

Using EPS/Deterministic forecasts for severe weather forecasting

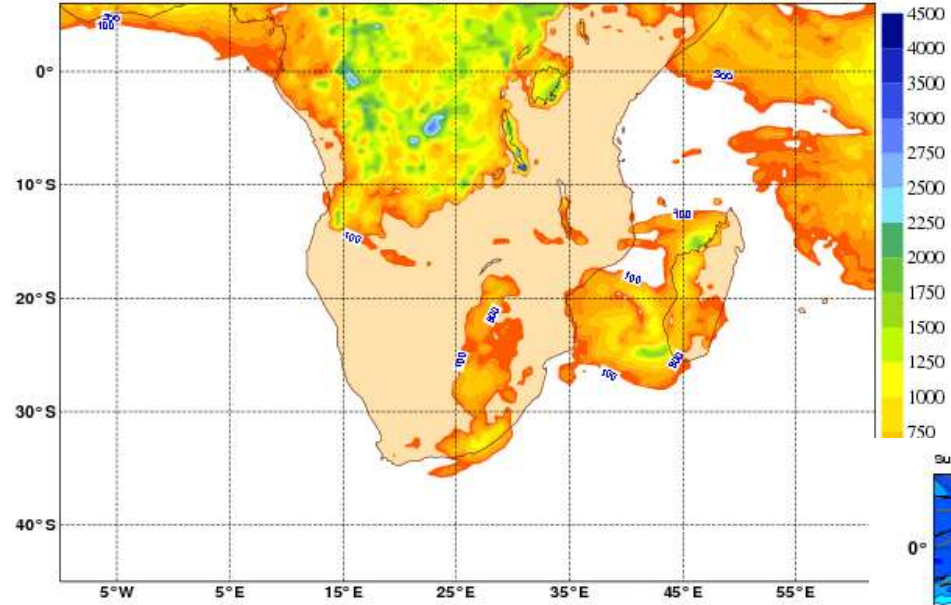
Ezekiel Sebego

Case of 28 October 2013: severe
thunderstorms over central and
eastern South Africa

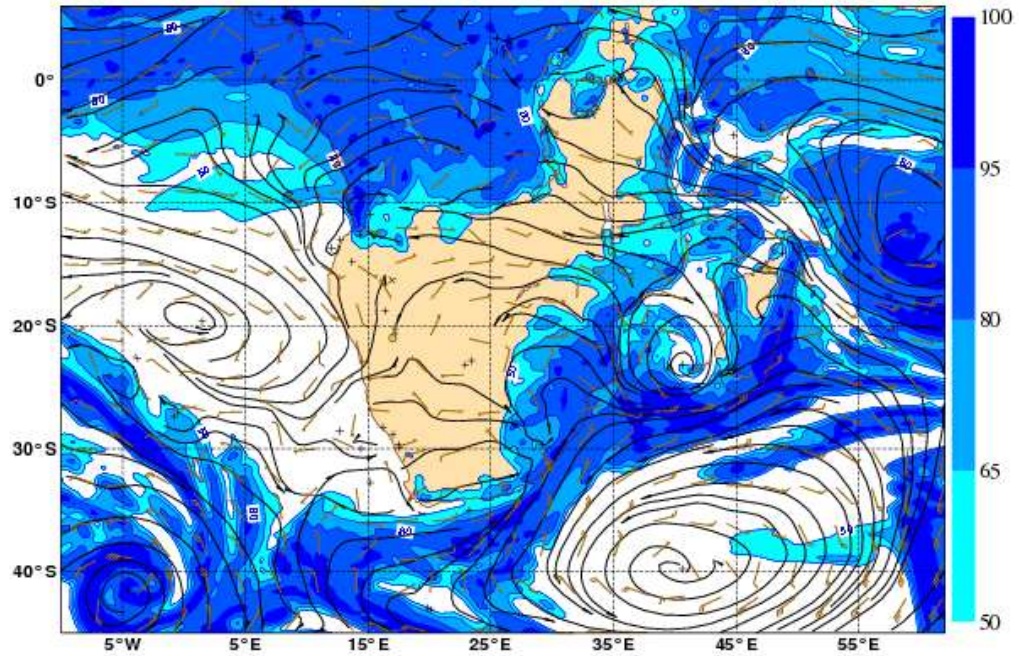
products from global centres

ECMWF

Sunday 27 October 2013 00 UTC ECMWF Forecast +42 VT: Monday 28 October 2013 18 UTC Surface Convective available potential energy

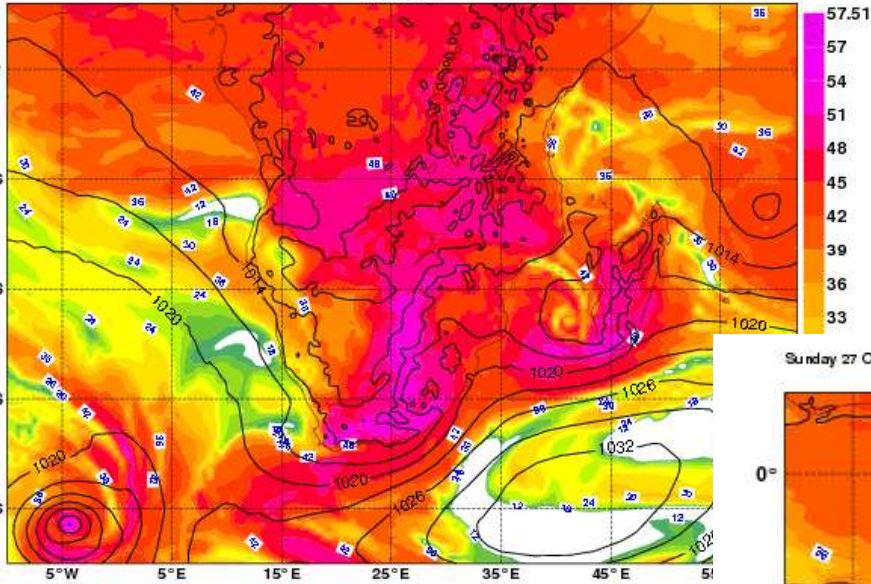


Sunday 27 October 2013 00 UTC ECMWF Forecast +36 VT: Monday 28 October 2013 12 UTC 850 hPa Relative humidity / V velocity / V velocity

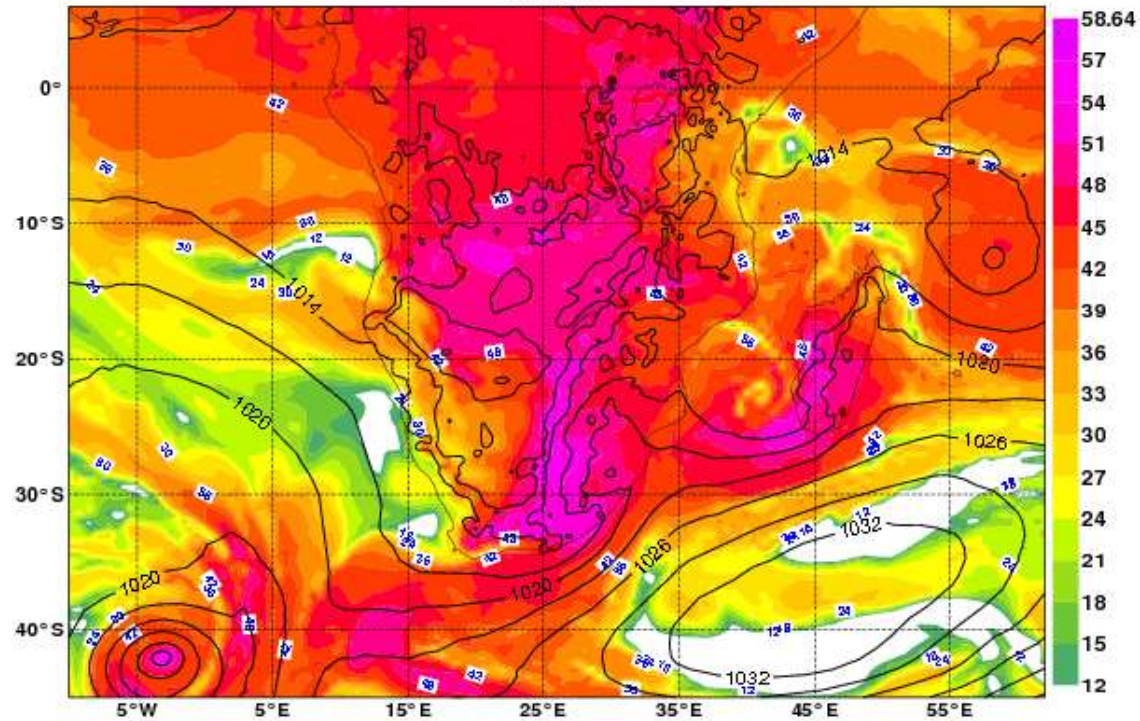


ECMWF

Sunday 27 October 2013 00 UTC ECMWF Forecast 1+36 VT: Monday 28 October 2013 12 UTC 850h Pa Temperature/ Mean sea level pressure
TT Index (C)



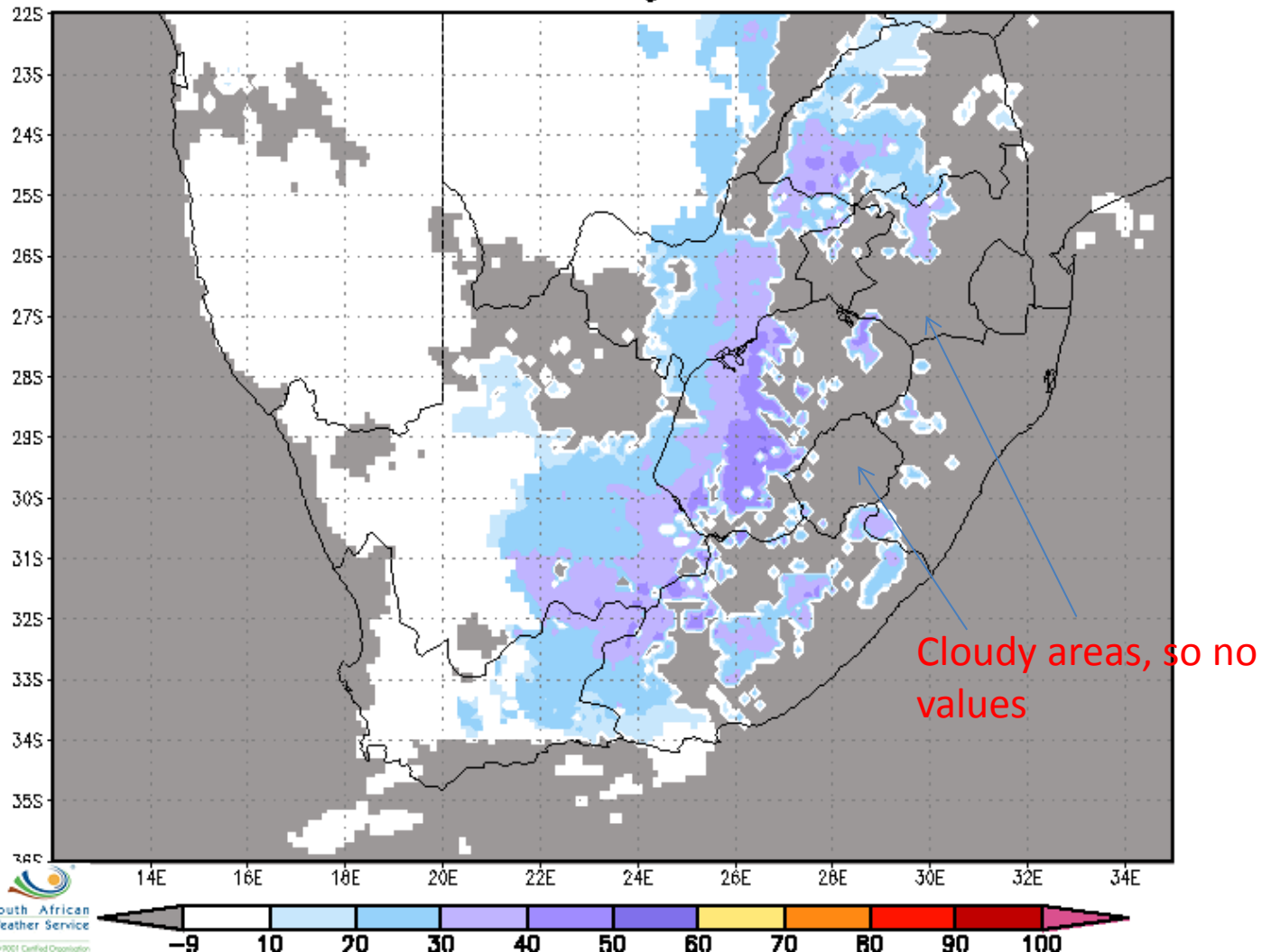
Sunday 27 October 2013 00 UTC ECMWF Forecast 1+42 VT: Monday 28 October 2013 18 UTC 850h Pa Temperature/ Mean sea level pressure
TT Index (C)



products from regional centre

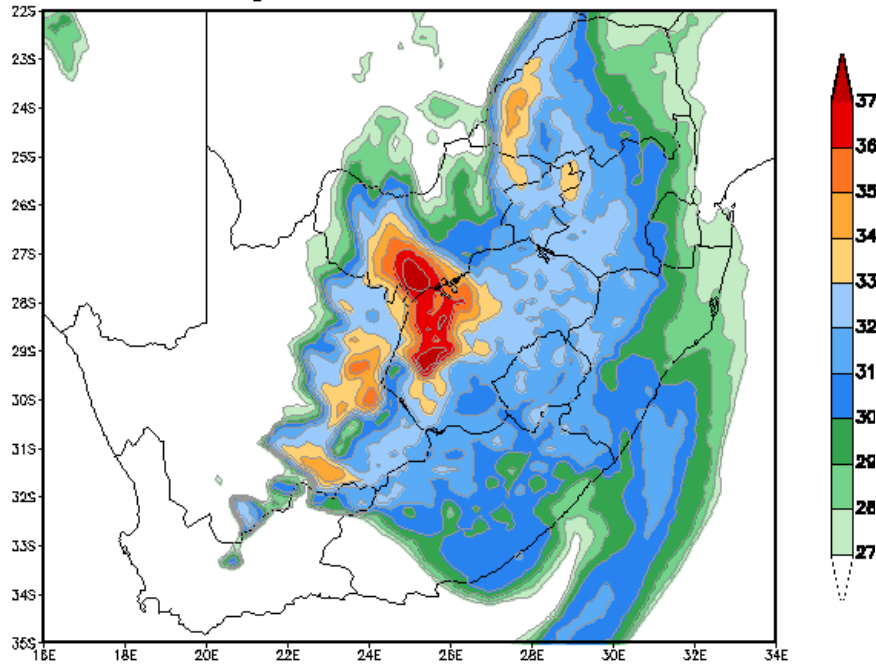
combined instability index (CII)

Probability for convective thunderstorms in percentages on
28OCT2013 Time average 0700–1000 UTC



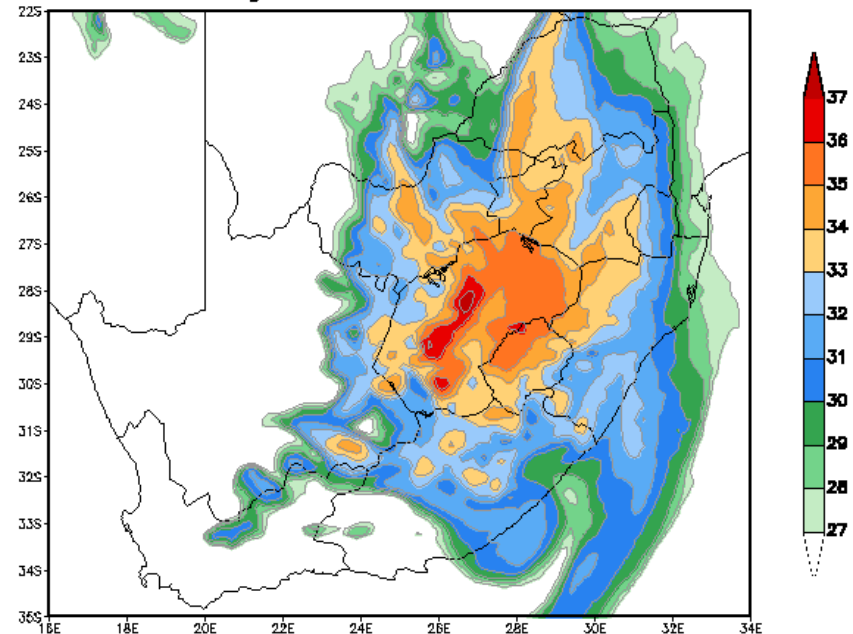
UM high level TT's

UM 12km horizontal resolution – xaant Run:
High Level Total Totals Index



12hr Forecast from 00Z 28 OCT 2013 – for 12Z 28 OCT 2013

UM 12km horizontal resolution – xaant Run:
High Level Total Totals Index

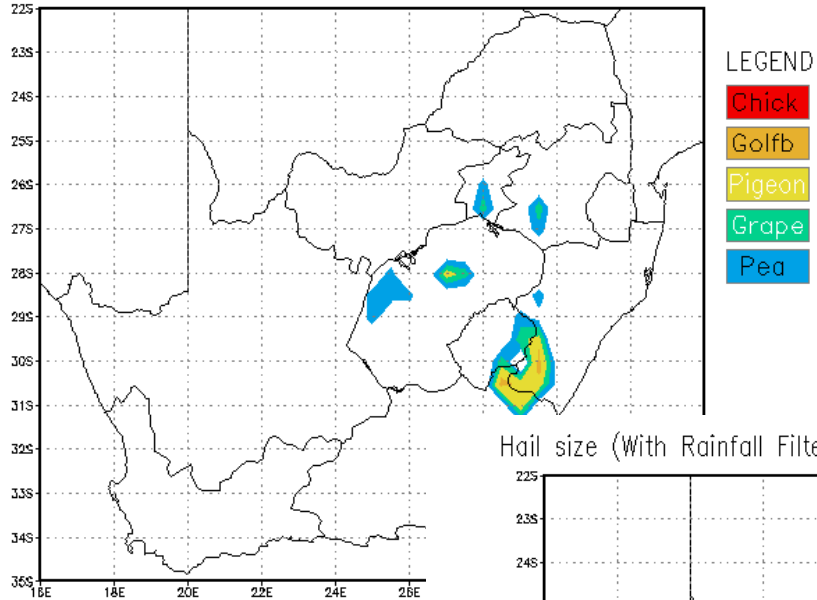


15hr Forecast from 00Z 28 OCT 2013 – for 15Z 28 OCT 2013

hail forecasts from UM

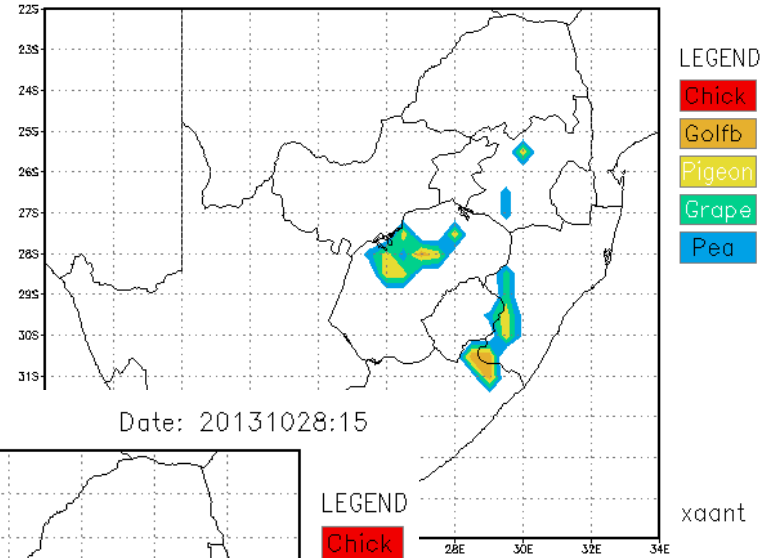
Hail size (With Rainfall Filter)

Date: 20131028:10



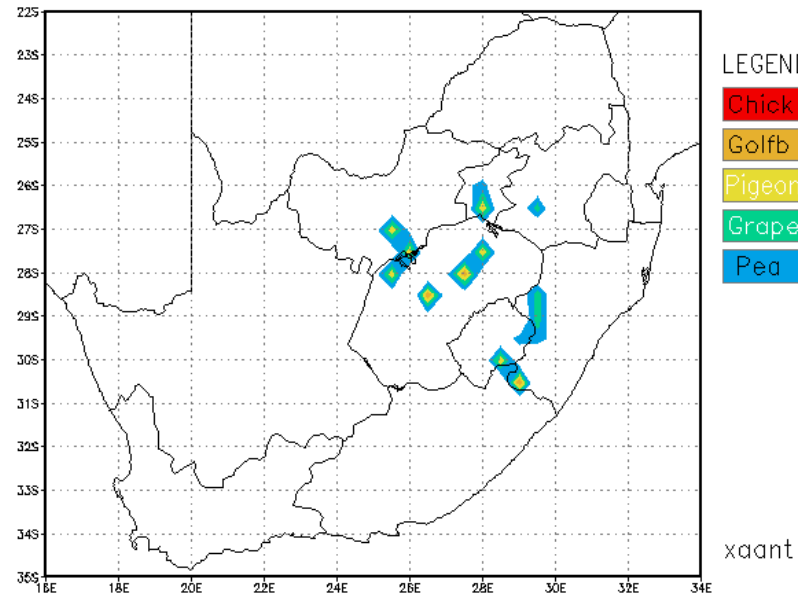
Hail size (With Rainfall Filter)

Date: 20131028:14



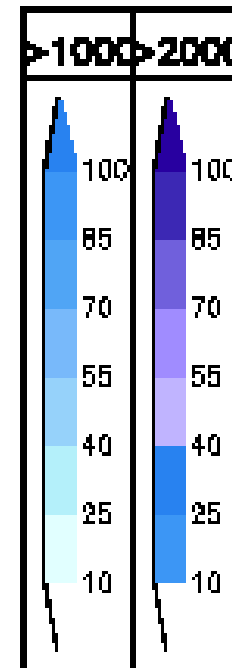
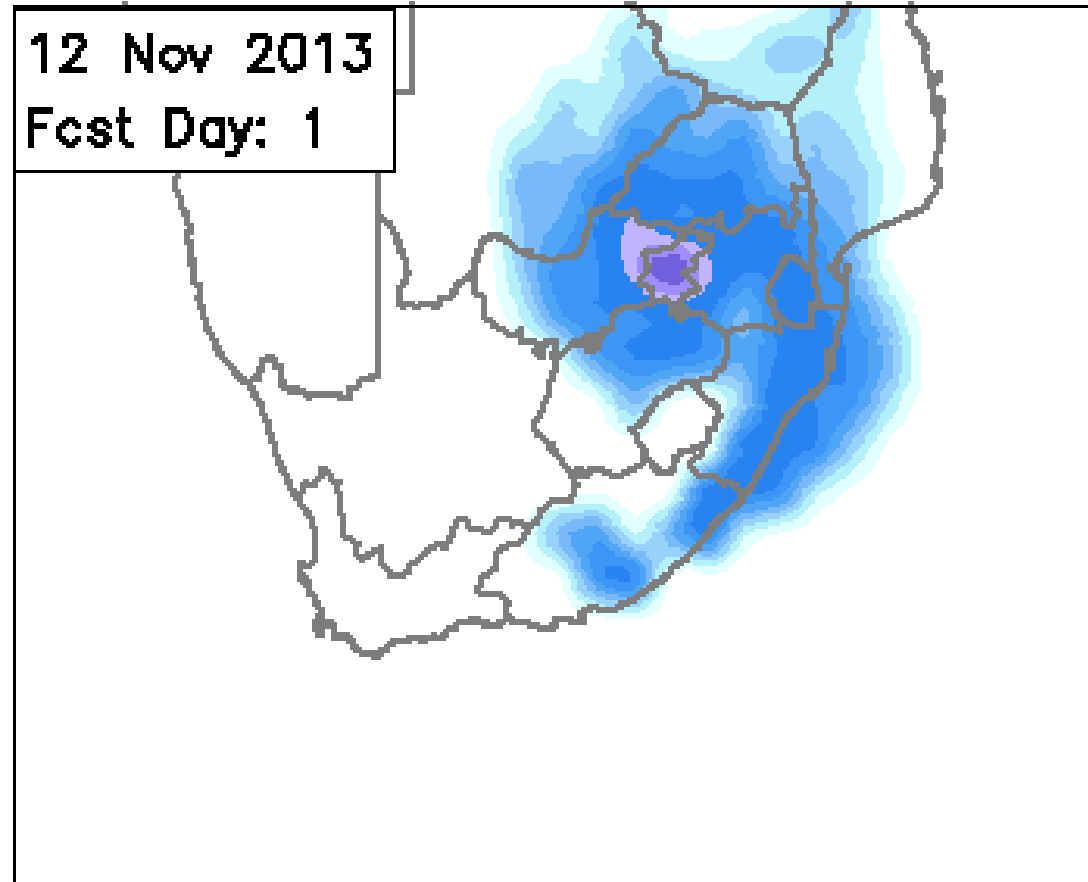
Hail size (With Rainfall Filter)

Date: 20131028:15



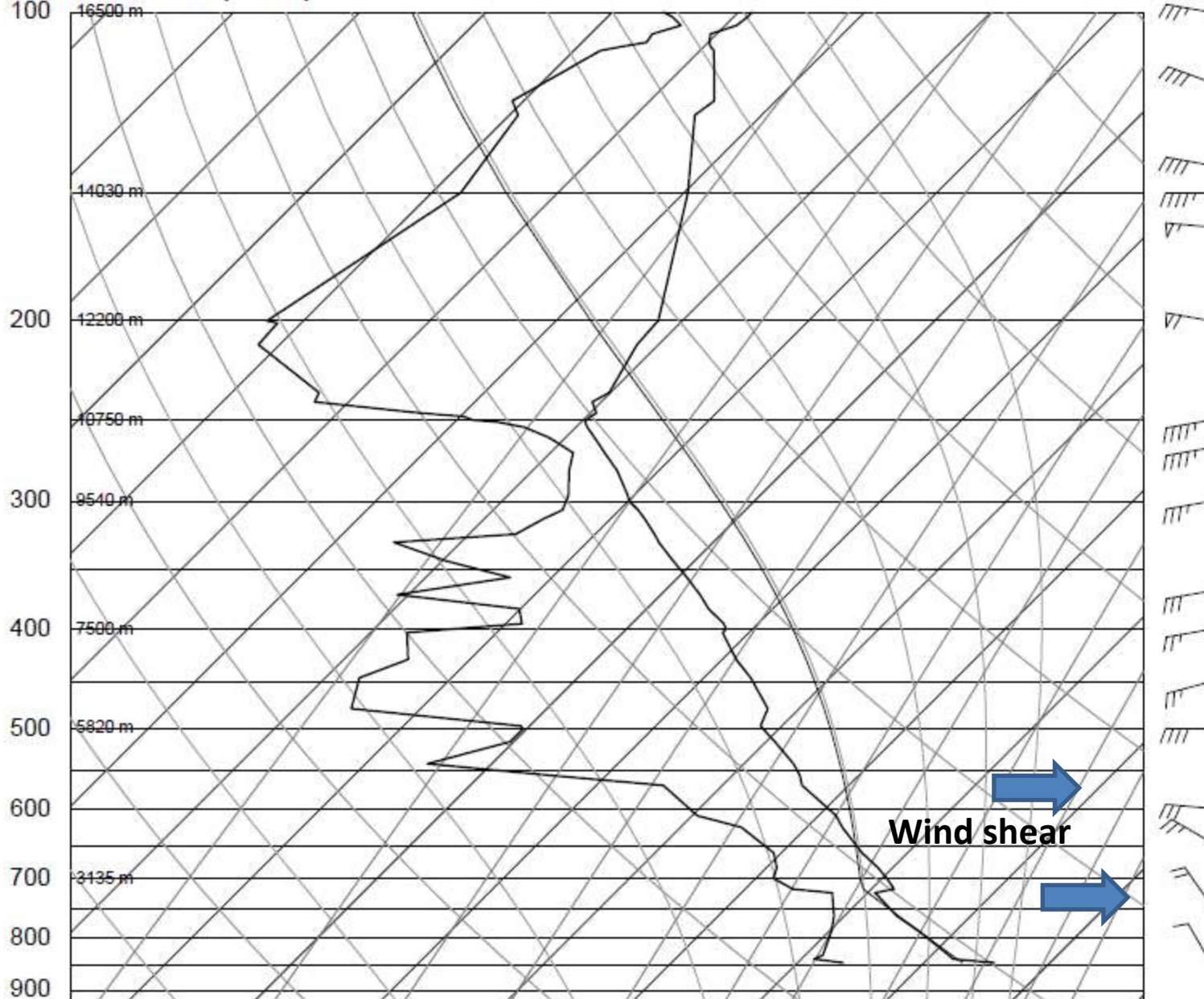
Prob of CAPE > 2000J/Kg, **unrelated event**

Prob of CAPE > 1000 & > 2000J.kg⁻¹



Upper air ascent

58263 FAIR Pretoria (Irene)



SLAT	-25.91
SLON	28.21
SELV	1523.
SHOW	-9999
LIFT	-5.38
LFTV	-6.08
SWET	-9999
KINX	-9999
CTOT	-9999
VTOT	-9999
TOTL	-9999
CAPE	1512.
CAPV	1629.
CINS	-46.6
CINV	-28.7
EQLV	221.8
EQTV	221.7
LFCV	648.7
BRCH	36.57
BRCV	39.40
LCLT	282.2
LCLP	714.1
MLTH	310.7
MLMR	10.25
THCK	-9999
PWAT	20.80

what happened?

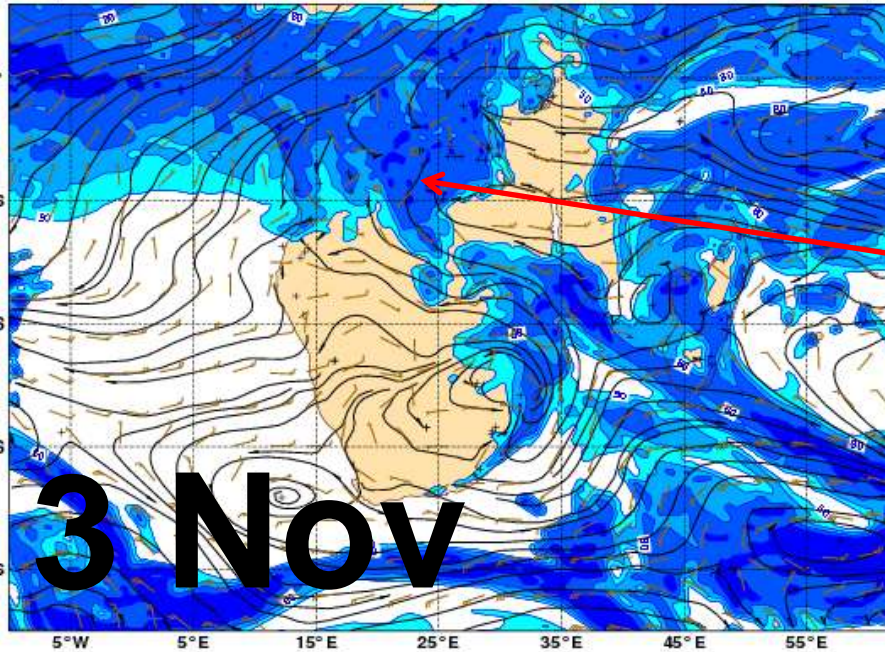


Case of 3-4 November 2013: heavy rains over Angola, DRC and Zambia

products from global centres

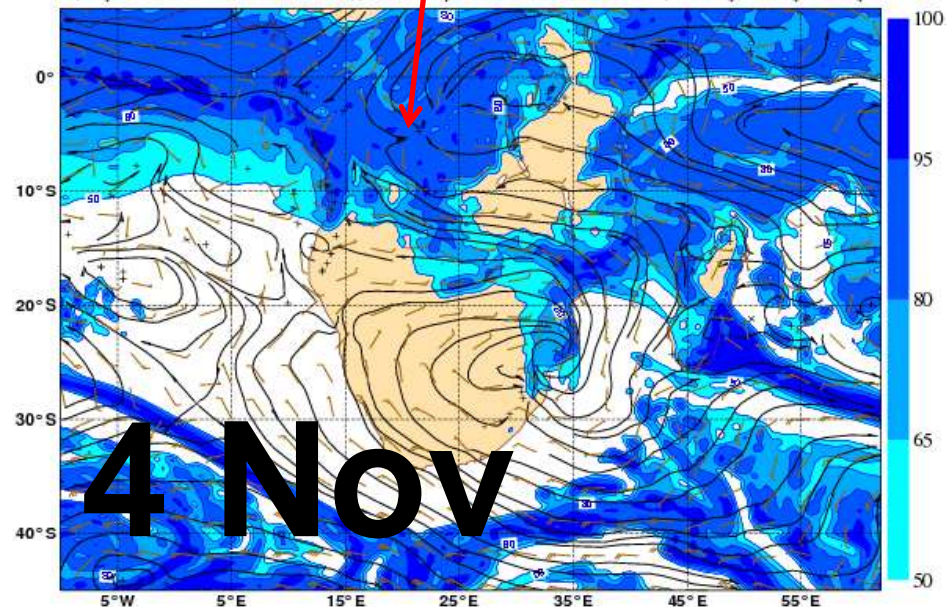
ECMWF 850hPa

Saturday 2 November 2013 12UTC ECMWF Forecast +24 VT: Sunday 3 November 2013 12UTC 850hPa Relative humidity/ V velocity/ V velocity



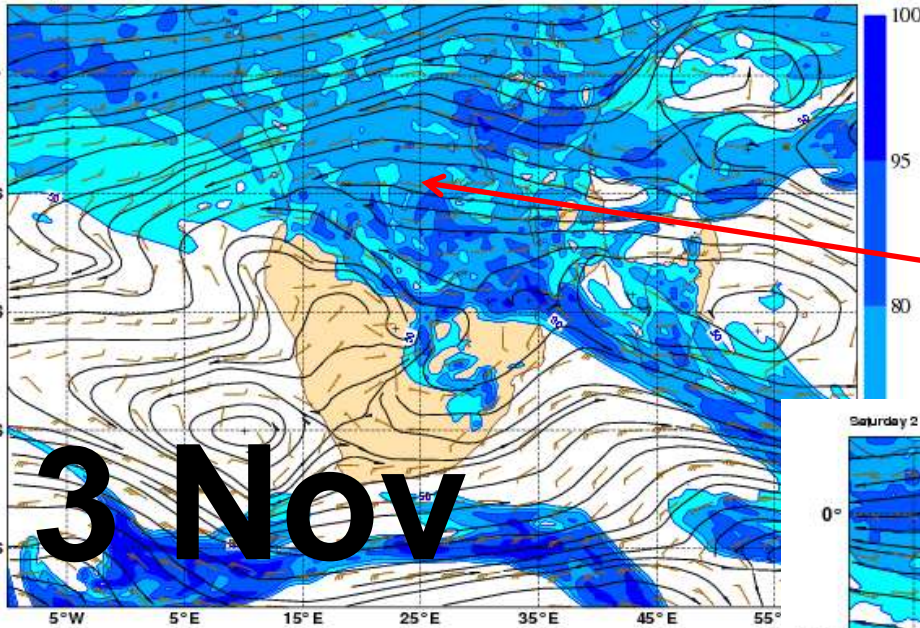
Strong convergence and high relative humidity over DRC, Angola and Zambia

Saturday 2 November 2013 12UTC ECMWF Forecast +48 VT: Monday 4 November 2013 12UTC 850 hPa Relative humidity/ V velocity/ V velocity



ECMWF 700hPa

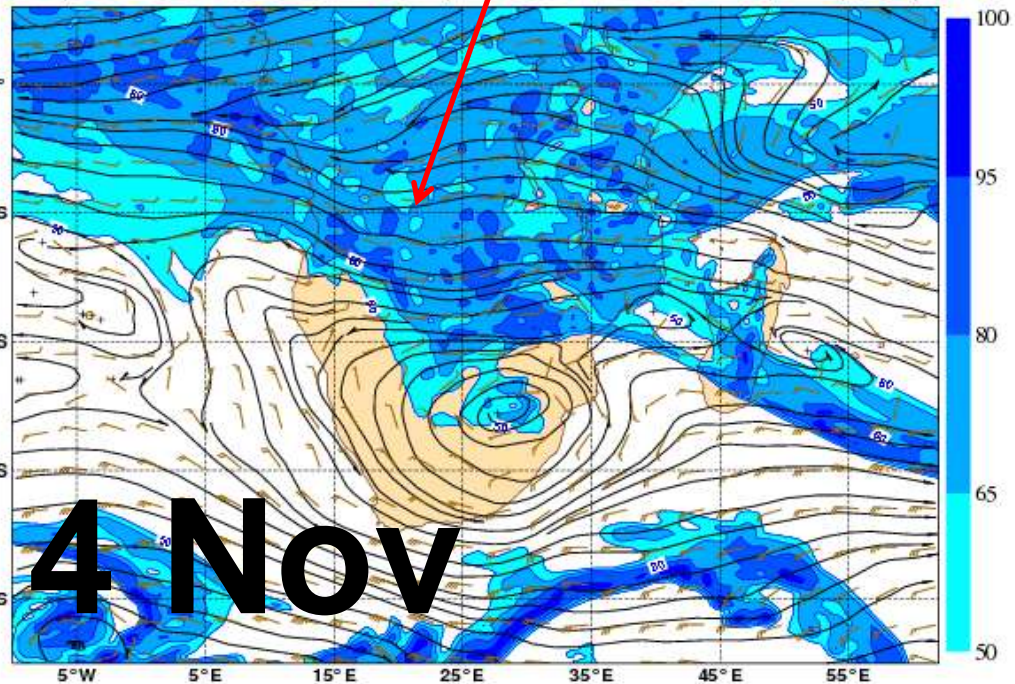
Saturday 2 November 2013 12UTC ECMWF Forecast 1-24 VT: Sunday 3 November 2013 12UTC 700hPa Relative humidity/ V velocity/ V velocity



3 Nov

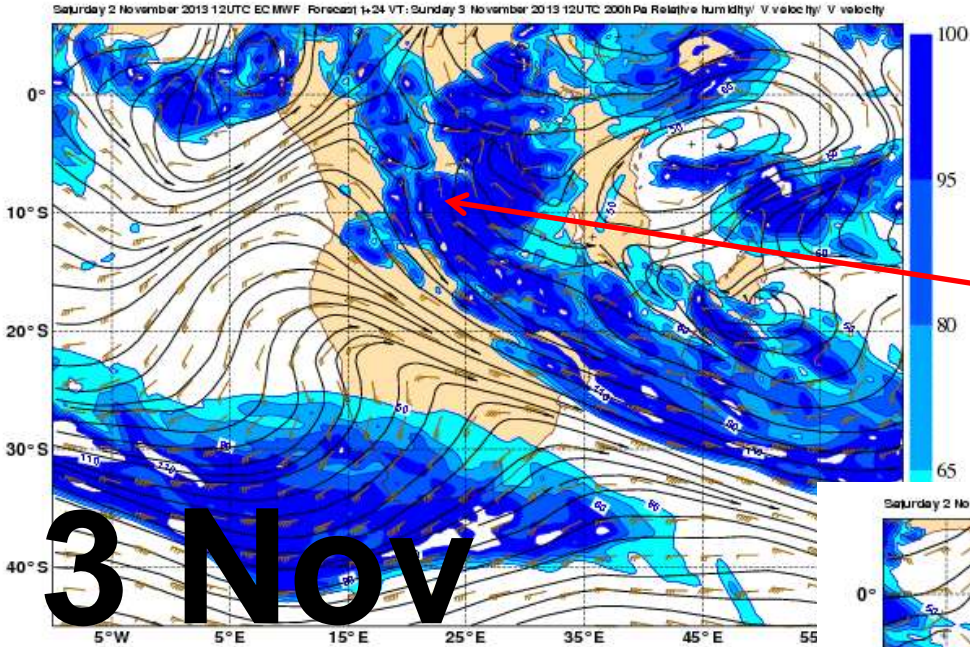
Strong convergence and high relative humidity over DRC, Angola and Zambia

Saturday 2 November 2013 12UTC ECMWF Forecast 1-48 VT: Monday 4 November 2013 12UTC 700hPa Relative humidity/ V velocity/ V velocity



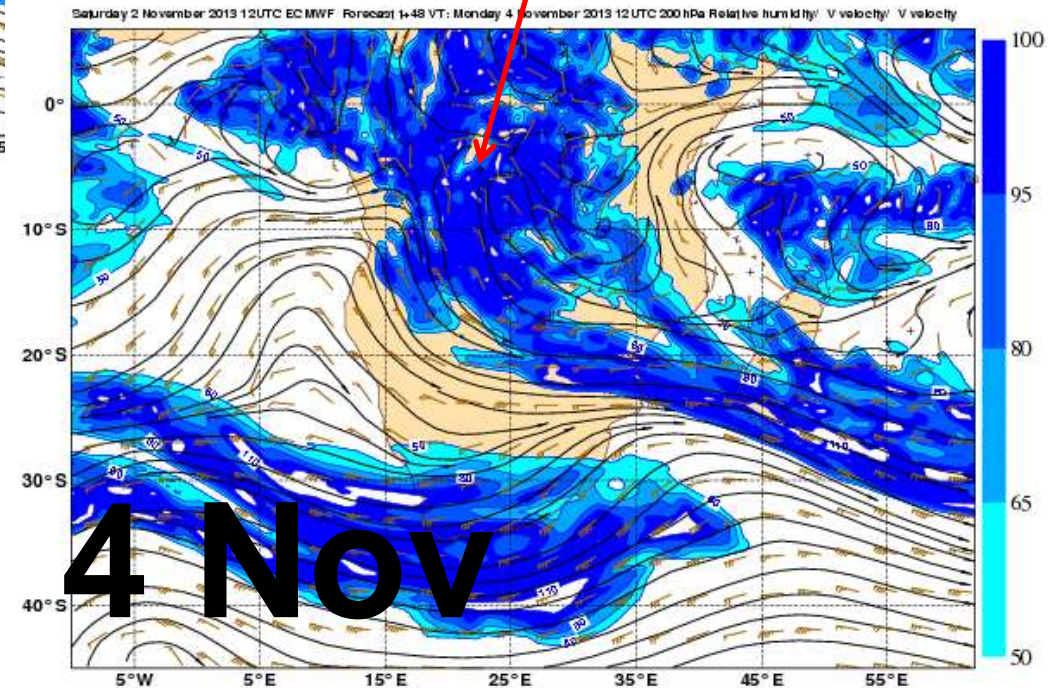
4 Nov

ECMWF 200hPa



3 Nov

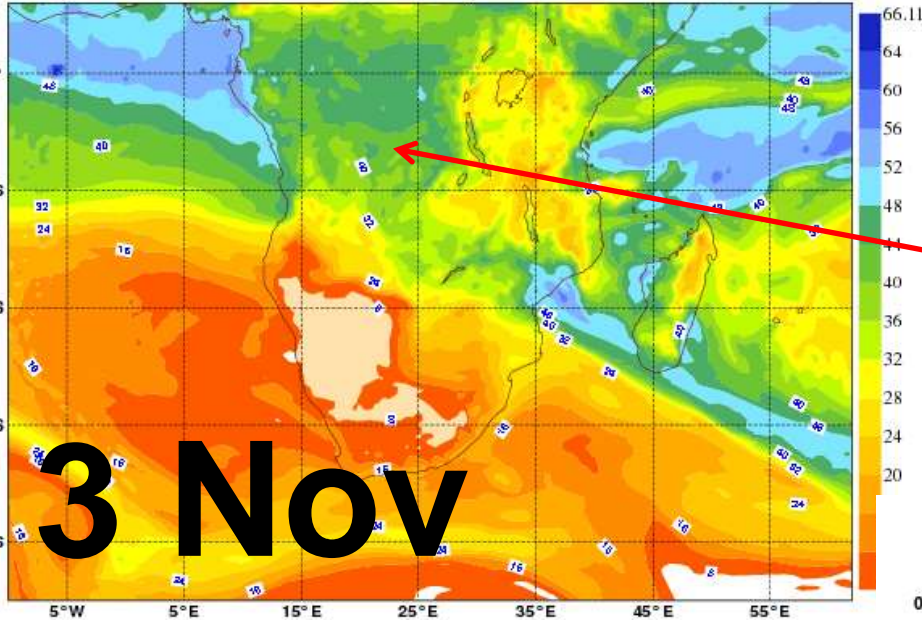
Strong upper divergence
over DRC, Angola and
Zambia



4 Nov

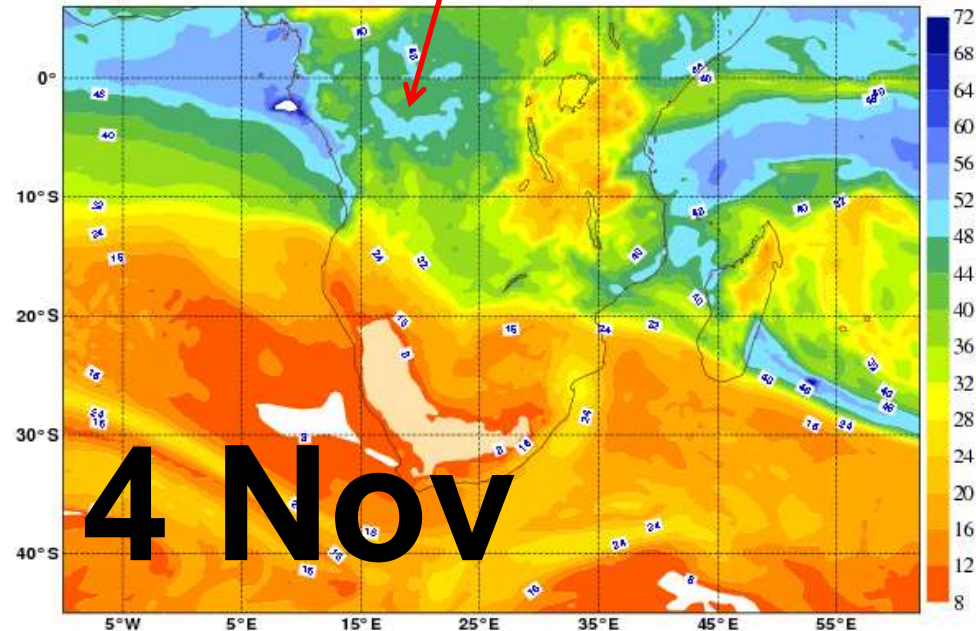
ECMWF total column waters

Saturday 2 November 2013 12UTC ECMWF Forecast (+24 VT: Sunday 3 November 2013 12UTC Surface: Total column water

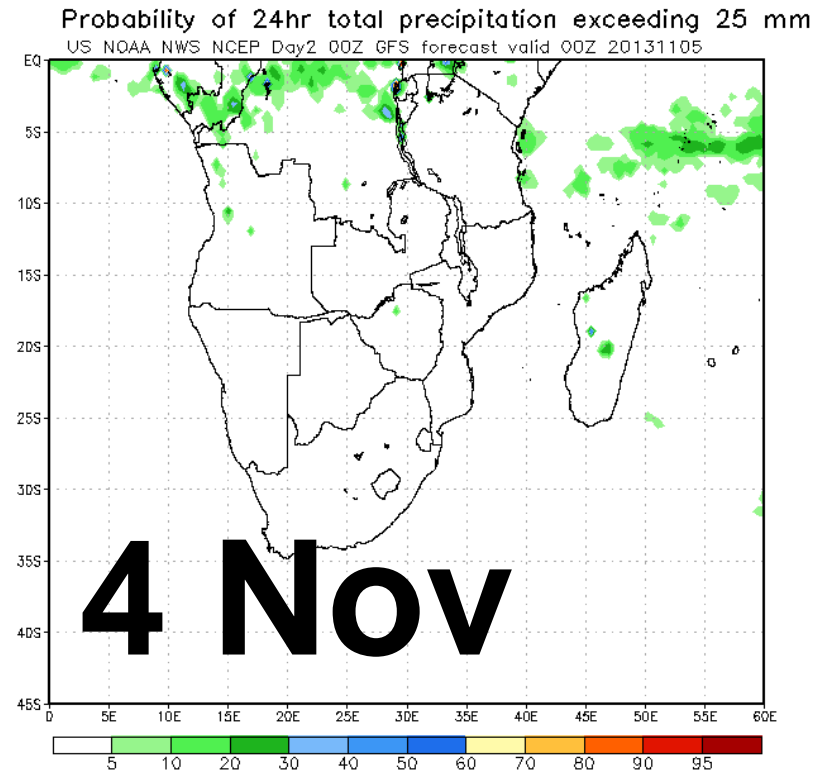
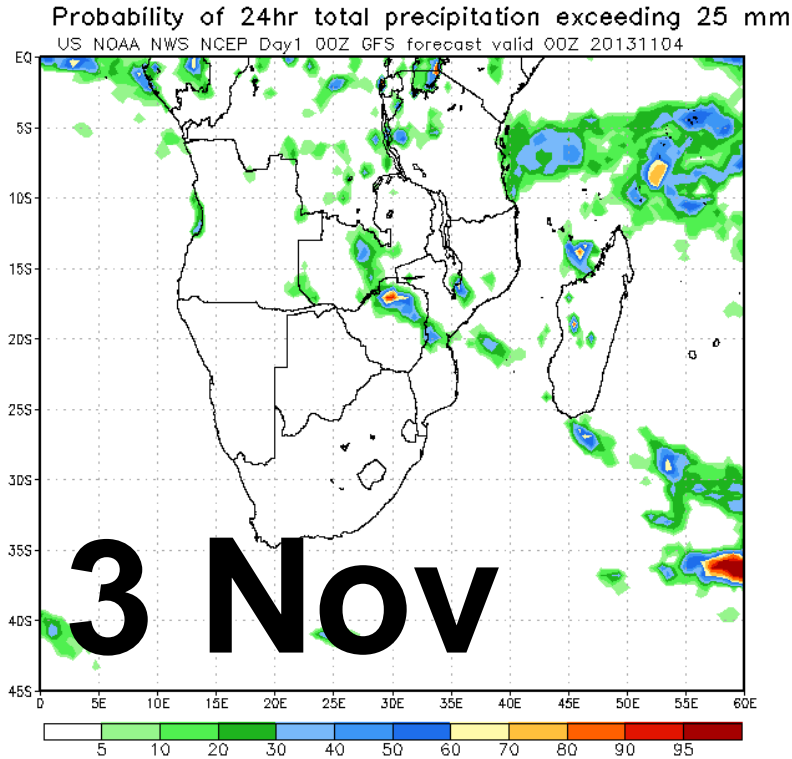


Relatively high precipitable waters over DRC, Angola and Zambia

Saturday 2 November 2013 12UTC ECMWF Forecast (+33 VT: Monday 4 November 2013 12UTC Surface: Total column water



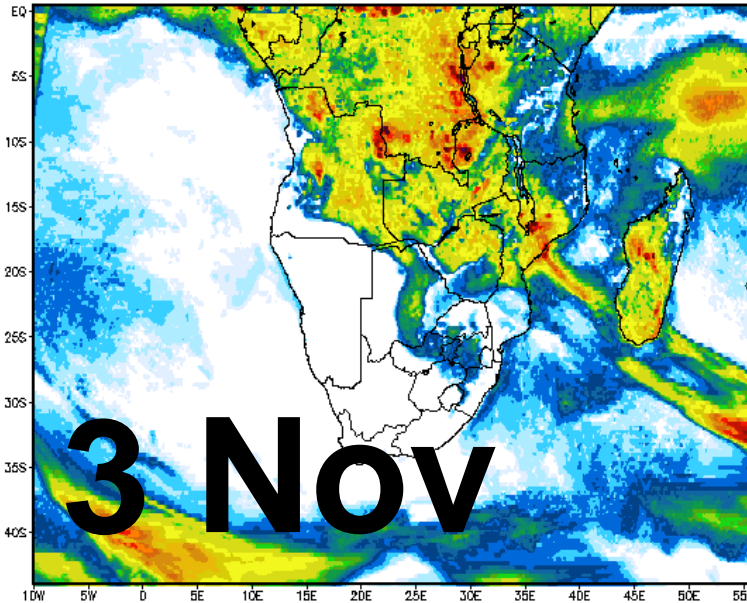
NCEP prob of precip exceeding 25mm



products from regional centres

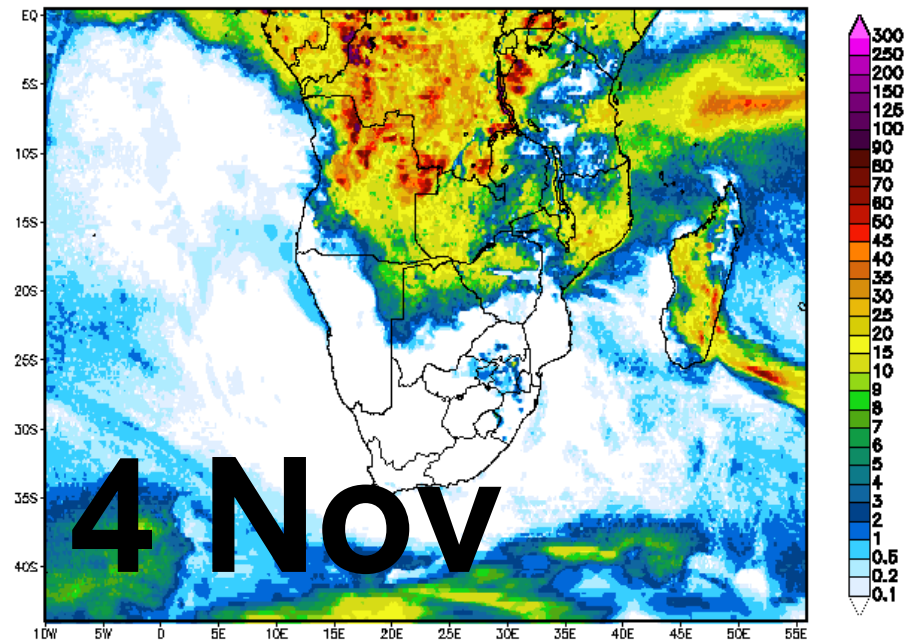
UM accumulated precipitation

UM 12km horizontal resolution – xaant Run:
Accumulating Precipitation for past 24 hours (mm)



Total precipitation of 00Z to 24Z, 03 NOV – Initiated 00Z 03 NOV 20

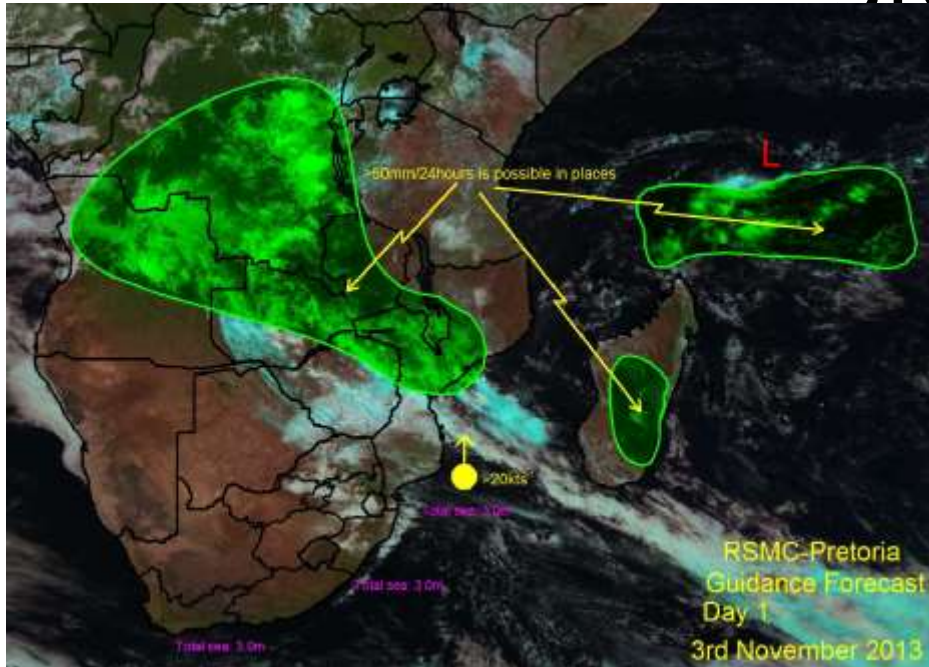
UM 12km horizontal resolution – xaant Run:
Accumulating Precipitation for past 24 hours (mm)



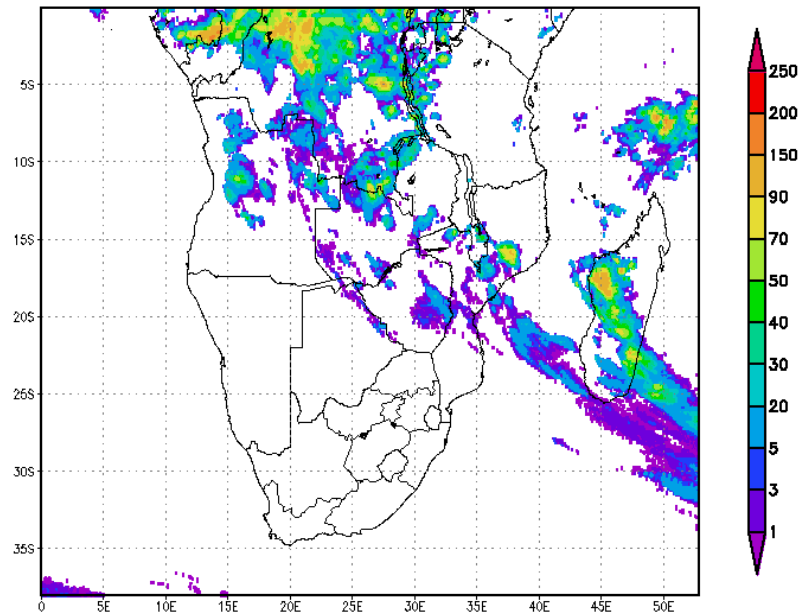
Total precipitation of 00Z to 24Z, 04 NOV – Initiated 00Z 03 NOV 2013

RSMC Guidance V Hydro-Estimator

3Nov

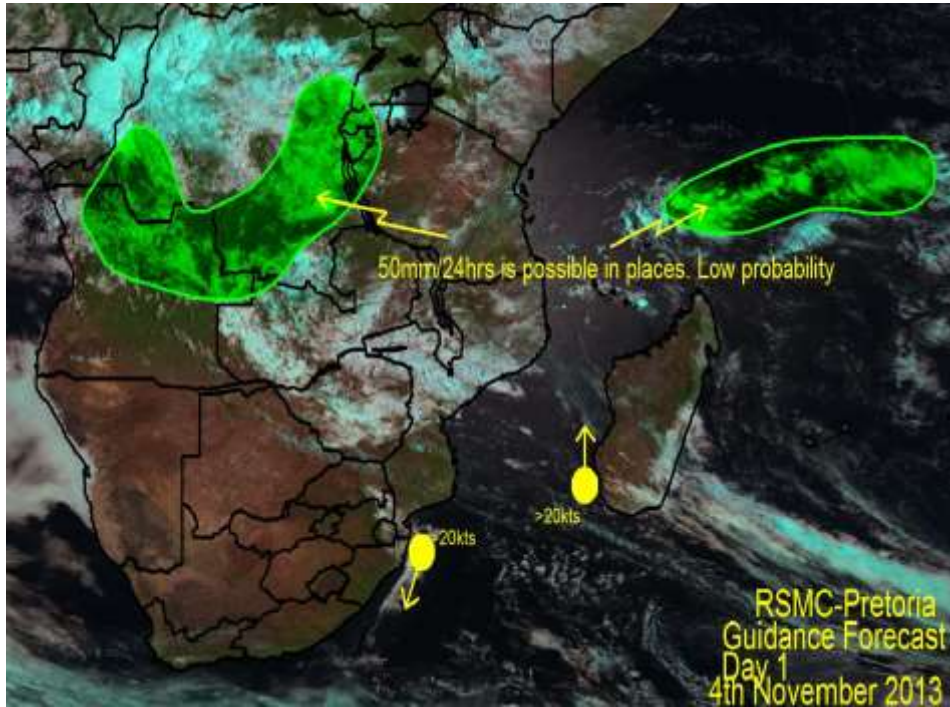


Hydro-Estimator Rainfall Total mm past 24 hours
20131103 06:00Z - 20131104 06:00Z

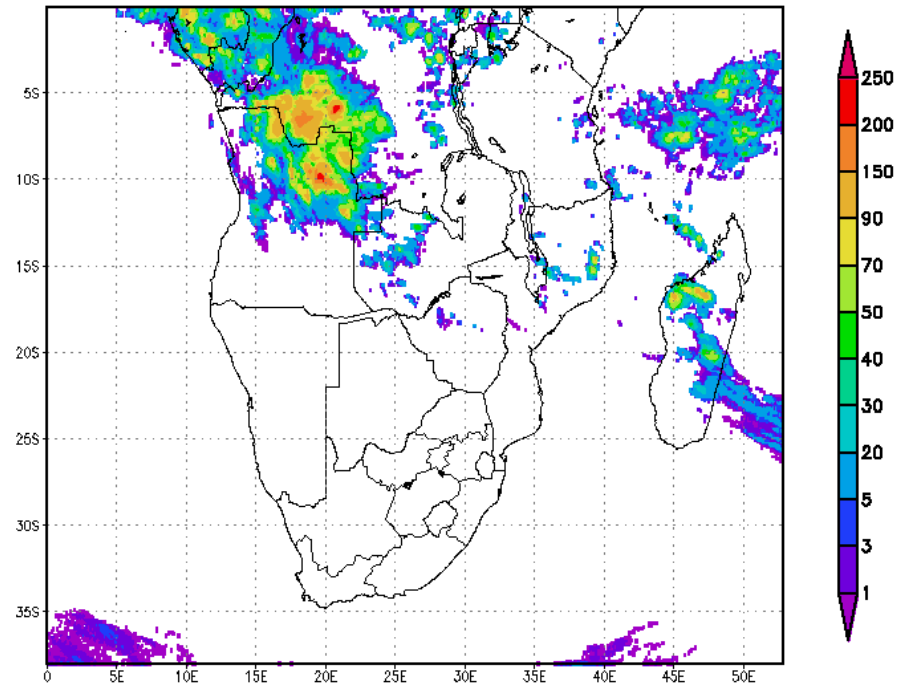


RSMC Guidance V Hydro-Estimator

4Nov



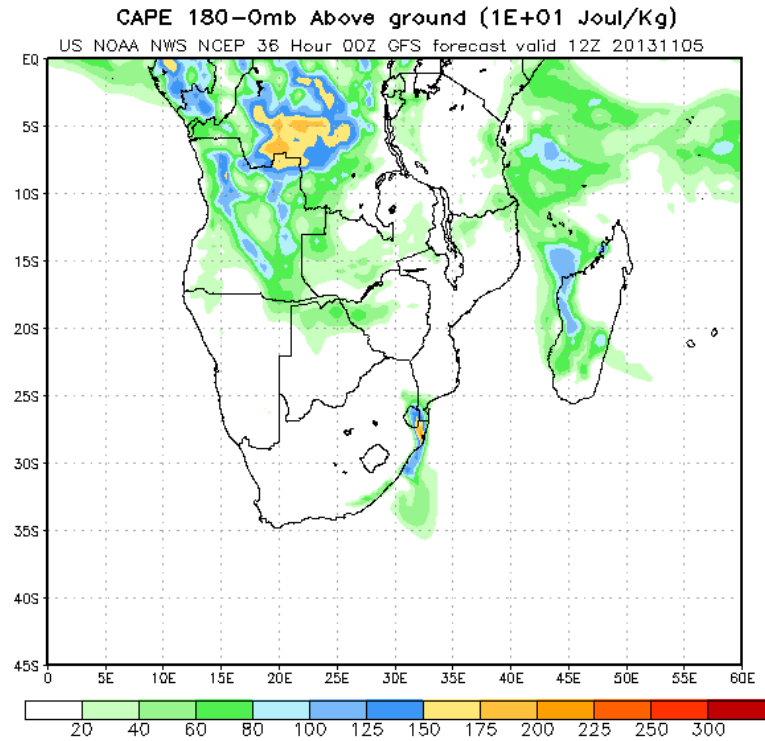
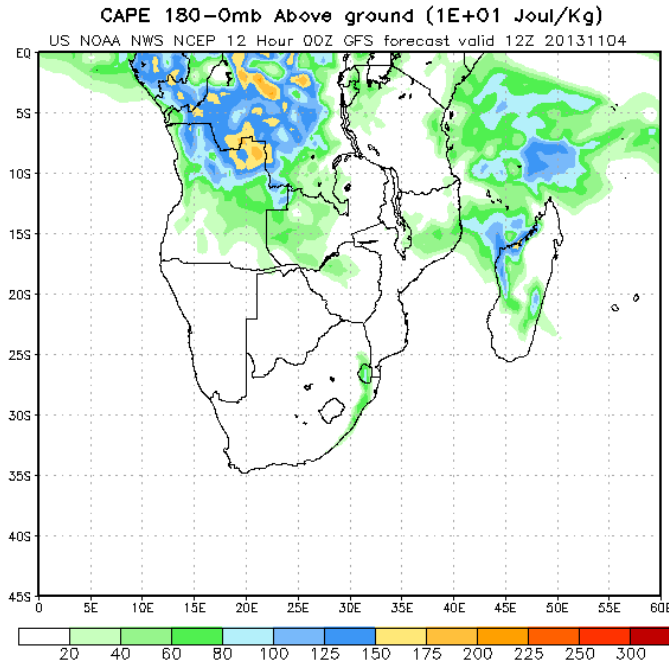
Hydro-Estimator Rainfall Total mm past 24 hours
20131104 06:00Z - 20131105 06:00Z



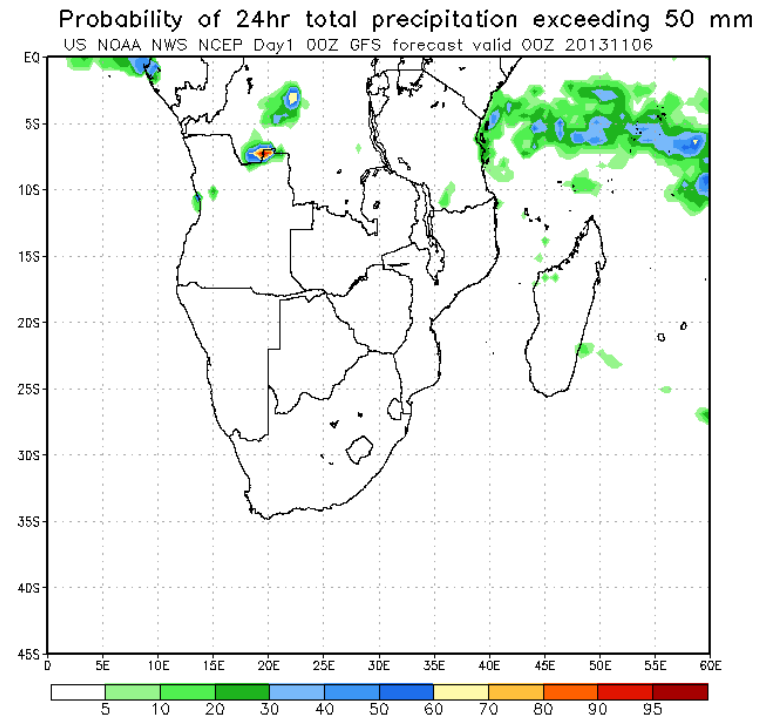
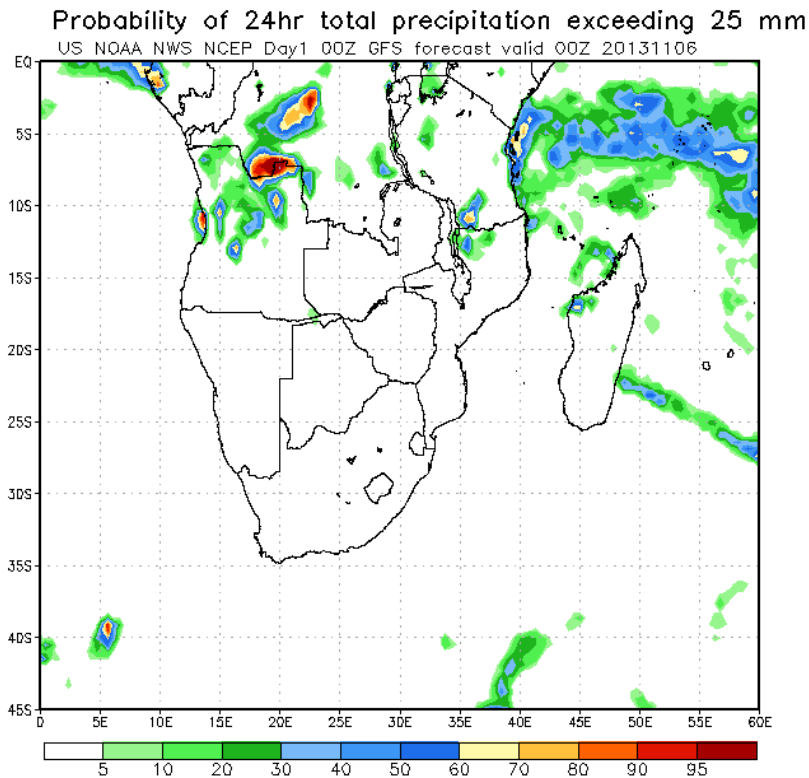
Case of 5-6 November 2013:
heavy rains over Angola and DRC

products from global centres

NCEP CAPE



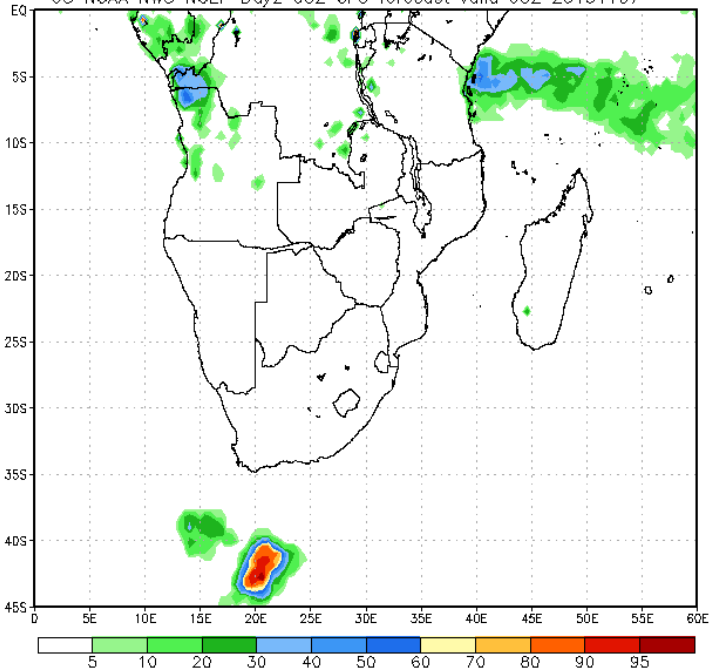
NCEP prob of precip exceeding 25 and 50mm on 5Nov



NCEP prob of precip exceeding 25 and 50mm on 6Nov

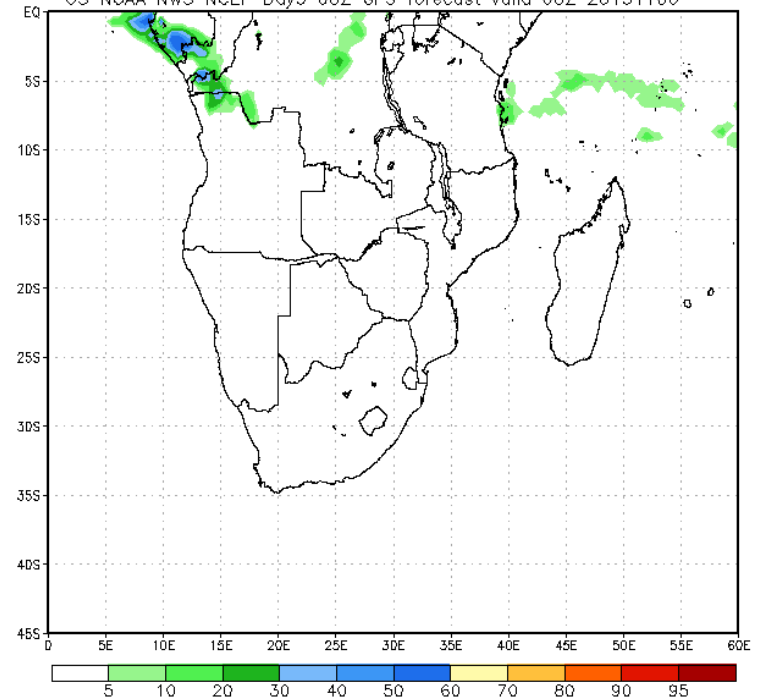
Probability of 24hr total precipitation exceeding 25 mm

US NOAA NWS NCEP Day2 00Z GFS forecast valid 00Z 20131107



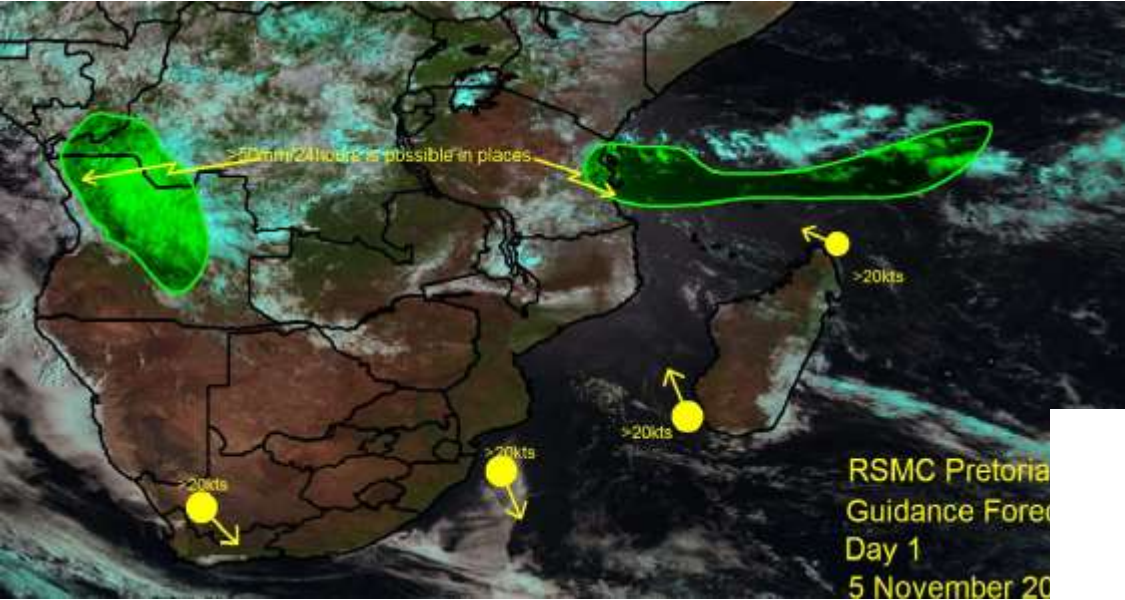
Probability of 24hr total precipitation exceeding 50 mm

US NOAA NWS NCEP Day3 00Z GFS forecast valid 00Z 20131106

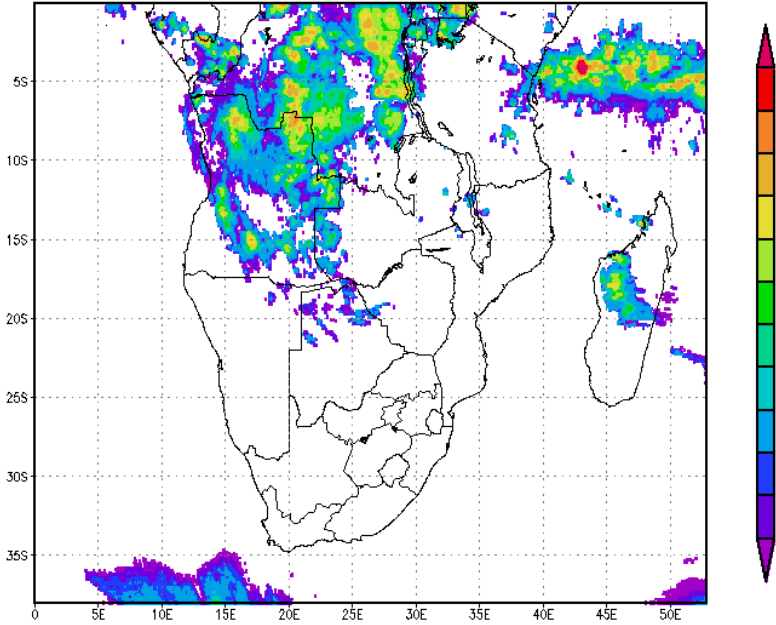


RSMC Guidance V Hydro-Estimator

5Nov

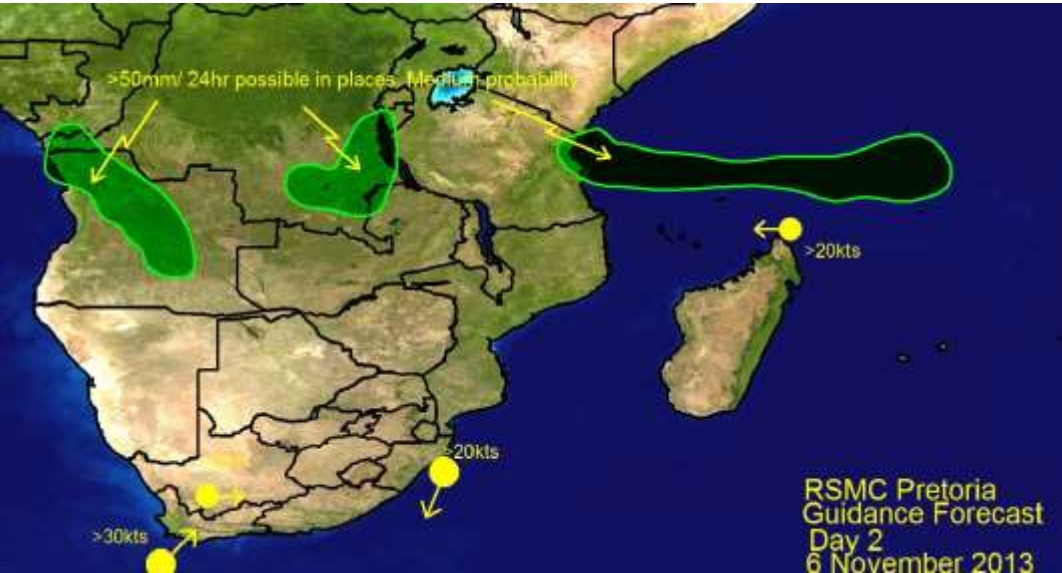


Hydro-Estimator Rainfall Total mm past 24 hours
20131105 06:00Z - 20131106 06:00Z

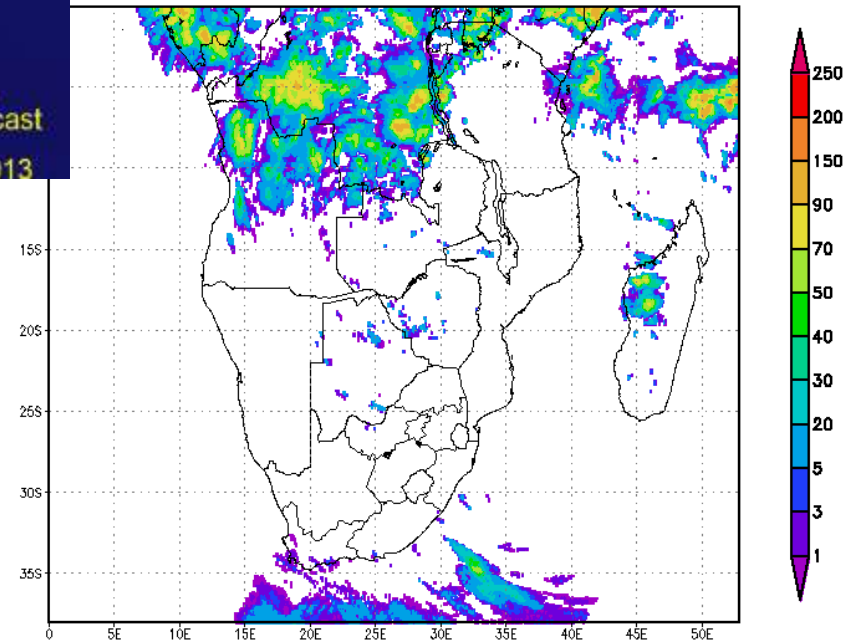


RSMC Guidance V Hydro-Estimator

6Nov



Hydro-Estimator Rainfall Total mm past 24 hours
20131106 06:00Z - 20131107 06:00Z



Conclusion

- Effective and correct usage of the EPS/NWP products made available for SWFDP on the RSMC website can help in forecasting severe weather events and is encouraged.
- These include the now-casting products as well
- Further input from observations like upper air ascents
- Feedback to RSMC and Global centres is encouraged