

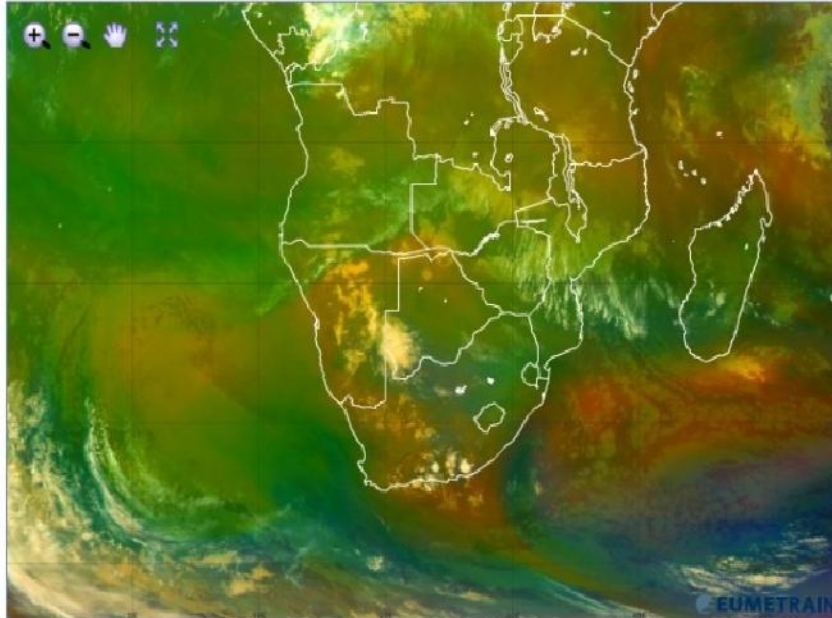
Leeann Simpson

Airmass 00Z.jpg

0600UTC | 1200UTC | 1800UTC | 0000UTC

▼ UKMO NWP

- ☐ MSLP
- ☐ Temp.
- ☐ Dewpoint Temp.
- ☐ 10m Windspeed
- ☐ Temp. Ave. 500
- ☐ Equiv. Thickness
- ☐ ThetaW 850
- ☐ H850
- ☐ H700
- ☐ H500
- ☐ H300
- ☐ T500
- ☐ Wind700
- ☐ Wind300
- ☐ RH700
- ☐ Omega 700
- ☐ Omega 500
- ☐ Total Totals
- ☐ Lifted Index
- ☐ Lapse Rate
- ☐ K-index
- ☐ CAPE
- ☐ Fog



▼ Meteosat Second Generation

- ☐ IR10.8
- ☐ WV6.2
- ☒ Airmass RGB
- ☐ Dust RGB

▼ Products

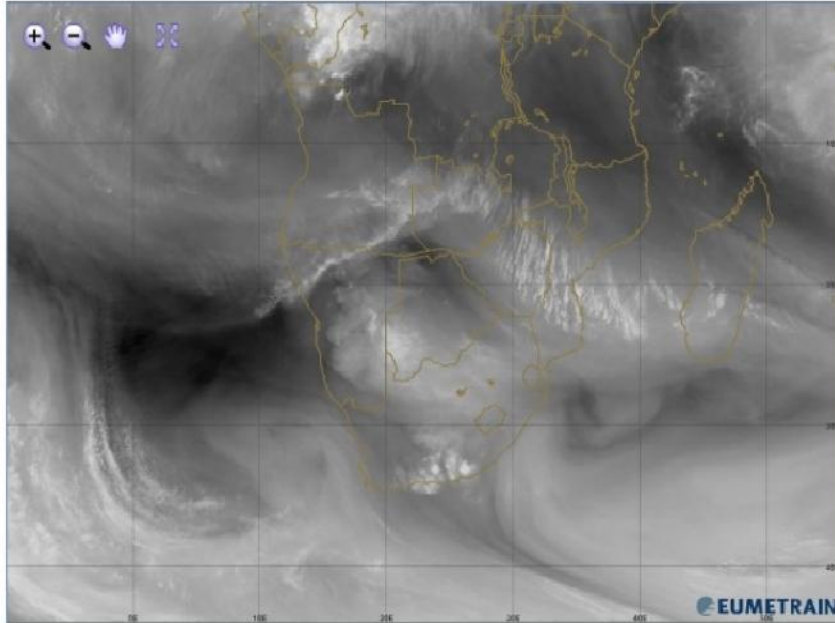
- ☐ ASCAT
- ☐ JASON
- ☐ SYNOP

WV 00Z.jpg

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slide 1.jpg

Weather Briefing

Lee-ann Simpson

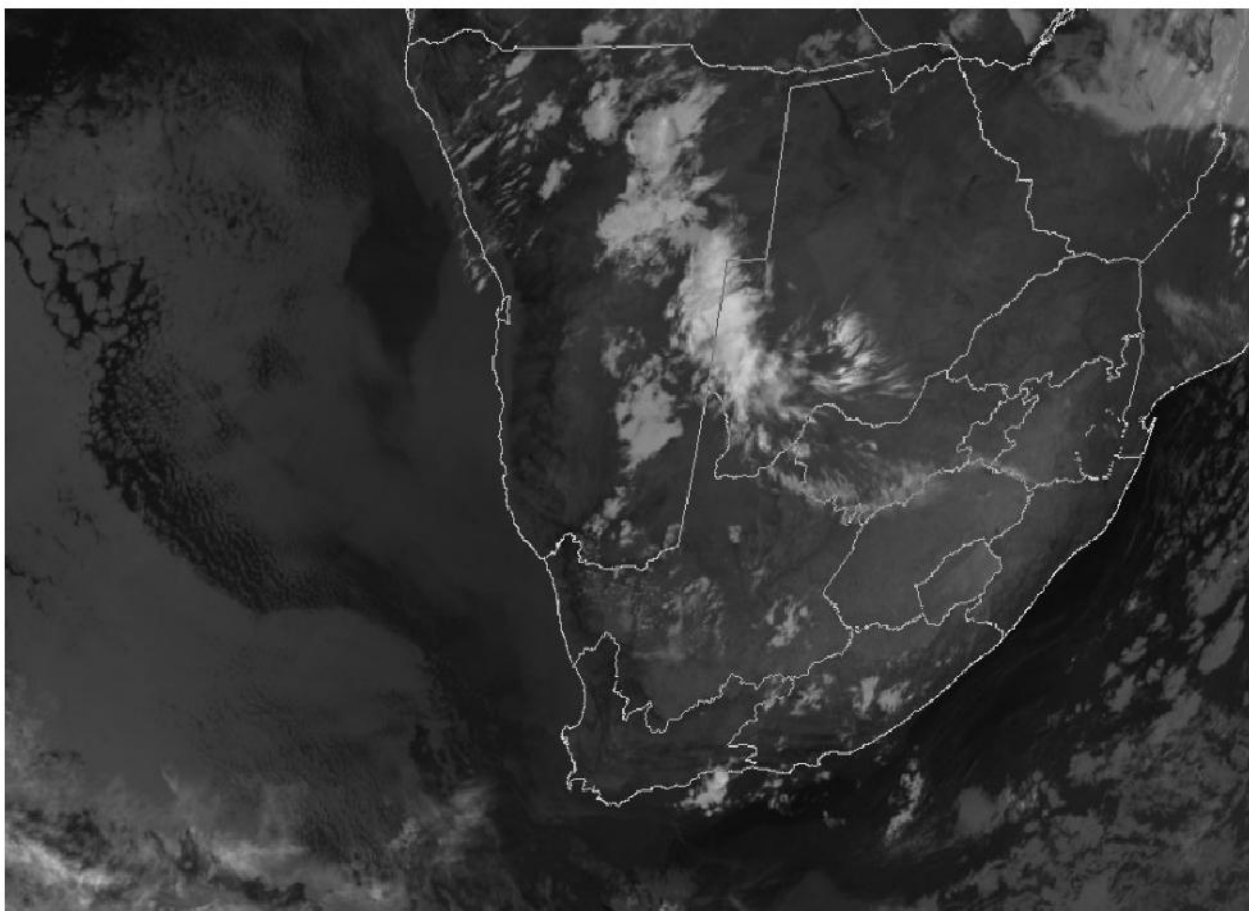
Agenda

- Brief overview of the available products
- Weather for 20 May (today)
- Weather expected for 21 May (tomorrow)

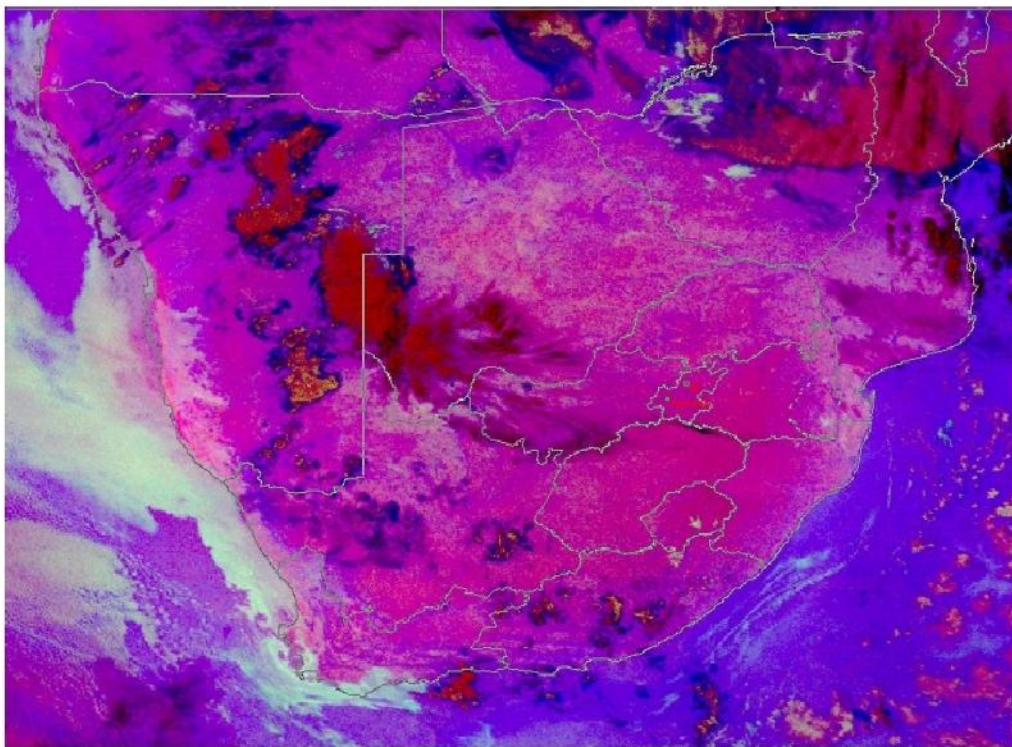
Products available

- Satellite imagery (MSG)
- Radar
- Lightning
- Real time observations
- Upper air ascents
- NWP (UM, GFS, ECMWF, WAFS, WRF, Ensemble products)

IR10.8_06Z.jpg

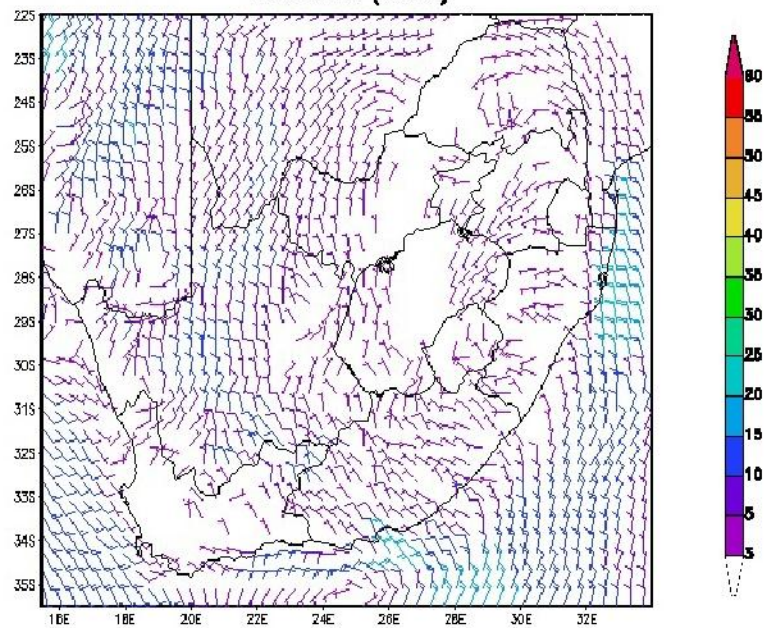


Night Micro 04Z.jpg



wind10m_33H.gif

UM 15km horizontal resolution - xacha Run:
10m Wind (knots)

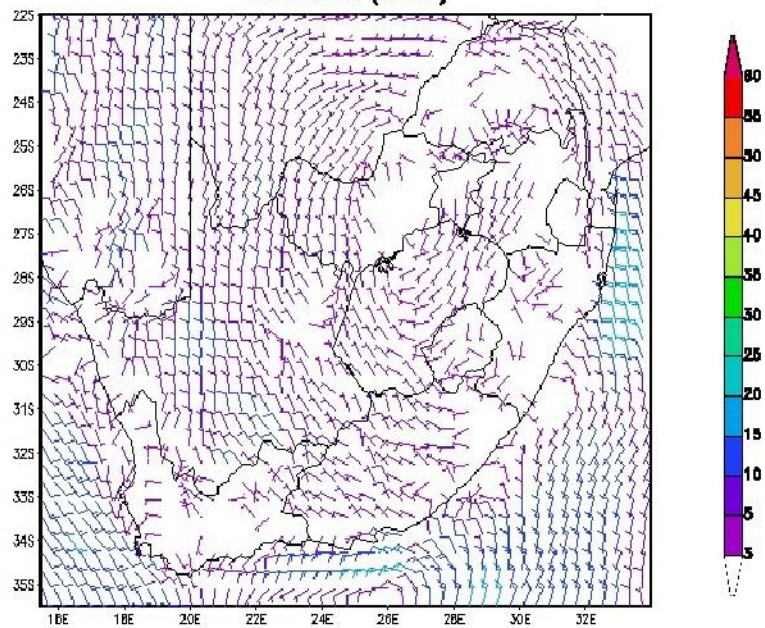


33hr Forecast from 00Z 19 MAY 2013 - for 09Z 20 MAY 2013

Speeds less than 5 knots are shown as blank

wind10m_36H.gif

UM 15km horizontal resolution - xacha Run:
10m Wind (knots)



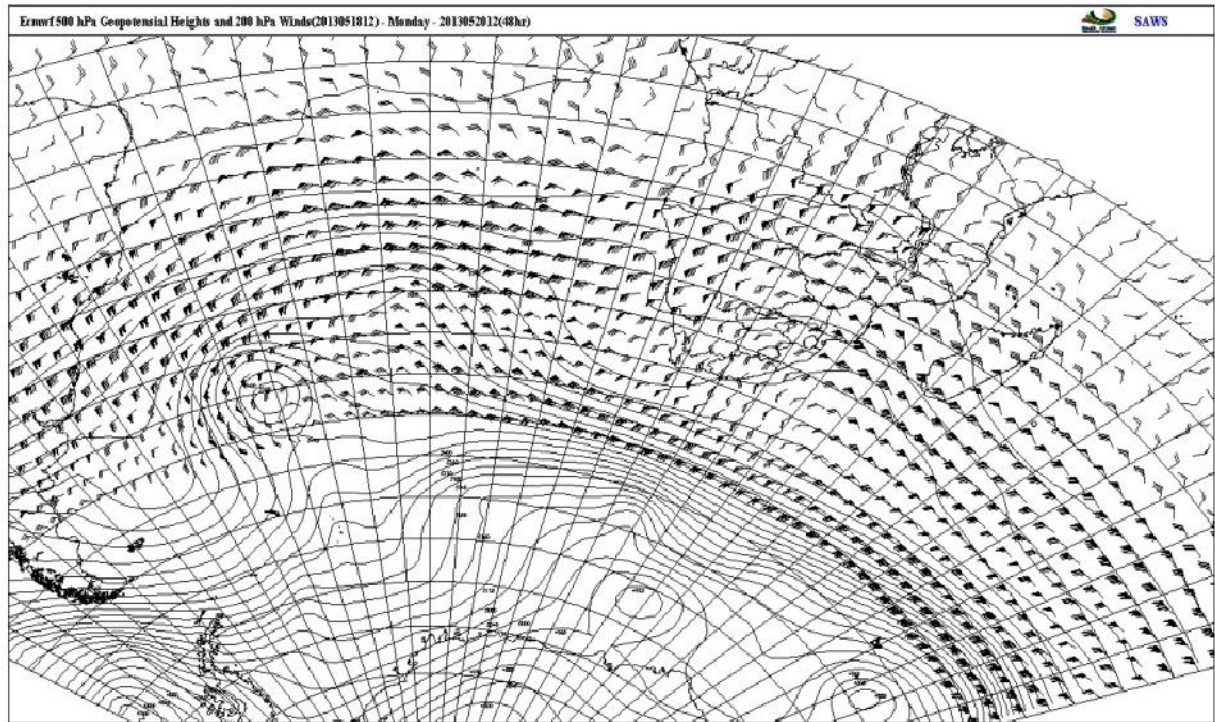
36hr Forecast from 00Z 19 MAY 2013 - for 12Z 20 MAY 2013

Speeds less than 3 knots are shown as blank

850hPa 20may12Z.jpg

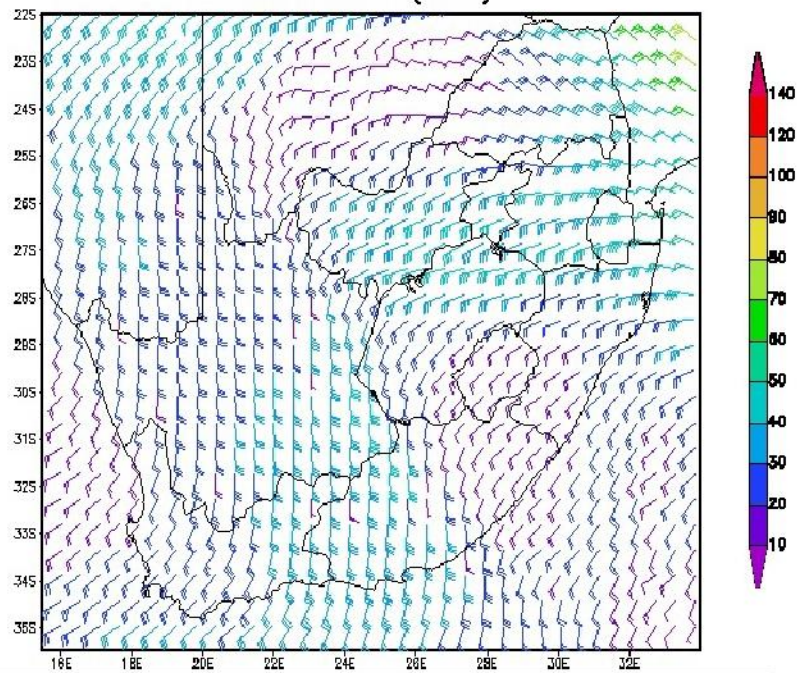


500hPa 20may12Z.jpg



wind300hPa_36H.gif

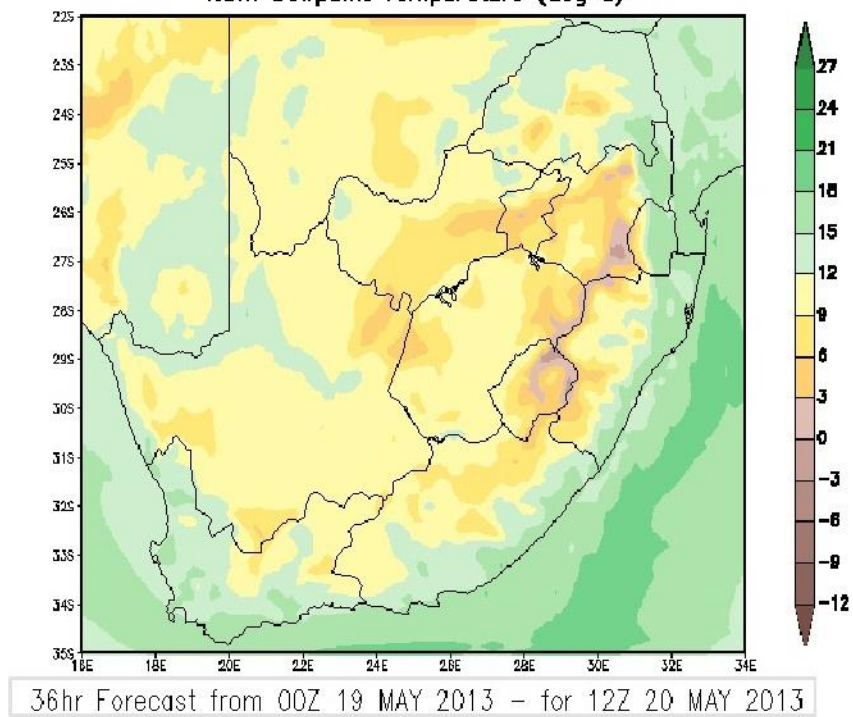
UM 15km horizontal resolution – xadha Run:
300hPa Wind (knots)



36hr Forecast from 00Z 19 MAY 2013 – for 12Z 20 MAY 2013

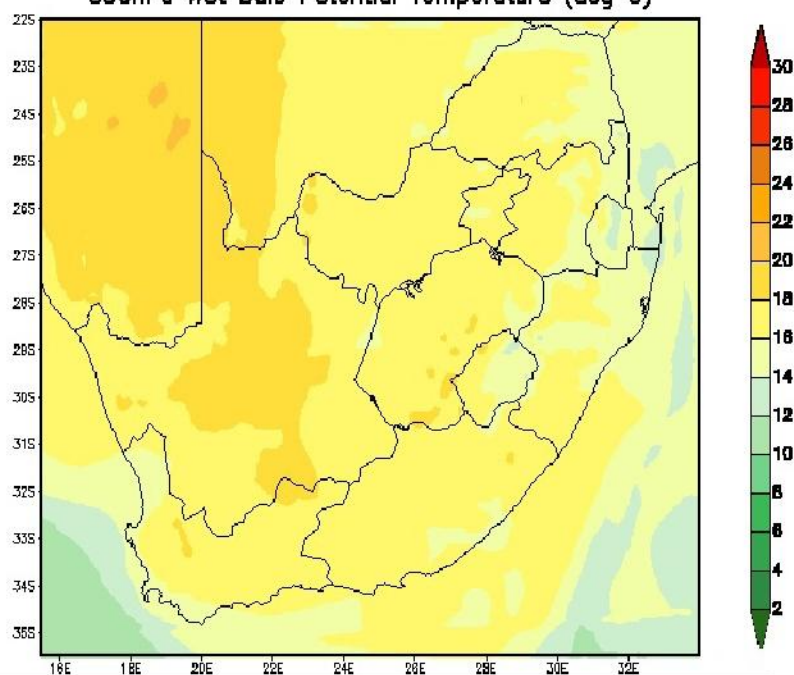
dewp1p5m_36H.gif

UM 15km horizontal resolution – xasha Run:
1.5m Dewpoint Temperature (deg C)



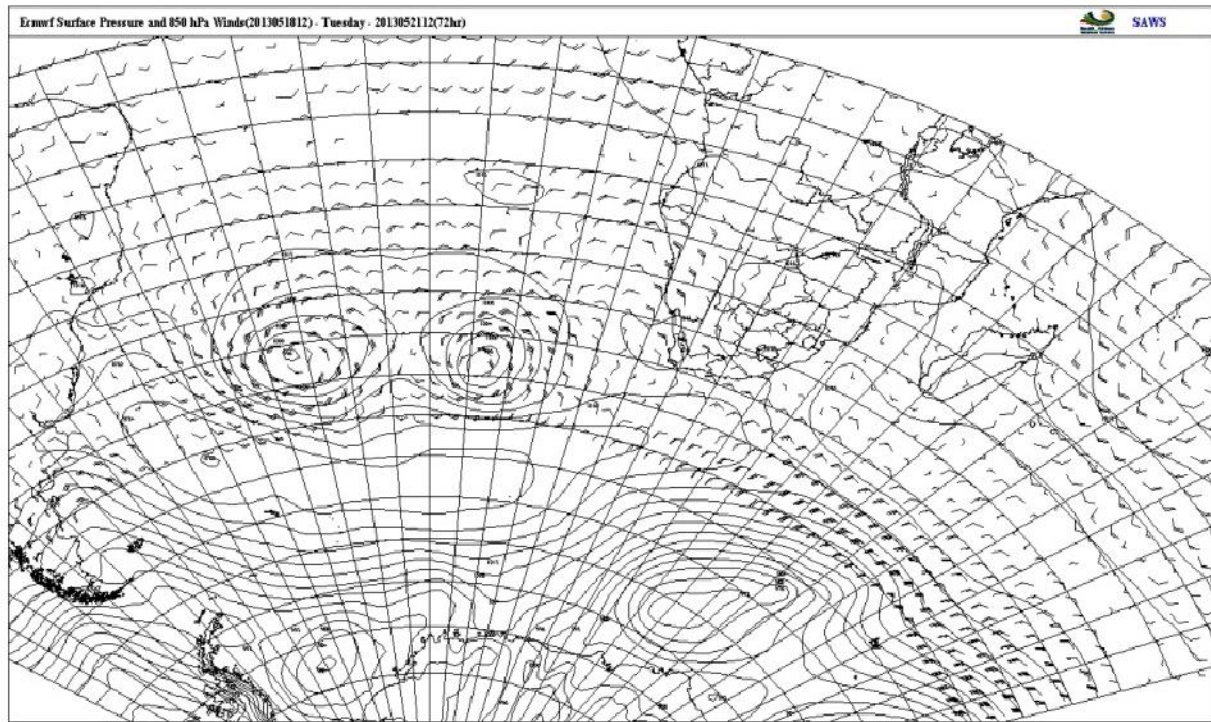
thetav850hPa_36H.gif

UM 15km horizontal resolution – xadha Run:
850hPa Wet Bulb Potential Temperature (deg C)

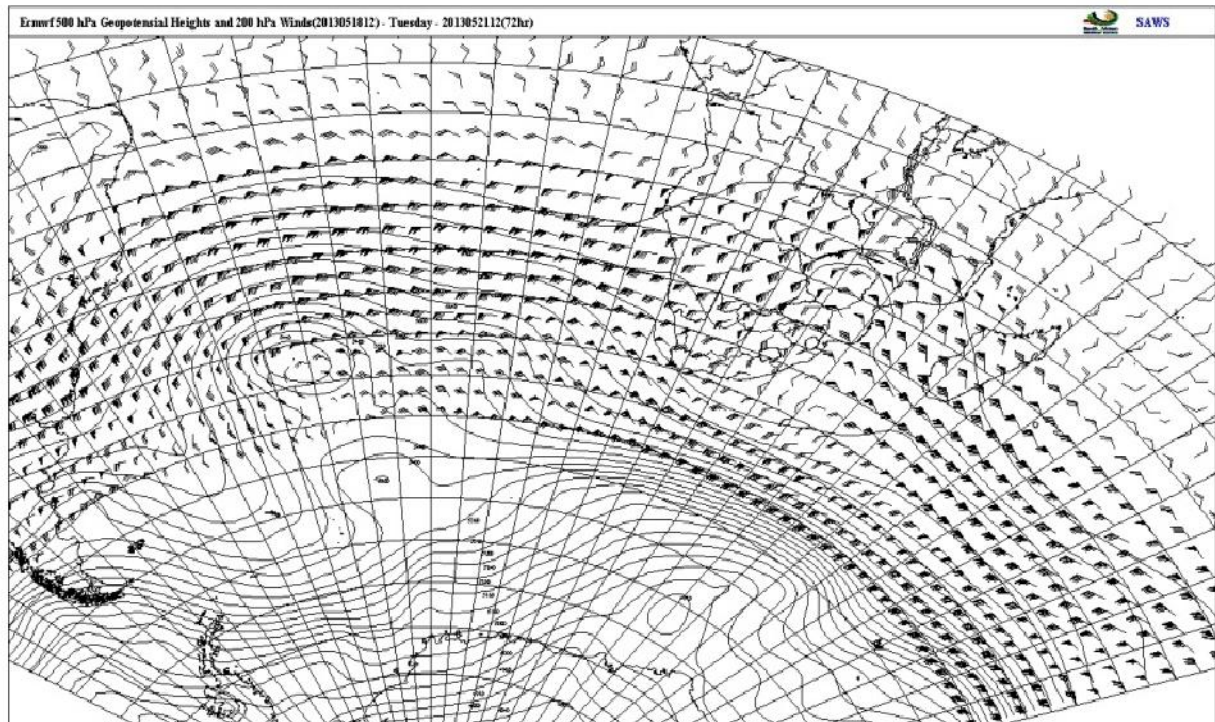


36hr Forecast from 00Z 19 MAY 2013 – for 12Z 20 MAY 2013

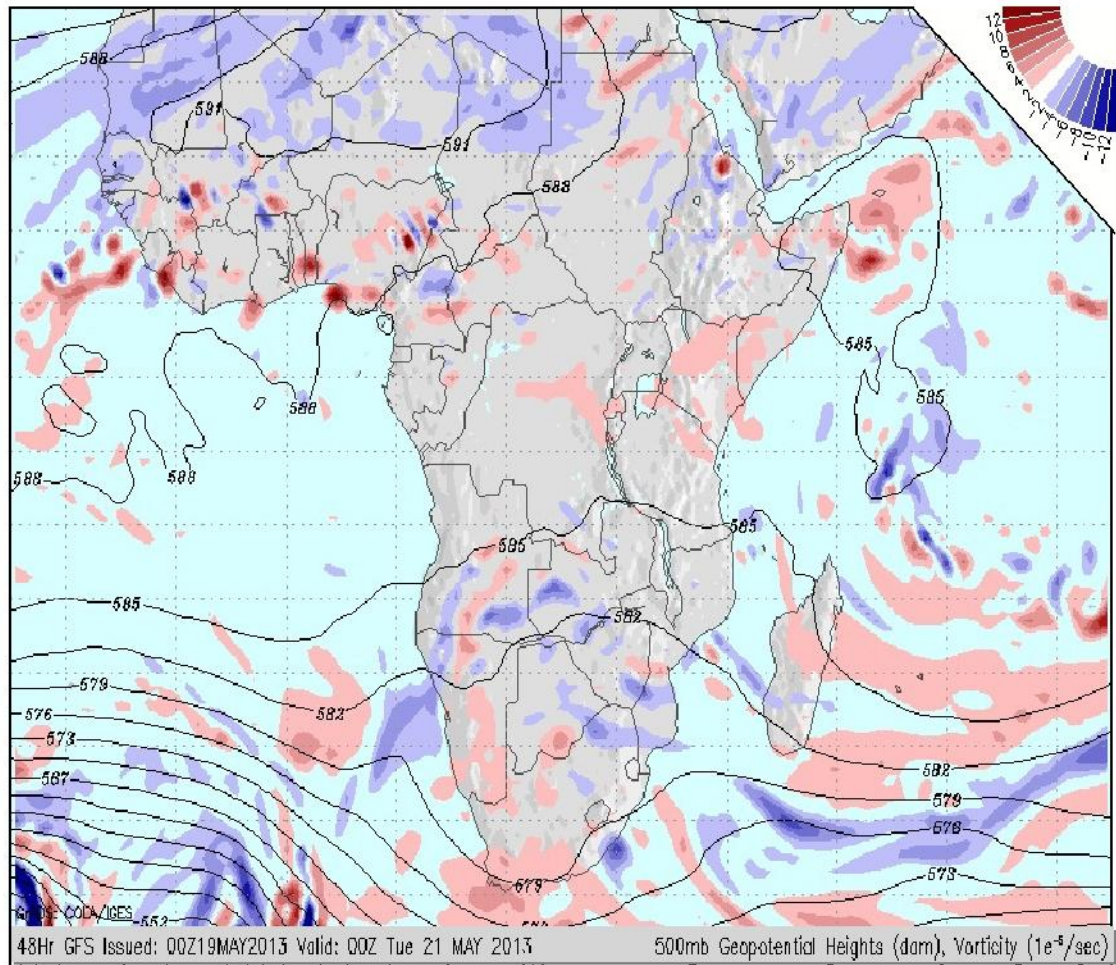
850hPa 21may12Z.jpg



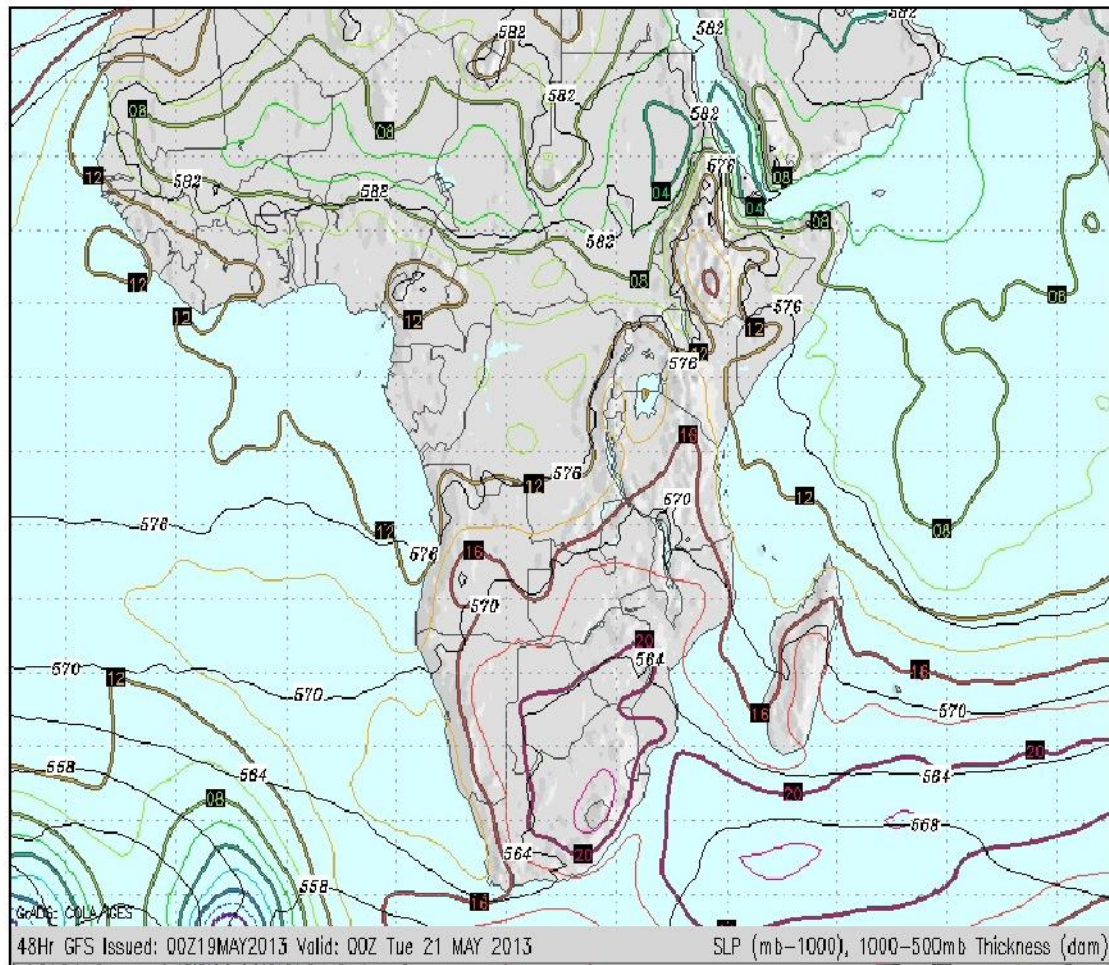
500hPa 21may12Z.jpg



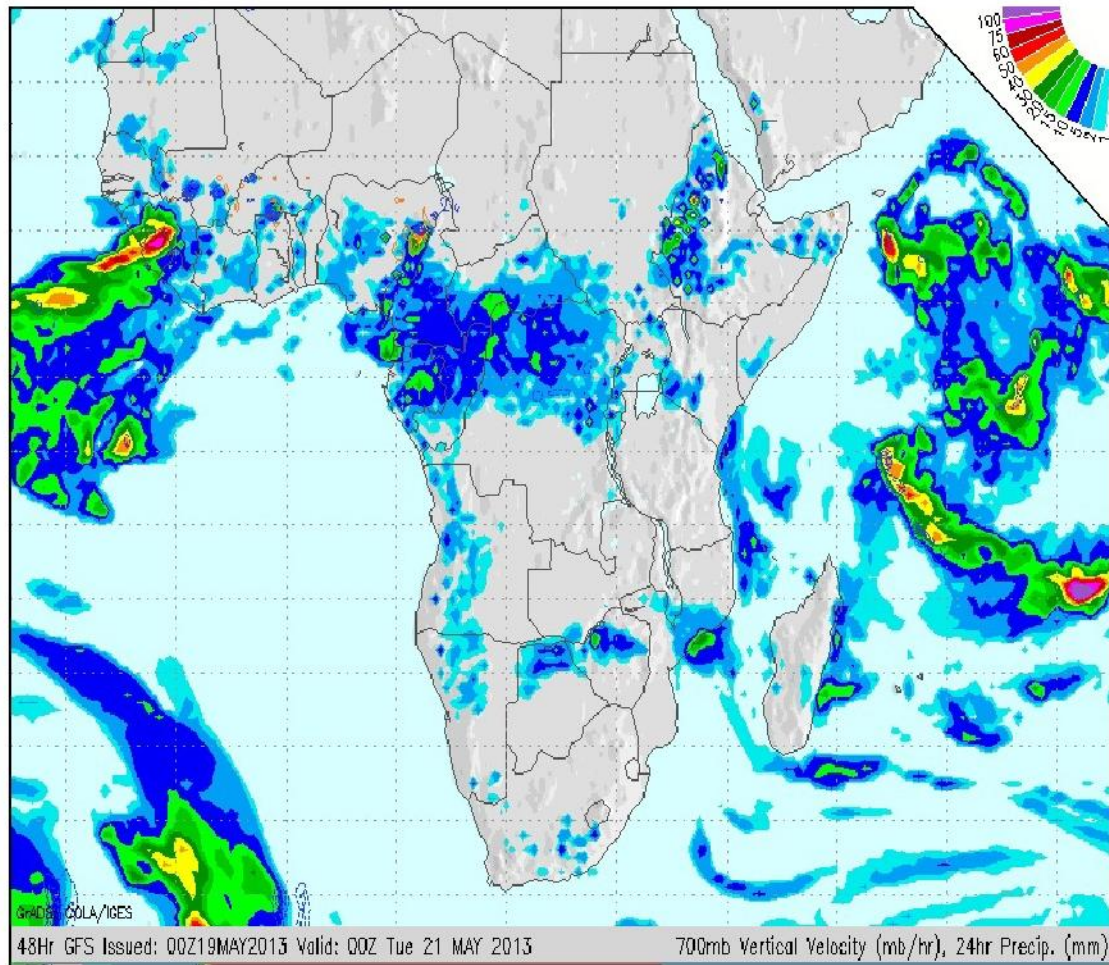
af1_48hr.png



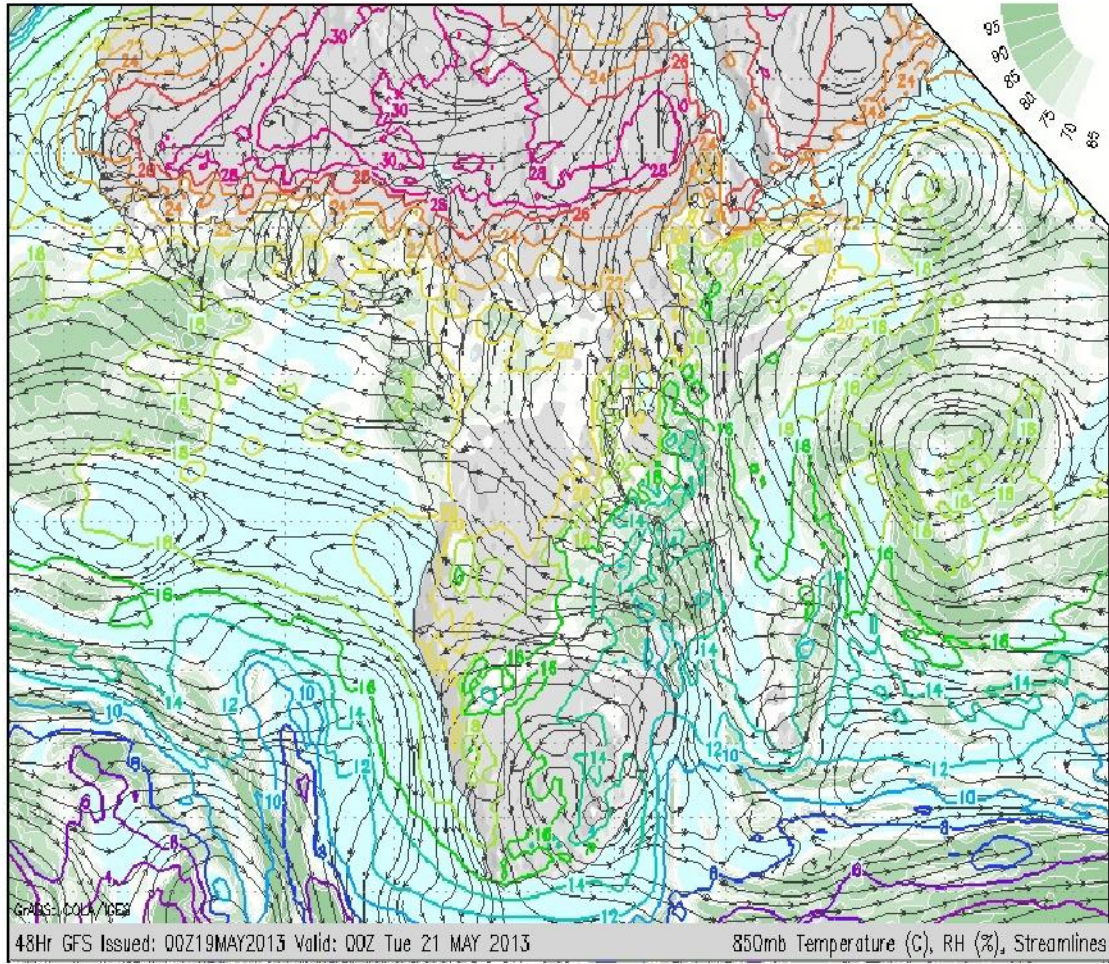
af2_48hr.png



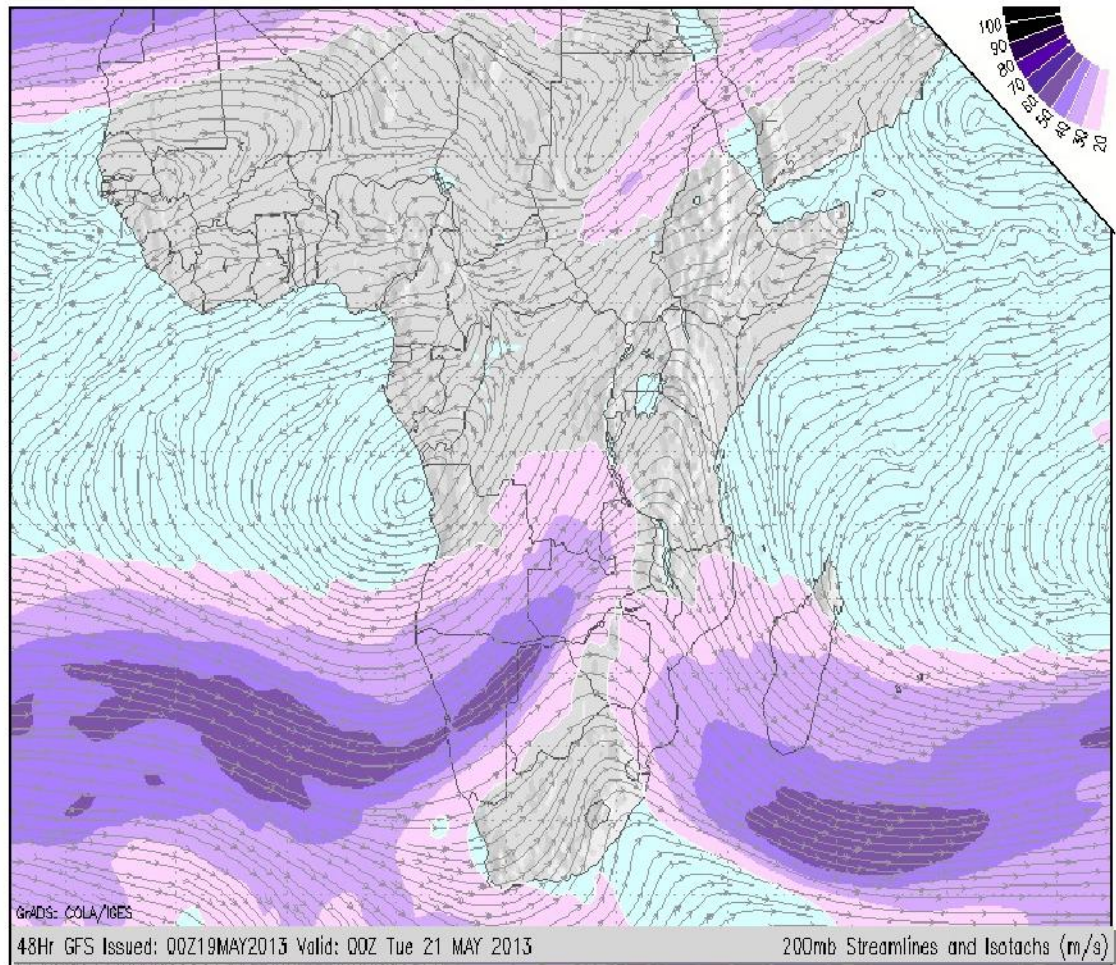
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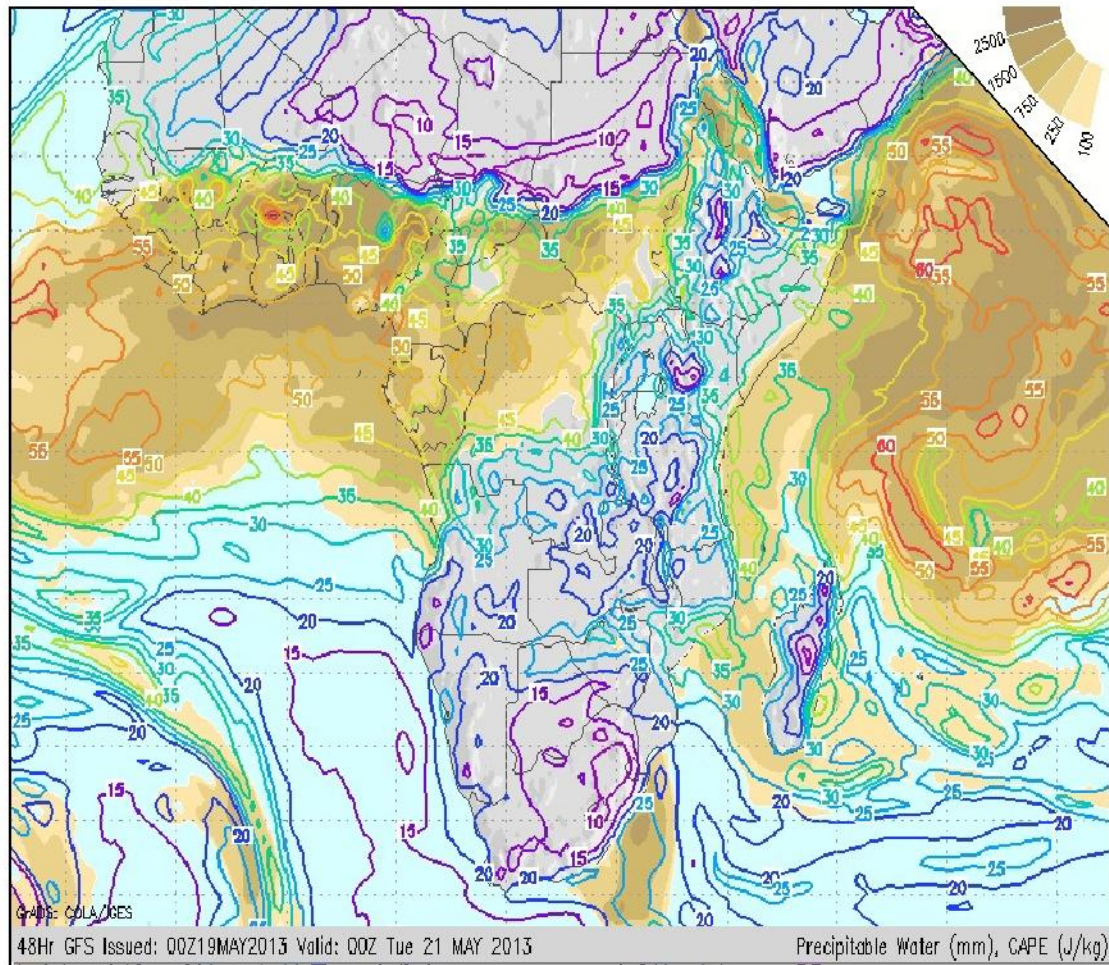
af4_48hr.png



af5_48hr.png

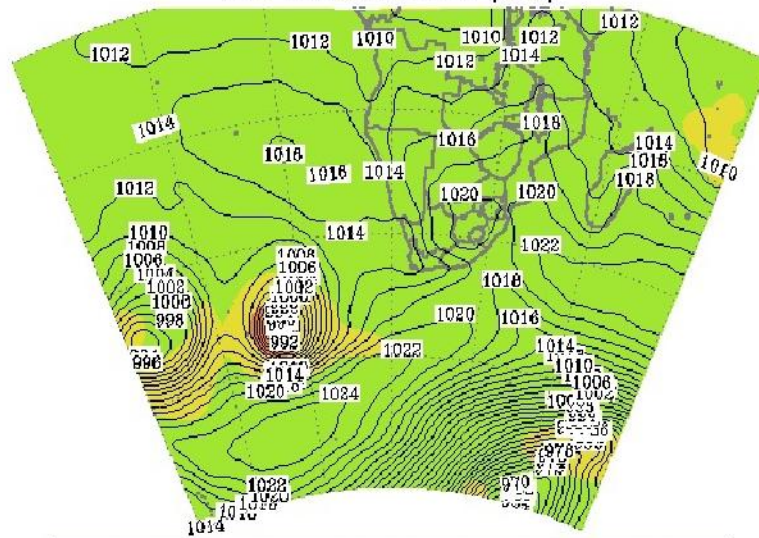


af6_48hr.png



mslp_day3.gif.png

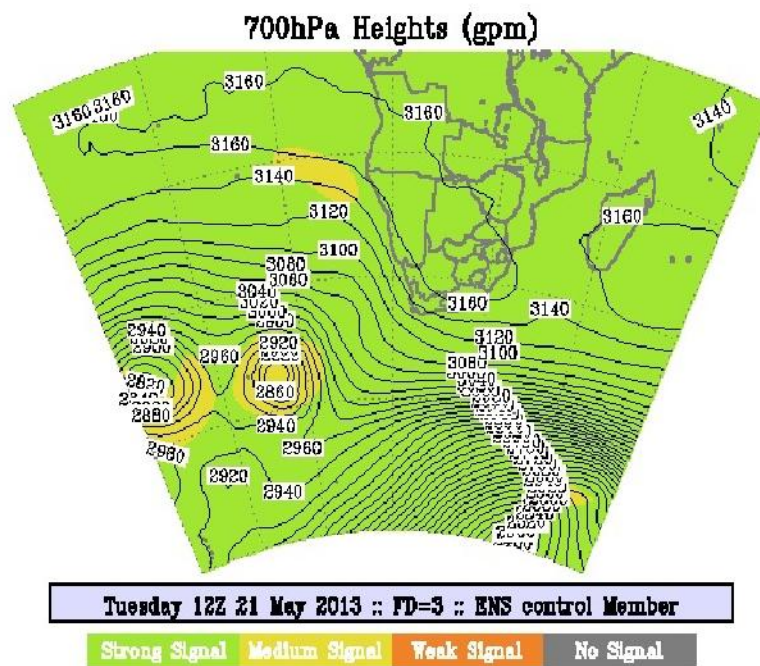
Sea-level Pressure (hPa)



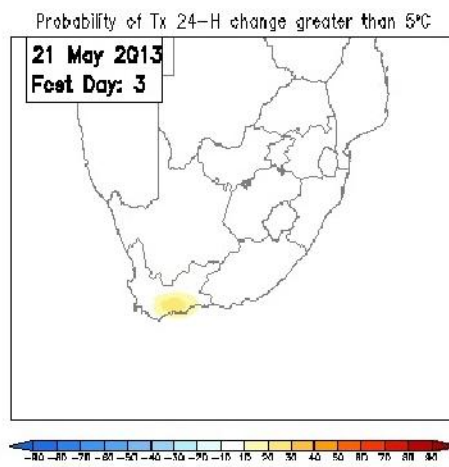
Tuesday 12Z 21 May 2013 :: FD=3 :: ENS control Member

Strong Signal Medium Signal Weak Signal No Signal

700z_day3.gif.png



txpb2_day3.gif.png

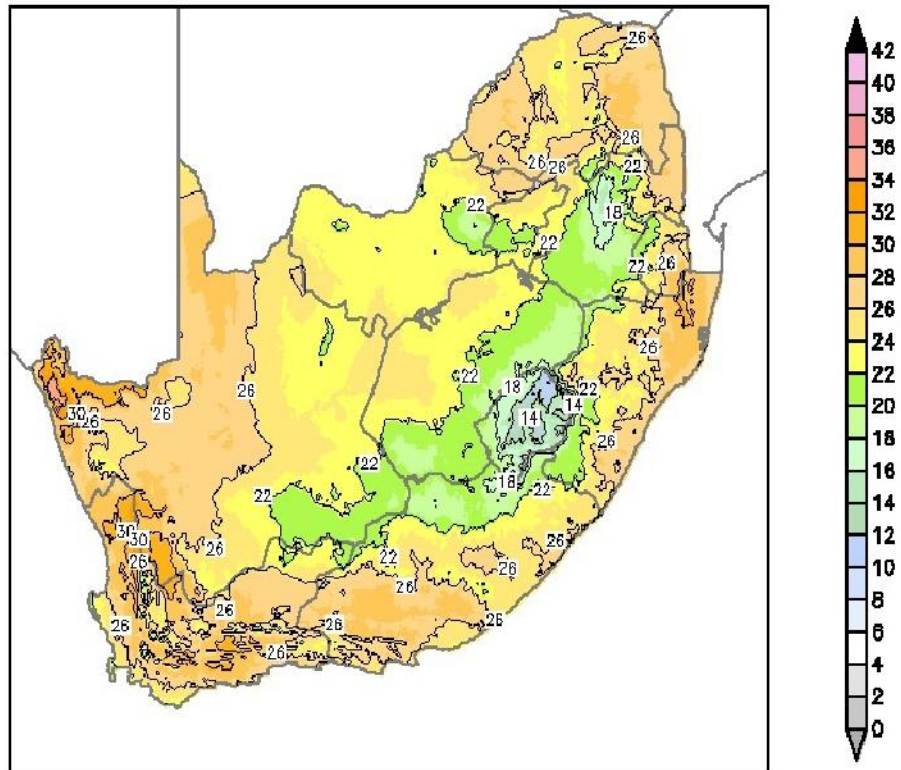


txpb1_day3.gif.png



txccb3.gif.png

Tmax climate/bias corrected Day 3 21may2013



Lee_phot
0

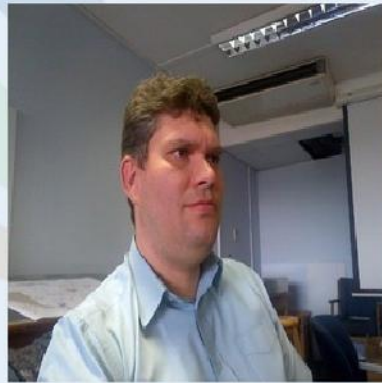


Jannie

Global Weather Briefing

May 2013

**Cold front and Cut-off lows
occurring together**
Jannie Stander



PRESENTATION OUTLINE

- Conceptual model for **cold front** over South Africa involving surface data, upper air sounding and satellite.
- Conceptual model off **cut-off low** over South Africa involving surface data, upper air sounding and satellite.
- **Investigate 2 case studies** involving cold fronts that are also associated with cut-off lows.
 - Case study 1: 26 June 2007 at 12:00 UTC
 - Case study 2: 24/25 July 2011 at 12:00 UTC

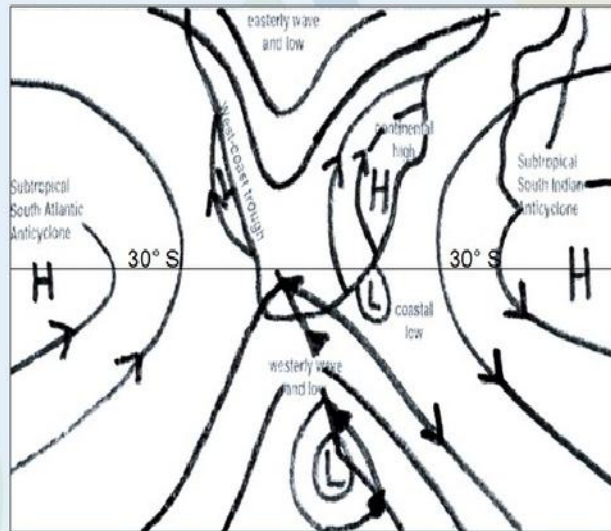
INTRODUCTION

- South Africa is normally associated with a **temperate climate** and is situated in the **sub tropics** (25° S to 35° S) (Taljaard, 1972).

- Warm fronts occur to the south of 35° S latitude. The **cold fronts** can be of the **same intensity** as those occurring in the **mid-latitudes** (Taljaard et al., 1961).

- In winter severe cold fronts over South Africa are able to move into the subtropics due to the **presence of an upper air cut-off low**.

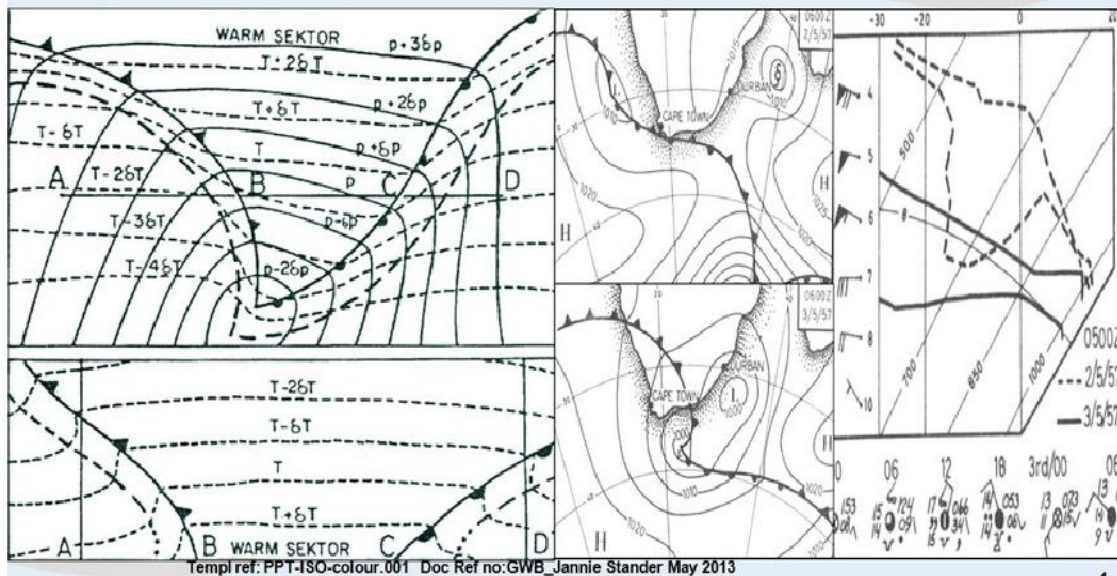
- Cut-off lows associated with cold fronts in winter are thus important weather systems



CONCEPTUAL MODEL OF A COLD FRONT

•Taljaard (1961; 1972; 1994b) described a cold front to be “a narrow sloping layer, with a vertical extent of at least 3 km, across which the temperature changes sharply in the horizontal direction by an average of at least 3 °C in subtropical regions (25° S to 35° S) and 4-5 °C in middle latitude and polar regions (35° S to 70° S)”

•A front is a boundary between different air masses, especially with regard to temperature gradient in the horizontal and usually coincides with a strong vertical wind shear in the presence of an upper level jet stream (Glickman, 2000).

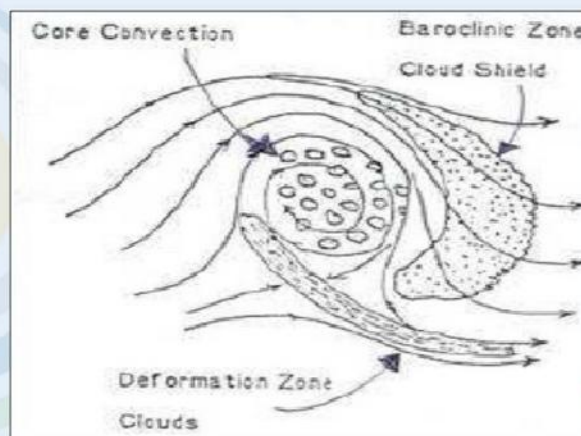


CONCEPTUAL MODEL OF A CUT-OFF LOW

According to Taljaard (1982b), COLs are described as **cold pools of cyclonic circulations** which intensify with height and are displaced towards the equator from pointed, westerly troughs.

According to Taljaard (1985a), during the development of a COL the **cold anticyclone** should be located south of its mean position around **35° S to 45° S** and the pressure should be higher than normal in the region of **1025 to 1035 hPa**.

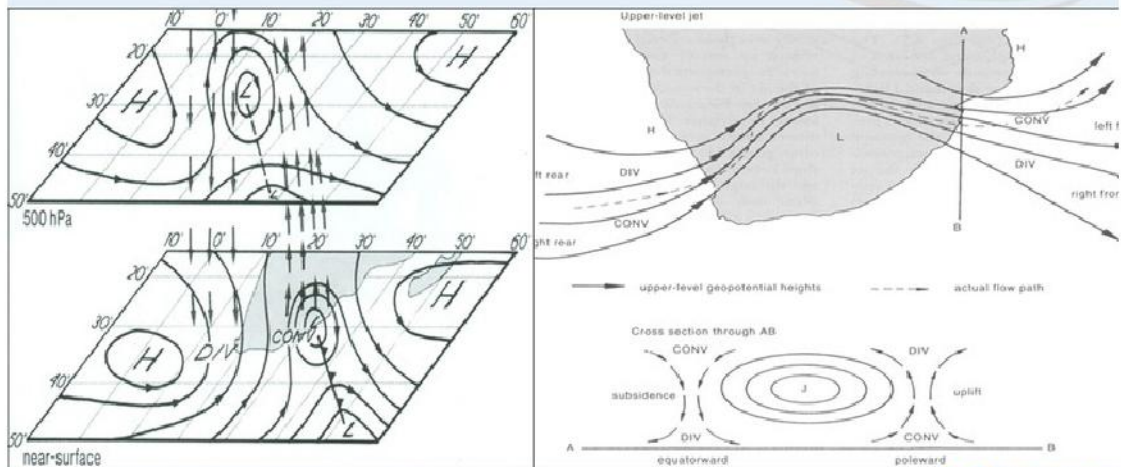
Clouds typically associated with cut-off lows are core convection, baroclinic cloud shield and deformation zone cirrus



slide_006.JPG

According to Taljaard (1985a), when considering COL development and associated precipitation, one should consider **horizontal divergence**, **vorticity**, and **vertical motion** at various levels in the atmosphere.

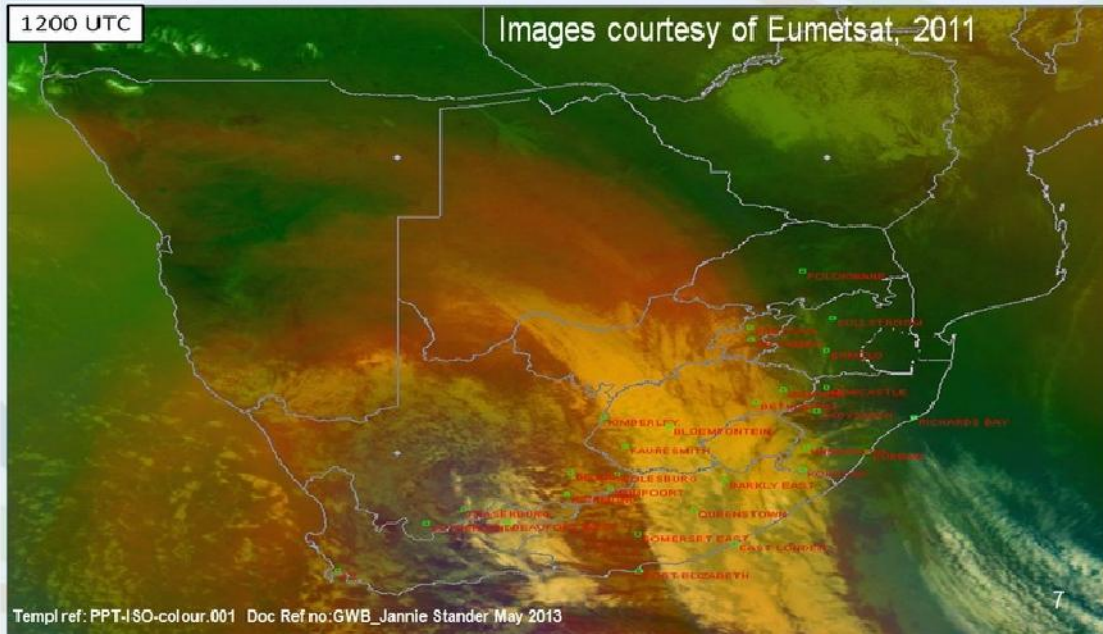
Rainfall intensity, provided adequate moisture is available, is associated with the extent of the **low level convergence, vertical motion and upper air wind divergence**. The most probable area for rainfall is located 300 to 1 000 km east of the upper low where upper air motion is greatest



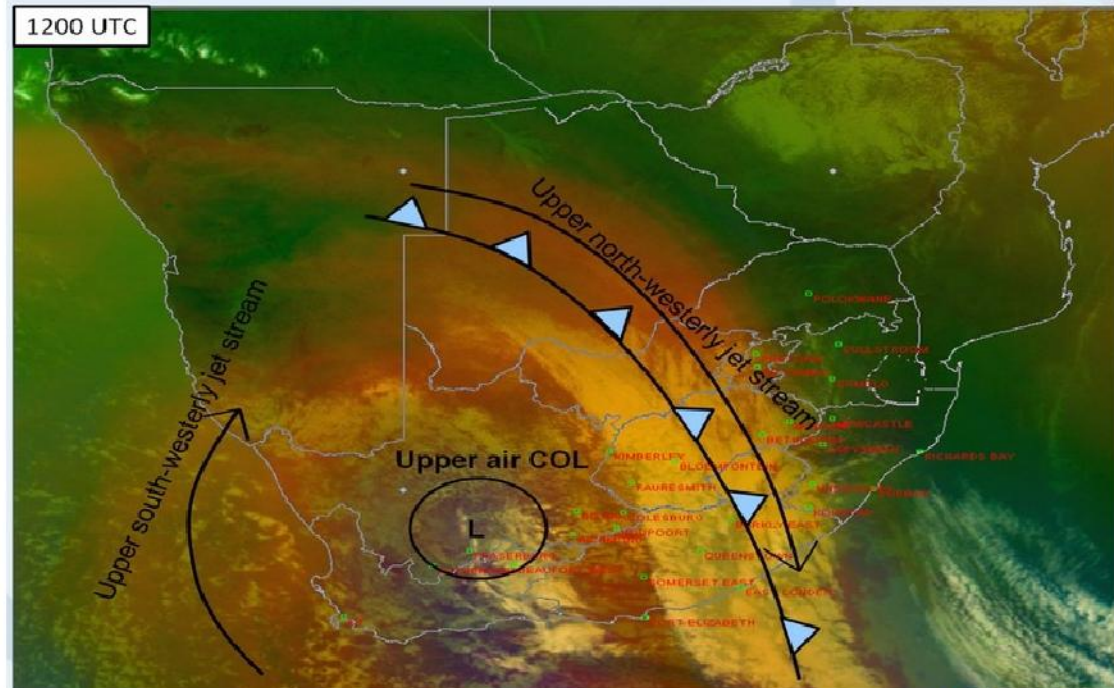
CASE 1: 26 June 2007 12Z SATELLITE IMAGERY

Identify the following features on the Airmass RGB below:

- 1) Position of upper COL
- 2) Approximate position of surface cold front
- 3) Location of upper level jet stream



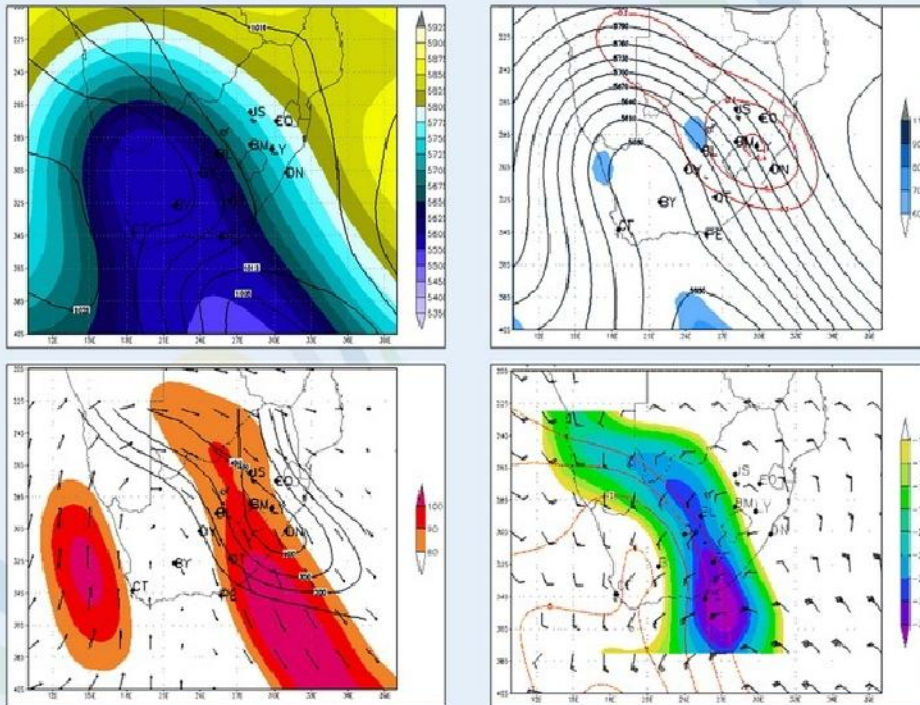
ANSWER



Images courtesy of Eumetsat, 2011

NWP ANALYSIS

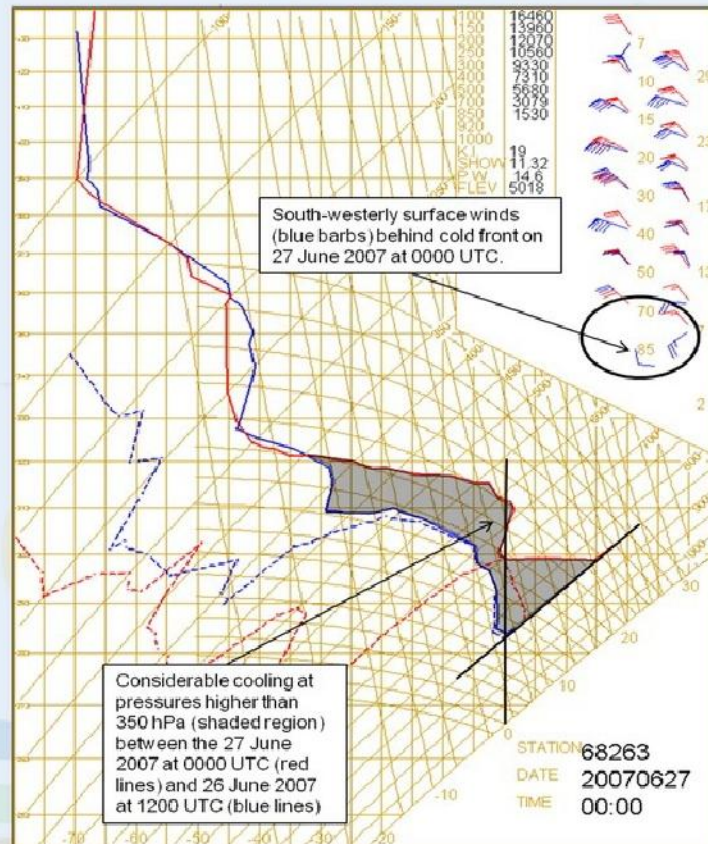
26 June 2007 12Z



Templ ref: PPT-ISO-colour.001 Doc Ref no:GWB_Jannie Stander May 2013

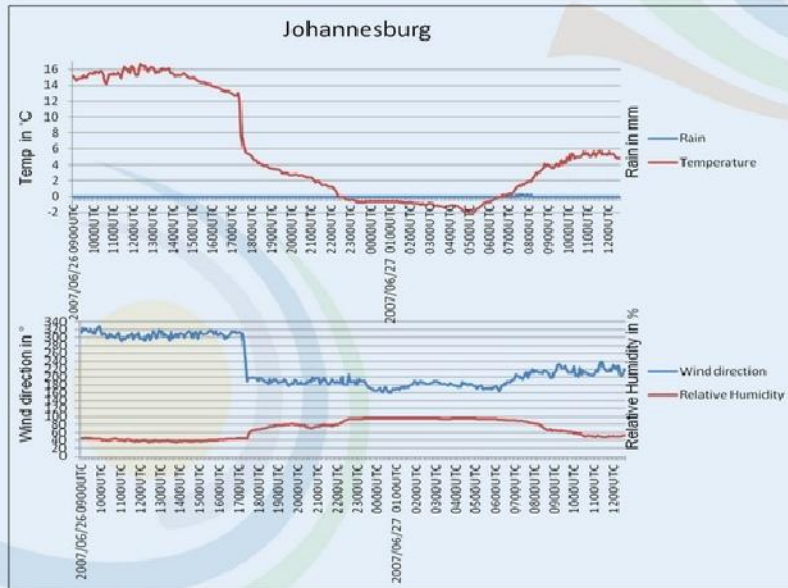
slide_010.JPG

UPPER AIR DATA AT IRENE CLOSE TO JOHANNESBURG

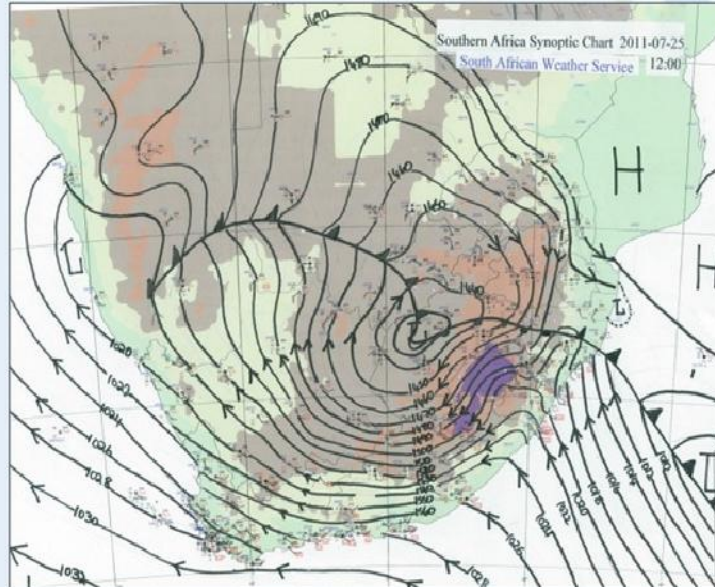


SURFACE DATA JOHANNESBURG

- Identify when and where the cold front most likely passed through the station?

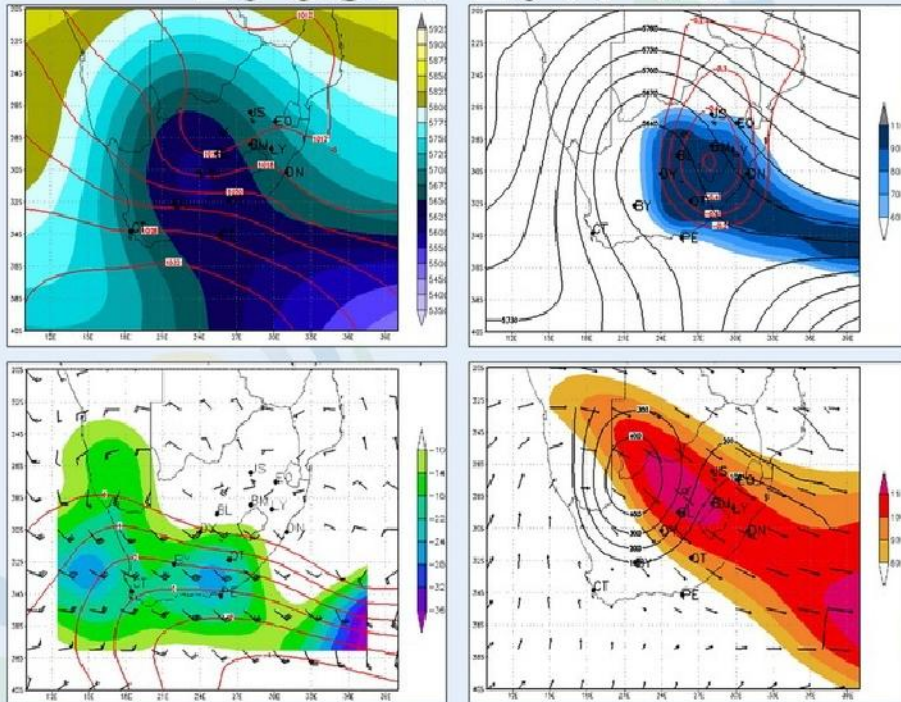


CASE 2: 25 JULY 2011

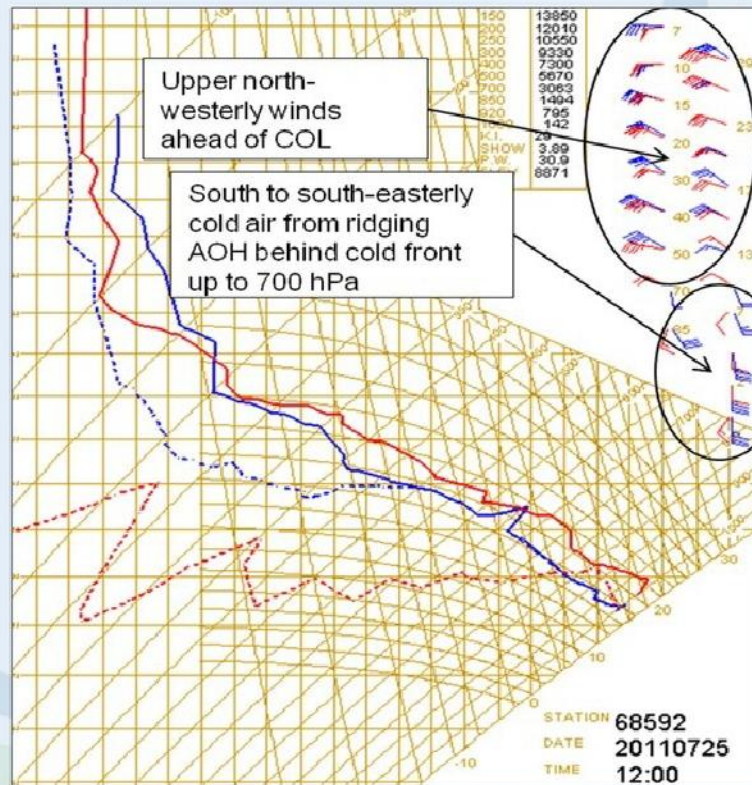


NWP ANALYSIS

25 JULY 2011 12Z

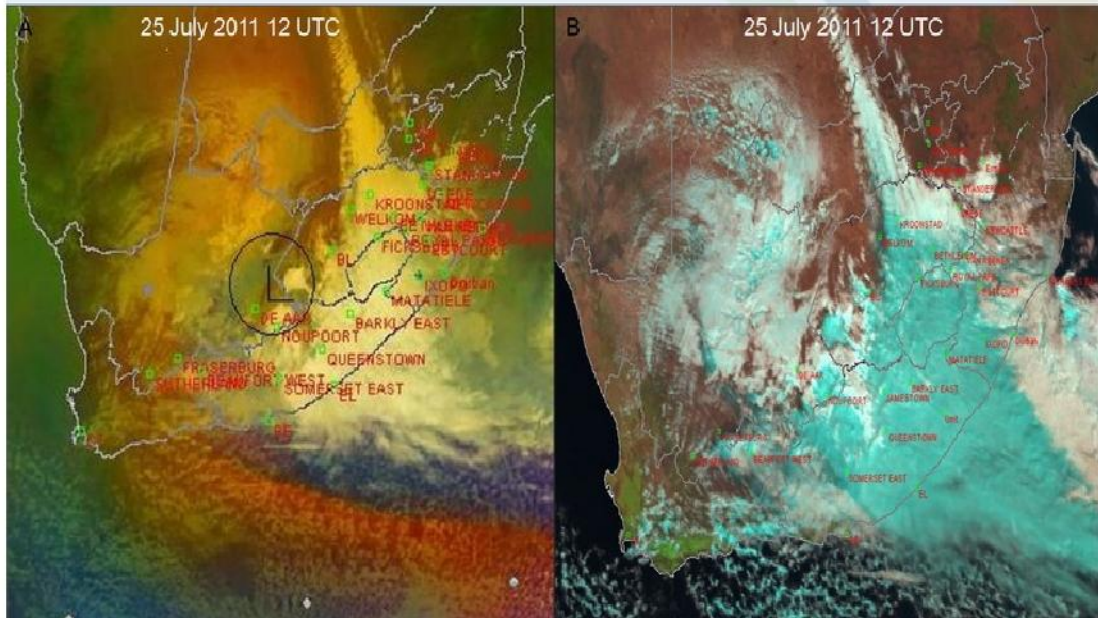


UPPER AIR DURBAN



Templ ref: PPT-ISO-colour.001 Doc Ref no:GWB_Jannie Stander May 2013

SATELLITE IMAGERY



Images courtesy of Eumetsat 2011

CONCLUSION

Cold fronts over South Africa, when associated with an upper air Cut-off low tend to be just as severe and comparable to those in the mid latitudes and tend to move further north into the sub tropics.

Cut-off lows and cold fronts are synoptic scale systems that can be readily identified with the use of satellite imagery, NWP and upper air soundings.

Conceptual models can sensitize the forecaster as to what features they need to look out for making identification of these weather systems easier.

