Use of NWP and satellite for disaster resilience

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EUMETSAT user Forum, Kigali, 12-16 Sept 2016

The use NWP and satellite can help

- Achieve better hazards preparedness
- reduce the impacts of the hazards
- and reduce the risks of disaters

Through

- better weather forecasts both in terms of accuracy and lead time
- Better warnings and alerts

If the forecasts and alerts are timely delivered and received to the right users

Better forecasts because of

- Better access to satellite data, more products and better resolution
- Improvements in numerical model, mainly attributed to the assimilation of satelitte data and advanced computing facilities

Examples in Africa

- The MCS developed
  - during the most active phase of the monsoon in August 2007;
  - in the afternoon of the 1 Aug. over Darfur and

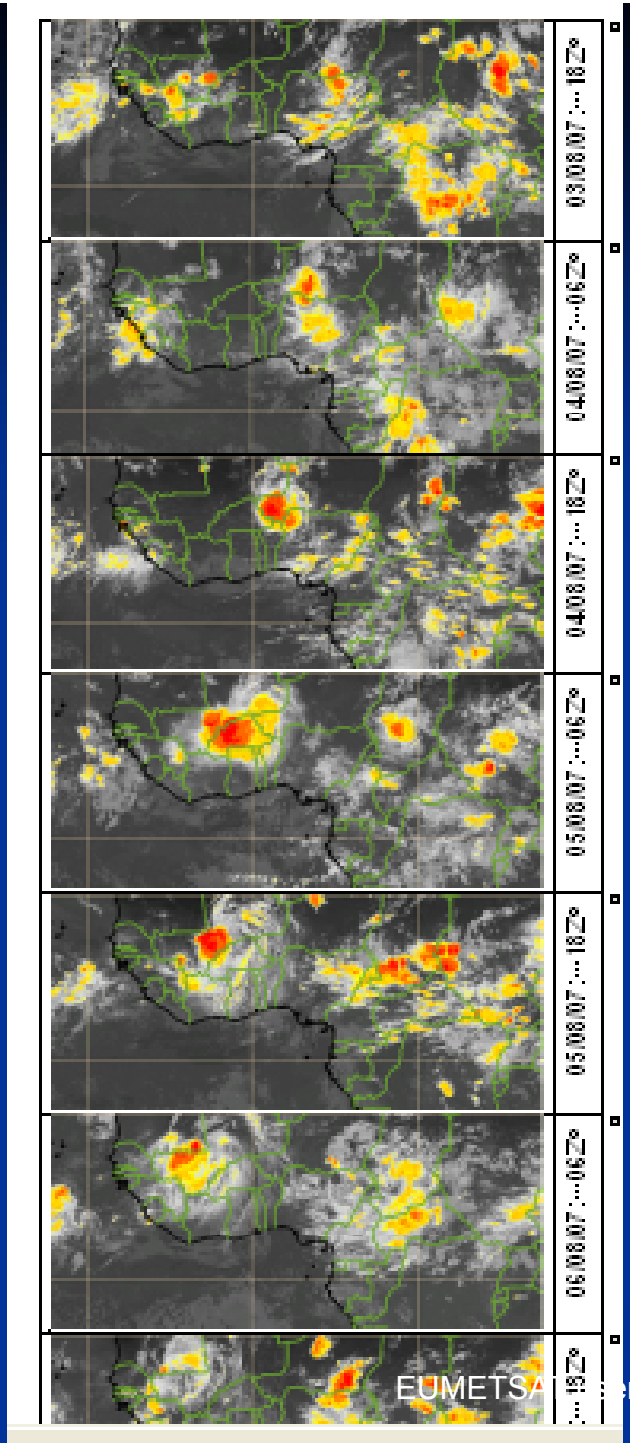
, l - S S U r Ms ooM- 6M U S F M i 6l m, s □

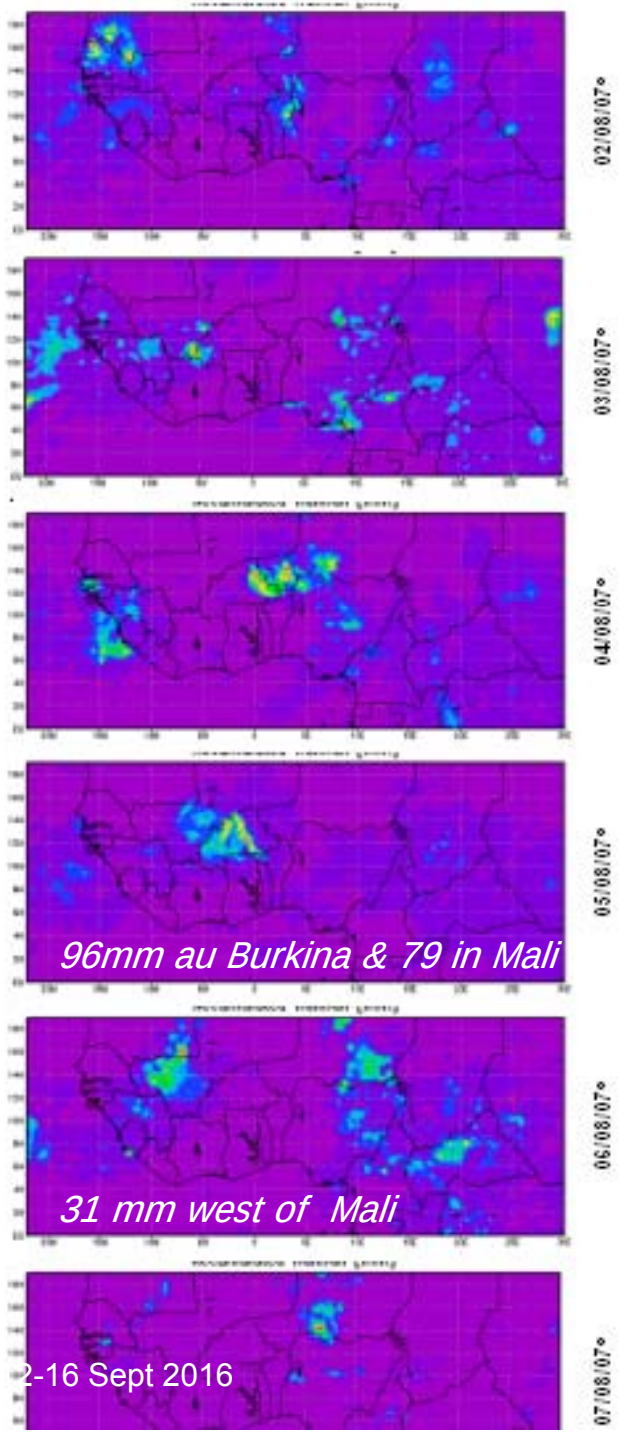
- The MCS
  - was weak in the early morning of the 3rd ;
  - reinvigorated as it passed over the Adamaoua

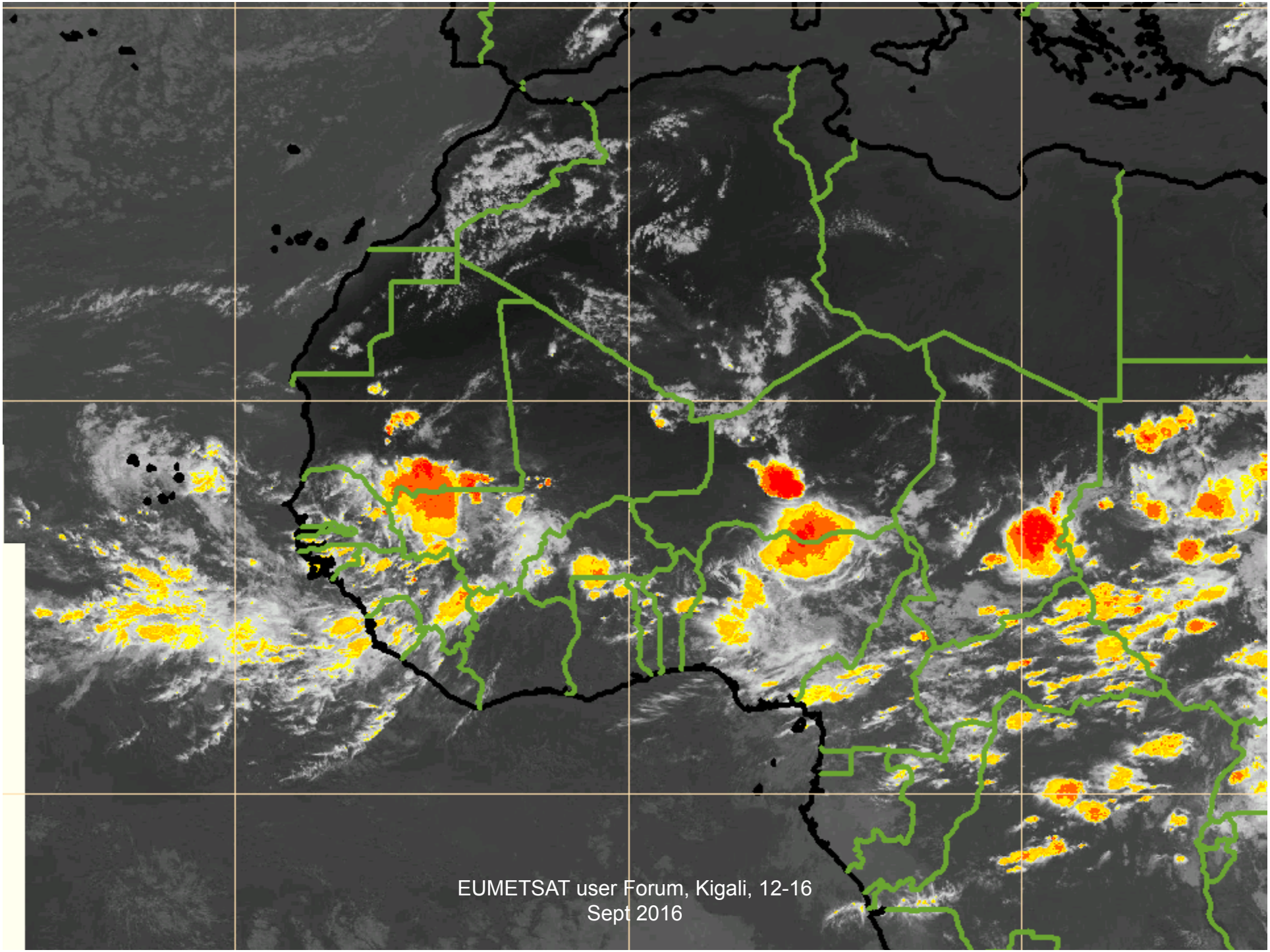
□ - T e F s me S □

  - decayed in Mali and Mauritania on the 7th;
  - was associated with a marked AEW, extending to 500hPa on 4th and up to 200hPa on 6th;
  - gave heavy rainfall throughout its passage

t s g U ME U s g □ M l s me 6s ooMF E l - T t E - T F MmF S MK s S S s t U □

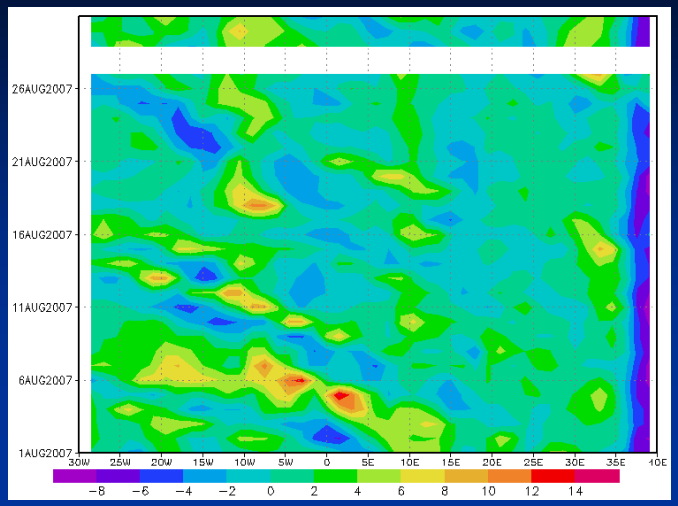

03/08/07 ... 18Z
04/08/07 ... 06Z
04/08/07 ... 18Z
05/08/07 ... 06Z
05/08/07 ... 18Z
06/08/07 ... 06Z


02/08/07
03/08/07
04/08/07
05/08/07
06/08/07
07/08/07
96mm au Burkina & 79 in Mali
31 mm west of Mali

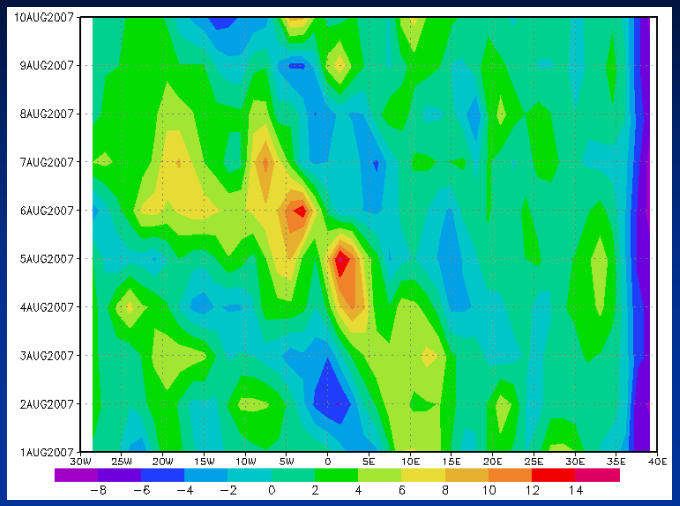

EUMETSAT user Forum, Kigali, 12-16
Sept 2016

850hPa vorticity from ARPEGE analysis averaged between 15-20N

1-31 August 2007

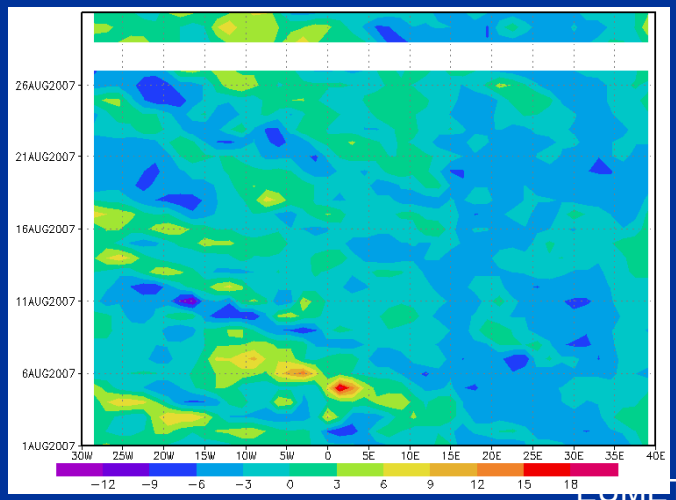


1-10 August 2007

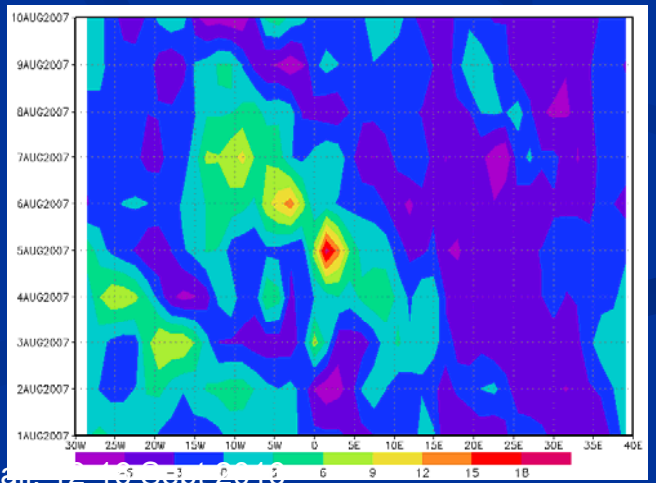


700hPa vorticity from Arpege analysis averaged between 15-20N

1-31 August 2007



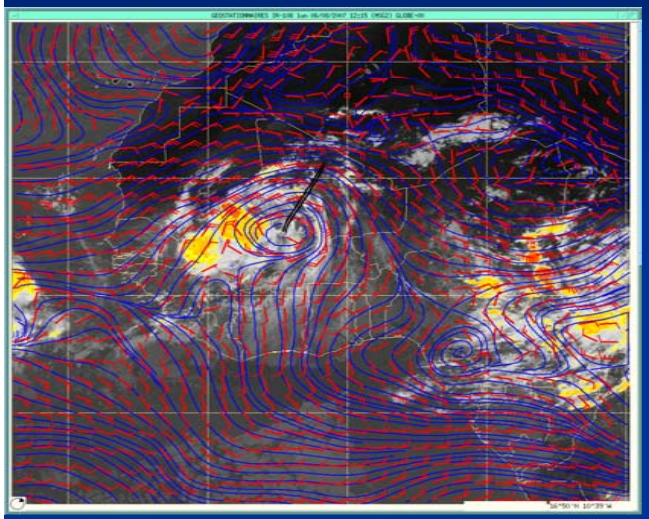
1-10 August 2007



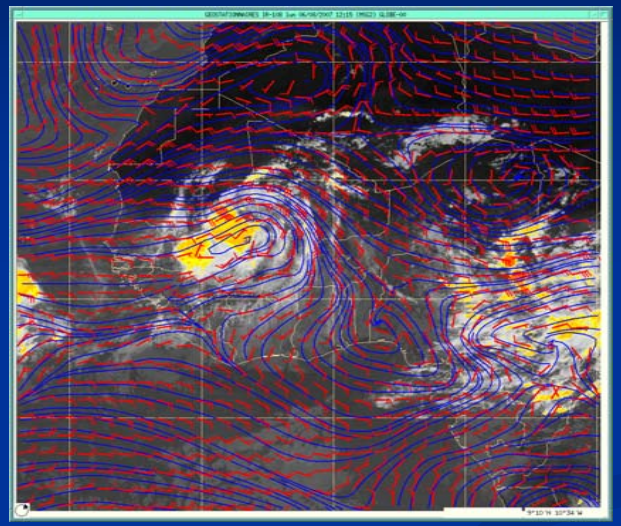
The squall line was all along embedded in an AEW; but was remarkably strong on 6th.

.The wave structure was present throughout the troposphere

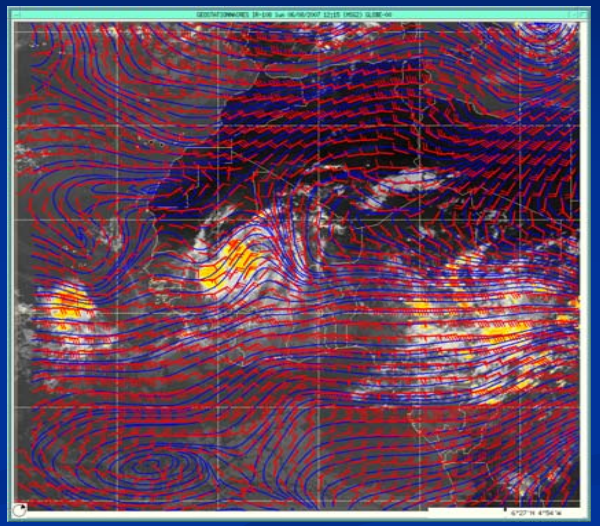
700 hPa



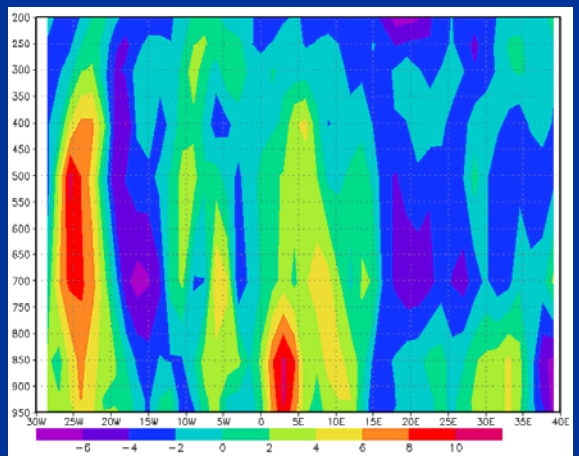
500 hPa



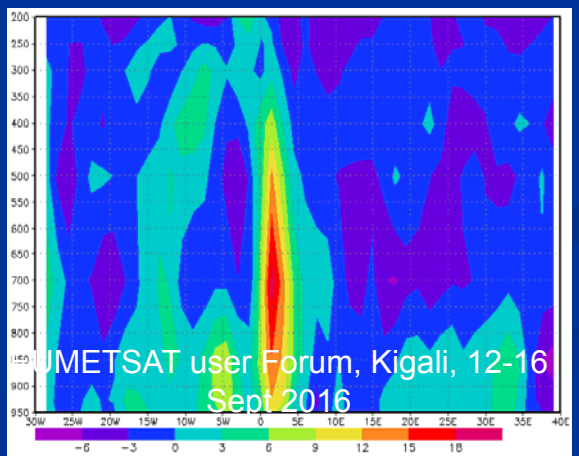
200 hPa



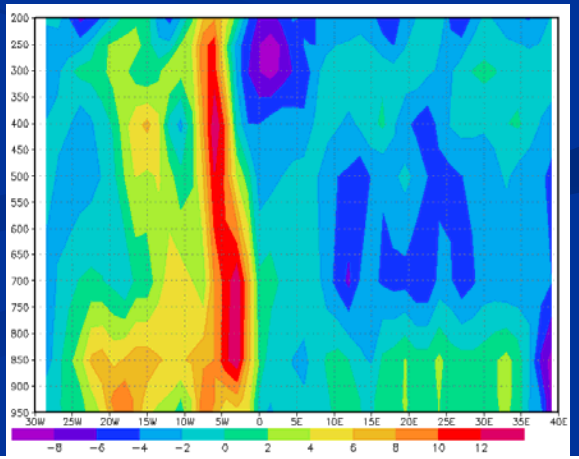
4th August



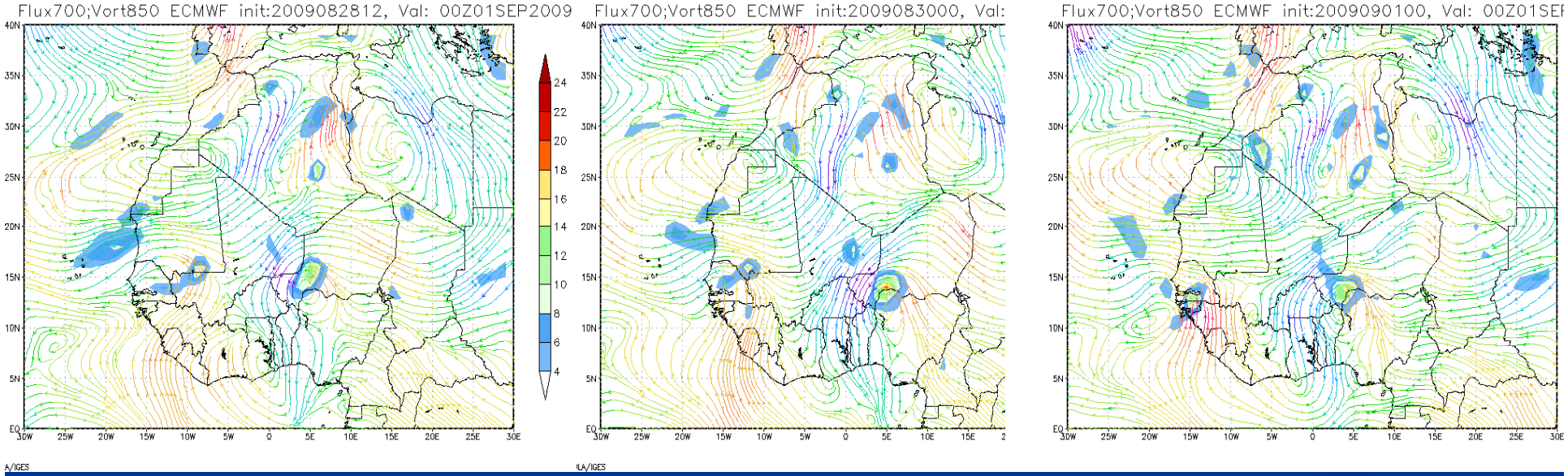
5th August



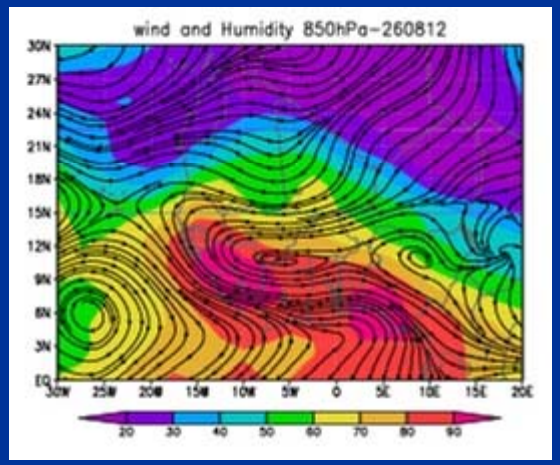
6th August

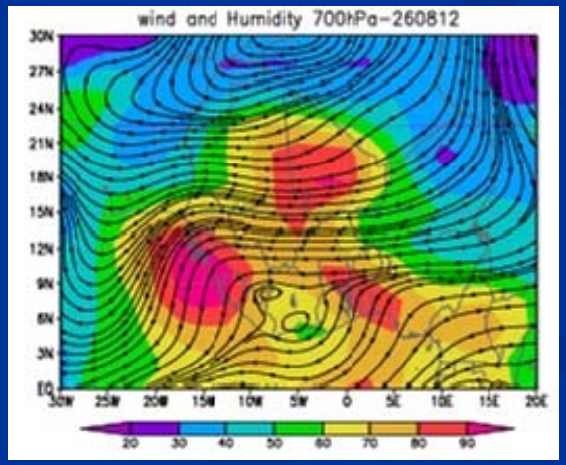


The case of Ouagadougou 2009, 250mm



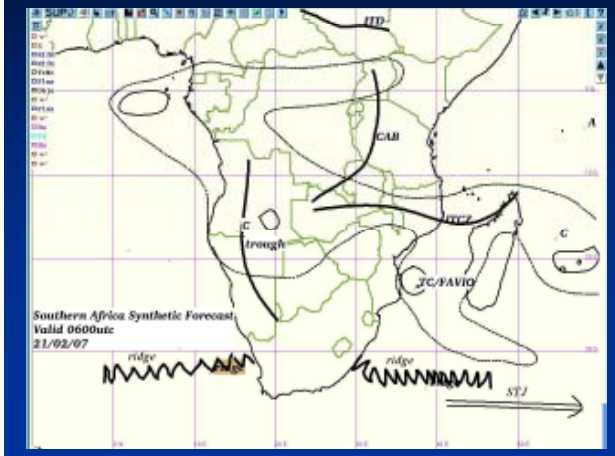
The case of Dakar 2012, 150mm

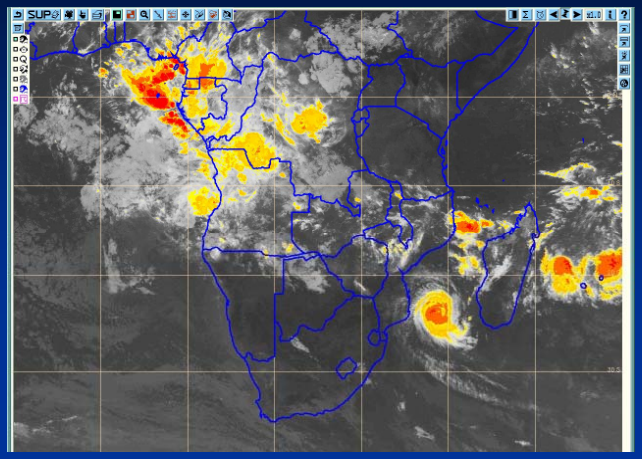


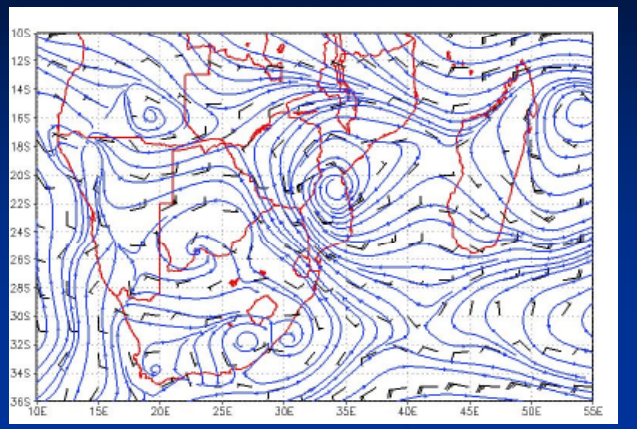


Good forecast of TC favio 21/02/2007, even 5 days ahead

ECMWF, T+120 forecast, valid 22/02/07 at 12Z

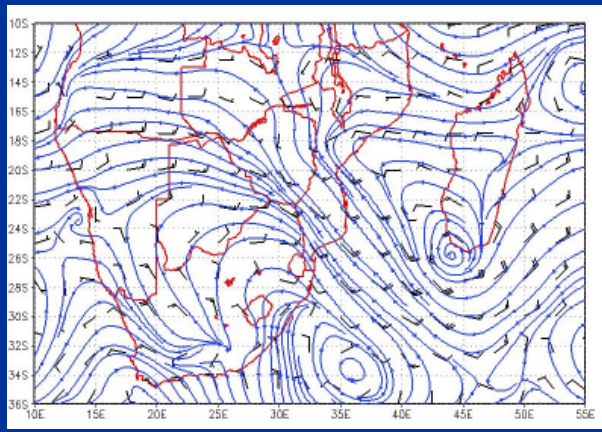




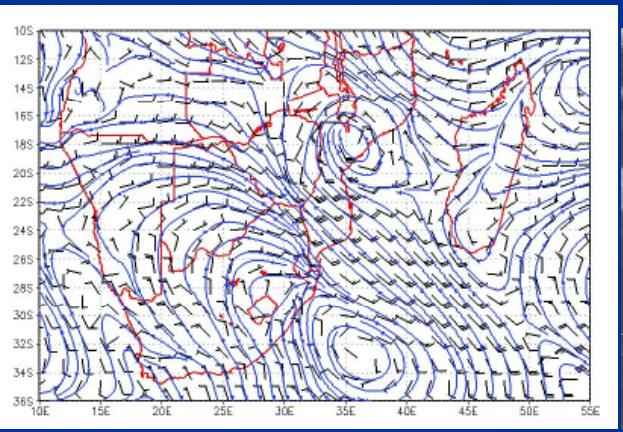


But would be impossible if ARPEGE used soleley

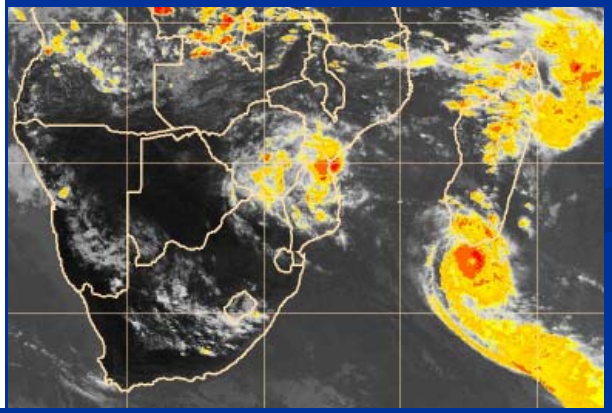
ECMWF T+48; valid 19/02/07 12Z



ARPEGE T+48; valid 19/02/07 12Z

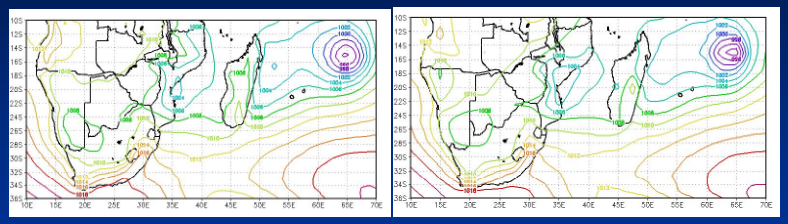


IR image 19/02/0712Z

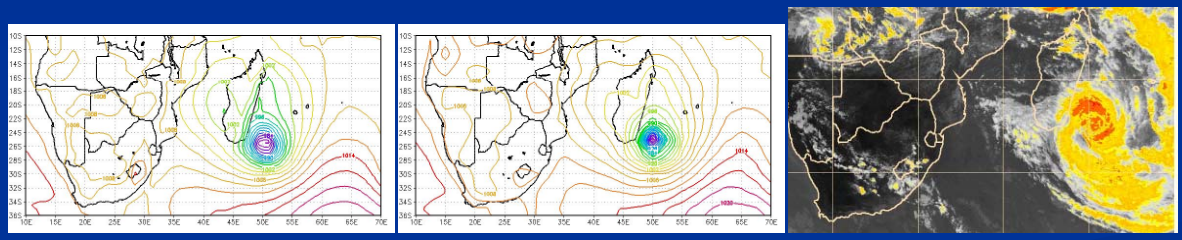


Good forecast of TC Gamede 28/02/2007,

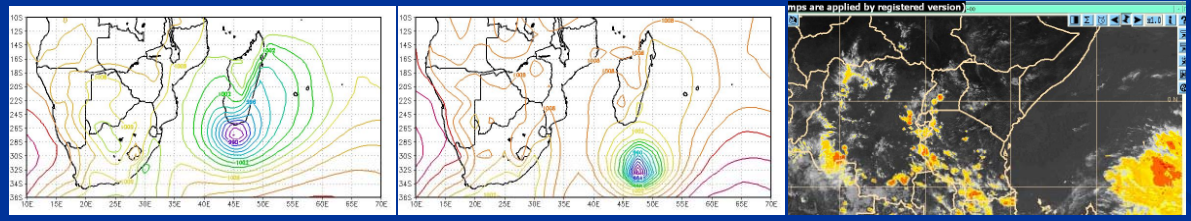
ARPEGE T+00; valid 22/02/07 12Z; ECMWF



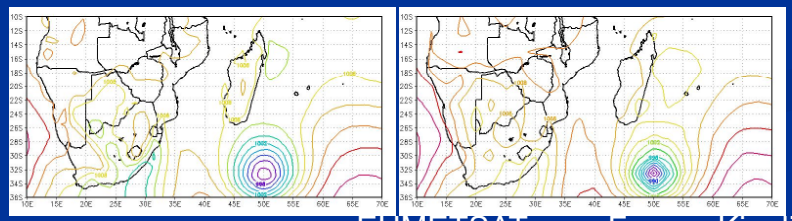
ARPEGE T+00; valid 28/02/07 12Z; ECMWF IR image 28/02/07 12Z



ARPEGE T+72; valid 03/03/07 12Z; ECMWF IR image 03/03/07 12Z



ARPEGE T+00; valid 03/03/07 12Z; ECMWF

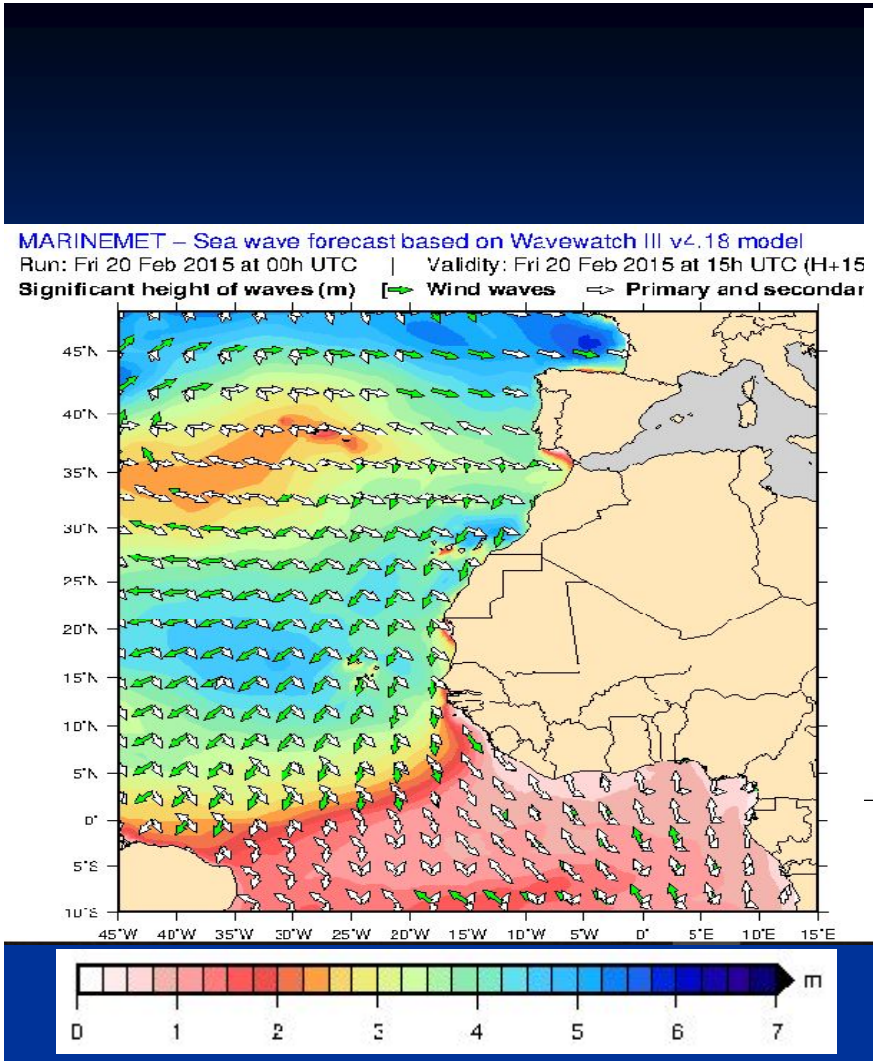


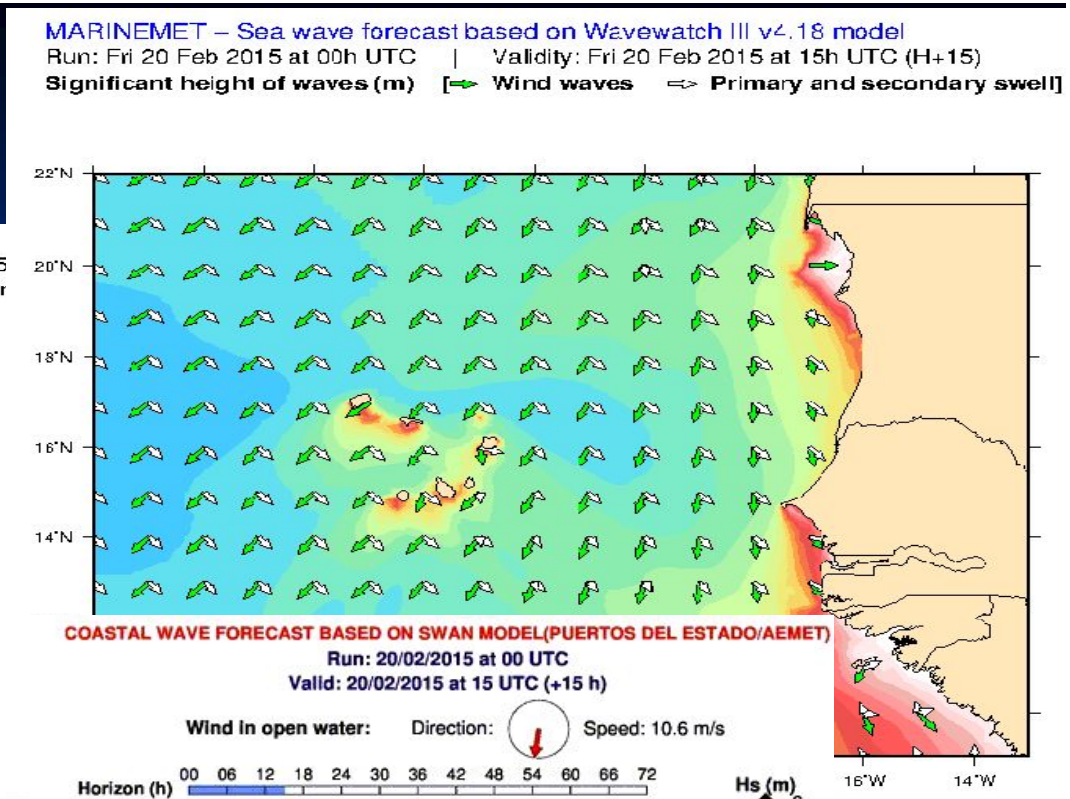
Case of Senegal

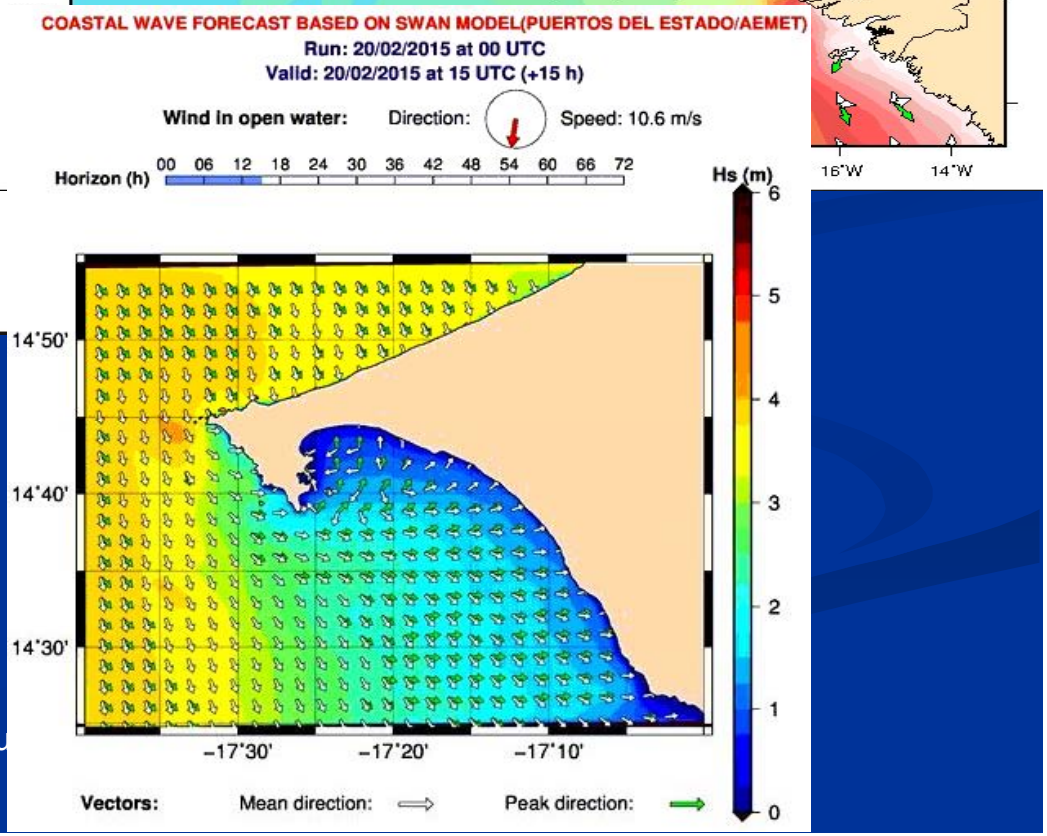
Global centres outputs, MSG products
WRF , Wavewatch and SWAN outputs

Forecasts and alerts for

- Civil protection authority
- Hydrology and Water resources management
- Agriculture and food security
- Fisheries and Marine transportation
- Health
- Tourism

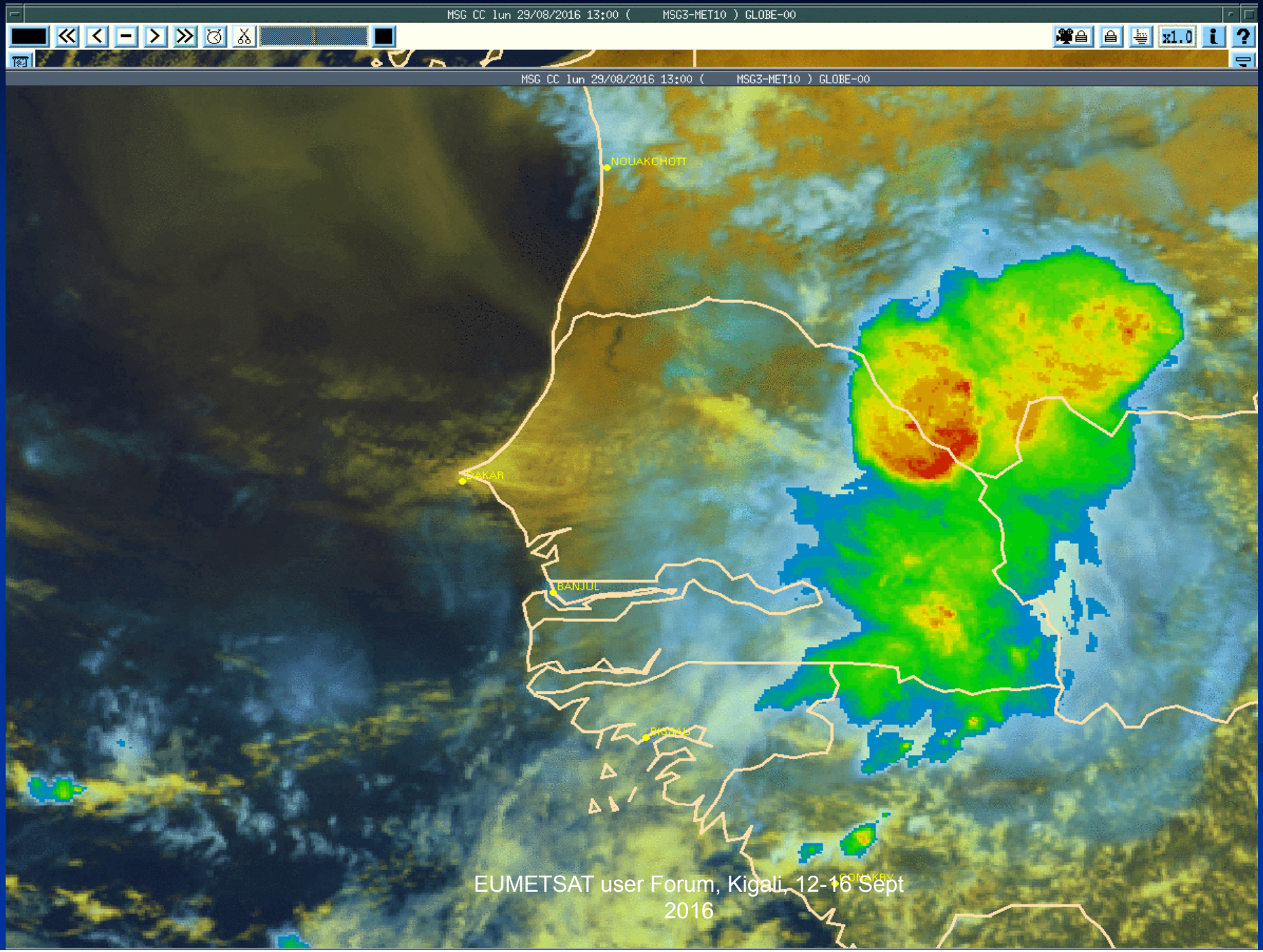

MARINEMET – Sea wave forecast based on Wavewatch III v4.18 model
Run: Fri 20 Feb 2015 at 00h UTC | Validity: Fri 20 Feb 2015 at 15h UTC (H+15
Significant height of waves (m) [Wind waves Primary and secondar
45°N
40°N
35°N
30°N
25°N
20°N
15°N
10°N
5°N
0°
5°S
10°S
45°W 40°W 35°W 30°W 25°W 20°W 15°W 10°W 5°W 0° 5°E 10°E 15°E
m
0 1 2 3 4 5 6 7


MARINEMET – Sea wave forecast based on Wavewatch III v4.18 model
Run: Fri 20 Feb 2015 at 00h UTC | Validity: Fri 20 Feb 2015 at 15h UTC (H+15)
Significant height of waves (m) [Wind waves Primary and secondary swell]
22°N
20°N
18°N
16°N
14°N
16°W
14°W

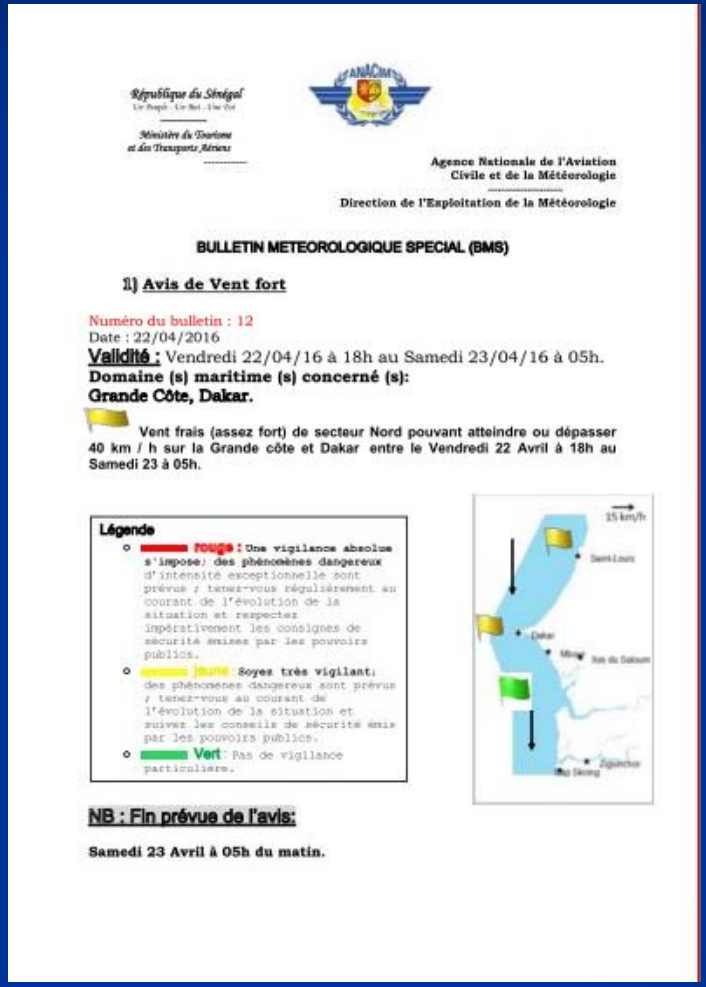

COASTAL WAVE FORECAST BASED ON SWAN MODEL(PUERTOS DEL ESTADO/AEMET)
Run: 20/02/2015 at 00 UTC
Valid: 20/02/2015 at 15 UTC (+15 h)
Wind in open water: Direction: Speed: 10.6 m/s
Horizon (h) 00 06 12 18 24 30 36 42 48 54 60 66 72
Hs (m)
6
5
4
3
2
1
0
14°50'
14°40'
14°30'
-17°30' -17°20' -17°10'
Vectors: Mean direction: Peak direction:

EUMETSAT u

Image satellite entre le 29 aout à 13h et le 31 aout à 06h



Forecasting bulletin for artisanal fisheries



République du Sénégal
Un Peuple - Un But - Une Foi

Ministère du Tourisme
et des Transports Aériens

Agence Nationale de l'Aviation
Civile et de la Météorologie

Direction de l'Exploitation de la Météorologie

BULLETIN METEOROLOGIQUE SPECIAL (BMS)

1) Avis de Vent fort

Numéro du bulletin : 12
Date : 22/04/2016
Validité : Vendredi 22/04/16 à 18h au Samedi 23/04/16 à 05h.
Domaine (s) maritime (s) concerné (s):
Grande Côte, Dakar.

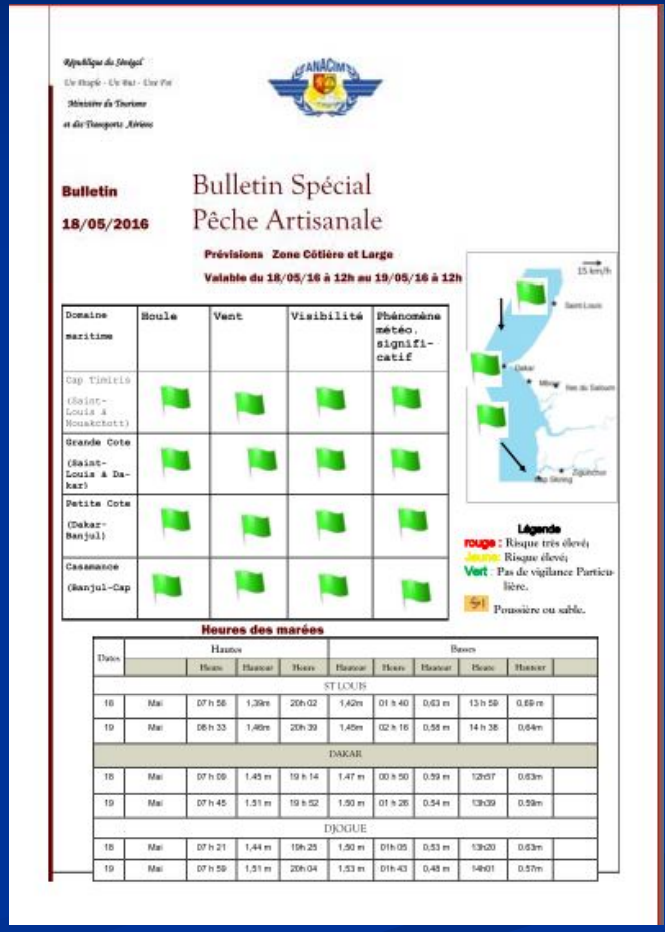
Vent frais (assez fort) de secteur Nord pouvant atteindre ou dépasser 40 km / h sur la Grande côte et Dakar entre le Vendredi 22 Avril à 18h au Samedi 23 à 05h.

Légende

- **rouge :** Une vigilance absolue s'impose; des phénomènes dangereux d'intensité exceptionnelle sont prévus ; tenez-vous régulièrement au courant de l'évolution de la situation et respectez impérativement les consignes de sécurité émises par les pouvoirs publics.
- **Jaune :** Soyez très vigilant; des phénomènes dangereux sont prévus ; tenez-vous au courant de l'évolution de la situation et suivez les conseils de sécurité émis par les pouvoirs publics.
- **Vert :** Pas de vigilance particulière.

NB : Fin prévue de l'avis:

Samedi 23 Avril à 05h du matin.



République du Sénégal
Un Peuple - Un But - Une Foi

Ministère du Tourisme
et des Transports Aériens

Bulletin
18/05/2016

Bulletin Spécial
Pêche Artisanale

Prévisions Zone Côtière et Large

Valable du 18/05/16 à 12h au 19/05/16 à 12h

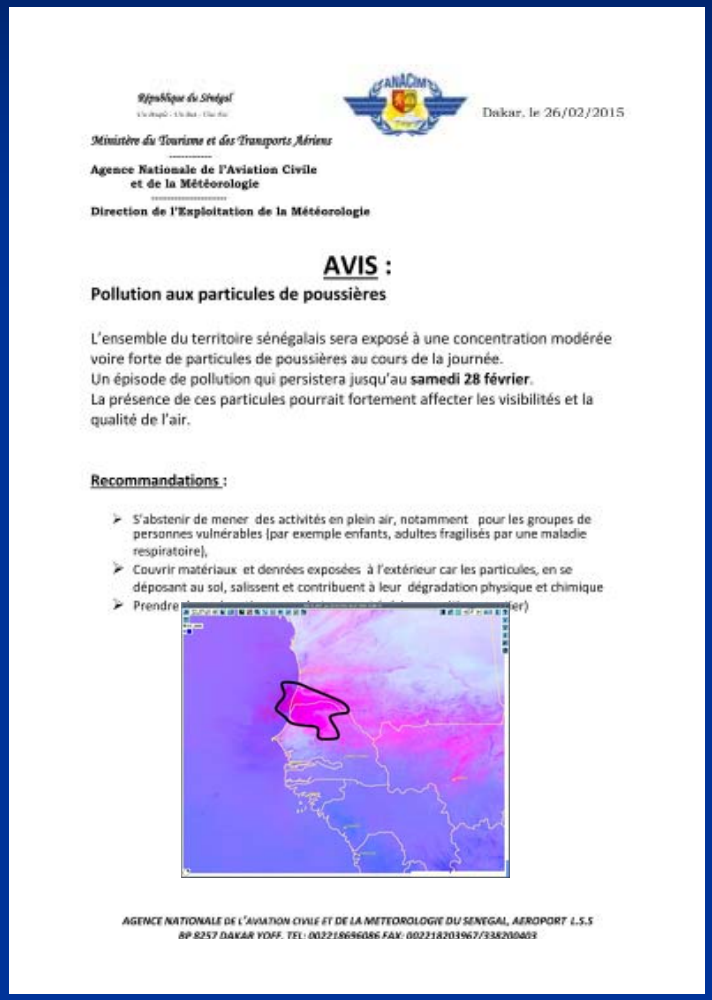
Domaine maritime	Houle	Vent	Visibilité	Phénomène météo. signifi-catif
Cap Timiris (Saint-Louis à Nouakchott)				
Grande Cote (Saint-Louis à Dakar)				
Petite Cote (Dakar-Banjul)				
Casamance (Banjul-Cap				

Légende
rouge : Risque très élevé;
Jaune : Risque élevé;
Vert : Pas de vigilance Particulière.
Poussière ou sable.

Heures des marées

Dates		Hautes			Basses				
		Heure	Hauteur	Heure	Hauteur	Heure	Hauteur	Heure	Hauteur
ST LOUIS									
18	Mai	07 h 58	1,39m	20h 02	1,42m	01 h 40	0,63 m	13 h 58	0,69 m
19	Mai	08 h 33	1,46m	20h 39	1,45m	02 h 16	0,58 m	14 h 38	0,64m
DAKAR									
18	Mai	07 h 09	1,45 m	19 h 14	1,47 m	00 h 50	0,59 m	12h57	0,63m
19	Mai	07 h 45	1,51 m	19 h 52	1,50 m	01 h 26	0,54 m	13h39	0,59m
DJOGUE									
18	Mai	07 h 21	1,44 m	19h 25	1,50 m	01h 05	0,53 m	13h20	0,63m
19	Mai	07 h 59	1,51 m	20h 04	1,53 m	01h 43	0,48 m	14h01	0,57m

Health



République du Sénégal

Dakar, le 26/02/2015

Ministère du Tourisme et des Transports Aériens

Agence Nationale de l'Aviation Civile
et de la Météorologie

Direction de l'Exploitation de la Météorologie

AVIS :

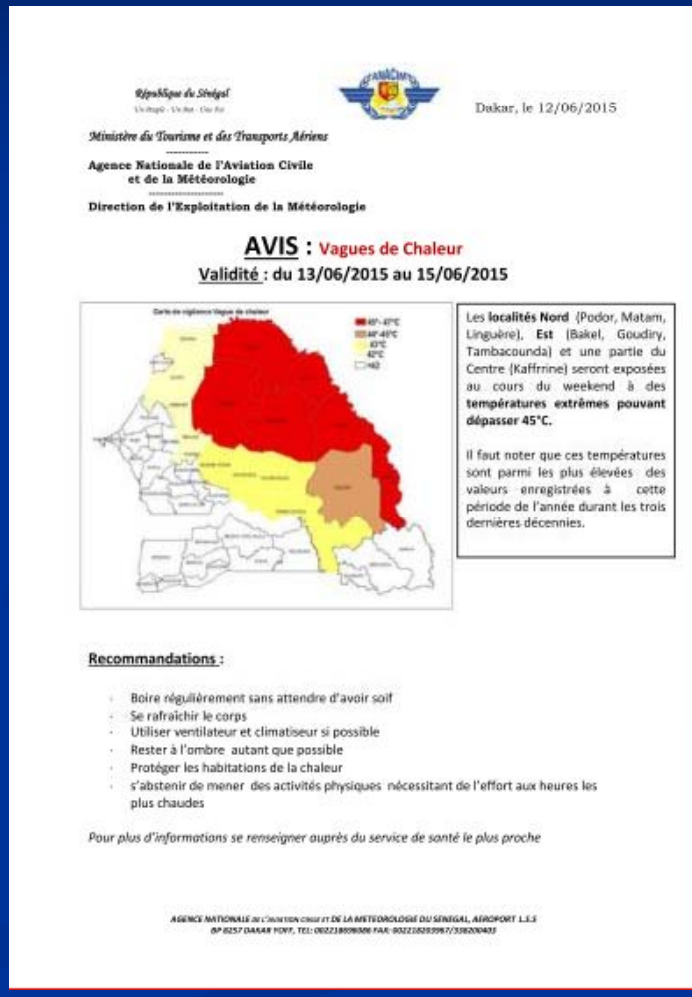
Pollution aux particules de poussières

L'ensemble du territoire sénégalais sera exposé à une concentration modérée voire forte de particules de poussières au cours de la journée.
Un épisode de pollution qui persistera jusqu'au **samedi 28 février**.
La présence de ces particules pourrait fortement affecter les visibilités et la qualité de l'air.

Recommandations :

- S'abstenir de mener des activités en plein air, notamment pour les groupes de personnes vulnérables (par exemple enfants, adultes fragilisés par une maladie respiratoire),
- Couvrir matériaux et denrées exposées à l'extérieur car les particules, en se déposant au sol, salissent et contribuent à leur dégradation physique et chimique
- Prendre ... er)

AGENCE NATIONALE DE L'AVIATION CIVILE ET DE LA METEOROLOGIE DU SENEGAL, AEROPORT L.S.S
BP 8257 DAKAR YOFF. TEL: 002218696086 FAX: 002218203967/338200403



République du Sénégal

Dakar, le 12/06/2015

Ministère du Tourisme et des Transports Aériens

Agence Nationale de l'Aviation Civile
et de la Météorologie

Direction de l'Exploitation de la Météorologie

AVIS : Vagues de Chaleur

Validité : du 13/06/2015 au 15/06/2015

Les **localités Nord** (Podor, Matam, Linguère), **Est** (Bakel, Goudiry, Tambacounda) et une partie du Centre (Kaffrrine) seront exposées au cours du weekend à des **températures extrêmes pouvant dépasser 45°C.**

Il faut noter que ces températures sont parmi les plus élevées des valeurs enregistrées à cette période de l'année durant les trois dernières décennies.

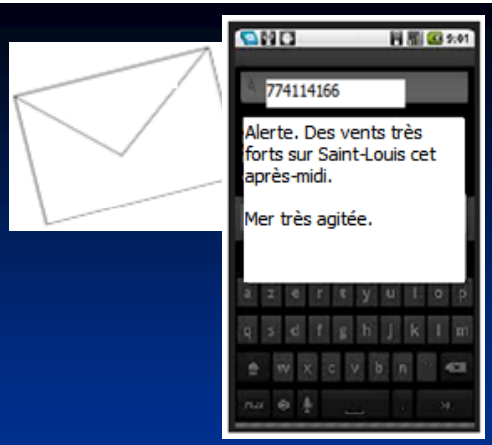
Recommandations :

- Boire régulièrement sans attendre d'avoir soif
- Se rafraîchir le corps
- Utiliser ventilateur et climatiseur si possible
- Rester à l'ombre autant que possible
- Protéger les habitations de la chaleur
- s'abstenir de mener des activités physiques nécessitant de l'effort aux heures les plus chaudes

Pour plus d'informations se renseigner auprès du service de santé le plus proche

AGENCE NATIONALE DE L'AVIATION CIVILE ET DE LA METEOROLOGIE DU SENEGAL, AEROPORT L.S.S
BP 8257 DAKAR YOFF. TEL: 002218696086 FAX: 002218203967/338200403

Passerelle SMS



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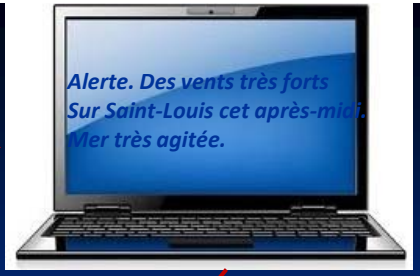

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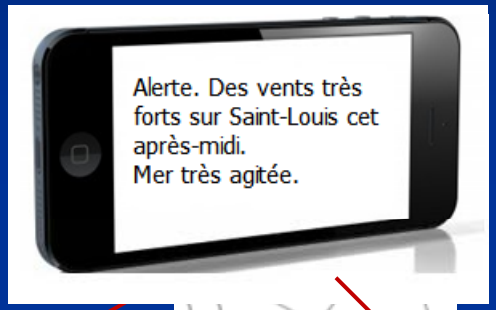


3 3 3

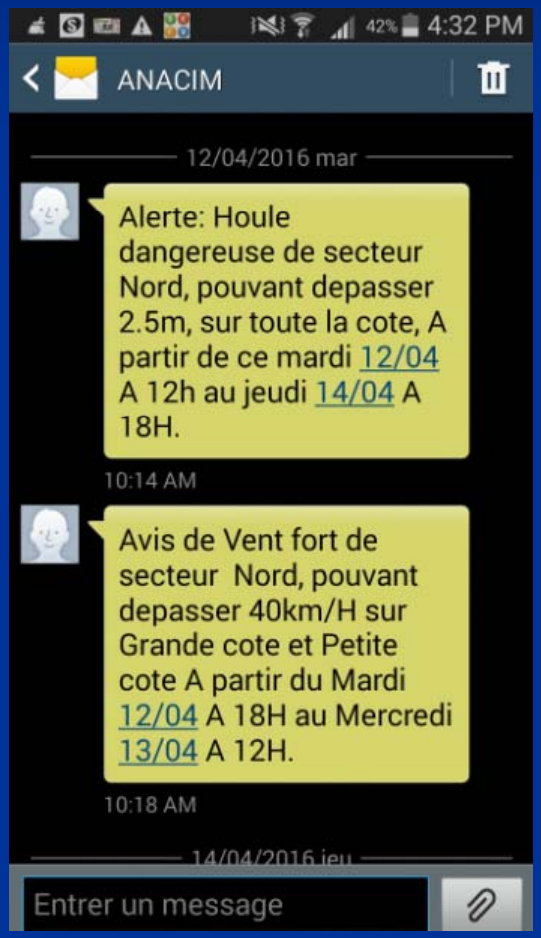
1: Envoi d'un SMS depuis le mobile client

2: Transfert de la demande au modem par la passerelle

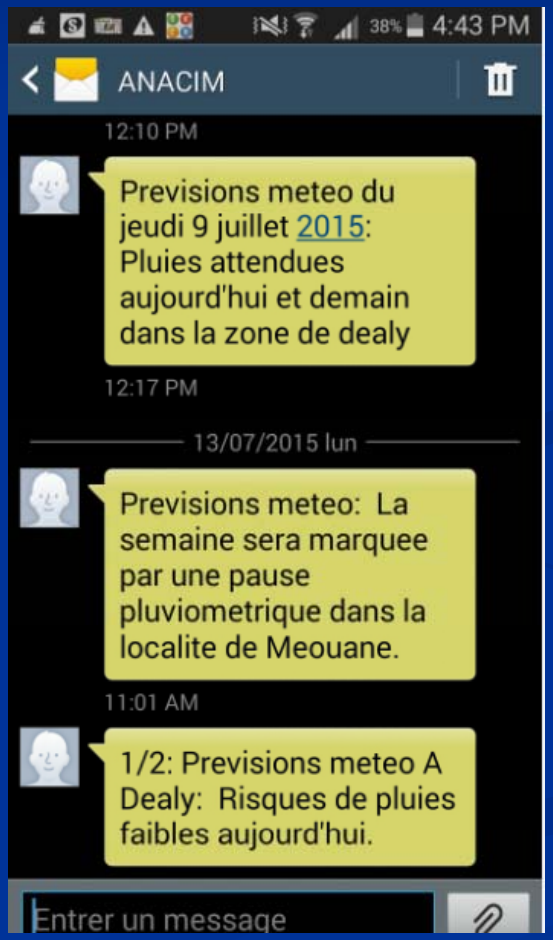
3: Modem transfert le message aux destinataires renseignés

SMS Plateform → Voice

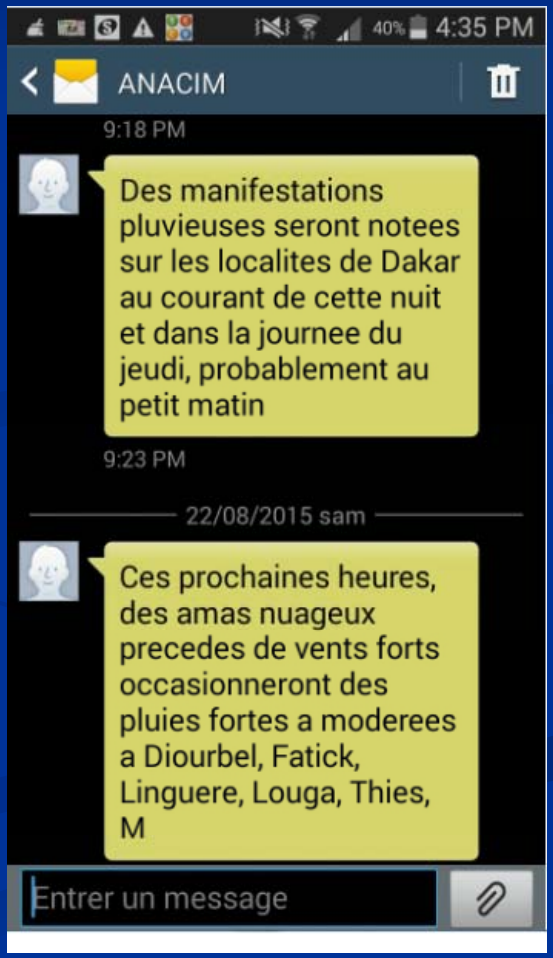
Fisheries



Agriculture



Floods



To conclude:

- A lot can be done in terms of forecasts and alerts for disaters risk reduction
- Critical mass training in new forecasting tools and products:
  - multi ensemble forecasting
  - combined use of satellite data & NWP
- Development of communication platforms