SREF in Hirlam

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SREF in Hirlam: contents

- Why SREF?
- What is done within Hirlam
- Alternative approach (KNMI view)

Why SREF?

- To forecast extremes!

- Are current models capable of producing extremes we are interested in?
- Not at current resolutions (10-20 km)
- Can 2 km do the job?
- In principle yes, but forecasts have to be interpreted probabilistic->SREF

Why SREF?

- SREF necessary
- Not possible to run with NH 1-2 km model
- 10-50 km resolutions are used
- Extremes (precipitation, convection) not resolved, so do not expect them
- We have to do something different

How to achieve SREF?

- Classical approaches: TEPS, Breeding, SLAF, MUMMA
- All have positive and negative points:

+ Model error: MUMMA
+ Reliable distribution: TEPS
+ Straightforward: SLAF, Breeding
- Model error: TEPS, SLAF, Breeding
- Maintenance: MUMMA, unless cooperation
- Timing maximum impact: TEPS

SREF in Hirlam

- Spain: MUMMA, Breeding, SLAF
- Norway: TEPS

- Spain wants to have operational system somewhere 2005
- How reliable are probabilities?

.... Reliable probability distribution (KNMI discussions)

- Extremes cannot be forecasted, unless NH model at 1-2 km are used in ensemble mode. Not feasible until 2015-2020
- Reliable probability distributions are necessary to enable good use of probability forecast
- Alternative approaches: Compare to model climate, e.g. extreme forecast index of ECMWF
- Add MOS to meso-Beta runs to determine accurate probabilities and correct for model errors

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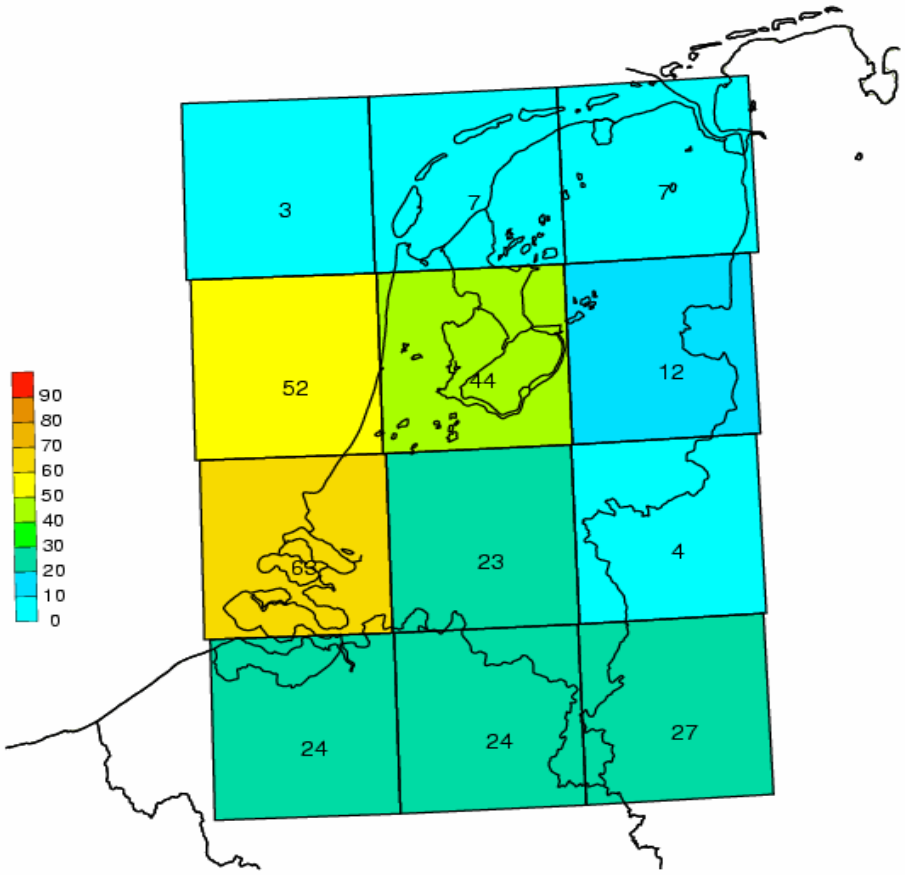
SREF+MOS

- Alternative: SREF+MOS:
  1) (small) number of SREF runs (MUMMA or other way to get spread in larger scale condition)
  2) MOS to derive reliable probabilities on specific severe weather phenomena
  3) NH-run to include forcing mechanisms

  + relatively cheap

MOS Examples (1)

Probability of thunder (>= 2 discharges)
00UTC-run of 6 August 2003 (15-21UTC)



lightning discharges 6 August 2003
(15-21UTC)

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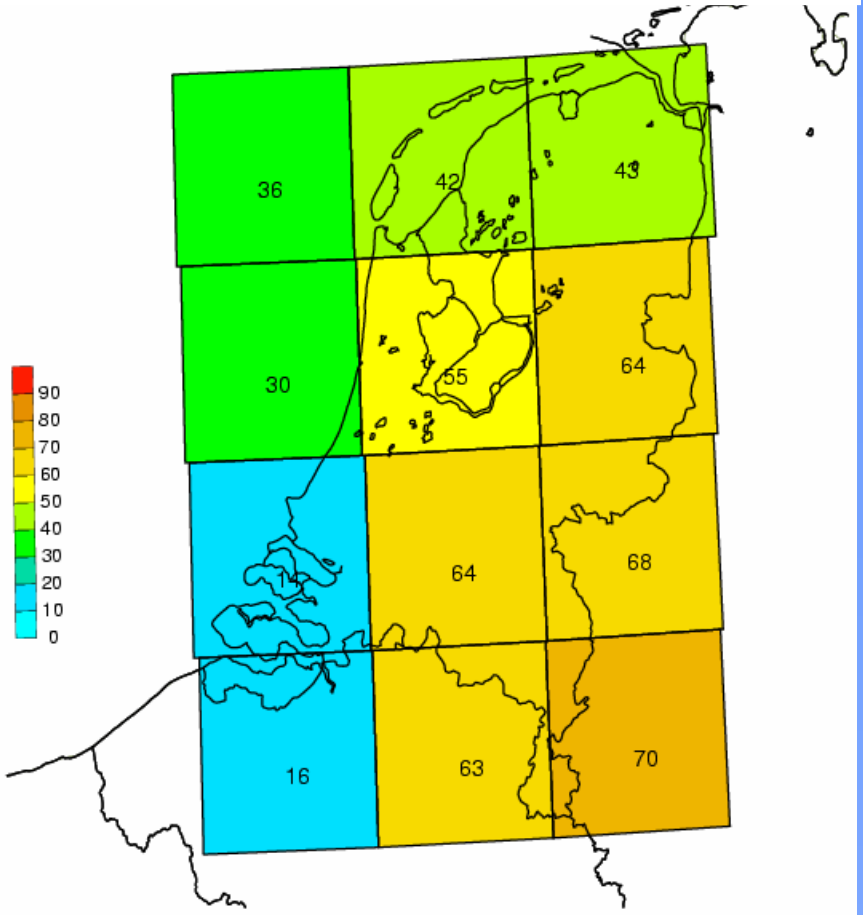
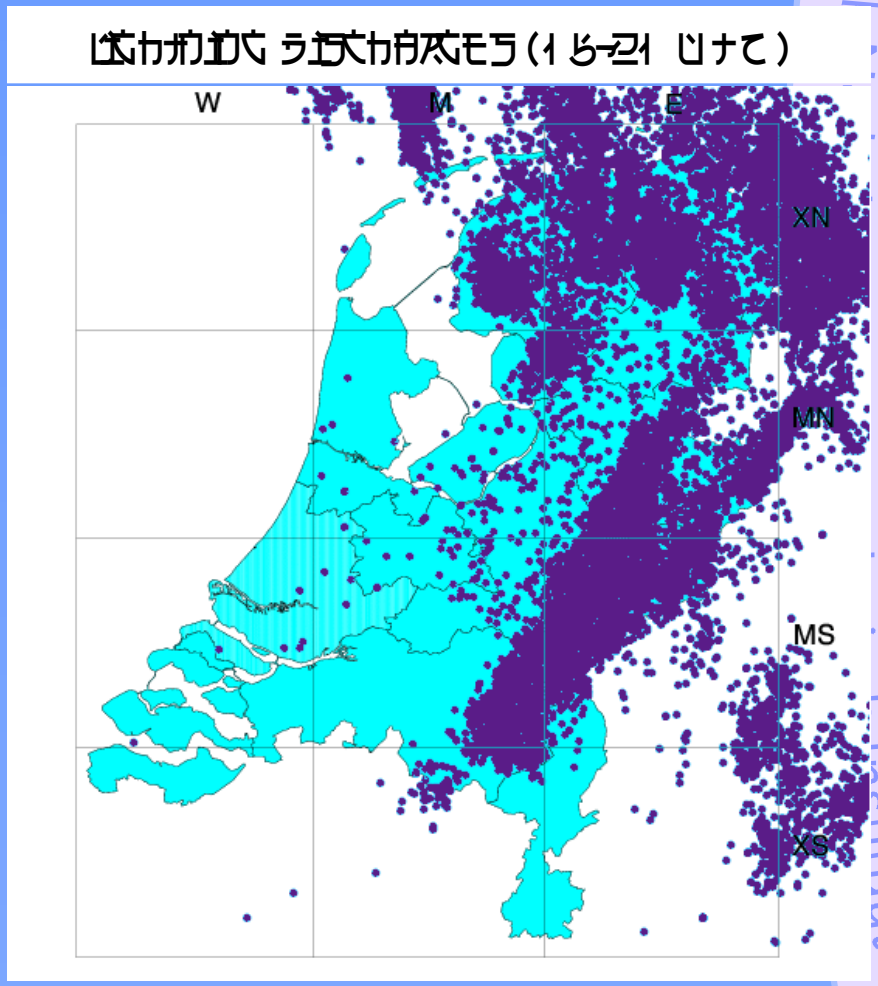
MOS Examples (2)

Probability of severe thunderstorms
(>= 500 discharges)
00UTC-run of 2 June 2003 (15-21 UTC)





Conclusions

- Important role MOS in SREF for derivation of reliable probabilities for specific severe weather events
- Cooperation may be easiest way to achieve MUMMA in Europe (PEPS)
- SREF as important as NH-modeling, role for NH-modeling in SREF