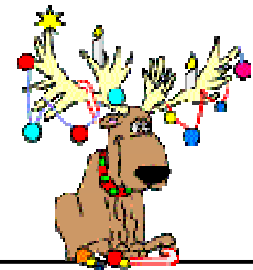


Impact of recent physics changes on IFS forecast performance – CY25R3

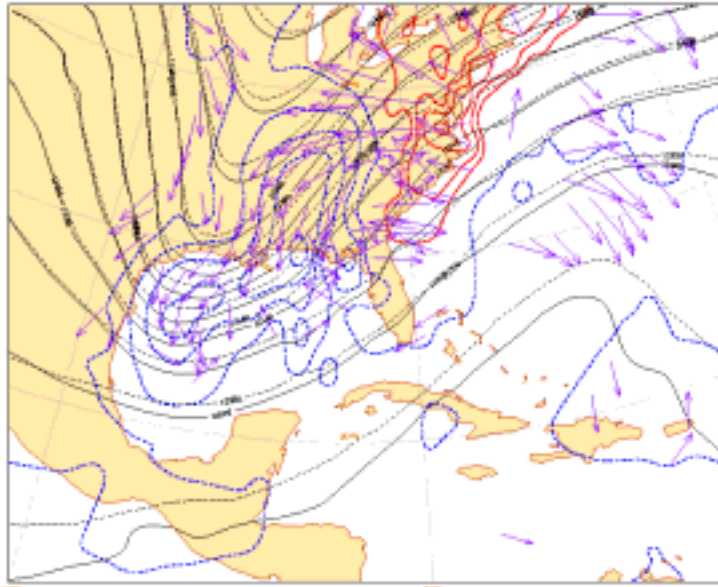
- The recent physics changes concerne:
 - Change in convective trigger (see former presentations) – Big impact everywhere (mostly positive – but some negative not to avoid)
 - Rewrite of cloud scheme (changes time evolution of T error growth)
- In the following show examples on
 - “Consequences of Grid point storm problem” –”American problem
 - Analysis Increments
 - Tropical cyclone Forecast
 - Forecast scores – comparison to Synop



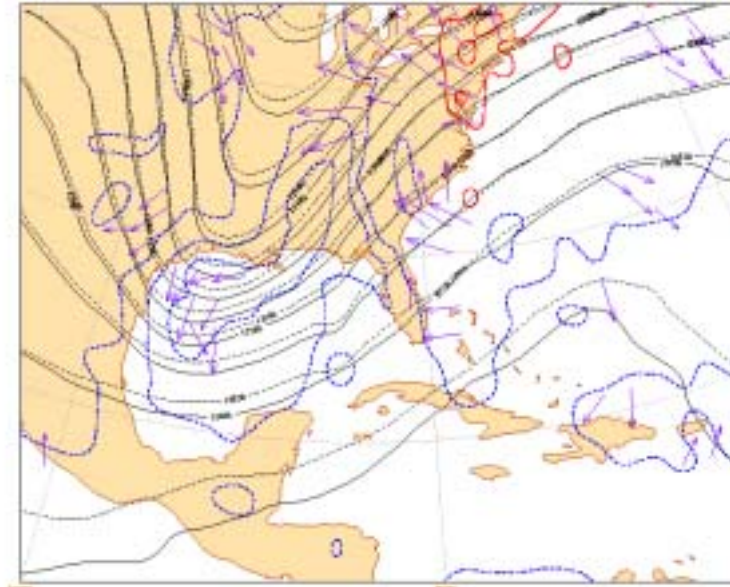
Mass (Z) and wind increments N.America

Analysis – First Guess

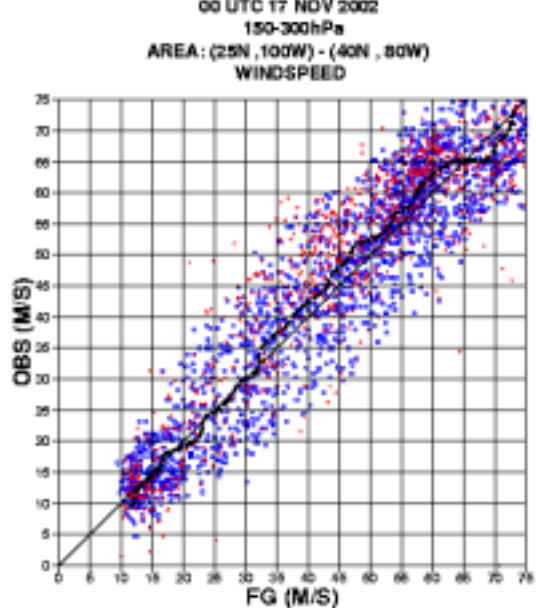
Increments O_SUITE 17/Nov/2002; 00 UTC



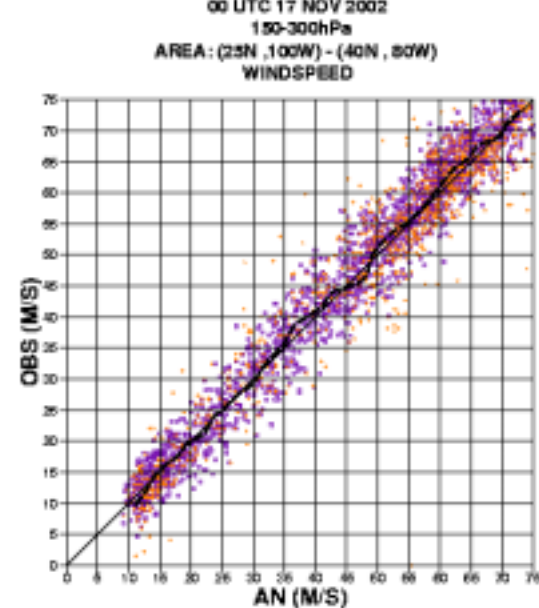
Increments E_SUITE 17/Nov/2002; 00 UTC



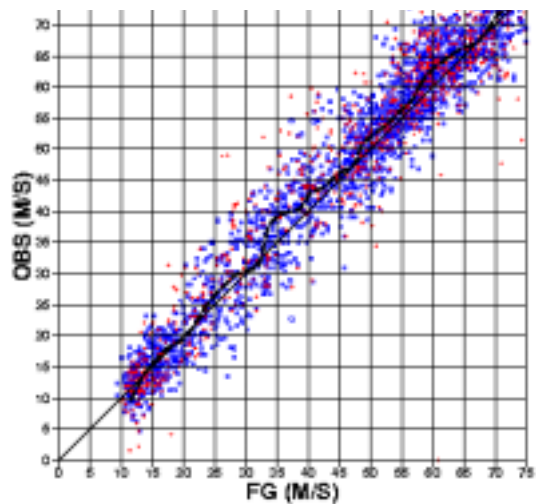
Data Usage



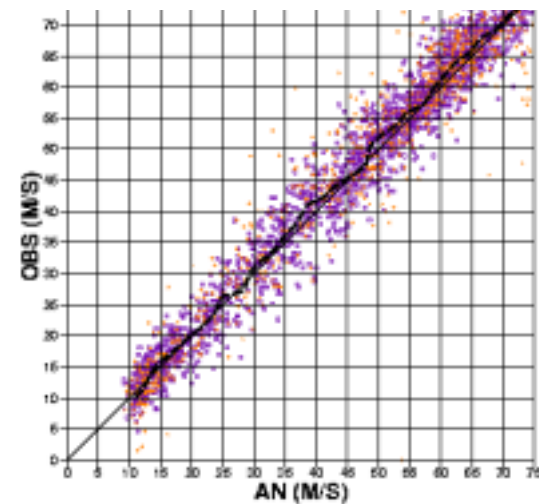
NO. OF OBS: 3128 BIAS: .7 STD: 7.2
NO. OF USED OBS: 1994 (64 %)



NO. OF OBS: 3128 BIAS: .7 STD: 4.4
NO. OF USED OBS: 1994 (64 %)



NO. OF OBS: 3128 BIAS: 1.4 STD: 5.0
NO. OF USED OBS: 2164 (70 %)

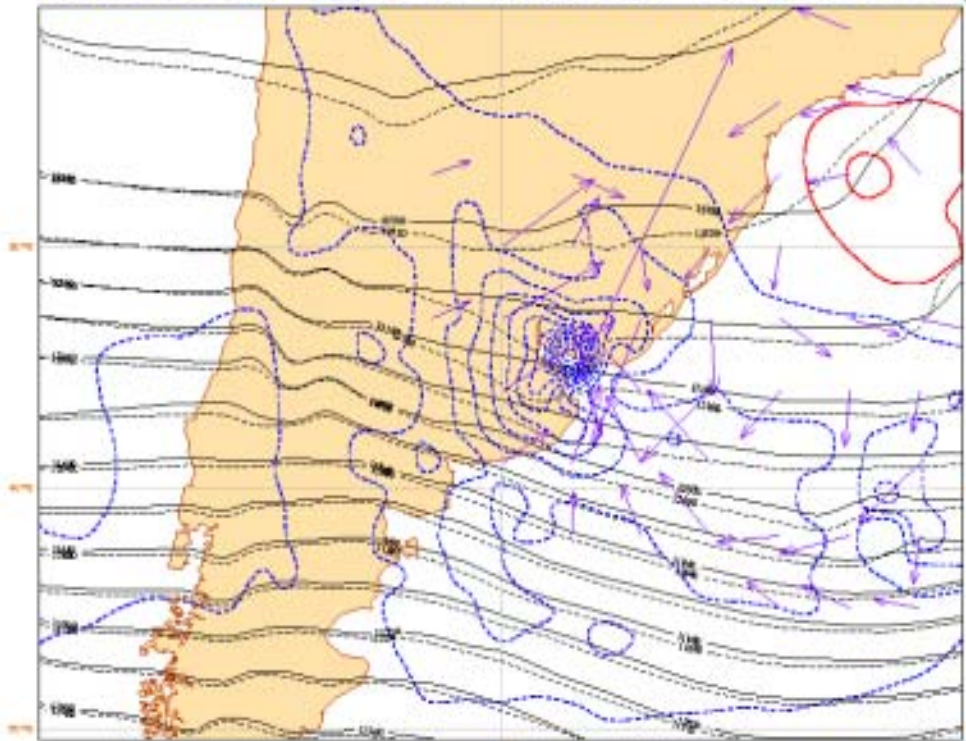


NO. OF OBS: 3128 BIAS: .9 STD: 4.1
NO. OF USED OBS: 2164 (70 %)

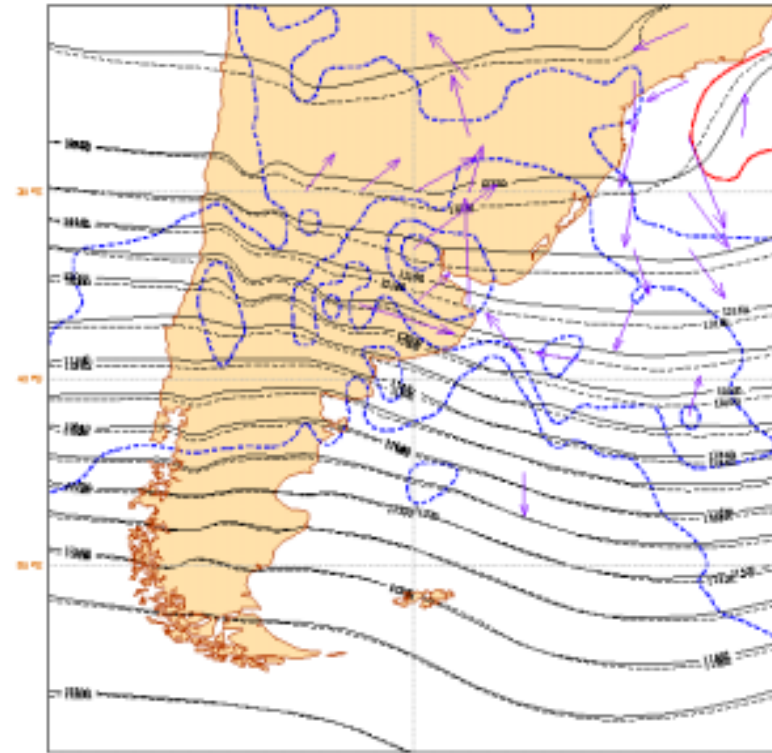
Mass (Z) and wind increments S.America

Analysis – First Guess

Increments O_SUITE 18/Nov/2002; 00 UTC

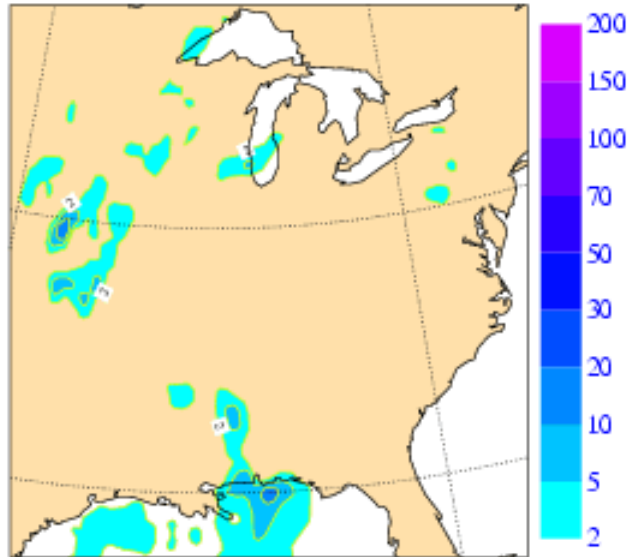


Increments E_SUITE 18/Nov/2002; 00 UTC

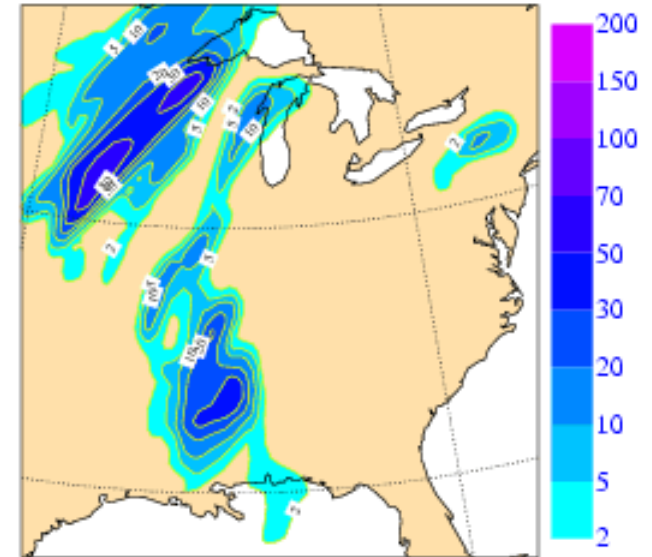


Convective and stratiform Precipitation – Cyclone Lilly

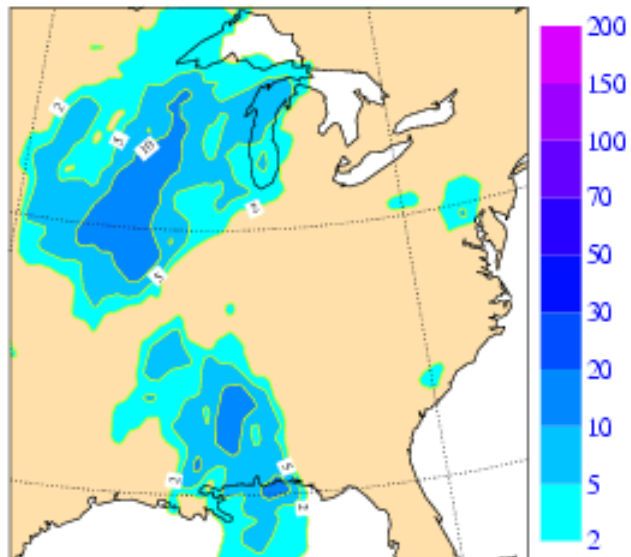
20021004 00UTC ECMWF FC 12 VT: 20021004 12UTC EXP: 0001
Surf: cp



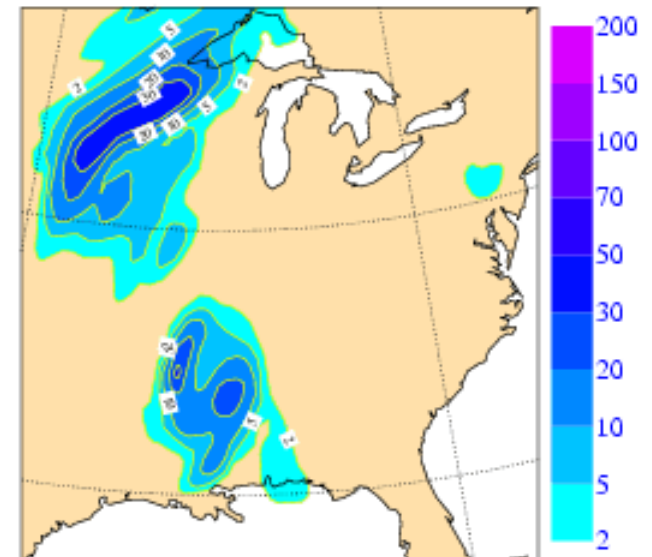
20021004 00UTC ECMWF FC 12 VT: 20021004 12UTC EXP: 0001
Surf: bp



20021004 00UTC ECMWF FC 12 VT: 20021004 12UTC EXP: 0018
Surf: cp

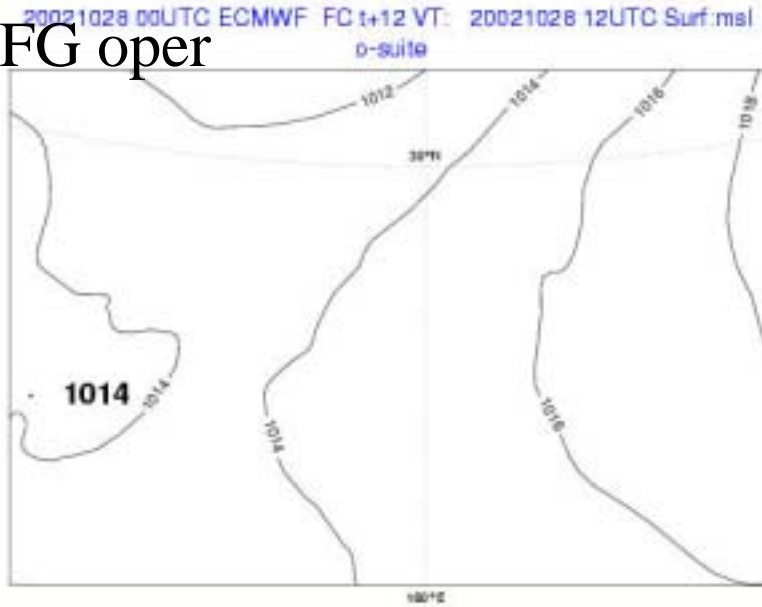


20021004 00UTC ECMWF FC 12 VT: 20021004 12UTC EXP: 0018
Surf: bp

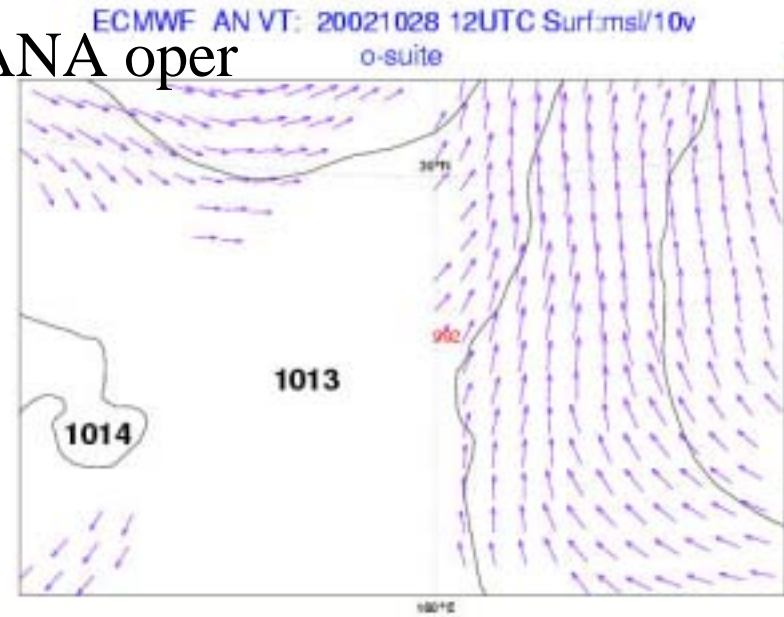


First Guess and Analysis – Cyclone Maysak

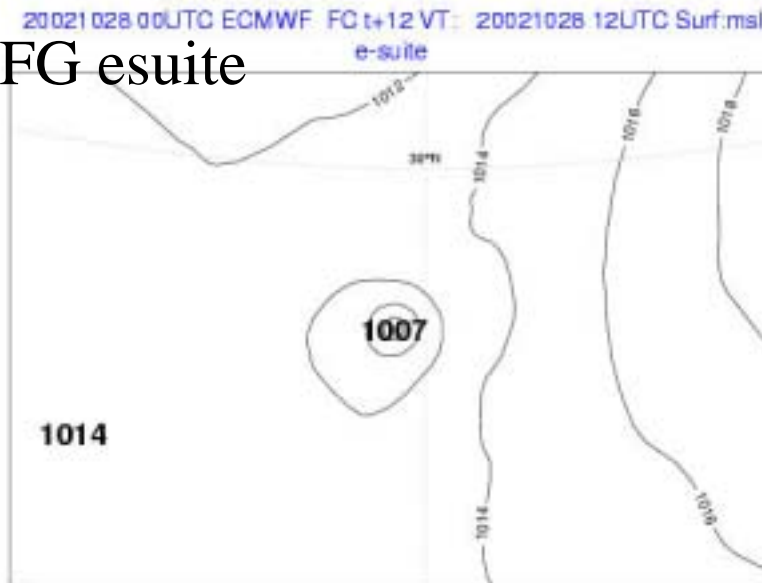
FG oper



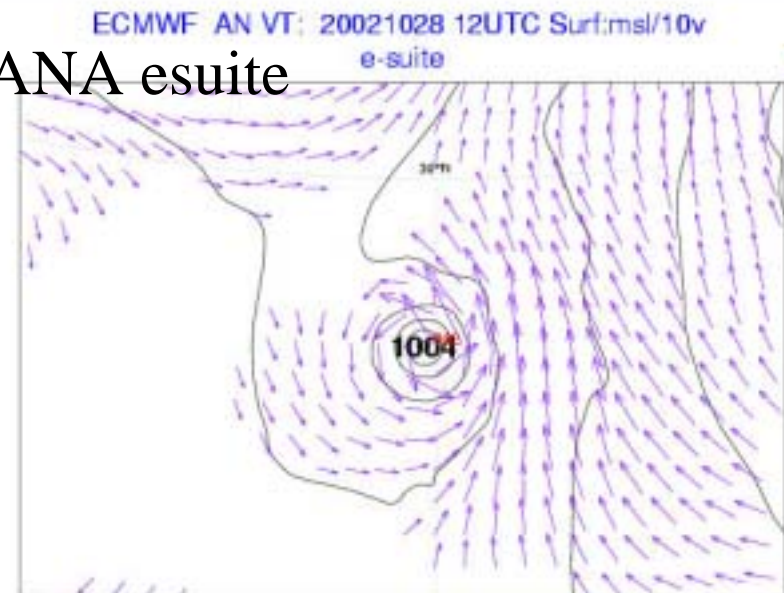
ANA oper



FG esuite

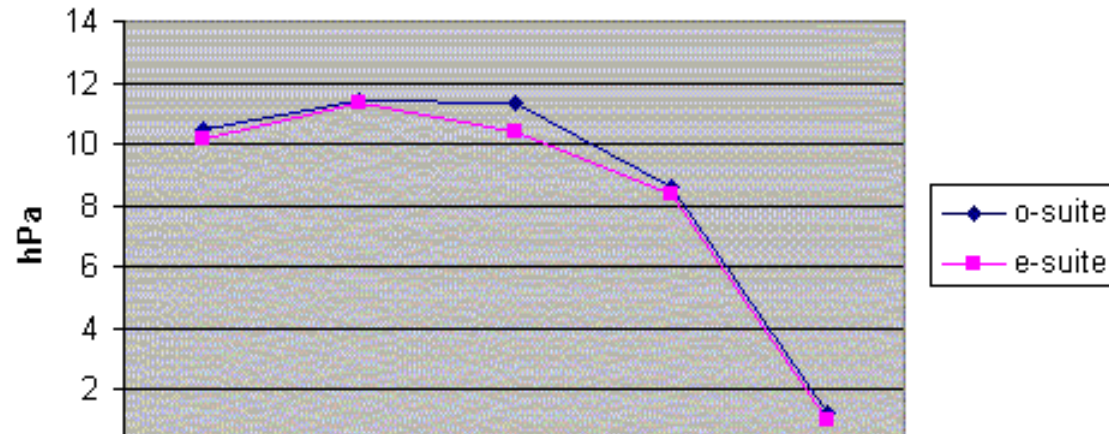


ANA esuite

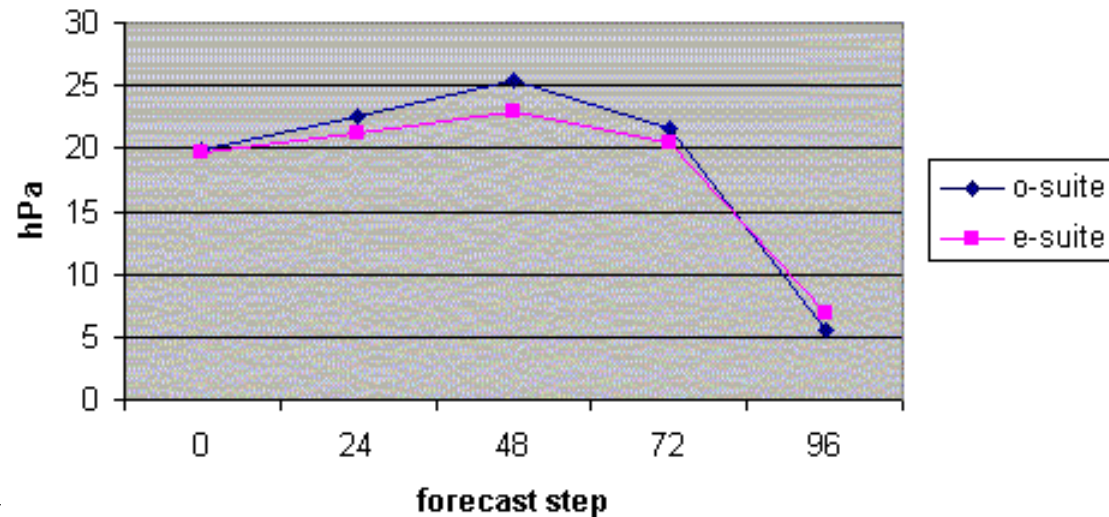


Cyclone Statistics

Mean Error Tropical Cyclone Core Pressure
Oct. 2002



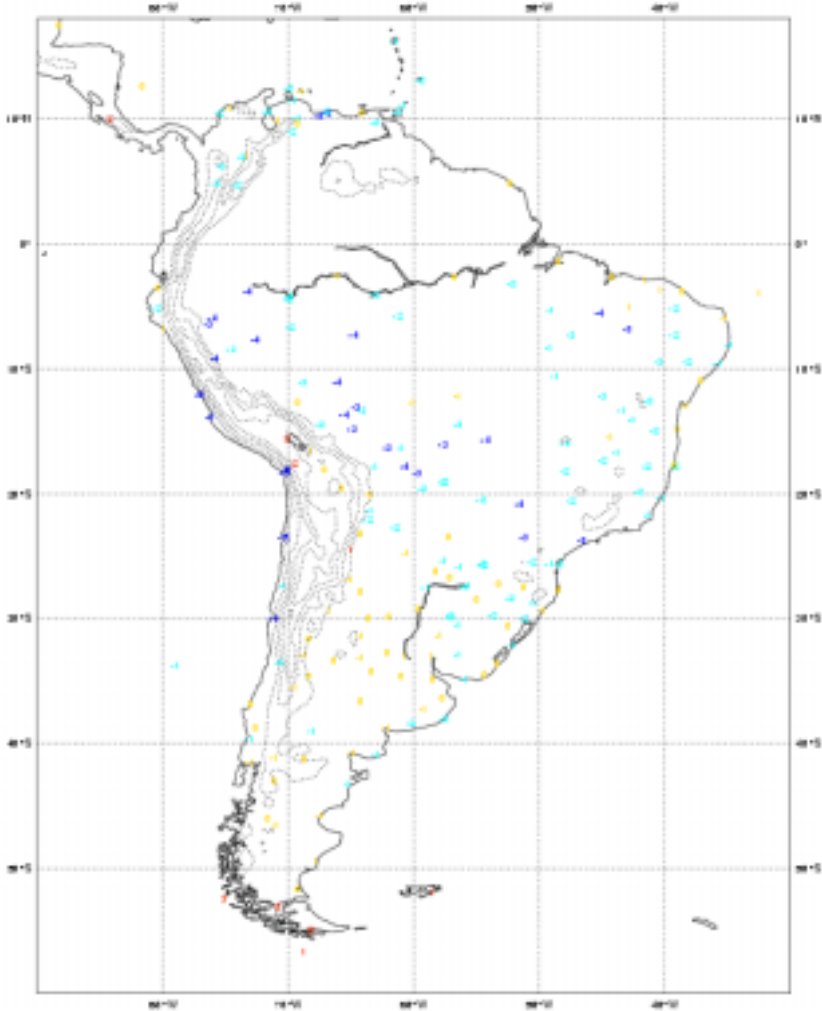
RMSE Tropical Cyclone Core Pressure
Oct. 2002



SYNOP verification Mai 2002 : Cloud Cover

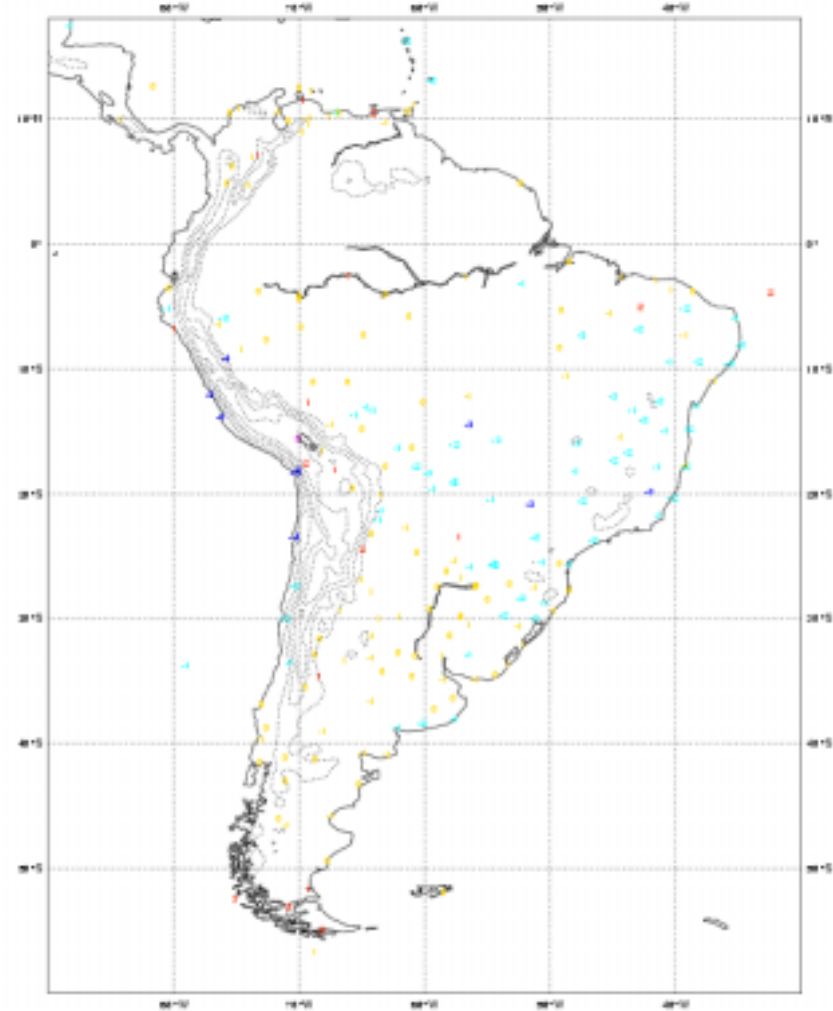
oper

BIAS Total Cloud Cover [octa] 25R1
FC PERIOD: 20020504 - 20020518 STEP: 48 VALID AT: 12 UTC
N= 3025 BIAS= -1.26 STDEV= 2.98 MAE= 2.38



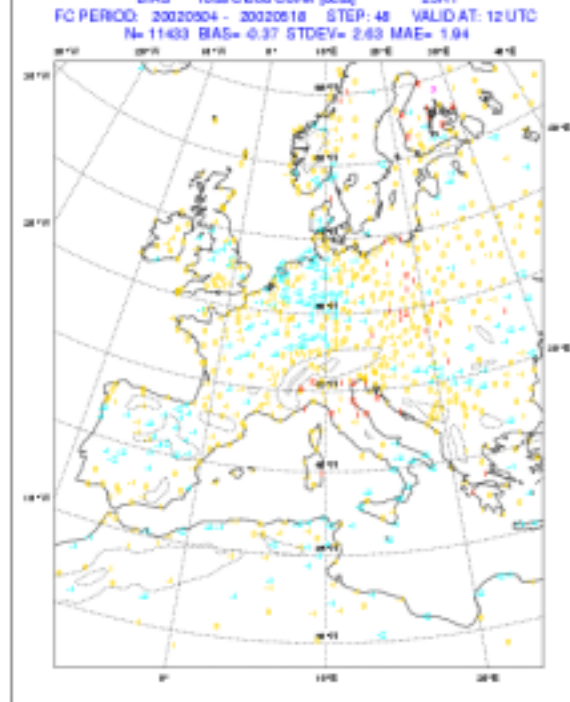
esuite

BIAS Total Cloud Cover [octa] eb7n
FC PERIOD: 20020504 - 20020518 STEP: 48 VALID AT: 12 UTC
N= 3025 BIAS= -0.54 STDEV= 3.10 MAE= 2.25

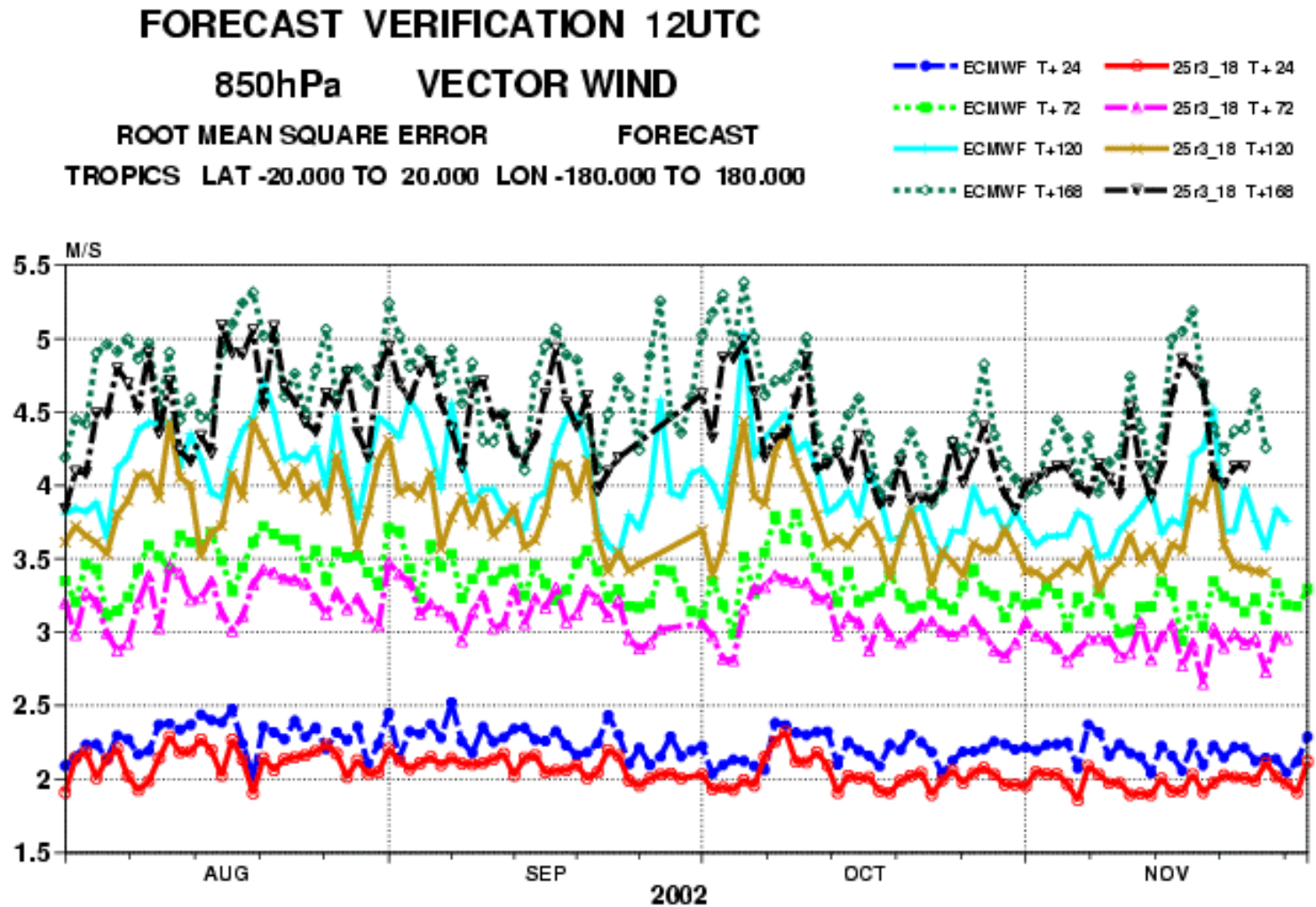


SYNOP:

Mai 2002 :
Precip



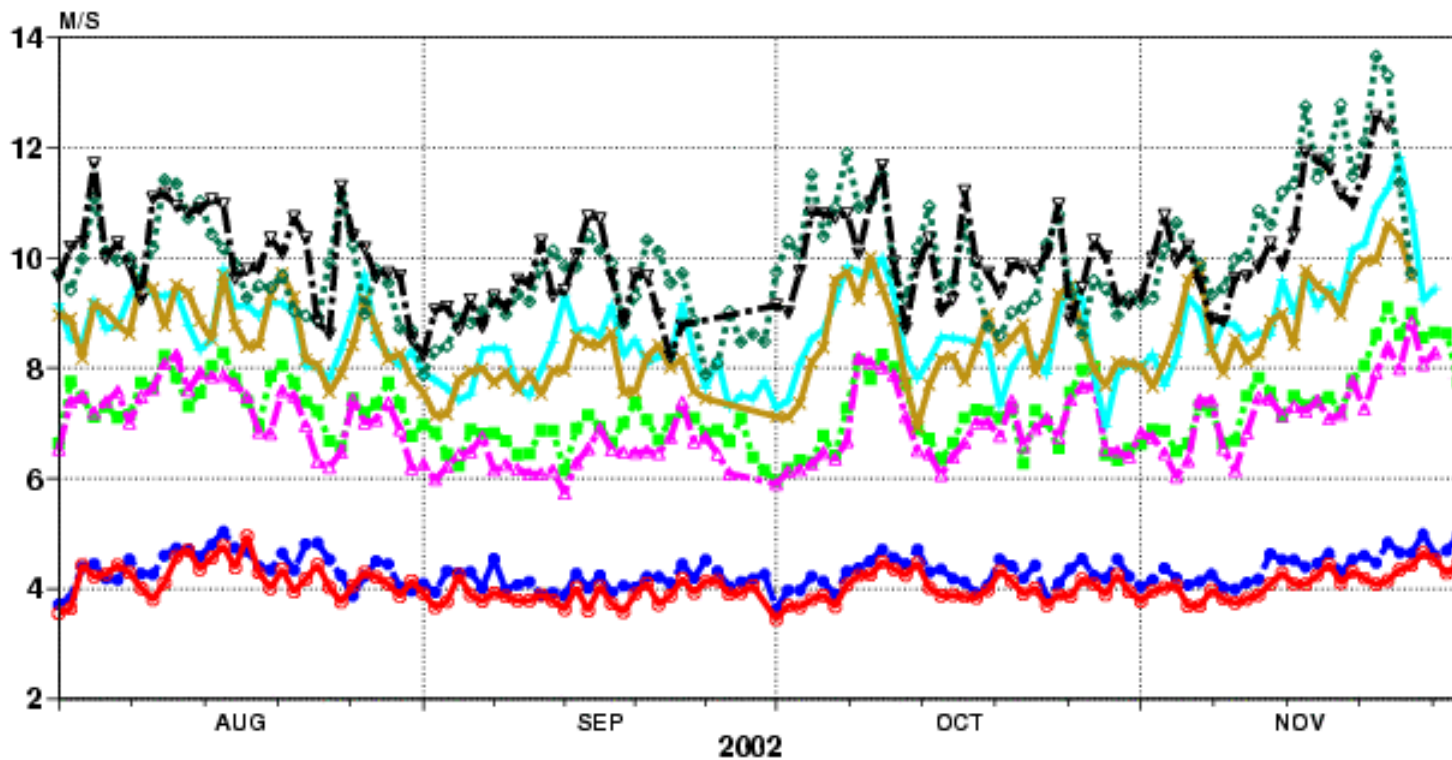
Verification against own Analysis: Aug-Nov 2002



Verification against own Analysis: Aug-Nov. 2002

FORECAST VERIFICATION 12UTC
200hPa VECTOR WIND
ROOT MEAN SQUARE ERROR FORECAST
TROPICS LAT -20.000 TO 20.000 LON -180.000 TO 180.000

Legend:
ECMWF T+24 (Blue line with circles)
25r3_18 T+24 (Red line with circles)
ECMWF T+72 (Green dashed line with squares)
25r3_18 T+72 (Magenta dashed line with triangles)
ECMWF T+120 (Cyan line with diamonds)
25r3_18 T+120 (Gold line with crosses)
ECMWF T+168 (Dark green dotted line with diamonds)
25r3_18 T+168 (Black line with inverted triangles)



Verification against own Analysis: Aug-Nov. 2002

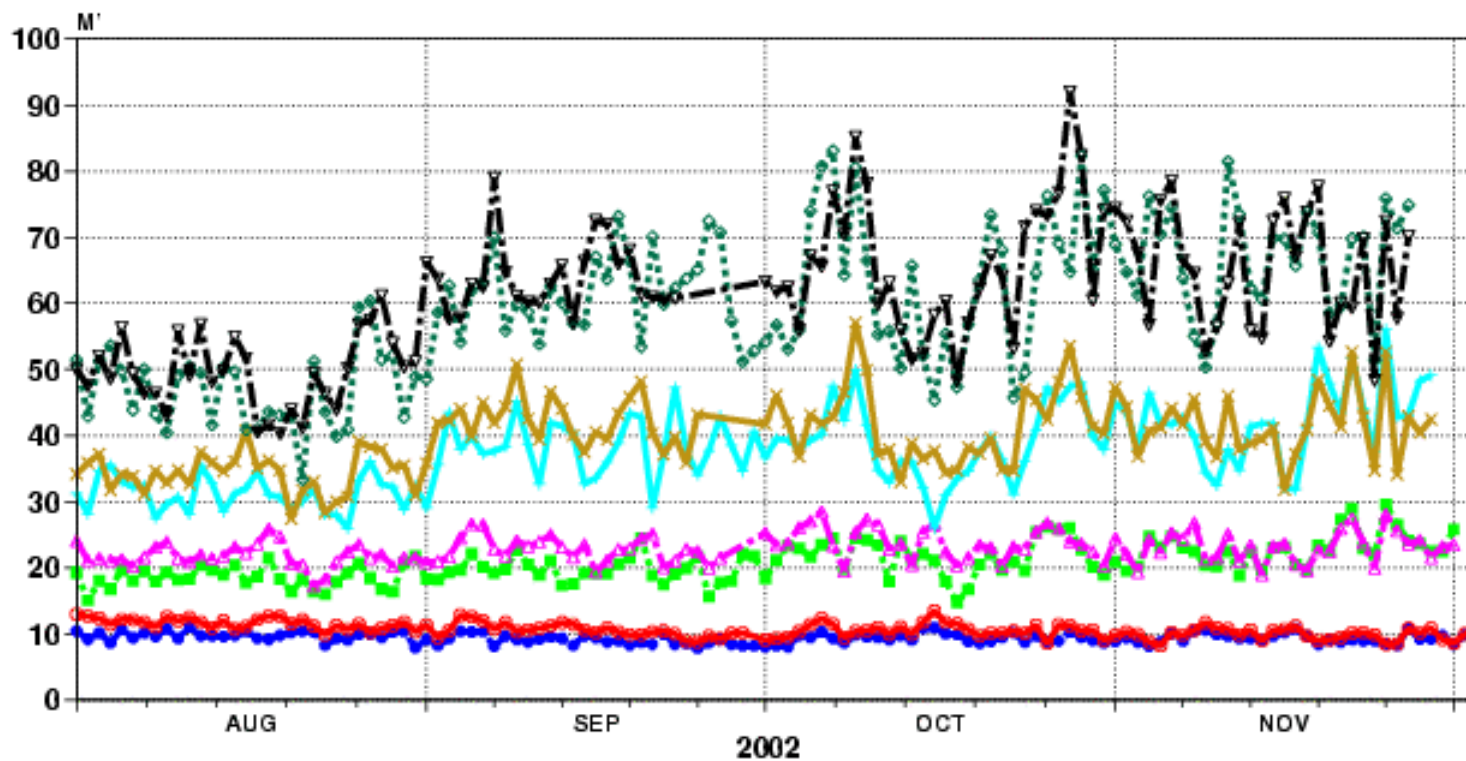
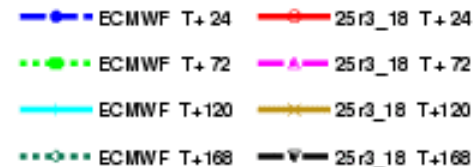
FORECAST VERIFICATION 12UTC

100hPa GEOPOTENTIAL

ROOT MEAN SQUARE ERROR

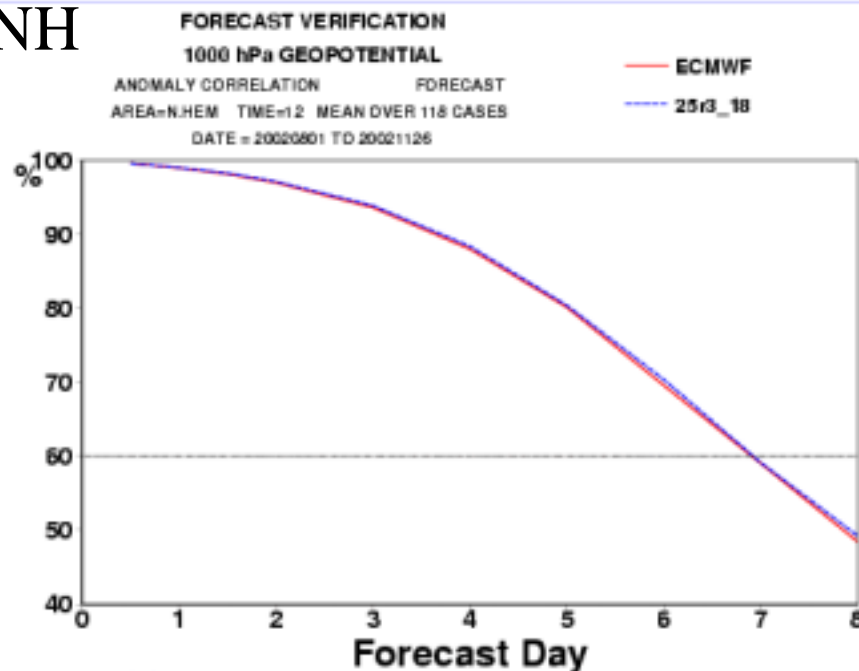
FORECAST

N.HEM LAT 20.000 TO 90.000 LON -180.000 TO 180.000

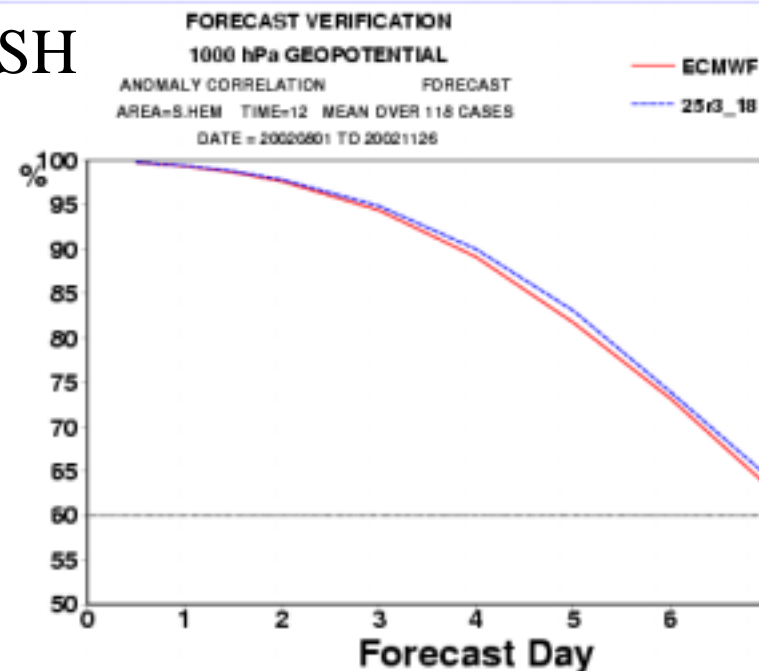


Anomaly Correlation 1000 hPa: Aug-Nov. 2002

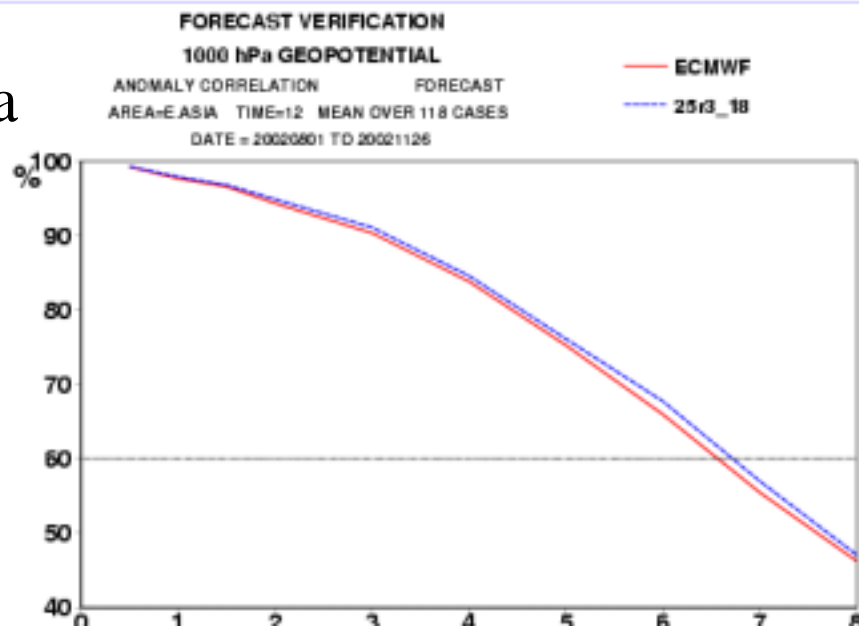
NH



SH

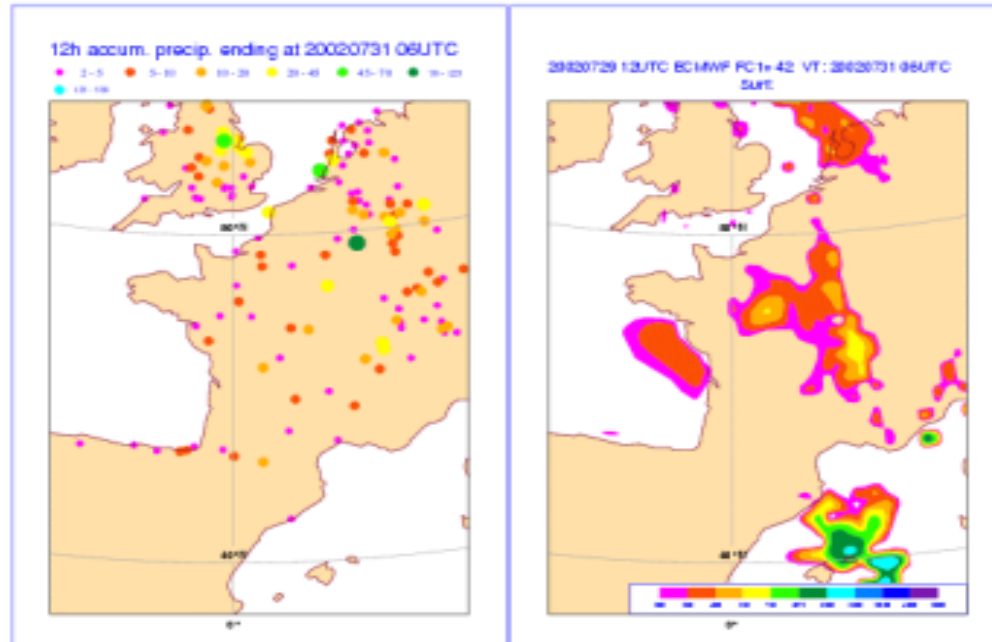


E.Asia



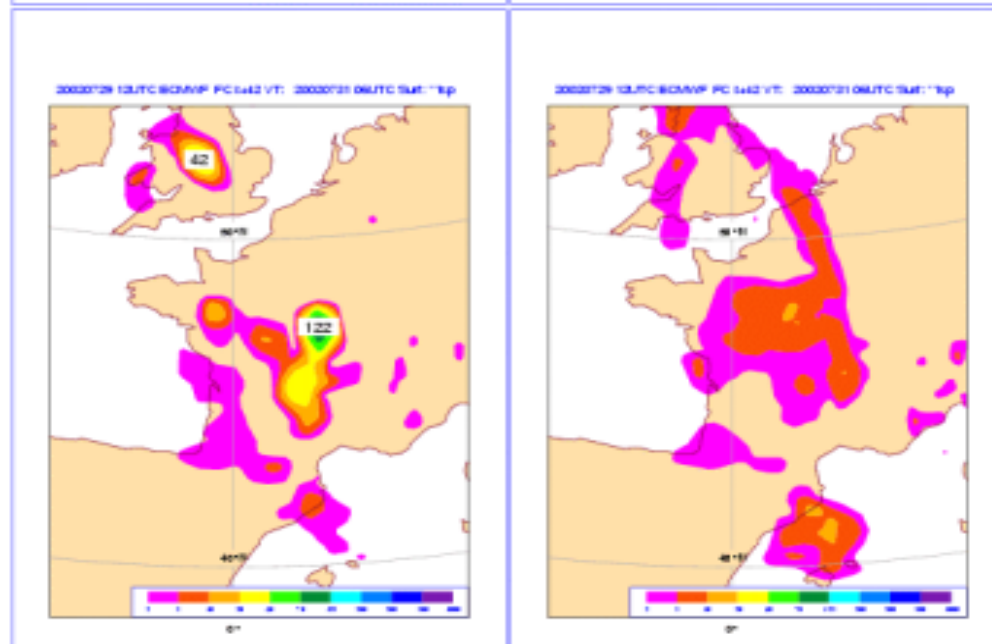
Case studies, starting with same Analysis

OBS



CAPE

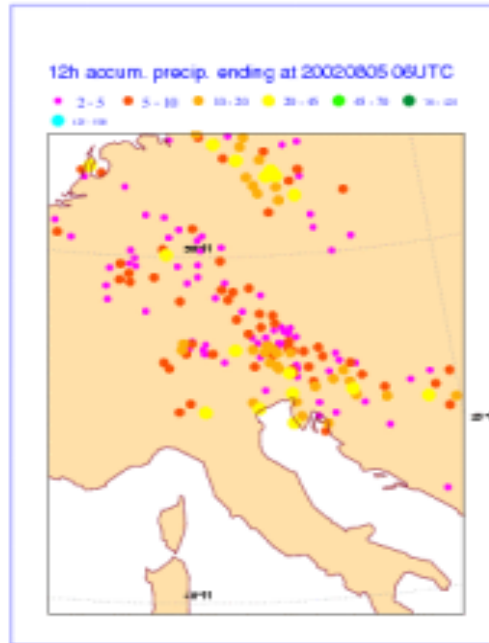
oper



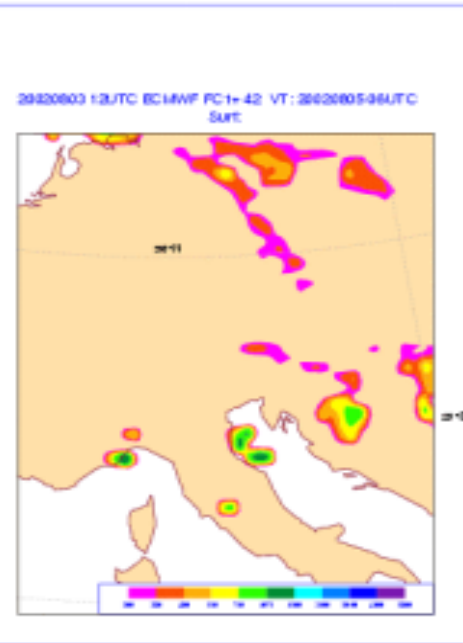
new

Case studies, starting with same Analysis

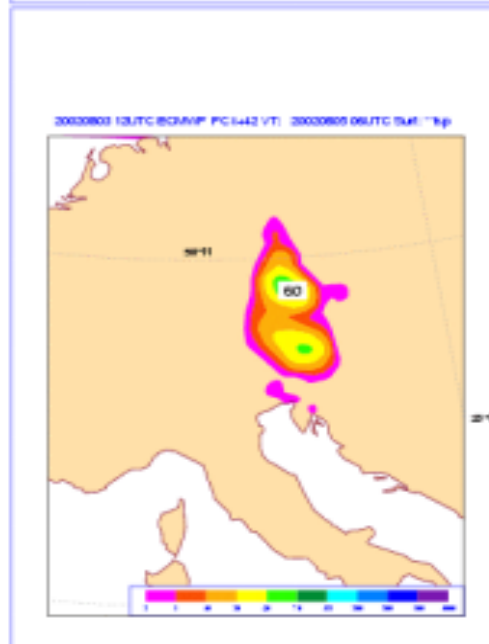
OBS



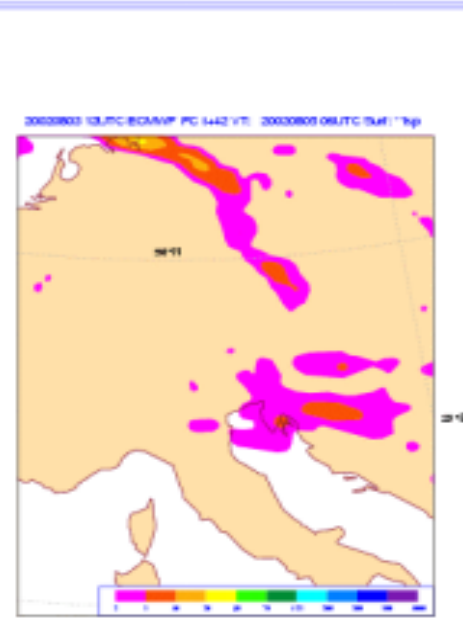
CAPE



oper



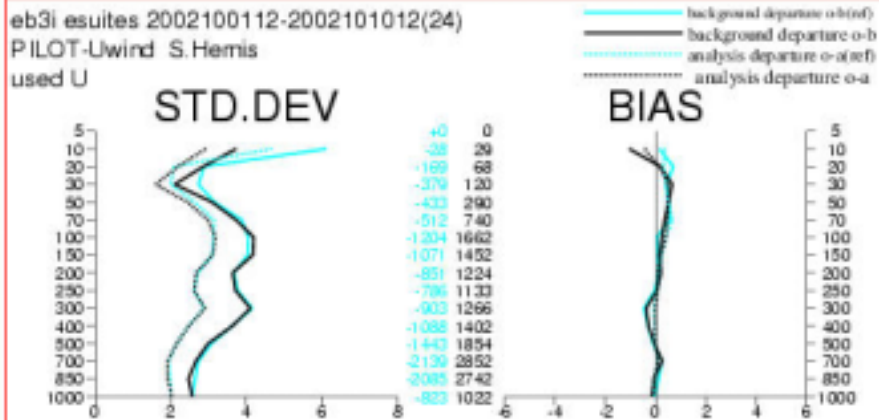
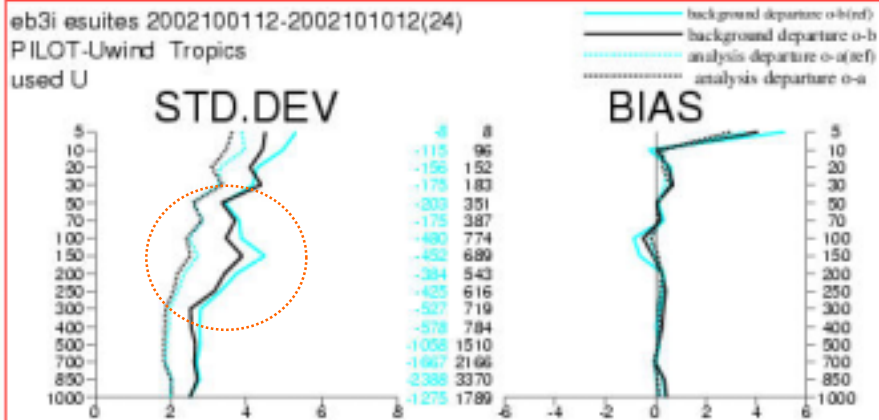
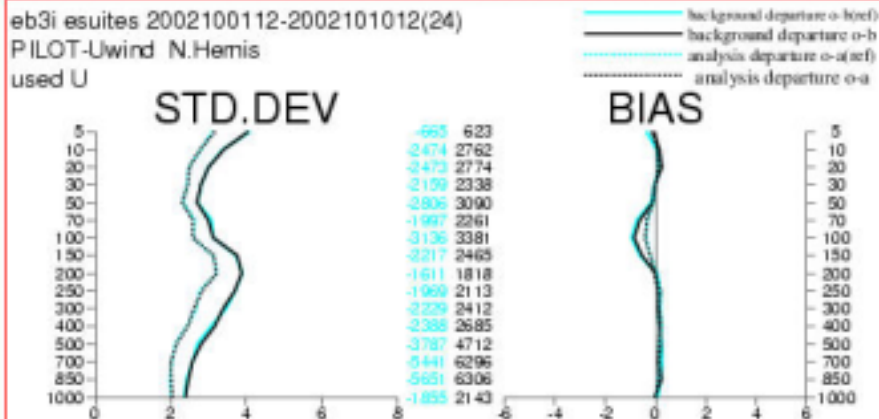
new



Analysis statistics with Temps

Standard: blue

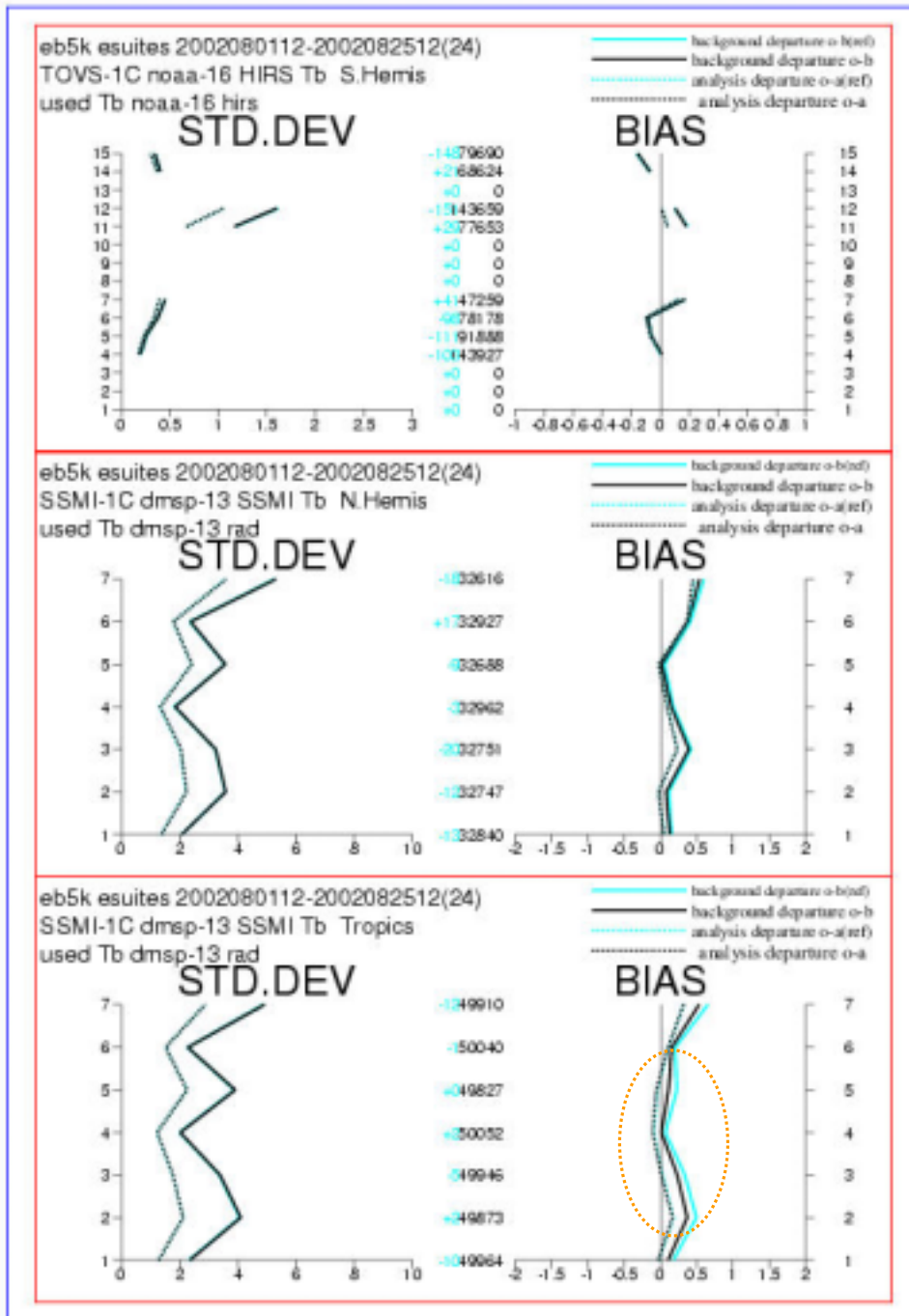
Incr. Entrainm: black



Analysis statistics with Satellite: SSMI

Standard: blue

Incr. Entrainm: black

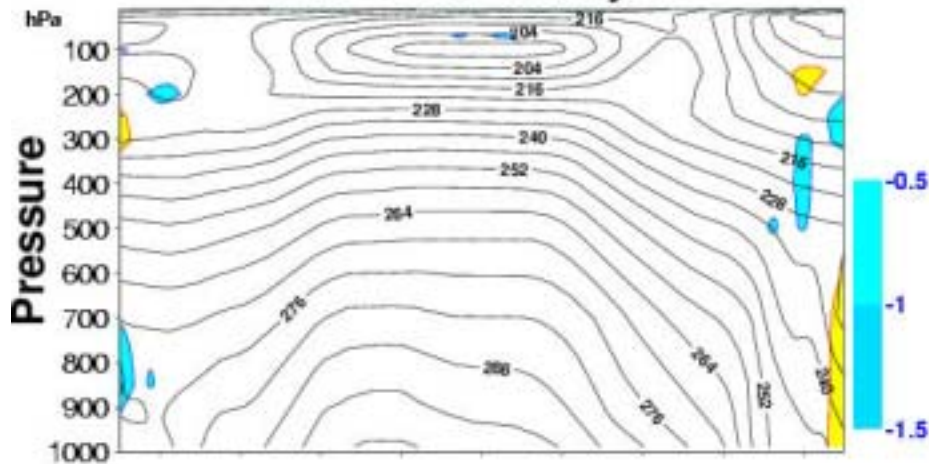


T verification against ERA40, august 2002

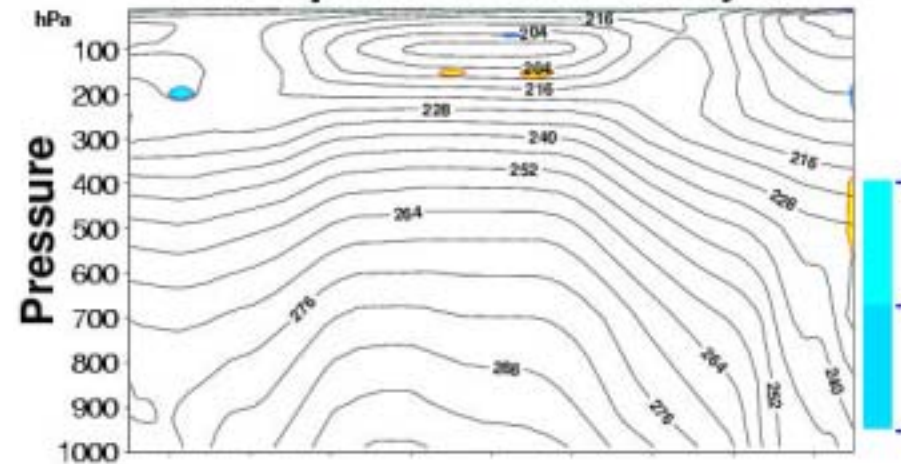
Test suite incr.entr

Oper

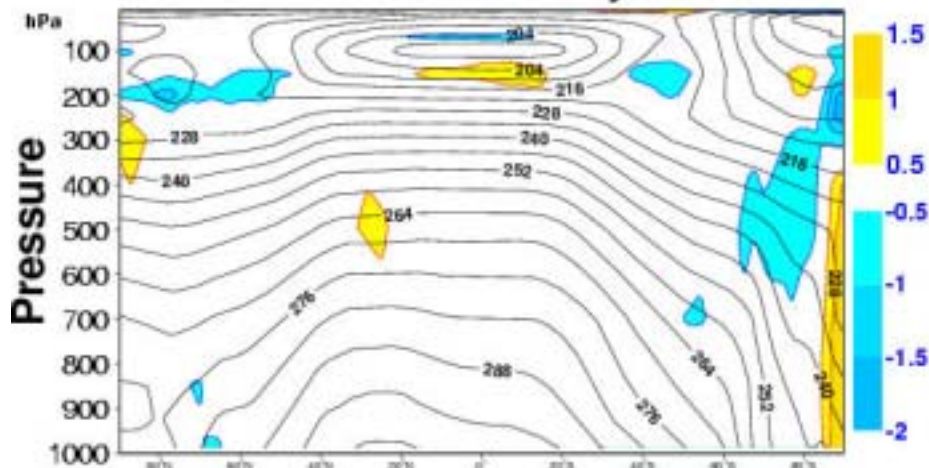
**Zonal Mean Error: Average T (n=5)
D+1 eb5k - Analysis**



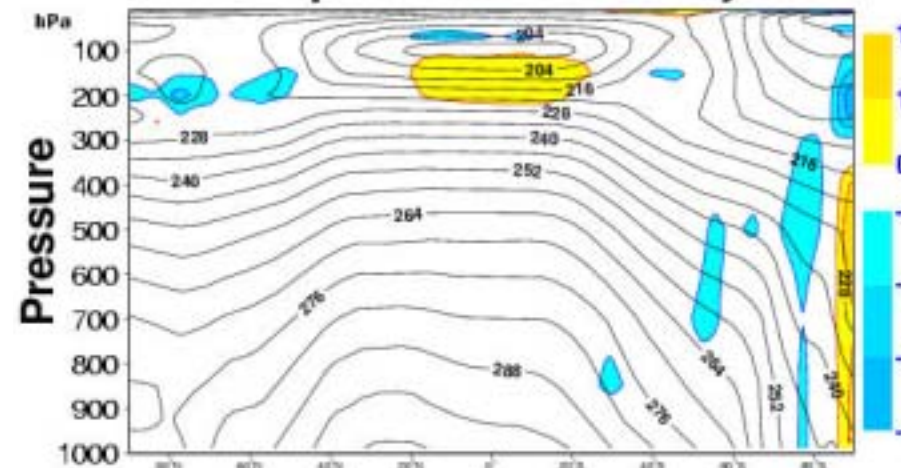
**Zonal Mean Error: Average T (n=5)
D+1 Oper. Forecast - Analysis**



**Zonal Mean Error: Average T (n=5)
D+2 eb5k - Analysis**



**Zonal Mean Error: Average T (n=5)
D+2 Oper. Forecast - Analysis**

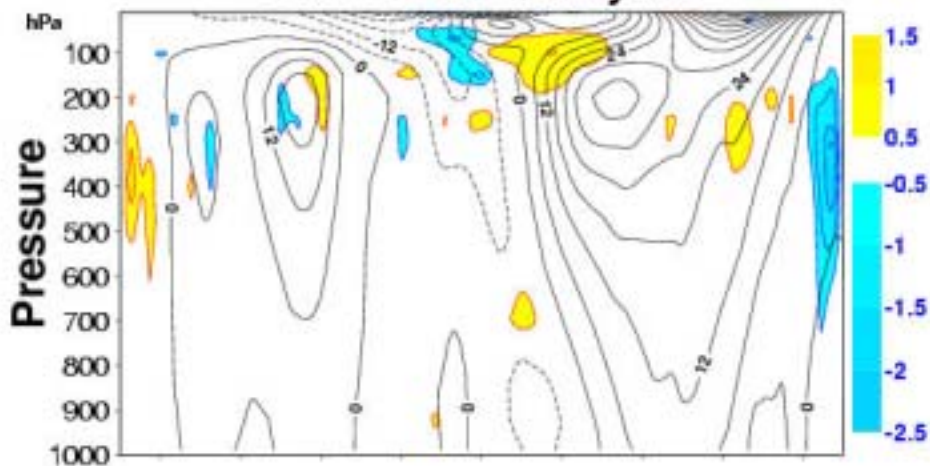


U verification against ERA40, august 2002

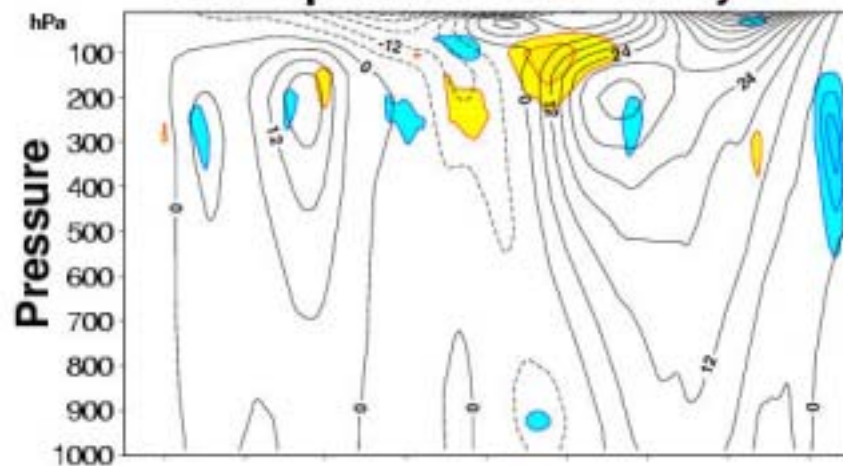
Test suite incr.entr

Oper

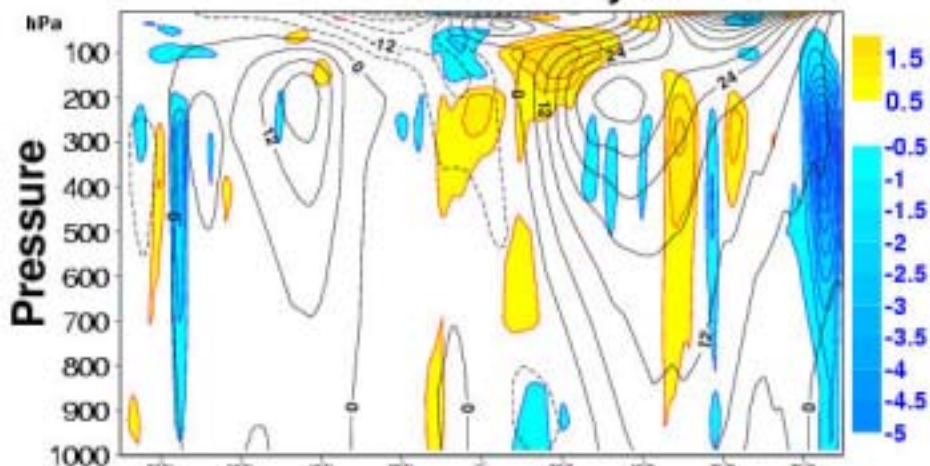
Zonal Mean Error: Average u (n=5)
D+1 eb5k - Analysis



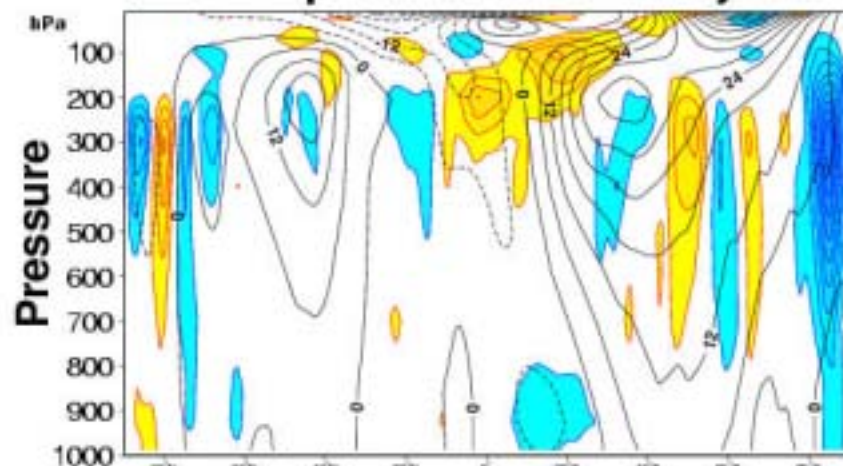
Zonal Mean Error: Average u (n=5)
D+1 Oper. Forecast - Analysis



Zonal Mean Error: Average u (n=5)
D+2 eb5k - Analysis

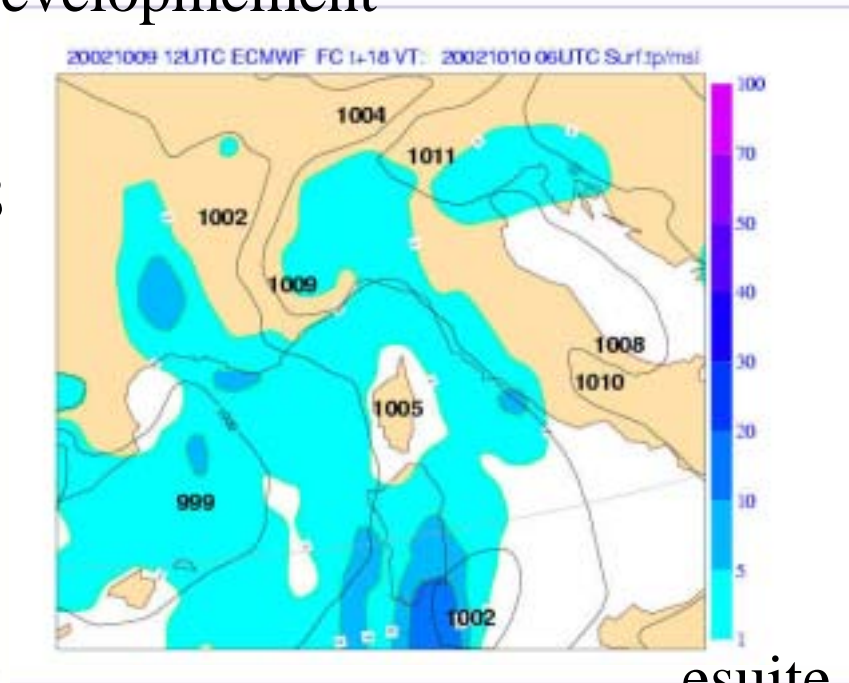
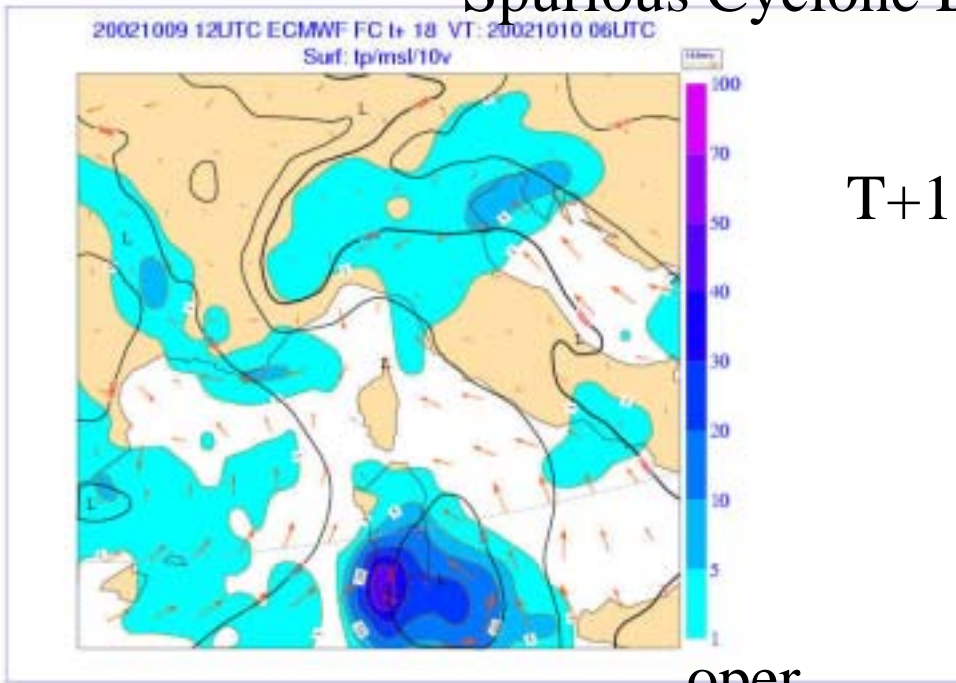


Zonal Mean Error: Average u (n=5)
D+2 Oper. Forecast - Analysis

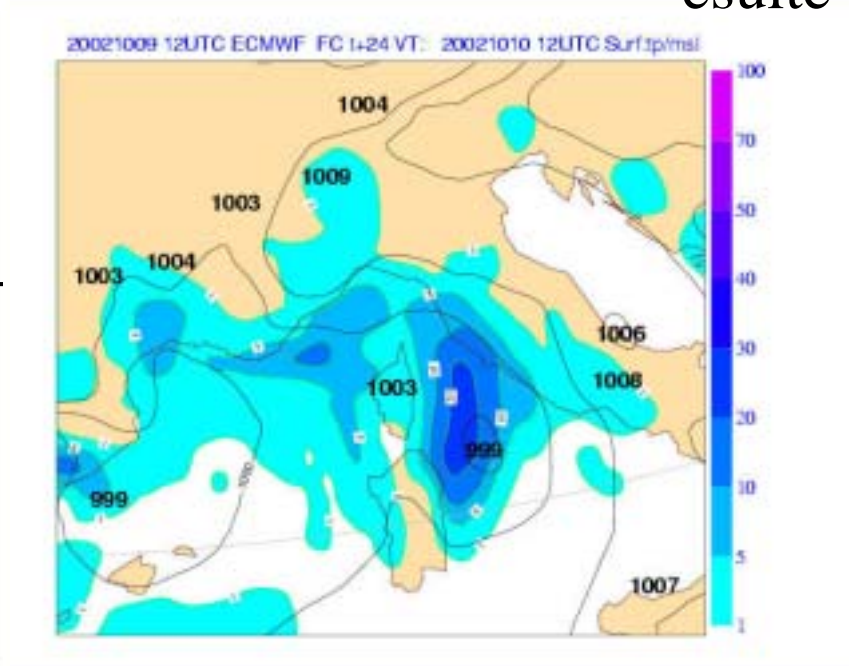
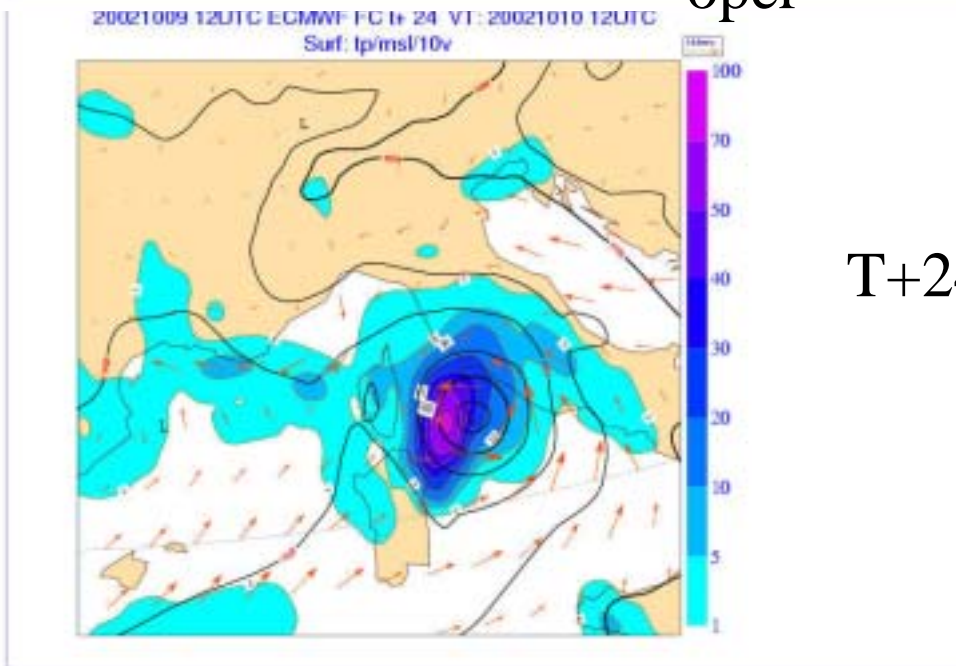


Spurious Cyclone Development

T+18



T+24



Brief Summary – CY25R3



- Model changes had mostly positive impact
 - Improvement in Rainfall over Land, tropical winds, cyclone development, Analysis Increments –Grid point storms (American problem)
 - Tropical variability and MJO has still to be evaluated – better use of TRMM DATA
 - But probaly convection still overactive over West Pacific – 100 hPa Z and T increments -> slope of 100 hPa T error is determined by cloud-radiation interaction (cloud scheme)
- Nota: any change in convection/cloud must be carefully evaluated as
 - Something will always degrade +/- error evolution
 - Any change in model physics becomes particularly effective through analysis Cycle – Forecats only is quite conservative

(more on this this afternoon)

