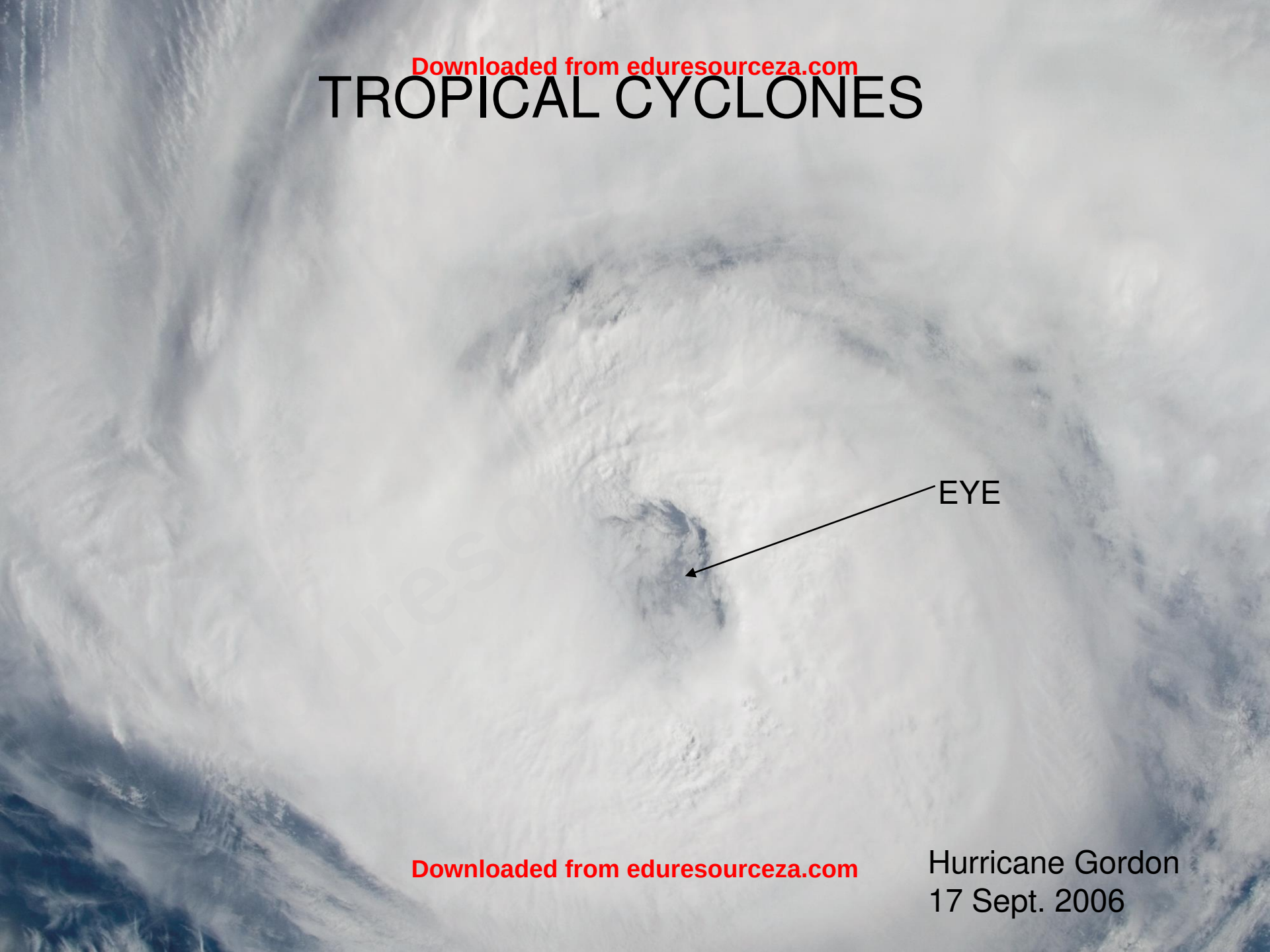




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TROPICAL CYCLONES



EYE

9 Mean number of tropical cyclones per year

Hurricane Local name

August–October

Time of occurrence

Sea temperature over 27°C

Tropic of Cancer

Equator

Tropic of Capricorn

13 Hurricanes
June–October

9 Hurricanes
August–October

6 Cyclones
October–November

8 Cyclones
December–March

26 Typhoons
May–December

10 Cyclones
January–March

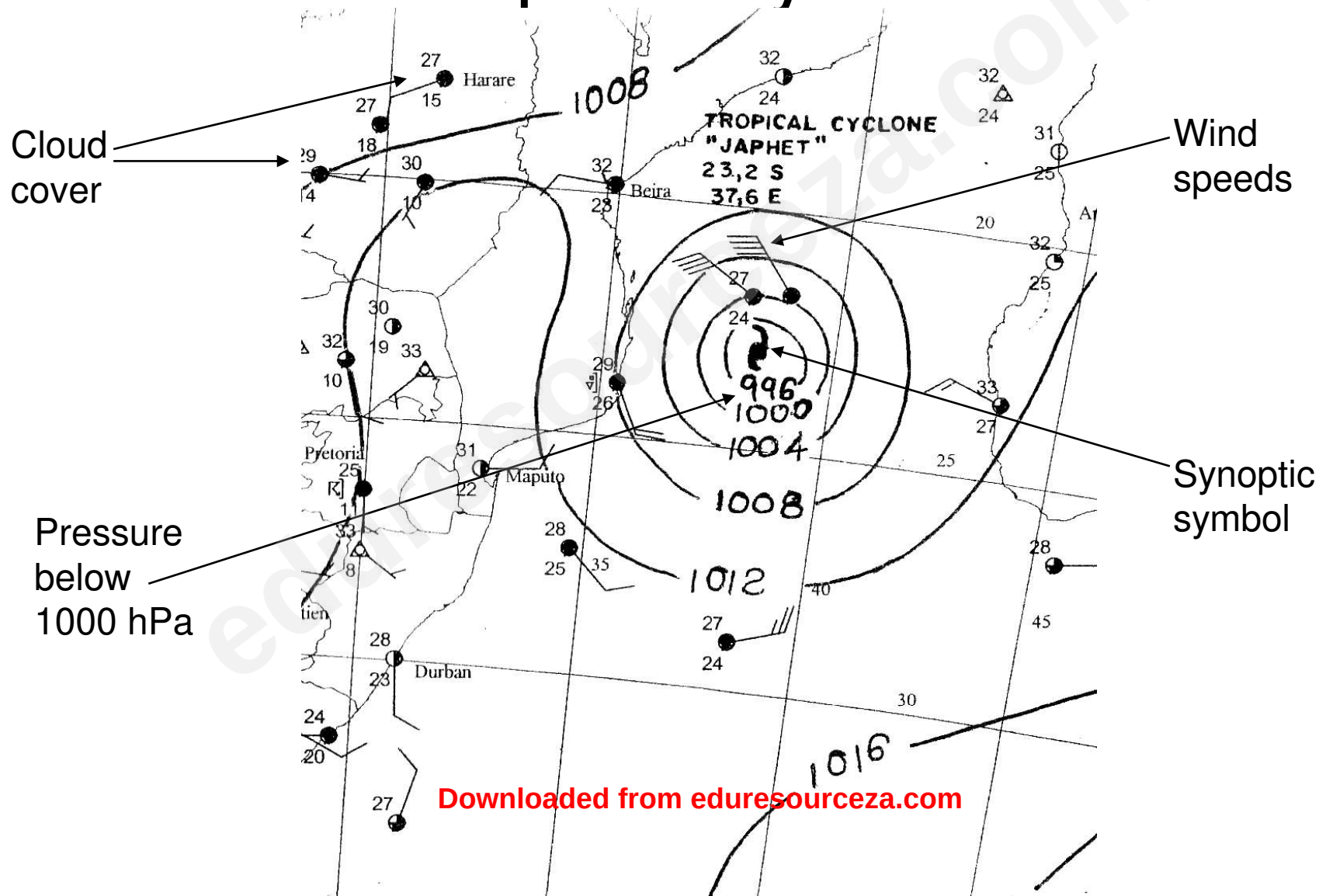
Figure 13.12

Location and frequency of tropical cyclones

Requirements	Reason
Ocean temperatures over 27°C	1 Heat is needed for convection. 2 Friction is at a minimum over the ocean. 3 The air is heavily charged with water vapour in a tropical maritime atmosphere.
Unstable air	Convection must be possible.
Very low pressure and steep pressure gradient	1 Rapid convergence helps the air to rise 2 The steep pressure gradient helps Coriolis Force to develop and causes the rotation
An undisturbed period of several days.	Time is needed, 1 for the slow convergence of warm moist air towards the low pressure centre and, 2 to develop its cyclonic vorticity and convective activity.
Some upper-air triggering action.	A strong horizontal divergence of air at upper levels would stimulate the circulation and formation of a vortex.
Winds must be light and variable before the formative period.	Strong winds or winds from a constant direction, 1 will prevent the development of a vortex, 2 disturb the low level distribution of water vapour and, 3 reduce the surface temperature of the water.

How to recognise a Tropical Cyclone

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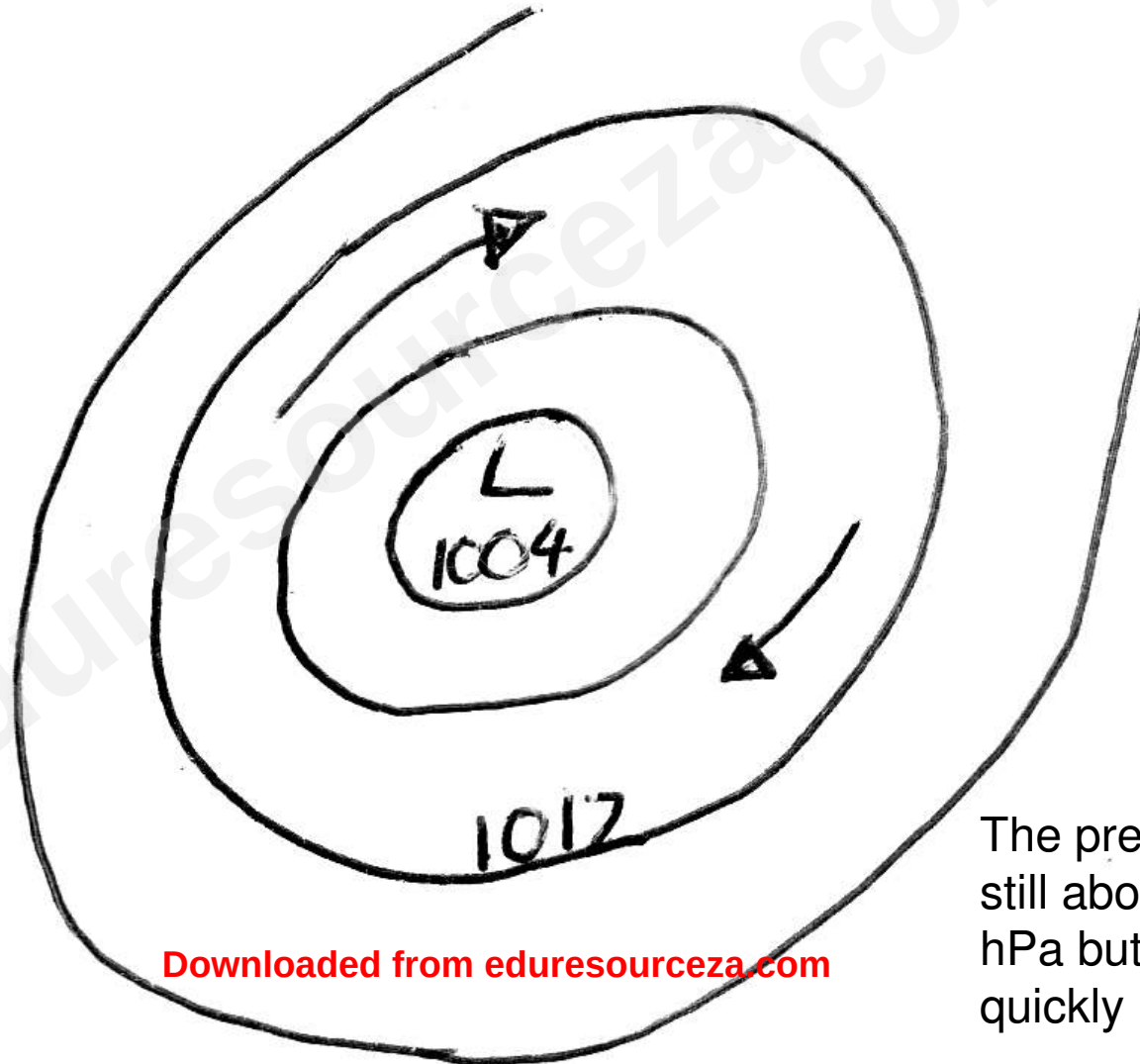


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Formative Stage (Tropical Depression)

Winds are
already at gale
force in the
front left hand
quadrant



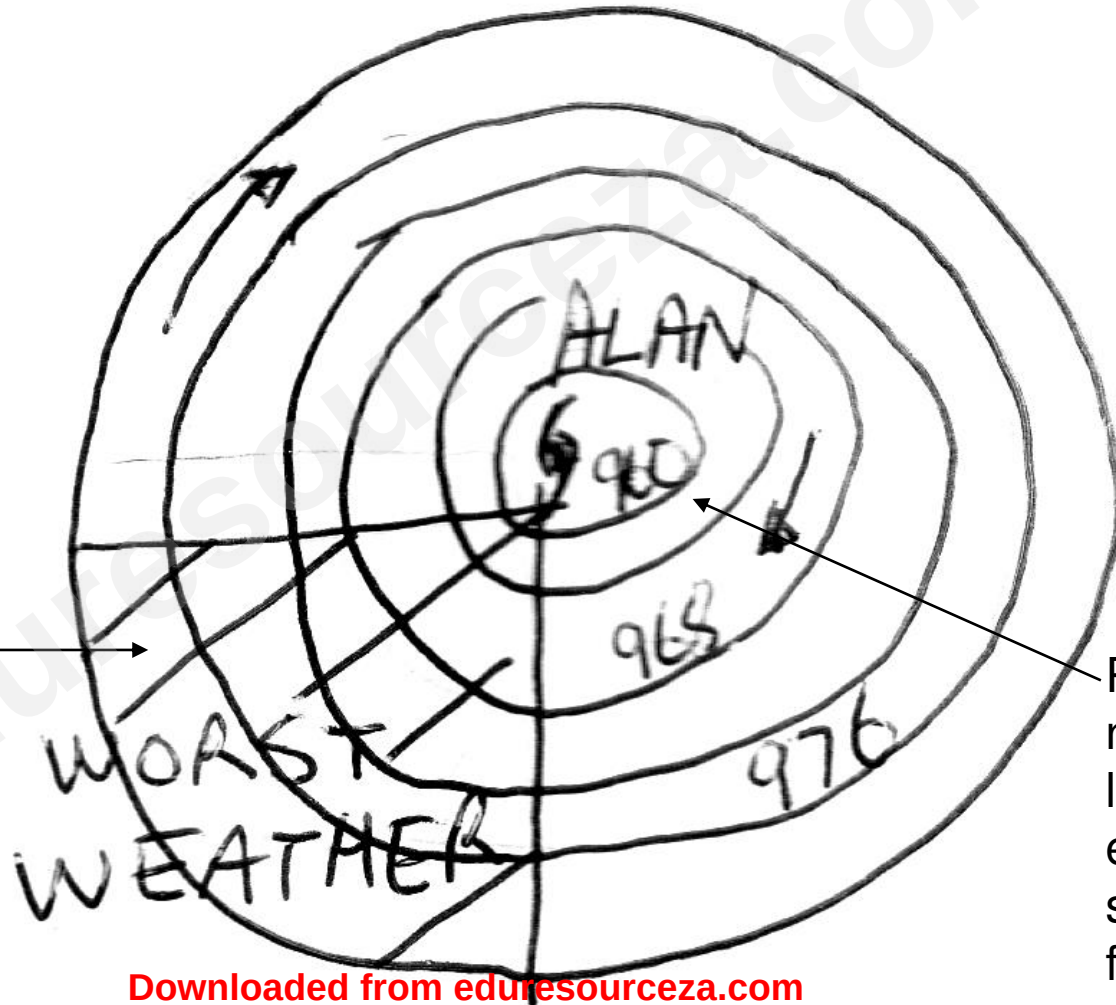
The pressure is
still above 1000
hPa but dropping
quickly

Immature Stage (Tropical Storm)



Mature Stage (Tropical Cyclone)

Weather & winds (hurricane strength) are at their worst especially in the worst weather quadrant



Pressure is now very low in the eye but has stopped falling

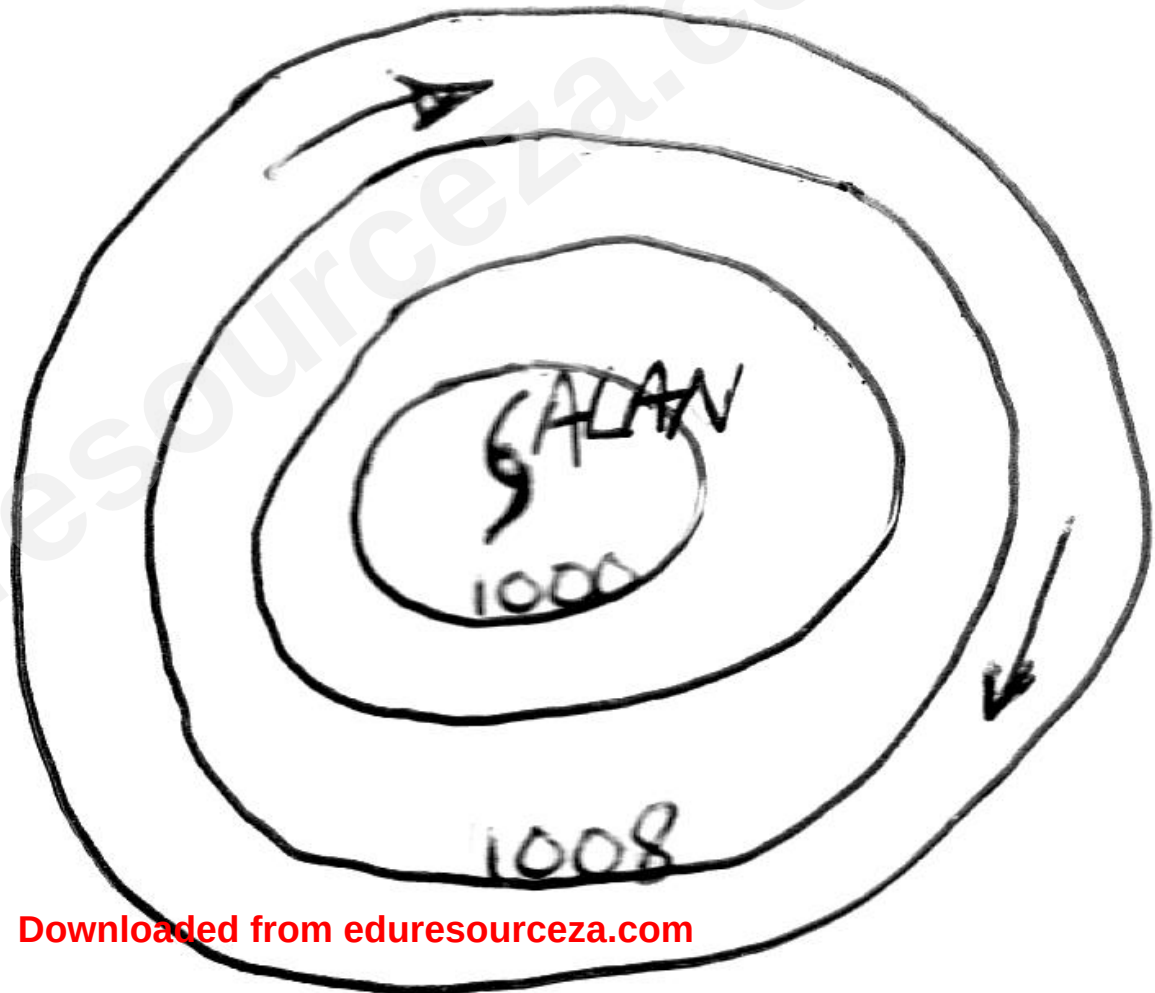
Dissipating Stage

Pressure
begins to rise

There is still
heavy rain

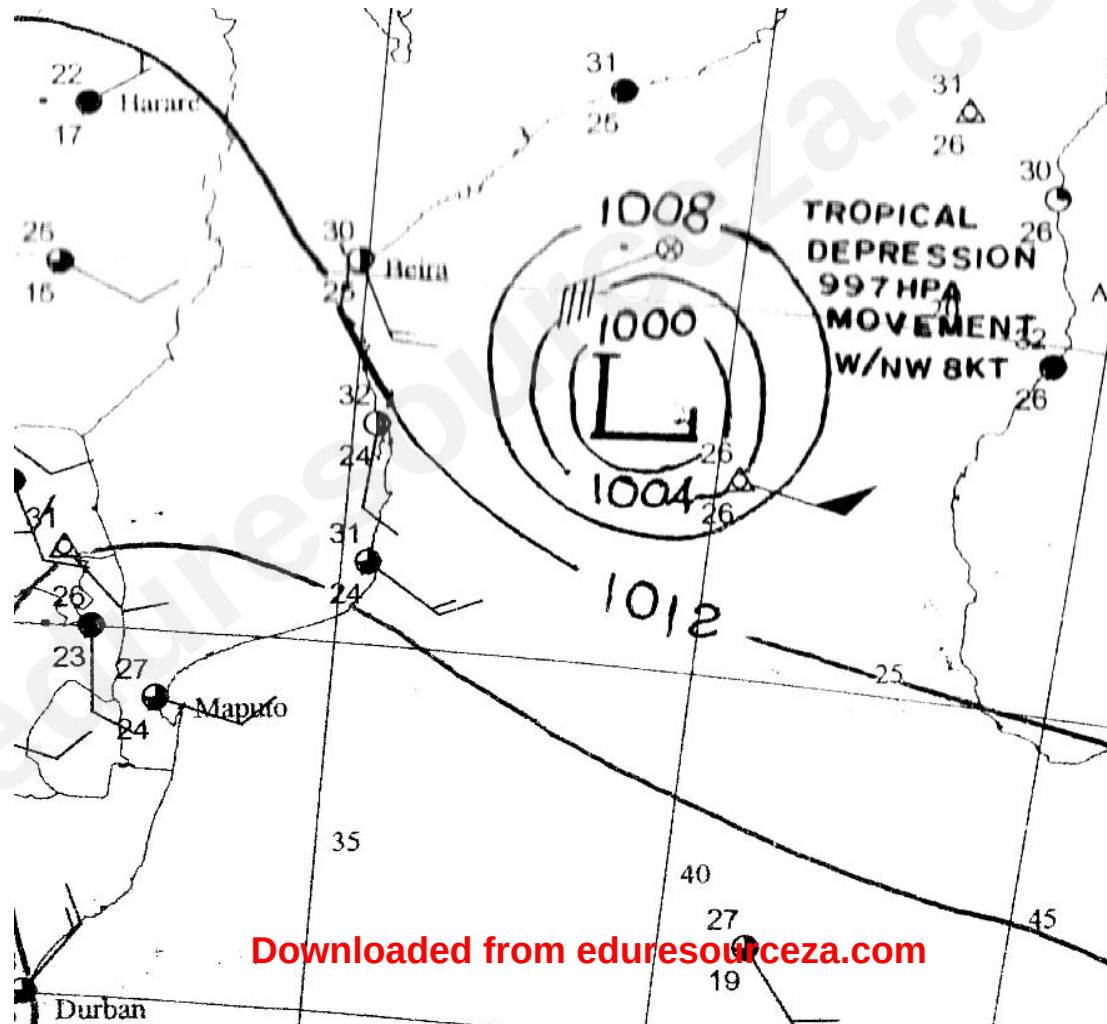
Winds drop in
strength

The system is
probably over land or
over cooler water and
does receive latent
heat



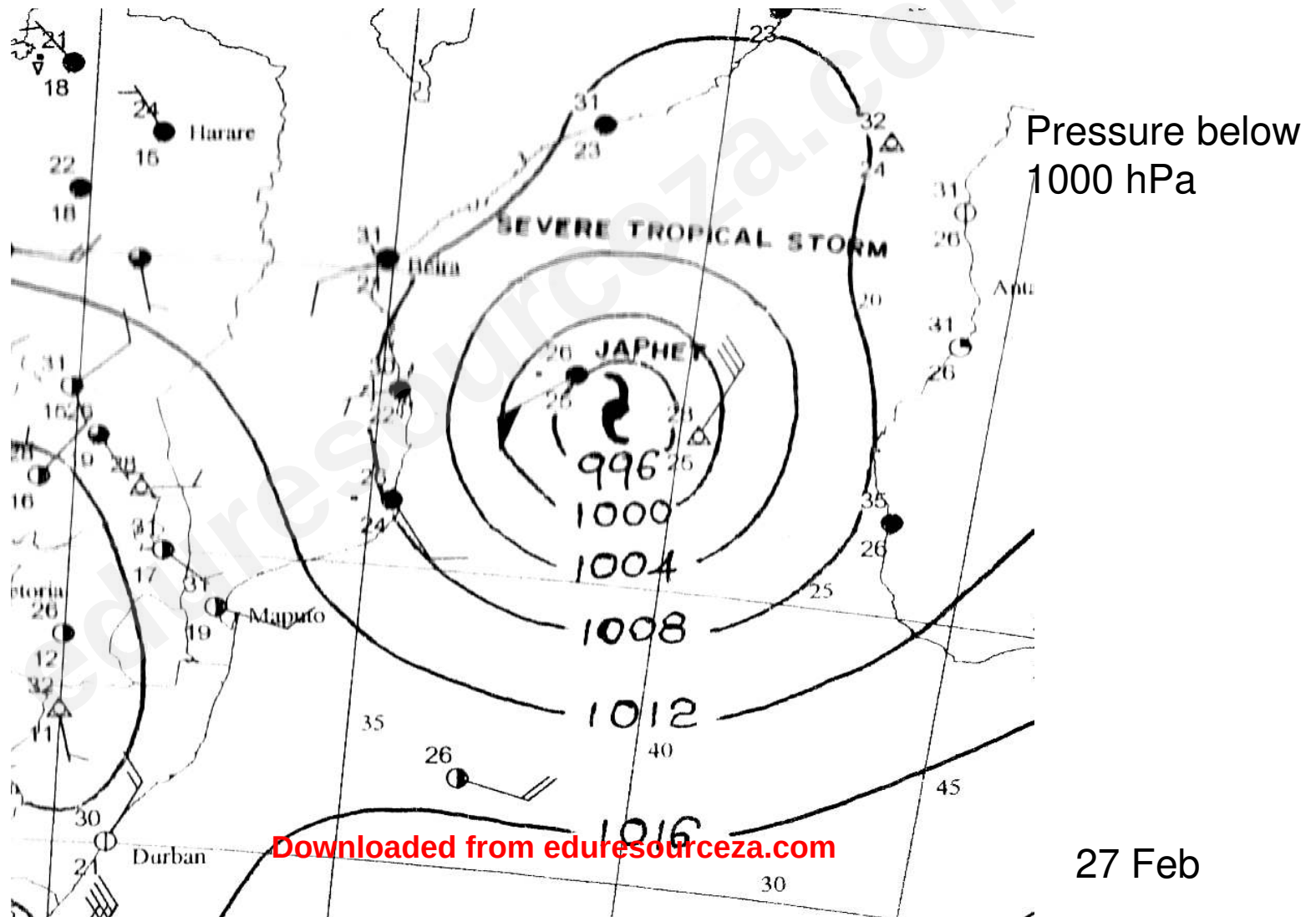
The Development and Decay of Tropical Cyclone Japhet

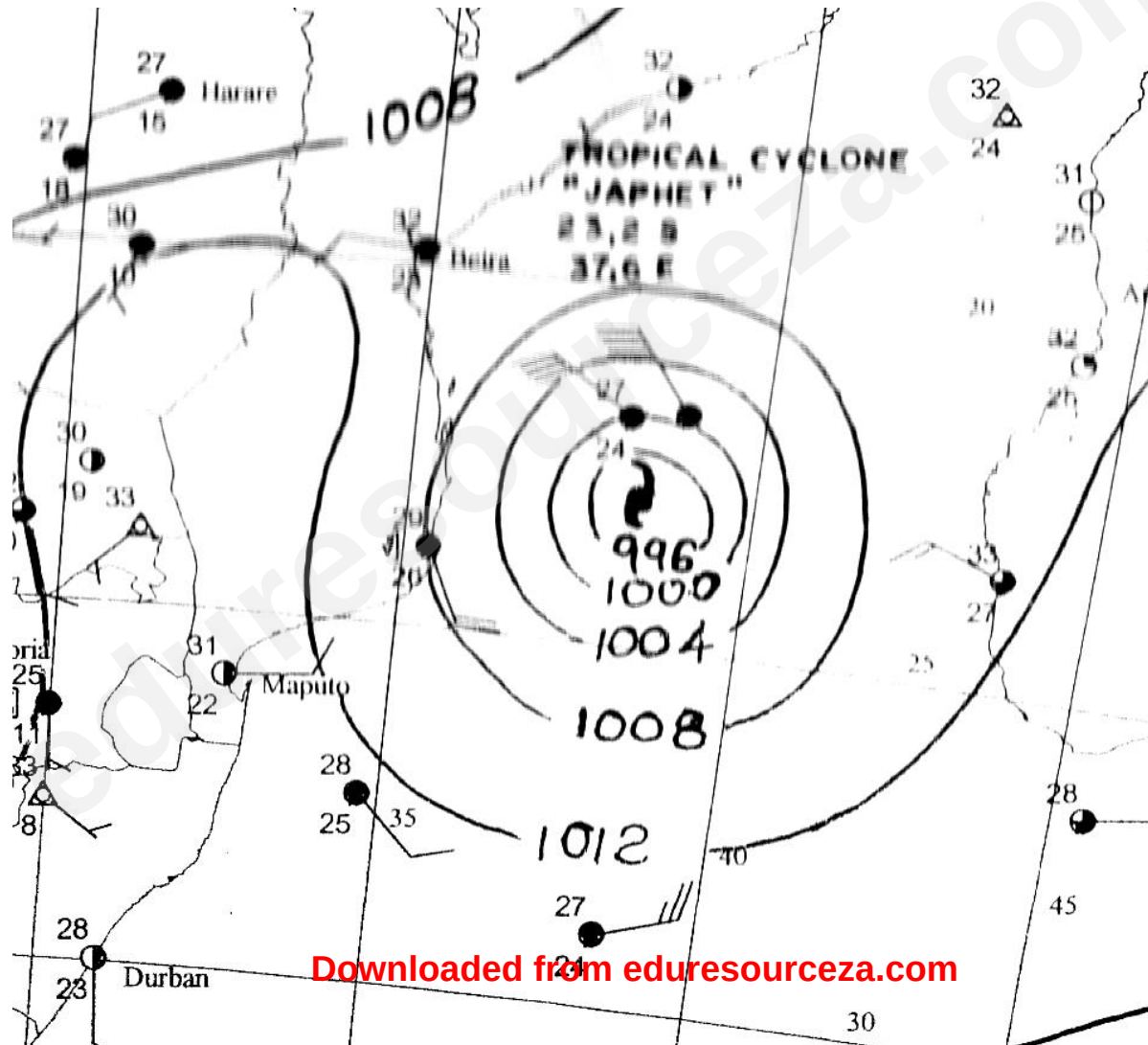
DAY 1 Formative Stage



26 Feb 2003

DAY 2 Immature Stage



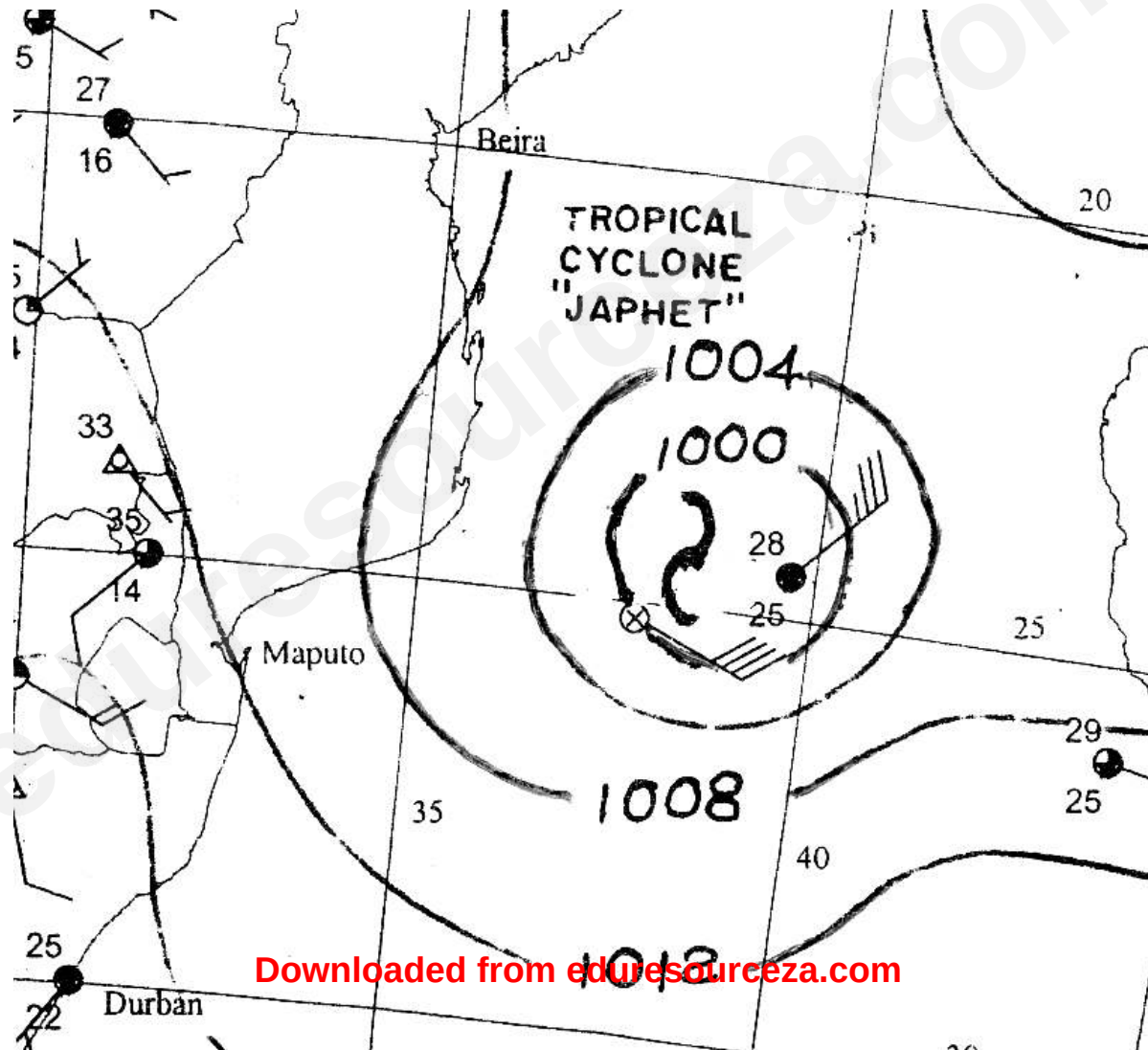


28 Feb

DAY 4 Dissipating/Rejuvenating

Has the
symbol

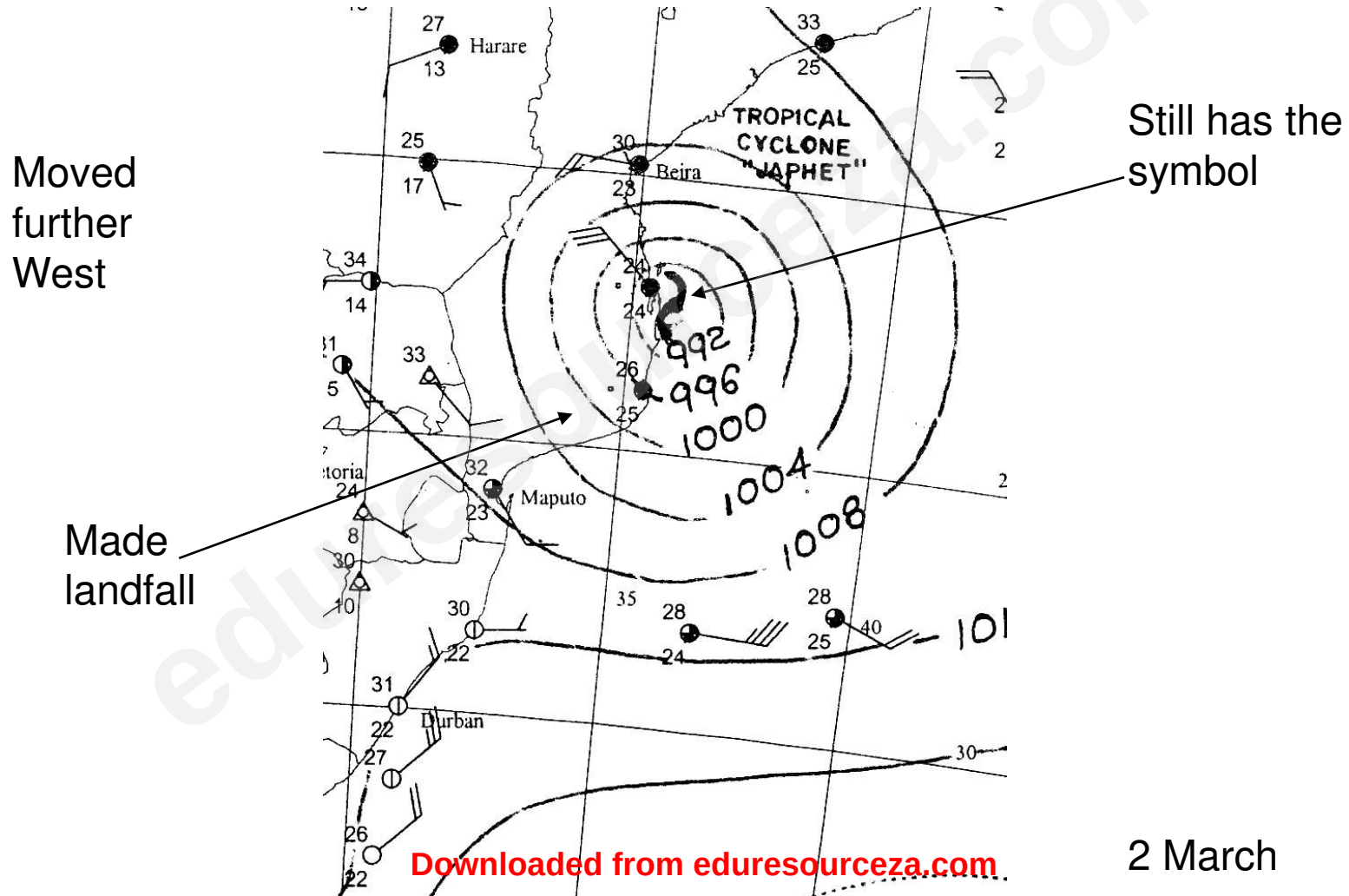
Over
warm
ocean



Pressure
around 1000
hPa

1 March

DAY 5 Rejuvenated stage



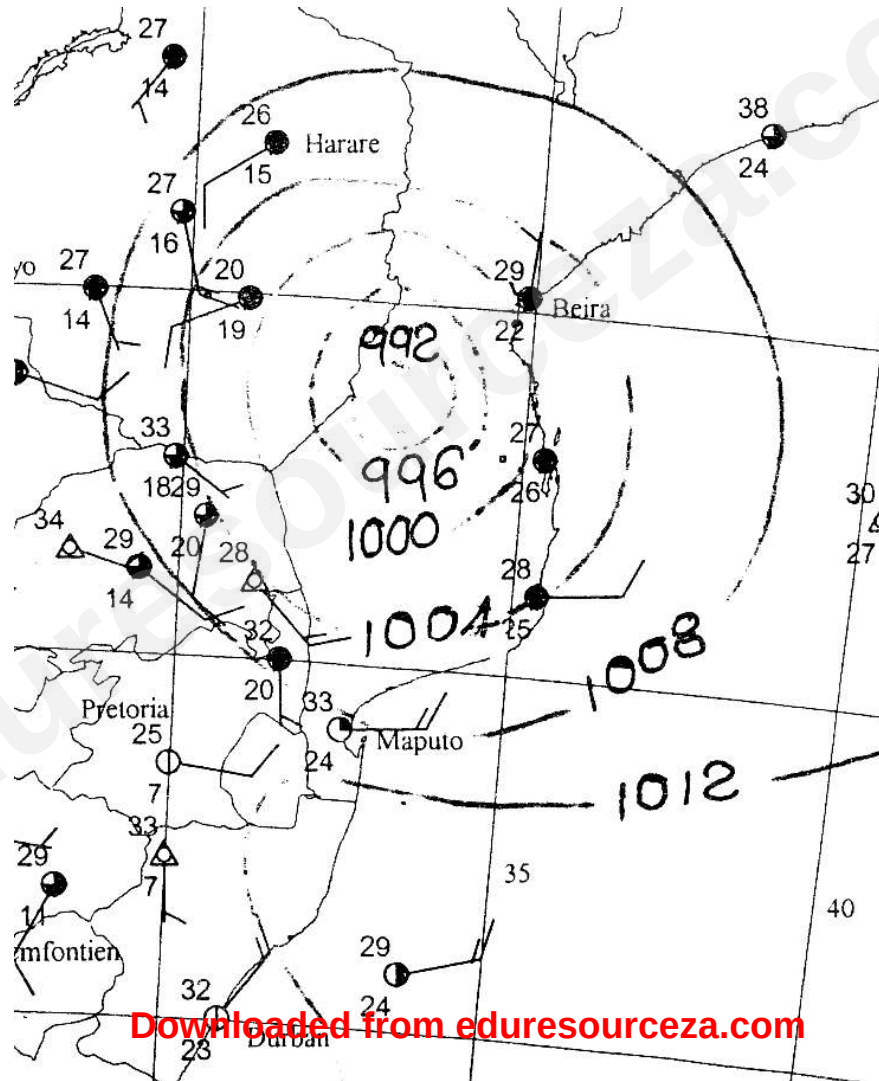
DAY 6 Dissipating Stage

Over
land

Reduced
source of
moisture

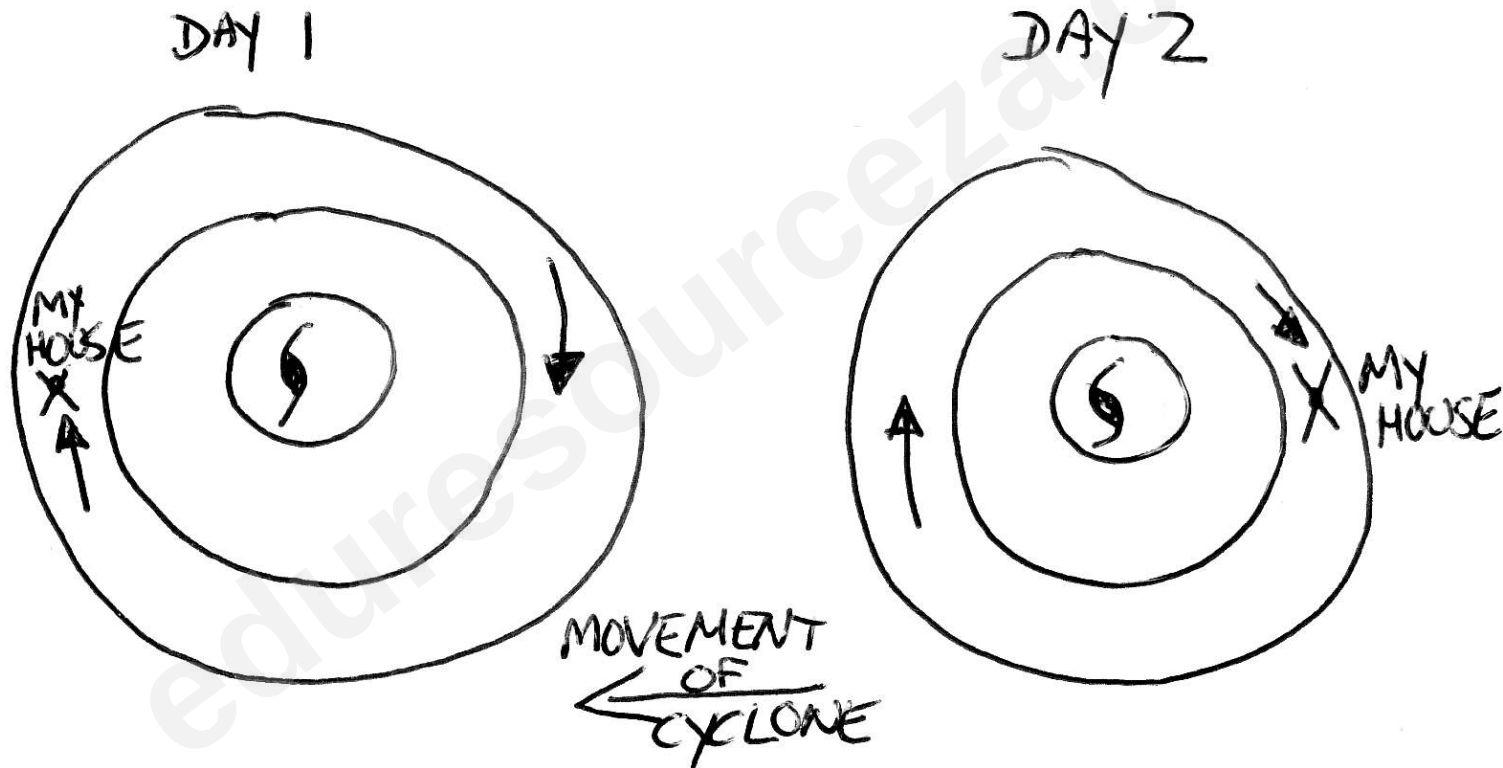
Friction
increases

Pressure
begins to
rise

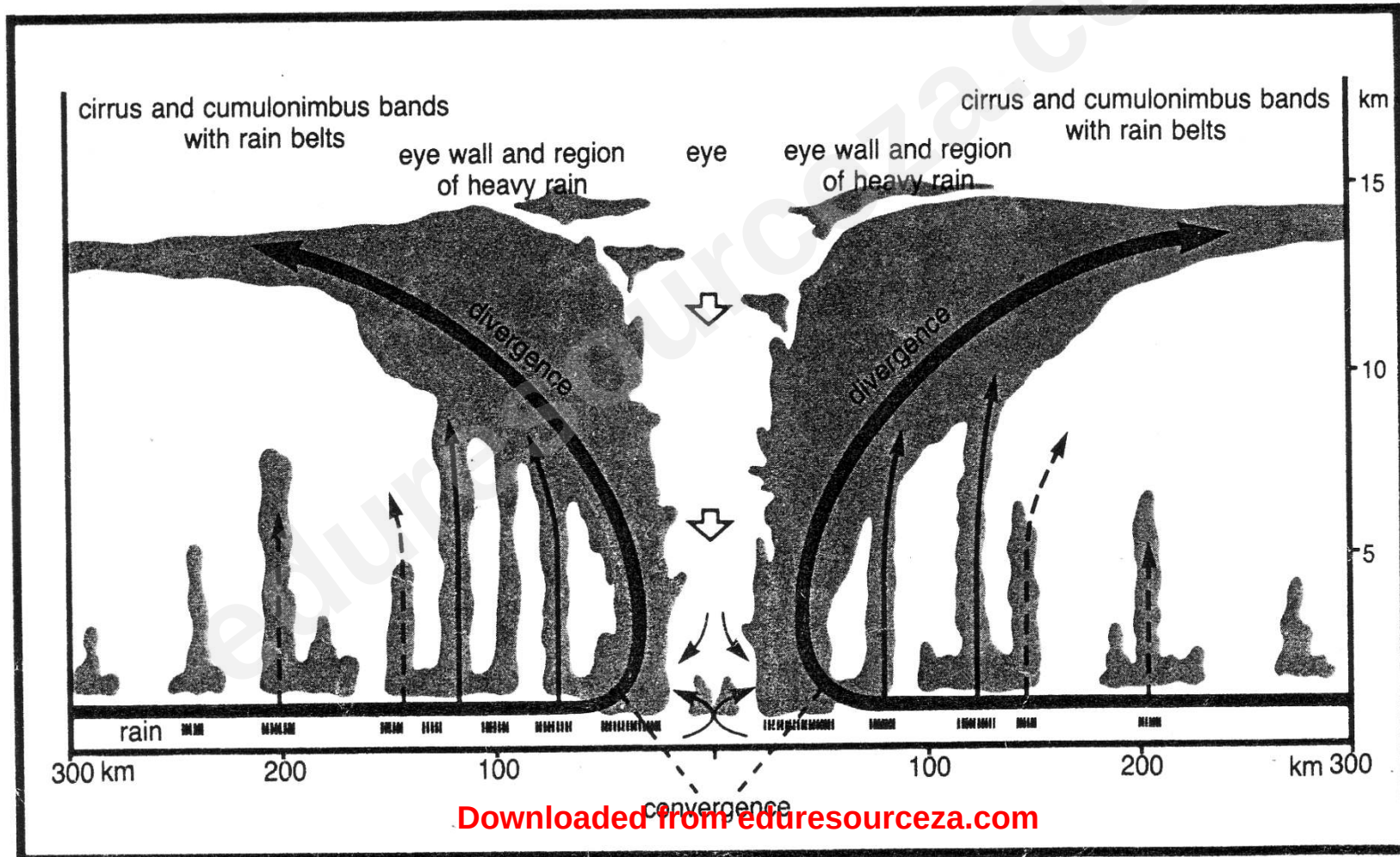


3 March

Wind reversal after a Tropical Cyclone

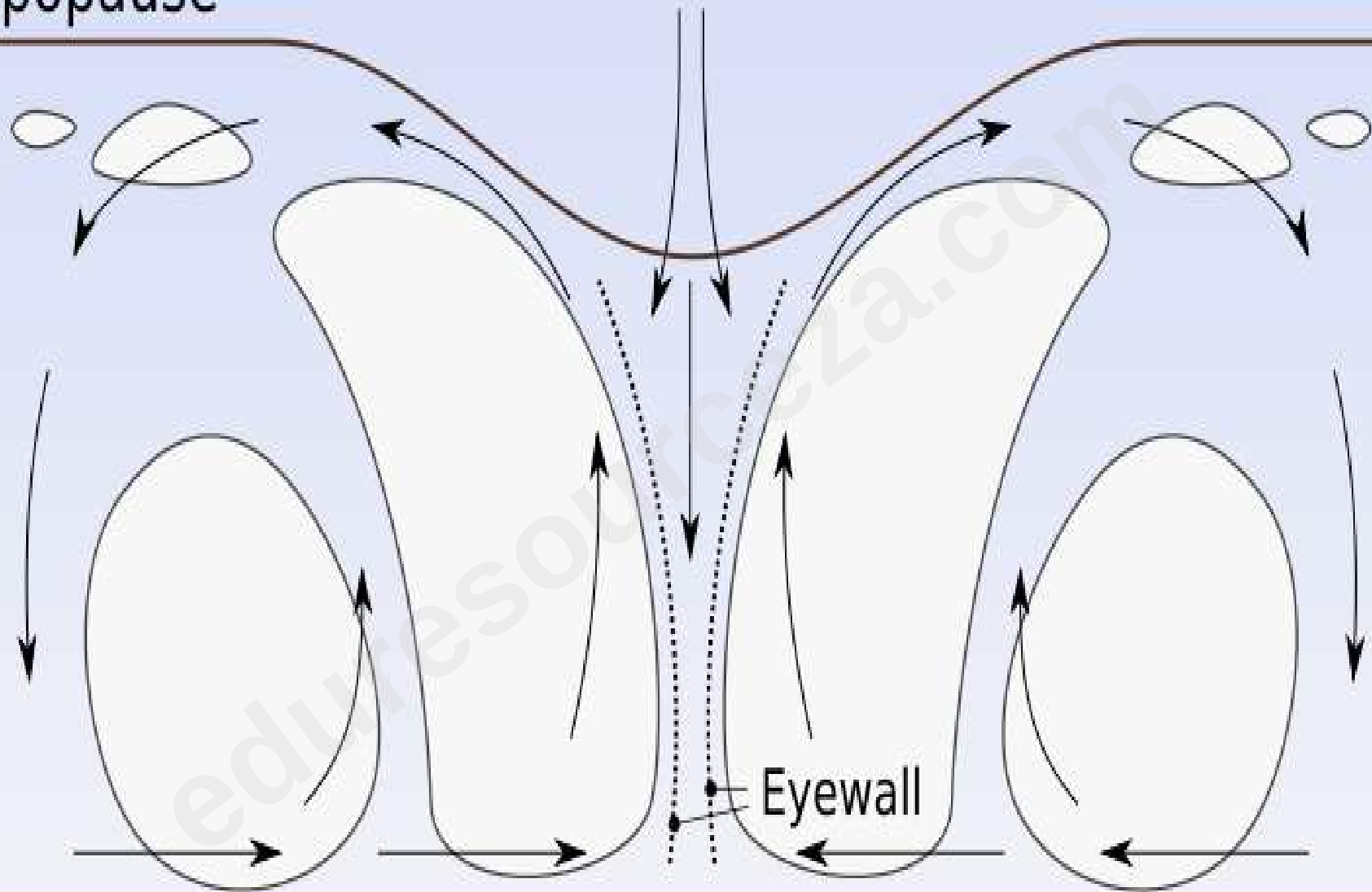


Cross-section through a mature tropical cyclone

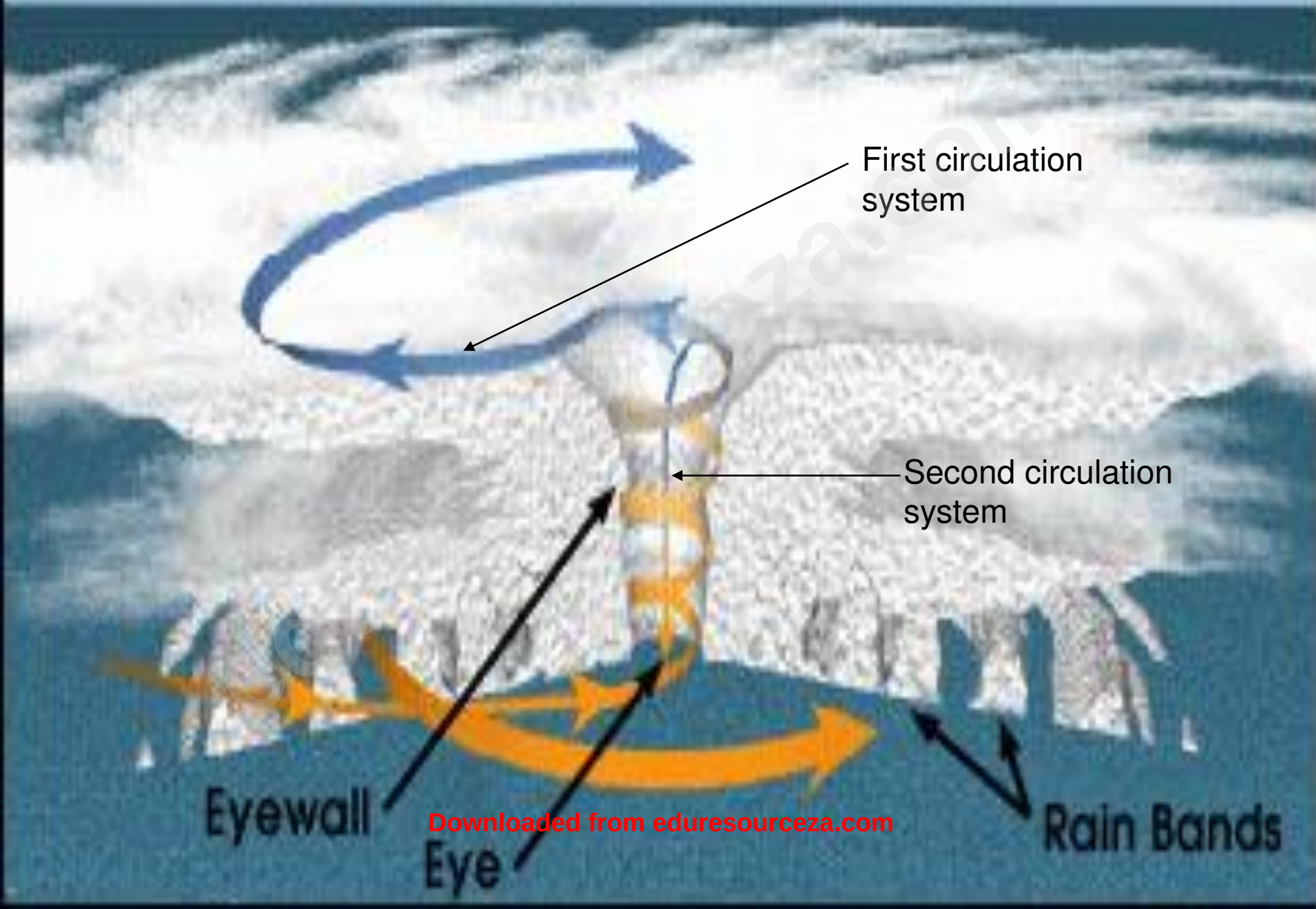


Tropopause

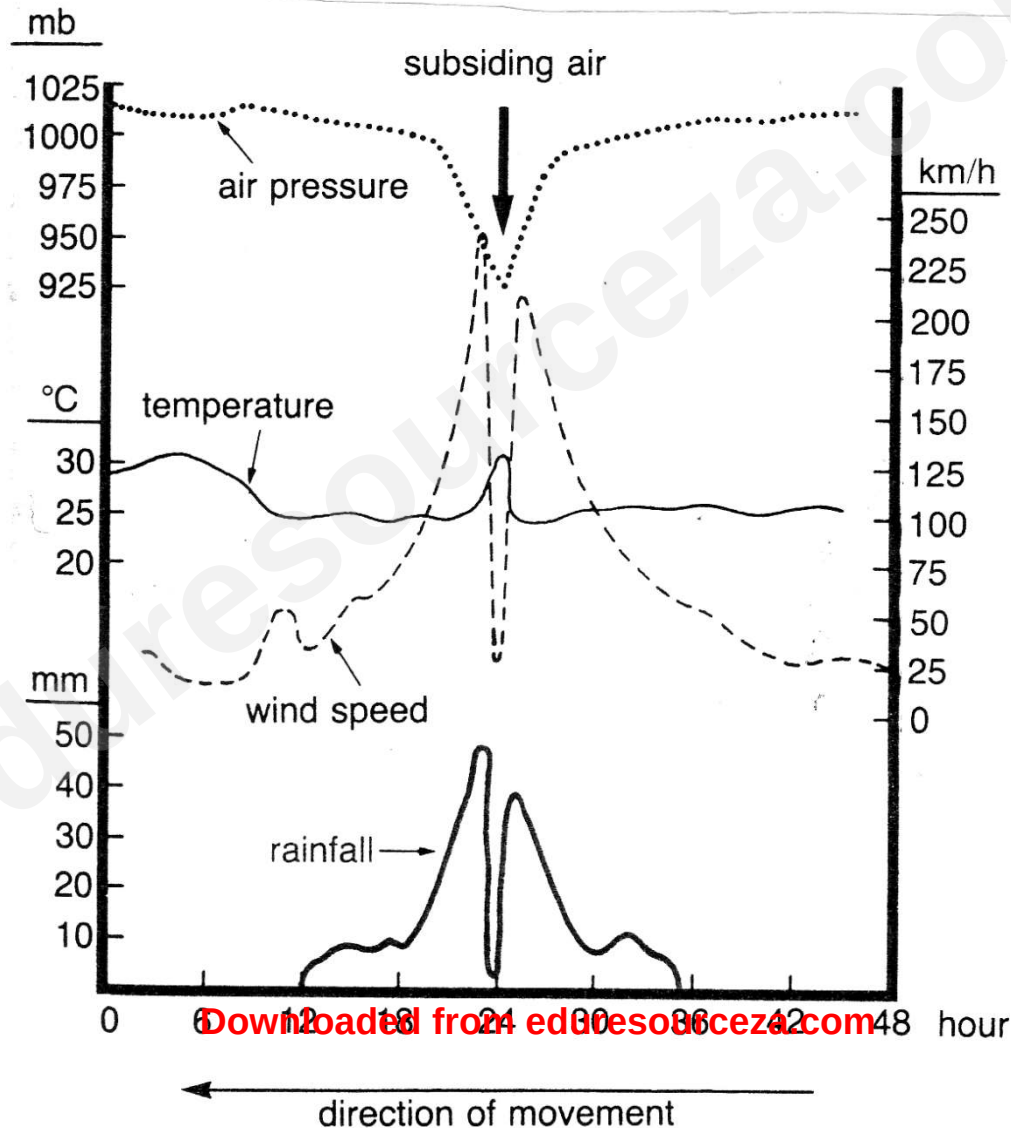
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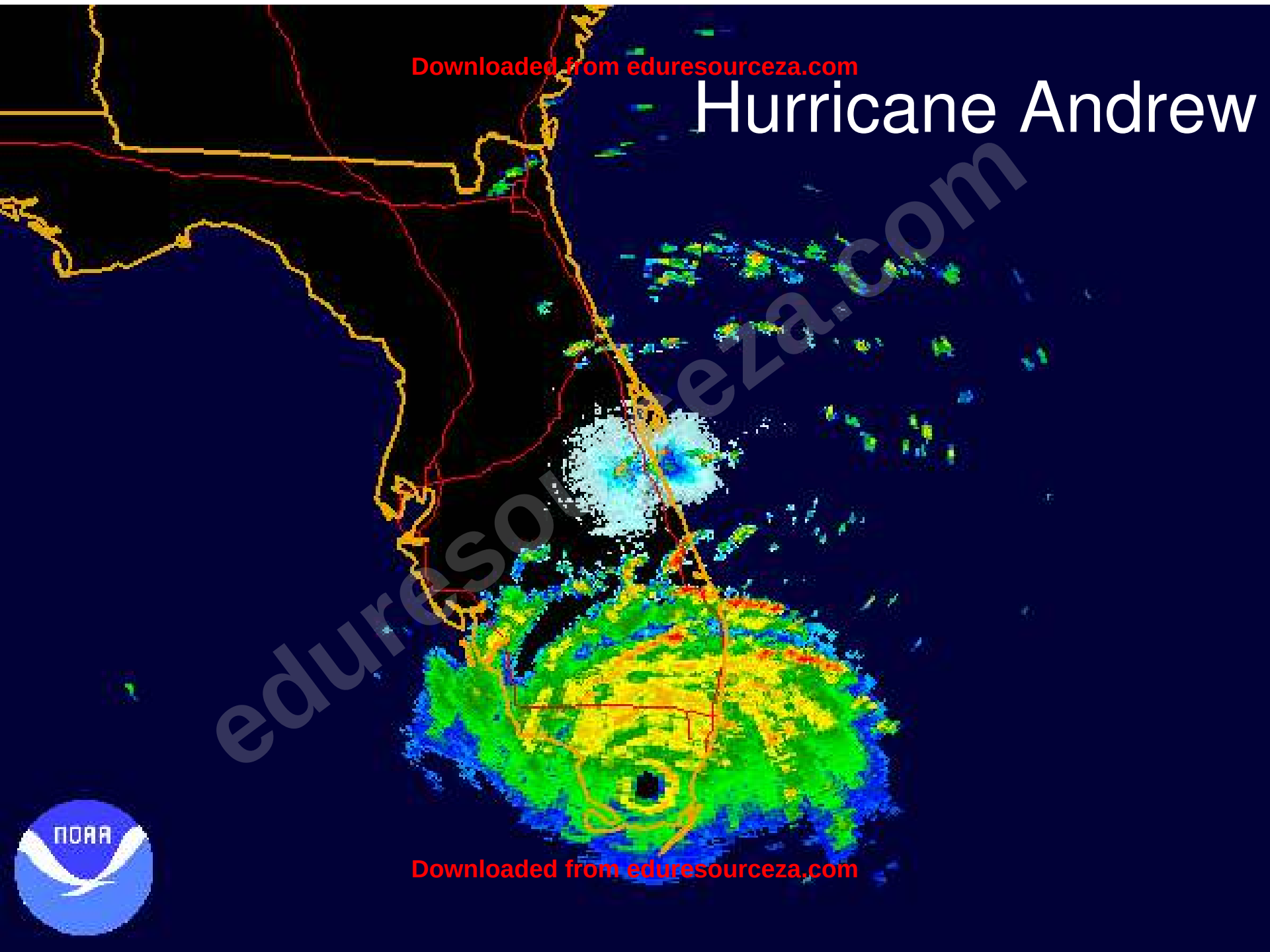


Graph of weather conditions over a 48 hour period of a tropical cyclone



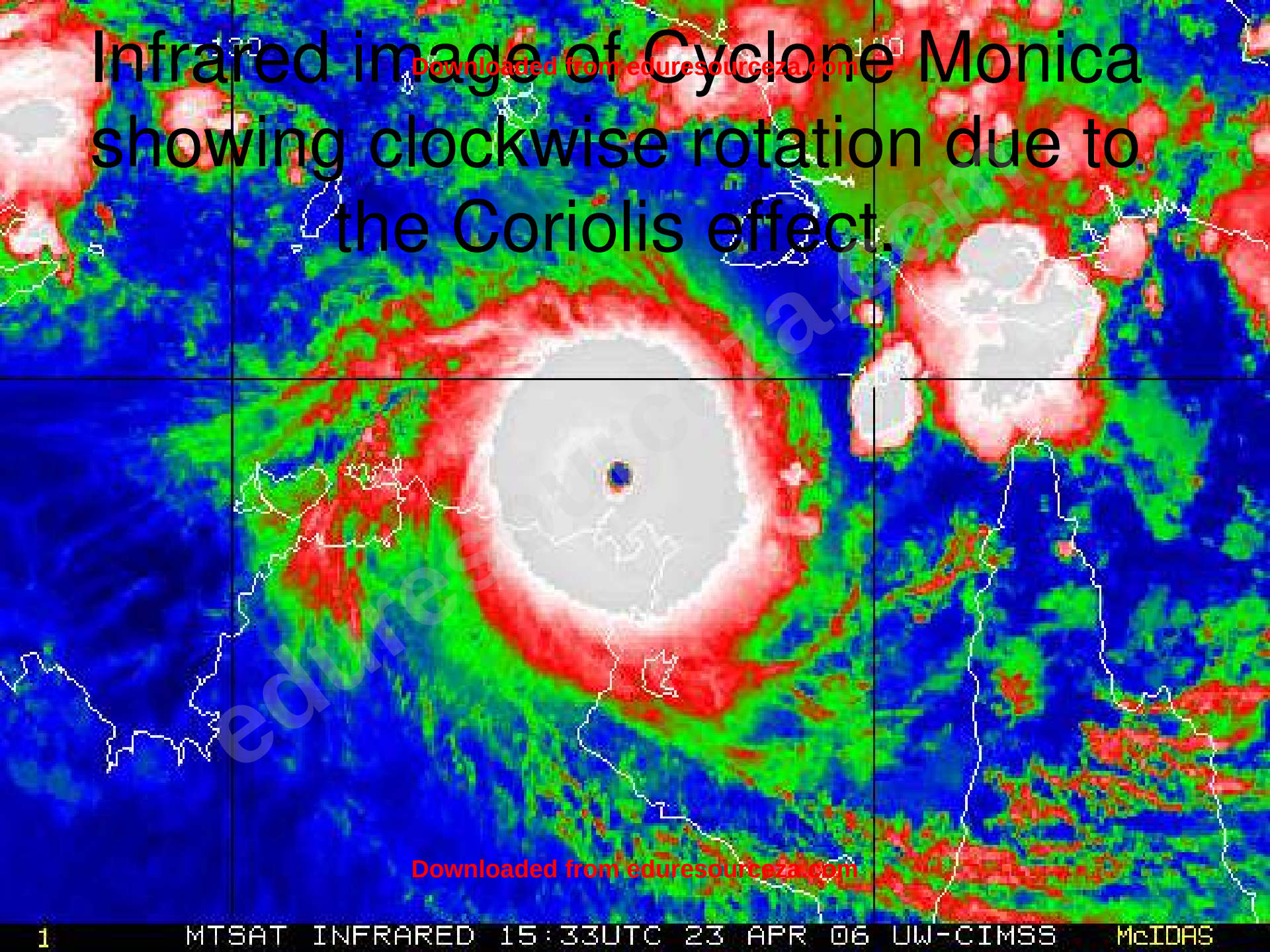
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Hurricane Andrew



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Infrared image of Cyclone Monica showing clockwise rotation due to the Coriolis effect.



A satellite photo of Typhoon Amber, exhibiting an outer and inner eye wall

Inner eye wall

Outer eye wall

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Three tropical cyclones at different stages of development. The weakest, on the left, demonstrates only the most basic circular shape. The storm at the top right, which is stronger, demonstrates spiral banding and increased centralization, while the storm in the lower right, the strongest, has

developed an eye.

Typhoon Bopha

Tropical storm Maria

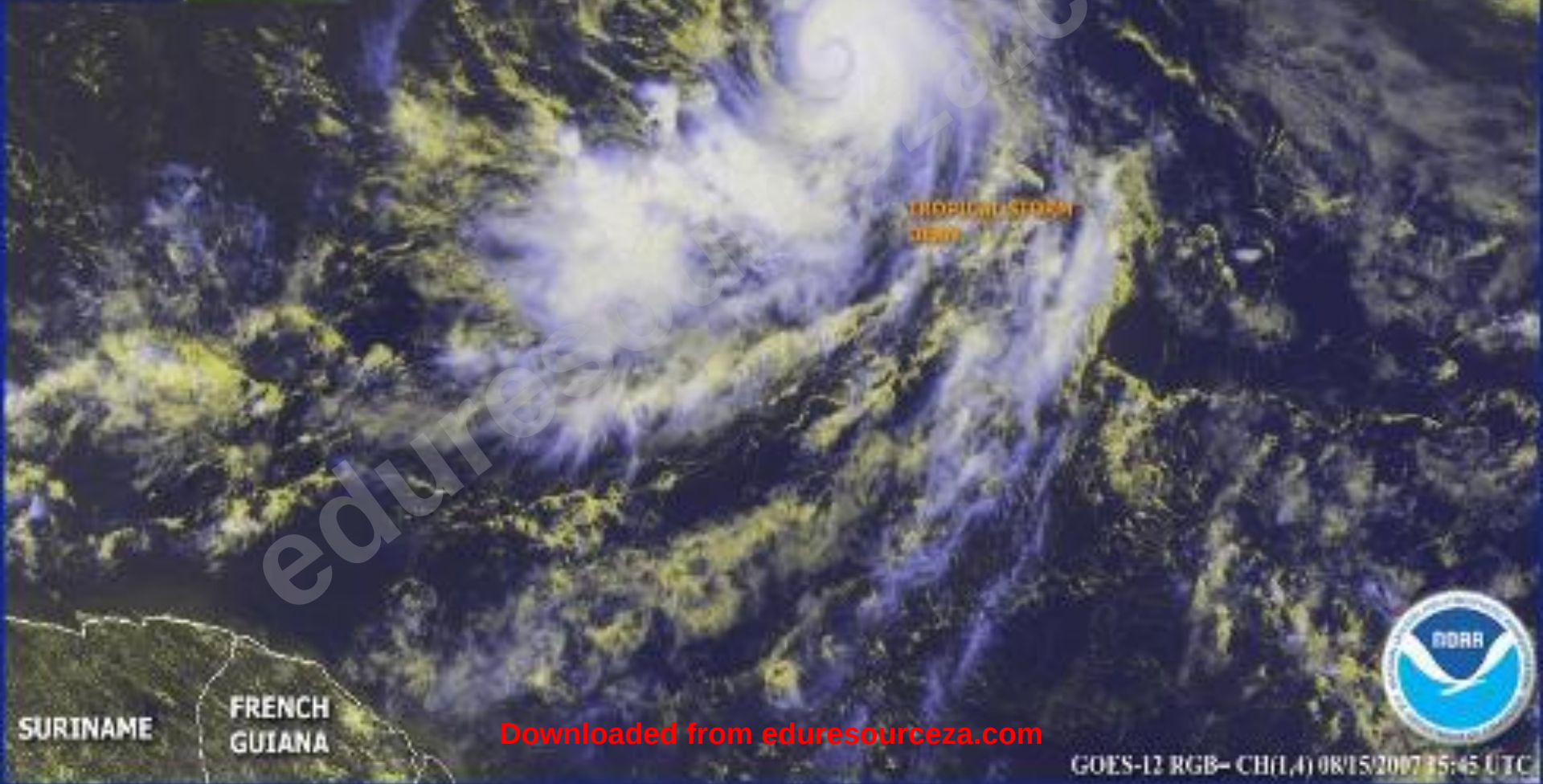
Typhoon Saomai

Comparison Between Tropical Cyclones and Frontal Depressions

	Tropical Cyclones	Frontal Depressions
Names	Hurricanes, typhoons	Temperate cyclones, mid-latitude cyclones, extra-tropical cyclones
Origin	Over tropical oceans, 5 – 30°N & S	At polar front: 40 – 60°N & S
Pressure	Very low, below 970 hPa	Low, 990 – 1000 hPa
Pressure Gradient	Very steep	Less steep
Movement	East – west, carried by tropical easterlies (easterly waves)	West – east, carried by westerlies
Wind speed	Very fast – hurricane strength	Less fast, less than gale force
Size	300-500km in diameter	1000-3000Km in diameter
Duration	Up to 14 days	4 – 14 days
Occurrence	Mid – late summer	Winter (in SA)
System	First vortex, eye, second vortex	Warm front, warm sector, cold front
Weather	Warm – hot, violent winds, intense thunderstorms	Cool, cloudy, rainy conditions
Energy of system	From latent heat being released by condensation of unstable, warm, moist air	From the cool air pushing up the warm air along the fronts
Areas affected	Eastern side of continents in tropical latitudes	Western side of continents in temperate latitudes

This is a geographical reference

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