

Why Ensembles?

DOH Conference

6/10/04

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An Excellent Question

- Many have gone before us and asked this question
 - Meteorologists have studied this question for their ensembles
 - They have developed a framework for looking at this question
 - Resulting in many considered responses



Many Suspect These are the Reasons

- To create more *SCCs*
- To irritate the *WFO*
- To confuse our

But the Real Reason is Uncertainty

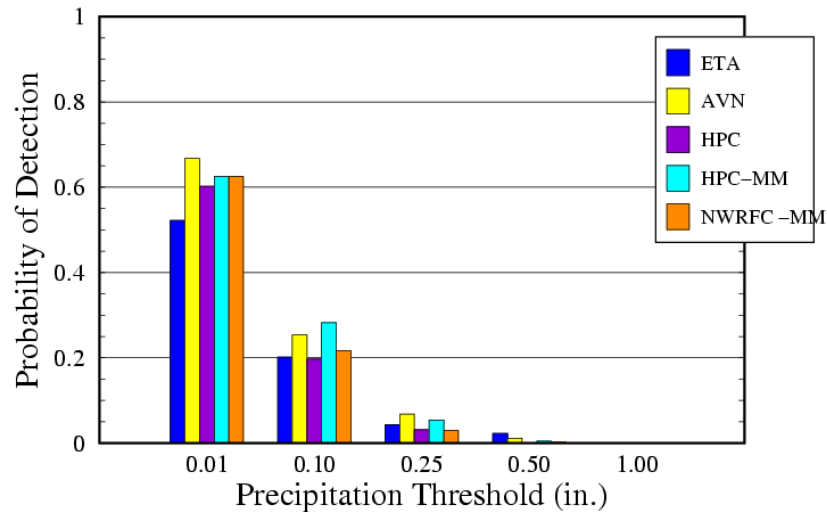
- Economic value in the face of uncertainty
- Making better single valued forecasts in the face of uncertainty.



Some QPF Stats from the NPVU

NPVU – NWRFC – POD

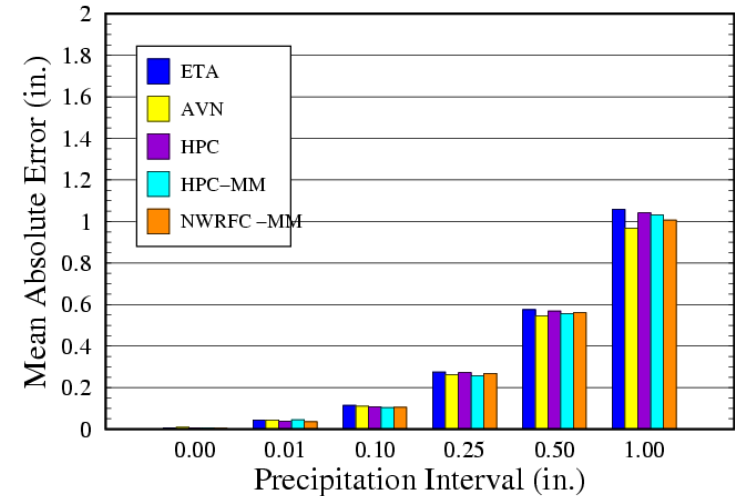
Apr2003–Sep2003 DAY3 06H GRD



Fri Jan 2 23:51:13 2004

NPVU – NWRFC – MAE

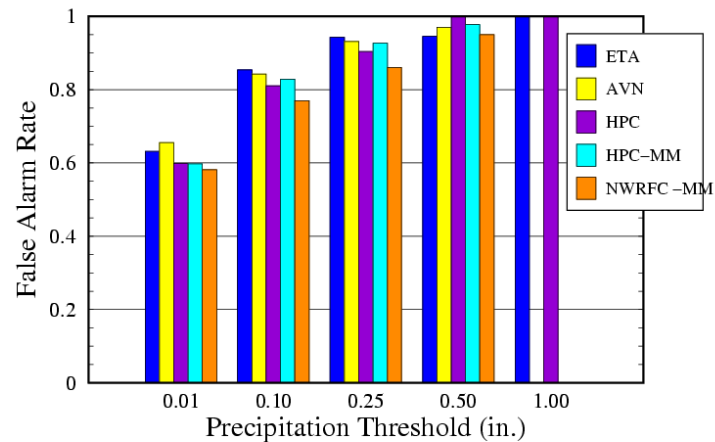
Apr2003–Sep2003 DAY3 06H GRD (OBS)



Sat Jan 3 00:02:59 2004

NPVU – NWRFC – FAR

Apr2003–Sep2003 DAY3 06H GRD



Fri Jan 2 23:51:19 2004

Forecast Value

- Using Cost/Loss ratios
 - The cost of protection vs. the potential loss
 - You can determine the Value of a set of forecasts
 - Value is the reduction in the mean expense relative to the reduction with perfect forecasts
 - And if you do this for probability forecasts, vs deterministic forecasts, you find
 - Across all users, the probability forecasts have greater Value.
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Value vs. Cost/Loss Ratio

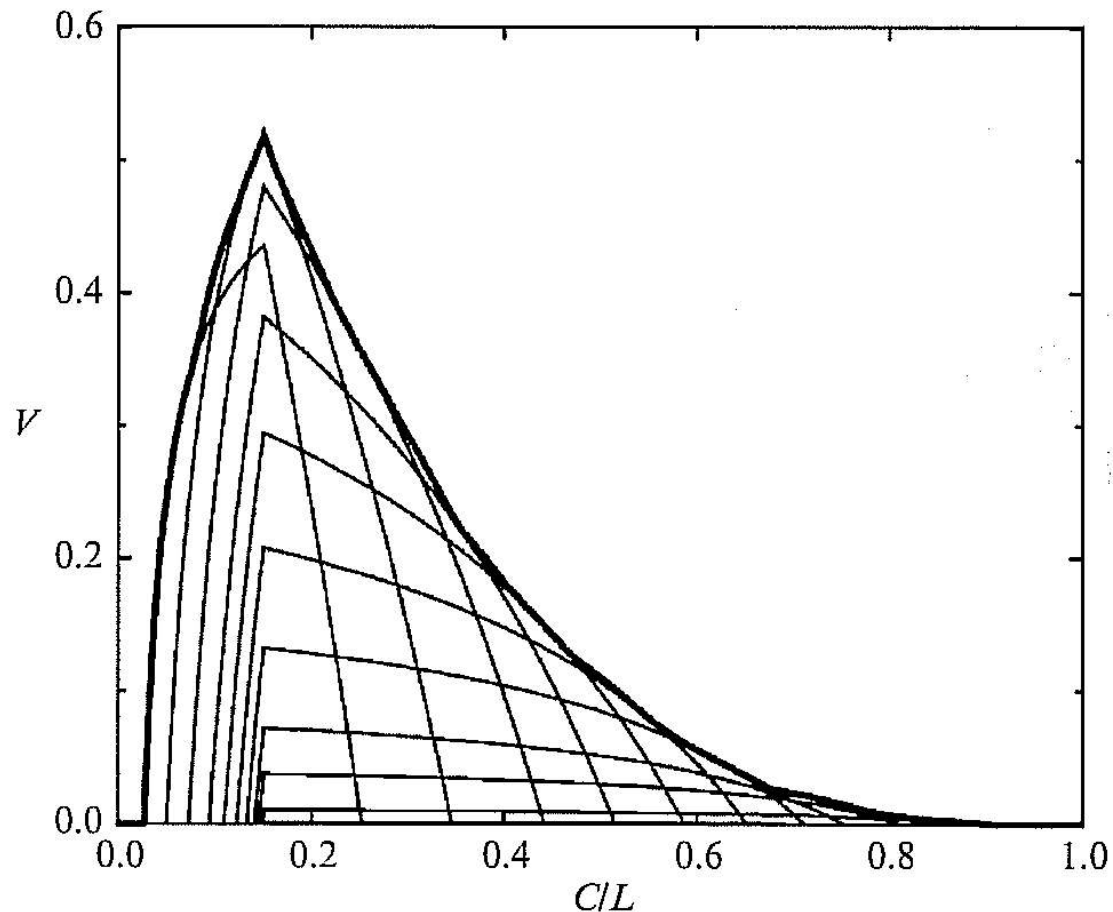


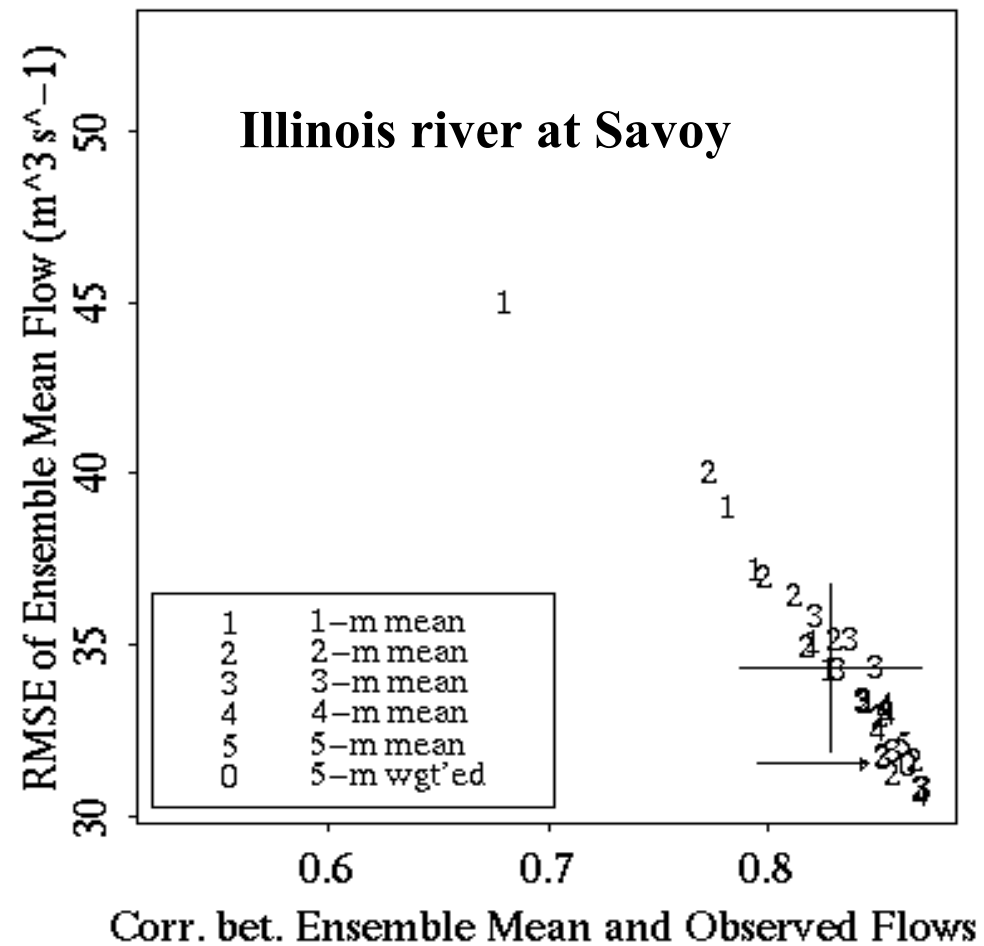
Figure 8.2 Value of ECMWF EPS probability forecasts of 24-h total precipitation exceeding 1 mm over Europe at day 5 for winter 1999/2000. Thin curves show value V as a function of cost–loss ratio C/L for different choices of probability threshold ($p_t = 0.02, 0.1, 0.2, \dots$); heavy solid line shows the envelope curve of optimal value

From: Jolliffe and Stephenson, 2003, p. 173

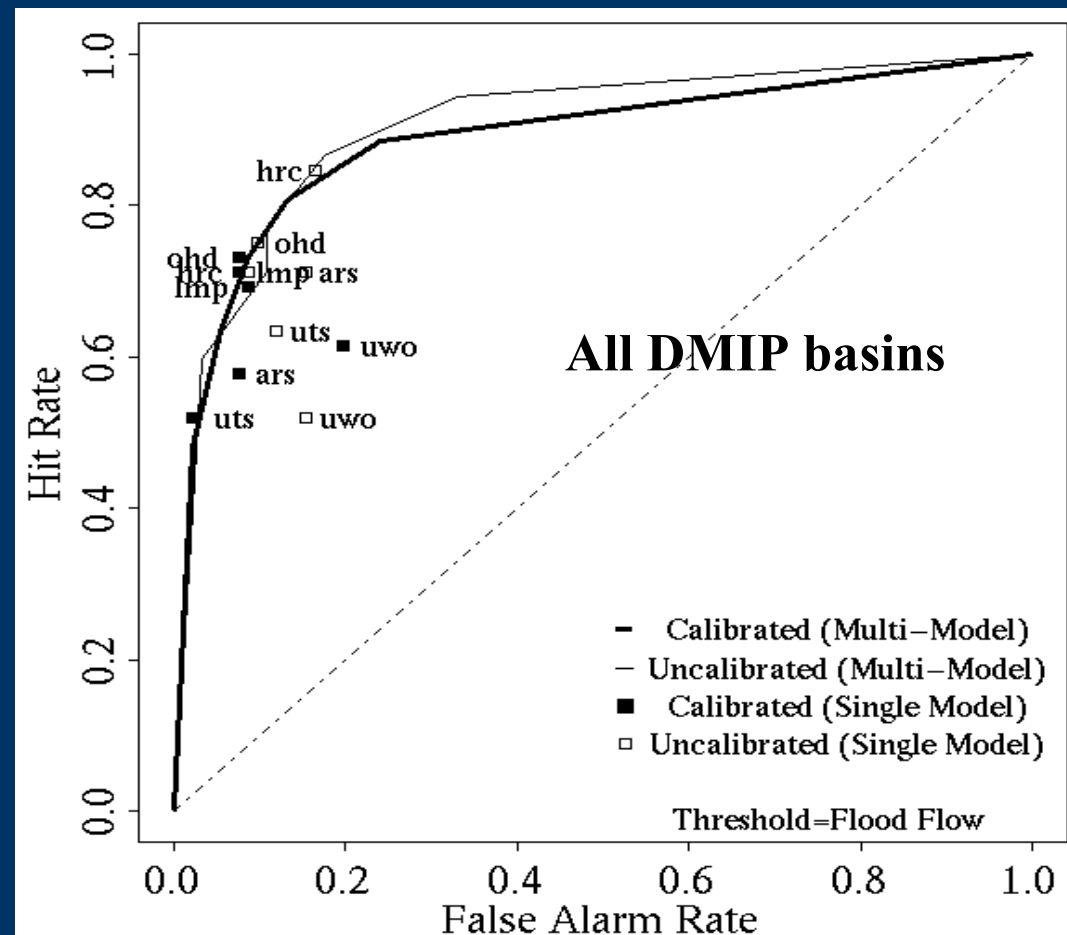
Ensemble Mean as a Single Valued Forecast

- DMIP multi-model analysis





Mean of multimodel ensemble (arrow) is superior to the best single model simulation (cross hair)



Probabilistic prediction using multimodel ensemble has larger economic value than single model results
 From Georgakakos et al. 2004