



Comparative Verification of Experimental HR QPFs with Model and Forecaster-Prepared QPFs in the NWS

**Jess Charba
Fred Samplatsky**

**Meteorological Development Laboratory
National Weather Service, NOAA**

Details = http://ams.confex.com/data/manuscript/ams/91Annual/Paper_177686_manuscript_132_0.pdf

HR QPF website = <http://www.weather.gov/mdl/hrqpf/>

What is HR QPF ?

- **HR QPF = high spatial and intensity resolution quant. precip forecasts**
 - **GFS-based MOS experimental model**
 - **Produced 2x / day since June 2008**
 - **On 4-km grid over CONUS**
 - **Two articles in Jan 2011 issue of MWR**
- **HR QPF elements**
 - **QPF = “single value” precip amount**
 - **PQPF = probabilities for precip thresholds**
 - **PoP = probability of precip**
 - **6- and 12-h valid periods**
 - **6-h projections to “day” 6.5 (day 8 for PoP)**

Objective

- **Use comparative scoring to see whether HR QPF elements provide**
 - **Better model guidance than presently available**
- **Compare HR performance with forecasters at**
 - **HPC (NCEP Hydromet. Predict. Center)**
 - **WFOs (produce NDFD QPFs)**
- **Compare HR performance with MOS**

Model QPF Guidance Included in Verification

■ NCEP models

- NAM
- GFS
- HPC 6-h PQPF “hybrid” exp. model
 - fits prob. density function to ensemble model and HPC forecaster QPFs

■ Gridded MOS QPF and PoP

■ MOS QPF (at MOS stations)

Human-Prepared Grids Included In Verification

- **HPC 6-h QPF**
- **NDFD** (Nat. Digit. Fcst. Database prod. by WFOs)
 - **6-h QPF**
 - **12-h PoP**

QPF Issuance Times (1200 Z Cycle)

- **Model cut-off time**
 - **~ 1800 Z**
- **Human cut-off time**
 - **HPC ~ 2200 Z**
 - **NDFD ~ 0000 Z (next day)**

Verification Data and Scoring

- **Stage IV quantitative precip estimates (QPE)**
- **Scoring performed on 4-km QPE grid and at MOS stations**
- **Independent verification samples**
 - **Period = Oct 2009 – Nov 2010**
 - **Cool (Oct – Mar) and warm (Apr – Sep) seasons**
- **CONUS domain**

6-h Cat. QPF

4-km grid

Models

NAM, GFS, GMOS, HR

Humans

HPC, NDFD

Oct 2009 – Mar 2010

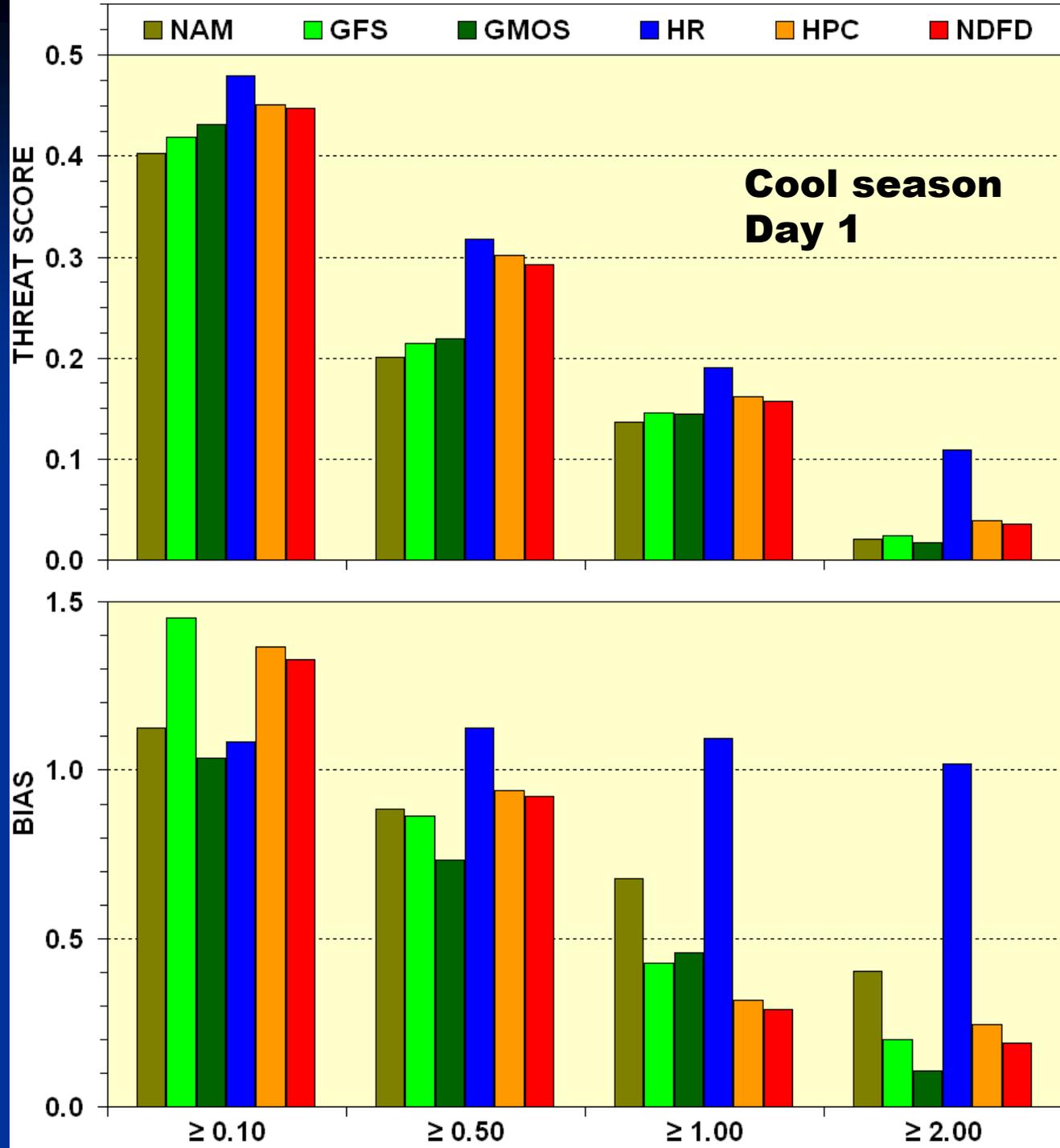
Notes

Similar rankings -

Warm season

Days 2 – 3

12-h valid period



6-h Cat. QPF

1647 MOS stations

Models only

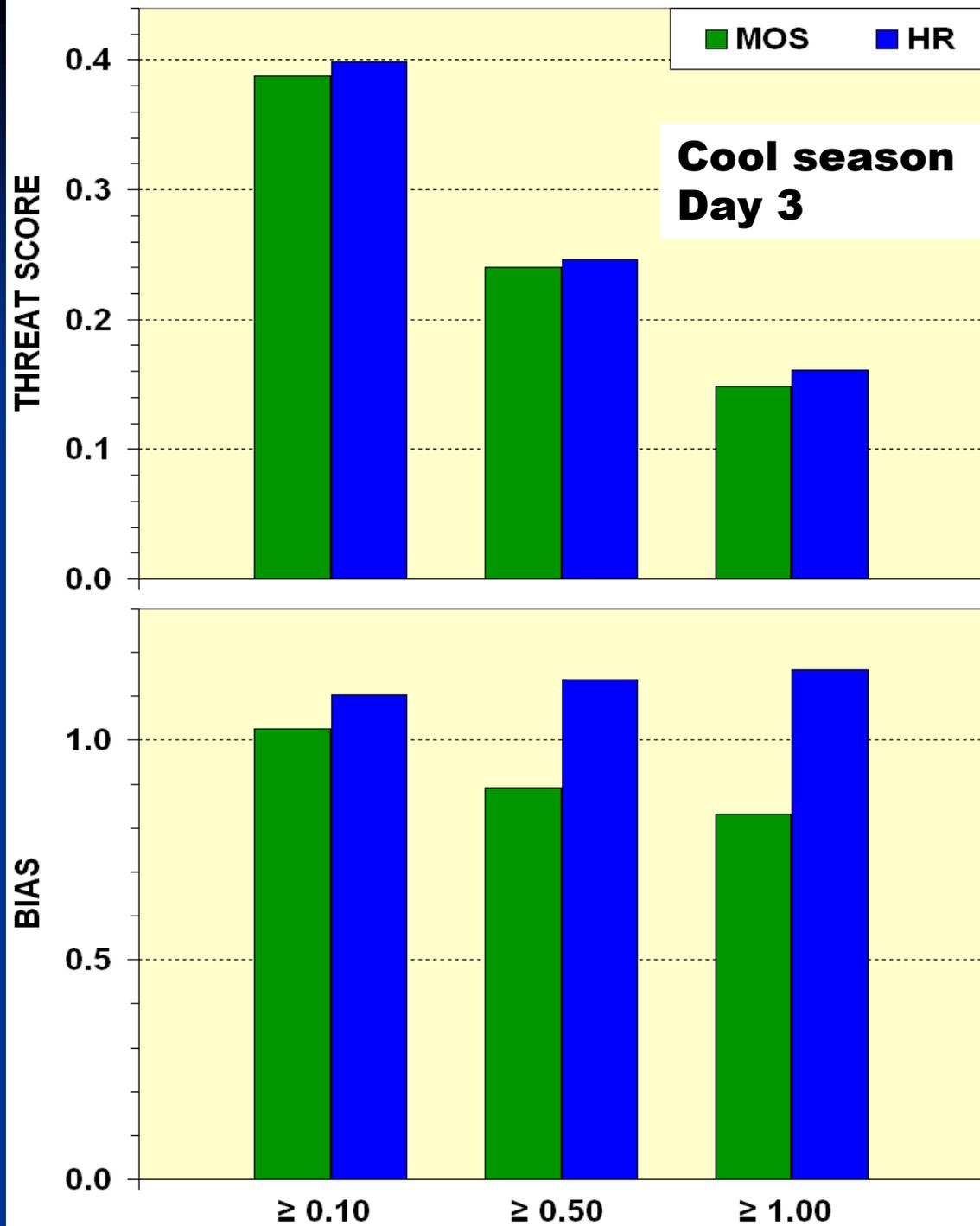
Oct 2009 – Mar 2010

Notes

Similar rankings -

Warm season

Thru Day 6.5



12-h PoP

4-km grid

BSS = Brier skill score

Models

GMOS, HR

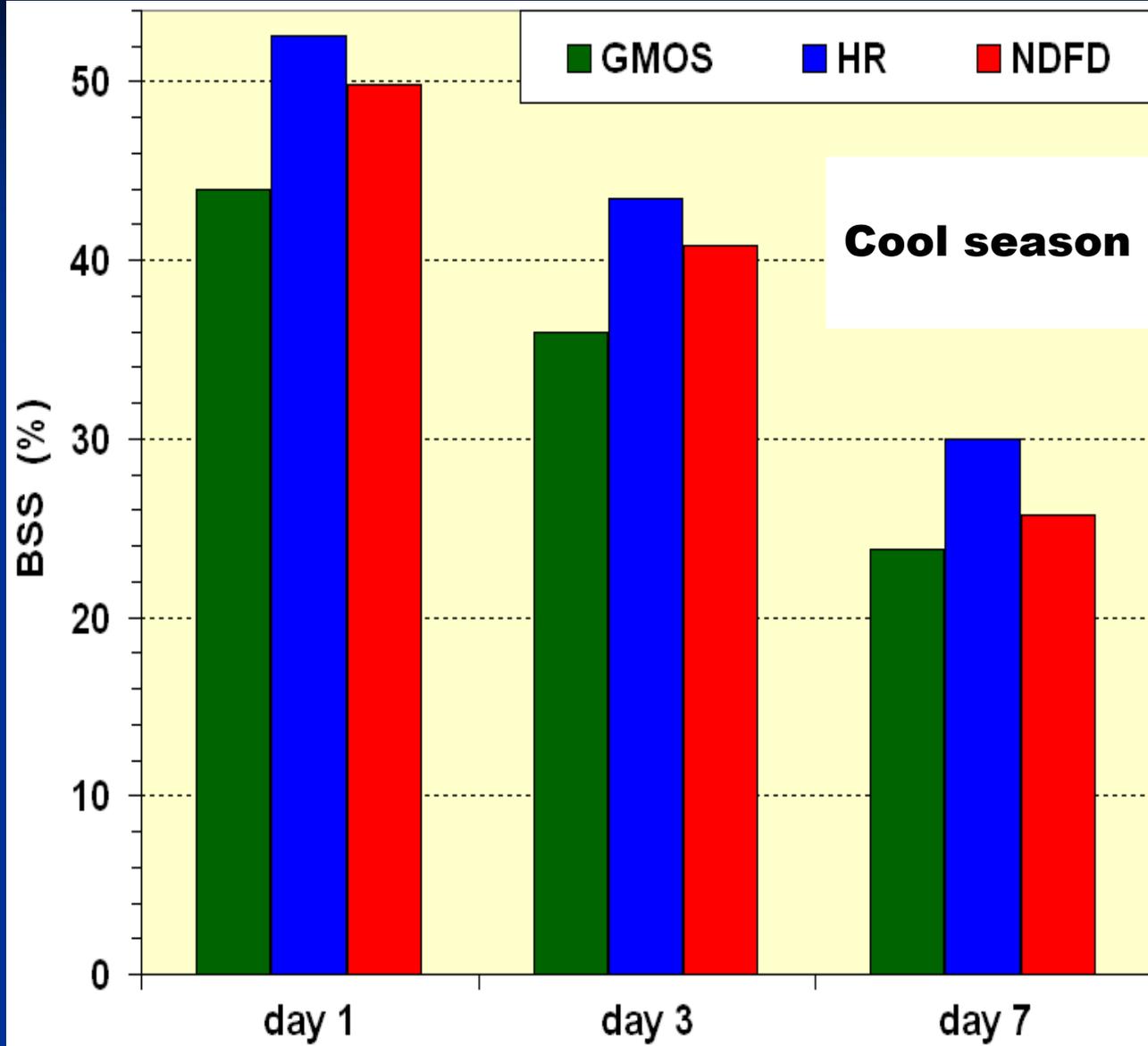
Humans

NDFD

Oct 2009 – Mar 2010

Note

Similar rankings for -
Warm season



6-h PQPF

4-km grid

Models only

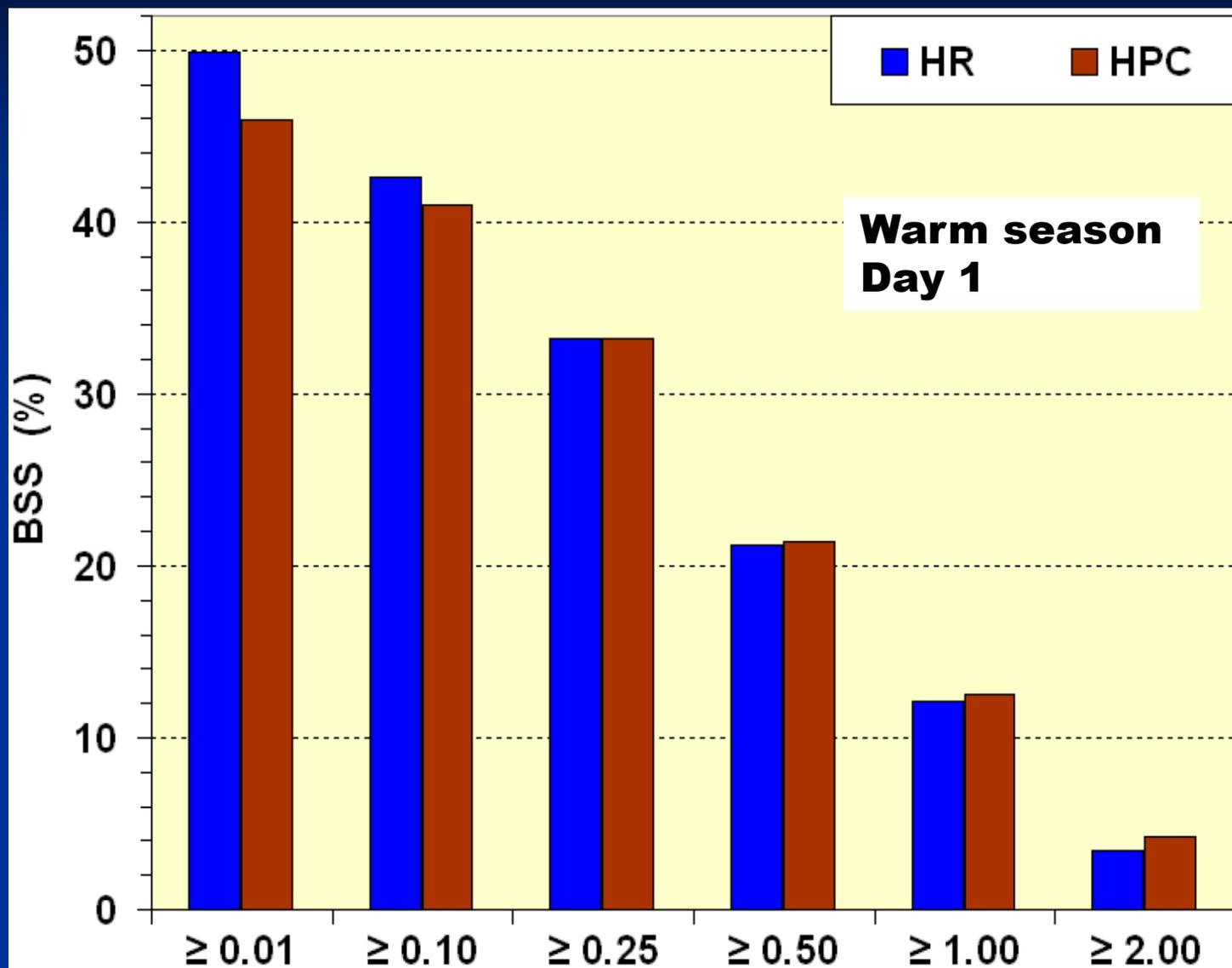
Apr '10 – Sep '10

Notes

Similar ranking -

Cool season

Days 2 and 3



6-h PQPF

Reliability

4-km grid

Models only

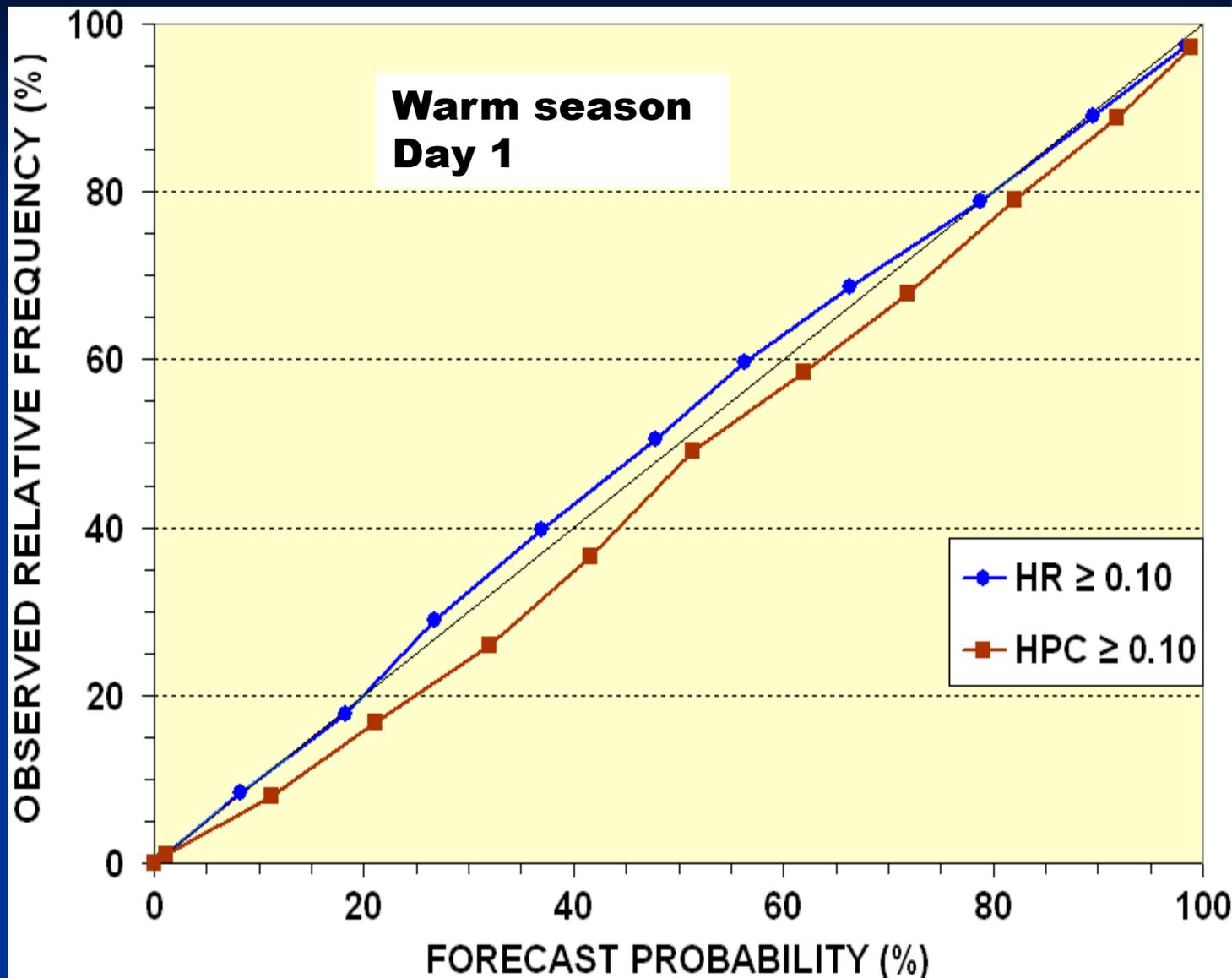
Apr '10 – Sep '10

Notes

Similar results -

Cool season

Days 2 and 3



6-h PQPF

Reliability

4-km grid

Models only

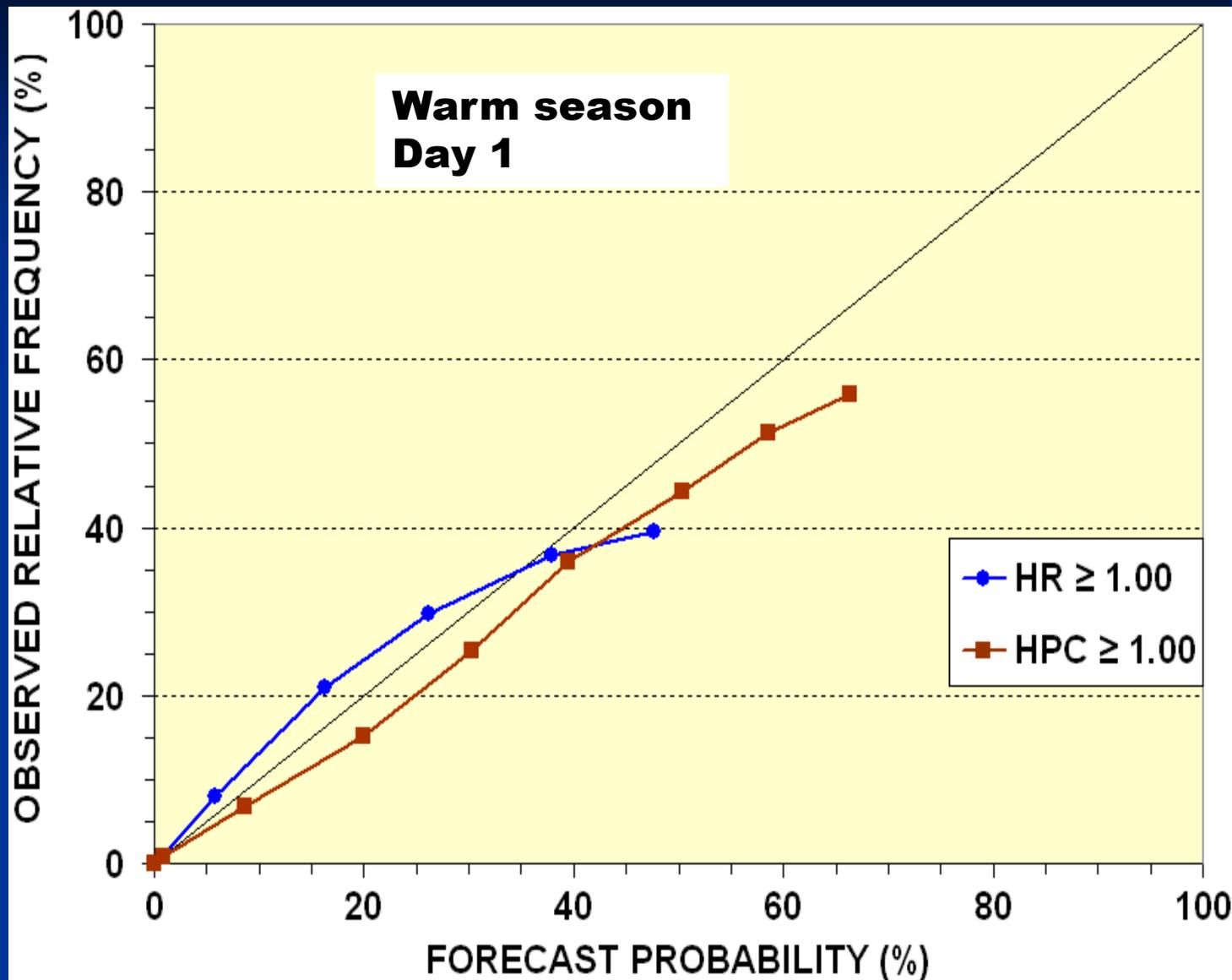
Apr '10 – Sep '10

Notes

Similar results -

Cool season

Days 2 and 3



6-h PQPF

Sharpness

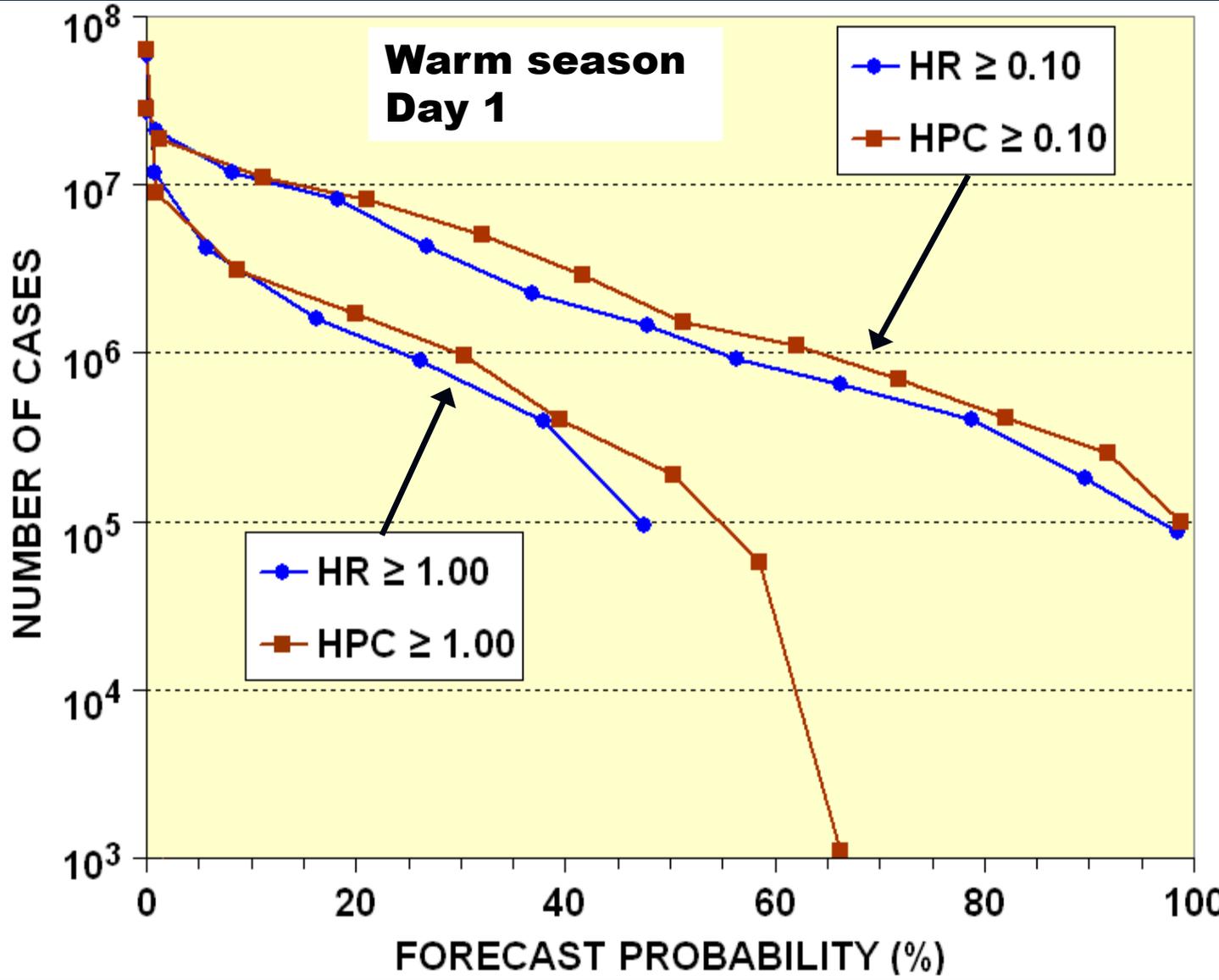
4-km grid

Models only

Apr '10 – Sep '10

Notes

Similar results -
Cool season
Days 2 and 3



Findings Summary

- **For cat. QPF grids HR scored**
 - **Somewhat better than HPC and WFO (NDFD) forecasters**
 - **Much better than NCEP models and GMOS**
- **For cat. QPF at MOS stations**
 - **HR improved on MOS but less than for GMOS**

Findings Summary (cont.)

- **For PoP grids HR skill**
 - **Better than GMOS and NDFD**
- **For PQPF model grids**
 - **HR and HPC PQPFs have similar skill**
 - **HR better reliab.; HPC better sharpness**
 - **HR and HPC PQPFs may complement each other**

HR Implementation Plans

- **HR QPF and PoP grids will replace GMOS grids over CONUS in spring 2011**
- **Issuance of HR PQPF grids expected later in 2011**

Questions ?