TROPICAL CYCLONE MONITORING AND FORECASTING SYSTEM AT WFO MADAGASCAR

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Outline

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1. Presentation of WFO

2. TC Monitoring (incl genesis)

3. TC Forecast

4. Interaction with the Disaster Management 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)
✓ METEOFACTORY (MFY):

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)

Source: NRL/NOAA
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

Source: NRL/NOAA
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

2.B TENDANCE ULTERIEURE:
12H: 10/03/2017 12 UTC: 16.6 S / 64.5 E, VENT MAX=025 KT, DEPRESSION POST-
24H: 11/03/2017 00 UTC: 16.3 S / 59.6 E, VENT MAX=025 KT, DEPRESSION POST-

3. TC FORECAST
4. Interaction with the DM Bureau

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)

Source: PREVI
Dissemination means
WARNING EXAMPLES

TC AVA issued on 05/01/2018

Courtesy: CIMMS

Source: PREVI
WARNING EXAMPLES

For mariners issued on 05/01/2018

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=

Source: PREVI
WARNING EXAMPLES

Valid from 05/01/2019, loc 05 PM

Source: PREVI
**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