



# **The use of ECMWF products at ACMAD; their performance in forecasting severe weather in Africa**

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# Outline

- Overview of ACMAD
- Tools for data processing and forecasting
- Examples of forecast products
- Skills of ECMWF
  - on 2 cases in Southeastern Africa (Tropical cyclones Favio & Gamete)*
  - on cases of West African squall lines*
- Summary

# The mission of ACMAD

Help African countries to achieve sustainable development through efficient use of Meteorological information

➤ Issue meteorological products available at <http://www.acmad.ne/> & <http://81.199.131.34/>

& disseminated via email to NMHSs & users

- *24h – 10 days forecast charts & bulletins over the African continent*
- *Production of WASA (West African Synthetic Analysis) & WASF (West Africa Synthetic forecast) since AMMA extension to the southern & eastern Africa SASA & SASF for the SWFDP*
- *Monthly and seasonal outlooks*

## ➤ Data archiving

## ➤ Training & Capacity building for the NMHSs

- *on the job training*
- *Training workshops*

## ➤ Technology transfer

## ➤ Research

- *Case studies*
- *Models evaluation & intercomparison*
- *Regional modeling*

# Tools for data processing & Forecasting

- Retim Afrique & MSG for real data reception
- PCs with MESSIR-VISION & VCS to analyze and visualize data received through MSG; available at all NMHSs but of somehow limited use; model data may not be available
- PCs SYNERGIE for data analysis and forecast;  
access to different models: Arpege, ECMWF, UKMO  
Double screen; Provides ample working space  
multiple windows concept; simultaneous examination and comparison of data from different platforms: imagery, models
- 1 workstation for numerical regional modeling
- 1 server for AMMA web site

# Example of forecast chart

CENTRE AFRICAIN POUR LES APPLICATIONS DE LA  
METEOROLOGIE AU DEVELOPPEMENT



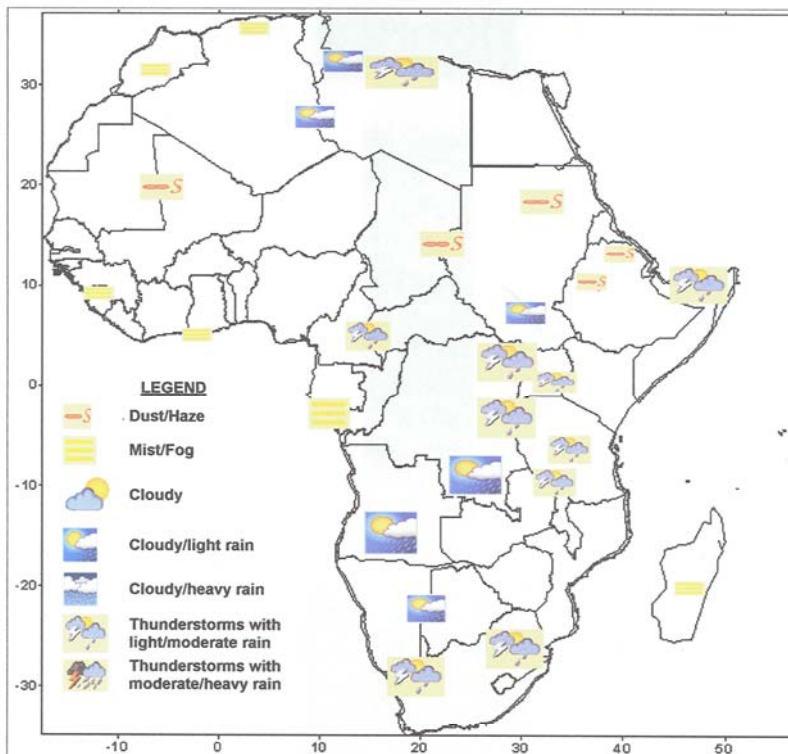
AFRICAN CENTRE OF METEOROLOGICAL APPLICATIONS FOR  
DEVELOPMENT

Institution Africaine parrainée par la CEA et l'OMM

African Institution under the aegis of UNECA and WMO

**CONTINENTAL FORECAST BULLETIN N°4974**  
VALID FOR MONDAY 05<sup>TH</sup> NOVEMBER 2007

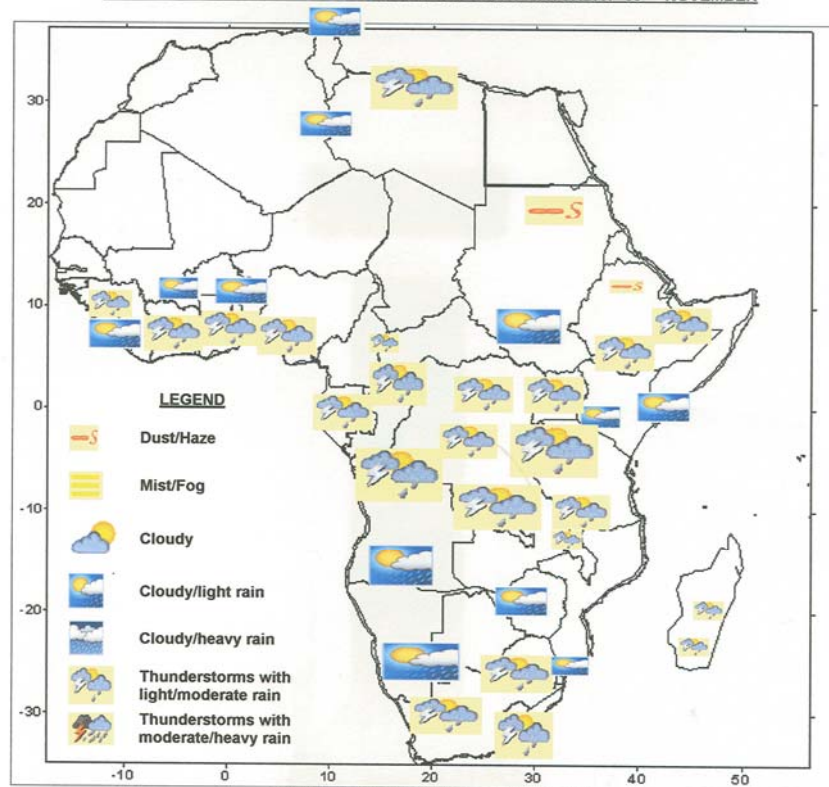
## SIGNIFICANT WEATHER FORECAST: MORNING OF MONDAY 05<sup>TH</sup> NOVEMBER



EVENT OF THE DAY



## SIGNIFICANT WEATHER FORECAST: AFTERNOON OF SATURDAY 05<sup>TH</sup> NOVEMBER



### MAXI AND MINI TEMPERATURES FORECAST

CITIES	MAXI	MINI	CITIES	MAXI	MINI	CITIES	MAXI	MINI	CITIES	MAXI	MINI
ABIDJAN	30°C	25°C	COTONOU			LILONGWE	30°C	18°C	NIAMEY	38°C	20°C
ACCRA			DAKAR			LOME	30°C	25°C	NOUAKCHOTT		
ADDIS ABABA	24°C	08°C	DAR-ES-SALAM	30°C	19°C	LUANDA	26°C	23°C	OUAGADOUGOU		
ALGER	19°C	12°C	DOUALA	30°C	24°C	LUSAKA	32°C	16°C	PLAISANCE	26°C	22°C
ANTANANAR	24°C	10°C	HARARE			MAPUTO	34°C	22°C	PRETORIA	30°C	18°C
BAMAKO	37°C	20°C	KHARTOUM	38°C	23°C	MASERU			RABAT	22°C	09°C
BANGUI	29°C	22°C	KIGALI			MANZINI	26°C	16°C	SAL	27°C	23°C
BANJUL			KINSHASA			MONROVIA			SEYCHELLES	31°C	22°C
BRAZZAVILLE	32°C	22°C	CAIRO	33°C	18°C	MORONI			TRIPOLI		
CONAKRY			LIBREVILLE	28°C	25°C	NDJAMENA	39°C	20°C	TUNIS	19°C	13°C
			KAMPALA	26°C	18°C	NAIROBI			WINDHOEK	32°C	12°C

85, Avenue des Ministères BP 13184

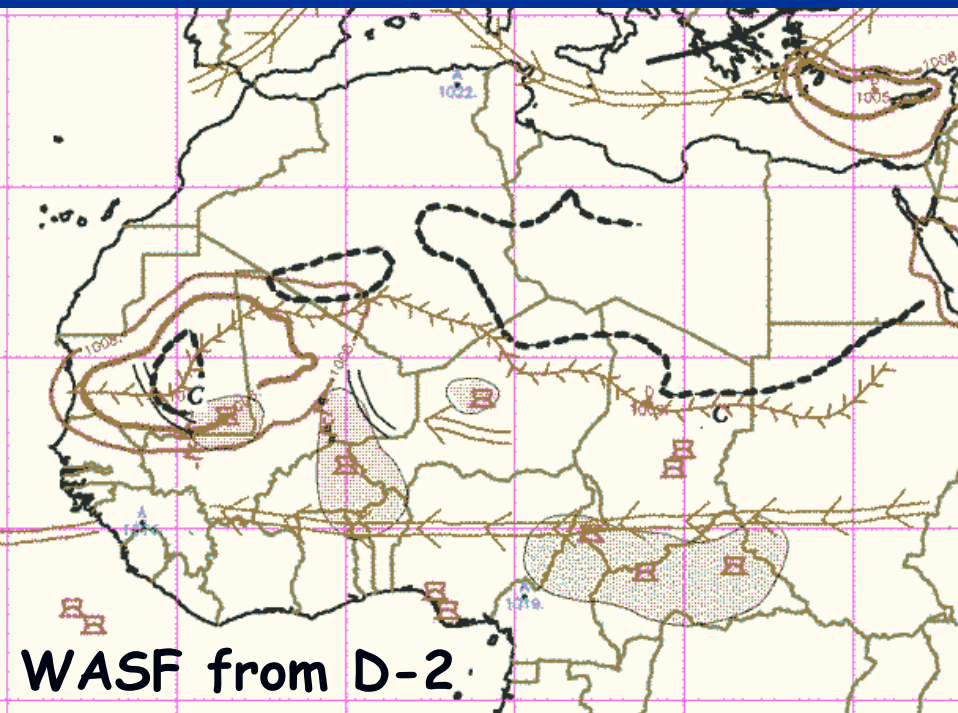
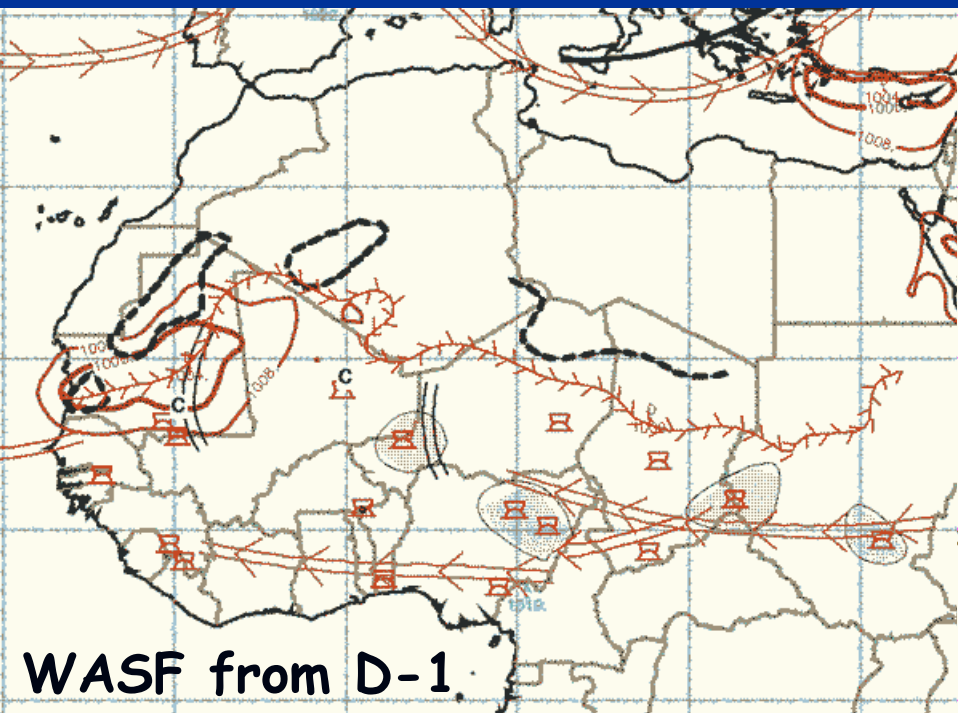
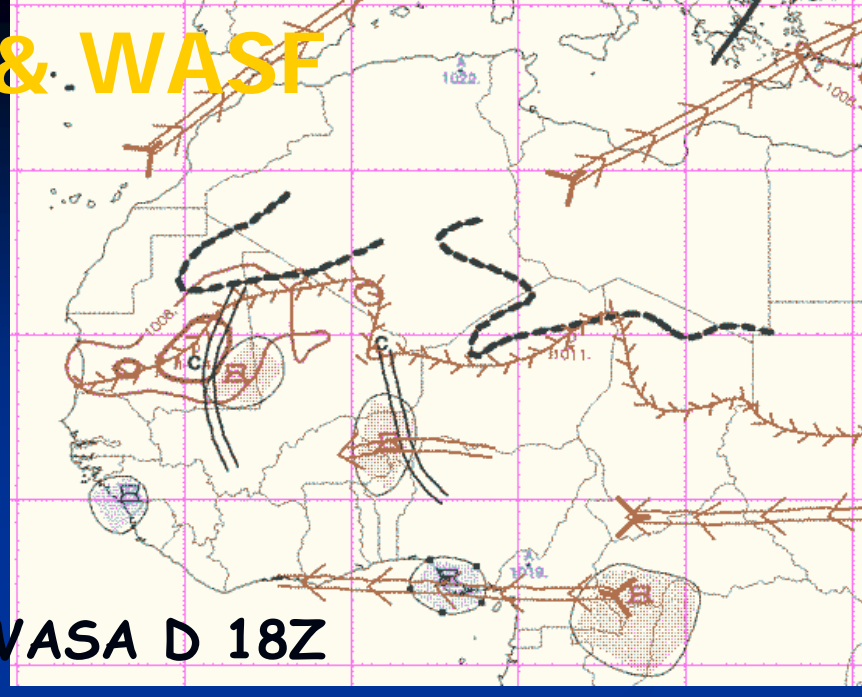
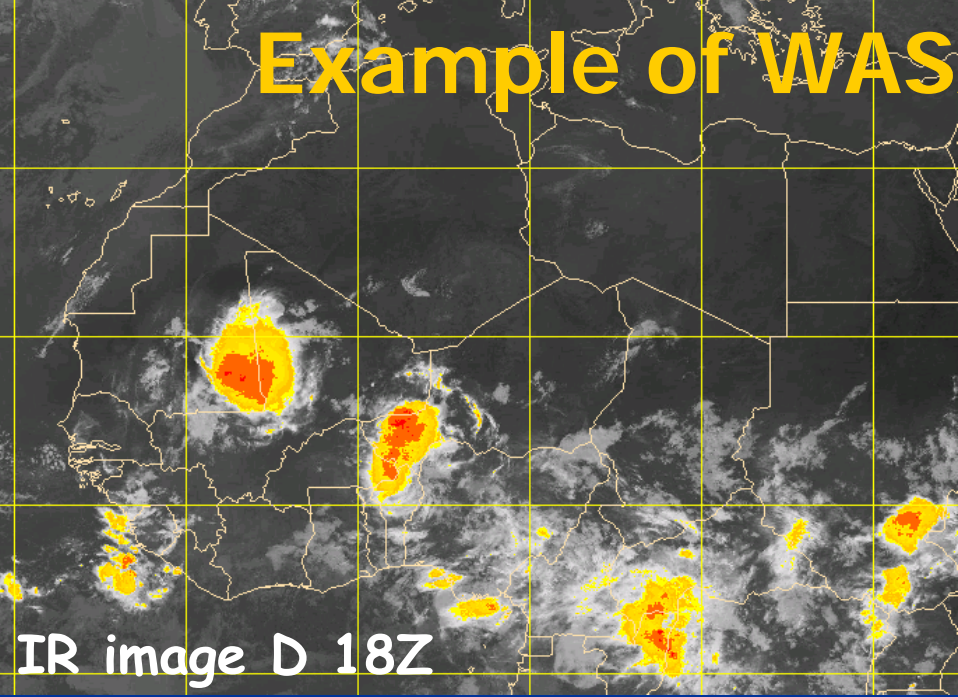
Niamey - Niger

Tél. (227) 20 72 36 27 E-mail: dqacmad@acmad.ne

Web: <http://www.acmad.ne>

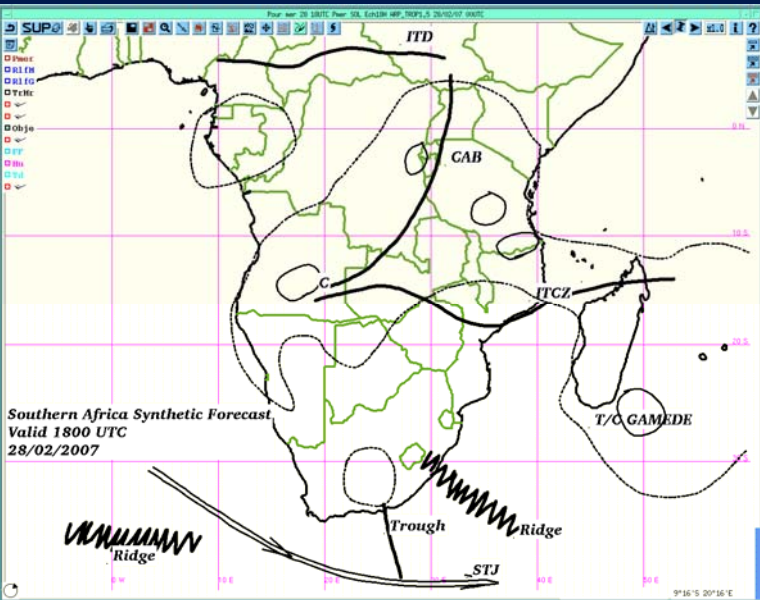


# Example of WASA & WASF

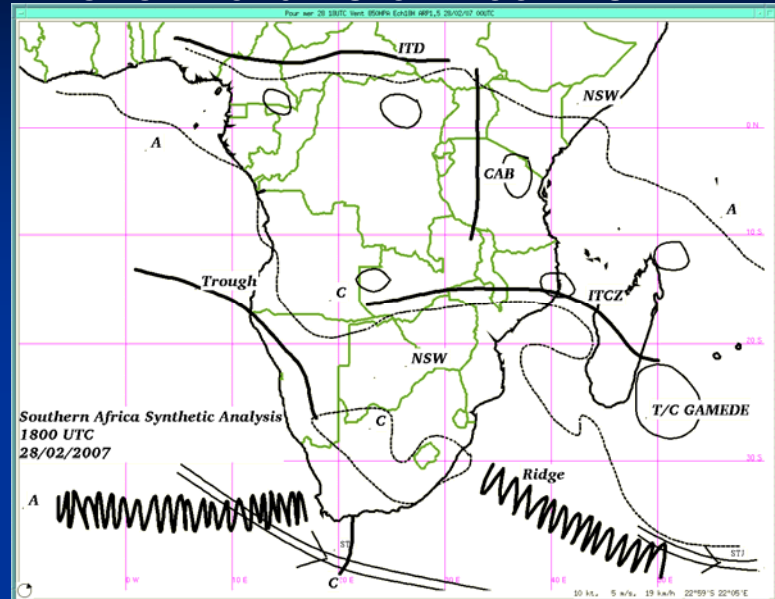


# Example of SASA & SASF

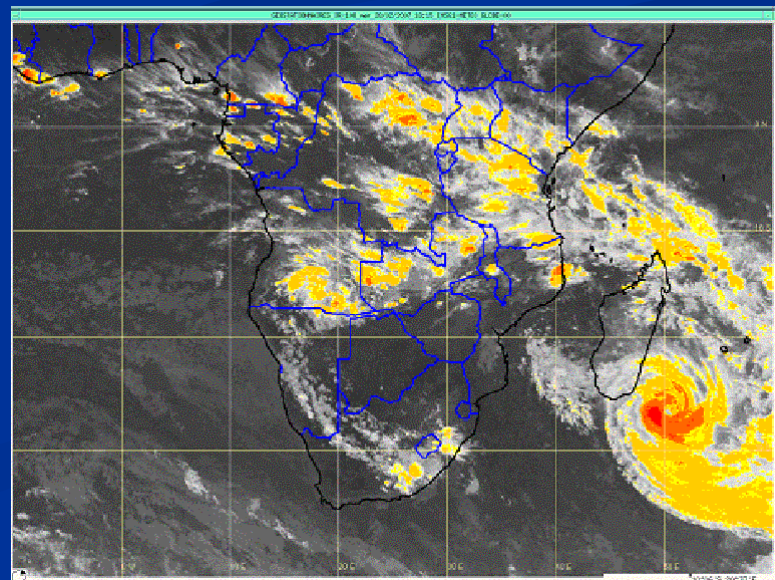
SASF valid 28-02-2007 18Z



SASA valid 28-02-2007 18Z



Reasonably good forecast  
but 5 days earlier the  
forecast was missed  
because of a bad  
interpretation of NWP and  
satellite image.

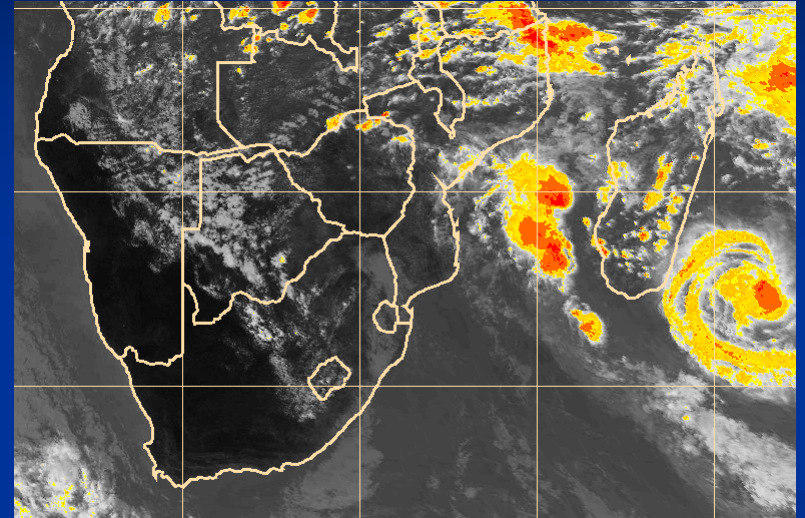
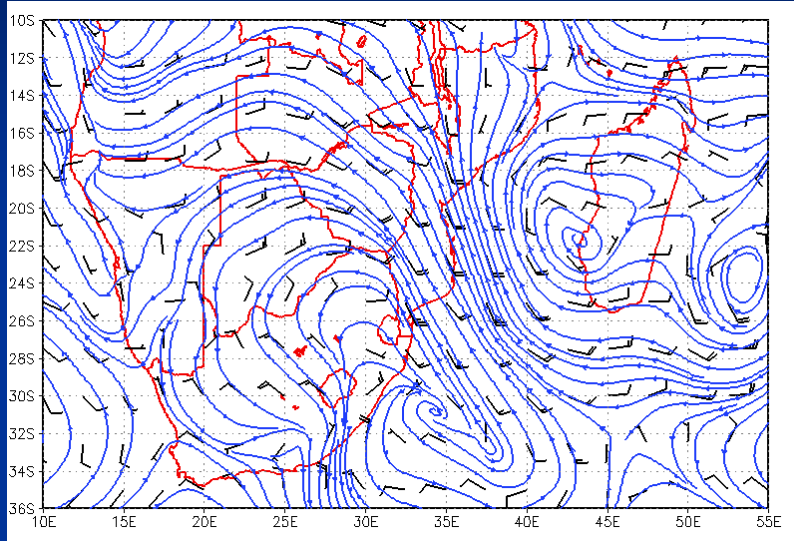




# Forecasting Tropical Cyclone Favio 11-23 Feb 07; How did ECMWF compared to ARPEGE?

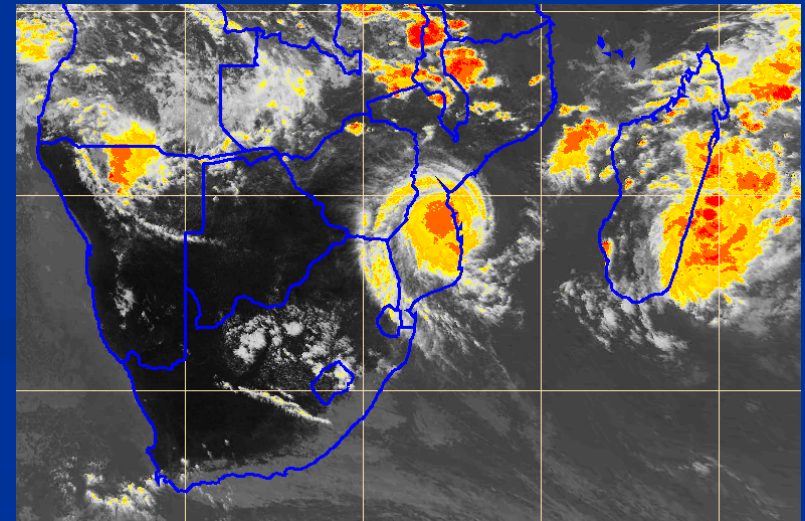
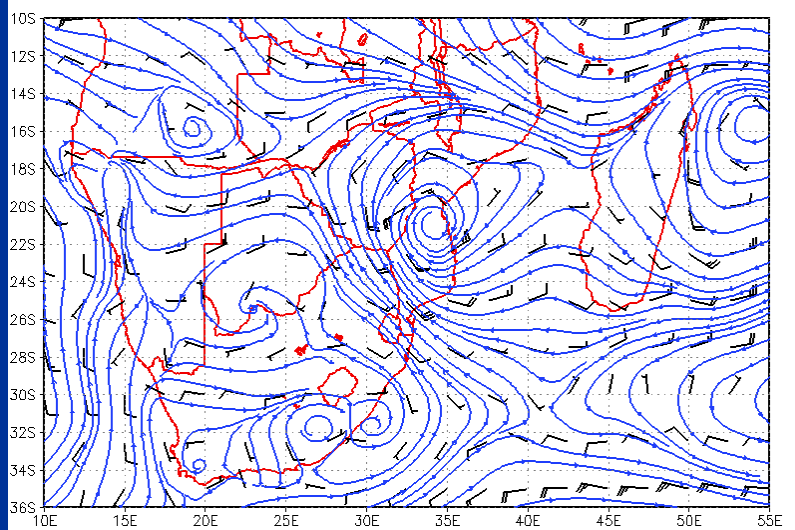
ECMWF 850 hPa winds 17/02/07 T+00

IR image 17/02/07 12 Z



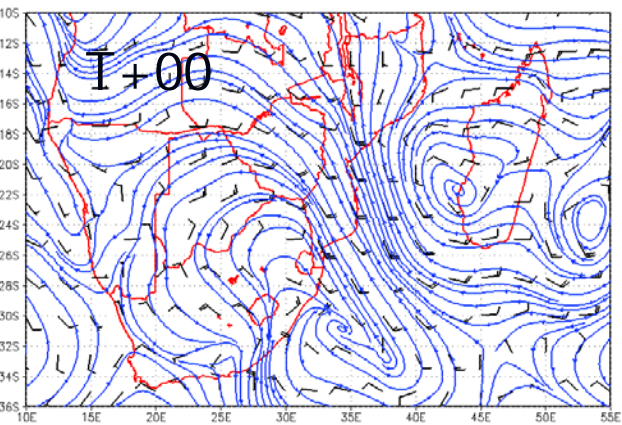
T+120; valid 22/02/07 12Z

IR image 22/02/07 12Z

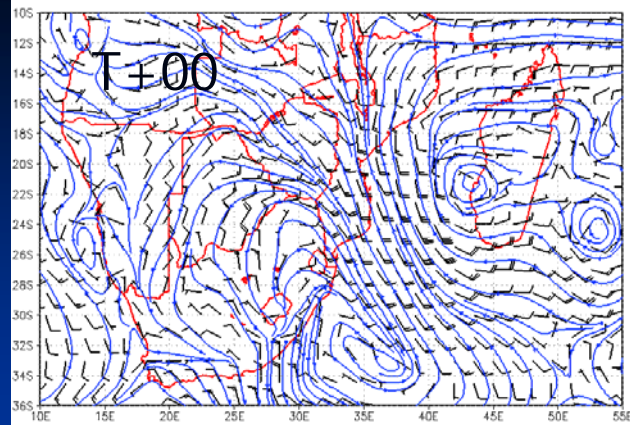




ECMWF; 17/02; T+00

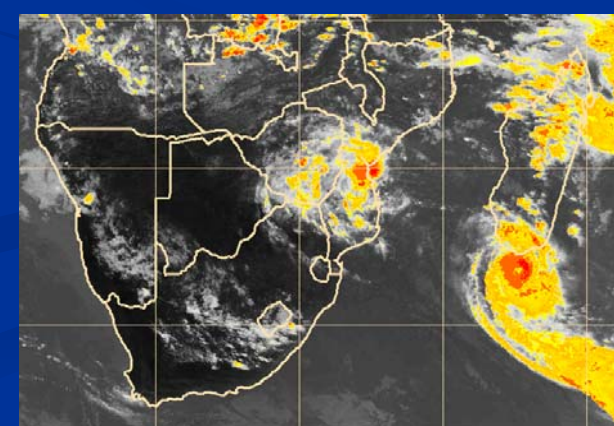
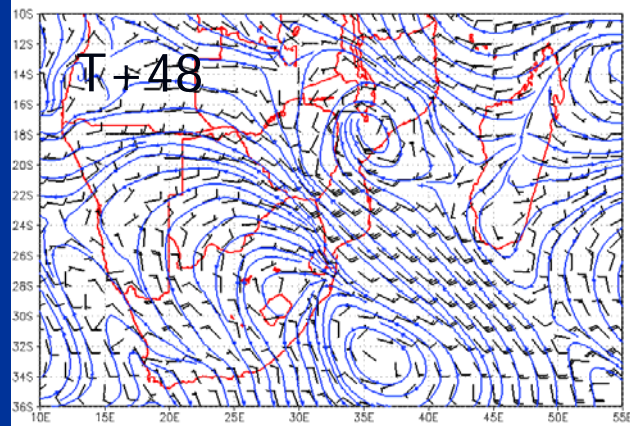
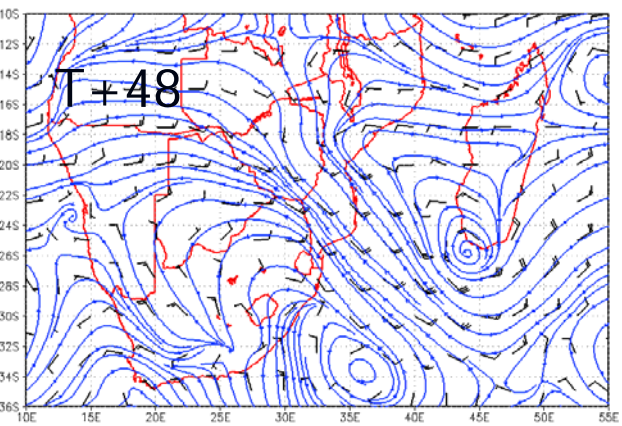
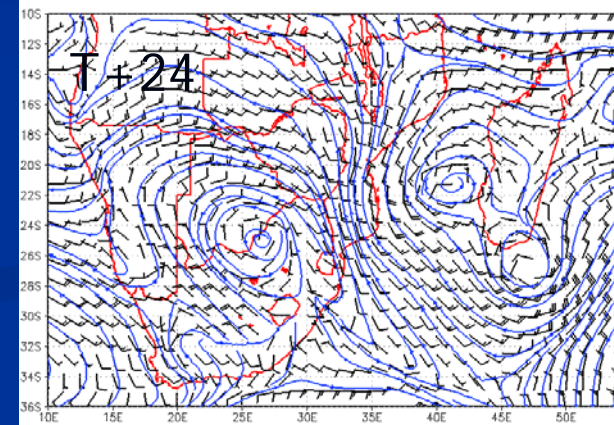
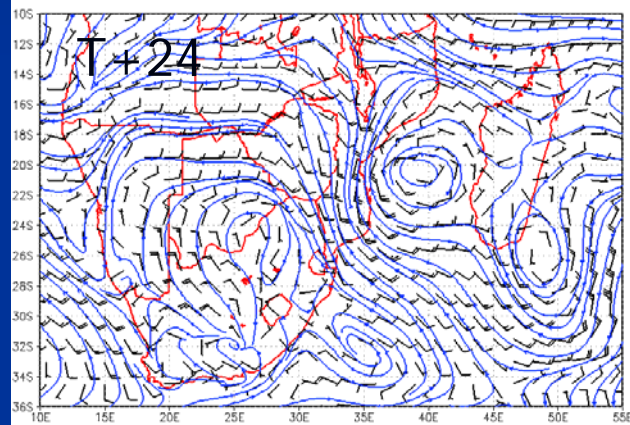
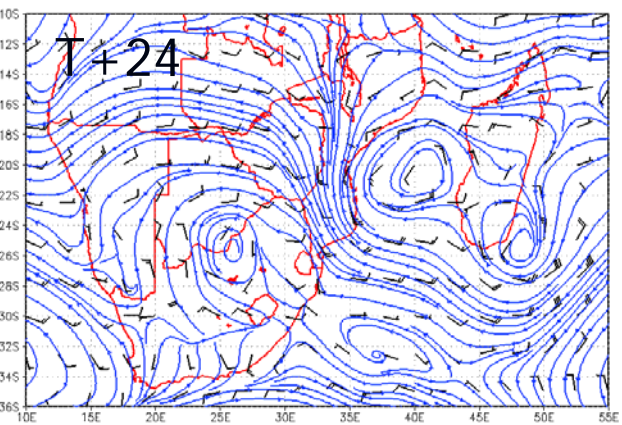


ARPEGE



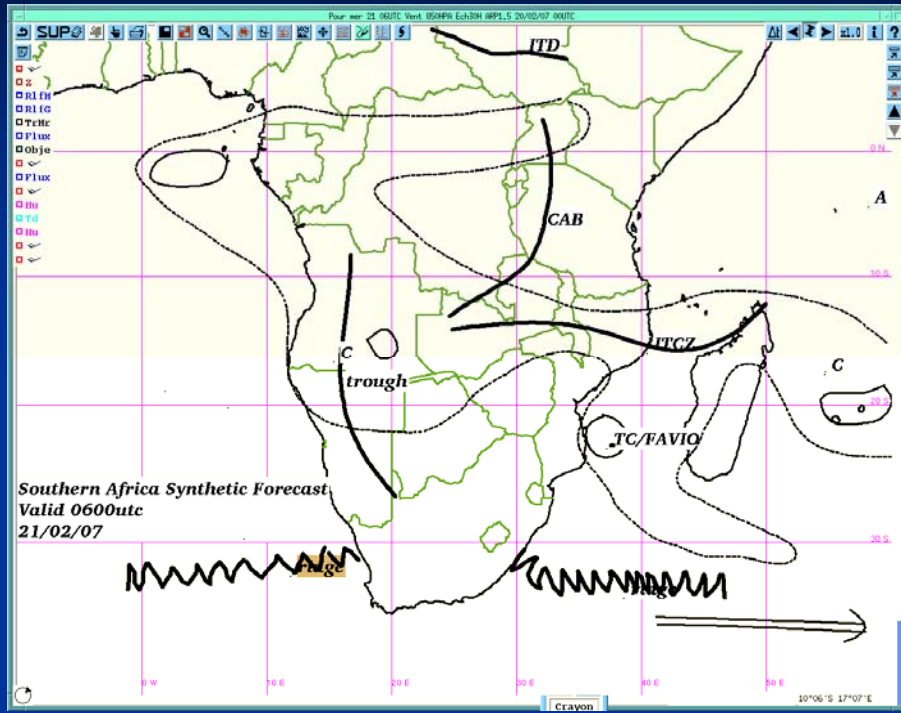
UKMO

*Only T+06, ... T+30 are available*

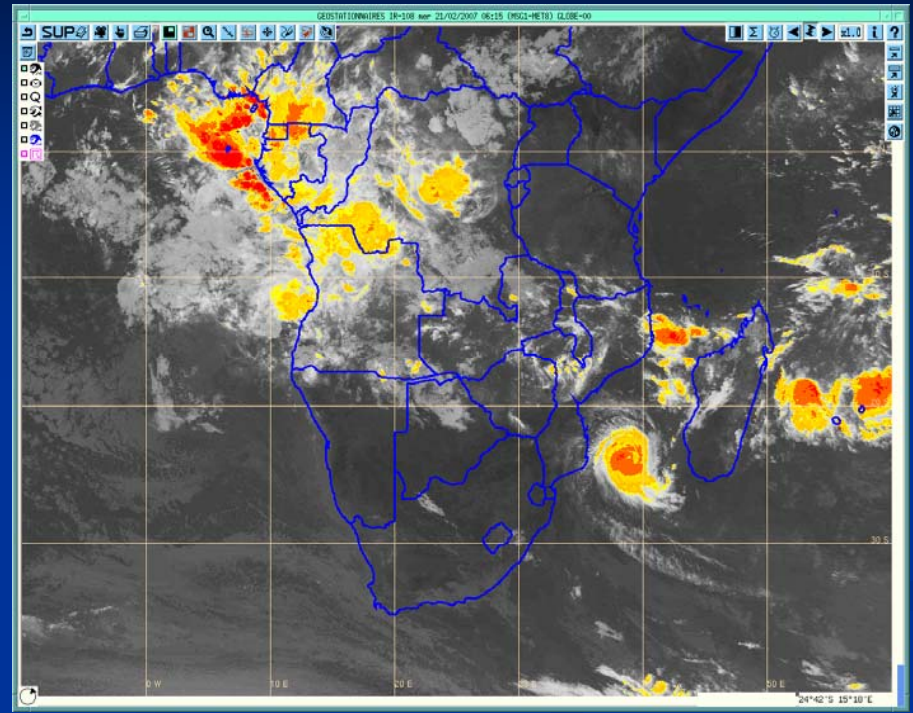




# SASF of 21/02/07 06Z



# IR image

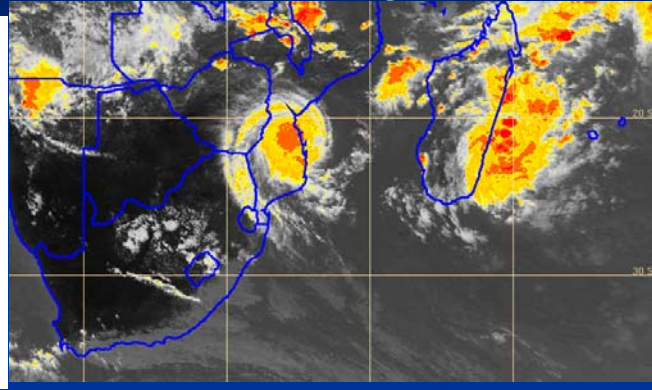
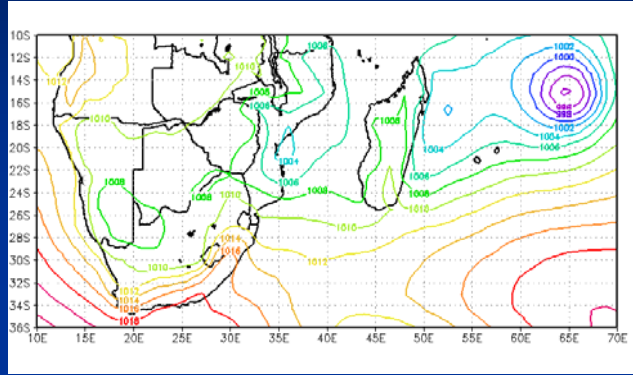
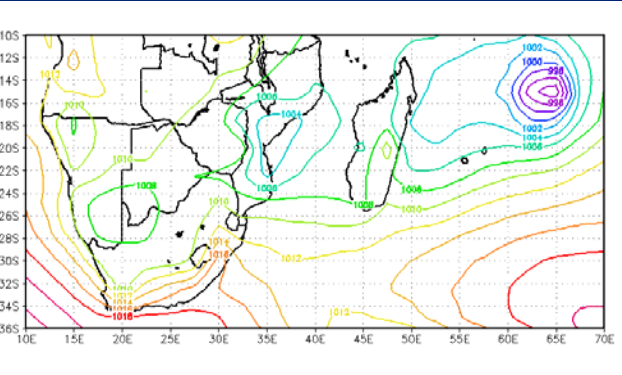


# Forecasting TC Gamete 19 Feb - 06 March 07; How did ECMWF compared to ARPEGE?

ECMWF; MSLP; 22/02; T+00

ARPEGE

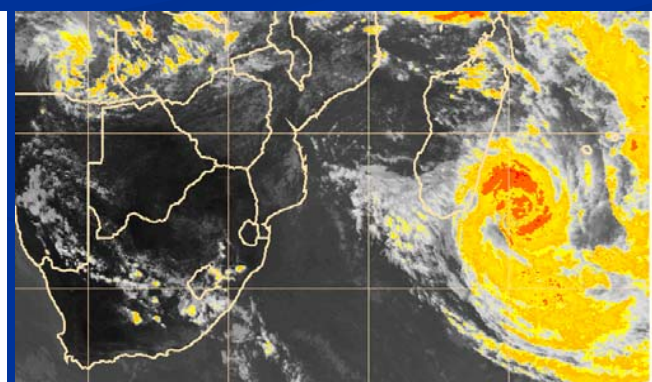
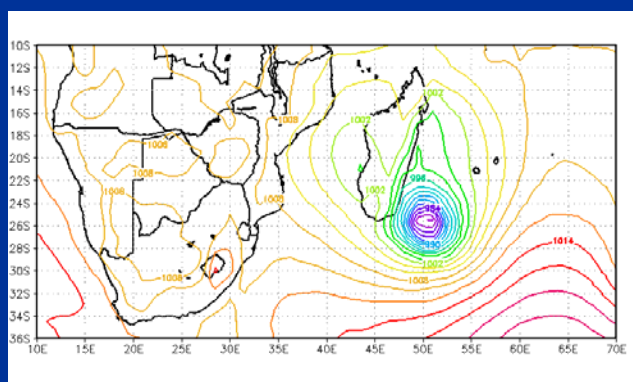
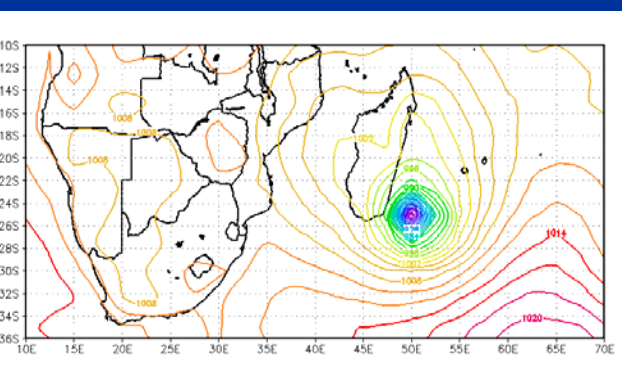
IR image



ECMWF; 28/02; T+00

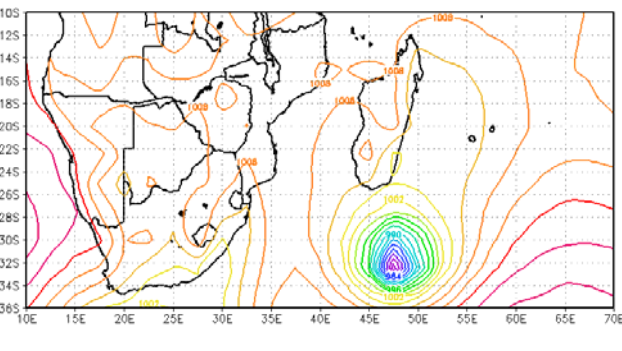
ARPEGE

IR image

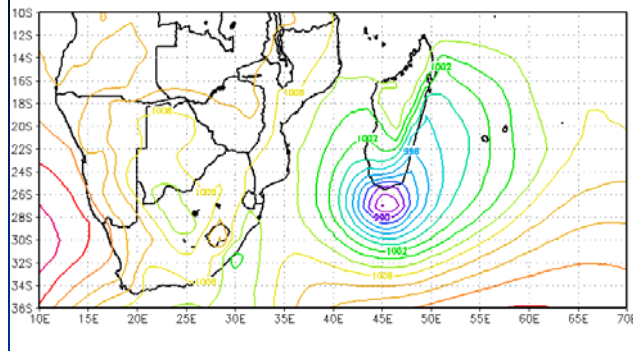




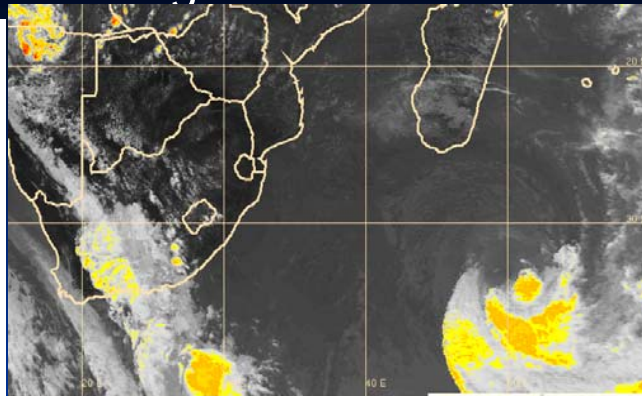
ECMWF; 28/02; T+72



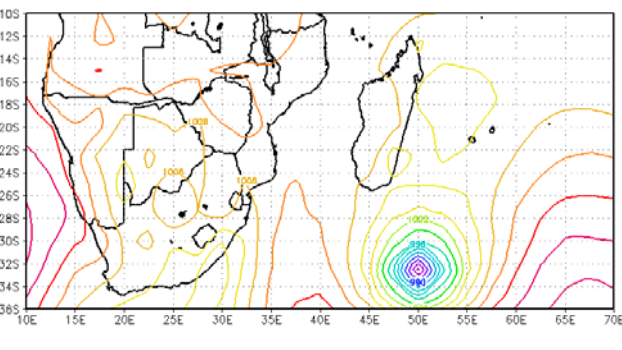
ARPEGE



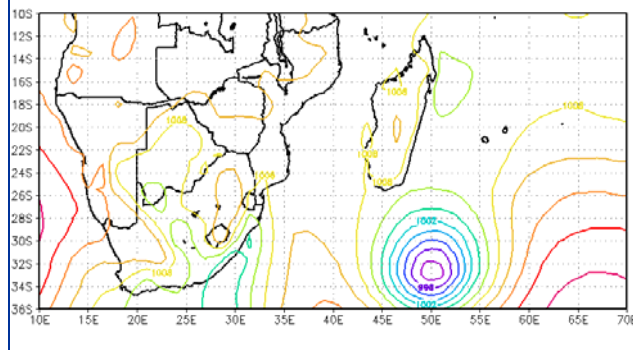
IR image 03/03/07 12Z



ECMWF; 03/03; T+00

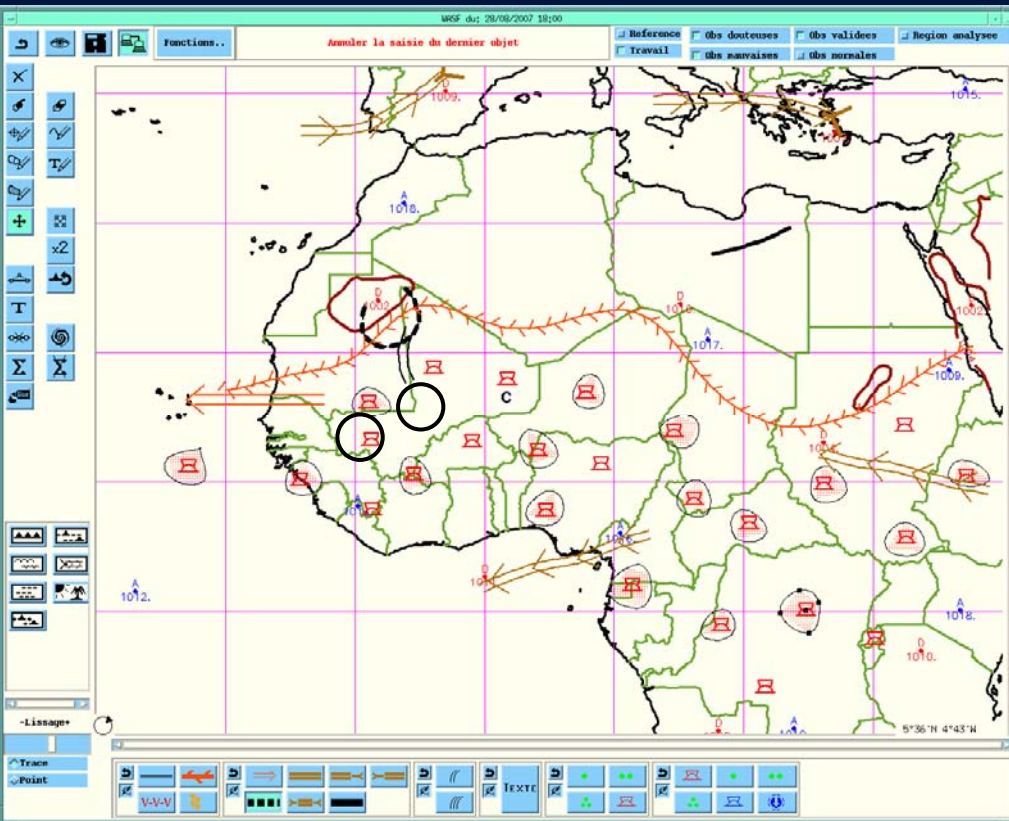


ARPEGE

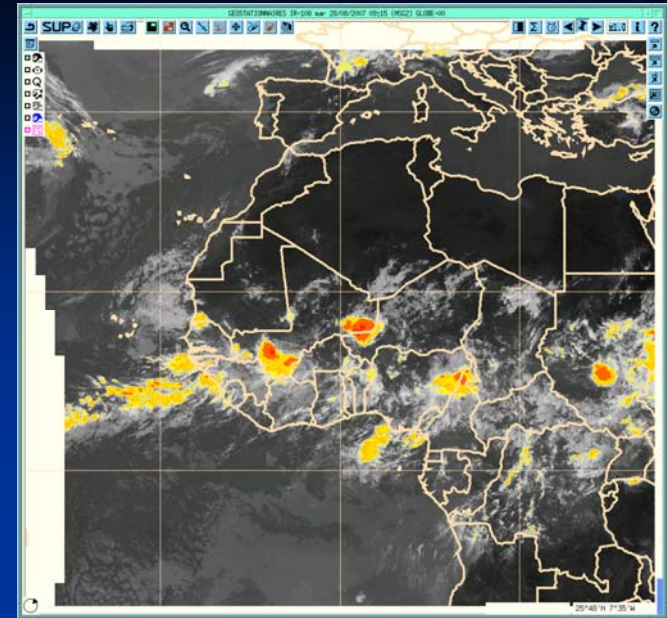


It looks that ECMWF forecast does better than ARPEGE when the forecast lead time increases; the two model outputs are quite similar for analysis and 24 hour forecast but beyond that differences will start growing.

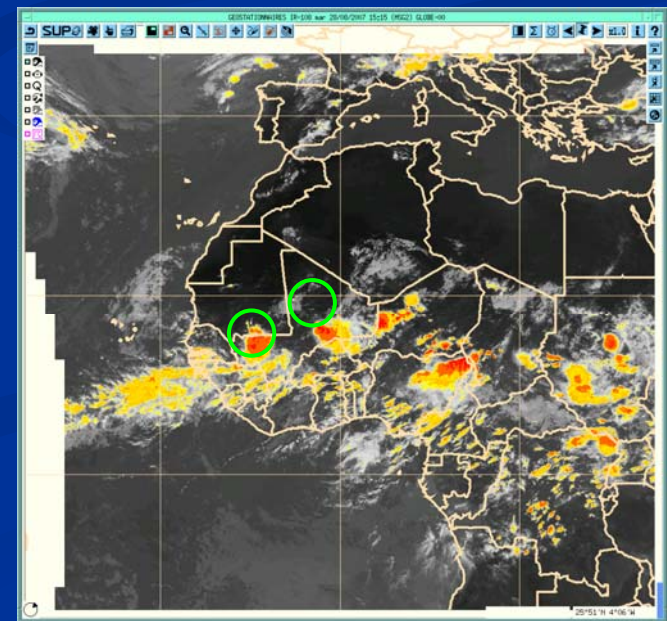
# WASAF 28/08/07 18Z



# IR 28/08/07 0915Z



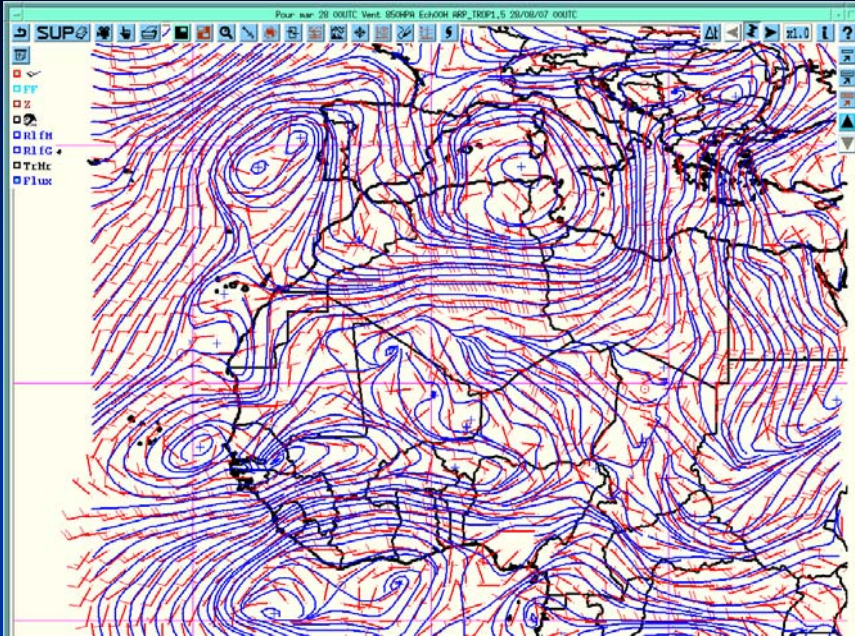
# IR 28/08/07 1515Z



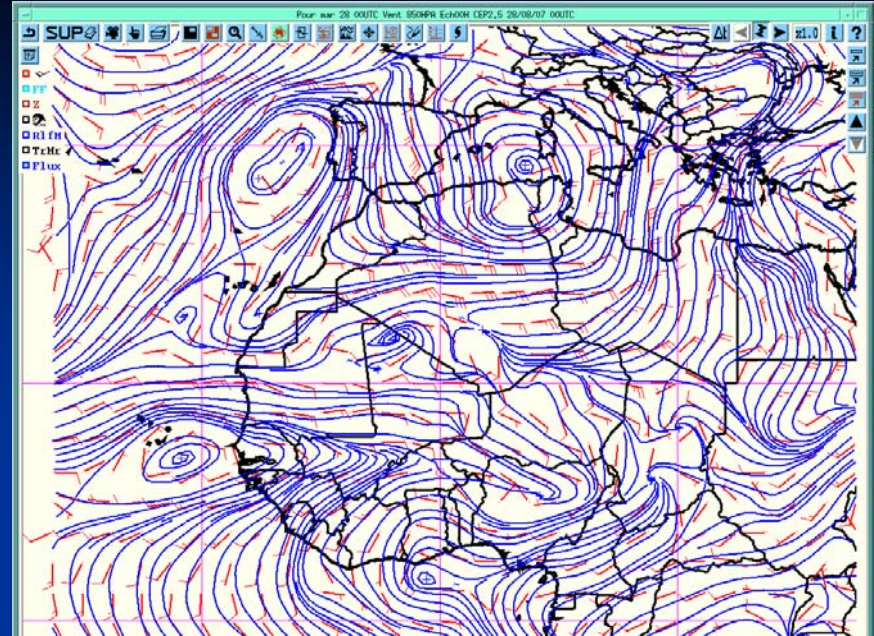
The 2 squall lines in Mali were not forecast though present in the morning. Why? ARPEGE has been solely used



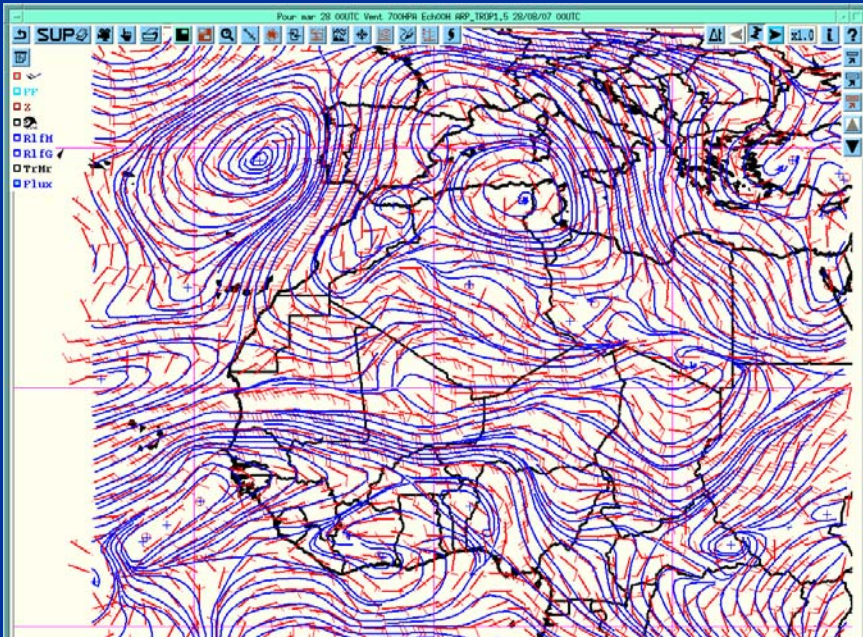
ARPEGE; 850hPa winds; 28/08; T+00



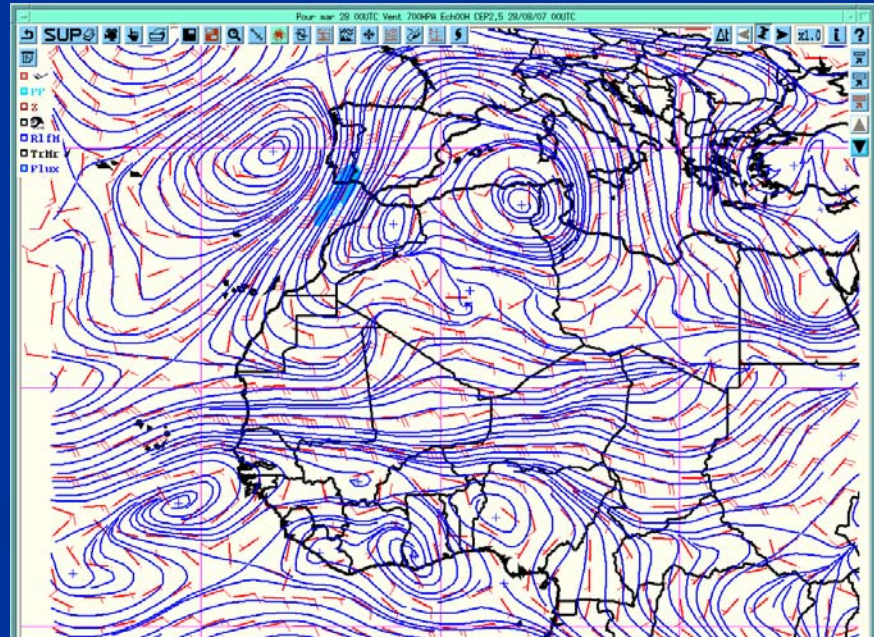
ECMWF; T+00



ARPEGE; 700hPa winds; 28/08; T+00

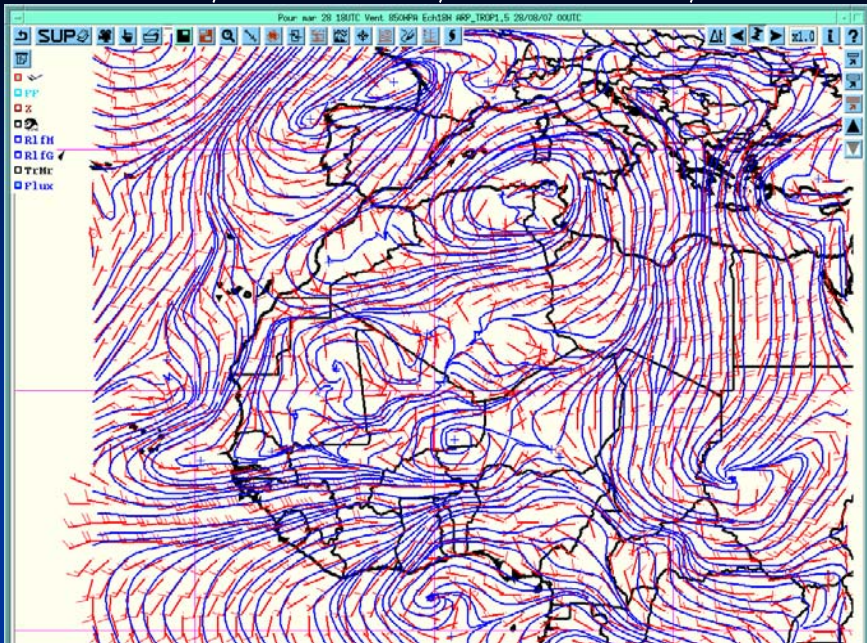


ECMWF; T+00

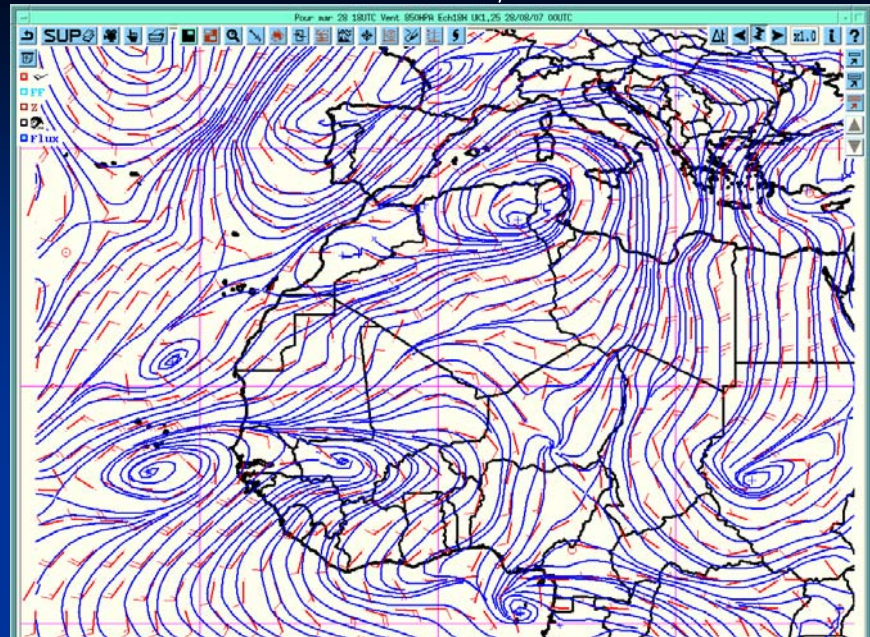




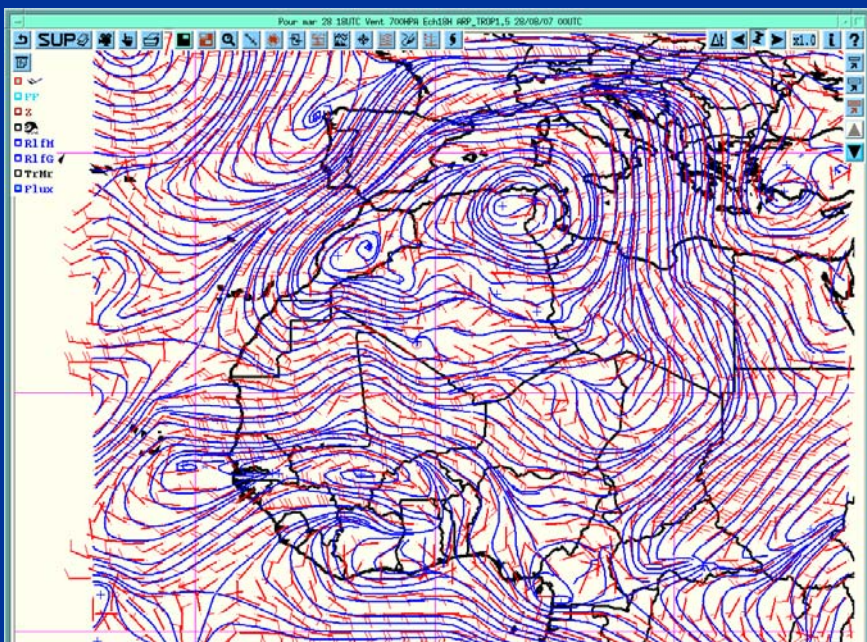
ARPEGE; 850 hPa; 28/08/07; T+18



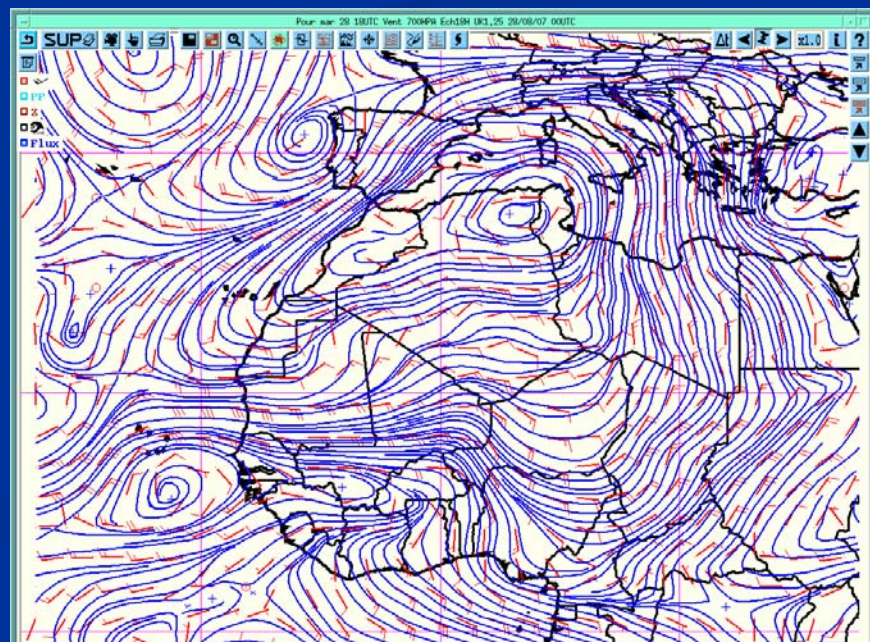
UKMO; T+18



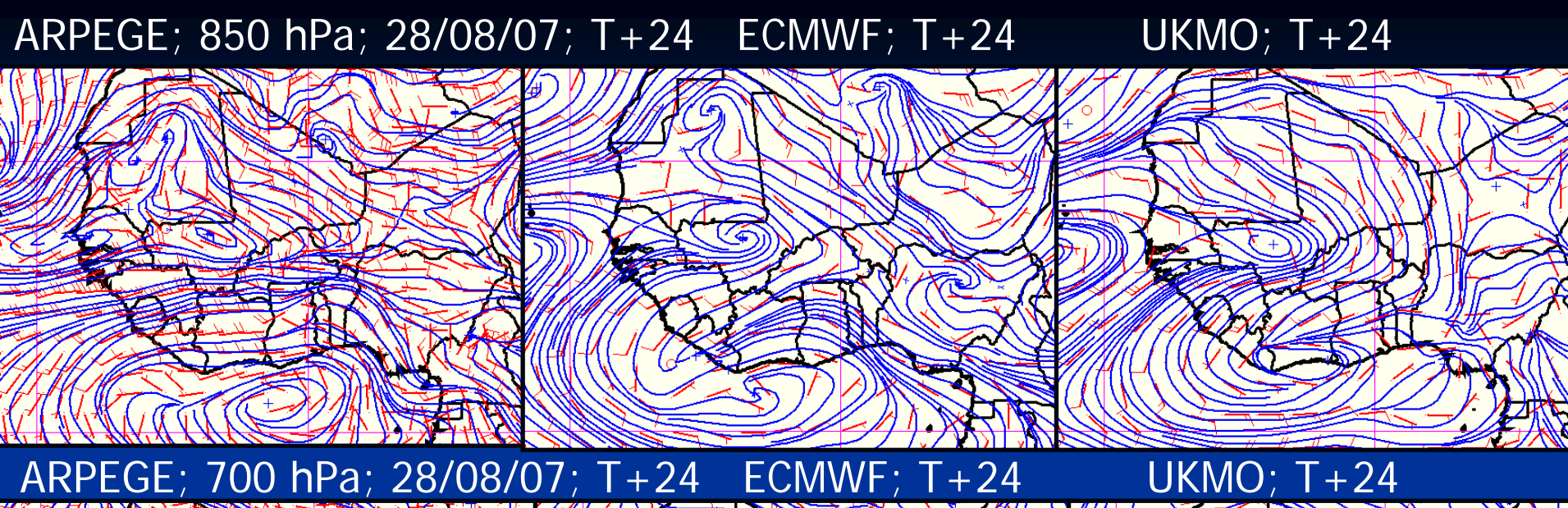
ARPEGE; 700 hPa; 28/08/07; T+18



UKMO; T+18



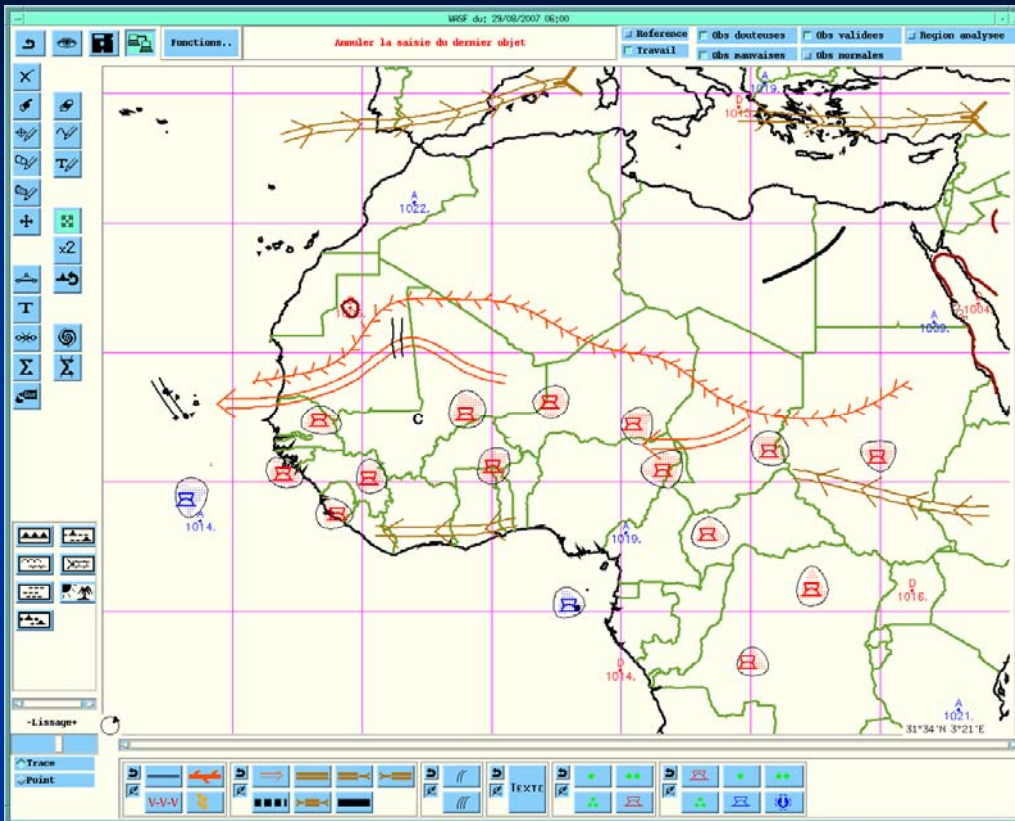




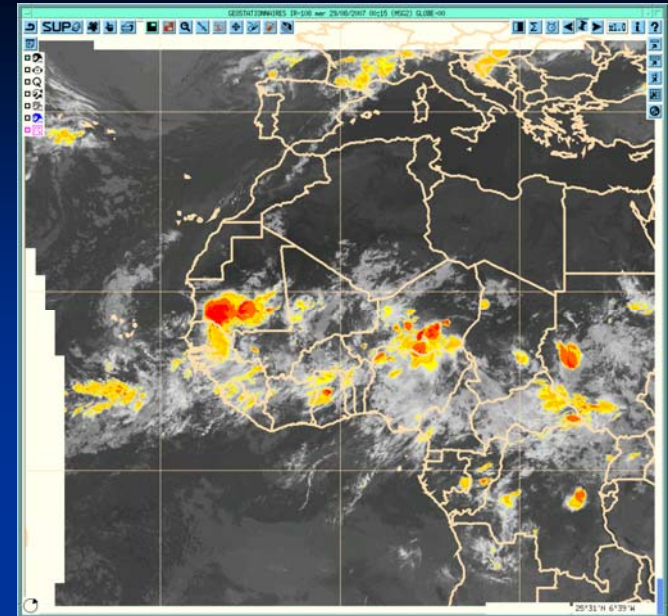
850 hPa; cyclonic circ north nigeria jos missed by Arpege and ukmo; that in mali weak with arpege; ok in ecmwf and ukmo; that in tchad ok with all models; good mcs forecast at 18z

700hPa; missed cyclonic circulation in Mali and struture of AEW; AEW sur Air associated with mcs at 18z well forecast; not seen in arpege and ukmo, although acmad forecast it well

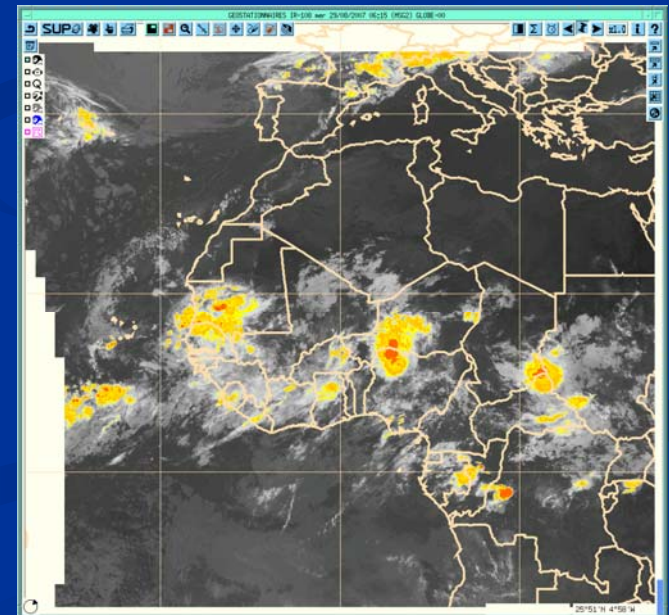
# WASAF 29/08/07 06Z



## IR 28/08/07 0015Z



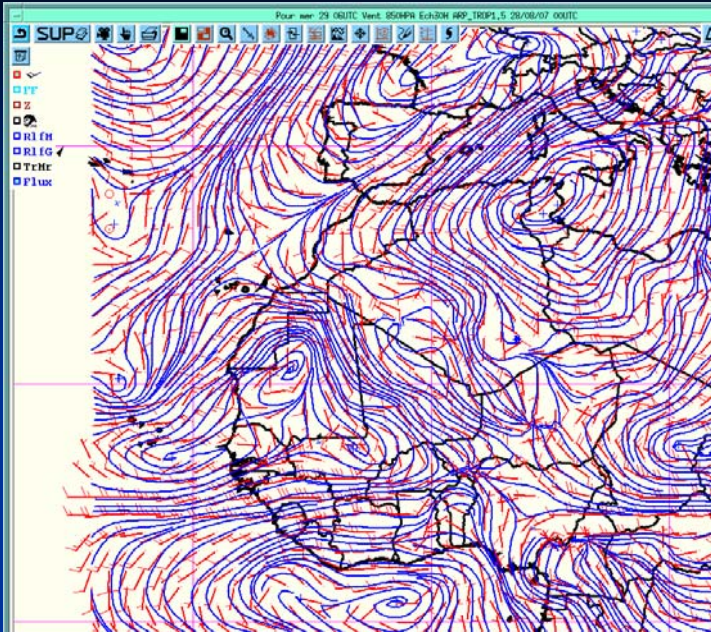
## IR 28/08/07 0615Z



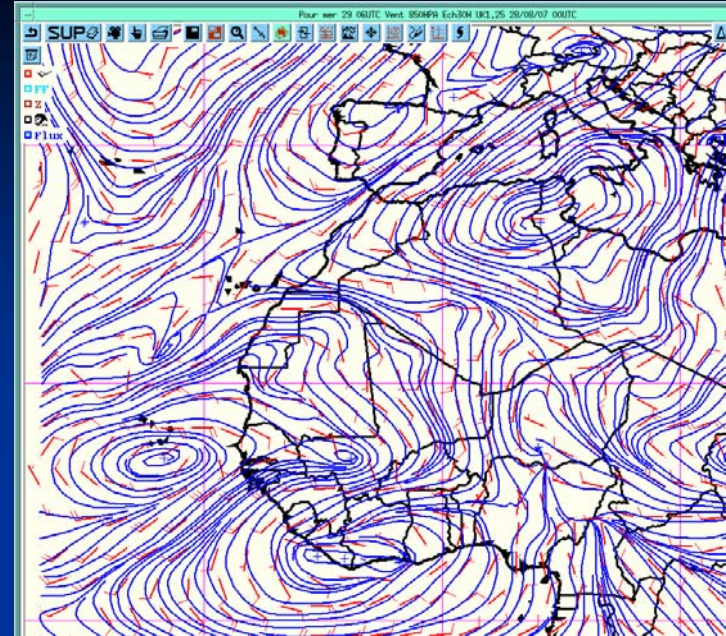
bad forecast because of the bad forecast of 18Z



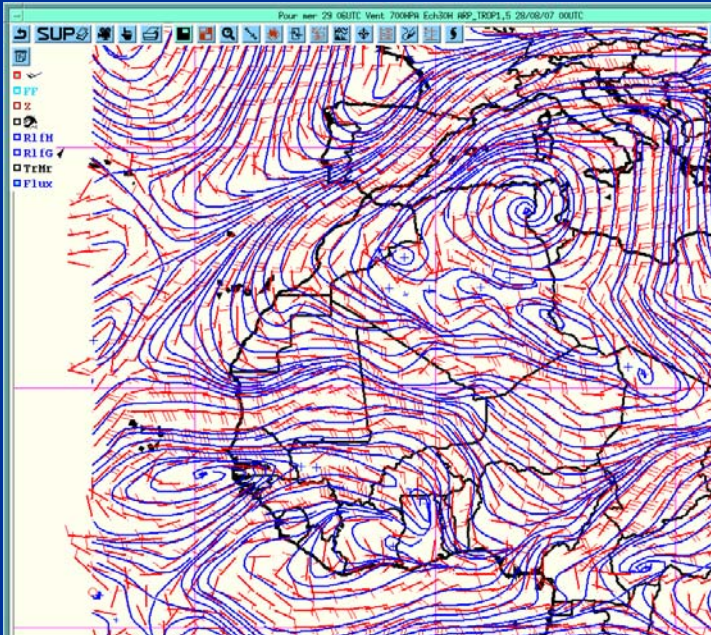
ARPEGE; 850 hPa; 28/08/07; T+30



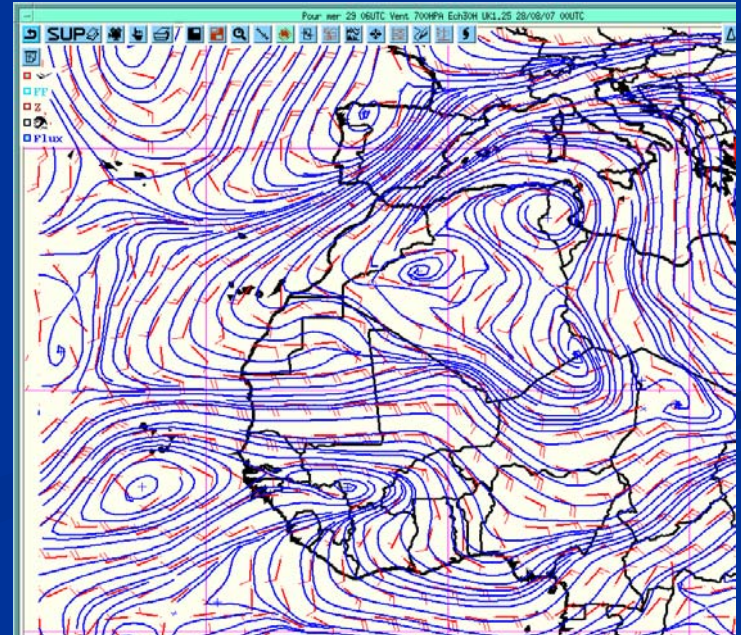
UKMO; T+30



ARPEGE; 700 hPa; 28/08/07; T+30



UKMO; T+30





The cyclonic circulation in ARPEGE had made the forecasters move the storm in Senegal; while inspection of both UKMO and ECMWF (although outputs at 06Z not available) wouldn't allow a mature storm in Senegal, situated within a neutral point and a weak ridge.

These examples show the value in using as many models as possible in order to issue appropriate forecast guidance.



# Summary

ECMWF products seem to give good forecast guidance but lots of constraints:

- Not enough parameters
- Data received through RETIM-Afrique available late; through MSG lots of gaps in the data
- Data received through RETIM-Afrique recoded so that it's difficult to use in platforms other than SYNERGIE