Ensemble Products Tiger Team Update

Ryan D. Torn, Univ. Albany, Team Co-Lead
Mark DeMaria, NHC, Co-Lead
Paul Kucera & DTC Team

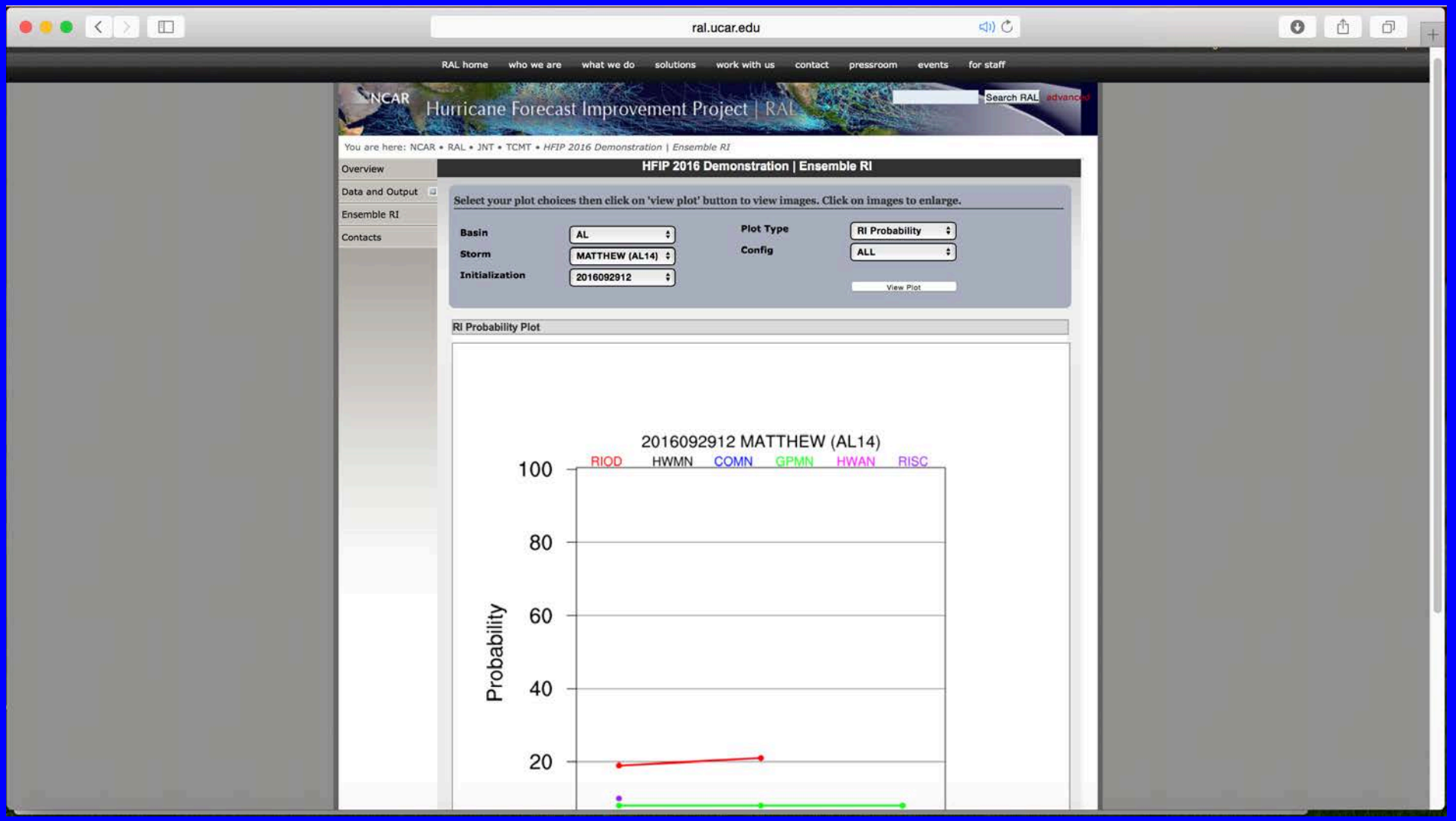
Contributions from various Ensemble Forecasting Groups & NHC Forecasters

Overview

- **Charge**: Develop new ensemble-based products beyond the typical mean/standard deviation that could be used by NHC forecasters to improve forecasts
- For 2016: Develop an ensemble-based probabilistic RI product similar to the SHIPS RI product
  - HWRF Ensemble
  - GFDL Ensemble
  - COAMPS-TC Ensemble
  - SPCE
  - HWRF Analog

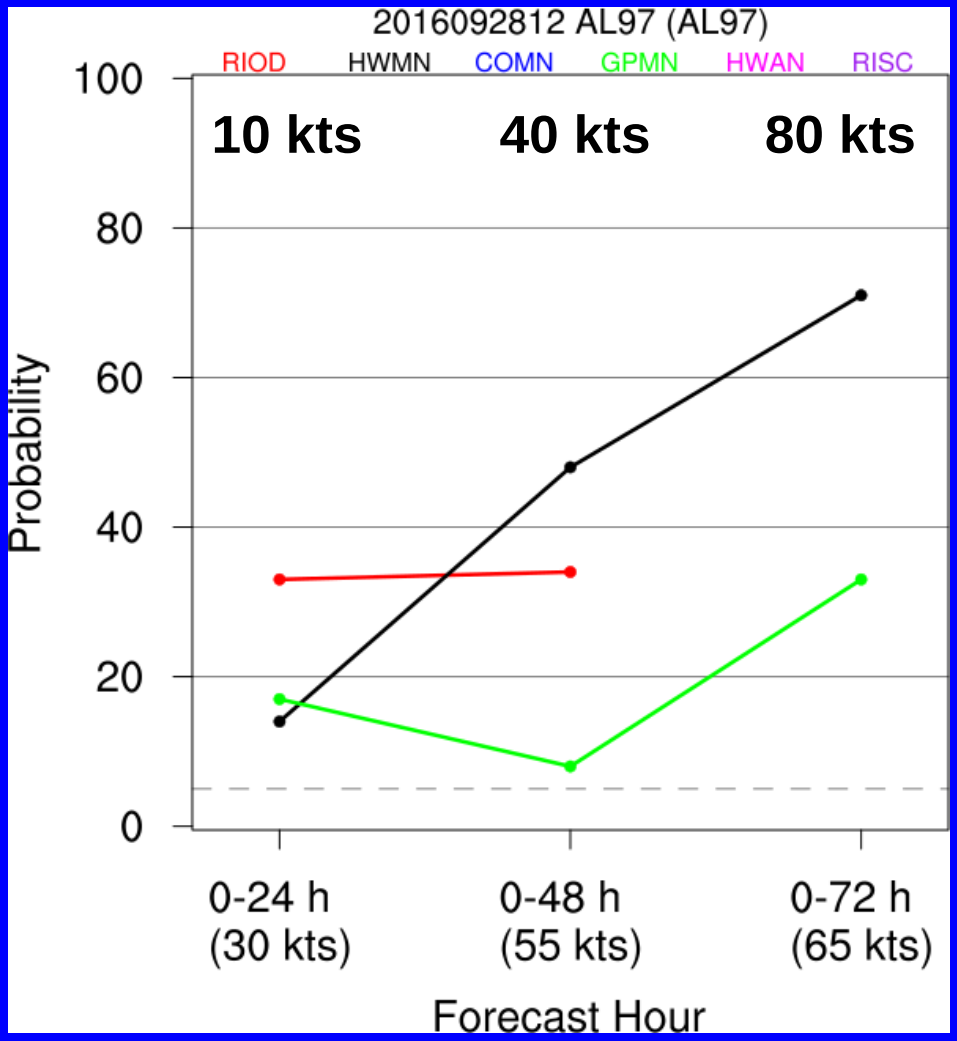
Accomplishments

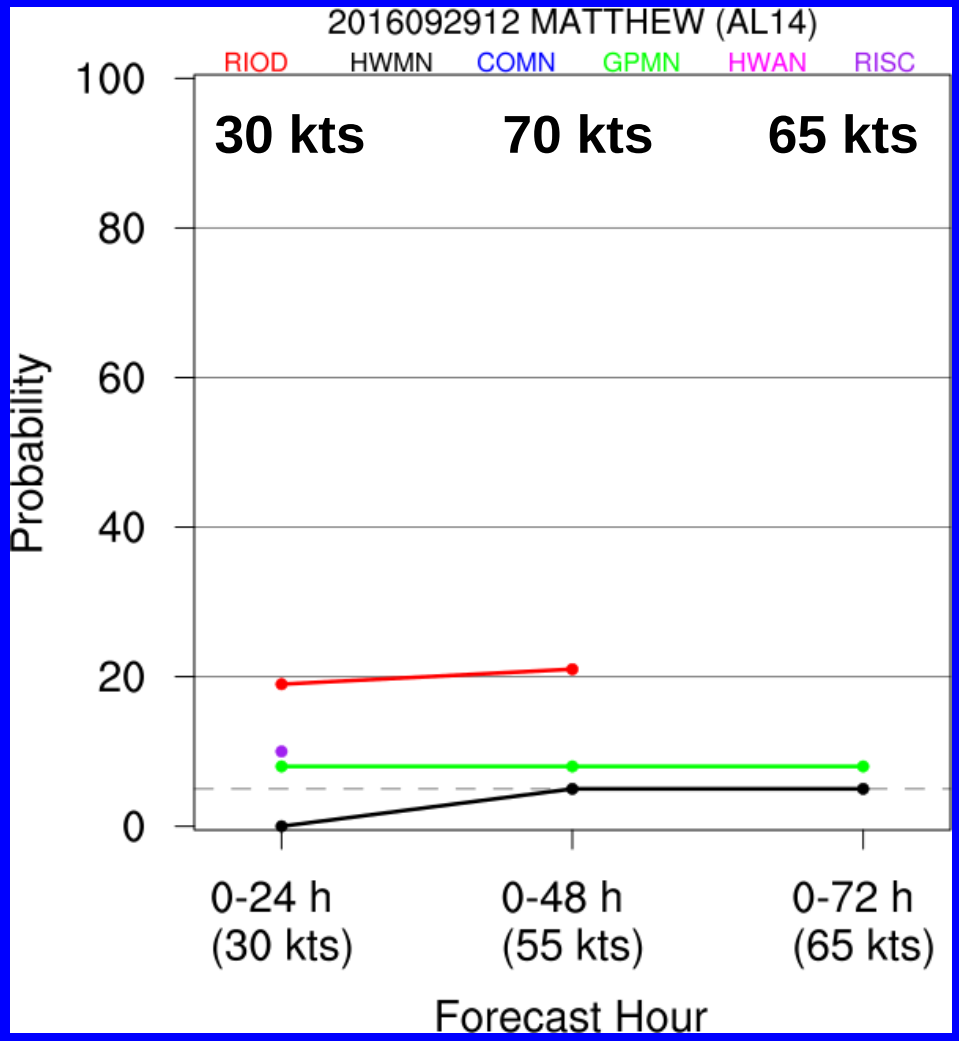
- Extension of ATCF e-deck format to intensity change probabilities
- Software to compute probabilities and write e-decks
- Retrospective forecast probabilities submitted for AL & EP 2013-2015 seasons
- Expansion of MET-TC software to validate RI probabilities
- Validation of retrospective forecasts
- Submission of real-time ensemble-based probabilities to DTC for demonstration project
- Validation of demonstration forecasts
- Development of real-time webpage to plot probabilities



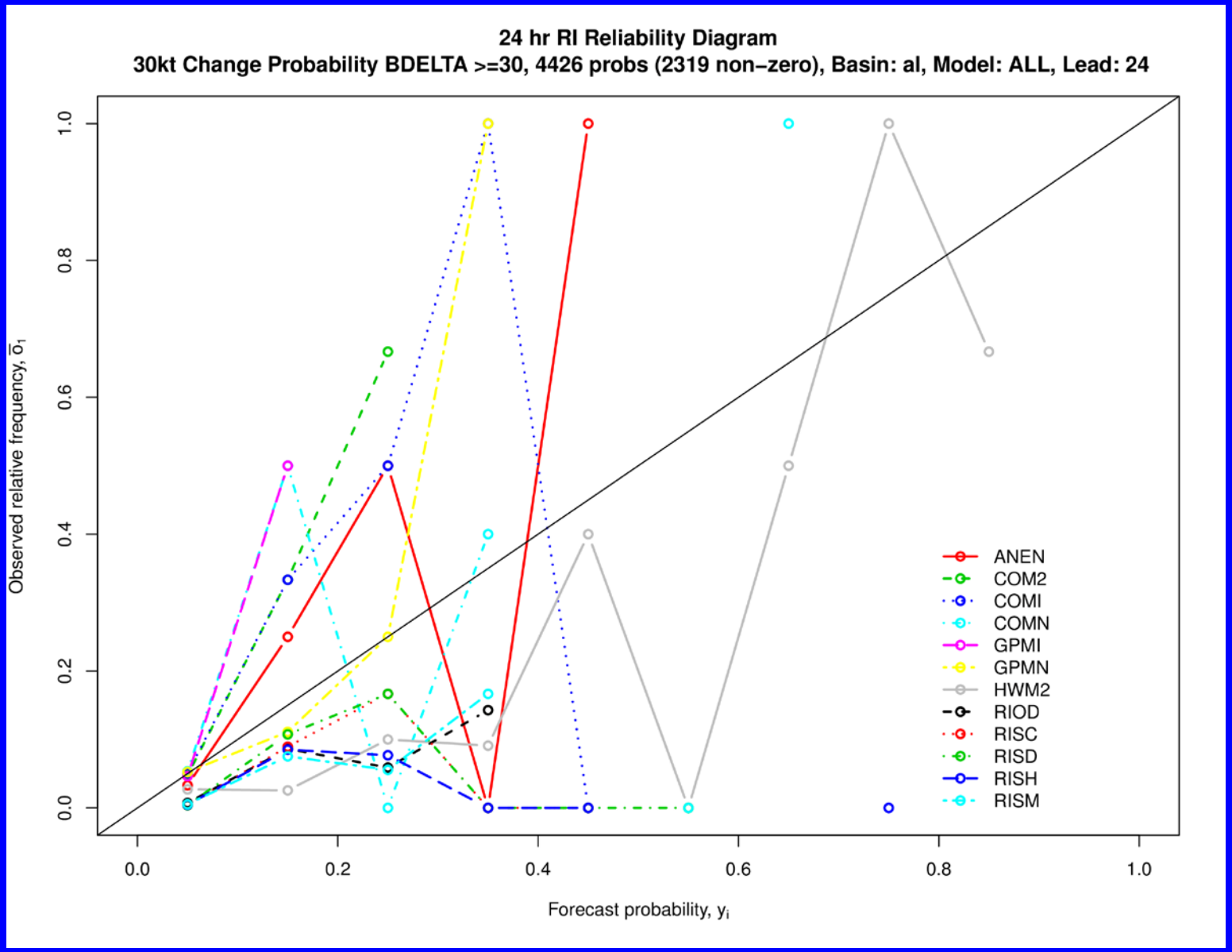
https://ral.ucar.edu/projects/hfip/d2016/ensRI/

Matthew Example

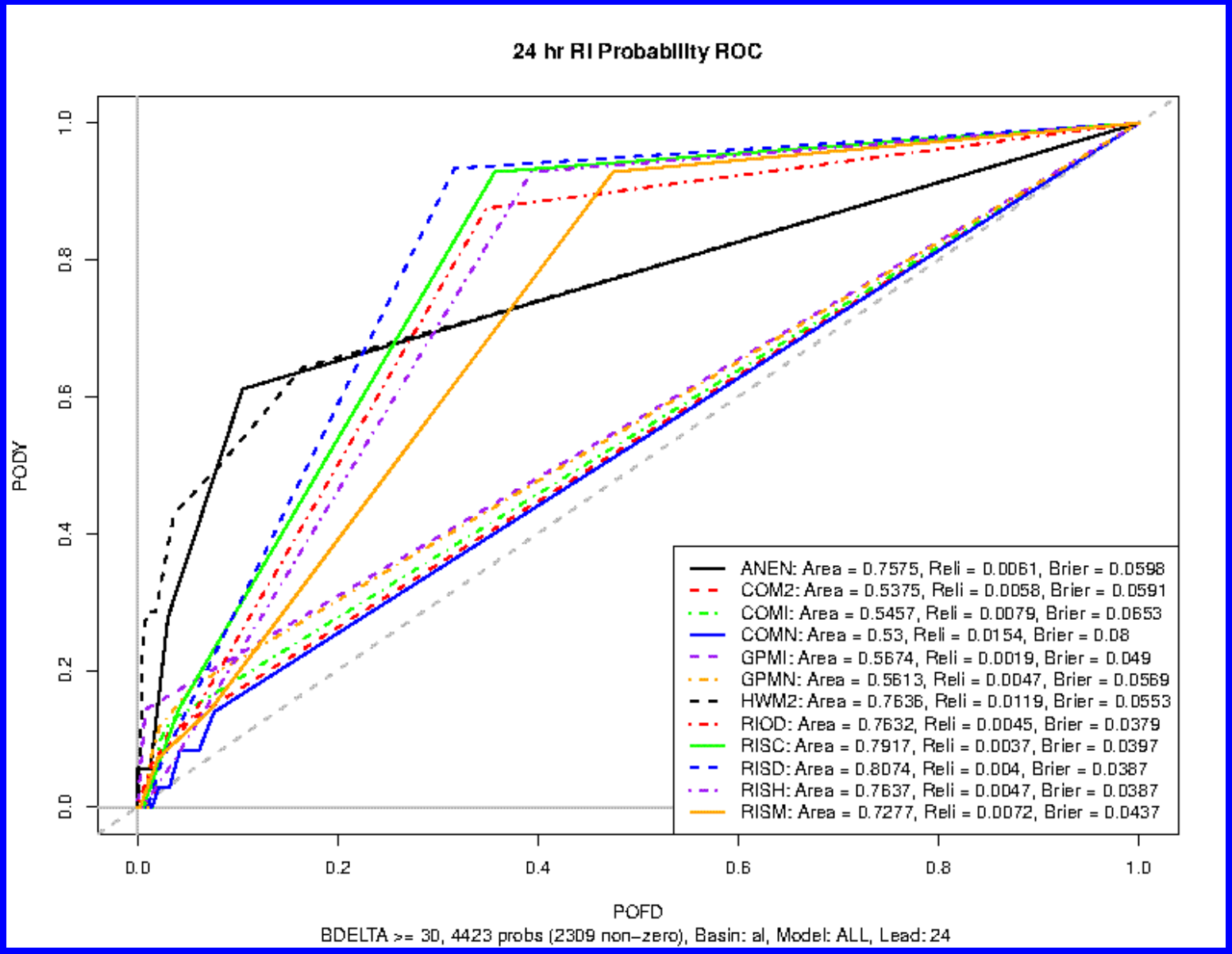




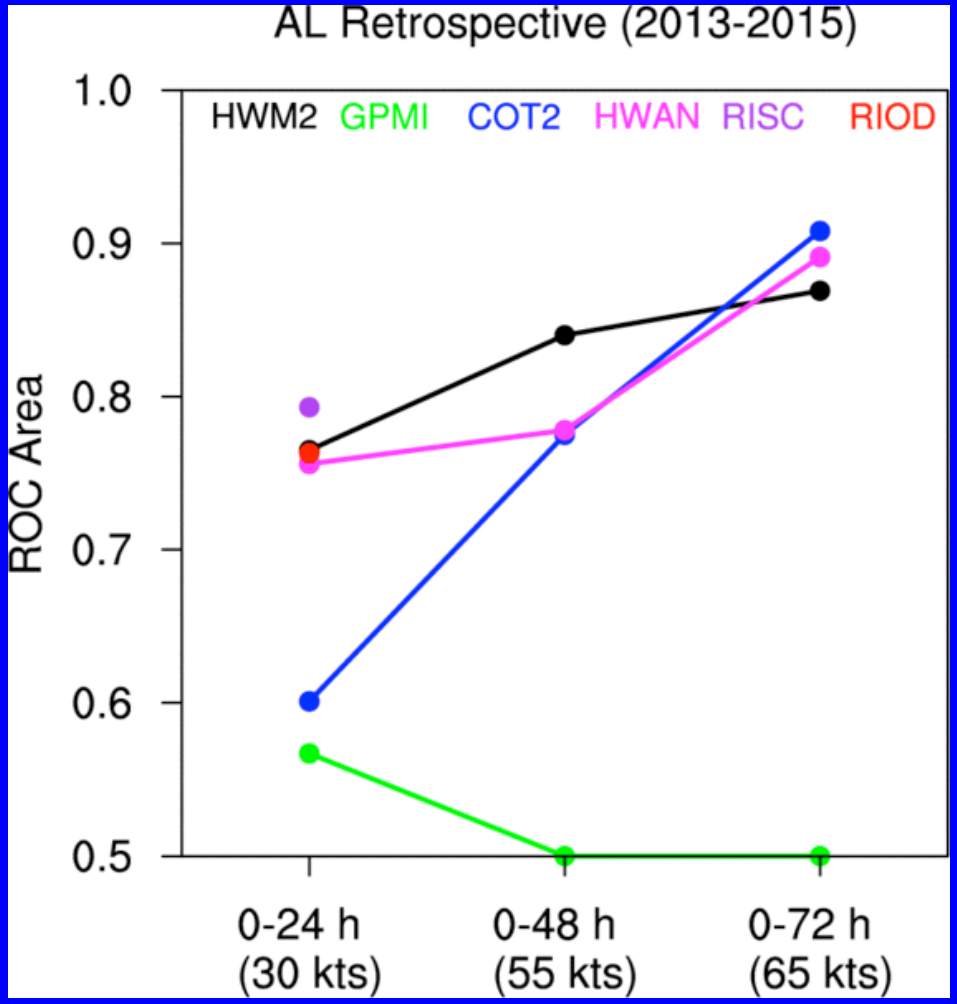
00-24 h AL RI Reliability

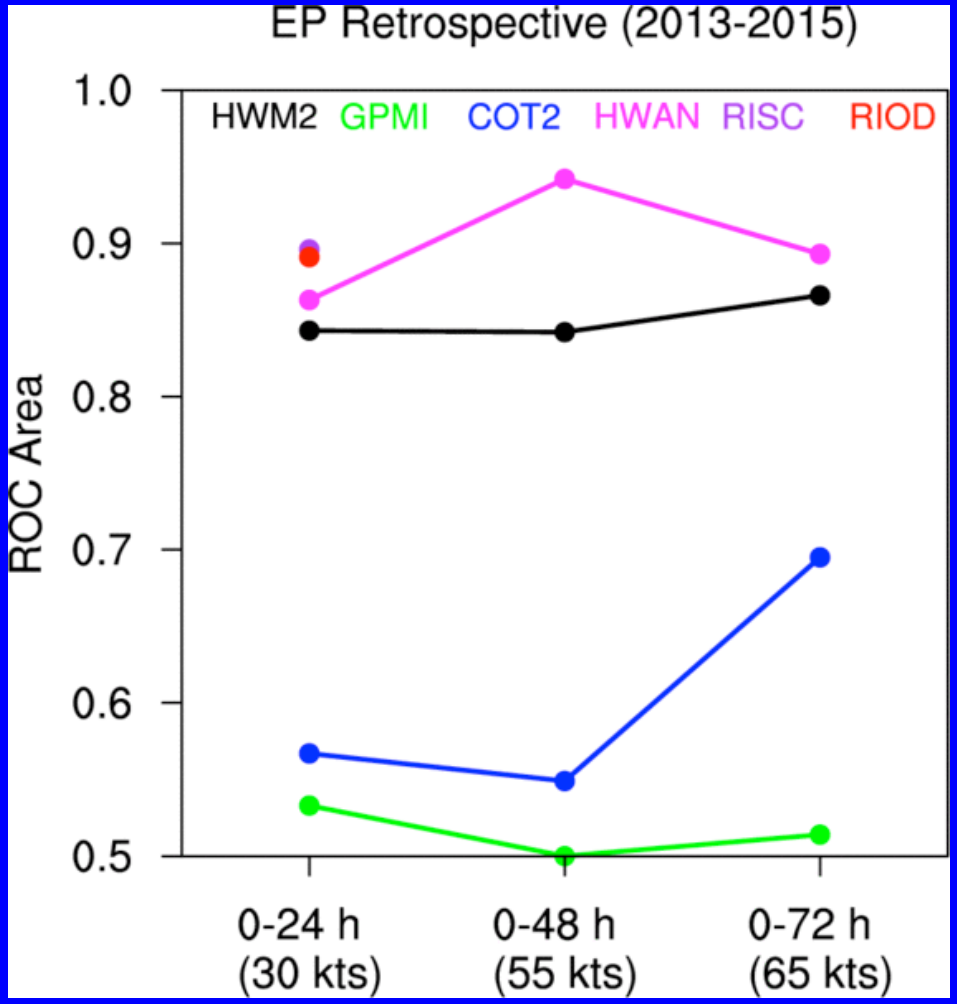


00-24 h RI ROC

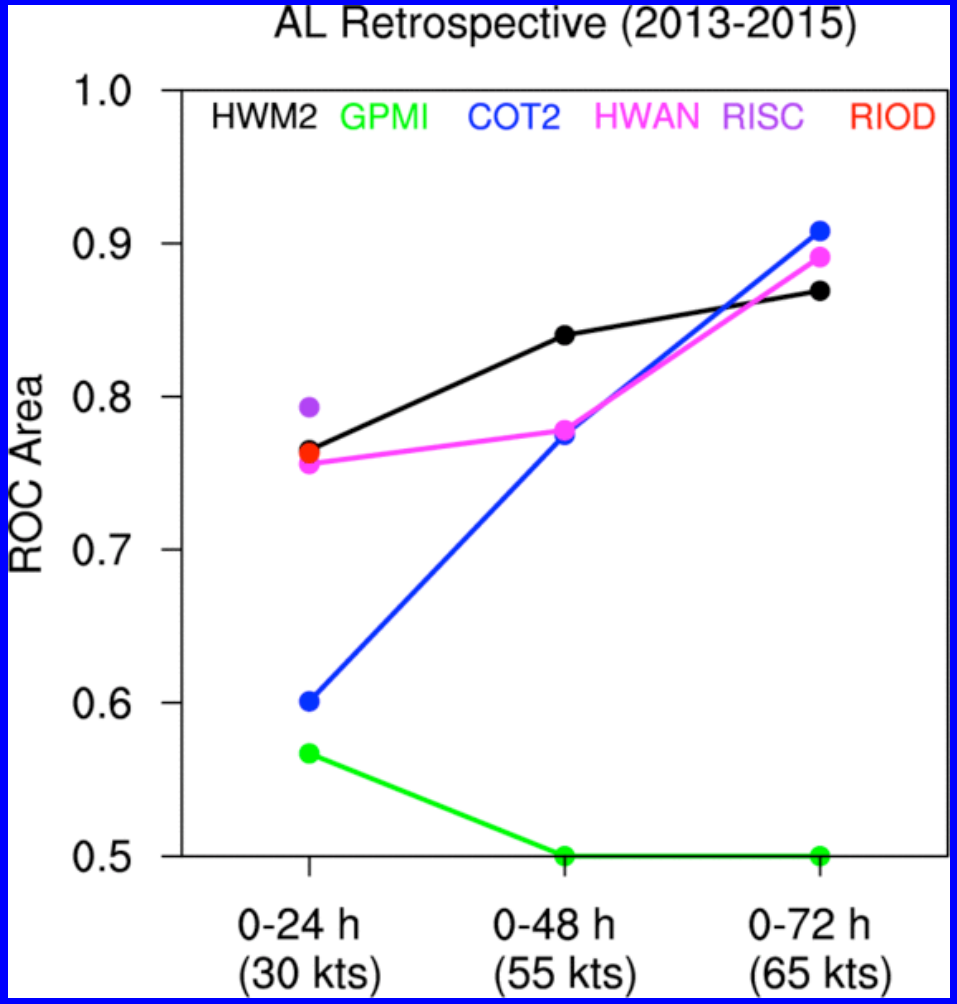

24 hr RI Probability ROC
POD
POFD
0.0
0.2
0.4
0.6
0.8
1.0
ANEN: Area = 0.7575, Reli = 0.0061, Brier = 0.0598
COM2: Area = 0.5375, Reli = 0.0058, Brier = 0.0591
COMI: Area = 0.5457, Reli = 0.0079, Brier = 0.0653
COMN: Area = 0.53, Reli = 0.0154, Brier = 0.08
GPMI: Area = 0.5674, Reli = 0.0019, Brier = 0.049
GPMN: Area = 0.5613, Reli = 0.0047, Brier = 0.0569
HWM2: Area = 0.7636, Reli = 0.0119, Brier = 0.0553
RIOD: Area = 0.7632, Reli = 0.0045, Brier = 0.0379
RISC: Area = 0.7917, Reli = 0.0037, Brier = 0.0397
RISD: Area = 0.8074, Reli = 0.004, Brier = 0.0387
RISH: Area = 0.7637, Reli = 0.0047, Brier = 0.0387
RISM: Area = 0.7277, Reli = 0.0072, Brier = 0.0437
BDELTA >= 30, 4423 probs (2309 non-zero), Basin: al, Model: ALL, Lead: 24

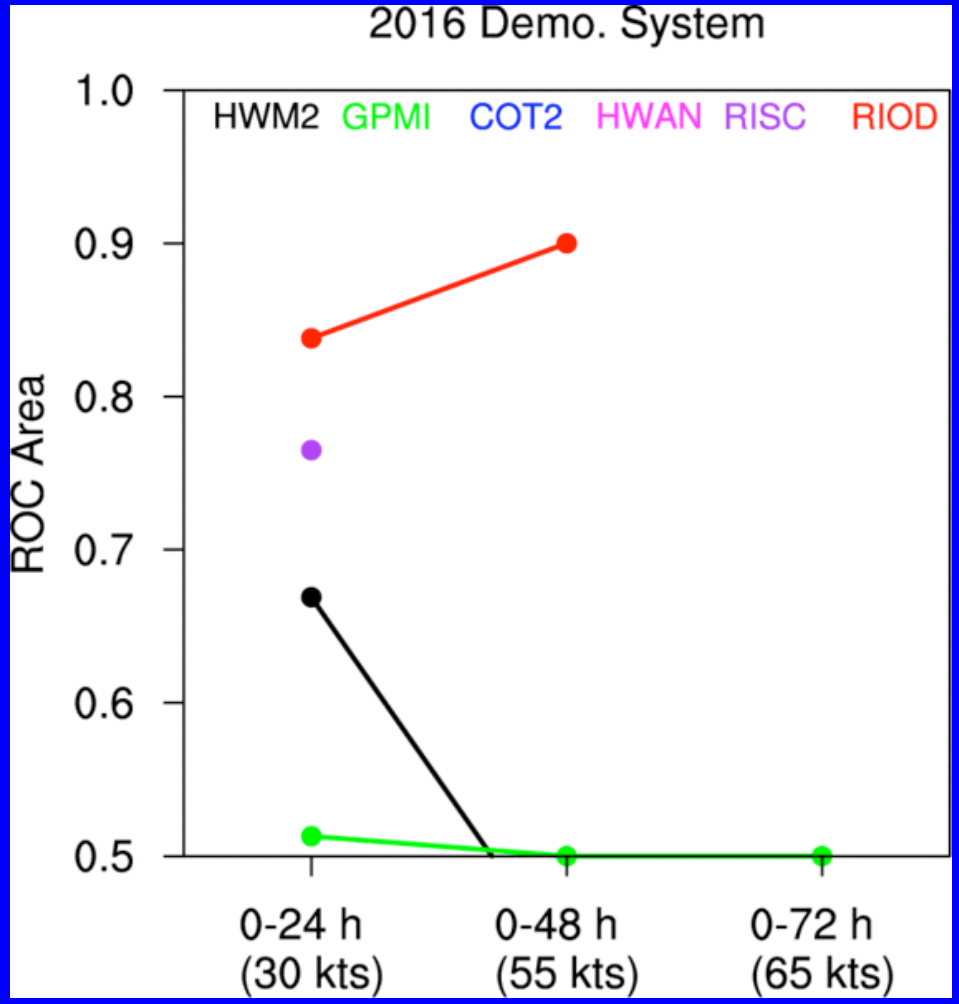
ROC Area Under Curve, Retro.





ROC Area Under Curve, Retro.

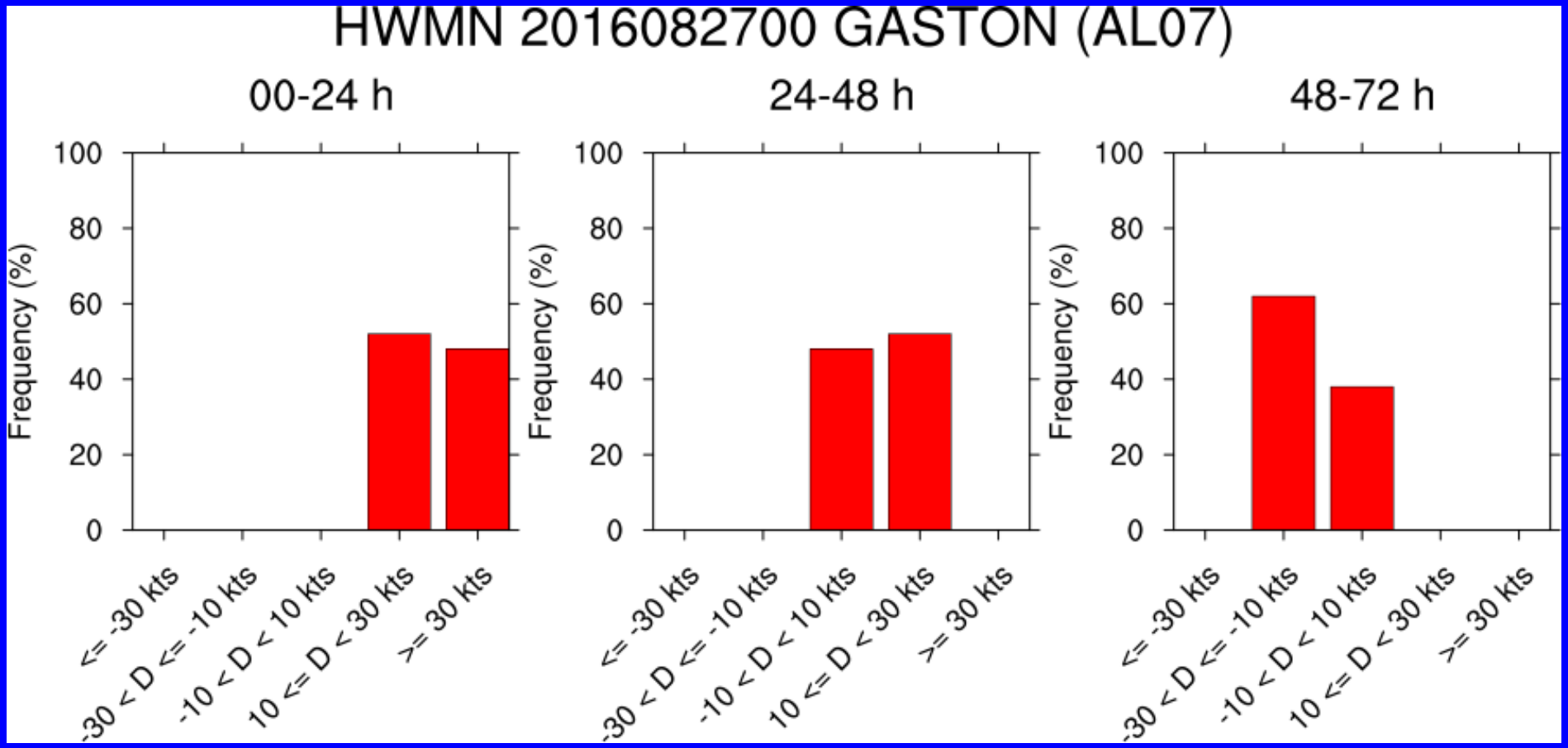




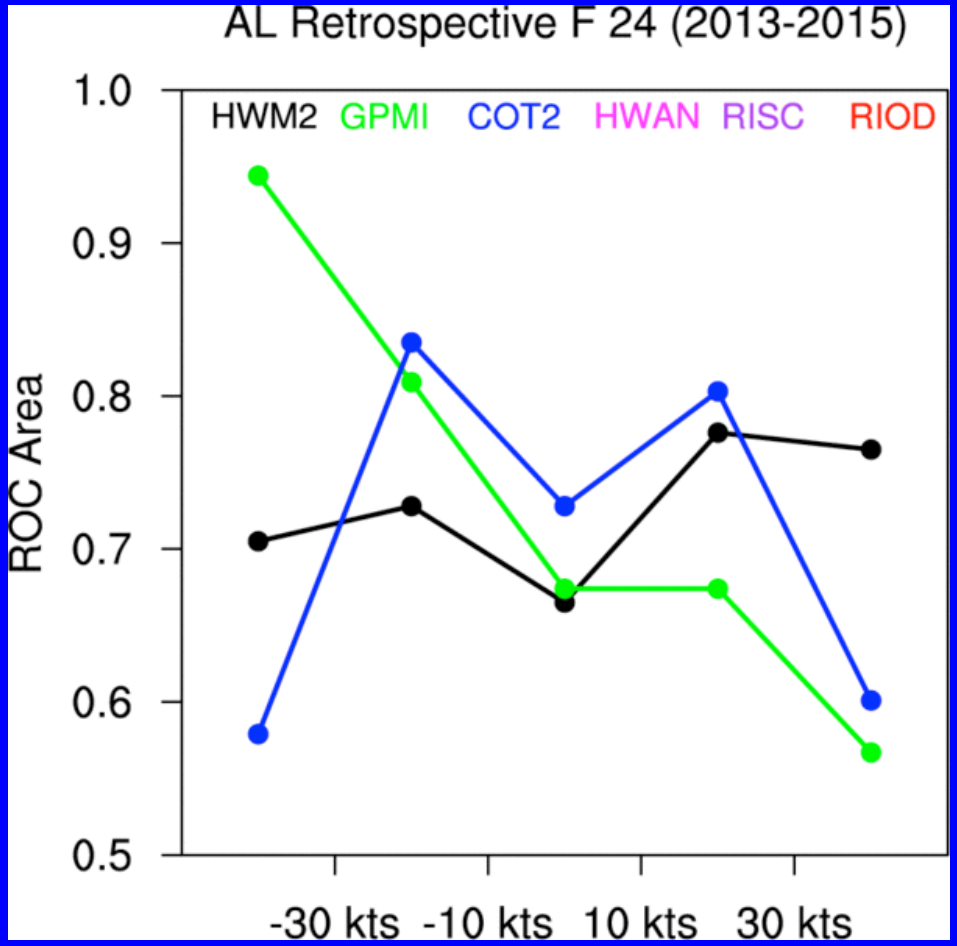
Future Directions

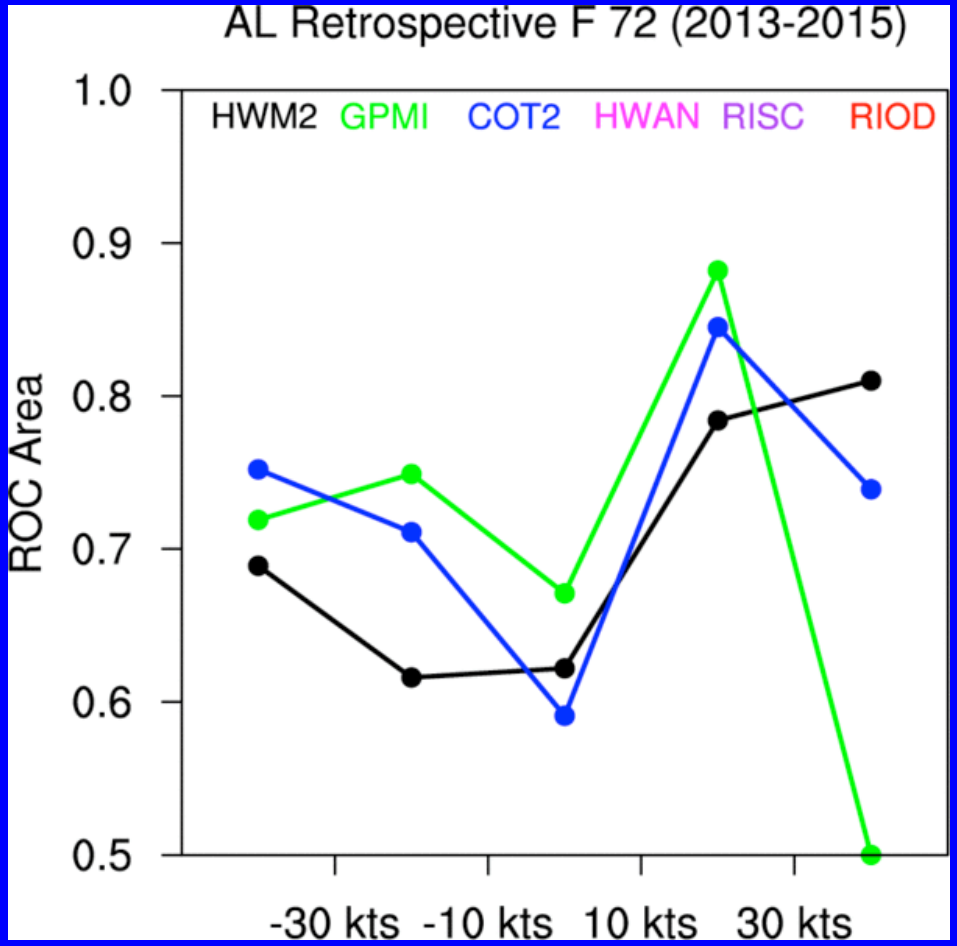
- In-depth validation of probabilities (ongoing)
- Increased Forecaster Participation
- Multi-system RI probabilities?
- Extending to other intensity categories
  - <= 30 kt 24 h^{-1}
  - 30 kt 24 h^{-1} < δ <= -10 kt 24 h^{-1}
  - -10 kt 24 h^{-1} < δ < 10 kt 24 h^{-1}
  - 10 kt 24 h^{-1} <= δ < 30 kt 24 h^{-1}
  - >= 30 kt 24 h^{-1}

Multiple Category Example



ROC Hourly


AL Retrospective F 24 (2013-2015)
HWM2 GPMI COT2 HWAN RISC RIOD
ROC Area
1.0
0.9
0.8
0.7
0.6
0.5
-30 kts -10 kts 10 kts 30 kts


AL Retrospective F 72 (2013-2015)
HWM2 GPMI COT2 HWAN RISC RIOD
ROC Area
1.0
0.9
0.8
0.7
0.6
0.5
-30 kts -10 kts 10 kts 30 kts