

TROPICAL CYCLONE MONITORING AND FORECASTING SYSTEM AT WFO MADAGASCAR

Voahanginirina Anne Marie RAMIANDRISOA
Director of Operational Meteorology

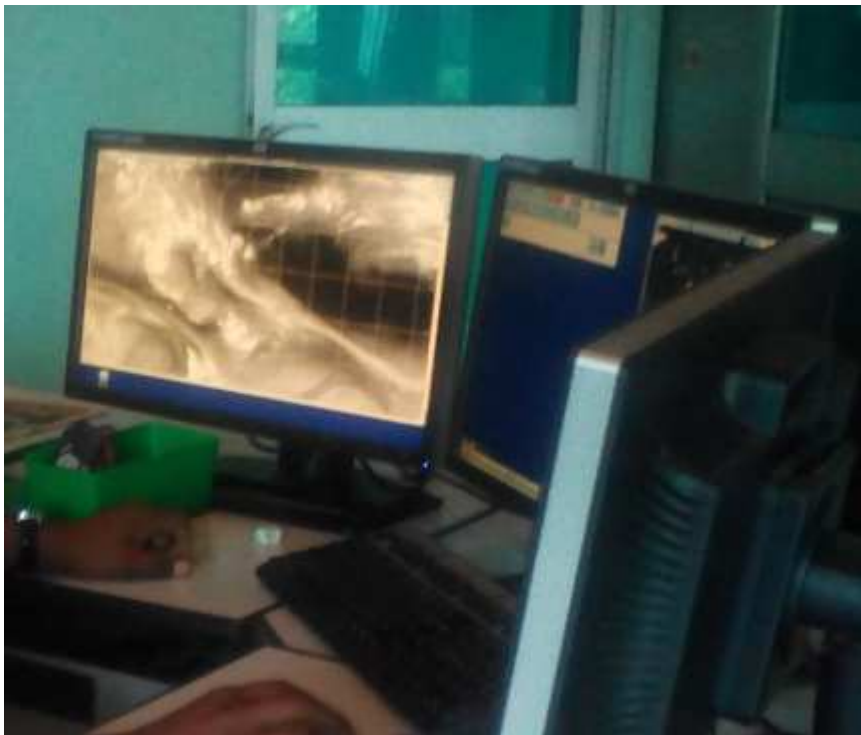
Outline

- 1. Presentation of WFO**
- 2. TC Monitoring (incl genesis)**
- 3. TC Forecast**
- 4. Interaction with the Disaster Managment Office**
- 5. Public Weather Service**

1. FMMD Forecasting Office

Principals activities (in terms of saving life and properties):

- ✓ Issues short and medium range forecast for whole the country (official forecast);
- ✓ Issues 24 h marine forecast (coastal water and High sea – GMDSS)
- ✓ High impact weather forecast and issue of warning and vigilances;
- ✓ Fully participates on public outreach campaign before the cyclonic season;
- ✓ Provides specialized (tailored) forecast or products.



1. FMMD Forecasting Office



Technical staff structure:

- ✓ Forecaster staff : 05 meteorologists
- ✓ Observation and data transmission : 05 technicians

Infrastructure and tools:

- ✓ 01 PUMA 2015 Station (recent upgrade)
- ✓ TRANSMET (GTS)
- ✓ METEOFACORY (MFY) :

A screenshot of a web browser showing the 'Archivage Transmet (Donnée)' page. The address bar shows '192.168.10.100/cgi-bin/archives/cgi.archives.pl?lang=fr-FR'. The page has a navigation bar with 'Les plus visités', 'DATA RECEPTION', 'PREVISION NUMERIQUE', and 'On line Radio'. The main content area shows a date/time selector set to '11:26:21 UTC' and 'aujourd'hui', with buttons for 'Exécuter la Requête' and 'Réinitialiser Formulaire'. There is also an 'Aide' link and a table with headers 'Entête' and 'Voie'.A screenshot of the 'MeteoFactory AUTHENTIFICATION' interface. It features a green background with a field of yellow flowers. The form includes fields for 'IDENTIFIANT' (containing 'cprevi') and 'MOT DE PASSE' (masked with dots), and a 'LOGIN' button.

Source: PREVI

2. TC MONITORING

- ☐ Check the AWIO 20/21 FMEE 12Z;
- ☐ Use of Satellite image (MSG 3-IODC) to detect, analyze deep convection (initial perturbation);
- ☐ Use of scatterometer (NESDIS) and surfaces observations (SHIP, BYUO, SYNOP);
- ☐ NWP Analysis (comparison with Obs);
- ☐ Satellite products to analyze the environment (SST, VWS, Upper divergence) through TCFW WMO;
- ☐ Use of Ensemble forecast (ECMWF risk of TC genesis product)

2. TC MONITORING

AWIO21 FMEE 281213

CENTRE DES CYCLONES TROPICAUX / CMRS DE LA REUNION / METEO-FRANCE

BULLETIN SUR L'ACTIVITE CYCLONIQUE ET LES CONDITIONS
METEOROLOGIQUES TROPICALES SUR LE SUD-OUEST DE L'OCEAN INDIEN

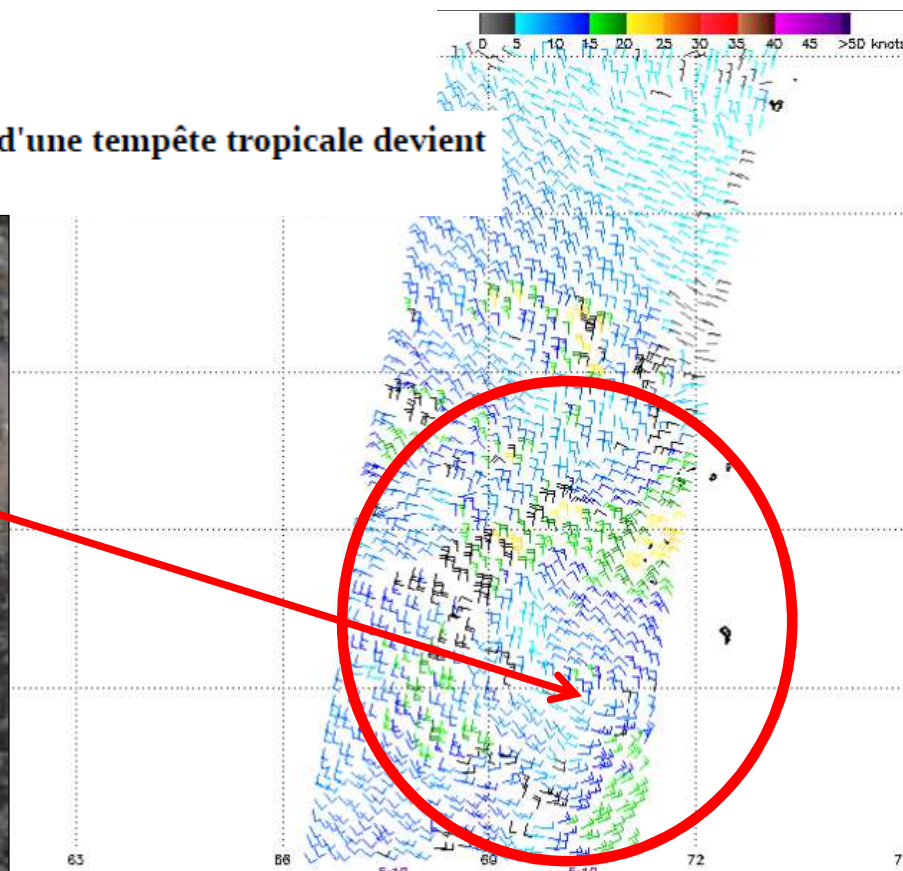
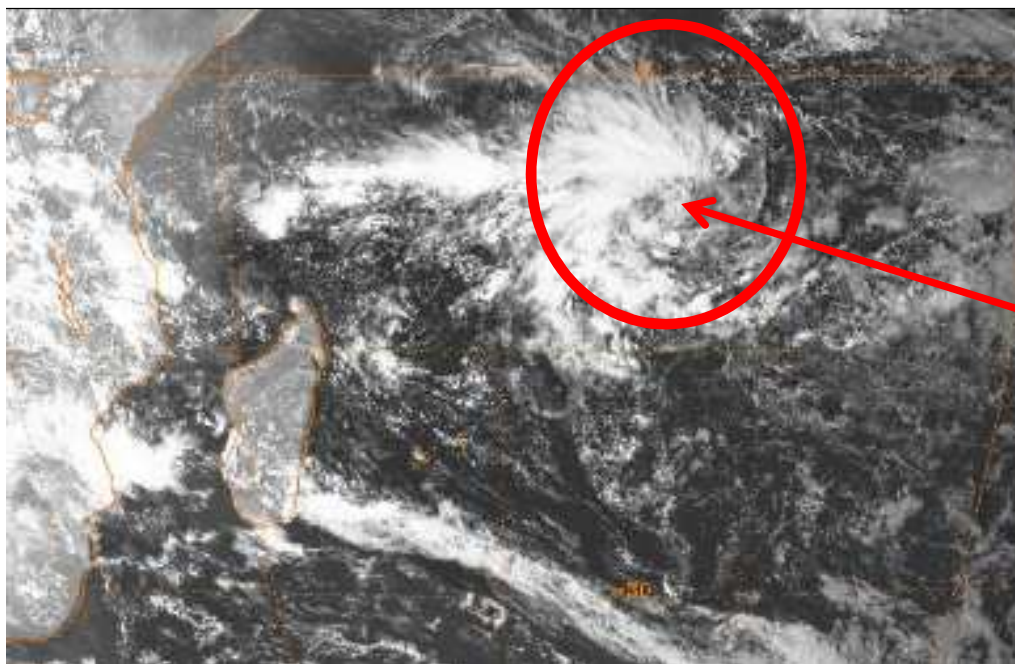
LE 28/02/2017 A 1200 UTC

PARTIE 1:

AVIS SPECIAUX EN COURS:

Néant

Au cours des 5 prochains jours, la probabilité de formation d'une tempête tropicale devient modérée à partir de jeudi et importante à partir de samedi.



3. TC FORECAST

- ❑ Prediction made for the next 3 or 5 days (depends on the threat level);
- ❑ Guidance from RSMC (WTIO 30/31) and JTWC;
- ❑ **TC Track forecast method:**
 - a. Climatology + environmental influence + NWP
 - b. NWP are criticized one by one (adoption of consensus)
 - c. Global models used : ECMWF - GFS - ARP – UKMO
- ❑ **TC Intensity forecast method:**
 - a. Dvorak (24 h forecast)
 - b. ADT - SATCON (Dvorak analysis from different global center)
 - c. NWP Guidances (ensemble forecast) + Climatology

3. TC FORECAST

7.A COTE/DIAM PREMIERE ISOBARE FERMEE: 1007 HPA / 1000 KM

8.A EXTENSION VERTICALE DE LA CIRCULATION CYCLONIQUE : PROFONDE

1.B PREVISIONS :

12H: 07/03/2017 12 UTC: 15.9 S / 72.9 E, VENT MAX=030 KT, DEPRESSION TROPICALE

24H: 08/03/2017 00 UTC: 16.0 S / 71.5 E, VENT MAX=030 KT, DEPRESSION TROPICALE

36H: 08/03/2017 12 UTC: 16.1 S / 70.2 E, VENT MAX=035 KT, TEMPETE TROPICALE MODEREE

48H: 09/03/2017 00 UTC: 16.2 S / 69.1 E, VENT MAX=035 KT, TEMPETE TROPICALE MODEREE

60H: 09/03/2017 12 UTC: 16.3 S / 68.5 E, VENT MAX=035 KT, TEMPETE TROPICALE MODEREE

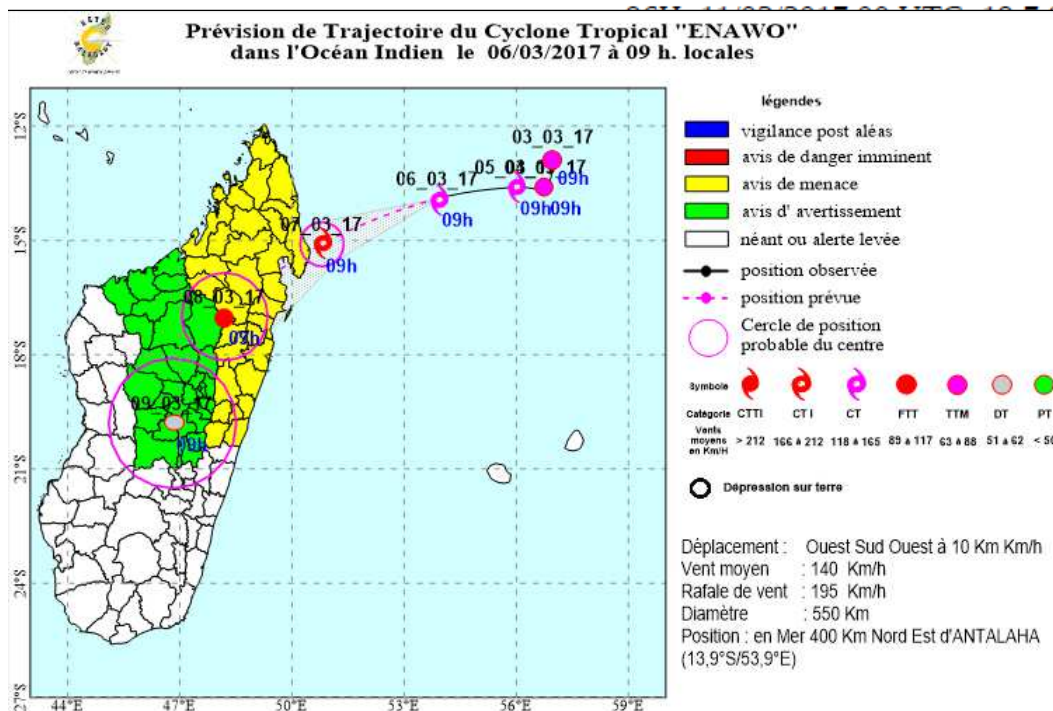
72H: 10/03/2017 00 UTC: 16.6 S / 68.2 E, VENT MAX=030 KT, DEPRESSION TROPICALE

WTIO 31 FMEE 070012

2.B TENDANCE ULTERIEURE:

03_03_17 09h / 64.5 E, VENT MAX=025 KT, DEPRESSION POST-

S / 59.6 E, VENT MAX=025 KT, DEPRESSION POST-



3. TC FORECAST



WORLD
METEOROLOGICAL
ORGANIZATION

Tropical Cyclone Forecaster Website



Fonts:   

Introduction

**Observational
and
Products Data**

**Advisory and
Warning Centres**

**Training
Materials**

**WMO Technical
Publications**

**Tropical Cyclone
Research**

TC Data Archive

**Weather Event
Discussion**

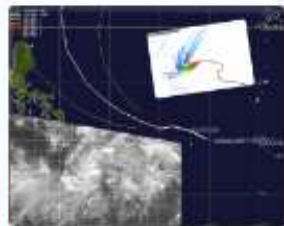
This website is operated
and maintained on behalf
of WMO by



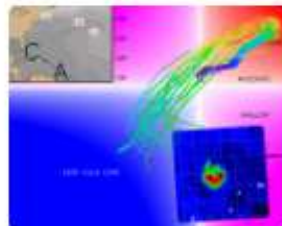
Hong Kong Observatory
of Hong Kong, China.

Observational and Products Data

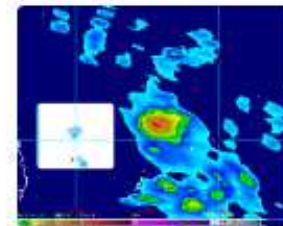
TC Position & Track



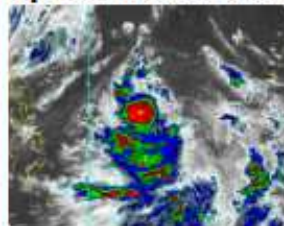
**TC Genesis, Intensity
& Structure**



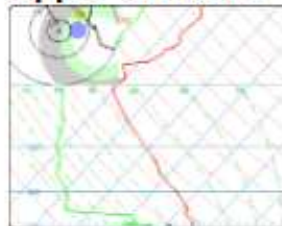
TC Rainfall



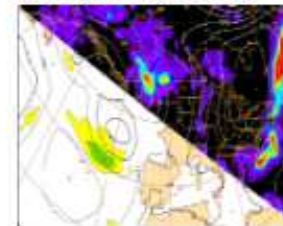
Space-based Observations



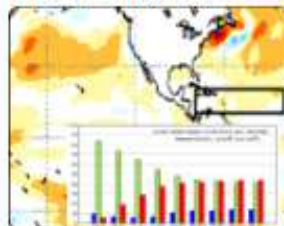
Upper-air Data



NWP Products



TC Outlooks



4. Interaction with the DM Bureau

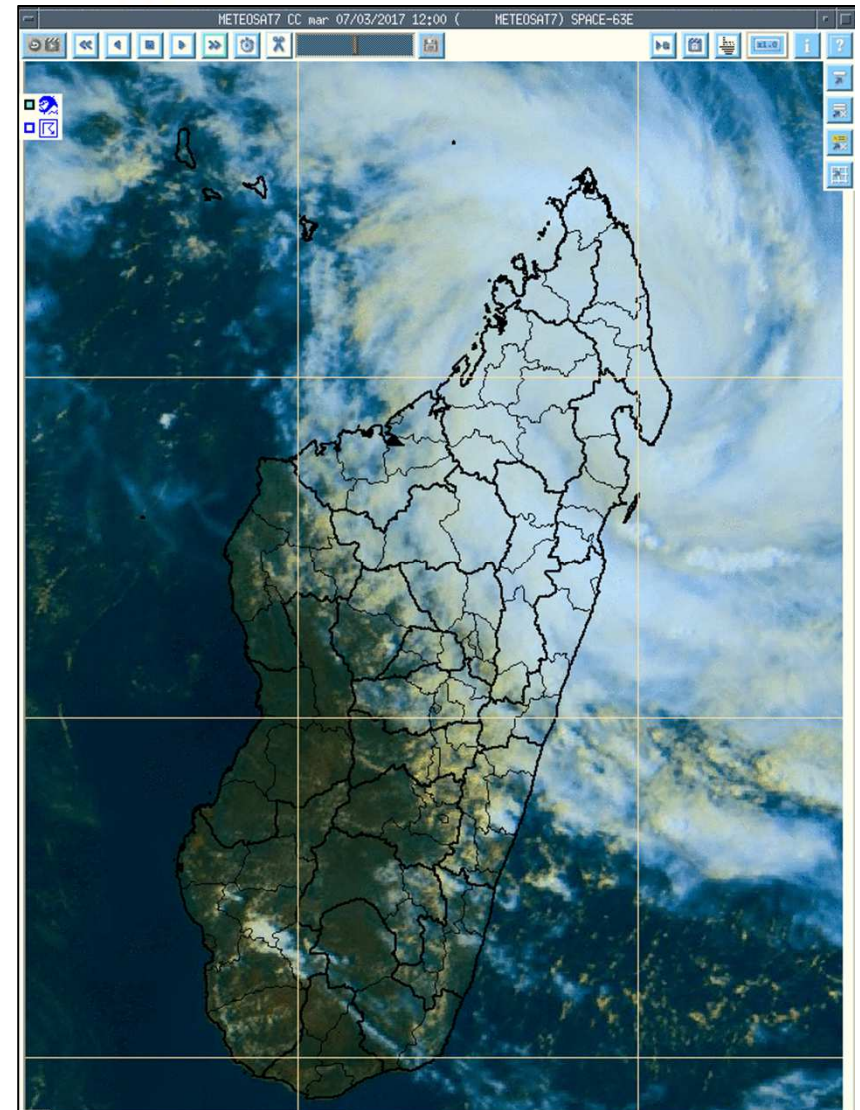
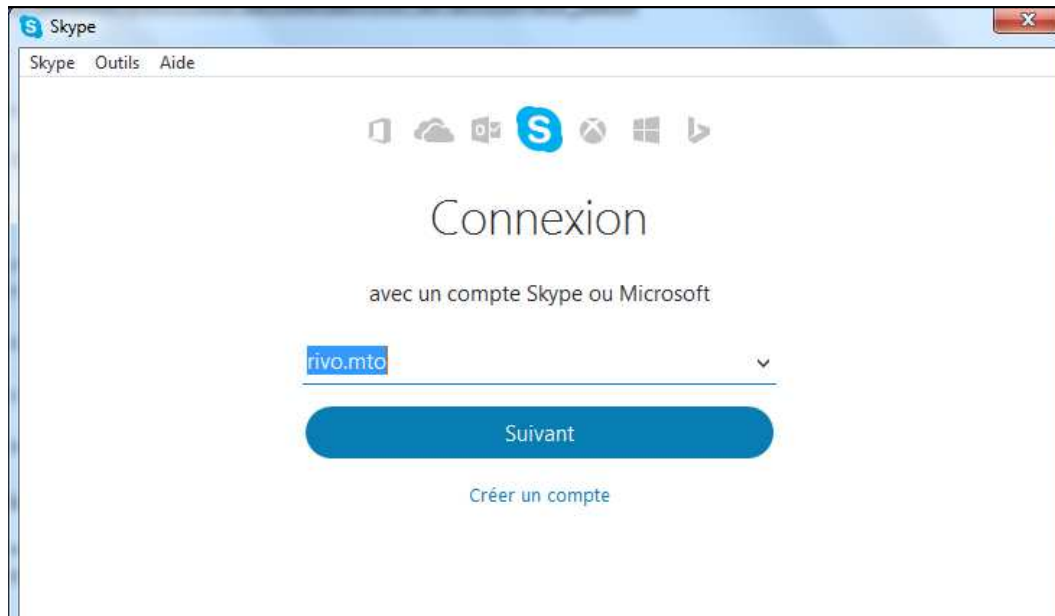


COMMUNIQUE SPECIAL SUR LE RISQUE DE CYCLOGENESE

ETABLIE LE 27 FEVRIER 2017 A 12 :50 HEURES LOCALES

Following the threat level and the lead time:

- The DMA ask for a regular technical briefing where the WFO explain what could be expected
- Is a threat become more potential?
- Global estimation of the future influence for planning purposes;



5. Public Weather Service



✓ EARLY WARNING SYSTEM:

a. Alerts and vigilances in 4 steps;

b. Color coded warning used since 01 November 2013;

c. Significations: (depends on degree of confidence)

Green issued 2 to 5 days before the event;

Yellow issued 1 to 2 days prior the hazard;

Red means the hazard arrived or expected over the next 12 hours;

Blue issued after red alert if adverse condition persist, the SDT passed away(flooding in progress, heavy rain, locally gusty wind may persist)

Alerte Verte

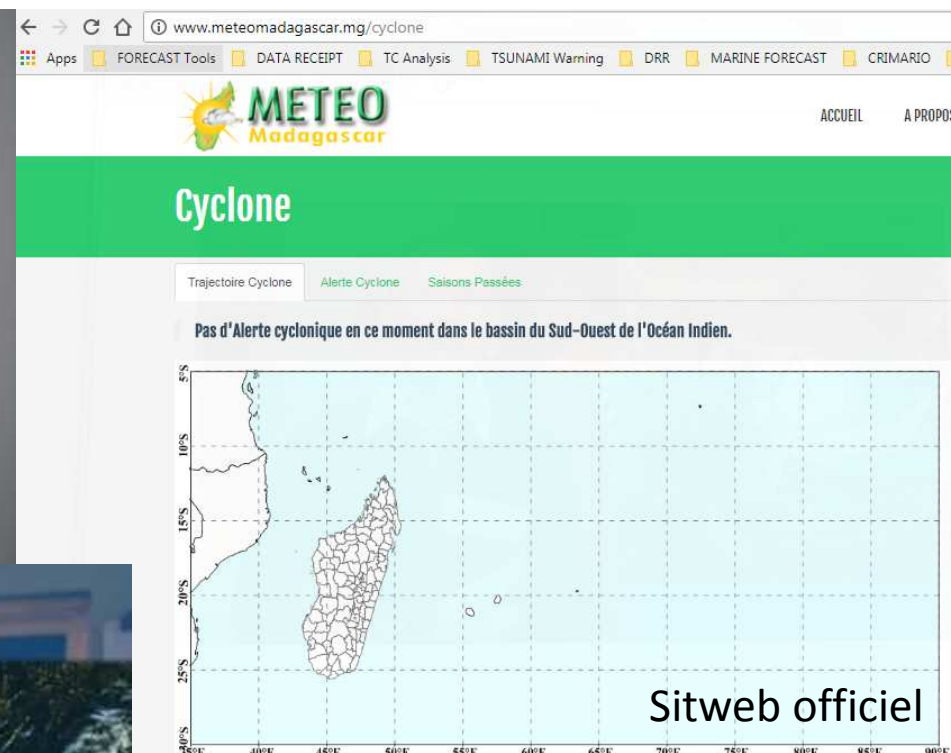
Alerte Jaune

Alerte Rouge

Alerte Bleue

Source: PREVI

Dissemination means



WARNING EXAMPLES

TC AVA issued on 05/01/2018

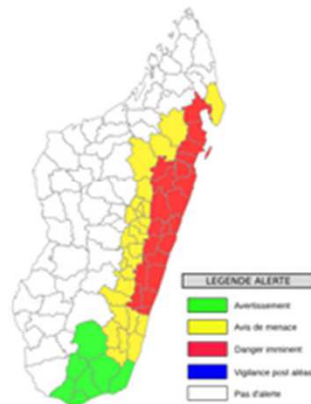


Alerte Cyclone

Bulletin rédigé le vendredi 05 janv. 17:28

Veillez consulter le dernier bulletin d'alerte cyclonique

Alerte rouge (Danger Imminent): Analanjirofo, Atsinanana, Alaotra Mangoro et Vatovavy Fitovinany
Alerte jaune (Avis de menace): Antalaha, Mandritsara, Andilamena, Tsaratanana, Anjozorobe, Manjakandriana, Antananarivo Avaradrano, Antananarivo Atsimondrano, Antananarivo Renivohitra, Ambohidratrimo, Andramasina, Arivonimamo, Ambatolampy, Antanifotsy, Antsirabe I-III, Fandriana, Ambositra, Manandriana, Ambohimahasoa, Isandra, Vohibato, Lalangina, Fianarantsoa Ville, Ambalavao, Faritra Atsimo Atsinanana, Ivohibe et Iakora
Alerte Verte (Avis d'Avertissement): Anosy, Androy



Les conditions cycloniques pour le déclenchement des alertes :

- Vent moyen sur 10 m supérieur à 63 Km/h
- Rafales de vent supérieur à 95 Km/h
- et/ou Fortes Pluies

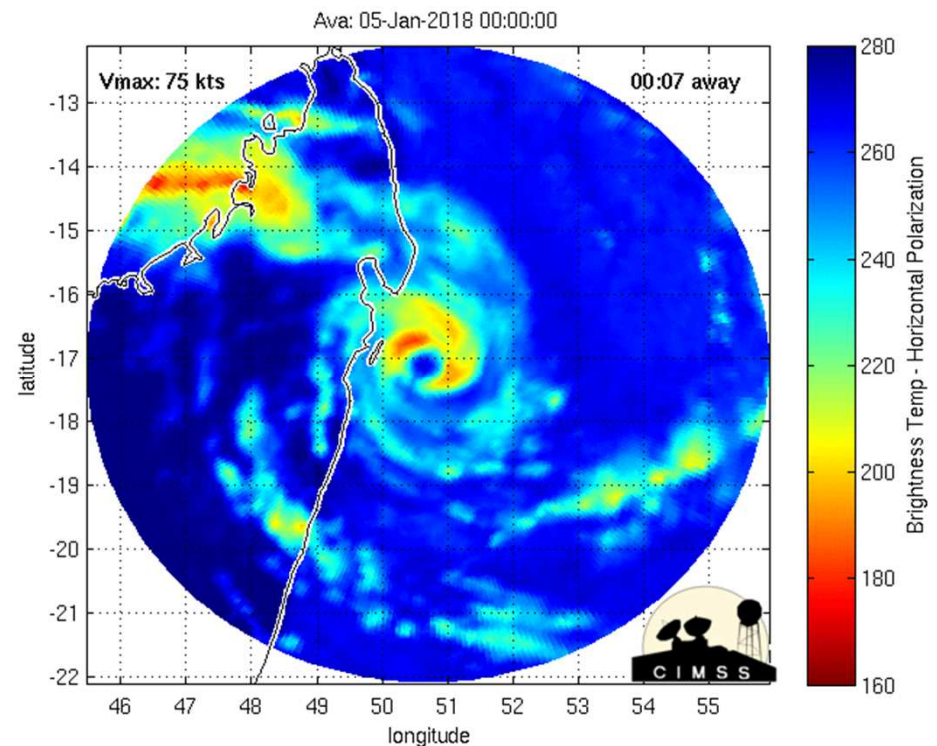
	Dans 5 à 2 jours ces conditions cycloniques sont prévues sur les zones
	Dans 2 à 1 jour(s) ces conditions cycloniques sont prévues sur les zones
	Dans 12 heures ces conditions cycloniques sont prévues sur les zones
	Les menaces cycloniques sont écartées mais il reste des dangers
	Alerte levée



Rue - FARAFATY - Ampandrianomby - Antananarivo
www.meteomadagascar.mg



Courtesy : CIMMS



Source: PREVI

WARNING EXAMPLES

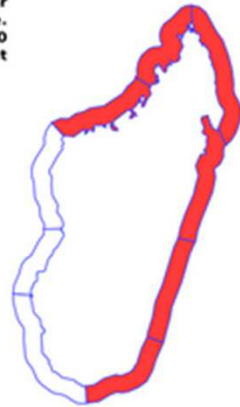
For mariners issued on 05/01/2018



Vigilance Vent Fort

Carte éditée le Ven. 05 janv. 17:29

Forcé par le Cyclone AVA sur Toamasina II, la mer restera très perturbée et houleuse durant l'épisode. Le vent pourrait aussi bien atteindre localement 60/70 Km/h dans le Nord-Ouest du pays. La sortie en mer est fortement déconseillée.



LEGENDE ALERTE	
	Danger imminent
	Avis de menace
	Avertissement
	Vigilance post aléas
	Pas d'alerte

AAXX 05154

67095 21305 **80434** 10257 20245 39842 49848 53142 **76366** 888//
333 60/// 83707 84817 88633=

AAXX 05124

67095 11310 **80436** 10246 20232 39700 49706 55088 60/// **76366** 888//
333 0//71 83707 84817 88633=

AAXX 05094

67095 21325 **82264** 10250 20249 39788 49794 57154 **76366** 888//
333 60171 83707 84817 88633=

AAXX 05064

67095 NIL=

AAXX 05004

67095 11358 **72014** 10252 20245 39976 49982 57028 60201 76062 888//
333 0//91 82707 84817 87633=

AAXX 04184

67095 11358 **71814** 10274 20254 30011 40017 51008 **60492** 72162 878//
333 10285 81707 84817 87633=



WARNING EXAMPLES

Valid from 05/01/2019, loc 05 PM



REPUBLIQUE MALAGASY
Fikambanana - Fivondronana - Fiaran-ankavanana

MINISTRE DES TRANSPORTS ET DE LA METEOROLOGIE
SECRETARIAT GENERAL
DIRECTION GENERALE DE LA METEOROLOGIE
DIRECTION DES EXPLOITATIONS METEOROLOGIQUES
BP 1254 - ANTANANARIVO 101 - MADAGASCAR
Tel : +261 (0) 20 26 396 32

Vigilance Forte Houle

Carte éditée le Ven. 05 janv. 17:29

Forcé par le Cyclone AVA sur Toamasina II, la mer restera très perturbée et houleuse durant l'épisode. La sortie en mer est fortement déconseillée.



LEGENDE ALERTE	
	Avertissement
	Avis de menace
	Danger imminent
	Vigilance post aléas
	Pas d'alerte



IMPACTS OF AVA



Impacts of TC AVA

26 missing; 51 deaths, 159 687 disaster victim (as per 13/01/18 from DMA)

THANKS FOR LISTENING

