

METEOROLOGICAL SERVICES

Technical Report

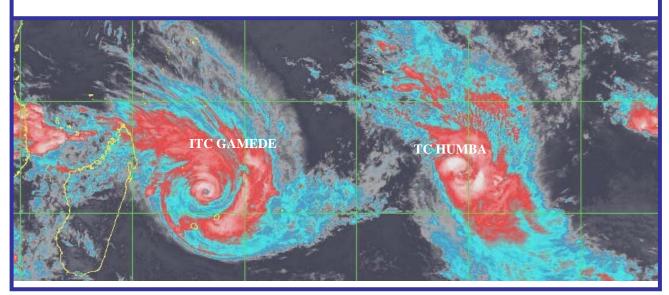
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Cyclone Season

of the

South West Indian Ocean

2006 - 2007



January 2008

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FOREWORD

As predicted in the summer outlook of 2006-2007 the past cyclone season ended with a very equitable average number of ten which is also the long term mean. Their strength was variable, but an above average number of 6 reached the intense tropical cyclone stage. The average number for this intensity is two.

But the most memorable one for Mauritius was intense tropical cyclone Gamede (Feb – Mar 2007) which lingered for several days and stayed as a strong menace. It stayed of a remarkable intensity for several days and alone provided Mauritius for one third of its summer rain. It also left behind some bitter memories of life lost near St. Brandon.

Rodrigues was directly threatened by more than one. But the one that came nearest was Severe Tropical Storm Enok, which necessitated all warnings stages. In general the prediction for both Mauritius and Rodrigues were satisfactory.

It is hoped that the present publication will be informative to our various stakeholders and appreciated in its true value.

Y. Boodhoo Director Meteorological Services

CHAPTER ONE

OPERATIONAL PROCEDURES

The Mauritius Meteorological Services (MMS) Tropical Cyclone Warning Centre becomes operational as soon as a named tropical storm is located in its Area of Responsibility (AOR). The MMS prepares and provides a variety of routine products and services to the users, including: -

- ❖ Significant tropical weather warnings for ships twice daily, describing all tropical disturbances and existence of Near-Gale to Gale force winds and their potential for further development during the period covered by the shipping bulletin. The public is also informed of the existence of such tropical phenomena through the media.
- ❖ Tropical storm/cyclone warnings issued periodically throughout the day with the frequency increasing as and when the threat becomes more imminent to Mauritius or any of the outer Islands. The professional cadre of the MMS highlight the danger through live interventions on Radios and Television.
- Prognostic impact messages this highly specialised information is discussed with decision-makers and with all important users.
- Supplementary marine bulletins at special scheduled times on emergency frequencies through various channels such as Mauritius Telecom, Port Louis Harbour Radio for the attention of maritime navigation.
- ❖ Aviation forecasts, trends etc.

1.1 DATA SOURCES

1.1.1 CONVENTIONAL DATA

These data sets comprise of land and shipboard surface observations, and en-route meteorological observations from commercial aircrafts.

1.1.2 SATELLITE DATA

Imagery from the NOAA polar orbiting satellites, Meteosat meteorological satellites are received at the MMS. Hourly coverage of our area enables a constant watch on the evolution, movement and intensity of the depressions/cyclones.

• The High Resolution Picture Transmission (HRPT) system is mainly used for treating polar orbiting satellite imagery.

1.1.3 RADAR DATA

Radar observations from Trou aux Cerfs are used to follow the evolution of tropical storms/cyclones once the tropical system moves within range of the radar i.e. 400 km. The reports are vital for the determination of structure and movement of the phenomenon as well as the intensity of the associated rain. Radar data is also obtained from Reunion Island.

1.1.4 DRIFTING METEOROLOGICAL BUOYS

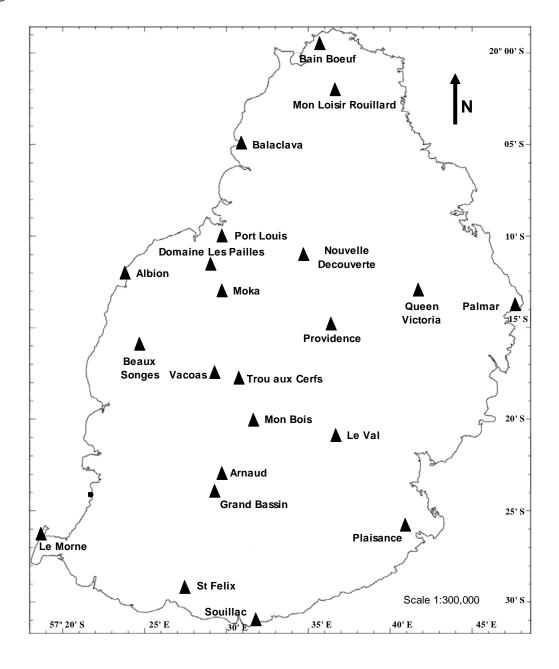
There are several drifting buoys deployed by WMO member countries in the Indian Ocean. They provide valuable data (wind direction, speed, sea state, atmospheric pressure and sea surface temperature) in the AOR and beyond. These meteorological information play crucial roles in such an otherwise vast data-sparse region for tropical storm/cyclone monitoring.

1.1.5 NUMERICAL WEATHER PREDICTIONS

Numerical weather prediction products are available from several international and regional meteorological centres.

1.1.6 AUTOMATIC WEATHER OBSERVING STATIONS

Automatic Weather Stations (AWS) installed over Mauritius provide real time data to the forecast centre at Vacoas on to a data collection platform. The platform also provides effective storage and manipulation capabilities of the large volume of meteorological data available from the various AWS scattered over the island. The locations of the AWS are given below. Two AWS are situated at Rodrigues.



1.1.7 WAVE RIDER BUOY

A wave rider buoy located off the coast of Blue Bay provided valuable data about wave-heights and sea temperature in the past. The complete system consisted of the "Directional Wave rider", the wave direction receiver and a personal computer for data display and storage.

The data of the wave rider buoys were extremely important for monitoring and forecasting storm surge generated by tropical cyclones, strong anticyclones, tsunamis and other meteorological events along the coasts and flood-prone areas. They also provided vital clues to meteorologists in forecasting the state of the sea within and just off the lagoon of Mauritius. Unfortunately, this important equipment has been lost to the waves.

1.1.8 SYNOPTIC AND HOURLY DATA

Data from Vacoas, Plaisance and other reliable stations in the area, such as Seychelles, Diego Garcia, Tromelin, La Reunion and Madagascar and ship observations are of significant importance. However the latter become rare, and understandably so in times of storms.

1.1.9 SADIS is a system that provided outputs from World Area Forecast Centre (UKMO), for aeronautical purposes. These products are now received via other communications channels.

1.2 COMMUNICATIONS

The primary communications support is provided by Mauritius Telecom. However the Global Telecommunication System (GTS) of the World Meteorological Organisation remains the backbone link to the outside world.

In addition to the conventional communication link (Telephone, Fax, Internet and E-mail), the following means are utilised:

- All meteorological data are received through the Meteosat satellite link and Reseau Européen de Transmission d'Information de la Meteorologie (RETIM). The numerical prediction models and charts are regularly available from UK, France and American centers. Meteosat Second Generation (MSG) system is operational.
- Computer products are being treated on Synergie which has become the main forecasting
 workstation. In addition to the traditional chart analysis, Synergie is an interactive media. This
 system has been conceptually devised by Meteo France and is widely used by several countries
 around the world.
- Meteorological data such as metars, synops, upper air sounding reports are transmitted world wide through satellite uplink (meteosat).
- TRANSMET, an automated system is another important tool used extensively for the rapid dissemination of our local weather forecasts and other associated products such as cyclone bulletins, flood warnings.

1.3 DATA DISPLAY

The staff of MMS provides equipment maintenance. Regularly updated storm tracks and warnings are displayed at the main entrance of the MMS for the general public. During the event of a cyclone warning, a special room at the ground floor is prepared with all the possible display materials, aimed specifically to brief people of the media.

CHAPTER TWO

STORMS NAMING CONVENTION & TECHNICAL DESCRIPTION

2.1 Area of Responsibility (AOR)

The Mauritius Meteorological Services has the responsibility for the **naming** of tropical storms in an area bounded by Equator to latitude 30 degrees south and longitudes 55 to 90 degrees east (Figure 1). Madagascar is responsible for naming storms between 55 degrees east and the east African coasts. East of 90 degrees east is the responsibility of Australia. Names from a common list in alphabetical order and previously approved by the RA 1 cyclone committee are officially retained.

2.2 Tropical Cyclone Season

The Tropical Cyclone Season is considered to be the period between 01 November and 15 May of the following year. It is however recognised that on some occasions a storm/cyclone may form outside this period and if such an event occurs, the tropical cyclone warning centre will be activated as would normally be done within the cyclone season.

2.3 Naming of tropical storms

A tropical storm is named when it is observed or estimated that the average 10-minute surface wind strength around the system has attained 63 km/h or 34 knots and persisted for six hours. The name, once given to a storm, will be retained permanently by all users in the region until it dissipates. If a named storm crosses into our area of responsibility from the Australian region, a new name from our list will be appended to the original name. The original name of the storm will be removed after a period of 48 hours unless dissipation occurs earlier.

2.4 Description of Associated Technical terms

• Zone of Disturbed Weather:

A large tropical area associated with huge mass of disorganised clouds observed in the satellite imagery and where the atmospheric pressure is relatively low compared to the surroundings.

• Tropical Disturbance:

A discrete system of apparently organised convection, originating in the tropics or subtropics, having a non-frontal, migratory character and having maintained its identity for about 12 to 24 hours.

• Midget storm:

Midget storms are those cyclones which are small in size. They consist essentially of an inner core, with practically no outer bands. Midget Tropical Cyclones have maximum winds similar to larger tropical cyclones, but with minimum central pressure higher by as much as 15 to 20 hectoPascal (hPa).

• Hybrid Storm:

Hybrid cyclones are cyclones which develop in the sub-tropical region as sub-tropical cyclones, but later acquire tropical cyclones characteristics, with central dense overcast features.

• Tropical Storm:

A tropical storm with maximum sustained 10-minute mean surface wind not exceeding 33 knots or 62 km/h.

• Moderate Tropical Storm:

A tropical storm with maximum mean surface wind in the range of 34 to 47 knots (63-88 km/h) inclusive.

• Severe Tropical Storm:

A tropical storm in which the maximum mean surface wind is estimated to be in the range 48 to 63 knots (89 - 117 km/h) inclusive.

• Tropical Cyclone:

A tropical storm in which the maximum mean wind speed is estimated to be in the range 64 to 89 knots (118 - 165 km/h) inclusive.

• *Intense Tropical Cyclone*:

A tropical storm in which the maximum mean surface wind is in the range of 90 to 115 knots (166 - 212 km/h) inclusive.

• Very Intense Tropical Cyclone:

A tropical storm in which the maximum mean surface wind exceeds 115 knots (212 km/h).

Best Track:

A subjectively smoothed path, used to represent tropical storm movement.

• Centre of a Storm:

The vertical axis or core of a tropical storm which is usually determined by cloud vorticity patterns, wind and/or pressure distribution.

• *Ephemerides*:

Position of a body (satellite) in space as a function of time, used for gridding satellite imagery. Since ephemerides gridding is based solely on the predicted position of the satellite, it is susceptible to errors from vehicle wobble, orbital eccentricity and oblateness of the earth.

• *Rapid deepening:*

A decrease in the minimum sea-level pressure of a tropical storm of 1.25 hPa/h for 24 hours.

• *Explosive deepening of a storm:*

A decrease in the minimum sea-level pressure of a tropical cyclone of 2.5hPa/h for 12 hours or 5.0 hPa/h for six hours.

• Eye of a Storm:

The central calm and clear area of a storm/cyclone inside the circular wall of convective wall clouds.

• Wall Cloud:

An organised band of intense convective - cumuliform clouds that immediately surrounds partially or entirely the central area of the cyclone.

• Fujiwara Effect:

A binary interaction where tropical storms within about 750 nm (1390 km) apart begin to rotate about one another. When tropical storms are within 400 nm (740 km) of each other, they may also begin to be drawn closer to one another.

• Extratropical:

A term used in warnings and weather summaries to indicate that a tropical storm has lost its "tropical" characteristics. It implies both poleward displacement from the tropical region and the conversion of the storms primary energy source from the release of latent heat to baroclinic processes. It is important to note that a cyclone can become extratropical and still maintain winds of hurricane or storm force.

2.5 Cyclone warning system used by the MMS

Countries affected by cyclones have their own warning systems, best adapted to the safety of life and property. The warning system used in Mauritius takes into consideration the degree of risk of gusts exceeding 120km/h and the time factor before the advent of such gusts. The threshold value of 120km/h represents the speed at which appreciable damage to structures may start to occur. The system essentially consists of a numbered series of cyclone bulletins and a summary statement of the class of warning in force. Bulletins numbering from a few to a dozen or more for each storm are normally issued at regular intervals. A bulletin gives the position, intensity and movement of the storm with a forecast of expected changes in weather conditions. Advice about precautions to be taken is given in general terms.

There are four classes of warnings numbering from 1 to 4 and these are issued by the Mauritius Meteorological Services so as to give ample lead time for necessary precautions to be taken.

CLASS I	is issued 36-48 hours before Mauritius or Rodrigues is likely to be affected by gusts reaching 120 km/h.
CLASS II	is issued so as to allow, as far as practicable, 12 hours of daylight before the occurrence of gusts of 120 km/h.
CLASS III	is issued to allow, as far as practicable, 6 hours of daylight before the advent of 120 km/h gusts.
CLASS IV	is issued when gusts of 120 km/h have been recorded in some places and are expected to continue.
TERMINATION	There is no longer any risk of gusts exceeding 120 km/h.

2.6 <u>Classification of Tropical Depressions</u>

Following the Regional Association 1(WMO divides the globe into six regions) Tropical Cyclone Committee (RA 1 TCC) 14th Session held in 1999 in Mauritius, the following classification was adopted and has been in use since the 1999 - 2000 Cyclone Season.

	10-min mean		Gusts km/h	
Tropical Disturbance	\leq 27 Kts	$\leq 50 \text{ km/h}.$	-	
Tropical Storm	28 - 33	51 - 62	< 89	
Mod. Trop. Storm	34 - 47	63 - 88	89 - 124	
Severe Trop. Storm	48 - 63	89 - 117	125 - 165	
Trop. Cyclone	64 - 89	118 - 165	166 - 233	
Intense Trop. Cyclone	90 - 115	166 - 212	234 - 299	
Very Intense trop. Cyclone	> 115	> 212	> 300	

A disturbance is named when it reaches the moderate stage. However, some disturbances which did not reach the moderate stage were named in the past because of their proximity to land and of the threat of severe flooding.

But following the RA 1 TCC 14th Session, the moderate stage (C.I. of 2.5 on the Dvorak scale) is maintained for at least six hours for the system to be named. The terms moderate and severe tropical depressions have been replaced by moderate and severe tropical storms.

Other important changes adopted by the RA 1TCC are the 10 minute average wind speed and the gust factors corresponding to a given Current Intensity (C.I). The one minute average wind speed and the minimum sea level pressure (MSLP) corresponding to a given C.I are unchanged (Figure 2) and are similar to the Dvorak Scale adopted for the Tropical North Western Pacific Ocean .

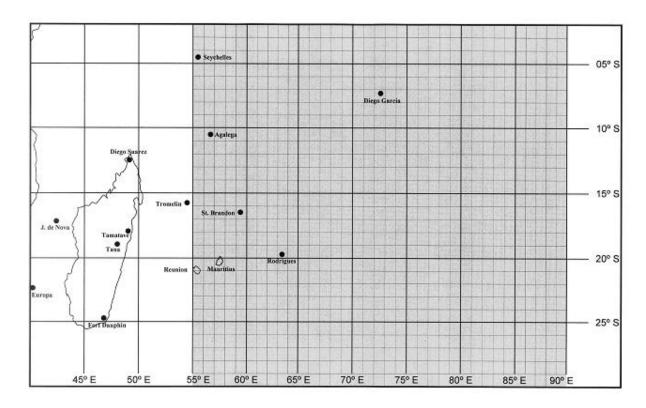


Fig 1: Area of responsibility of the Republic of Mauritius for the naming of tropical cyclones.

T. Number (Dvorak) (Km/hr) (Km/hr) (Km/hr) Fig 2: Classification of Tropical Storms adopted for use in the South West Indian Ocean area of RA 1 (hPa) (X (<u>X</u> (<u>X</u> ∞ ω 6.5 ဖ 5.5 S 4.5 3.5 ന 2.5 1.5 Knots Knots Mean Wind (10') Knots Km/hr Mean Wind (10') Km/hr Sustained Wind (1') Km/hr Kt Km/h 136 252 hPa -115 - 212 89- 165 Tropical Depression/ 33 - 62 Storm - 20 63-Central Pressure Moderate Tropical Sustained Wind (1') Depression/Storm Depression/Storm Very Intense Tropical Cyclone Intense Tropical Cyclone Tropical cyclone Severe Tropical T. Number Gusts Gusts

CHAPTER THREE

FORECASTING TECHNIQUES & CYCLONE WARNING

3.1 ANALYSES

The MMS duty meteorologist performs analyses of sea level and upper-level (850, 700, 500, 400, 300, 250 and 200 hPa) data mainly for 0000, 0600 and 1200 UTC each day. Computer products of sea-level pressure analyses of the South West Indian Ocean region from UK forecasting centre, American model forecasts and France are utilised as additional guides. Additional sectorial charts at intermediate synoptic times and auxiliary charts, such as station-time plot diagrams and pressure-change charts, are analysed during periods of significant tropical cyclone activity.

3.2 FORECAST PROCEDURES.

3.2.1 INITIAL POSITIONING

The warning position is the best estimate of the centre of the surface circulation at synoptic time. It is estimated from an analysis of all "fix" information received. It also includes synoptic observations and other information used to adjust the position, testing consistency with the past direction and speed of movement and the influence of the different scales of motions.

3.2.2 TRACK FORECASTING

A preliminary forecast track is developed based on an evaluation of the rationale behind the previous warning and the guidance given by the most recent set of objective techniques, numerical prognoses, recent movement, satellite animation and other objective and empirical techniques. This preliminary track is then subjectively modified based on the following considerations:

- 3.2.2.1 The prospects for recurvature or erratic movement are evaluated. This determination is based primarily on the present and forecast positions and amplitudes of the middle-tropospheric, mid-latitude troughs and ridges as depicted on the latest upper-air analyses and numerical forecasts.
- 3.2.2.2 Determination of the best steering level is partly influenced by the maturity and vertical extent of the tropical cyclone. Shallow or sheared systems would be steered by the lower tropospheric flow whereas deep or mature cyclones would be affected by the mid-level or deep-layer steering. For mature tropical cyclones located to the north of the subtropical ridge axis, forecast changes in speed of movement are closely related with anticipated changes in the intensity or relative position of the ridge.
- 3.2.2.3 Over the 12 to 24 hour interval forecast period, the speed of movement during the early forecast period is usually biased towards persistence, while the later forecast periods are biased towards objective techniques. When a tropical storm moves poleward and towards the mid-latitude steering currents, the speed of movement becomes increasingly biased towards a selective group of objective techniques capable of estimating acceleration.

3.2.3 INTENSITY FORECASTING:-

Heavy reliance is placed on the empirically derived DVORAK (1984) technique for forecasting tropical cyclone intensity. Other techniques used for forecasting intensity are extrapolation of synoptic wind, pressure data, climatology and whenever available European Research Satellite 1 wind data. An evaluation of the entire synoptic situation is made including the location of major

troughs and ridges, the position and intensity of the tropical upper-tropospheric trough, if present. The vertical and horizontal extent of the tropical storm's cyclonic circulation and the extent of the associated upper-level outflow patterns are considered. Animated satellite data plays a key role in the evaluation of intensification potential.

3.3 WARNING

The MMS issues tropical storm warnings for the general public and for maritime and aeronautical navigation within our area of responsibility. Such warning is issued whenever a closed circulation is evident and the maximum gusts are forecast to reach beyond 120 km/h within the following 36 to 48 hours thus endangering life or property inland or at sea.

Each tropical storm warning bulletin is numbered sequentially and written in simple terms for the public while still containing sufficient technical information for emergency service and industrial use. In general each warning message includes the following information:

- The storm name selected in accordance with the list provided by RA1 cyclone committee.
- The warning class.
- The current position of the surface centre.
- The intensity and radial extent of 120 km/h wind gusts.
- An initial narrative section outlining the area under warning and watch and a cancellation of those areas no longer under threats.
- Qualitative description of tidal variations and the risks of storm surge.
- Description of areas prone to flooding due to heavy rainfall.
- Forecasts of heavy rainfall.
- Track and Intensity.

3.4 DISSEMINATION

Cyclone warning messages are distributed by the TRANSMET system and fax according to a preestablished list provided by the local cyclone committee. Immediately upon issuance, the cyclone message is recorded on the audiotex service announcement, operated by Mauritius Telecom and the MBC (Phone No. 3026070, 3026071) and on TELMET (Phone No. 96 and 171)

3.5 WARNING TO SHIPPING

The MMS area of responsibility for the issue of Gale/Storm warning is shown in fig 3. Shipping messages and warnings are sent to the MRS and linked to IMMARSAT through Toulouse earth station. The area north of Madagascar and south of the equator has been included up to 95° E (GMDSS) as it falls under the responsibility of the Mauritius Meteorological Services. The warning criteria for maritime navigation are as follows:

- (a) A gale warning is a statement which warns of surface winds of average speed 34-47 knots.
- (b) A storm warning is a statement which warns of winds of average speed from 48-63 knots.
- (c) A hurricane warning is a statement which warns of winds of average speed of 64 knots or above.

These warnings are issued if the above criteria are expected to be met any time within 24 hours of issue time. Gale warnings may be issued when a storm has not been even named. These warnings are prepared according to the format laid down by the International Maritime Organization and the World Meteorological Organisation.

3.6 WARNING TO AVIATION

All warnings to aviation are issued by the duty meteorologist according to procedures set down by the International Civil Aviation Organization and the World Meteorological Organization under the heading SIGMET. This will refer to Thunderstorms, Severe Icing and Turbulence as appropriate. SIGMETs may be required even though the centre of the cyclone may be in an adjacent Flight Information Region. The duty Meteorologist is also responsible for preparing aerodrome forecasts.

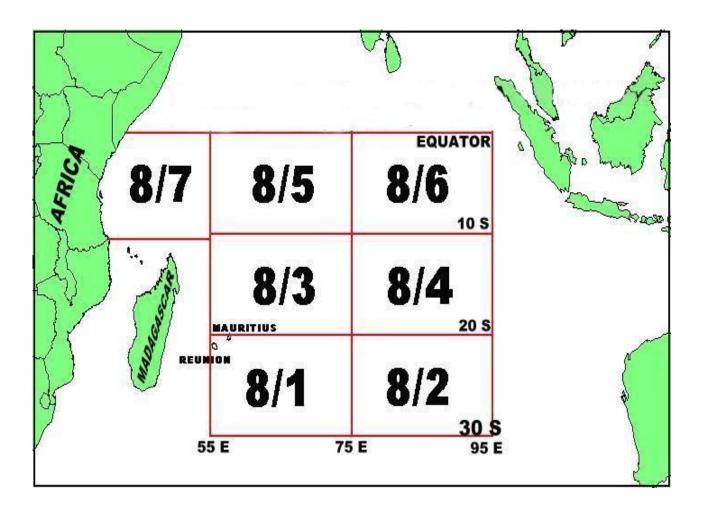


Fig. 3: Mauritius Global Maritime Distress Safety System Metarea VIII (S) - Subdivisions

CHAPTER FOUR

Cyclone Season 2006 - 2007 - Summary

- 1) Moderate Tropical Storm ANITA (27 November 04 December 2006)
- 2) Intense Tropical Cyclone BONDO (18 25 December 2006)
- 3) Severe Tropical Storm CLOVIS (30 December 2006 03 January 2007)
- 4) Intense Tropical Cyclone DORA (29 January 09 February 2007)
- 5) Severe Tropical Storm ENOK (09 12 February 2007)
- 6) Intense Tropical Cyclone FAVIO (13 22 February 2007)
- 7) Intense Tropical Cyclone GAMEDE (21 February 02 March 2007)
- 8) Tropical Cyclone HUMBA (23 28 February 2007)
- 9) Intense Tropical Cyclone INDLALA (12 18 March 2007)
- 10) Intense Tropical Cyclone JAYA (29 March 04 April 2007)

Moderate Tropical Storm ANITA

(27 November – 04 December 2006)

Active convective activity fluctuated during the second half of November and minor circulations developed to the north of the Mozambique Channel.

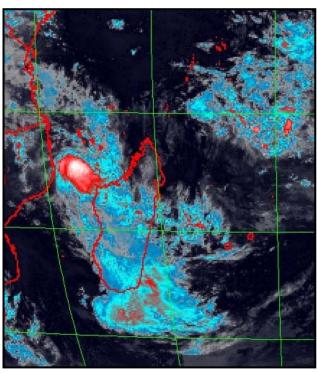
A marked low pressure formed on 27 November near 6.5° S and 46.5° E.

The system moved west-south-west at about 15 km/h with a small Central Dense Overcast (CDO) on 29 November. (Refer track).

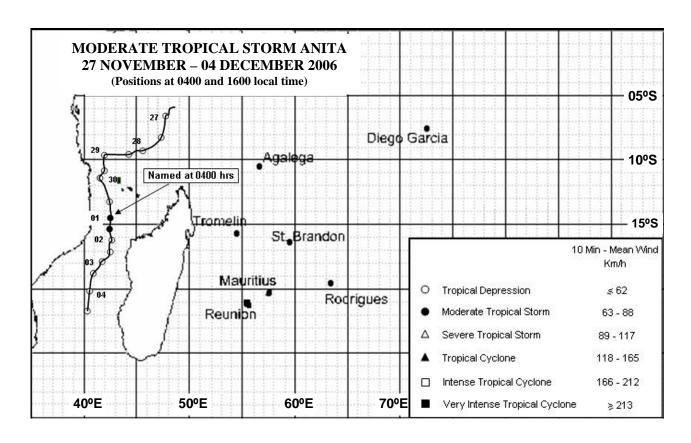
The next day it intensified. On 01 December it was baptized ANITA by the Meteorological Services of Madagascar near 14.5° S and 42.5° E at 04hrs00 when it reached moderate intensity with central pressure estimated at 994 hPa.

It moved into an unfavourable environment and on 02 December morning, it weakened to a tropical storm. Vertical shear aloft decreased associated convection rapidly. Heavy rainfall occurred in northern parts of Madagascar, eastern

Tanzania and northern Mozambique Channel. Flash floods were reported in a few areas of the above countries.



Satellite picture of Tropical Storm ANITA on 01 December 2006 @ 04hrs00



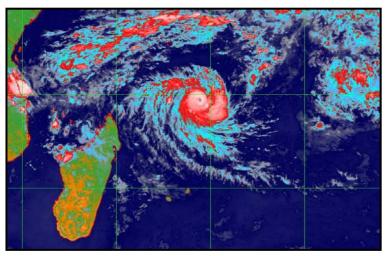
Intense Tropical Cyclone BONDO

(18 - 25 December 2006)

Around mid-December, a tropical disturbance evolved to the south-west of Diego Garcia. Initially, the convective activity fluctuated and by 17 December, assumed a general west-south-westerly movement, and soon reached a region which was more favourable for further development with less wind shear that helped it intensify rapidly. The system intensified to a moderate tropical storm overnight. On 19 December at 04hrs00, it was named BONDO by the Mauritius Meteorological Services, when it was almost east of Agalega, near 11.0° S and 60.5° E.

In the following six hours, moderate tropical storm BONDO intensified into severe tropical storm. The intensification rate was higher than expected as BONDO was located in a region which was very favourable for further development. The warm sea surface temperature (around 29° C), a good cross-equatorial flow feeding the system, weak vertical wind shear and a very good ventilation aloft, were all contributing for the system intensify.

Given its westerly movement and the fact that it was already a severe tropical storm undergoing further



Satellite Picture of Intense Tropical Cyclone BONDO on 19 December 2006 @ 14hrs00

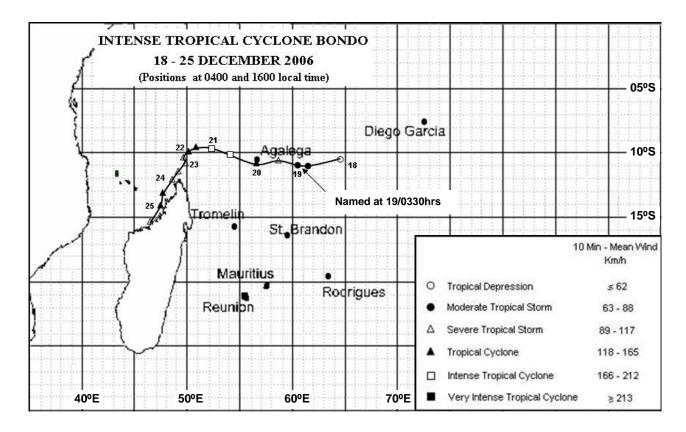
intensification and was increasingly becoming a direct threat to Agalega, regular warnings were issued as from 18 December . On 19 December at 05hrs30, a warning was issued and at 10hrs00 an updated version was sent to different stakeholders. By that time, severe tropical storm BONDO was about 330 km to the east of Agalega. Cyclonic conditions were expected to prevail over Agalega overnight with torrential rain and gusts. BONDO was expected to pass very close to the island of Agalega in the early hours of 20 December, potentially bringing a storm surge as well. It intensified into a tropical cyclone overnight on 19 December. The presence of a high pressure cell to the south of the system was guiding the storm on a westward track. BONDO was a rather small core system but satellite imagery showed cloud patterns which were indicative of an organised and symmetric circulation.

Data received from Agalega, indicated that BONDO, now a tropical cyclone passed at a closest distance of about 20 km to the south of the south island of Agalega at 02hrs30 on 20 December. (Note the slight deviation on the trajectory when the cyclone passed south of Agalega). The minimum atmospheric pressure recorded at the station was 990.1 hPa (digital barometer). Highest gusts recorded did not exceed 100 km/h. Rainfall recorded from 19/10hrs00 to 20/10hrs00 was about 287 mm. From 20/10hrs00 to 21/10hrs00, 42 mm were recorded. Gradually during the day, BONDO shifted on a west-north-westerly track. TC BONDO continued to intensify rather rapidly and it reached the intense tropical cyclone stage on the afternoon of 20 December. At 10hrs00 on 21 December, it was near the point 9.5° S and 51.5° E. With this trajectory, it was approaching the remote Farquhar Atoll, which is part of the Seychelles archipelago. Authorities had ordered evacuations on 21 December, in anticipation of potential wind gusts and torrential rain. Cyclones in this region are rare because of its proximity to the equator.

Intense tropical cyclone BONDO temporarily moved in a westerly direction overnight of 21 December and later on started moving in a general west-south-westerly direction. On this trajectory, it was becoming a threat to Madagascar as well. However, the system had entered a region with

increasing wind shear which caused it to weaken to a tropical cyclone and eventually by 22 December, it was downgraded to a severe tropical storm. With south-west movement on 23 December, it headed towards the north-western coast of Madagascar. The warm waters of the Mozambique Channel helped the system to re-intensify. On the eve of Christmas, BONDO again became a tropical cyclone.

On Christmas day, BONDO lay to the north-west of Madagascar. Making landfall, the system weakened during the day after interaction with land and was downgraded to a severe tropical storm and weakened gradually. (Refer to trajectory).



Severe Tropical Storm CLOVIS

(30 December 2006 - 03 January 2007)

Towards the end of December 2006 the cross equatorial flow from the northern hemisphere was very well established and the presence of the Inter Tropical Convergence Zone (ITCZ) was very well marked on the satellite picture. Several vortices were observed along it. One of these just south-south-east of Agalega Island, showed signs of intensification due to the weakening of vertical wind shear and an efficient upper level outflow. It became a tropical disturbance on 30 December 2006 at 10hrs00 near latitude 12.5° S and longitude 56.8° E and was moving towards the west-south-west at about 10 km/h.

On 31 December 2006, being in a favourable environment, the tropical disturbance intensified rapidly and became a moderate tropical storm. At 16hrs00, the same day, it was named CLOVIS by the Meteorological Services of the Republic of Madagascar when it was near 15.0° S and 54.5° E. Initially CLOVIS was moving towards the south-west at about 10 km/h. It passed very close to Tromelin Island on 31 December at 22hrs00.

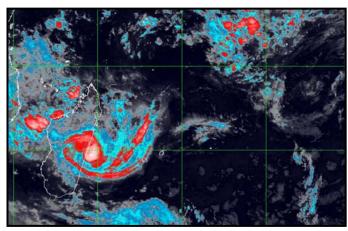
Due to the continued good poleward outflow and low vertical wind shear, CLOVIS intensified further and on 01 January 2007 at 10hrs00 it became a severe tropical storm near 17.5° S and

52.9° E, i.e. at about 570 km north-west of Mauritius. CLOVIS maintained its track towards the south-west due to the weakening of the mid-level sub-tropical ridge south of Madagascar.

As the upper level poleward outflow persisted, CLOVIS remained a severe tropical storm and tracked in a general south-westerly direction till the night of 02 January.

North-westerly swells affected the north-western parts of Mauritius. Soon then after, a transient short wave ridge built up to the south of CLOVIS causing it to track more towards the west-south-west at about 12 km/h as from 03/04hrs00 hrs, when it was near 20.3° S and 49.0° E.

On this new trajectory, CLOVIS was about to make landfall to the north of Manajary district in Madagascar.



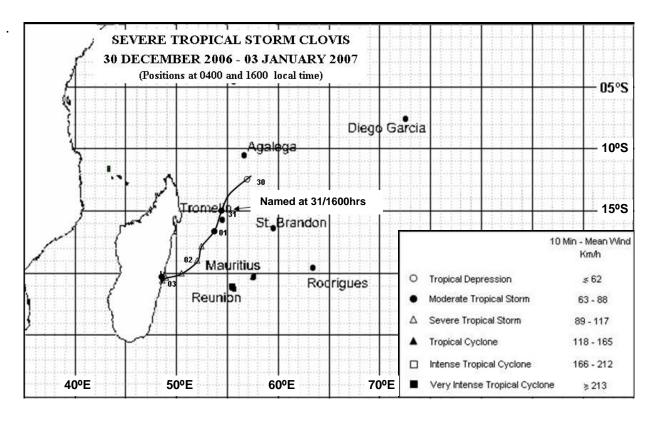
Satellite Picture of Severe Tropical Storm CLOVIS on 03 January 2007 @ 07hrs00

Once over land, CLOVIS weakened as it interacted with the high terrains of Madagascar. It became a moderate tropical storm again on the night of 03 January. It also encountered an area of strong vertical wind shear and the convection associated with it got displaced to the north-east of Low Level Circulation Center.

In the morning of 04 January, CLOVIS continued to weaken rapidly overland and the residual vortex was detected on the visible animated imagery.

When tropical storm CLOVIS made landfall on 03 January on the eastern coast of Madagascar at the level of Nosy Varika district, heavy winds and rains caused flooding and damages to houses, public buildings and electricity network.

CLOVIS had made one casualty and caused several thousands of homeless and displaced, and significant damage to agriculture.



Intense Tropical Cyclone DORA

(29 January - 09 February 2007)

As from 26 January 2007, an area of convection was noted to persist to the west of Diego Garcia. Weak convective banding was present on the north-eastern and south-western peripheries of the Low Level Convective Centre (LLCC). Located in a region of low vertical shear and favourable diffluence aloft, the system started to develop into a tropical disturbance with convective activity flaring over a well-defined centre.

The system was named DORA on 29 January 2007 by the Mauritius Meteorological Services at

14hrs30 and was located near latitude 11.5° S and longitude

66.5° E. Storm DORA of moderate intensity moved initially towards the south and then south-west with a speed of about 15 km/h. (Refer to trajectory).

With an excellent equatorward outflow, DORA began to show signs of further intensification and reached severe tropical storm around 04hrs00 on 30 January about 770 km to the north-east of Rodrigues. As from 10hrs00, it became impregnated in

Satellite picture of Intense Tropical Cyclone DORA on 02 February 2007 @ 03hrs30

a weak steering environment between a mid-level ridge to the north-east and another ridge to the south and started to

move slowly towards the south-south-west, at times remaining quasi-stationary. Due to the proximity of DORA with Rodrigues a cyclone warning CLASS I was issued for Rodrigues as from 16hrs30 on the same day as from 31 January.

As from 31 January, DORA changed direction and started to move slowly in a south-south-easterly direction and with the upper level environment still favourable, it continued to intensify.

In the afternoon of 01 February, DORA reached tropical cyclone intensity when it was located at about 630 km to the north-east of Rodrigues, near latitude 15.5° S and longitude 67.5° E. It was then moving towards the south-east at about 8 km/h.

Under the influence of a subtropical steering ridge anchored over Madagascar and extending eastward to the south of the system, DORA started to move slowly in a southerly and then south-south-westerly direction as from 02 January and was centered at 22hrs00 near 18.2° S and 67.7° E, i.e. 460 km to the east-north-east of Rodrigues.

DORA reached intense tropical cyclone intensity at 04hrs00 on 03 January, which it maintained for the next 30 hours due to the good eastward and equatorward outflow before weakening into a tropical cyclone by 10hrs00 the next day. However its motion became erratic again from slow west-south- westerly to quasi-stationary at times which was mainly due to the influence of the near equatorial ridge to the east and the sub-tropical ridge to the south-west. A building mid-latitude anticyclone south-east of the system led to the inflow of cooler and drier air into the tropical cyclone centre. In addition with the increasing upper level wind shear, DORA continued to weaken to become a severe tropical storm on 05 January morning and was centered near latitude 19.1° S and longitude 66.4° E, approximately 310 km to the east-north-east of Rodrigues. With its slow movement towards the west-south-west, the warning over Rodrigues was upgraded to CLASS II. It must be noted that with quite an unusual slow movement, 24 CLASS I cyclone warnings (bulletins) were issued. The system weakened further into a moderate storm as from the 06 January.

The CLASS II warning was maintained from its time of issue to 07 January at 04hrs30 as DORA moved in a general south-westerly direction with a speed of about 8 km/h.

As from 07 January onward, animated multi-spectral imagery reveals a low level circulation center that had become fully exposed from the deepest areas of convection located approximately 60 nm to the east.

The LLCC remained well organised and it continued to track west-south-westward. The system weakened as it tracked towards a region of higher vertical wind shear and the next day, it experienced a brief flare of convection over the low level circulation centre. The storm by this time was becoming extra-tropical.

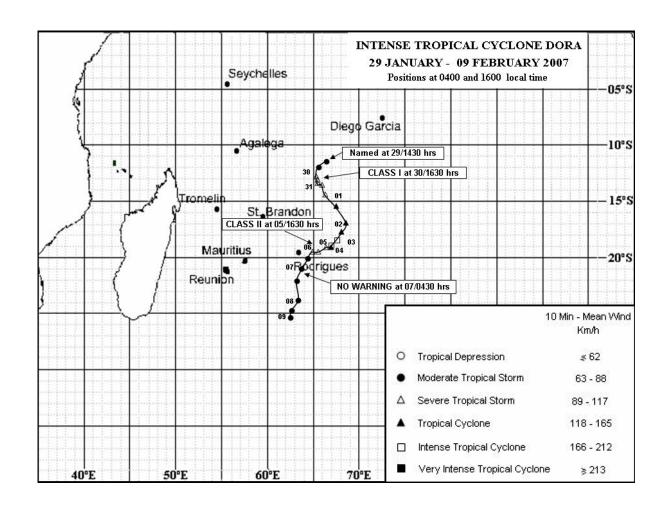
On 09 January, DORA still has a well-defined low level circulation centre but lost all deep convection over the past 24 hours. DORA then completed its transition into an extra-tropical system with the strongest winds (locally up to 95 km/h) occurring far to the south of the centre due to pressure gradient with the subtropical high.

Duration of warnings for Rodrigues

WARNING	FROM (date/time)	TO (date/time)	DURATION (hours)
CLASS 1	30/1630	05/1630	144
CLASS 2	05/1630	07/0430	36
TERMINATION	07/0430		

Rainfall (29 Jan – 07 Feb 2007), highest gusts and lowest pressure recorded at Rodrigues during Intense Tropical Cyclone DORA

STATIONS	AMOUNT (mm)	GUSTS (Km/h)	LOWEST PRESSURE (hPa)
POINTE CANON	55.2	78	998.2
CORAIL AIRPORT	33.3	76(AWS)	999.7
CITRONELLE(AWS)	77.0	83	961.5
ROCHE BON DIEU	92.0		
PORT SUD EST	41.4		
MOUROUK	49.0		
MARECHAL	49.6		
SOLITUDE	59.1		
TERRE ROUGE	58.7		

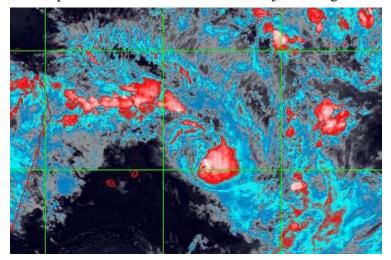


Severe Tropical Storm ENOK

(09 - 12 February 2007)

A low pressure area evolving to the north-east of Madagascar moved north-eastwards and intensified as from 09 February 2007 morning. It was named ENOK on 09 February by the Mauritius Meteorological Services.

ENOK passed on St. Brandon but no major damage was reported from meteorological staff except



Satellite picture of Severe Tropical Storm ENOK on 10 February 2007 @ 22hrs00.

that a few iron corrugated sheets and one window pane were blown away. Rainfall recorded was 118 mm and maximum gusts 160 km/h. The lowest pressure was 978 hPa around 05hrs30 in the morning when the centre passed over the island with calm period lasting a few minutes.

It rapidly intensified into severe storm during the night when about 700 km north-west of Rodrigues near latitude 15.0° S and longitude 58.7° E. It moved very rapidly at about 25 km/h

towards east-south-east. (See trajectory). Due to its position and movement, a CLASS I had to be issued on 10 February morning at 04hrs10. CLASS II was issued at 10hrs10 as the system accelerated and intensified while approaching Rodrigues dangerously. A CLASS III warning was issued at 15hrs10. Frequent gusts of 124 km/h were recorded at Pointe Canon and a peak of 141 km/h. CLASS IV warning was thus issued at 21hrs10 on the night of 10 February. At its closest, ENOK passed at 25 km to the east of Rodrigues. The last cyclone bulletin was issued at 04hrs10 on 11 February. No damage was reported in Rodrigues.

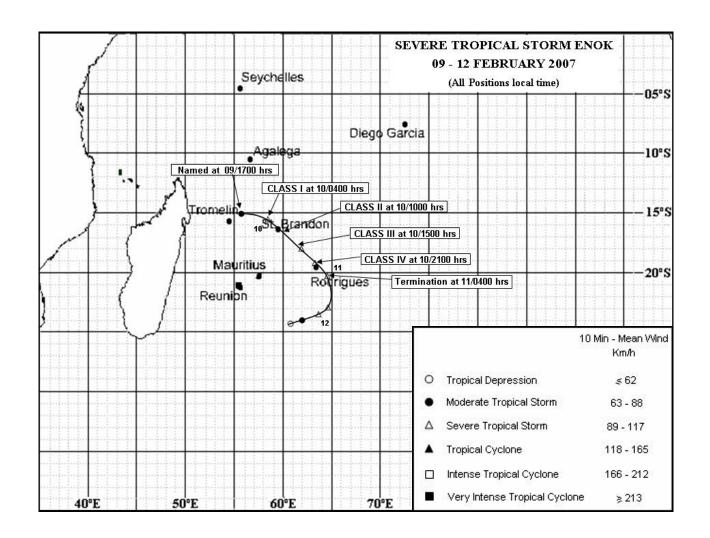
Duration of warnings for Rodrigues

WARNING	FROM (date/time)	TO (date/time)	DURATION (hours & mins)
CLASS 1	10/0430	10/1010	5 hrs 40 mins
CLASS 2	10/1010	10/1510	5
CLASS 3	10/1510	10/2110	6
CLASS 4	10/2110	11/0410	7

Rainfall (10 - 11 February 2007), highest gusts and lowest pressure associated with Severe Tropical Storm ENOK

STATIONS	AMOUNT (mm)	GUSTS (Km/h)	Lowest Pressure (hPa)
POINTE CANON	67.2	141	998.5
CORAIL AIRPORT	20.2	108(AWS)	997.3(AWS)
CITRONELLE(AWS)		122	
ROCHE BON DIEU	147.5		
PORT SUD EST	91.2		
MOUROUK	91.0		
MARECHAL	64.2		
SOLITUDE	95.6		
TERRE ROUGE	89.3		

There was also the effect of "Fujiwara" which stipulates that whenever two storms evolve near to each other, there is a rotation where the stronger storm movement causes the other storm to move in the opposite direction.

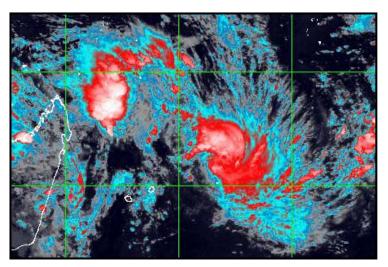


Intense Tropical Cyclone FAVIO

(13 - 22 February 2007)

A marked low pressure area was located to the south-west of Diego Garcia near 11.5° S 69.5° E on 12 February. Surrounded by favourable environment with good upper level divergence, the low deepened slowly and became a tropical disturbance on the following day. Movement was slow towards the south at first, and then on 13 February in the evening, it assumed a general south-westerly track at a speed of around 15 km/h. It reached the moderate tropical storm

stage in the morning of 15 February and was named FAVIO at 08hrs45 by the Mauritius Meteorological



Moderate Tropical Storm FAVIO on 15 February 2007 @ 13hrs00

Services. FAVIO was then located at about 300 km to the north-north-east of Rodrigues. As the storm was approaching the island and represented a potential threat, a cyclone warning CLASS I was issued at 15/10hrs00 for Rodrigues.

FAVIO maintained its trajectory while intensifying slightly. The warning was upgraded to CLASS II at 13hrs10 on the same day. From then on, the storm accelerated towards the south-west at a speed of 20 km/h. At 16hrs00, the storm was located at about 120 km to the north-north-west of Rodrigues, which was its closest distance from Pointe Canon. The CLASS II warning was maintained until 22hrs10. The fifth and last bulletin issued at 22hrs10 lifted all warnings at Rodrigues. The lowest pressure recorded was 1006 hPa at Pointe Canon at 15/16hrs00.

Five bulletins were issued.

Duration	of	warnings	for	R	odrigue	es

WARNING	FROM (date/time)	TO (date/time)	DURATION (hours)
CLASS 1	15/1010	15/1310	3
CLASS 2	15/1310	15/2210	9
TERMINATION	15/2210		

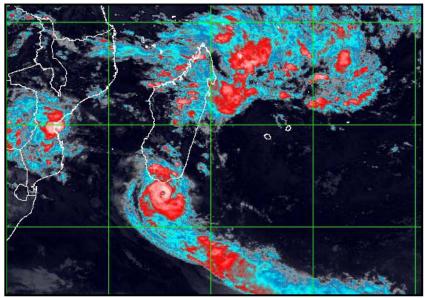
The passage of moderate tropical storm FAVIO in the vicinity of Rodrigues was beneficial to the island as can be seen in the table below.

Table - Rainfall, highest gust and lowest pressure associated with FAVIO

STATIONS	AMOUNT (mm)	GUSTS (Km/h)	LOWEST PRESSURE (hPa)
POINTE CANON	109.9	114	1006.0
CORAIL AIRPORT	113.3	93(AWS)	1007.2
CITRONELLE (AWS)	111.4	106	
ROCHE BON DIEU	82.0		
PORT SUD EST	217.6		
MOUROUK	197.7		
MARECHAL	160.2		
SOLITUDE	104.2		
TERRE ROUGE	98.7		
BAIE TOPAZE	184.2		

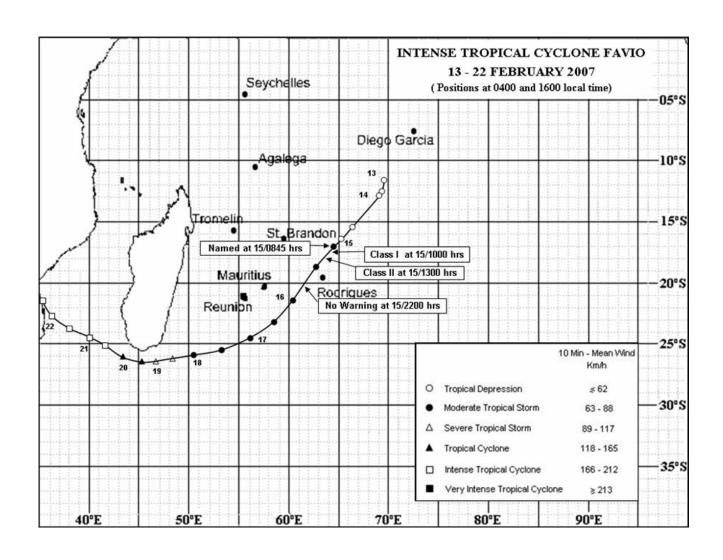
Leaving the Rodrigues region, FAVIO continued to move in a south-westerly trajectory at a fairly constant speed but with not much evolution in the intensity until 17 February. It was then located close to the 25th parallel. Thereafter, it started to move west-south-westerly and became again better organised. On the following day, satellite imagery showed that FAVIO had reached the severe tropical storm stage though it was of small diameter. As intensification continued, it became a tropical cyclone on 19 February, then peaked to an intense tropical cyclone on 20 February with central pressure 930 hPa.

Passing off the south coast of Madagascar, FAVIO assumed a westerly track then a west-north-westerly trajectory as from 20 February. It maintained its intensity while crossing the Mozambique



Satellite picture of Tropical Cyclone FAVIO on 19 February 2007 @ 16hrs00

channel, towards Mozambique. Intense tropical cyclone FAVIO made landfall on 22 February at about 10hrs00 near the town Vilanculos in Inhambane Province. Once inland FAVIO weakened quickly.



Intense Tropical Cyclone GAMEDE

(21 February – 02 March 2007)

An active ITCZ was observed during the month of February 2007 where various low pressure areas had been spotted. A significant zone of disturbed weather persisted since 18 February 2007 near latitude 13.5° S and longitude 79.5 ° E.

This zone gradually developed into a tropical storm of moderate intensity located near 14.2° S and 71.7° E and was named GAMEDE at 08hrs30 on 21 February by the Mauritius Meteorological Services. It was moving in a general westerly direction at about 25 km/h.

The convective clouds associated with GAMEDE were well organised and located in a favourable environment. GAMEDE recurved towards the west-south-west with an accelerated speed of 30 km/h and thus became a potential threat to Mauritius. A CLASS I warning was issued on 22 February at 16hrs10 when it was located at a distance of 880 km to the north-east of Mauritius in latitude 14.6° S and longitude 63.6° E.

GAMEDE continued on its general west-south-westerly track and was on the intensifying curve. As the threat became more significant for Mauritius, a CLASS II warning was issued when it was located at about 660 km to the north-east of Mauritius i.e. in latitude 15.3° S and longitude

61.6° E. GAMEDE intensified into a tropical cyclone on 23 February at 10hrs10 and passed over St. Brandon at 16hrs00. The highest gust observed at St. Brandon exceeded 160 km/h and the lowest pressure recorded was 955 hPa. The diameter of the central calm area was estimated to be 50 km.

In view of its sustained movement towards the west-south-west and its position at about 440 km to the north-north-east of Mauritius, a CLASS III warning was enforced as from 17hrs00.

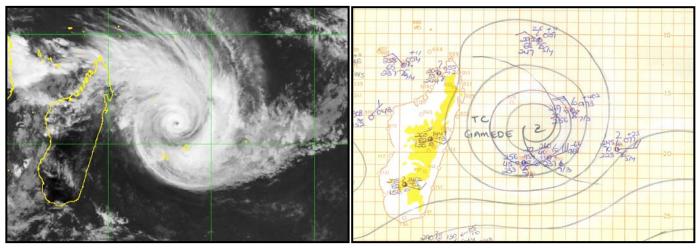
During the night, GAMEDE slowed down significantly and was moving at a reduced speed of about 10 km/h along its west-south-westerly track. Strong winds were recorded at various places across the island and a CLASS IV warning became in force on 25 February at 04hrs10 when it was located at about 260 km to the north-west of Mauritius.

At 07hrs00, GAMEDE showed a slight change in its trajectory and started moving in a westerly direction. On this trajectory the centre of GAMEDE moved away from Mauritius and the risk of cyclonic conditions decreased. All warnings were waived at 10hrs10.

GAMEDE then moved in a general west-north-westerly direction, described a loop on 26 February and took a general southerly direction. It then accelerated and on 02 March, it had weakened into a severe tropical storm. Post analysis indicates that it had even become temporarily an intense tropical cyclone on 26 February.

GAMEDE caused severe coastal erosion along the northern and western coasts of Mauritius. The agricultural and other sectors suffered some damage.

WARNING	FROM (date/time)	TO (date/time)	DURATION
			(hours & mins)
CLASS I	22/1610	23/0410	12 hrs
CLASS II	23/0410	23/1700	12 hrs 50 min
CLASS III	23/1700	25/0410	35 hrs 10 min
CLASS IV	25/0410	25/1010	6 hrs
NO Warning	25/1010		



Tropical Cyclone GAMEDE on 24 February @ 16hrs00

Surface Chart of 24 February 2007 @ 16hrs00 showing TC GAMEDE

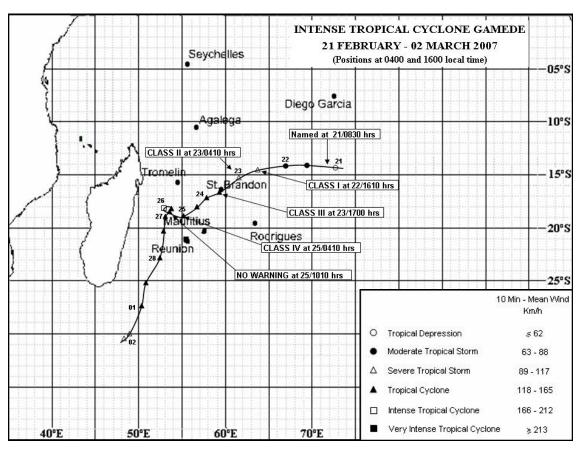
A few damages were observed to the platform at St. Brandon on top of the anemometer tower. Some window panes were broken with heavy leakage inside the building. Sea water rose up to the back of the building and waves eroded the coasts in front of the building. The meteorological staff had to seek shelter in the Coast Guard office.

HIGHEST GUSTS RECORDED

Stations	Gust (km/h)	Stations	Gust (km/h)
Albion	122	Grand Bassin	130
Trou aux Cerfs	133	Queen Victoria	97
Le Morne	148	Vacoas	111
Palmar	101	Domaines Les Pailles	140
Arnaud	104	Providence	112
Balaclava	120	Plaisance	108
Beaux Songes	155	Quatre Bornes	115
Nouvelle Decouverte	122	Fort William	158
M. Loisir Rouillard	122		

Mean rainfall (mm) for 21 – 25 February 2007

	REGION	MEAN for 21 -25 Feb	LONG TERM MEAN (1971-2000) for	PERCENTAGE (%) OF LONG TERM MEAN for		
MAURITIUS	WEST (W & SW)	386	219	176		
N NW E E SE SE SE	NORTH (N & NW)	153	245	62		
	SOUTH (S & SE)	266	366	73		
	EAST (E)	223	336	66		
	CENTRE (CPW & CPL)	464	464	100		
RODRIGUES	POINTE CANON	55	185	30		
P, CANON CITRONELLE	PLAINE CORAIL	50	168	30		
	CITRONELLE AWS	71	236	30		
AGALEG	99	248	40			
ST. BRAND	208	179	116			
MEAN over MAURITIU	298 mm 89 %					

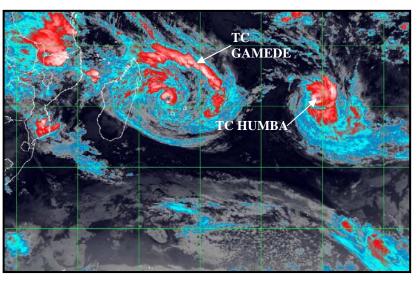


Tropical Cyclone HUMBA

(23 - 28 February 2007)

With GAMEDE still evolving near longitude 75° E, another low pressure appeared near 87° E and eventually developed into tropical depression by 21 February night. It had a broad but poorly defined clockwise circulation flaring west of the low level centre. From thereon till 22 February/ 16hrs00, the system maintained the same intensity (T number 2.0) with however slightly better organisation of the low level circulation which nevertheless

remained exposed east of the fluctuating deep convection. This was mainly due to an upper level

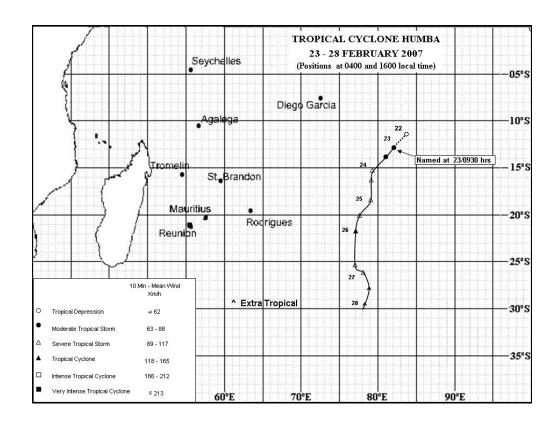


Satellite picture of Tropical Cyclone HUMBA on 25 February 2007 @ 06hrs00

moderate east-north-easterly shear prevailing within the environment in which the system was embedded. This easterly wind shear persisted but on the other side the upper level divergence improved, which led to a better organisation of the low level circulation. This led to a further intensification of the system which reached a T number 2.5 by early morning of 23 February. It was named HUMBA at 09hrs30 (near 12.8° S and 82.1° E) on the same day. Having maintained a T number of 2.5 since early morning, the moderate tropical storm HUMBA attained a T number of 3.0 in the afternoon. (Refer trajectory). HUMBA was evolving along the north-western periphery of an anticyclone and tracked towards the south-west, intensifying rather rapidly at the same time to reach severe tropical storm (STS), T number 3.5, at 22hrs00.

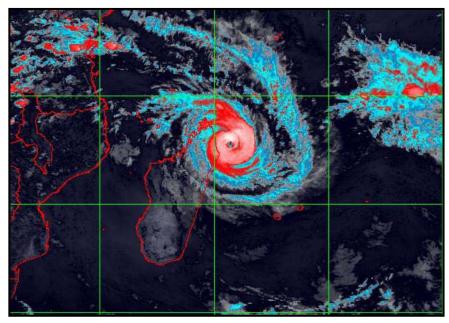
From 23/22hrs00 to 24/04hrs00, it had maintained a general south-westerly movement with a tendency to intensify further. It reached a T number 4.0+ on 24 night tracking in a more southerly direction after 04hrs00. HUMBA was still located along the north-western edge of the mid level ridge east of it and the environment had a good poleward upper level outflow. This favoured a more southerly track and further intensification when it reached a tropical cyclone intensity (T number 4.5) near 20.5° S and 77.2° E on 25 February at 22hrs00. The general southerly track was maintained where tropical cyclone (TC) HUMBA was eventually expected to enter an environment with increasing vertical wind shear.

As TC HUMBA tracked further southwards, its convective activity started to get disorganised under a northerly vertical wind shear. Most of the convective activity shifted to the south of the low level clockwise circulation. On the 26 February at 04hrs00, TC HUMBA weakened into a severe tropical storm (T number 3.5). By 27 February at 10hrs00, HUMBA was already an extra-tropical depression still tracking south onto a cooler environment.



Intense Tropical Cyclone INDLALA

(12 – 18 March 2007)



Satellite picture of Intense Tropical Cyclone INDLALA on 14 March 2007 @ 16hrs00

The Inter Tropical Convergence Zone (ITCZ) was active at the beginning of March. As from 09 March, a zone of disturbed weather was found to evolve along it near 12.1° S and 66.0° E. Initially it moved towards the westsouth-west at 18 km/h. It kept this trajectory till the 11 March at 04hrs00, while intensifying slightly as a tropical disturbance. On this trajectory, the system was approaching St. Brandon island dangerously. On 11

March at 08hrs00, the tropical disturbance was almost to the north of St. Brandon, near

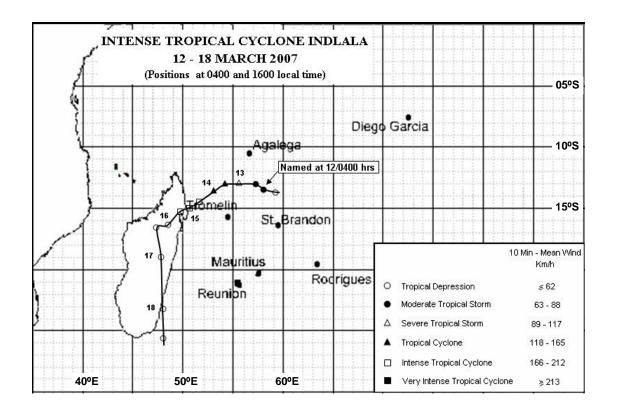
13.4° S and 59.6° E. The highest rainfall was 25.5 mm, highest mean wind 65 km/h. The lowest pressure recorded was 1004.3 hPa at 16hrs00. Thenafter it began to track slowly towards the west and away from St. Brandon.

During the night of 11 March, satellite imagery showed deep convection flaring up near the well-defined low level circulation center. Upper level analysis revealed good equatorial and poleward

diffluence associated with low to moderate vertical wind shear. The system intensified further and became a moderate tropical storm near 13.5° S and 58.0° E, at about 330 km south-south-east of Agalega and was named INDLALA on 12 March at 04hrs00 by the Mauritius Meteorological Services. INDLALA continued to be steered towards the west and west-north-west along the periphery of a sub-tropical ridge anchored south of the Mascarenes. No warning was issued for Mauritius. However, as it was approaching Agalega, several communiqués were issued as the active cloud bands were influencing the local weather. The lowest pressure recorded was 1001.8 hPa on 12 March at 16hrs00 and highest gust was only 48 km/h on 12 March at 19hrs00. INDLALA moved away from Agalega towards the west.

Due to the favourable environment present ahead, INDLALA became a severe tropical storm on 12 March at 22hrs00, near 13.0° S and 56.3° E and remained so till the 13 March at 04hrs00. As conditions remained good for further intensification i.e. good outflow and decreased wind shear, INDLALA organised into a tropical cyclone near 12.9° S and 54.9° E. It tracked westwards till the 13 March at 16hrs00 due to the sub-tropical ridge to the south. From 22hrs00, it recurved towards the west-south-west at 12 km/h.

Tropical cyclone INDLALA continued to intensify at a climatological rate due to good outflow aloft and a small well-defined eye formed near the center. It became an intense tropical cyclone on 14 March at 16hrs00 near 14.5° S and 51.5° E and was approaching the Malagasy Republic dangerously. INDLALA maintained its west-south-westerly track and made landfall over Masoala peninsula, in the vicinity of Anthalaha in the morning of 15 March. Heavy rainfall and hurricane force winds were recorded over northern part of the Republic of Madagascar. Once over land, INDLALA started to lose energy and dissipated very rapidly and became a tropical depression on 16 March at 04hrs00 near 16.3° S and 48.5° E.



Intense Tropical Cyclone JAYA

(29 March – 04 April 2007)

An area of convection far to the east-south-east of Diego Garcia was spotted on 26 March near 11° S and 86° E. It gradually started to move in a general westerly direction. Favourable conditions enabled it to develop into a moderate tropical storm on a general westerly direction and was named by the Mauritius Meteorological Services at 14hrs00 on 30 March, near 13.2° S and 66.6° E.

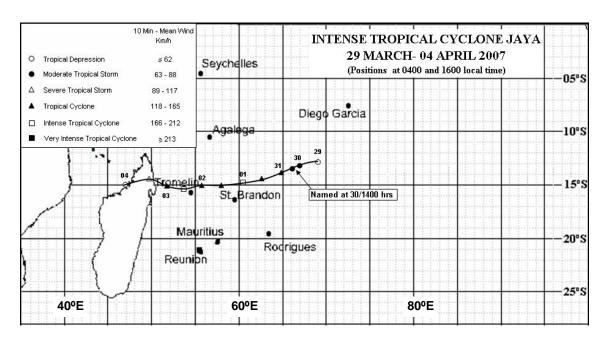
JAYA intensified very rapidly and by 31 March at 04hrs00, it was already a tropical cyclone moving along a general west-south-westerly track at 15 km/h. It was located near 13.8° S and 64.8° E, at about 630 km north-east of St. Brandon. By 22hrs00, JAYA reached intense tropical cyclone intensity. On 01 April at 10hrs00, it again weakened into a tropical cyclone and was centered around 15.0° S and 59.3° E.

Satellite picture of Tropical Cyclone JAYA on 31 March 2007 @ 03hrs00

JAYA was 165 km at its nearest distance to the north of St. Brandon while moving in a west-south-westerly direction at 18 km/h. Lowest pressure recorded at St. Brandon was 1006.0 hPa at 03hrs00 on 01 April. Highest Gust recorded at St. Brandon was 72 km/h. Associated rainfall was 11.7 mm.

Tropical cyclone JAYA moved away from St. Brandon in a general westerly track at 20 km/h. JAYA made landfall over Madagascar, 25 km south of Sambava on 03 April at 12hrs00, keeping a general westerly track and then weakened rapidly. It crossed Madagascar and came over water in the Mozambique Channel on 04 April

morning. JAYA was then located near 15.0° S and 47.0° E. Being in an unfavourable atmospheric condition with easterly wind shear, JAYA stayed as a tropical disturbance in the Mozambique Channel. It then moved in a general southerly track and on 12 April at 10hrs00. JAYA became an extra-tropical depression and got caught up along a frontal system which was moving towards the east.



CHAPTER FIVE

WEATHER SUMMARY

NOVEMBER 2006

The axis of the sub-tropical anticyclone was south of 35° S and as the latter crossed the South Indian Ocean, it extended a weak ridge of high pressure over the Mascarene Islands. The presence of a cold front and a mid-tropospheric trough in the vicinity of Mauritius created a baroclinic zone over our region at the end of the first fortnight. Thenafter, an easterly wave came in phase and gave widespread heavy thundery showers over Mauritius.

Rather damped convection was observed along the equatorial region during the first two weeks of November. Convective activity flared up again to the west of Diego Garcia as from the second fortnight. A marked clockwise circulation was observed near 08° S 58° E on 24 November. The low deepened slowly while moving westward. It reached the tropical depression stage on 30 when it was located to the north of the Mozambique Channel.

Maximum and minimum temperatures were above normal over all the islands.

Total rainfall amount recorded over Mauritius was 90 mm, representing 113% of the long-term mean. Most of this rain fell on 16 November. The weather stayed dry between 18 and 30 November. Agalega received abundant rainfall again with a total of 328.2 mm recorded at the Meteorological Station in North Island. Rodrigues and St. Brandon continued to experience dry spell.

Mean Sea Level pressure was slightly above normal at Plaisance and below normal at the outer island stations.

DECEMBER 2006

The anticyclones to the south of the Indian Ocean maintained a ridge of high pressure over the Mascarene Islands.

Convective activity in the equatorial region was becoming more persistent, especially to the west of Diego Garcia with three named tropical storms/cyclones.

ANITA, the first tropical storm of the season 2006-2007 was named on 01 December by the Meteorological Services of Madagascar. ANITA was short-lived and evolved in the Mozambique Channel without affecting the Mascarene Islands.

Tropical cyclone BONDO, named on 18 December, moved westward passing at about 20 km at its closest distance to the South Agalega Island. Lowest pressure recorded at Vingt Cinq, North Island was 990.1 hPa and the highest gust did not exceed 100 km/h. But BONDO brought heavy precipitation over the island - 287 mm over a 24-hr period recorded on 20 December. Thereafter, BONDO moved into the Mozambique Channel and dissipated on the evening of Christmas day over north-west Madagascar.

A zone of disturbed weather located in the Inter tropical Convergence Zone to the south-south-east of Agalega on 27 December, intensified slowly and became a moderate tropical storm on 31 December. It was named CLOVIS. Thereafter, CLOVIS deepened into a severe tropical storm while moving towards the south-west. It made landfall close to Manajary, Madagascar on 03 January, 2007.

Average day maximum and night minimum temperatures were above normal by over 1.3° C at Mauritius and St Brandon and around 0.5° C at Rodrigues and Agalega.

December was dry over Mauritius with a mean rainfall of 47 mm, representing 24% of the long term mean. Rodrigues as well experienced the dry spell. St Brandon received 62.8 mm of rainfall whereas Agalega Island registered 716.5 mm over the whole month. Mean Sea Level Pressure (MSLP) was above normal by 1.5 hPa at Plaisance and 0.4 hPa at Rodrigues. It was below normal at St. Brandon and Agalega by 0.3 and 0.9 hPa respectively.

JANUARY 2007

At the start of the New Year, severe tropical storm CLOVIS continued its movement in a south-west trajectory, making landfall over Madagascar on 03 January.

The sub-tropical ridge migrated south of the 35th parallel. And, though the monsoon trough was active over the Malagasy Republic, convection remained fluctuating in the equatorial region. The lows that appeared at first were all non-developing.

As from the end of the third week, airmass instability increased over the Mascarenes. The advent of a trough from the west triggered occasional thunderstorms over Mauritius.

An area of disturbed weather to the west of Diego Garcia intensified into a moderate tropical storm and was named DORA on 29 January. As DORA meandered slowly southward, it intensified into an intense tropical cyclone and became a potential threat to the Mascarene Islands. Warnings were issued for Rodrigues.

Average day maximum and night minimum temperatures were above normal over all the islands. At St Brandon the maximum was above the mean by 2.9 degrees Celsius and the minimum was above by 2.2 degrees Celsius.

Significant rainfall was recorded over Mauritius during the last week of the month. Thus total rainfall for January was 131% of the long term mean. Pointe Canon station at Rodrigues received 72.8 mm of rainfall, St. Brandon 20.0 mm and Agalega 213.3 mm. These amounts represented 49%, 12% and 78% of the normal respectively. Mean sea level pressure was above normal by over 1.0 hPa at all island stations, including Mauritius.

FEBRUARY 2007

February 2007 was unusually active with five named storms/cyclones, namely intense tropical cyclone DORA, severe tropical storm ENOK, intense tropical cyclone FAVIO, intense tropical cyclone GAMEDE and tropical cyclone HUMBA. Large scale convection in the equatorial region flared-up even as from the first week of the month, cyclonic activity increasing during the second period of February.

An area of disturbed weather to the west of Diego Garcia intensified into a moderate tropical storm and was named DORA on 29 January. While at a distance of about 750 km to the north-north-east of Rodrigues and considering its trajectory and speed of movement, DORA became a potential threat to the Mascarene Islands. Therefore a cyclone warning CLASS I was issued for Rodrigues. But, DORA would meander slowly southward for the next two days while becoming an intense tropical cyclone. It passed at 90 km to the east-south-east of Mourouk at its closest distance on 06 February. Highest gusts recorded were 78 km/h at Pointe Canon and 83 km/h at Citronelle.

Another area of active convection to the north-east of Madagascar deepened slowly while moving eastward. This disturbance reached the moderate tropical storm stage on 09 February and was named ENOK. The storm passed on St. Brandon causing heavy precipitation and gusts of the order of 160 km/h. Intensifying rapidly into a severe tropical storm, ENOK headed towards Rodrigues at a speed of 25 km/h. Timely warnings were issued for the island (Rodrigues). ENOK passed at 25 km to the west of Port Mathurin on 10 February when cyclonic conditions were registered.

The tropical disturbance to the south-west of Diego Garcia deepened into a moderate tropical storm and was named FAVIO on 15 February, early morning. As the storm threatened Rodrigues, warnings were issued at 10hrs10. FAVIO accelerated along its south westerly track and passed at about 120 km of Pointe Canon at its closest distance. The storm moved in a south-westerly track south of the Mascarenes Islands. As from 18 February, FAVIO gathered strength becoming a severe tropical storm, then a tropical cyclone on the following day. It reached the intense tropical cyclone stage on 20 February and crossing the south Mozambique Channel, it made landfall at Inhambane Province as an intense tropical cyclone on the 22 February. Another zone of disturbed weather intensified into a moderate tropical storm and was named GAMEDE on 21 February. Warnings were issued for Mauritius on the following day. Assuming a westerly, then west-south-westerly track and moving at an accelerated speed of 30 km/h GAMEDE passed just off St. Brandon Islands as a tropical cyclone on 23 February when gusts

exceeding 160 km/h were recorded. The cyclone continued to move in this trajectory at a reduced speed and passed at about 220 km to the north-west of Port Louis at its closest distance on 24 February evening. GAMEDE became an intense tropical cyclone and caused cyclonic condition to prevail over Mauritius late 24 February night and 25 February morning. Highest gusts recorded were 158 km/h at Fort Williams, 155 km/h at Beaux Songes, and 148 km/h at Le Morne. The cyclone brought heavy precipitation over the island.

A marked low pressure area advecting from the Australian area of responsibility on 19 February intensified slowly and became a moderate tropical storm on 23 February and was named HUMBA. Intensification continued and HUMBA became a tropical cyclone on 25 February. But the system evolved in the eastern part of the Indian Ocean throughout its life span and did not directly interest the Mascarene Islands.

Maximum temperature was slightly above average at Mauritius, St. Brandon and Agalega. It was slightly below average at Rodrigues. Minimum temperature was above normal over all the islands, except at Rodrigues where it was near normal.

February was wet with excessive rainfall over Mauritius. Intense tropical cyclone GAMEDE contributed about 110% of the total rainfall for the month. Agalega, St. Brandon and Rodrigues also recorded abundant rainfall amount.

Mean sea level pressure was below normal over the South West Indian Ocean, most stations recording a departure lower than 3 hPa.

MARCH 2007

As ex-GAMEDE moved away from the Mascarene Islands, moist and sultry conditions persisted over our region. The unstable air mass favoured occasional widespread heavy showers over the country during the first week of March. Convection was sporadic on the equatorial region with the formation of two tropical storms, INDLALA and JAYA.

The marked low located near 13° S 65° E on 09 March gradually strengthened into a moderate tropical storm and was named INDLALA on 12 March. INDLALA moved westwards towards Madagascar while intensifying into a tropical cyclone on the following day and reached the intense tropical cyclone stage on 14 March. INDLALA did not directly influence the Mascarene Islands.

A sheared low pressure system was located near 12° S 85° E on 25 March. Under favourable conditions, the low deepened rapidly as from 29 March and reached the moderate storm stage on the following day when it was named JAYA. Intensification continued at a steady rate and JAYA became a tropical cyclone on 31 March. It moved westward without influencing the Mascarene Islands.

Maximum and minimum temperatures were slightly above average at Mauritius, though certain stations over the high grounds reported close to the mean values. At Rodrigues and St. Brandon, temperature was near normal, whereas at Agalega it was above normal.

Inspite of the heavy showers of the first week, rainfall was below normal over Mauritius though the high grounds were well watered. The outer islands Rodrigues, St. Brandon and Agalega also recorded below normal rainfall for the month of March.

Mean sea level pressure gradually stabilized over the Mascarenes. Departure from normal was +1.0 hPa at Plaisance. Pressure anomalies at the island station at Rodrigues, St. Brandon and Agalega recorded near normal values.

APRIL 2007

At 10.00 am on 01 April, intense tropical cyclone JAYA was centered near 15.0 °S and 58 °E. It continued to track westward while weakening slightly due to strong vertical wind shear. JAYA made landfall on 03 April near Sambava, Madagascar, crossed the land mass and emerged again over water in the Mozambique Channel on the following day as a disorganized system. Thereafter, atmospheric conditions became more settled over the Mascarene Islands with the gradual establishment of a weak ridge pressure. The transiting anticyclone to the south of the Indian Ocean maintained a rather moist and slightly perturbed air-stream over our region during the rest of the month.

Convective clouds flared up again at the end of the second week and during the third week to the east of the equatorial Indian Ocean with two non-developing lows appearing for short time period.

Maximum and minimum temperatures were slightly above average at Mauritius, St. Brandon and Agalega and near average at Rodrigues.

Total rainfall was deficient over Mauritius, Rodrigues and Agalega with 56%, 51% and 46% of the long term mean respectively. St. Brandon received near normal rainfall amount.

Mean sea level pressure was 1.7 hPa above normal at Mauritius, whereas it was near normal at the island station at Rodrigues, St. Brandon and Agalega.

MAY 2007

May 2007 was a typical transition month. Activity in the equatorial regions had subsided. The anticyclones transiting to the south of the Indian Ocean were mostly weak (central pressure < 1030 hPa.) and they extended a weak ridge of high pressure over our region. Pressure gradient was slack with light wind blowing over the Mascarenes. However, the airstream became momentarily moist and perturbed as from the second fortnight. A cold front crossed the island on 27 May.

Other noteworthy systems at this time of the year are the extra-tropical lows which travel far to the south of the Indian Ocean from west to east. A deep extra-tropical low, central pressure 945 hPa, was located between Crozet island and Kerguelen island on 10 May. Gale to strong gale force winds associated with this low extended up to a radius of about 1200 km. The maximum gust estimated near the center of the low was 175 km/h. This slow moving extra-tropical low, also known as extra-tropical cyclone generated heavy swells of the order of 10 metres and of periodicity of 18 seconds. The south-westerly wave swells traveled at an average speed of about 50 km/h and reached the southern coast of Mauritius as from the evening of 12 May as a major tidal surge of the 5 – 6 metres wave height (most likely amplified at the time of high tide) and caused extensive coastal inundation. Heavy swells of the order of 5 metres also reached the coast of Rodrigues on Sunday 13 May during daytime.

Both maximum and minimum temperatures were above normal at Mauritius and at the outer islands, namely Rodrigues, St. Brandon and Agalega.

Total rainfall over Mauritius was 145 mm representing 91% of the normal. Rodrigues and St. Brandon recorded about 50% of the long-term mean rainfall. Total precipitation at Agalega was 145.7 mm, representing 143% of the normal for the month of May.

Mean sea level pressure was above normal by 1.5 hPa at Plaisance. Positive pressure anomalies of 0.5 hPa, 0.4 hPa and 0.4 hPa were also observed at Rodrigues, St. Brandon and Agalega respectively.

Mean (mm) rainfall over Mauritius from November 2006 to May 2007

Region> Month	North	North West	East	West	Central Plateau (Windward)	Central Plateau (Leeward)	South East	South	South West	Whole Island
Nov-06	61	38	75	44	168	124	85	123	88	90
Dec-06	24	34	46	14	101	54	60	48	19	47
Jan-07	193	229	381	149	557	443	399	385	187	342
Feb-07	338	445	396	484	876	773	625	714	456	566
Mar-07	107	131	145	85	285	207	168	257	138	169
Apr-07	73	49	107	21	240	153	158	178	88	123
May-07	114	47	164	18	270	125	179	214	101	145
Maan rain	fall over	. Moveiti	ua face	a Novom	her 2006 to	. Amril 200)7		· 1337	mm

Mean rainfall over Mauritius from November 2006 to April 2007 : 1337 mm Normal mean rainfall over Mauritius for summer seasons : 1344 mm Percentage rainfall (mm) over Mauritius from November 2006 to April 2007 : 99 % Mean rainfall at Pointe Canon (Rodrigues) from November 2006 to April 2007 : 523 mm Normal rainfall at Pointe Canon for summer seasons : 724 mm Percentage rainfall at Pointe Canon from November 2006 to April 2007 : 72 %