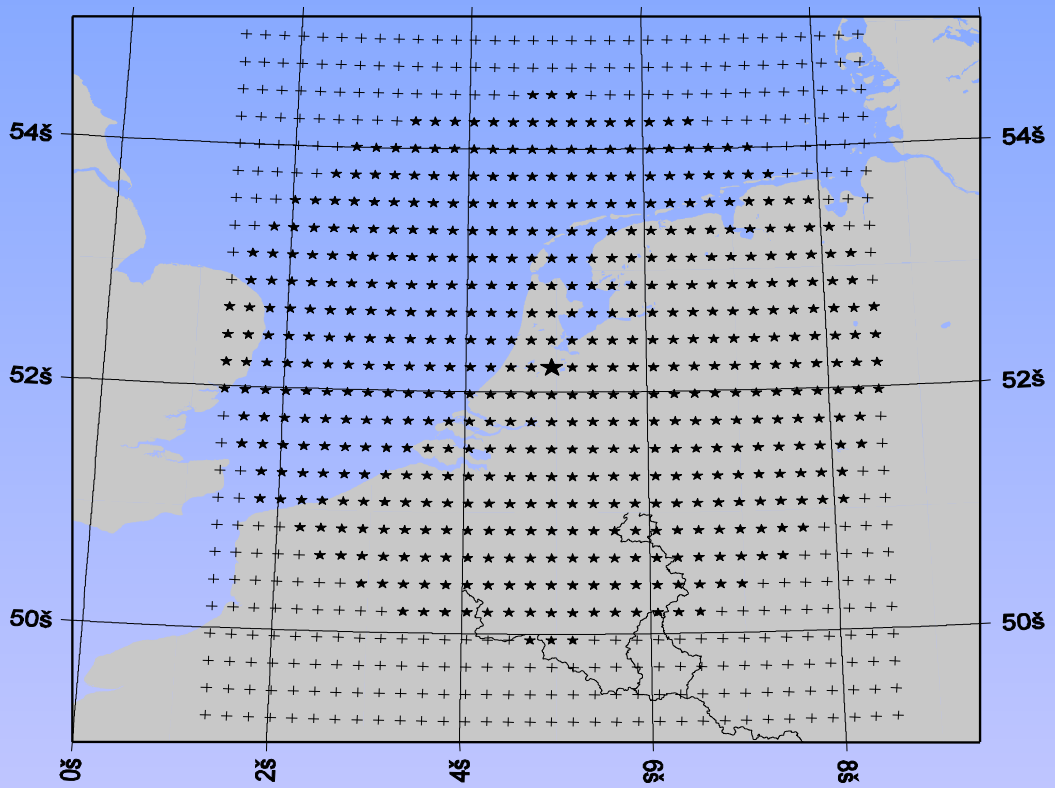
Operational (HRM) vs Control (LRM) of ECMWF
* N400 versus N200 (25 and 50km resp)
* almost 2 years of fcs starting from 1 Feb 2006
* forecasts of 3 hour accumulated precipitation
  for +3, +6, ..., +72
* verified against *station* De Bilt

* thresholds >0, ≥ 1, ≥ 2.5 and ≥ 4mm/3hr

Low (EPS) Resolution



High (OPR) Resolution



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Potential (precip.) predictors (for HR and LR)

* central grid point value (DMO)
* extent of rain area, sqrt(precip), distance to rain area

on circular (and elliptical) areas around central station (radius 50, 100, ..., 250km):

* mean precip, sqrt of max precip,
* fraction covered
* maximum precip. weighted with distance
* ...

Extra set potential predictors on 25 km circle (only for HR)

* the same as on the other circular areas

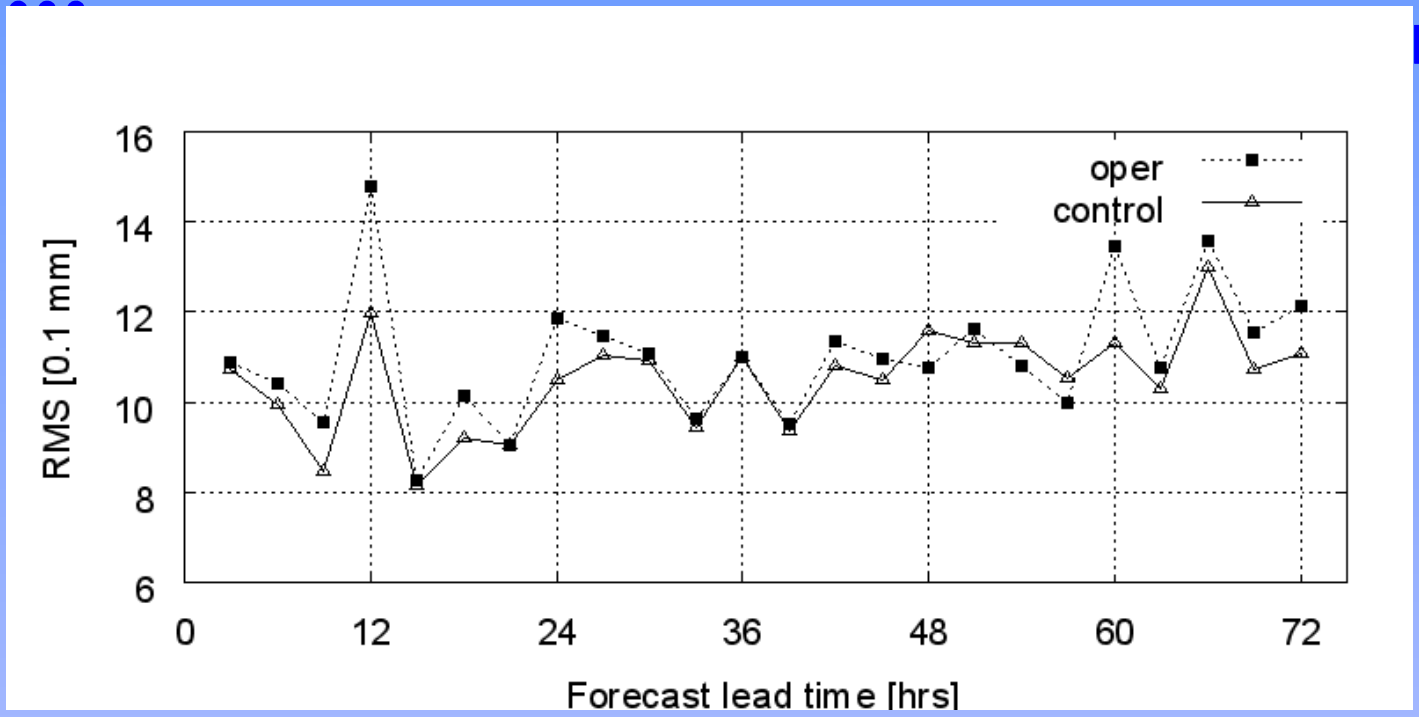
Selected predictors

* central grid point value was never selected

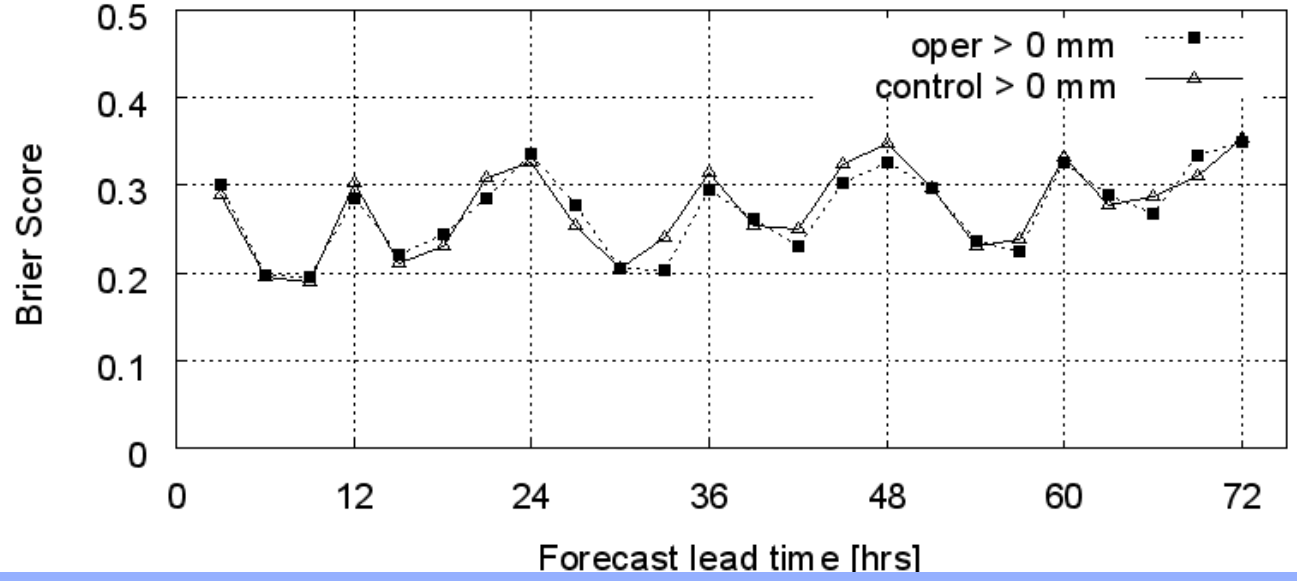
* in all cases “circular” predictors (and no “elliptica

* with increasing radius with forecast period

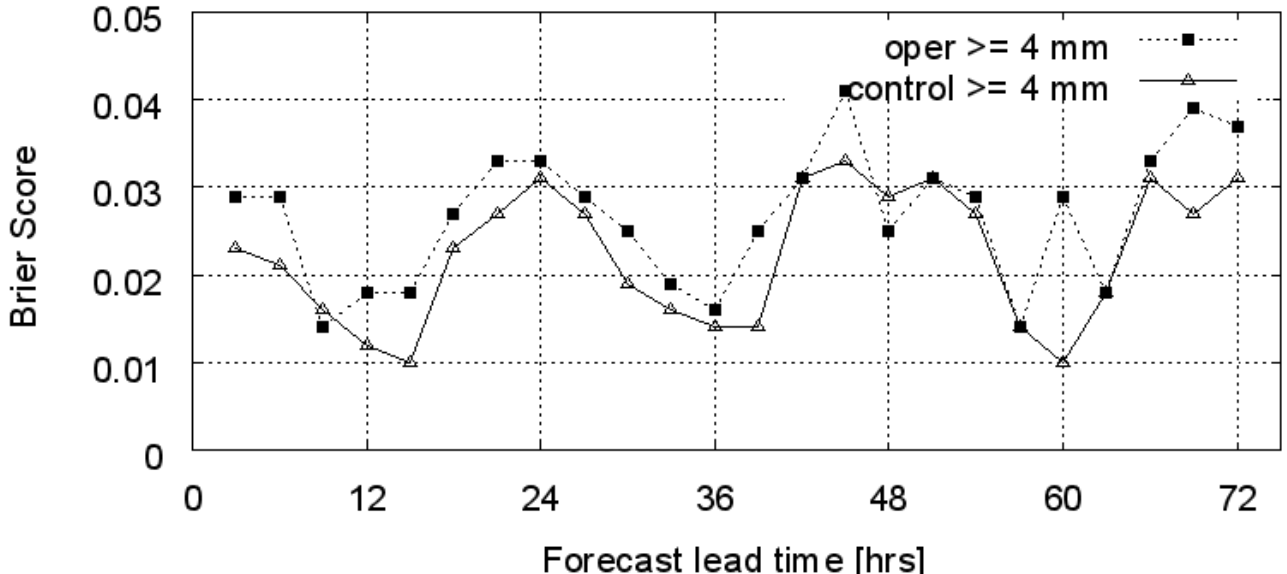
* no predictors selected on 25km circle



DMO (deterministic)



Categorical DMO



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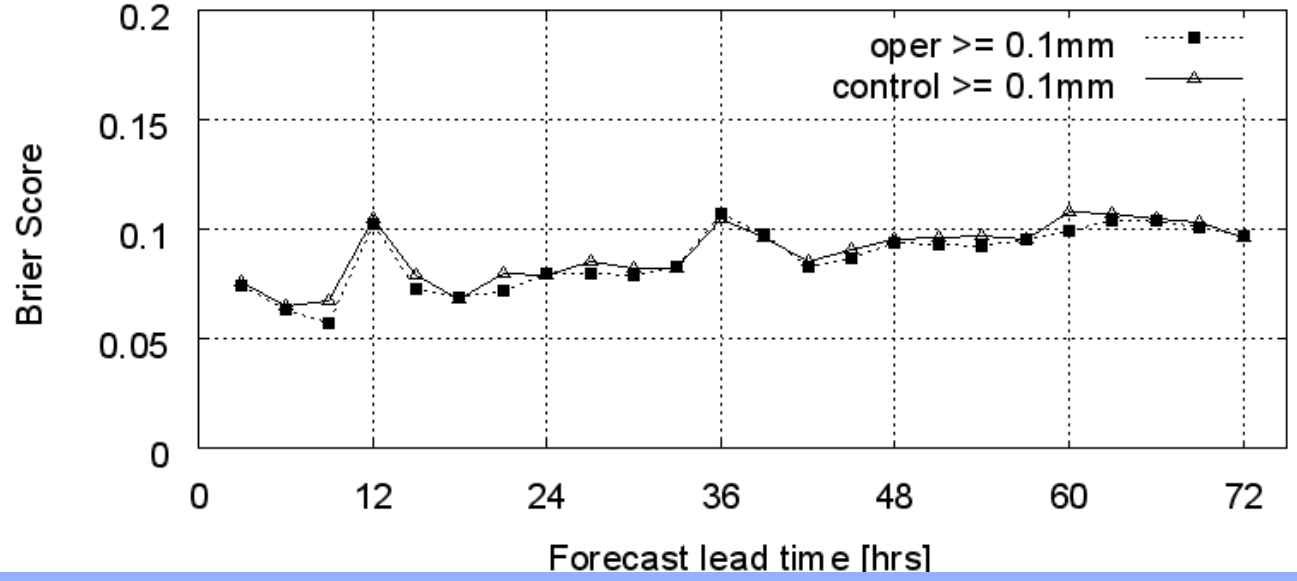
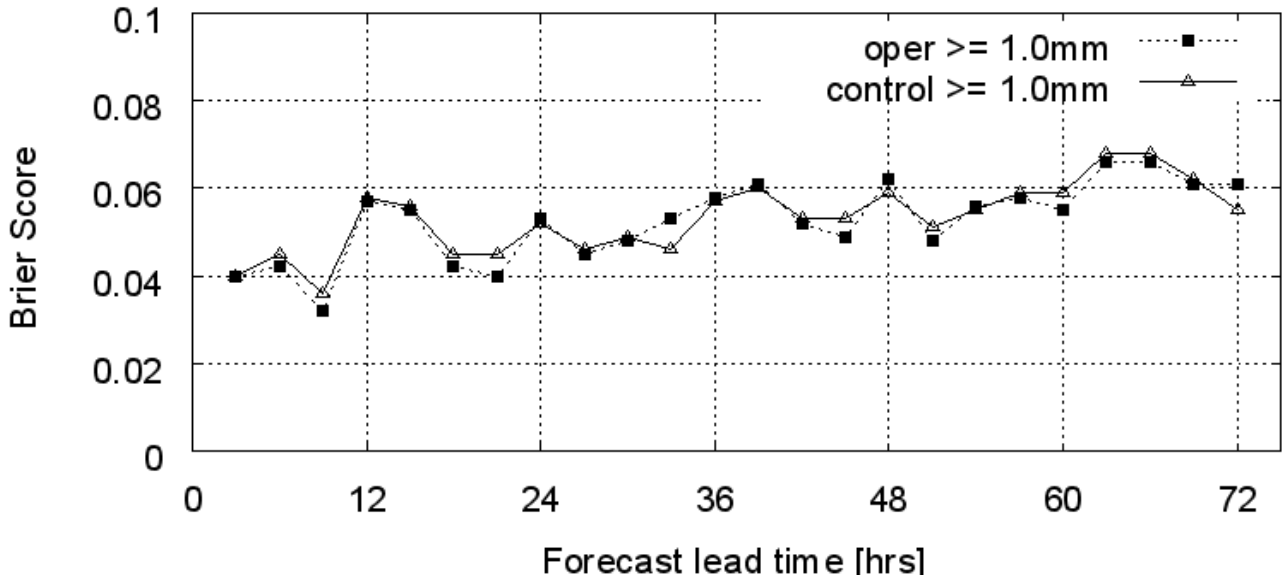
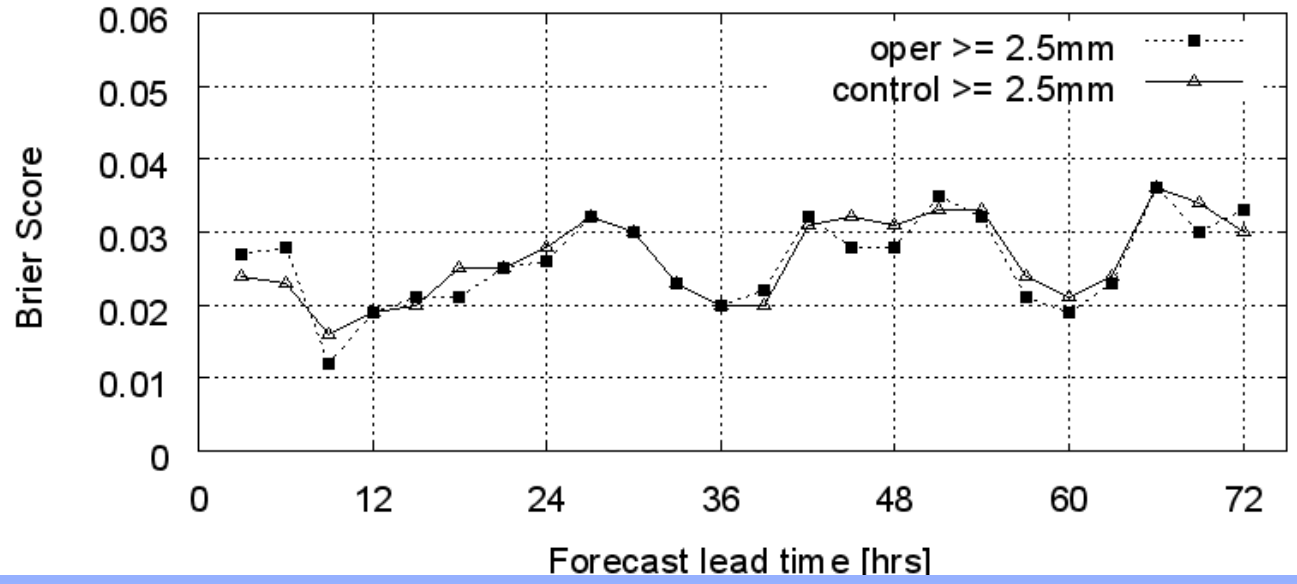


Probabilistic
(after post-proc.)





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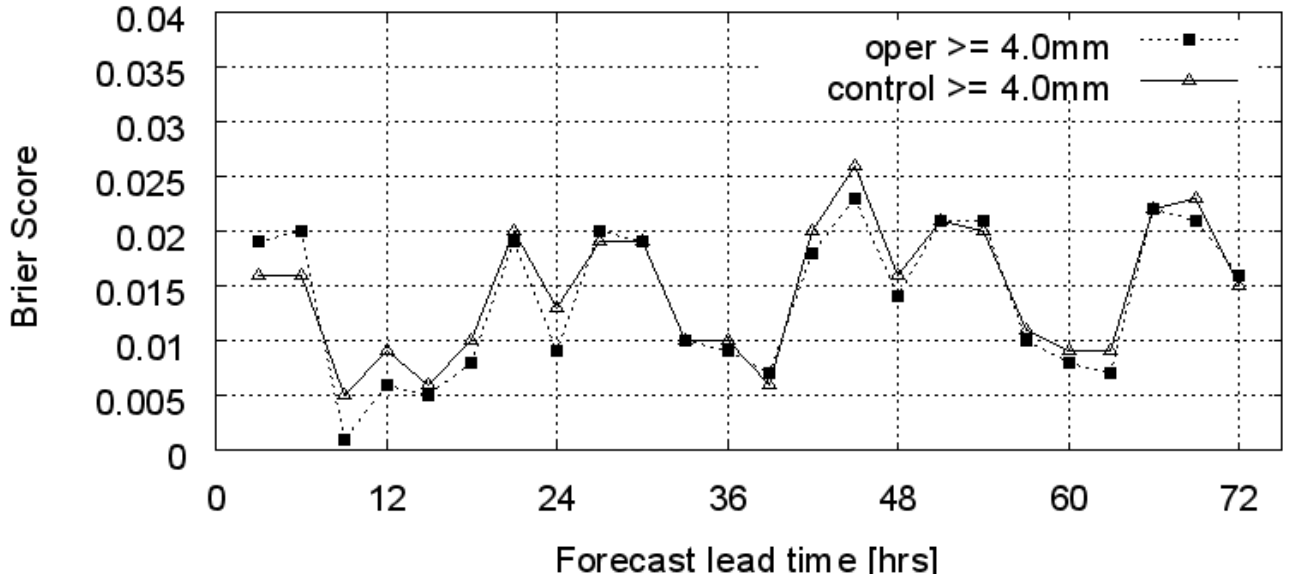

ADVANTAGES

* is able to use all of the spatio-temporal domain
* only statistically significant information is used
* no double penalty
* can deal with scattered showers
* forecasts are reliable
* objective

DISADVANTAGES

* large data sets needed
* you never know that you can't do better
* separate analysis for each predictand
* difficulties with rare events

CONCLUSIONS

* Not only DMO is important in verification but also the “predictive potential” of the model

* Assessing this predictive potential can best be done by means of probabilities

* A way to do that is by statistical post-processing

* (Comparative) verification should include statistically processed model output

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