First tests of SLAF and Stochastic Physics in GLAMEPS

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NWP – Spanish Met Service - AEMET

Hirlam – Aladin All Staff Meeting
Brussels – 7-10 April 2008

Introduction

- Testing the framework of GLAMEPS
- Very crude implementation
- 15 days parallel test:
  - 2007100100 - 2007101500
- Area EPS71 and 10 members + control
- 72 hours forecast at 00 and 12 UTC
- Experiments:
  - EPS → Standard downscaling of ECMWF EPS.
  - SLF → SLAF
  - TEP → TEPS (met.no)
  - STP → Stochastic Physics + EPS
  - STF → Stochastic Physics + SLAF
  - TEF → Stochastic Physics + TEPS (met.no)

SLAF - Errors H+48

- SLAF (AN $\pm$ K $\cdot$ (AN - FCHH), k=cte.)
- Experiments:

Control	ANP = AN
1 and 2	ANP = AN $\pm$ 2.5 $\cdot$ (AN-FC12)
3 and 4	ANP = AN $\pm$ 2 $\cdot$ (AN-FC24)
5 and 6	ANP = AN $\pm$ 1.5 $\cdot$ (AN-FC36)
7 and 8	ANP = AN $\pm$ 1 $\cdot$ (AN-FC48)
9 and 10	ANP = AN $\pm$ 0.5 $\cdot$ (AN-FC60)

Stochastic Physics

- ECMWF scheme
- Perturbing Physics tendencies
- Perturbations from **+0.5 to +1.5**
- Keeping the same value of the perturbation coefficient for **1 hour** and at squares of **10 x 10** degrees latxlon

Verification

- Verification exercise using synoptic observations
  - **Calibration:** with synoptic variables Z500, T500, Pmsl
  - **Response to binary events:** reliability and resolution of surface variables 10m surface wind and 6h accumulated precipitation
- Using GLAMEPS verification tool (Carlos Santos) on ecgate.

Pmsl- Obs

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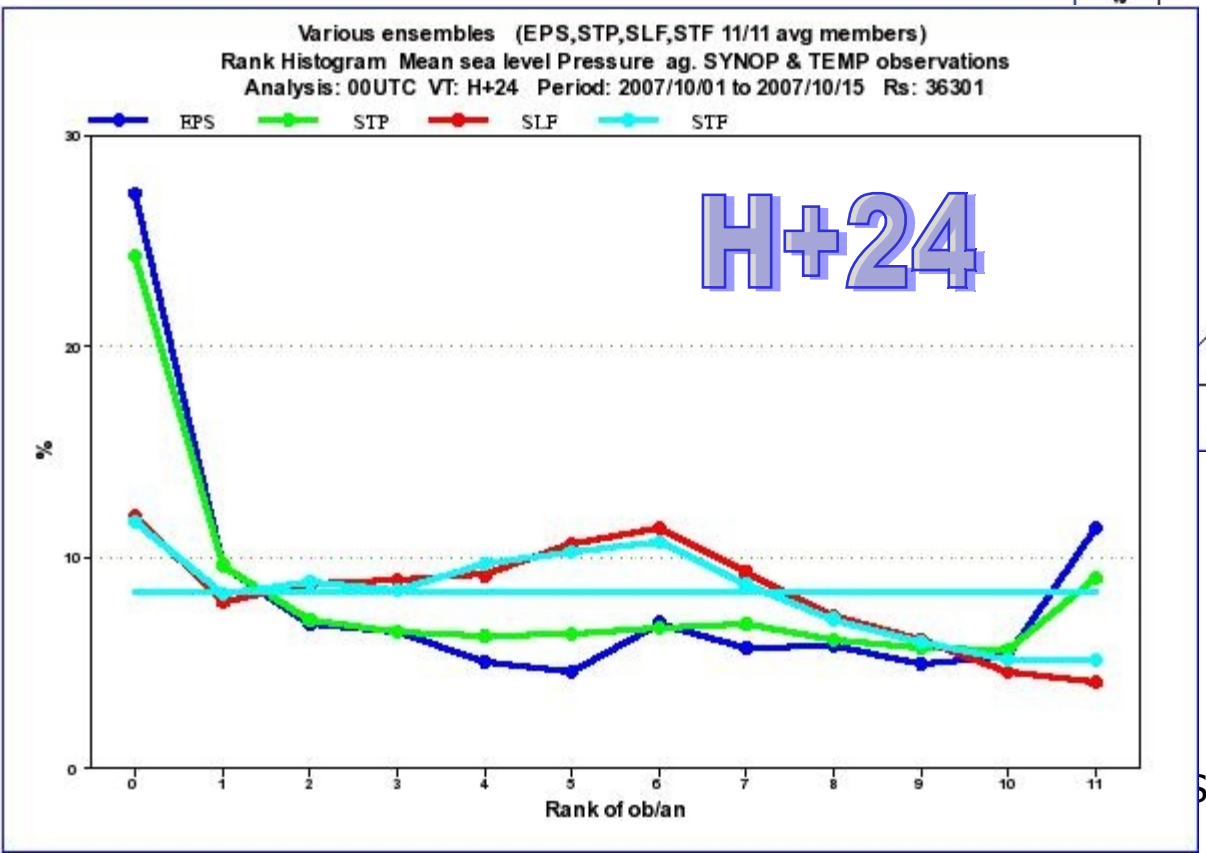
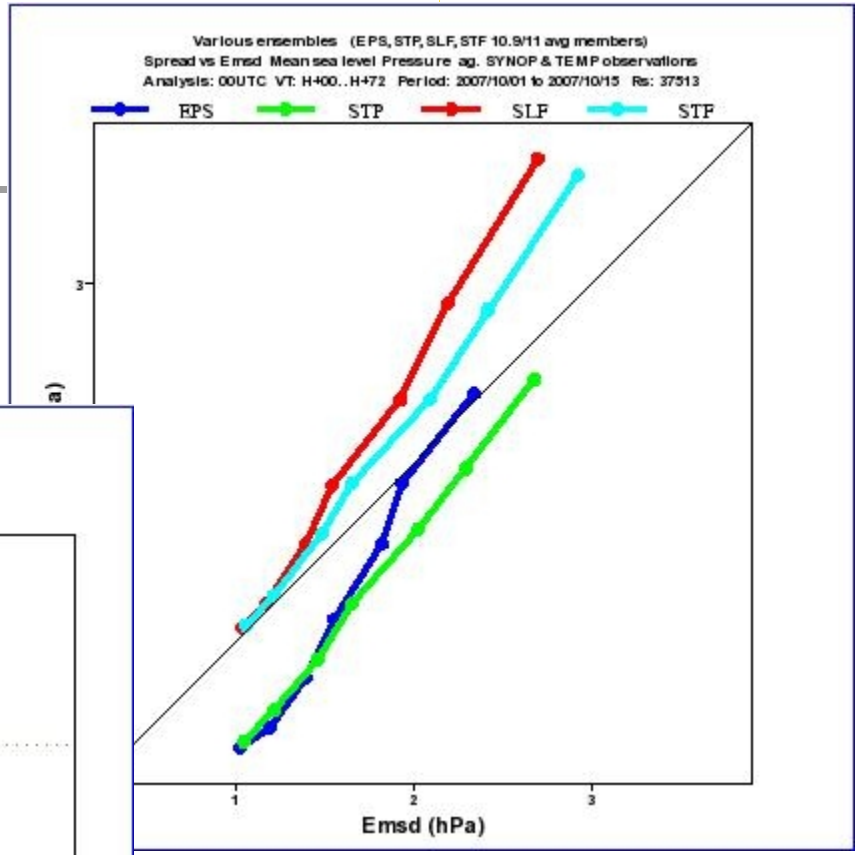
EPS – STP - SLF - STF





Pmsl- Obs

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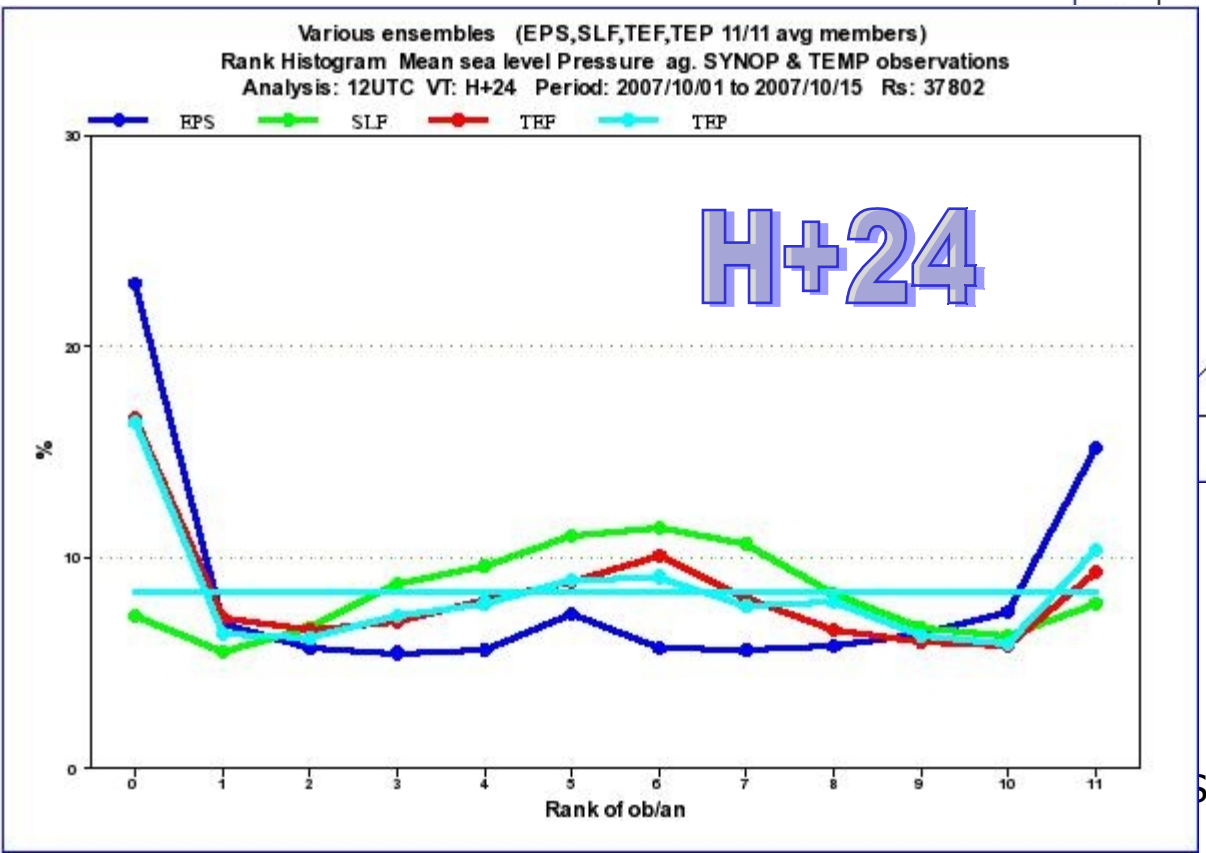

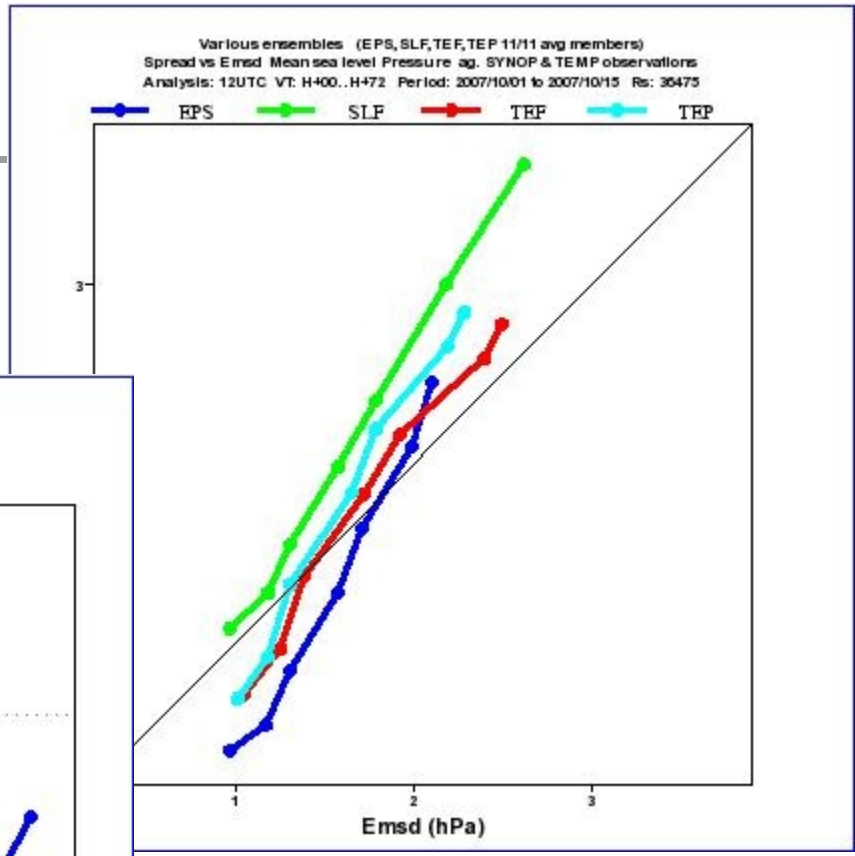

Precip. EPS – STP - SLF - STF

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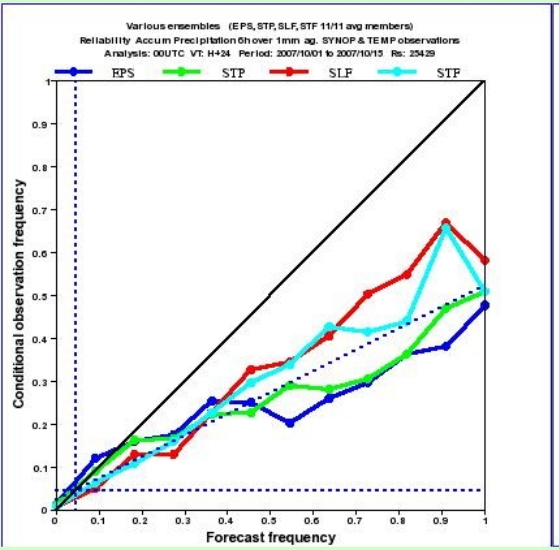
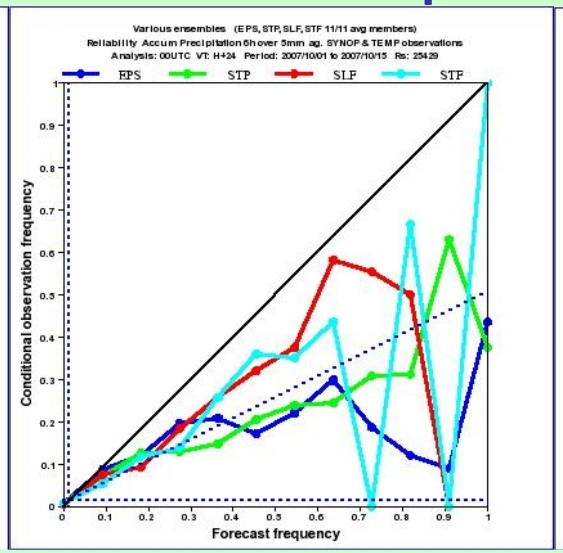
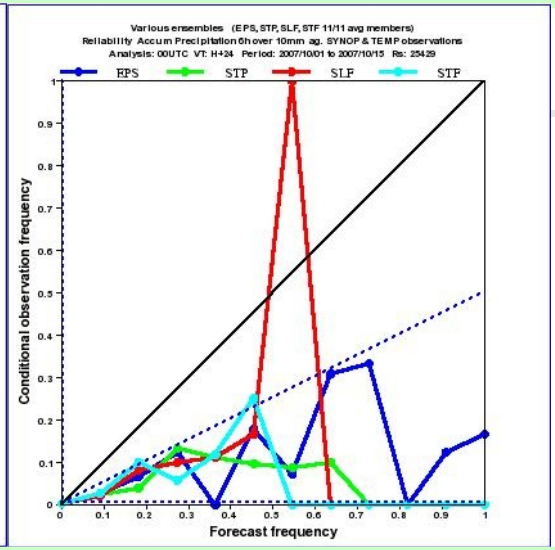
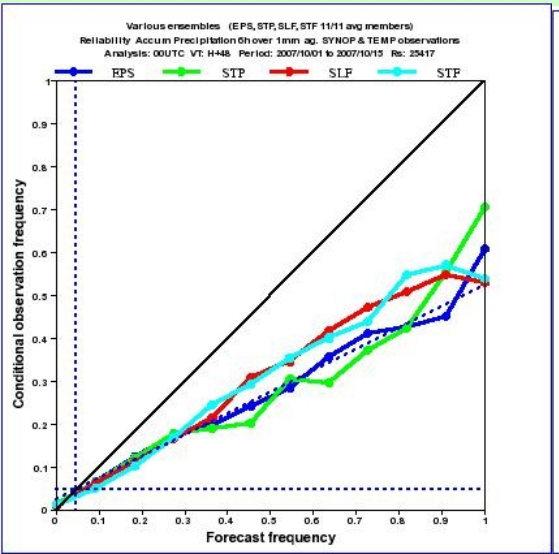
Reliab. - 6 h Acc. Precip H+24 (1,5,10,20) mm

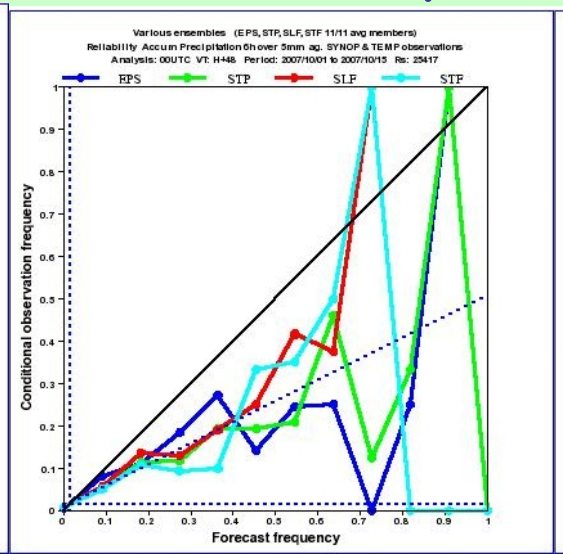


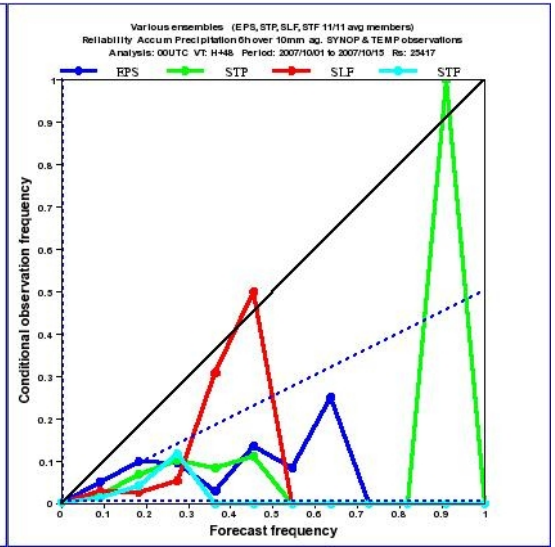




Reliab. - 6 h Acc. Precip H+48 (1,5,10,20) mm







Undersampling

Precip. EPS – SLF – TEP - TEF

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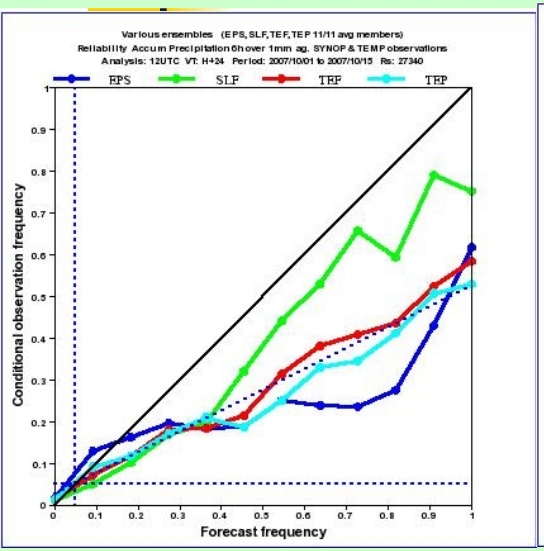
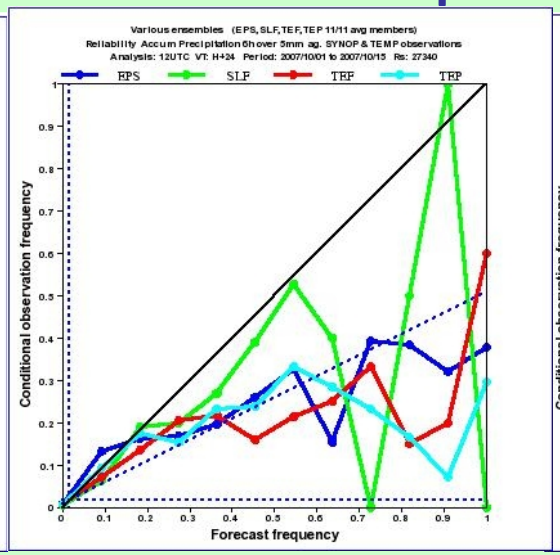
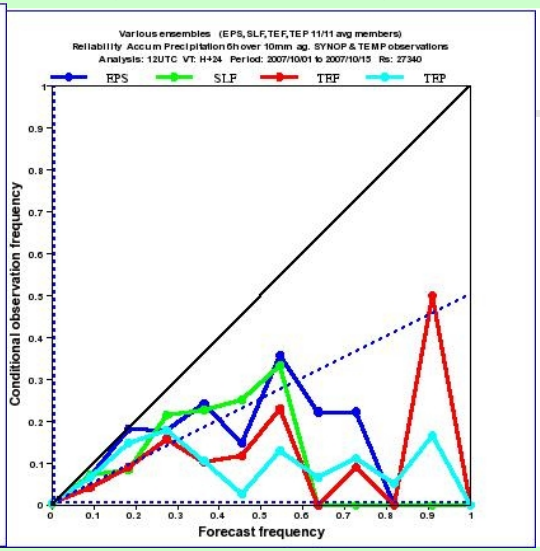
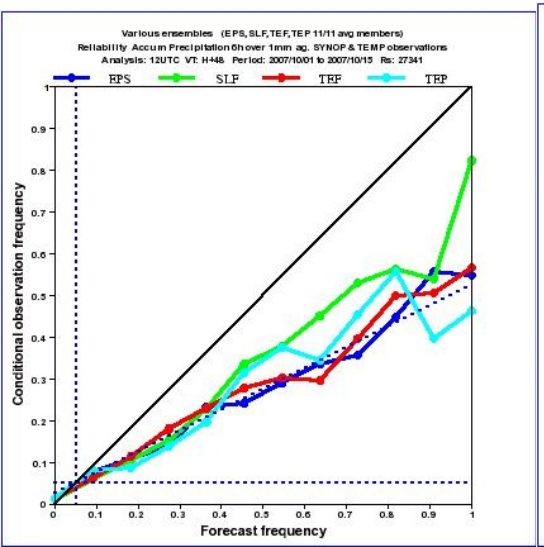
Reliab. - 6 h Acc. Precip H+24 (1,5,10,20) mm

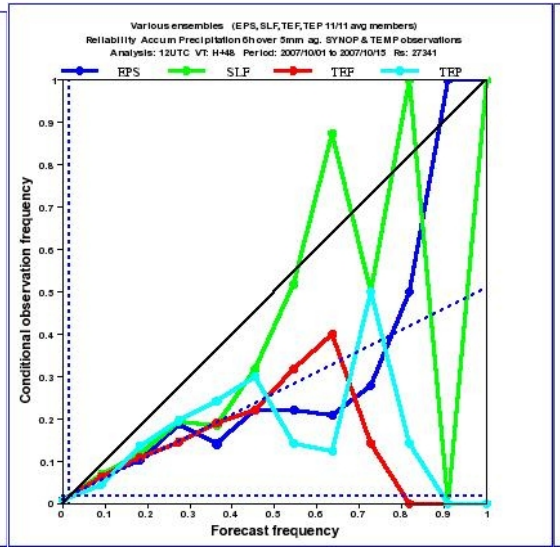


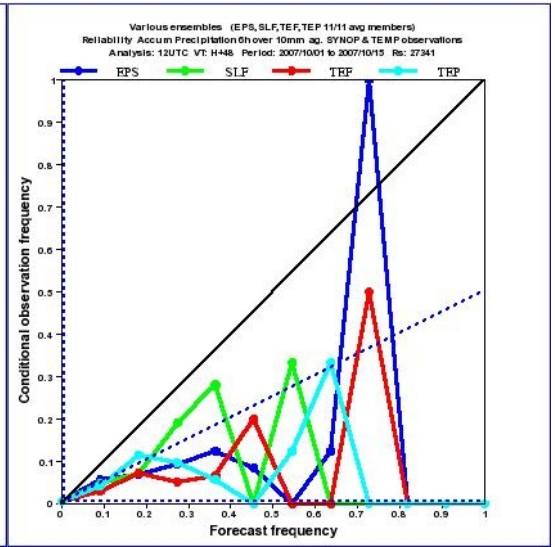




Reliab. - 6 h Acc. Precip H+48 (1,5,10,20) mm







Undersampling

ROC curves – 6 h Acc Precip (1 & 5 mm)

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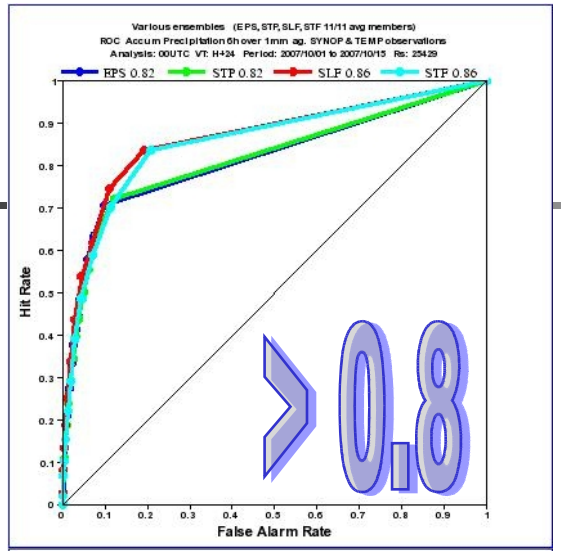
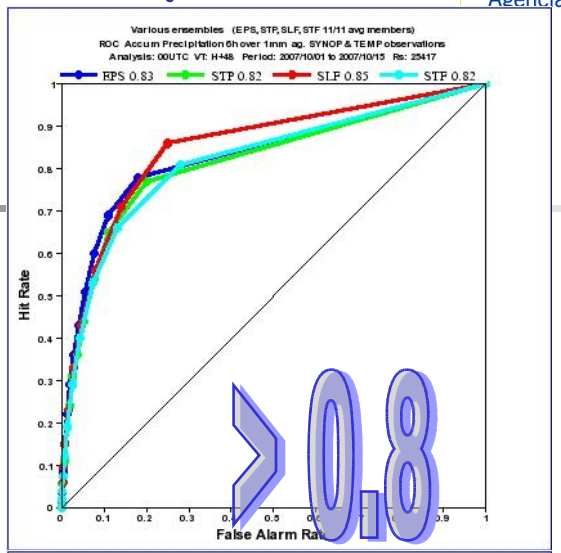
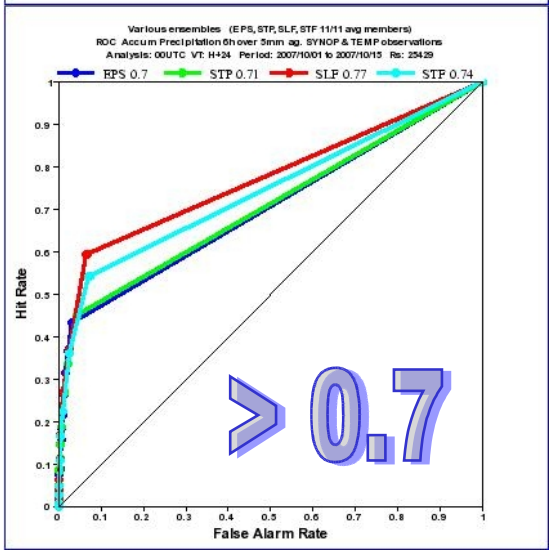
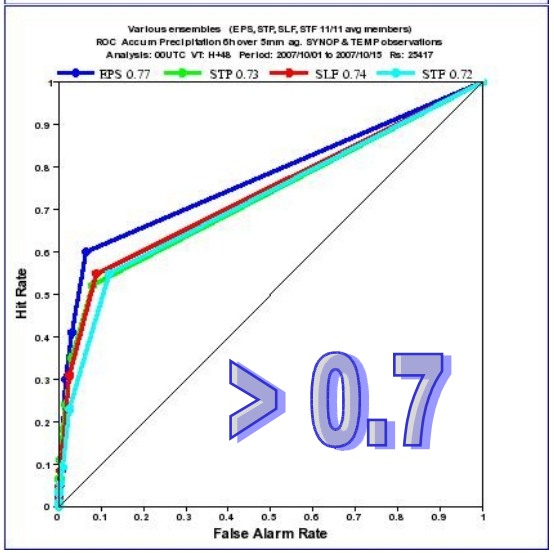
H+24





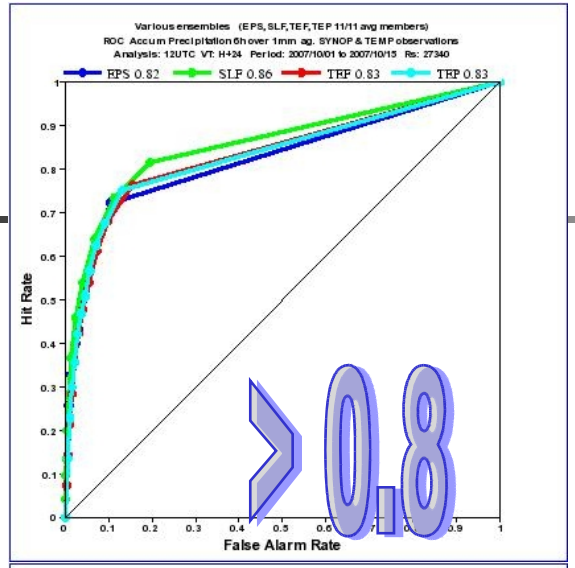
H+48

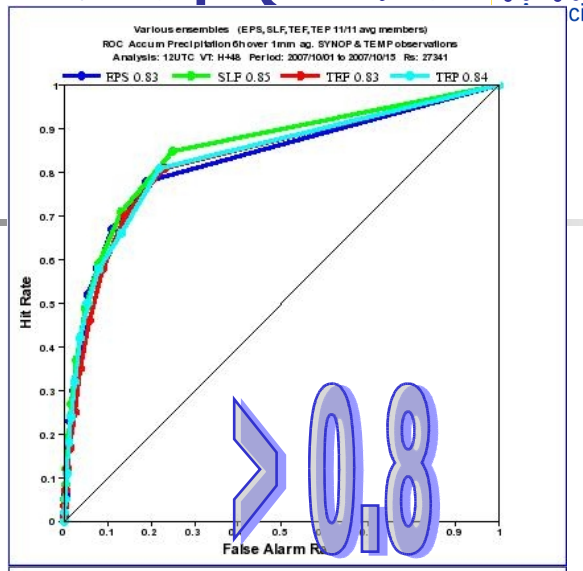




EPS – STP - SLF - STF

ROC curves – 6 h Acc Precip (1 & 5 mm)





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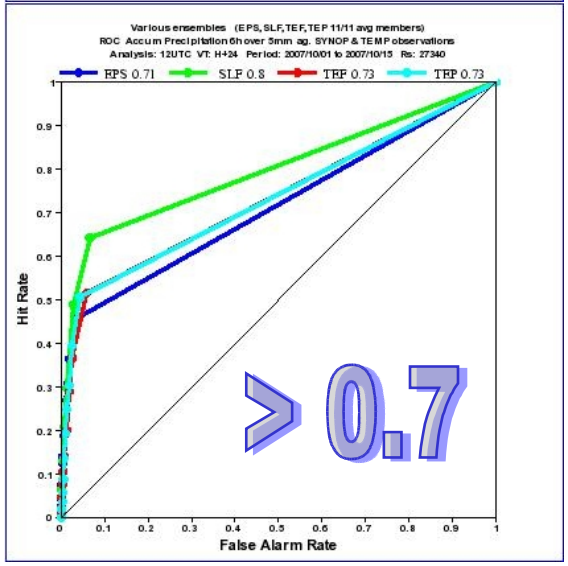

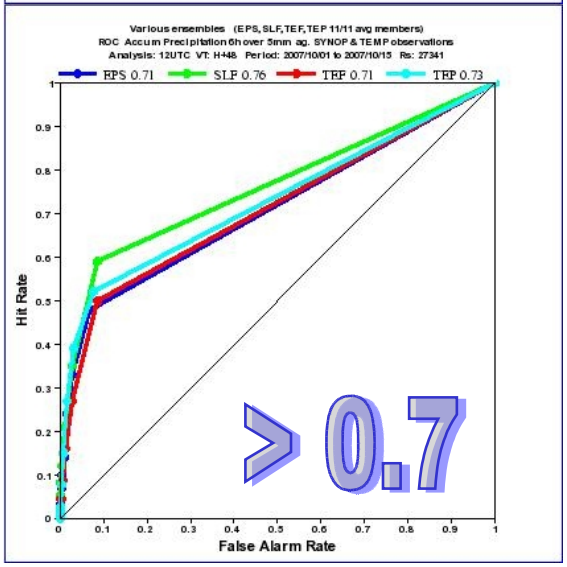

H+48

EPS – SLF – TEP - TEF

Obs. EPS – STP - SLF - STF

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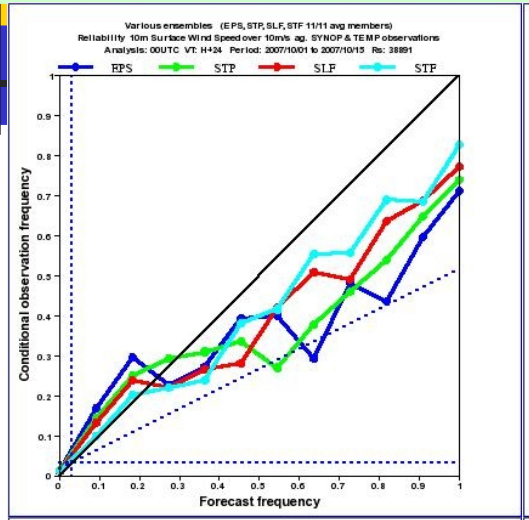
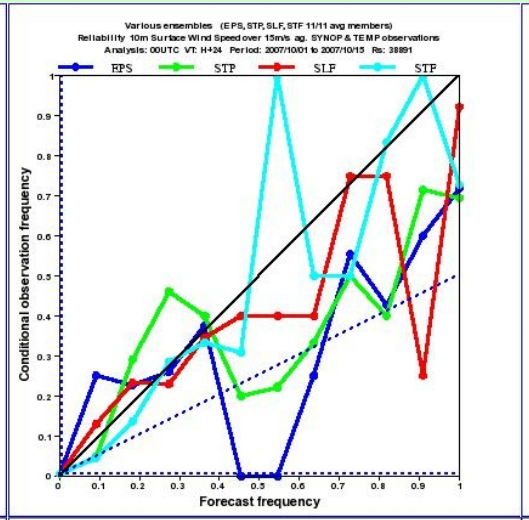
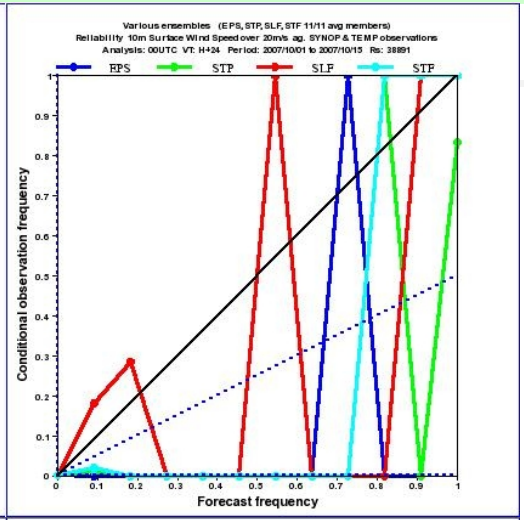
Reliability - 10 m wind (10,15,20) m/s

H+24







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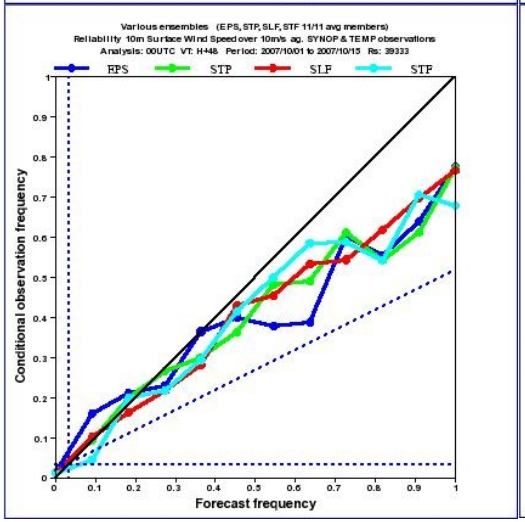

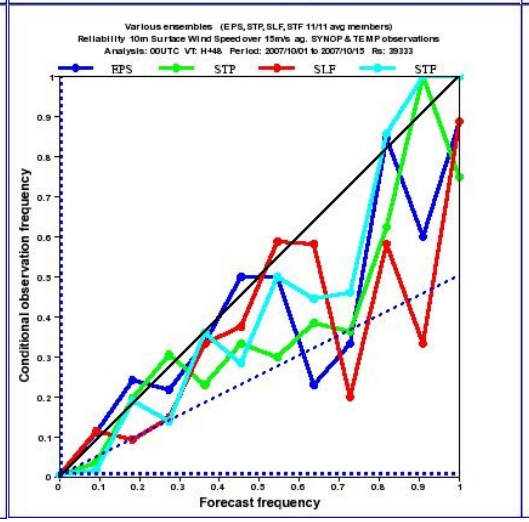

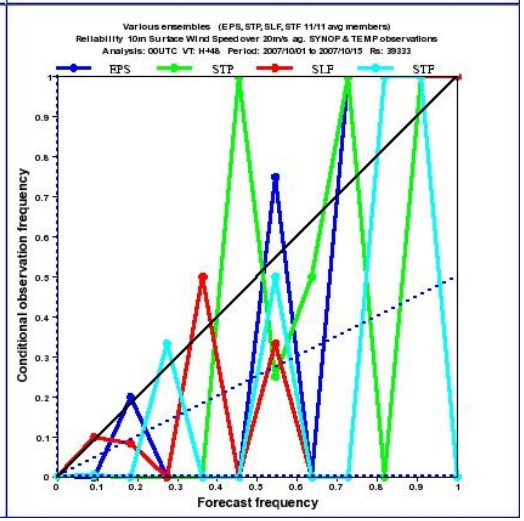

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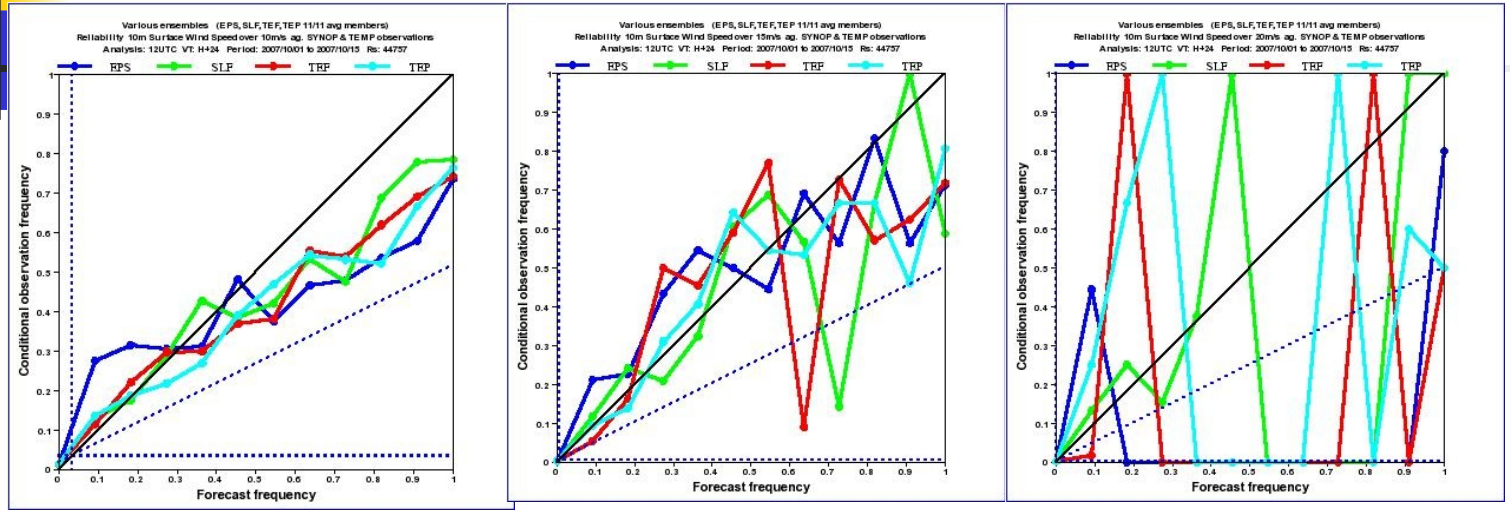

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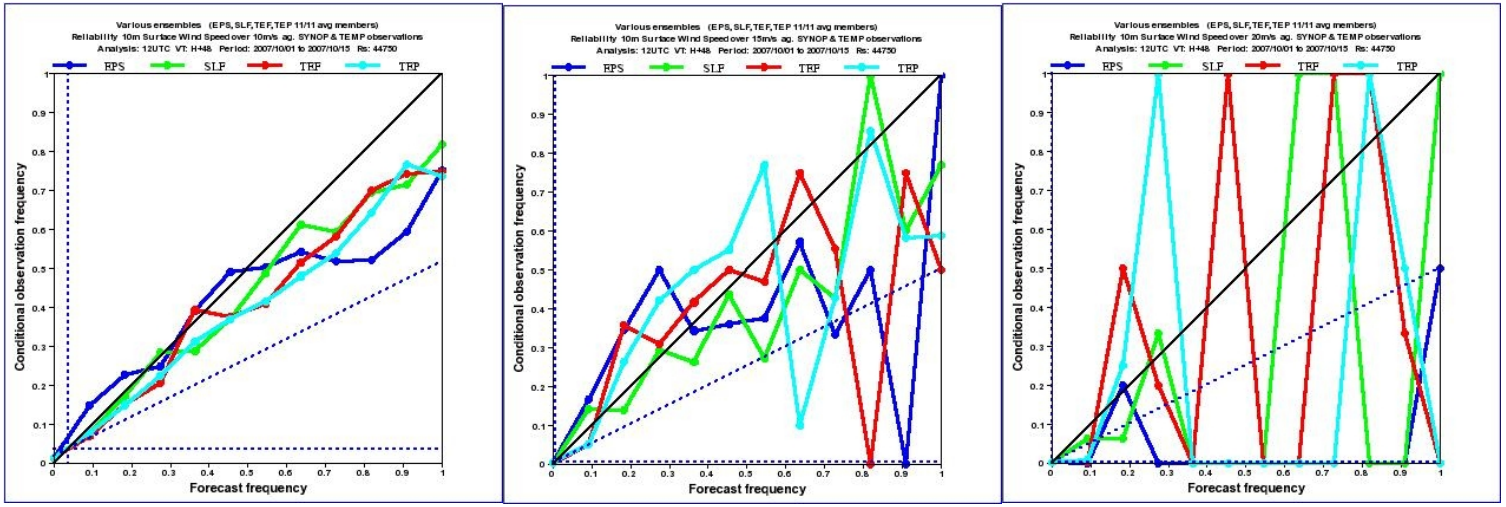


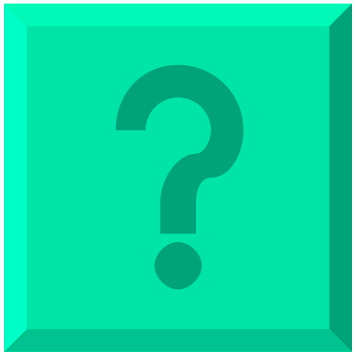
Conclusions

- Very crude implementation of SLAF and Stochastic Physics schemes.
- SLAF based in 48 hours forecast errors.
- Stochastic Physics scheme like ECMWF one and perturbing Physics tendencies, no individual scheme ones.
- Short parallel test of 15 days just to test the implementation.
- No clear statistical significance of results.
- But …
  - SLAF is giving encouraging results and it needs only a single global model forecast for IC's & BC's.
  - Stochastic Physics doesn't increase spread in the short range (more research needed).
  - Nice results of just downscaling ECMWF EPS and TEPS for BC's and IC's

Future

- Improve the implementation of SLAF in GLAMEPS.
- More experiments on Stochastic Physics to increase spread.
- Longer parallel test to get more significant results from the verification.
- 20 members ensemble.

Questions



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