



# GEOGRAPHY

## Revision

### Climate and weather



# MID-LATITUDE CYCLONES

1

Cold and warm fronts

2

Characteristics

3

Stages

4

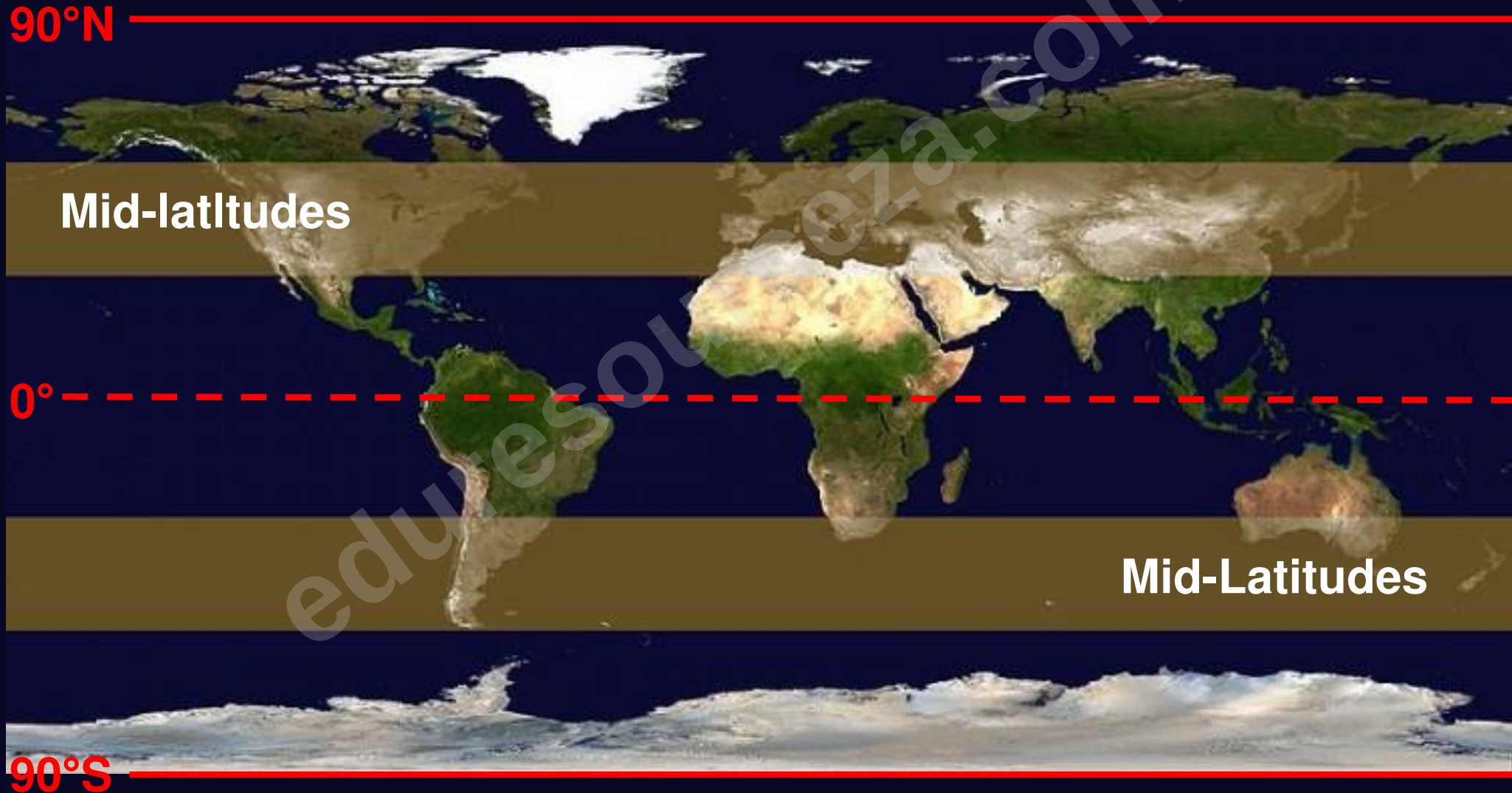
Weather





# Where do mid-latitude cyclones form?

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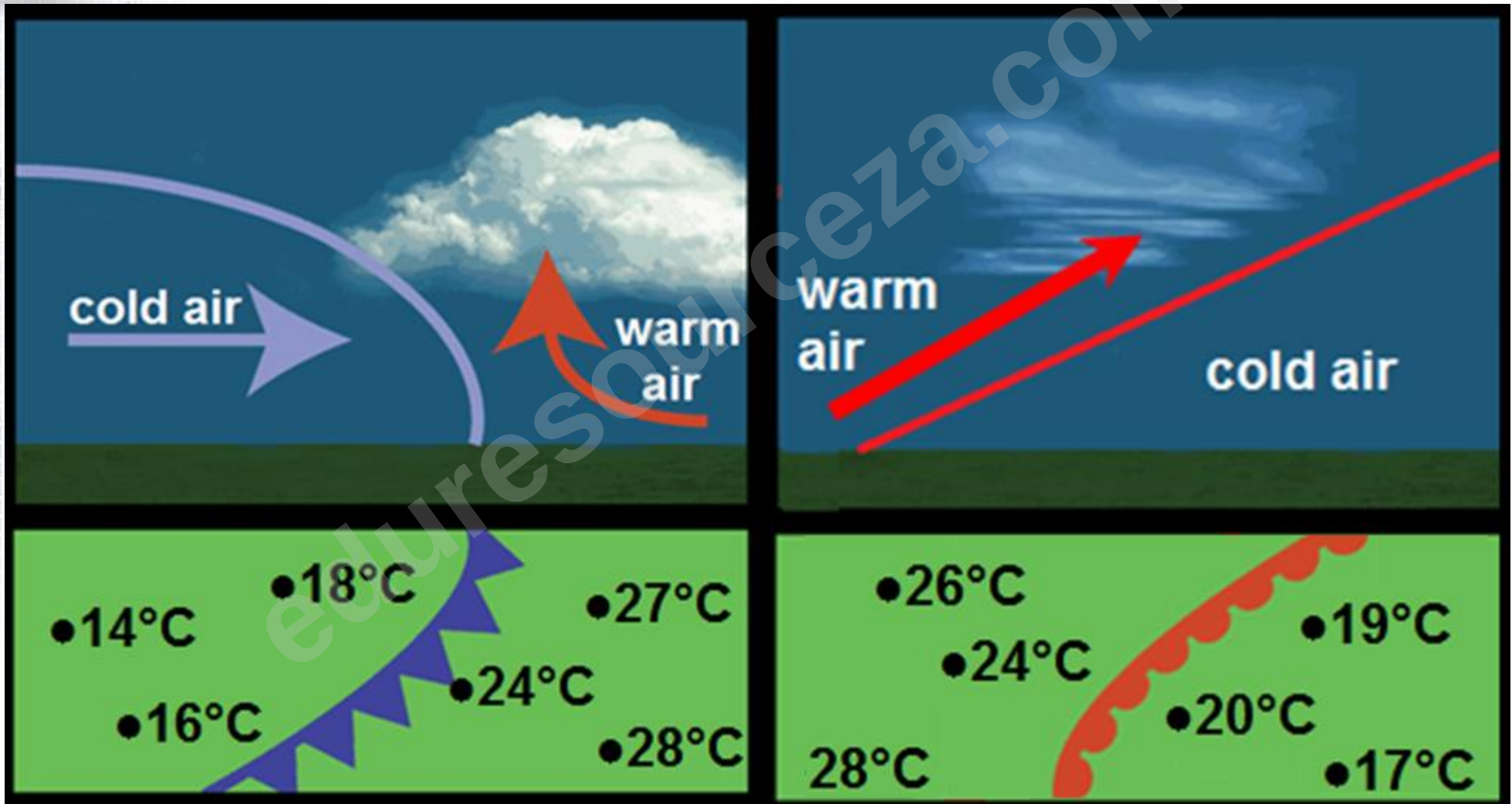
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# What are warm and cold fronts?

## COLD FRONT

## WARM FRONT



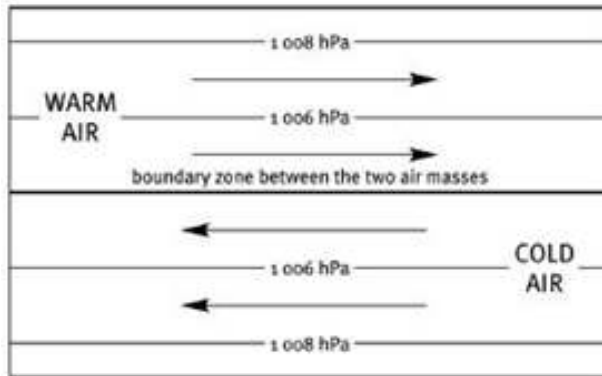
Cold air behind cold front Warm air behind warm front



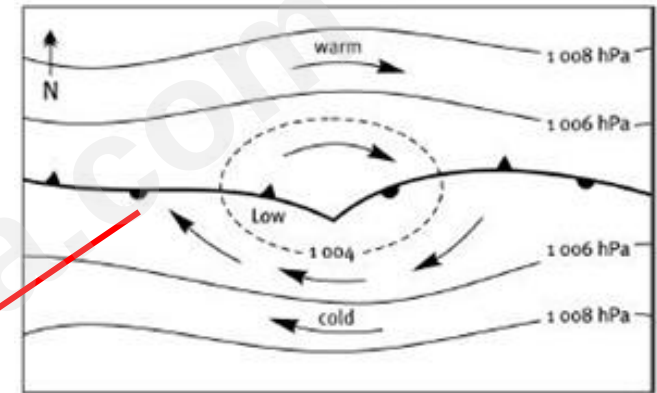
# MIDLATTITUDE CYCLONE: DEVELOPMENT

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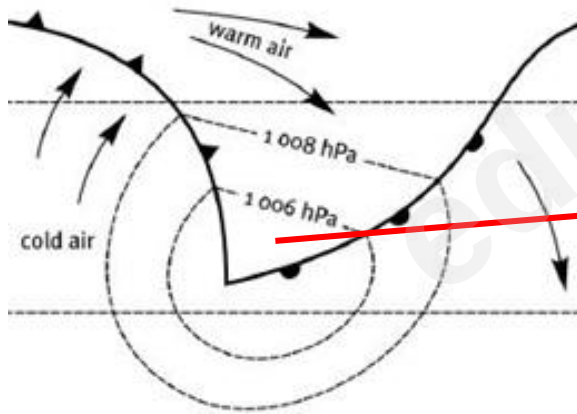
## 1 INITIAL STAGE



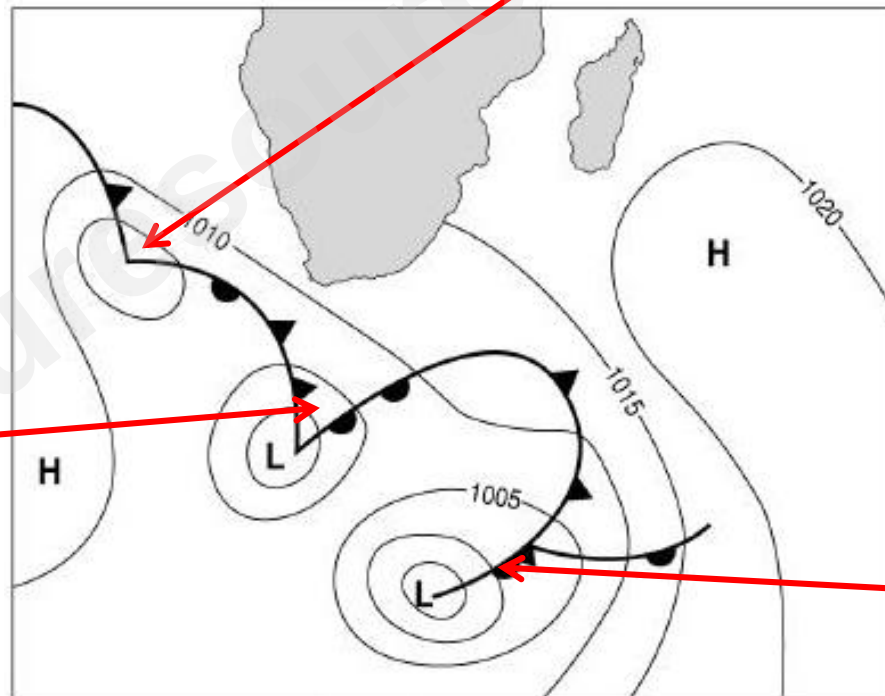
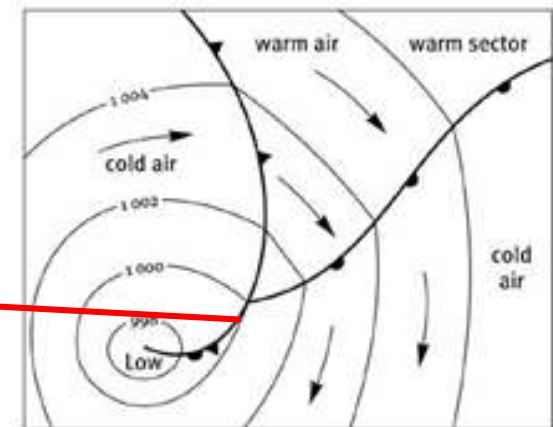
## 2 DEVELOPMENT STAGE



## 3 MATURE STAGE



## 4 OCCLUSION



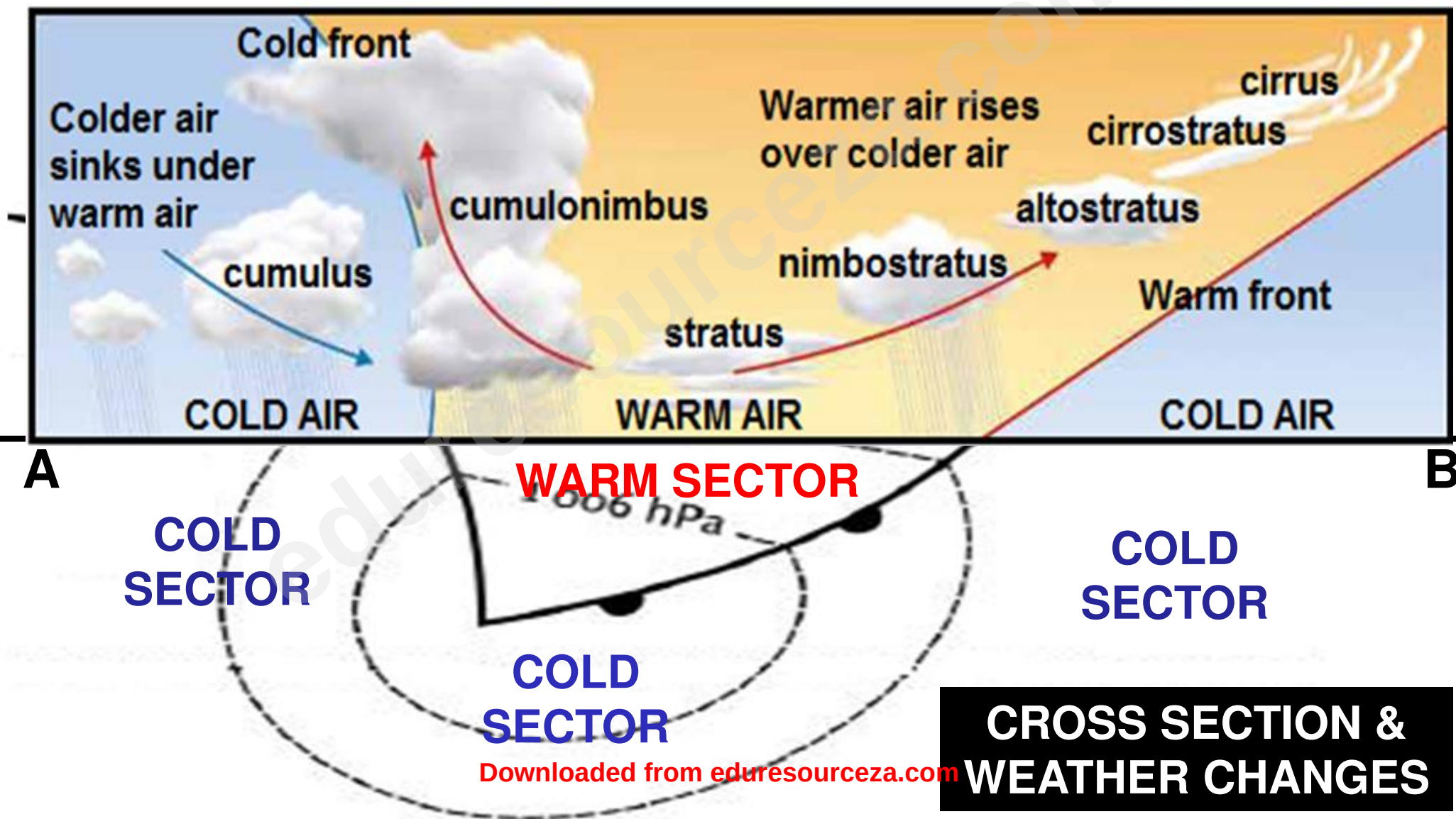
## FAMILY OF CYCLONES

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- Temp: sudden decrease
- Air pressure increases
- Wind changes to SW
- Thick cloud cover
- Heavy rainfall

- Temp reaches maximum
- Air pressure: at lowest
- Wind direction: N-NW
- Cloud cover decreases
- Rainfall stops

- Temp: sudden rise
- Air pressure drops
- Wind direction: NE
- Cloud cover increases
- Rainfall: steady



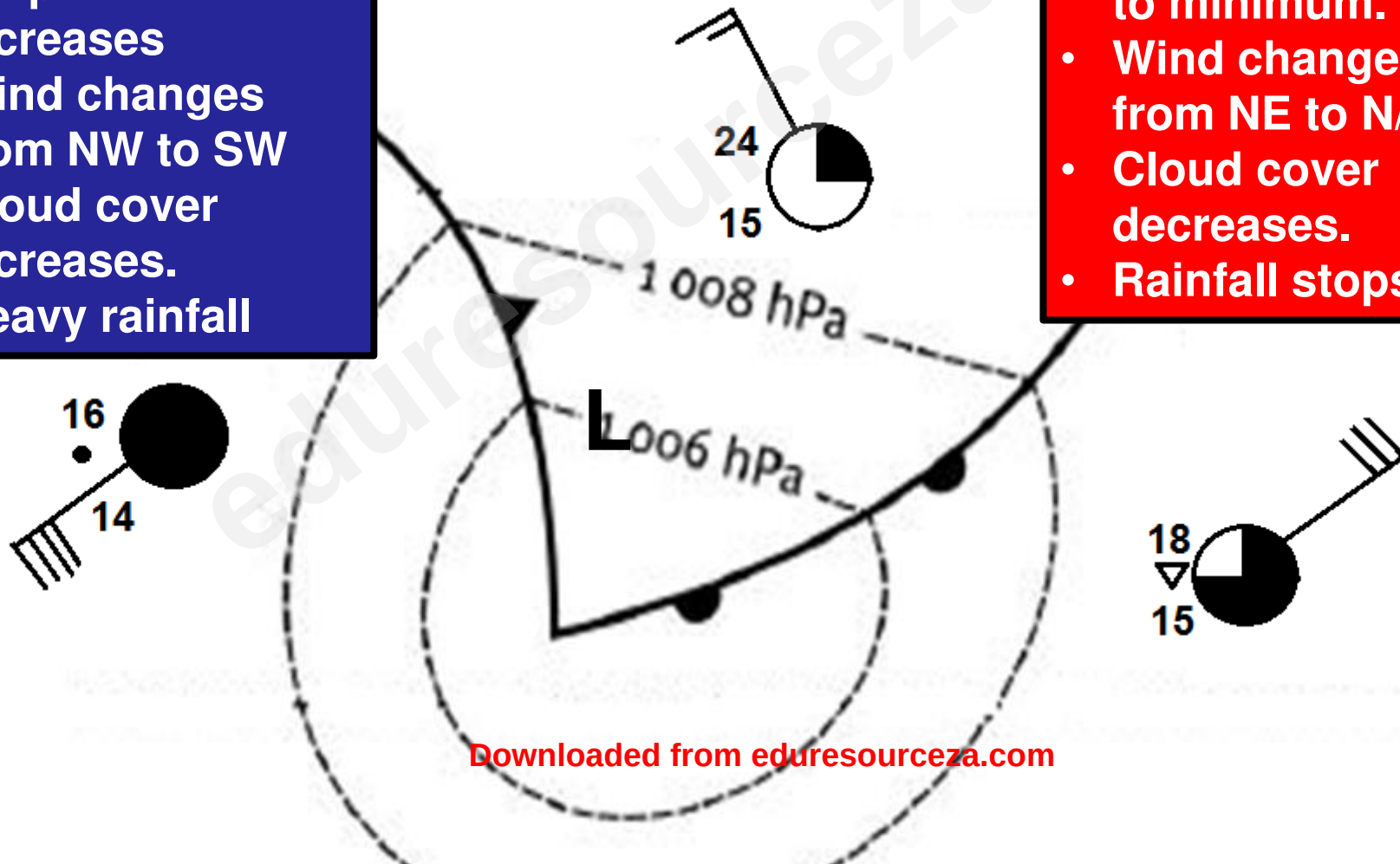
# Describe the weather changes associated with the passing of a warm/cold front.

## COLD FRONT

- Temp drops
- Air pressure increases
- Wind changes from NW to SW
- Cloud cover increases.
- Heavy rainfall

## WARM FRONT

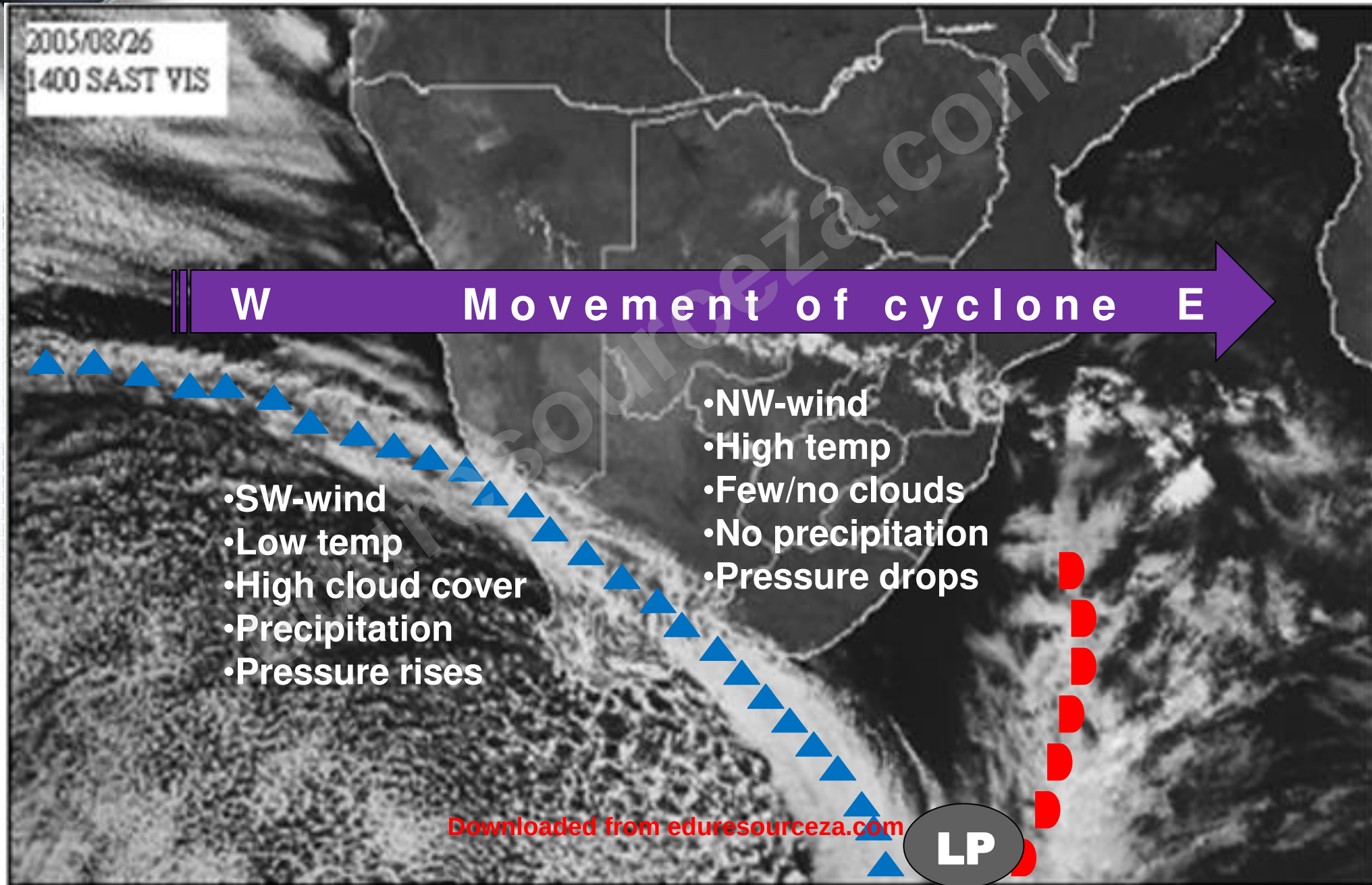
- Temp rises to max
- Air pressure drops to minimum.
- Wind changes from NE to N/NW
- Cloud cover decreases.
- Rainfall stops





# WEATHER CHANGES: COLD FRONT

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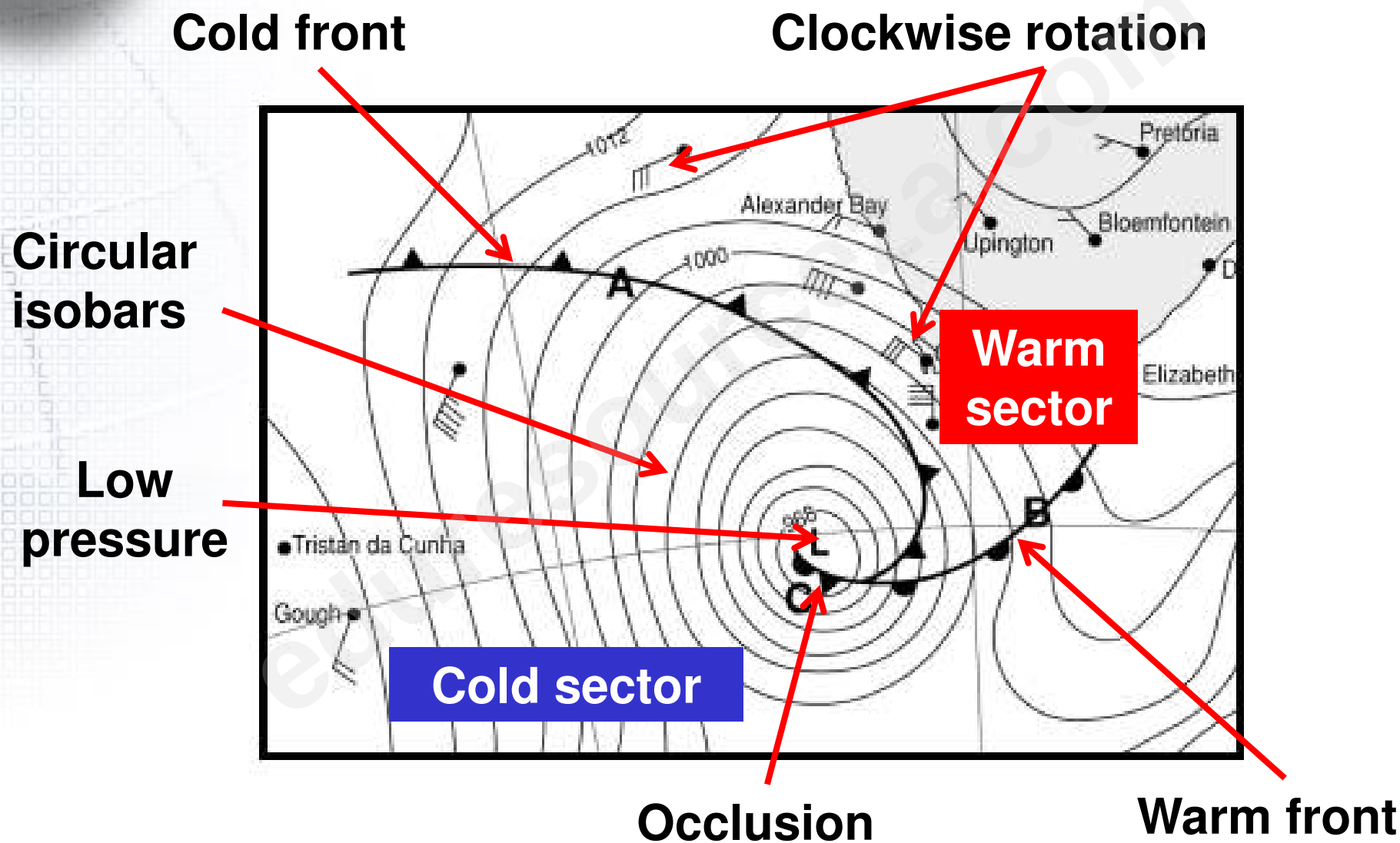


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# Mid-latitude cyclones – Synoptic Weather map

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# Tropical cyclones

1

Favourable conditions

2

Characteristics

3

Location

4

Weather patterns

5

Development stages

6

How managed





# CONDITIONS FOR TROPICAL CYCLONES TO FORM

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**Divergence in  
upper air levels**

**Sea temperature  
at least 26° C**

**High  
humidity**

**Air pressure  
below 950hPa**

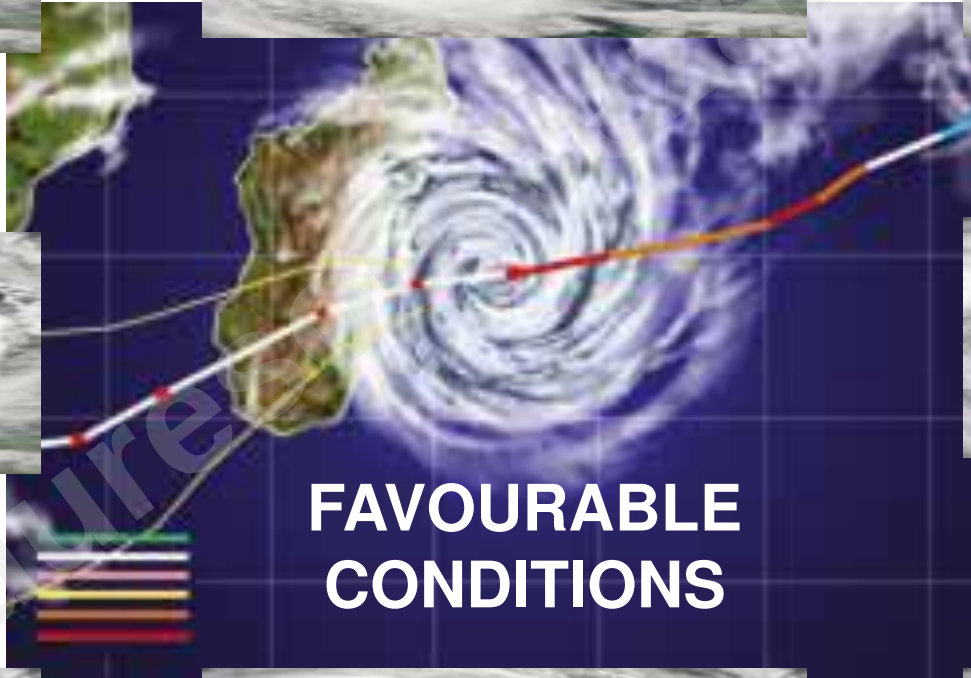
**Coriolus  
force**

**Light variable  
winds**

**FAVOURABLE  
CONDITIONS**

**Little surface  
friction**

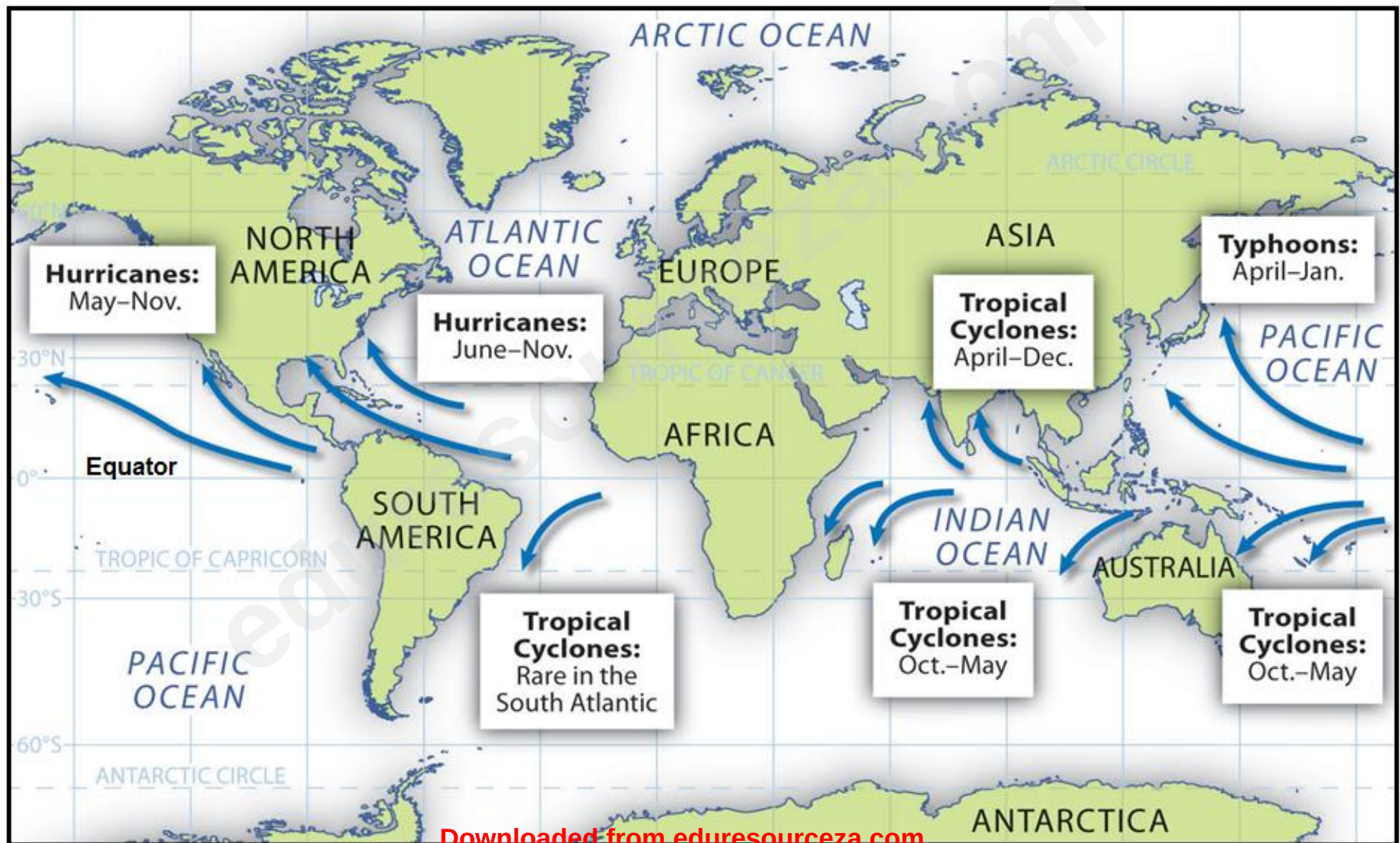
**Unstable  
air**



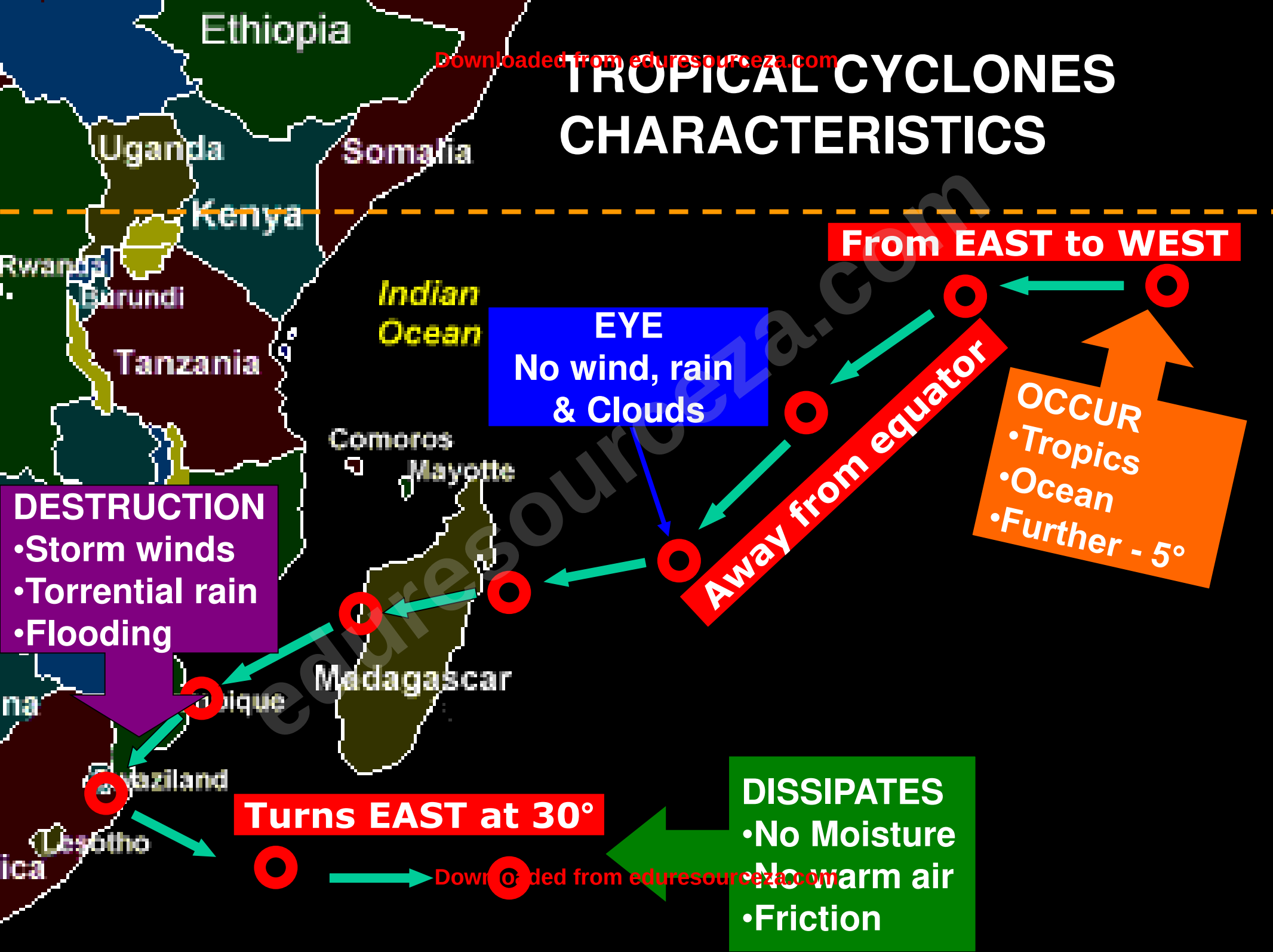
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# Where do tropical cyclones form?



# TROPICAL CYCLONES CHARACTERISTICS



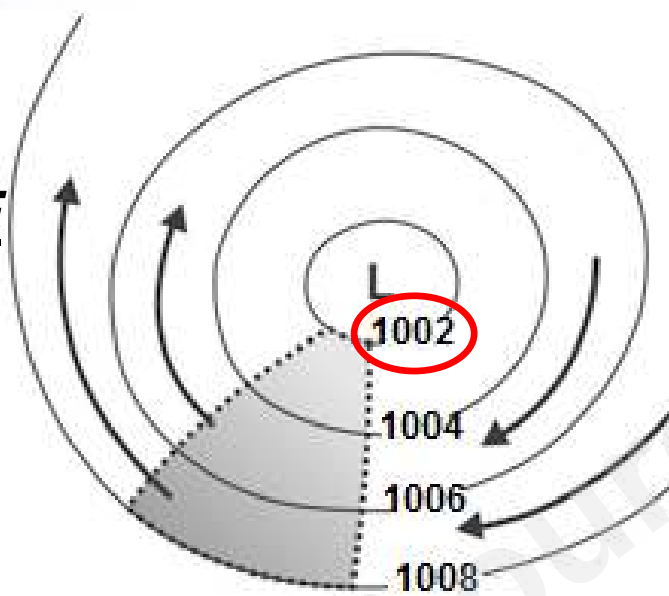


# TROPICAL CYCLONE: DEVELOPMENT

1

## FORMATIVE

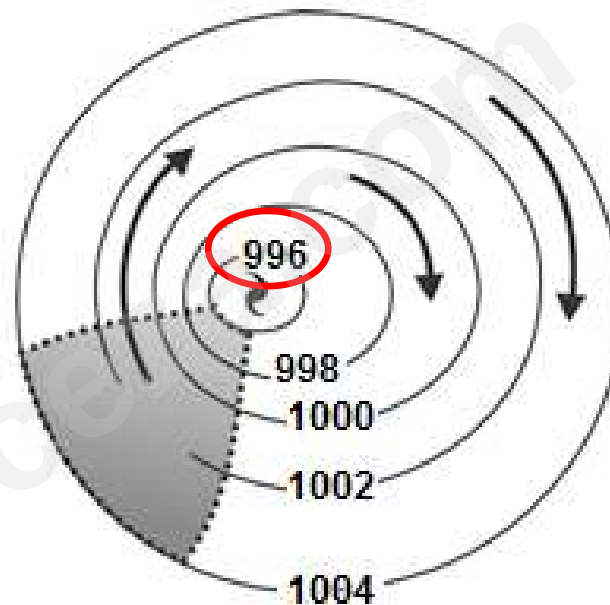
Pressure  
**ABOVE**  
1000 hPa



2

## IMMATURE

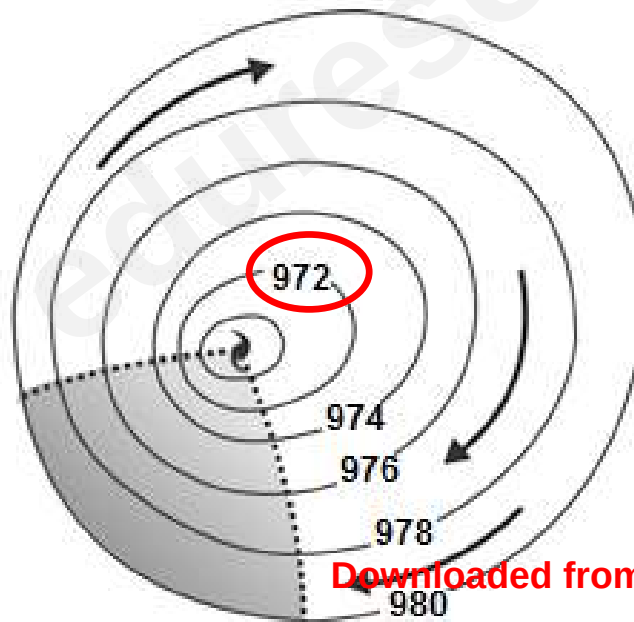
Pressure  
**BELOW**  
1000 hPa



3

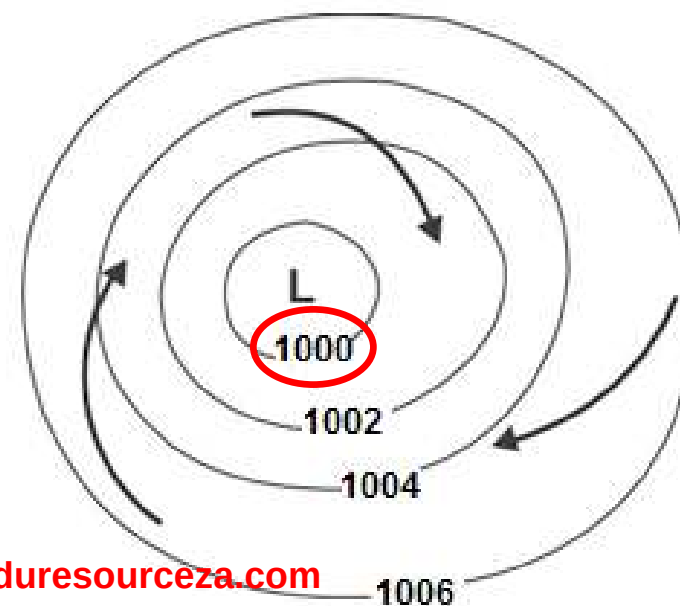
## MATURE

Pressure  
**WELL**  
**BELOW**  
1000hPa



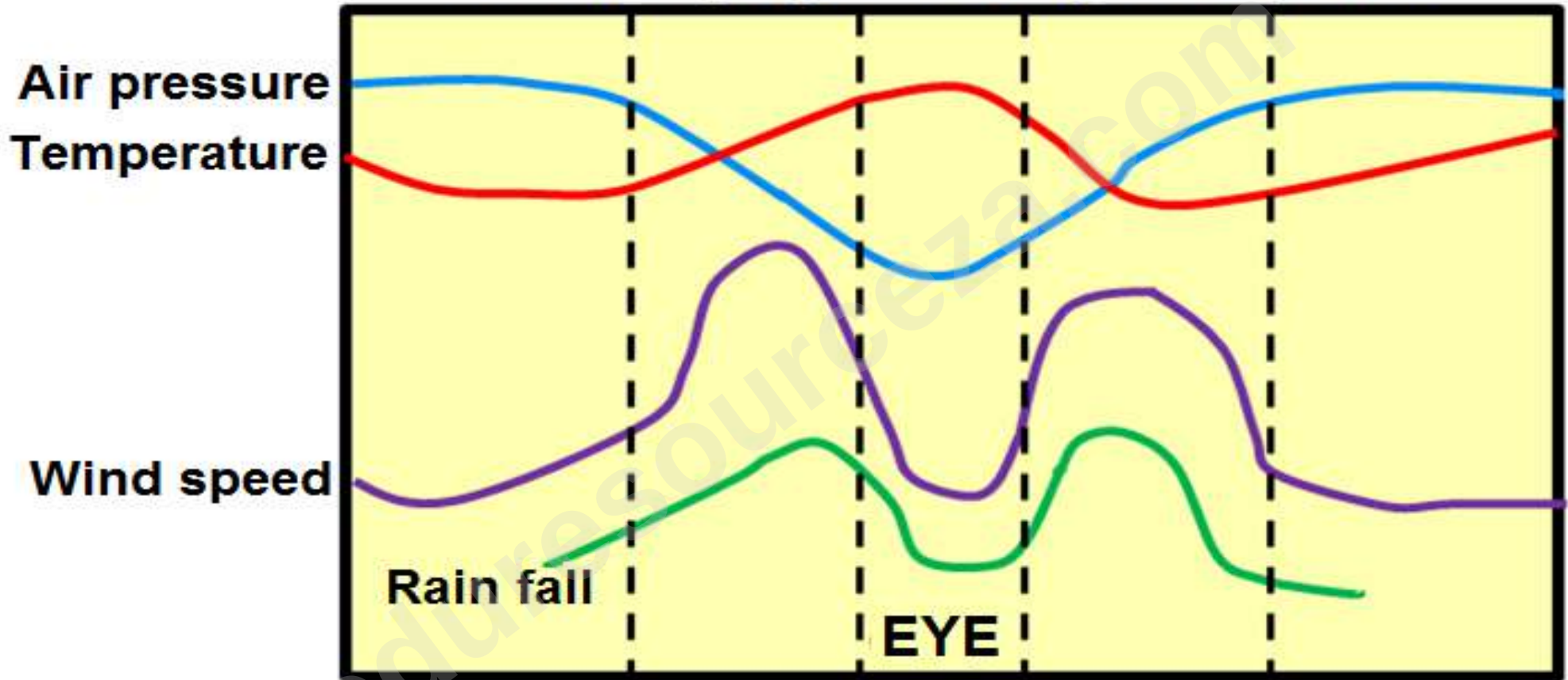
4

DISSI-  
PATION  
Pressure  
**RISES**



# Tropical Cyclones: Weather patterns

Weather graph of Tropical Cyclone



| BEFORE EYE (SH)                                                                                                                                                       | IN EYE                                                                                                                                                       | AFTER EYE (SH)                                                                                                                                                                                           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Wind direction: South</li> <li>• Wind: Hurricane</li> <li>• Air pressure decreases</li> <li>• Very heavy rainfall</li> </ul> | <ul style="list-style-type: none"> <li>• No wind</li> <li>• No rain</li> <li>• No clouds</li> <li>• Lowest air pressure</li> <li>• Temp increases</li> </ul> | <ul style="list-style-type: none"> <li>• Wind direction: North</li> <li>• Wind: storm to hurricane</li> <li>• Air pressure increases</li> <li>• Heavy rainfall</li> <li>• Starts to dissipate</li> </ul> |

# STORM WINDS

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# GREAT SWELLS & WAVES

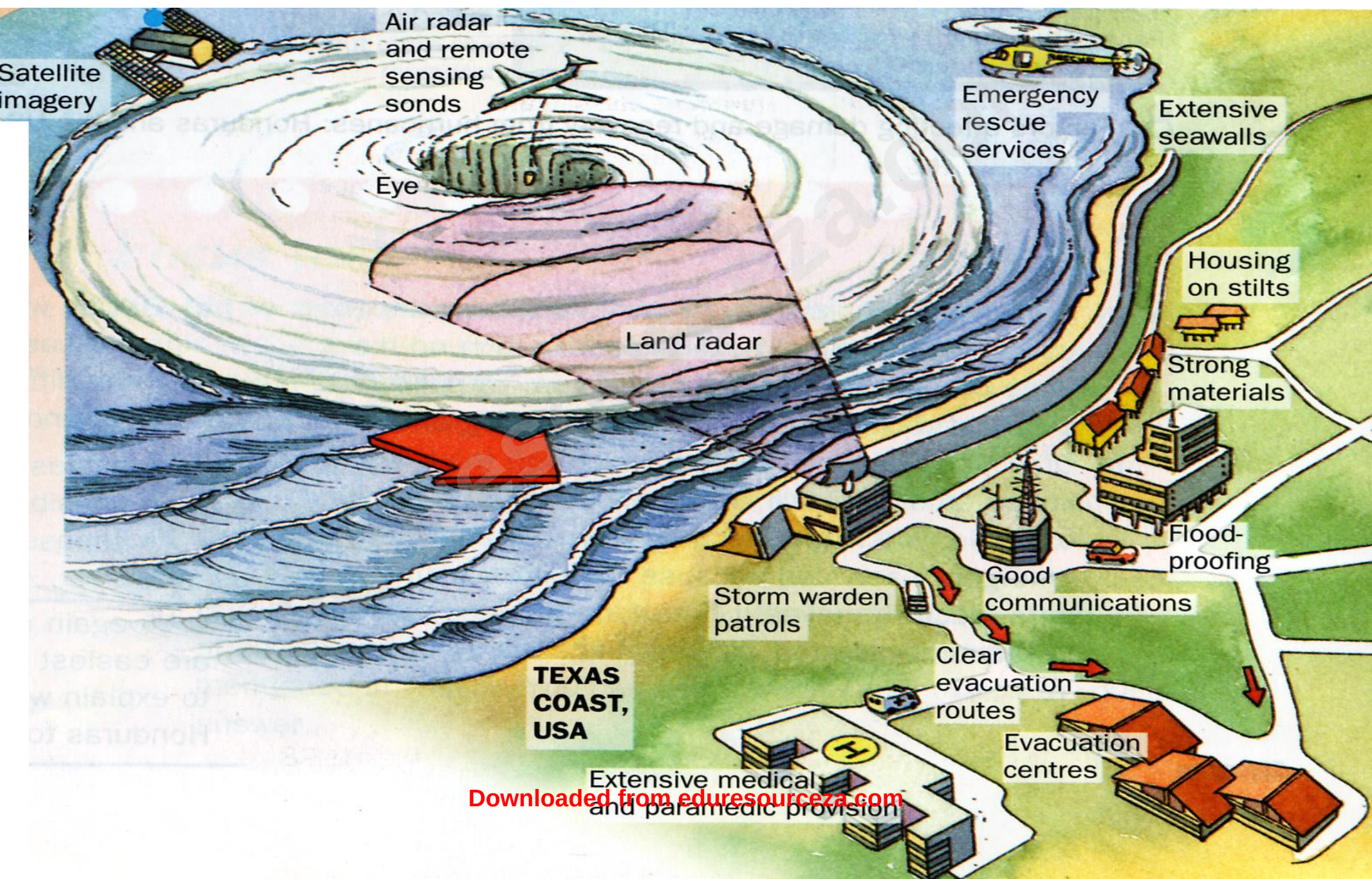


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# FLOODING



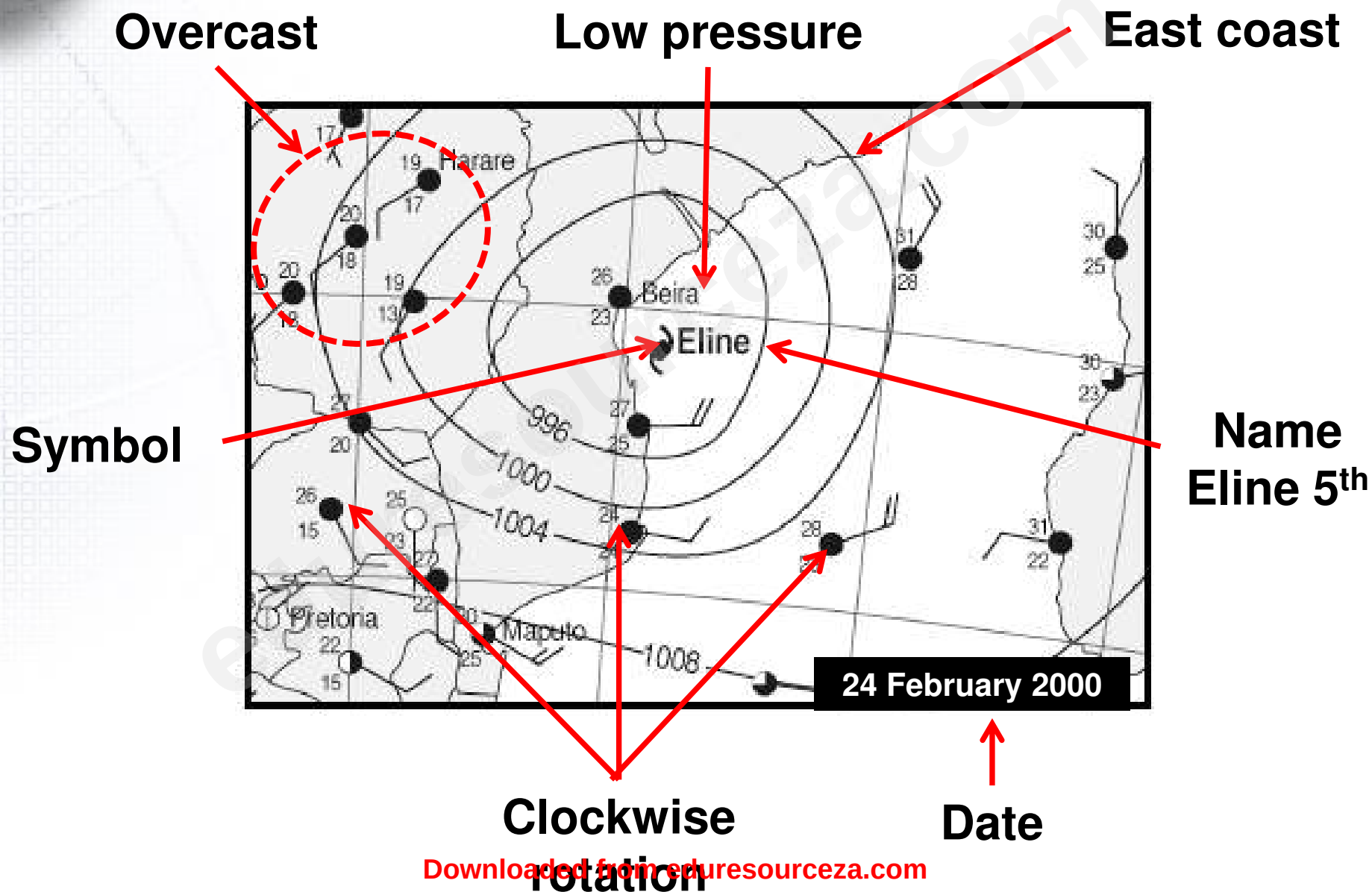
# TROPICAL CYCLONE - MANAGEMENT





# Tropical Cyclones: Synoptic weather maps

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# SUBTROPICAL ANTICYCLONES AND ASSOCIATED WEATHER

1

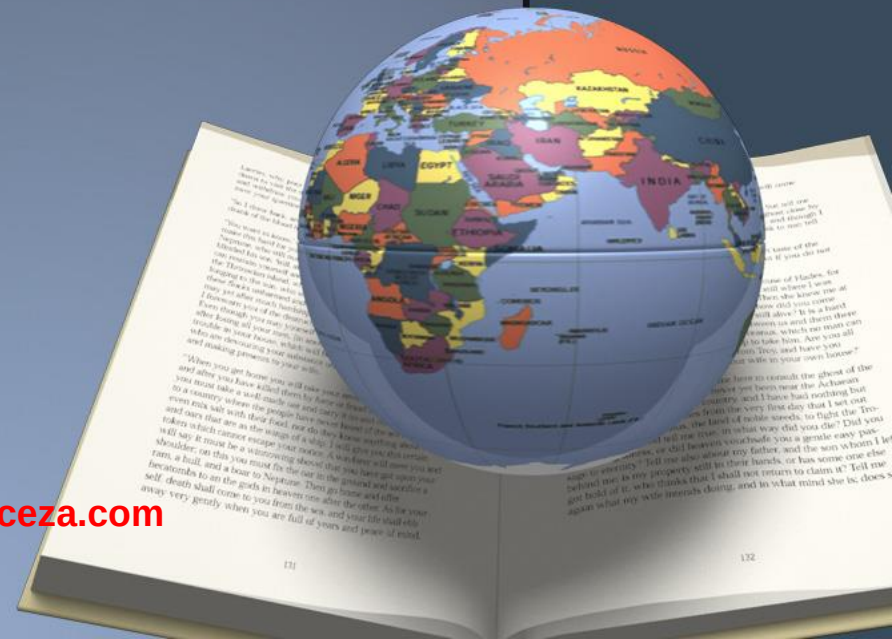
Factors influencing climate of SA

2

Line Thunderstorms

3

SA Bergwind



# FACTORS THAT INFLUENCE THE CLIMATE OF SOUTH AFRICA

## 2. SUBTROPICAL ANTICYCLONES High temp, dry cloudless

Kalahari  
HP

## 3. THE PLATEAU Lower temp, dry

escarpment

Warm and wet

Warm Mozambique

Warm Agulhas

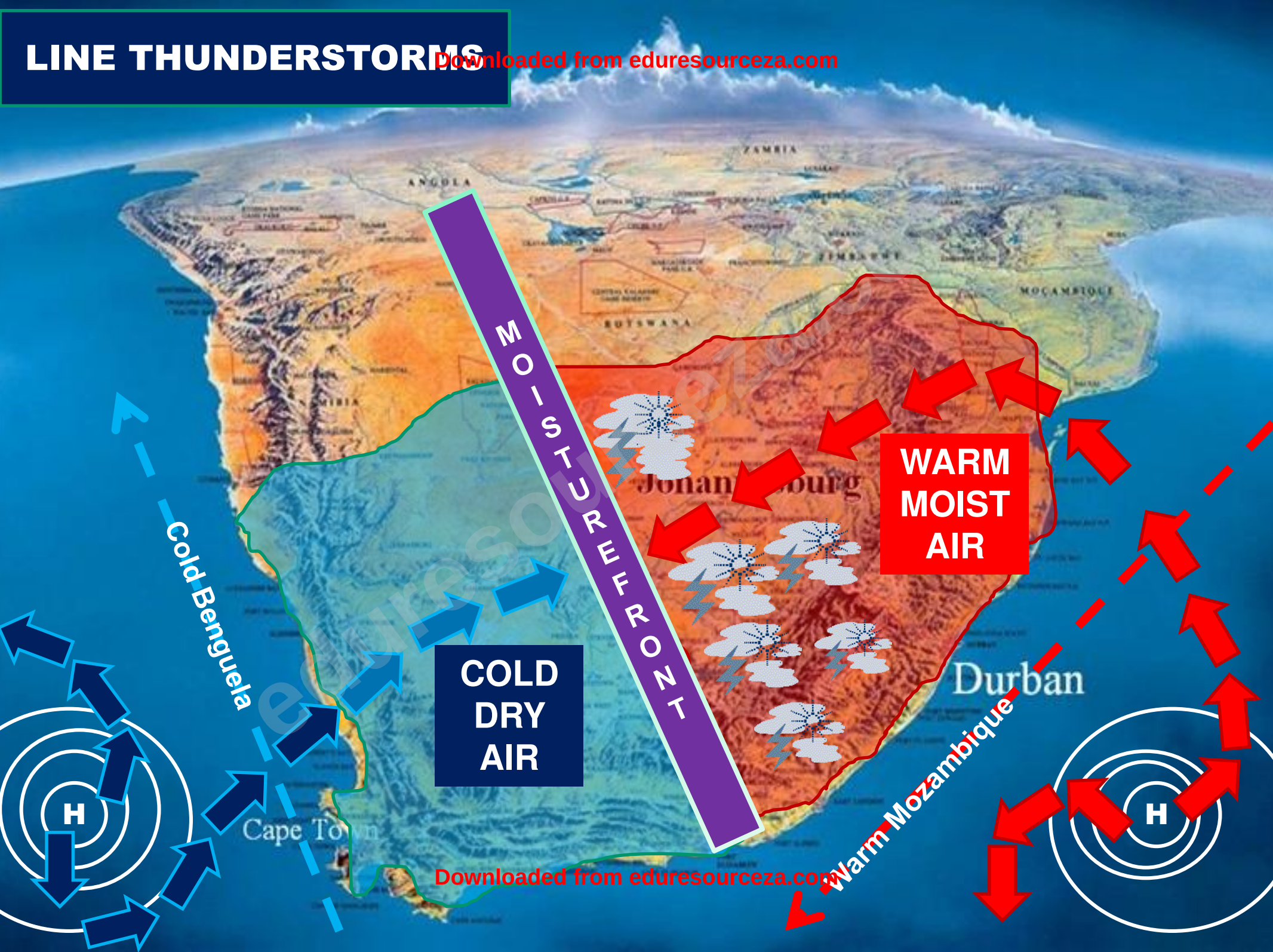
South  
Atlantic  
HP

South  
Indian  
HP

## 1. INFLUENCE OF OCEANS

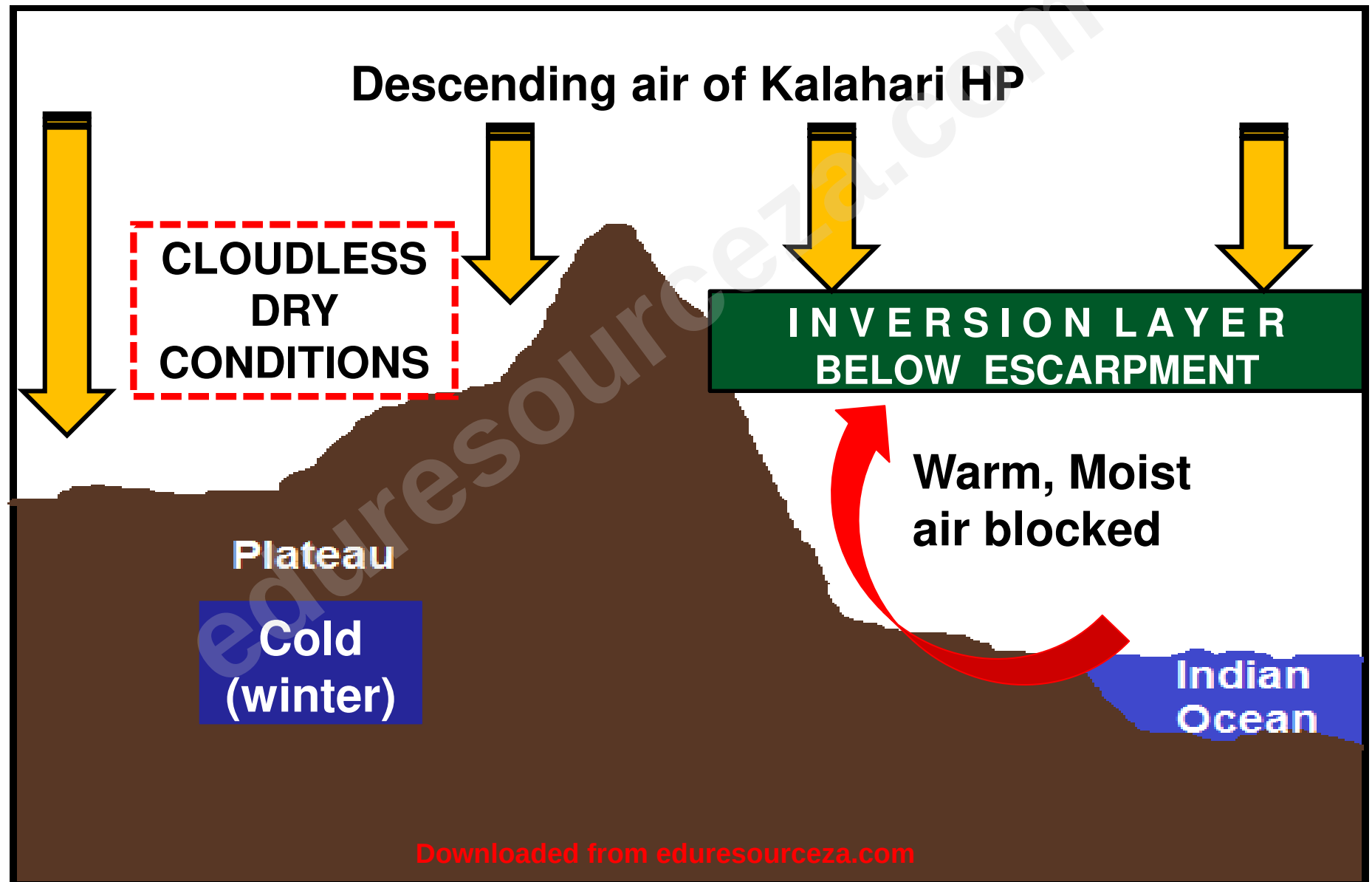
# LINE THUNDERSTORMS

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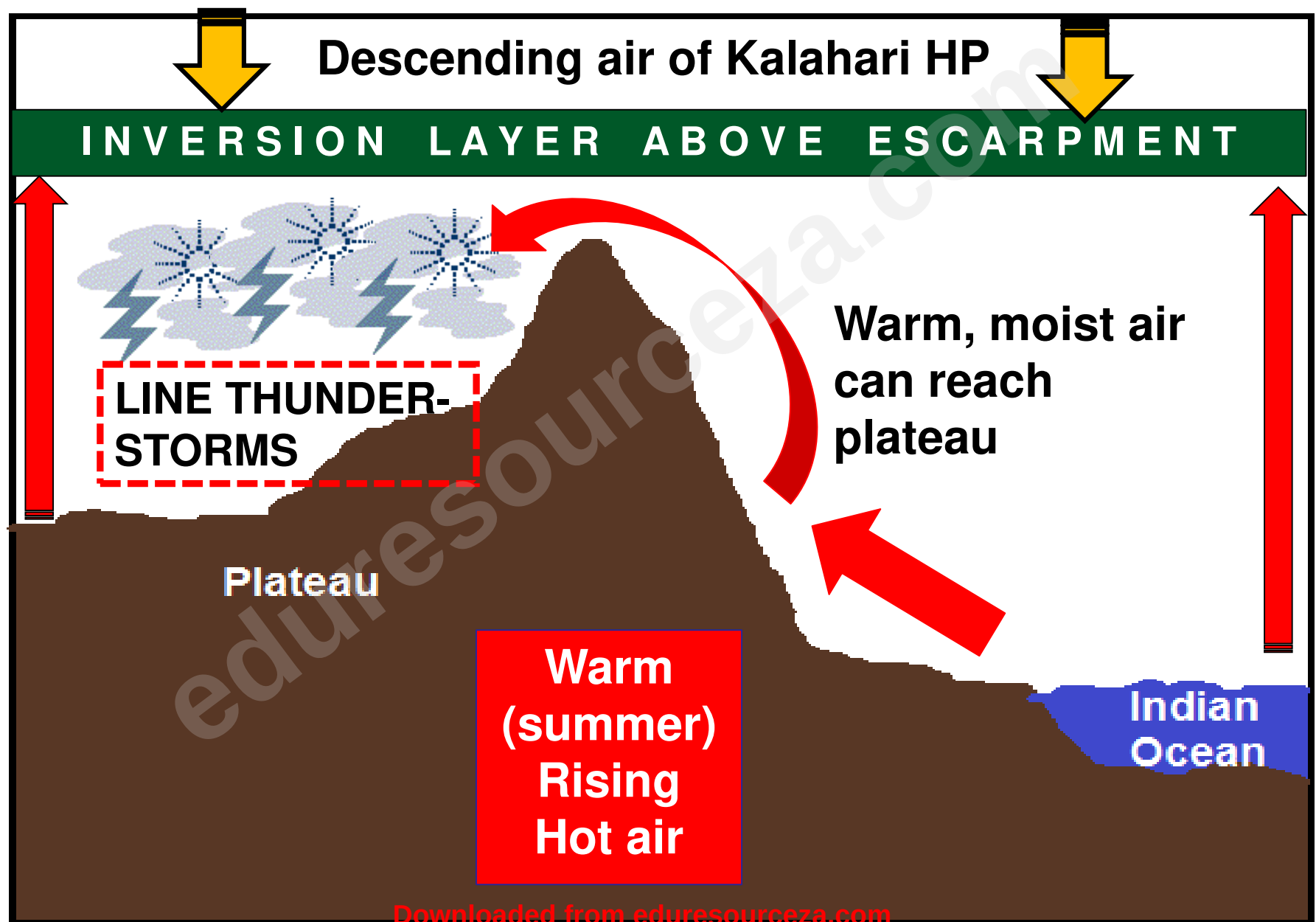


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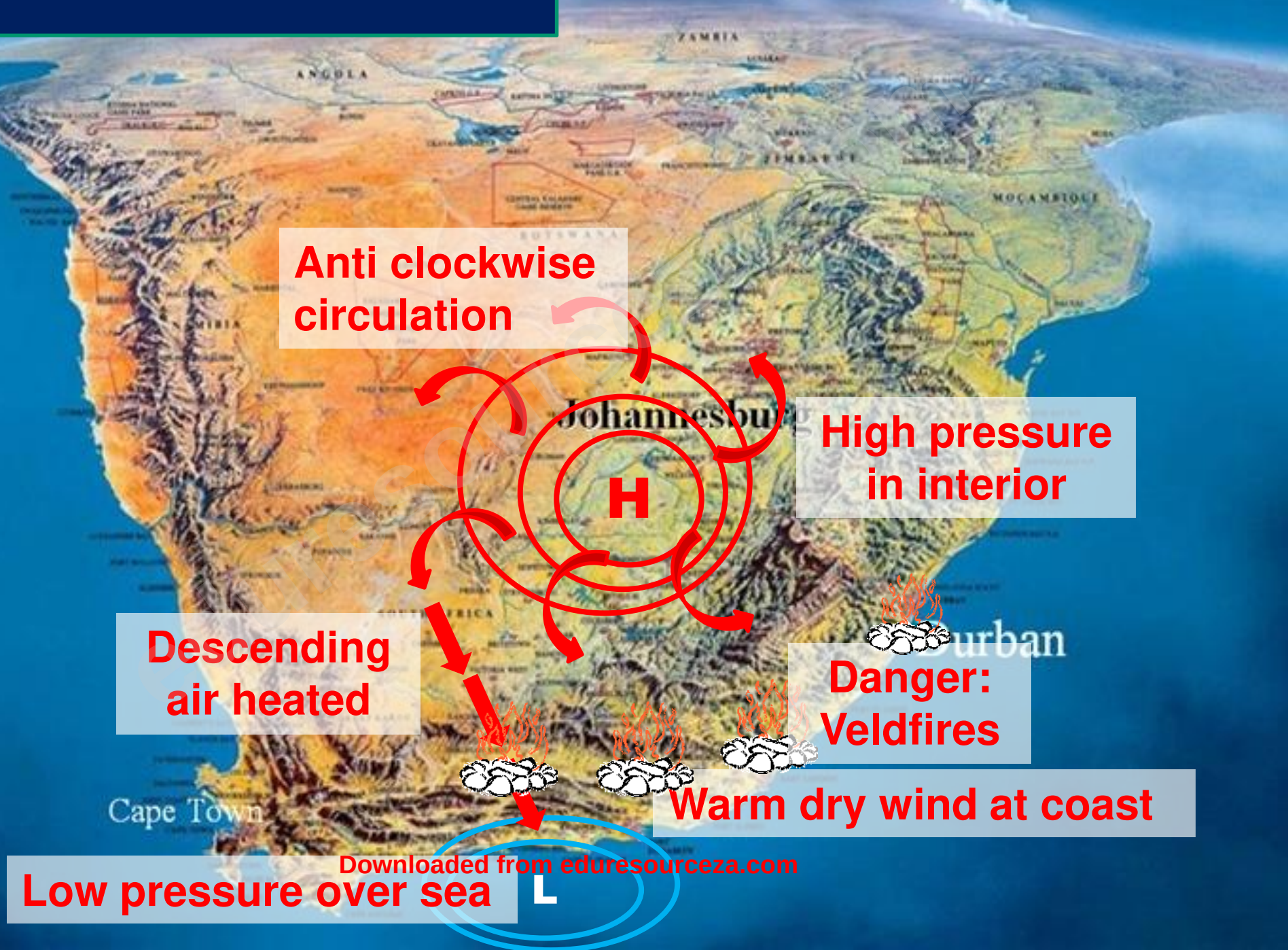
# WINTER



# SUMMER



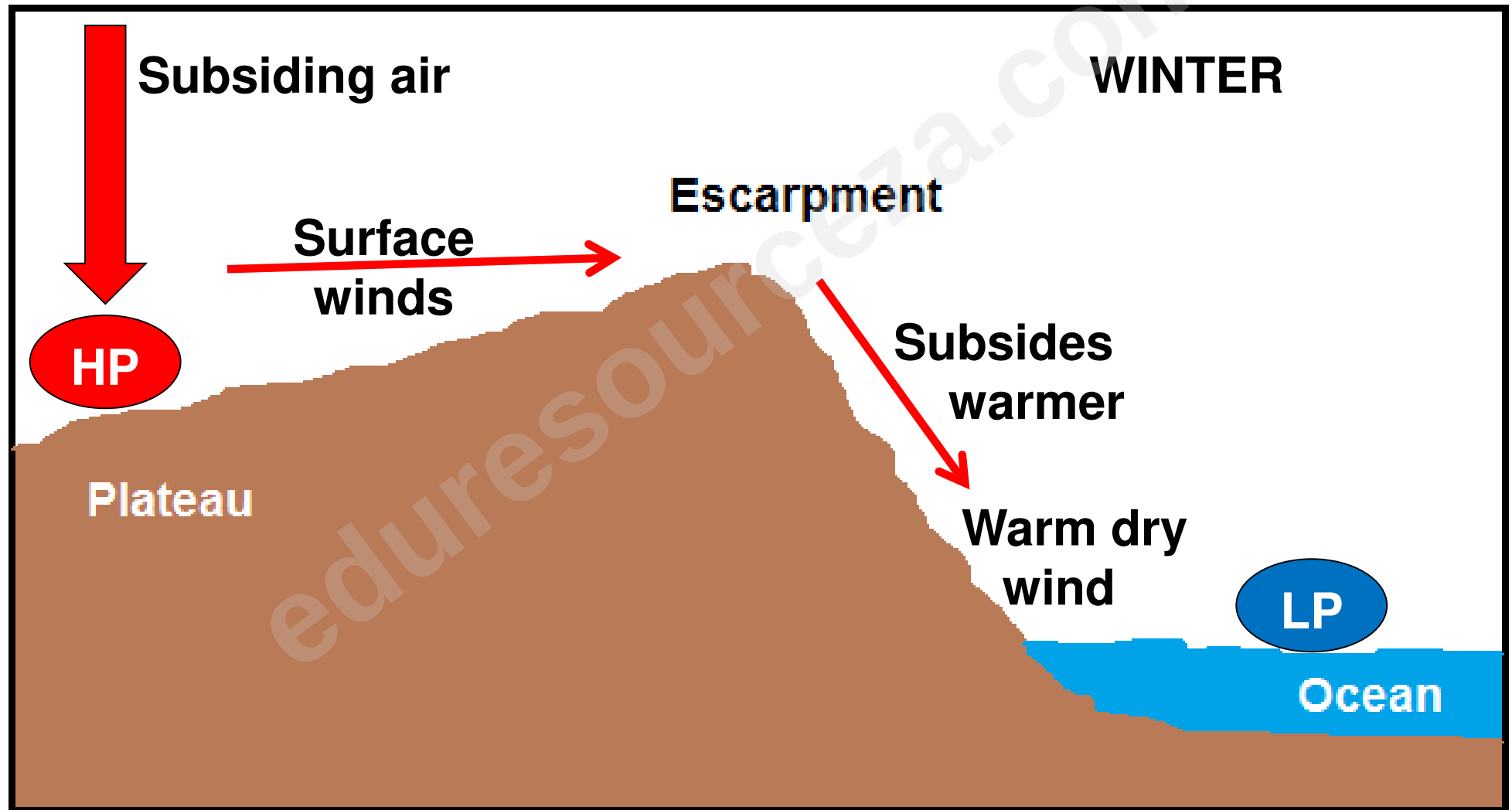
# SOUTH AFRICAN BERGWIND





# SOUTH AFRICAN BERGWIND

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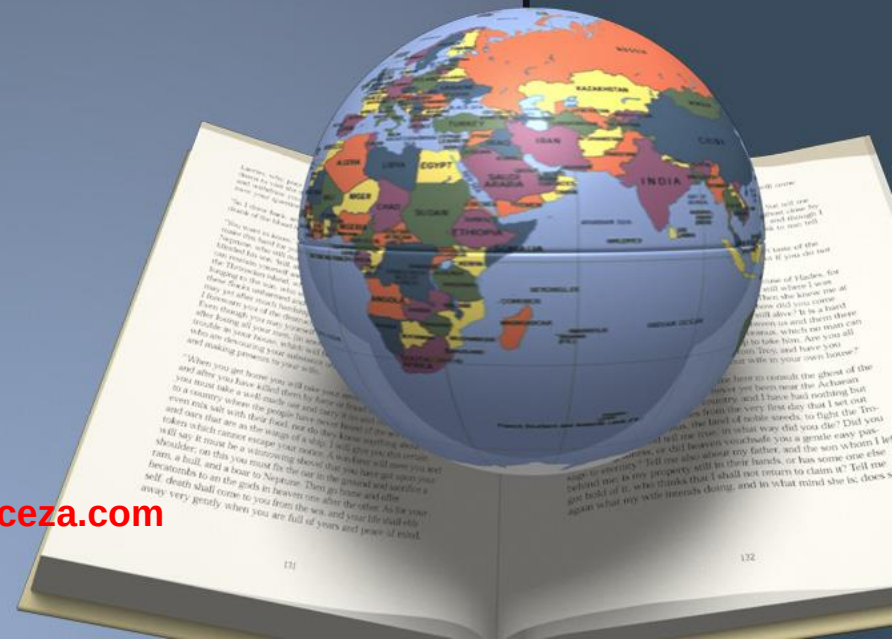
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# Valley Climates

1 Effect of the slope (aspect)

2 Inversions

3 Frost pockets / Smog

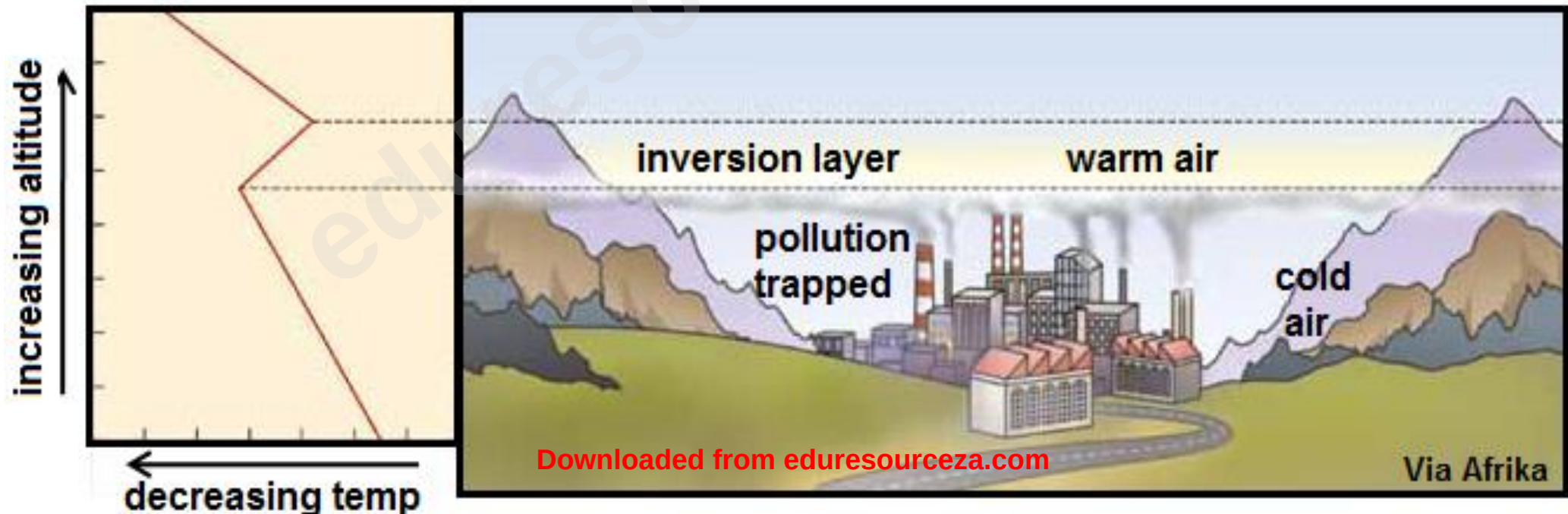
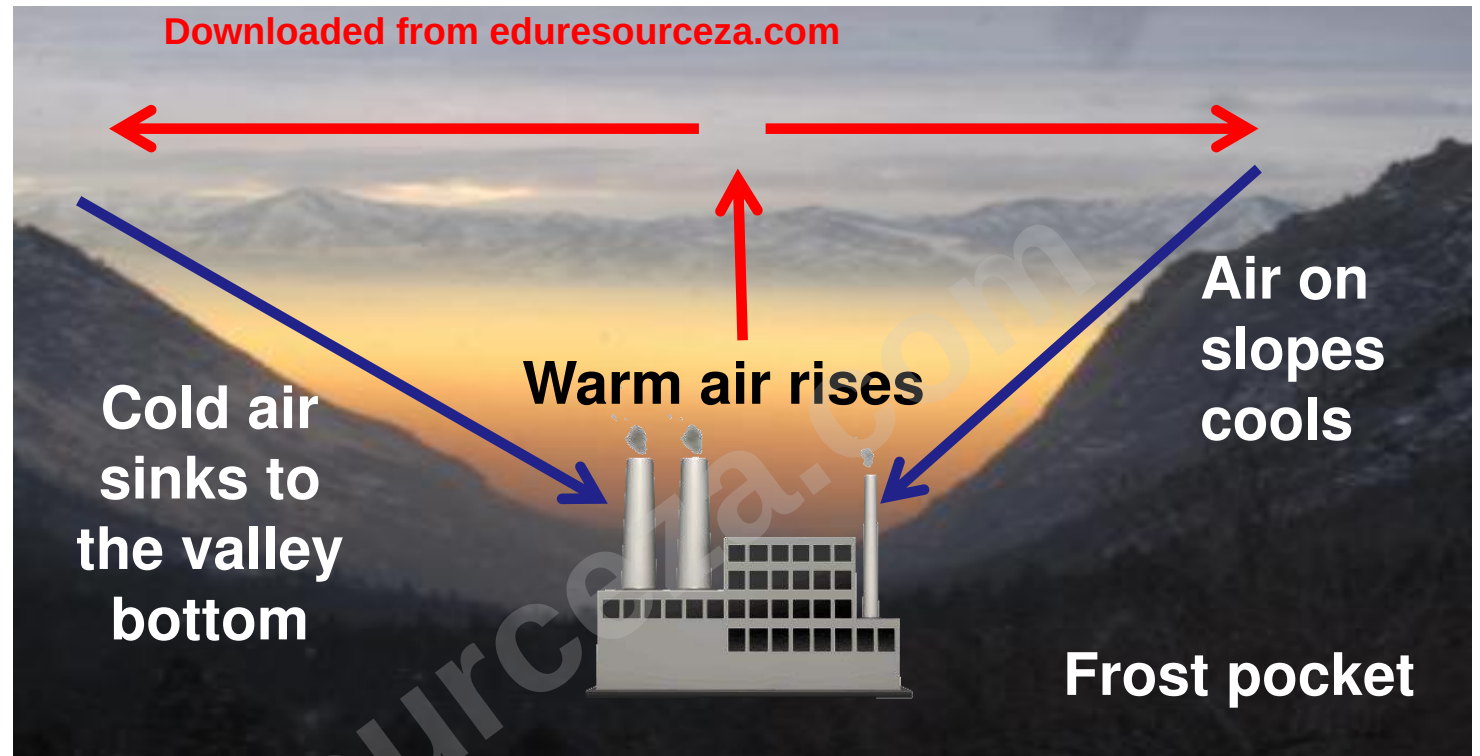


# VALLEY CLIMATES ASPECT (SH)

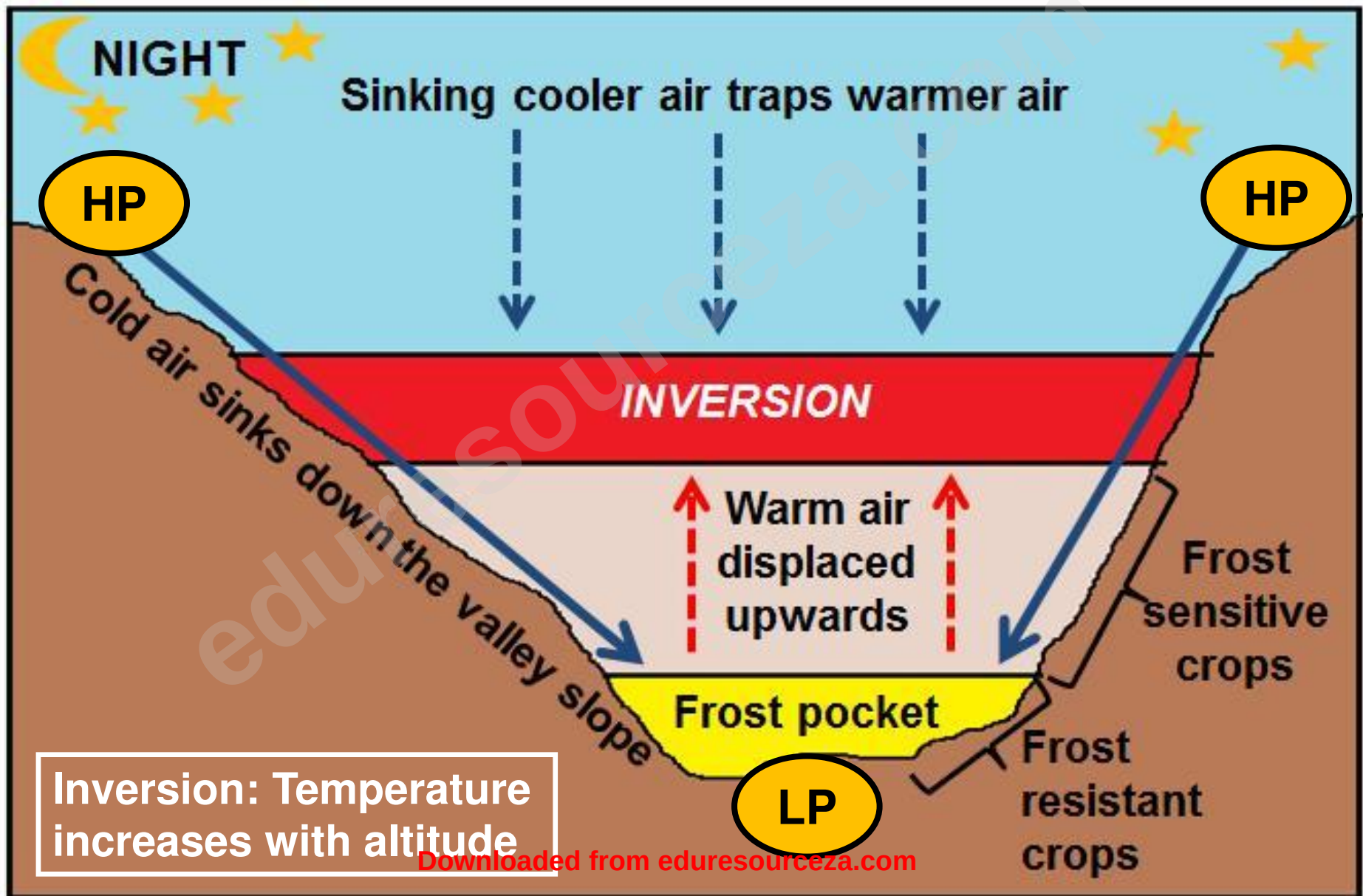
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# INVERSIONS



# Katabatic winds and Inversions



# URBAN CLIMATES

1 Reasons for differences

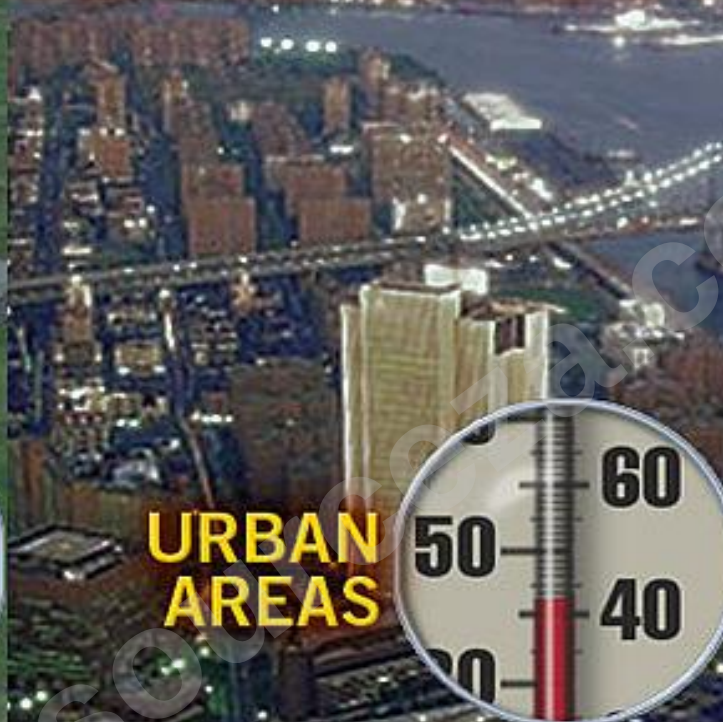
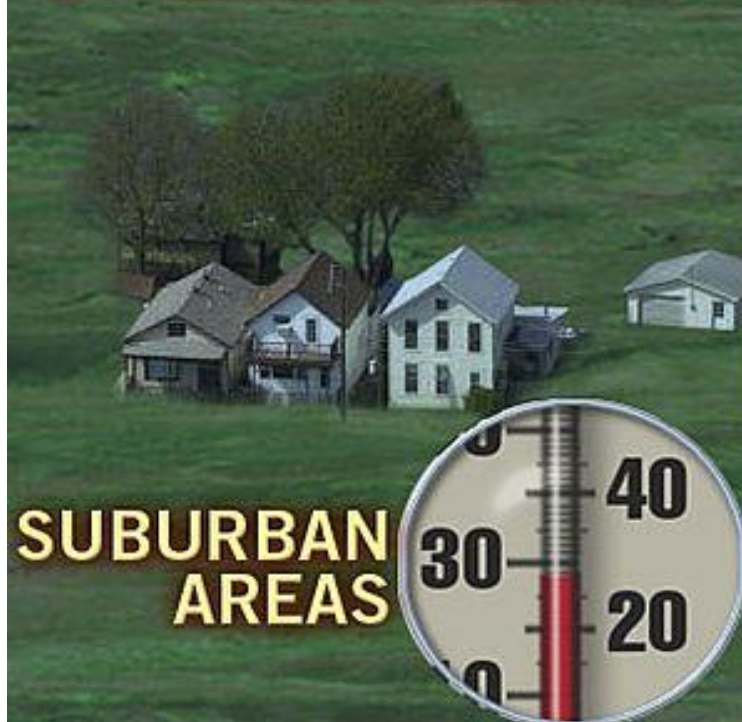
2 Causes of heat islands

3 Pollution domes

4 Effects of heat islands



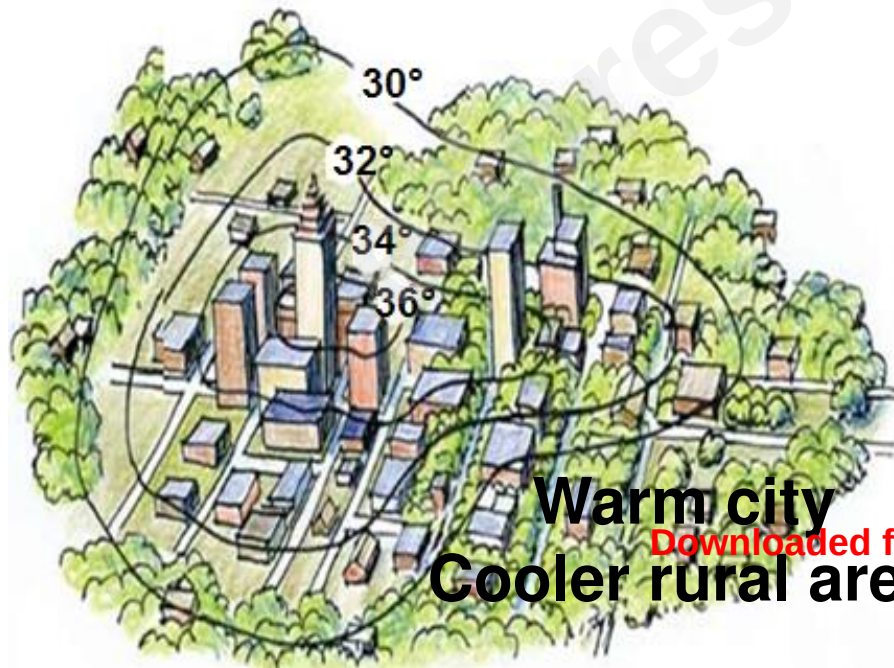
# URBAN HEAT ISLAND EFFECT



**Differences  
between city  
& rural areas**

## IN CITY

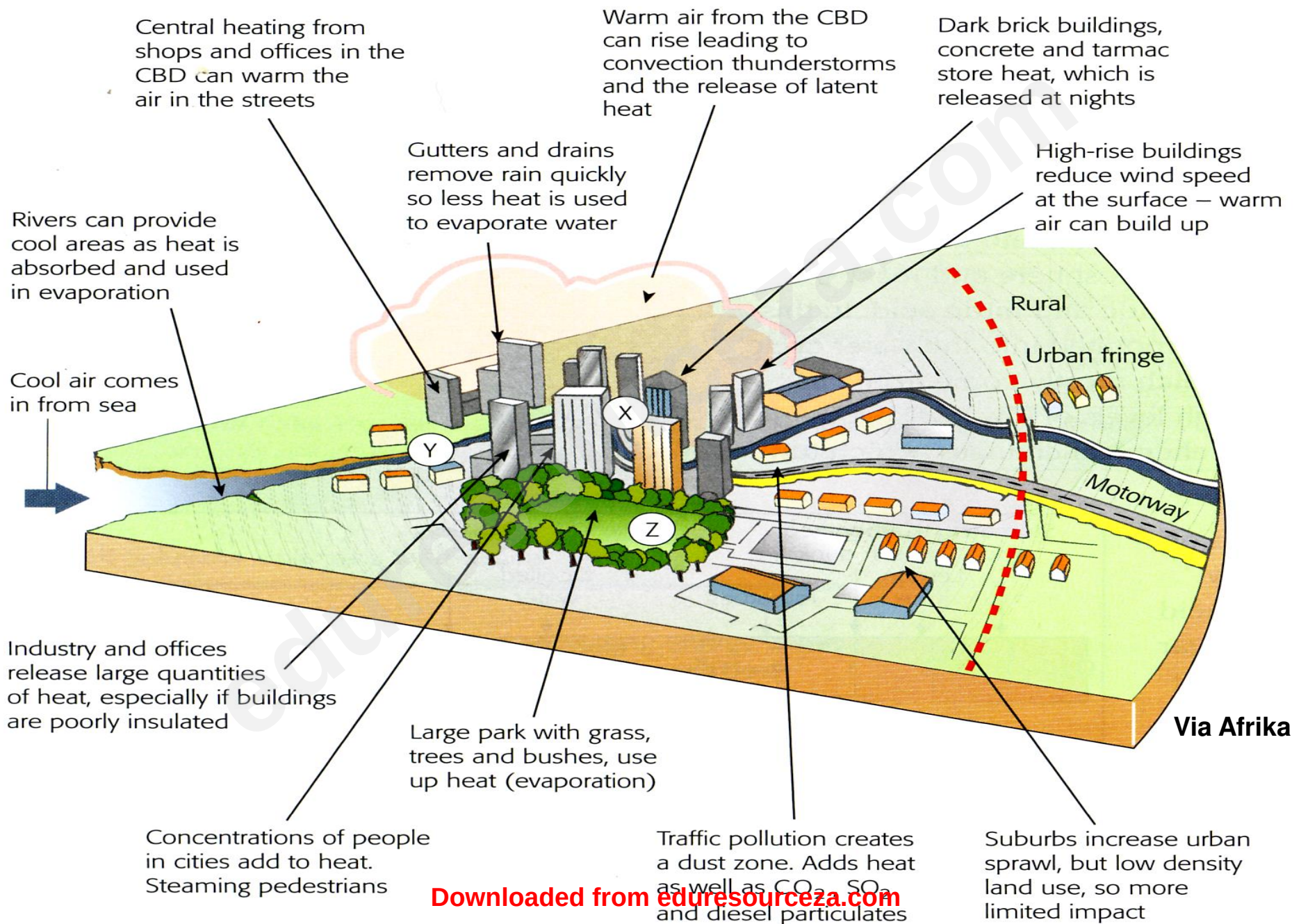
- Artificial surfaces
- High buildings
- Industries
- Many cars



**Mass of polluted air  
trapped by inversion layer  
and prevented to rise.**

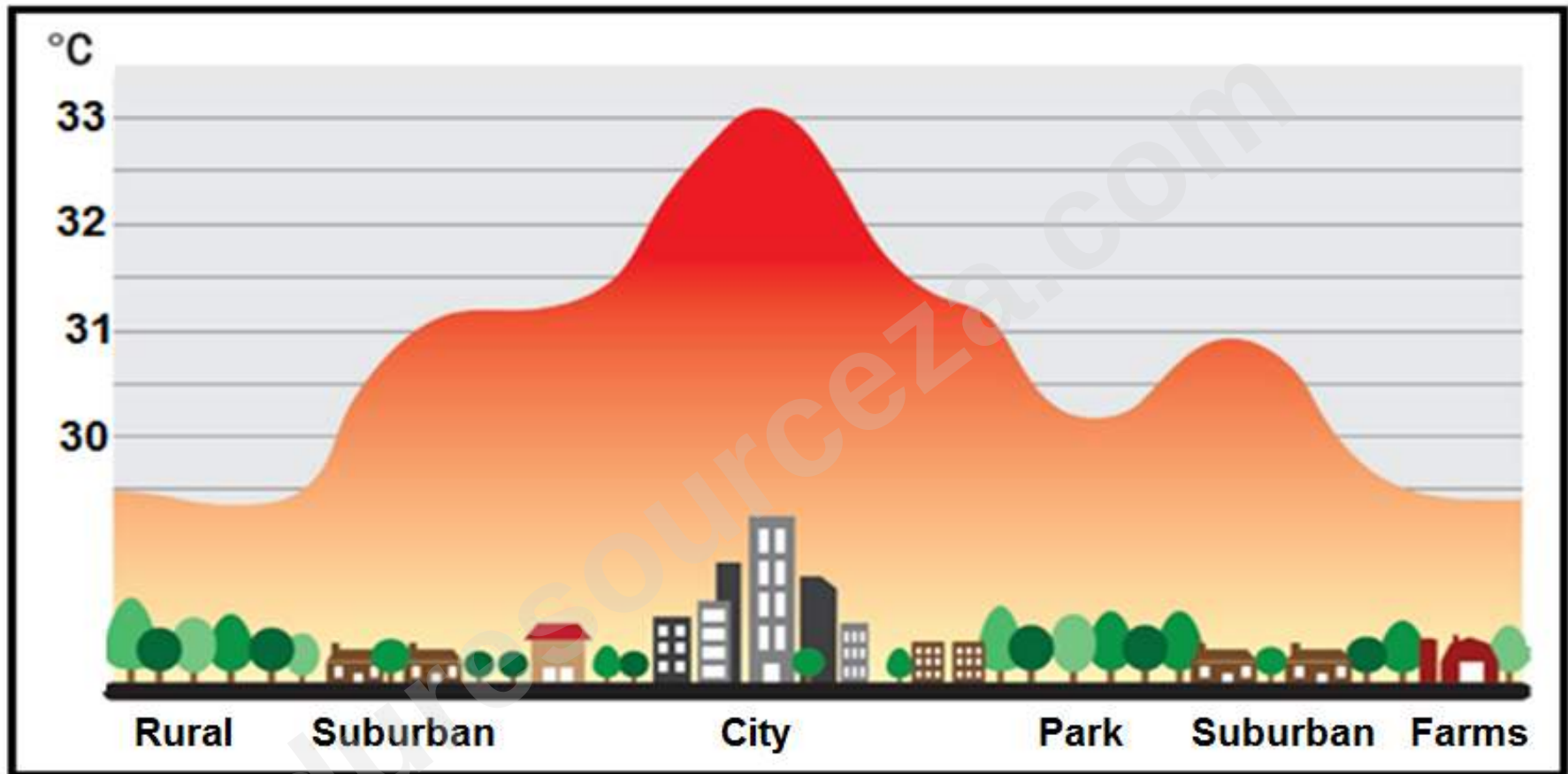
# CAUSES OF URBAN HEAT ISLANDS

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# EFFECTS OF URBAN HEAT ISLANDS



- Human discomfort
- Heat stroke-deaths
- Reduced visibility (smog)
- Increased energy use
- Air conditioners
- Increase in air pollution
- Increase in greenhouse gasses
- Respiratory discomfort. Asthma
- Increased precipitation
- Reduced insolation (pollution)

# Synoptic Weather maps

1

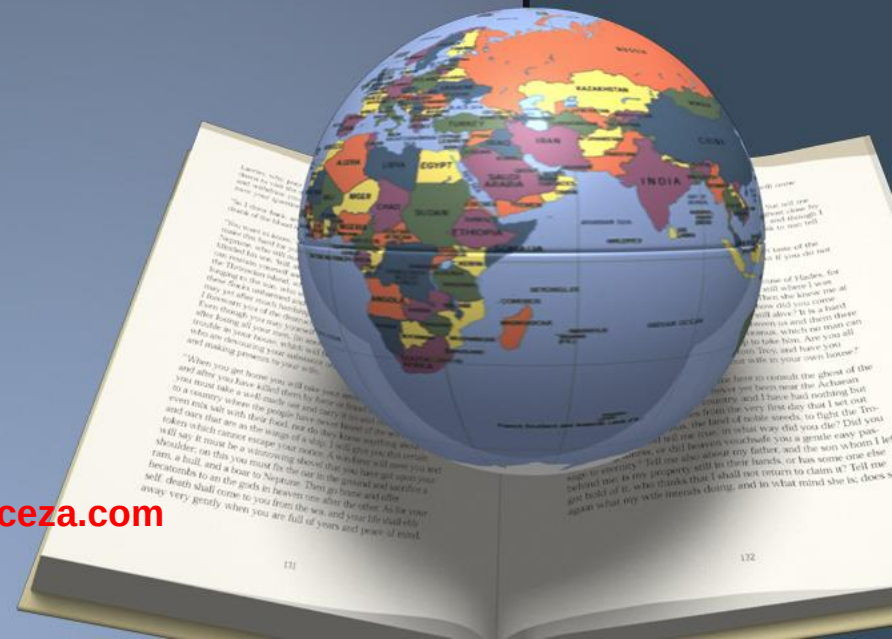
Station Models

2

Features on SA weather maps

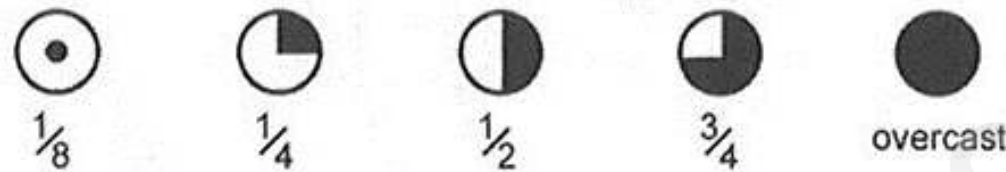
3

Satellite images



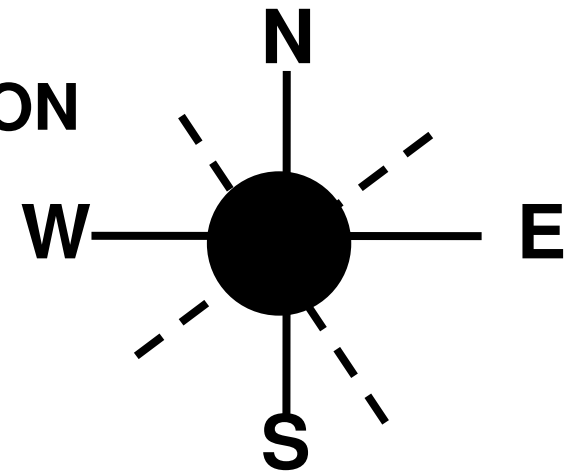
# WEATHER STATION MODEL

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CLOUD COVER

WIND  
DIRECTION



TEMPERATURE  $\rightarrow$  20

WEATHER 18

DEW POINT  
TEMPERATURE

WIND SPEED

10 Knots

15 Knots

5 Knots

Fog



Snow

Drizzle



Showers

Rain



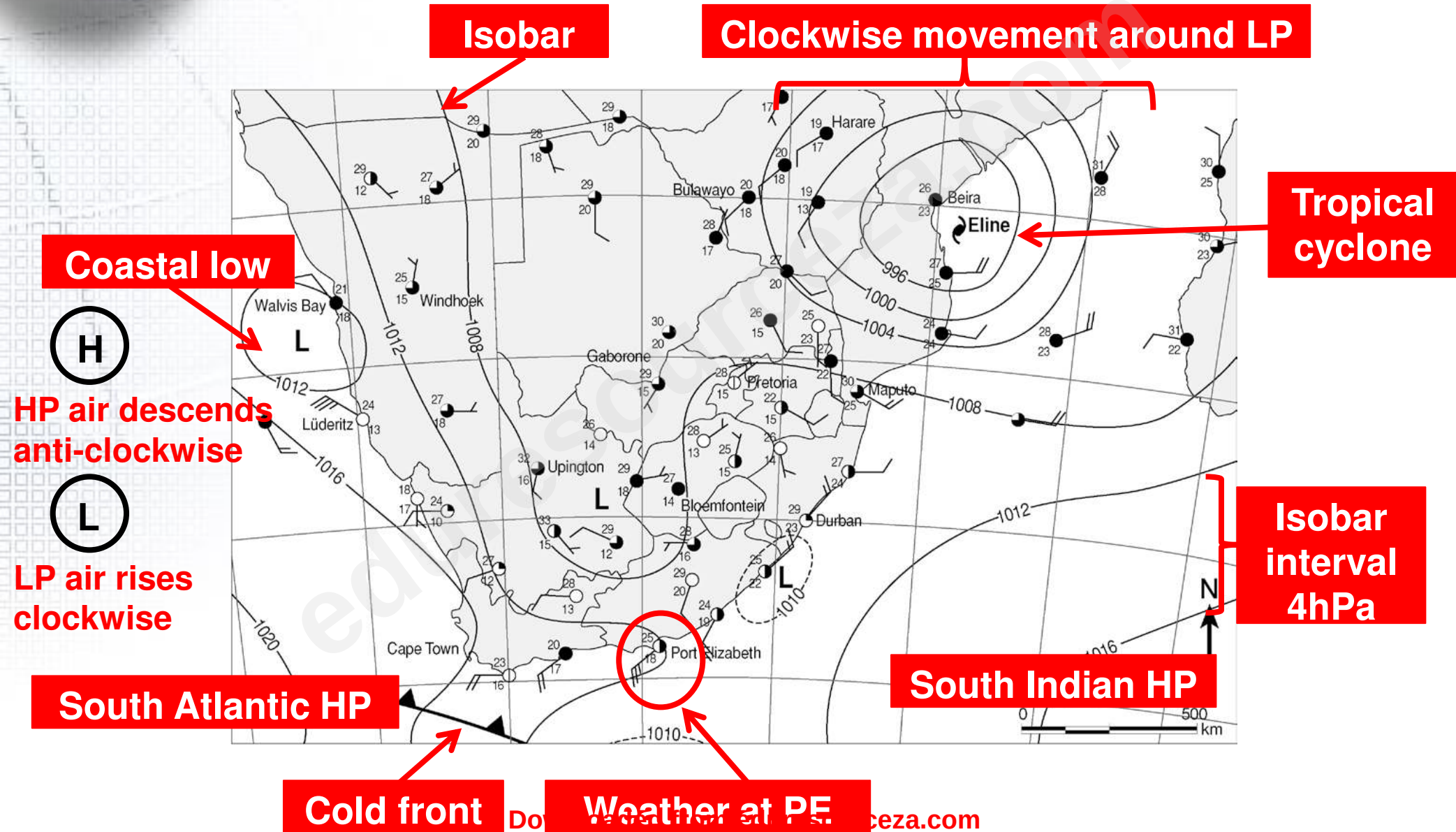
Thunderstorm

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# FEATURES ON A SOUTH AFRICAN SYNOPTIC WEATHER MAP

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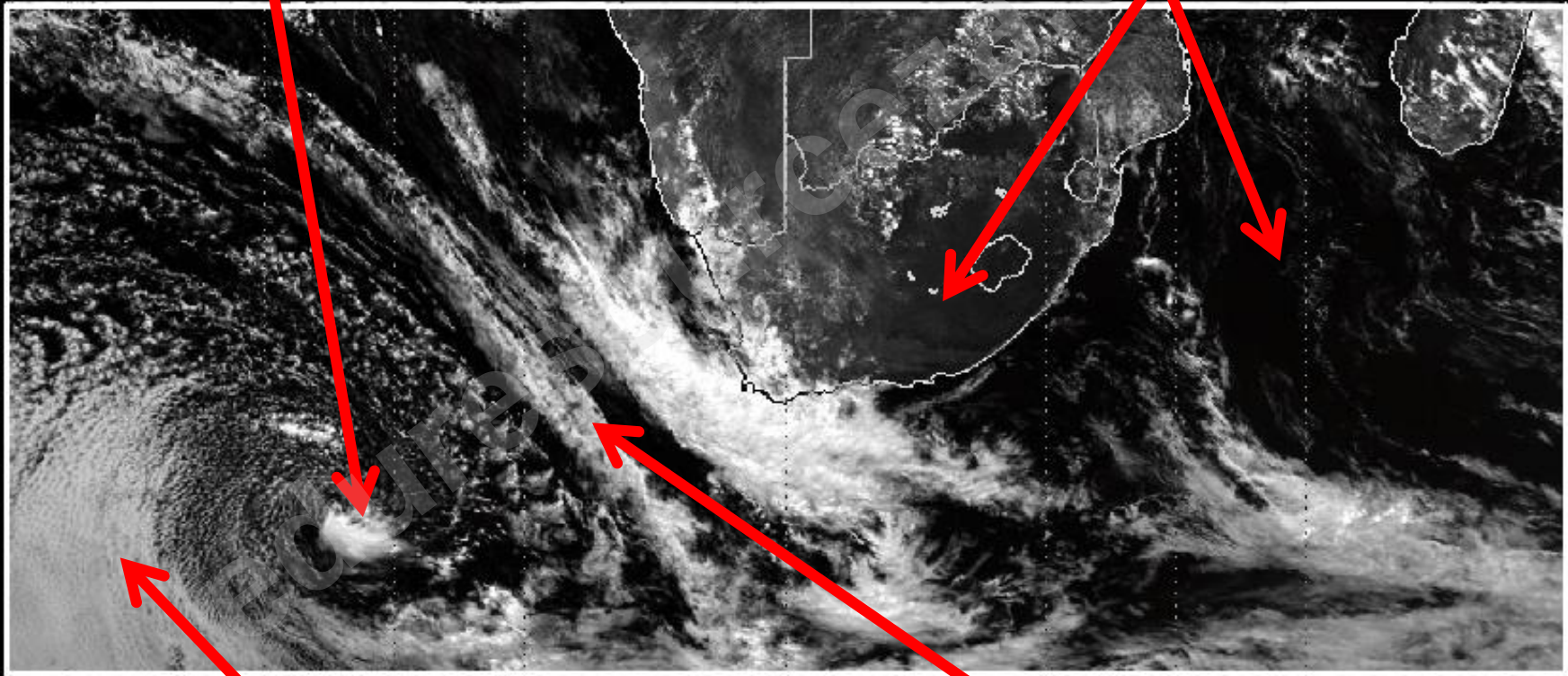


# HOW TO INTERPRET A SATELLITE IMAGE

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**LOW PRESSURE CELL**  
**Pivot point of cold front**

**CLEAR SKIES**  
**Black/grey area**



**SOLID CLOUD COVER**  
**Grey/white area**

**COLD FRONT**  
**Curved band of clouds**

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