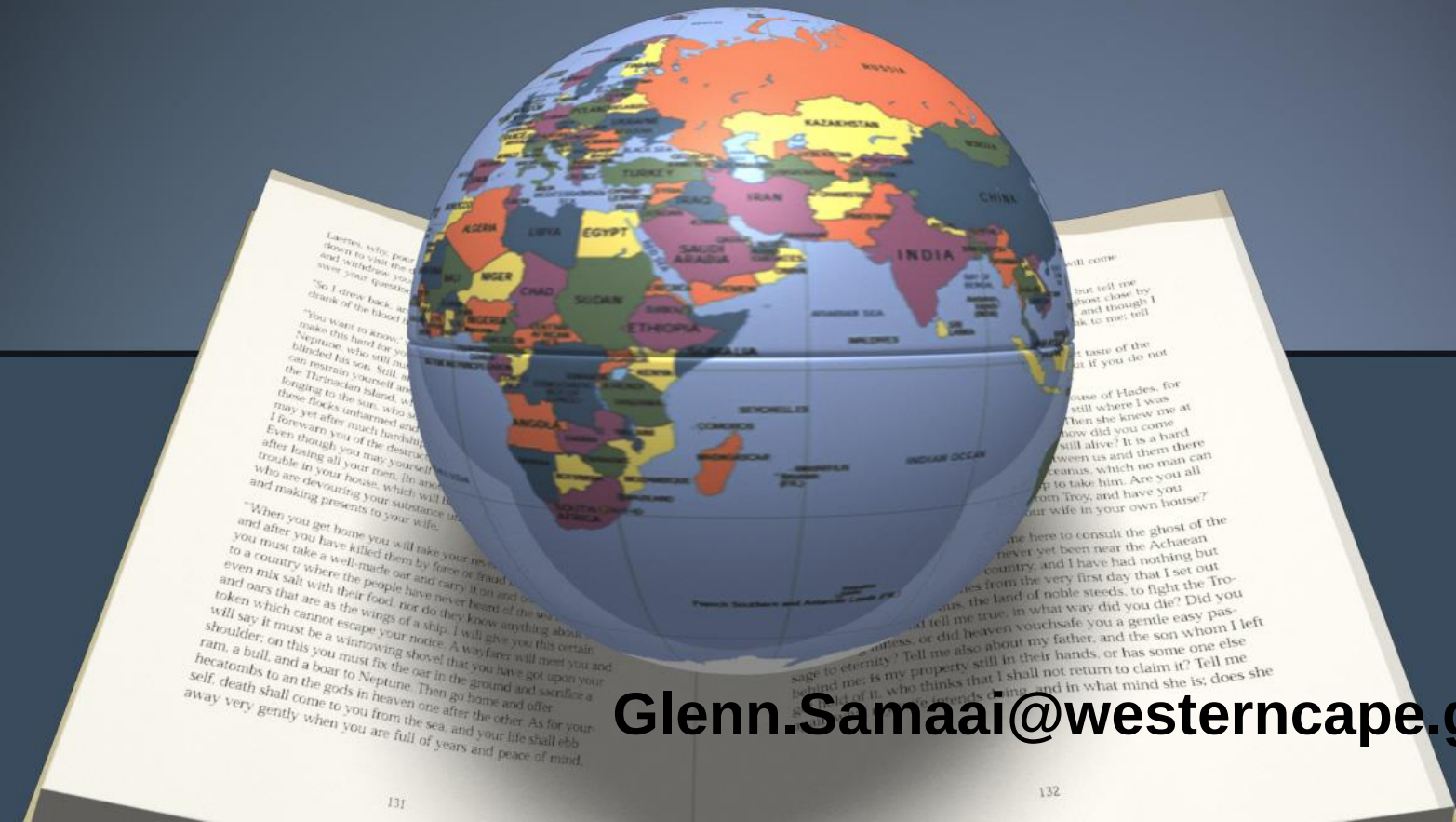
GEOGRAPHY

Revision

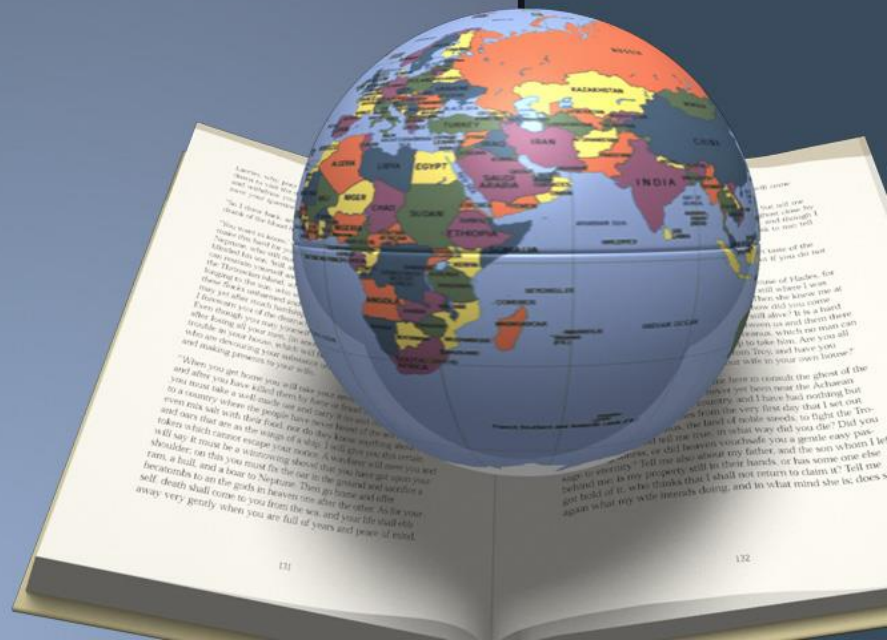
Climate and weather



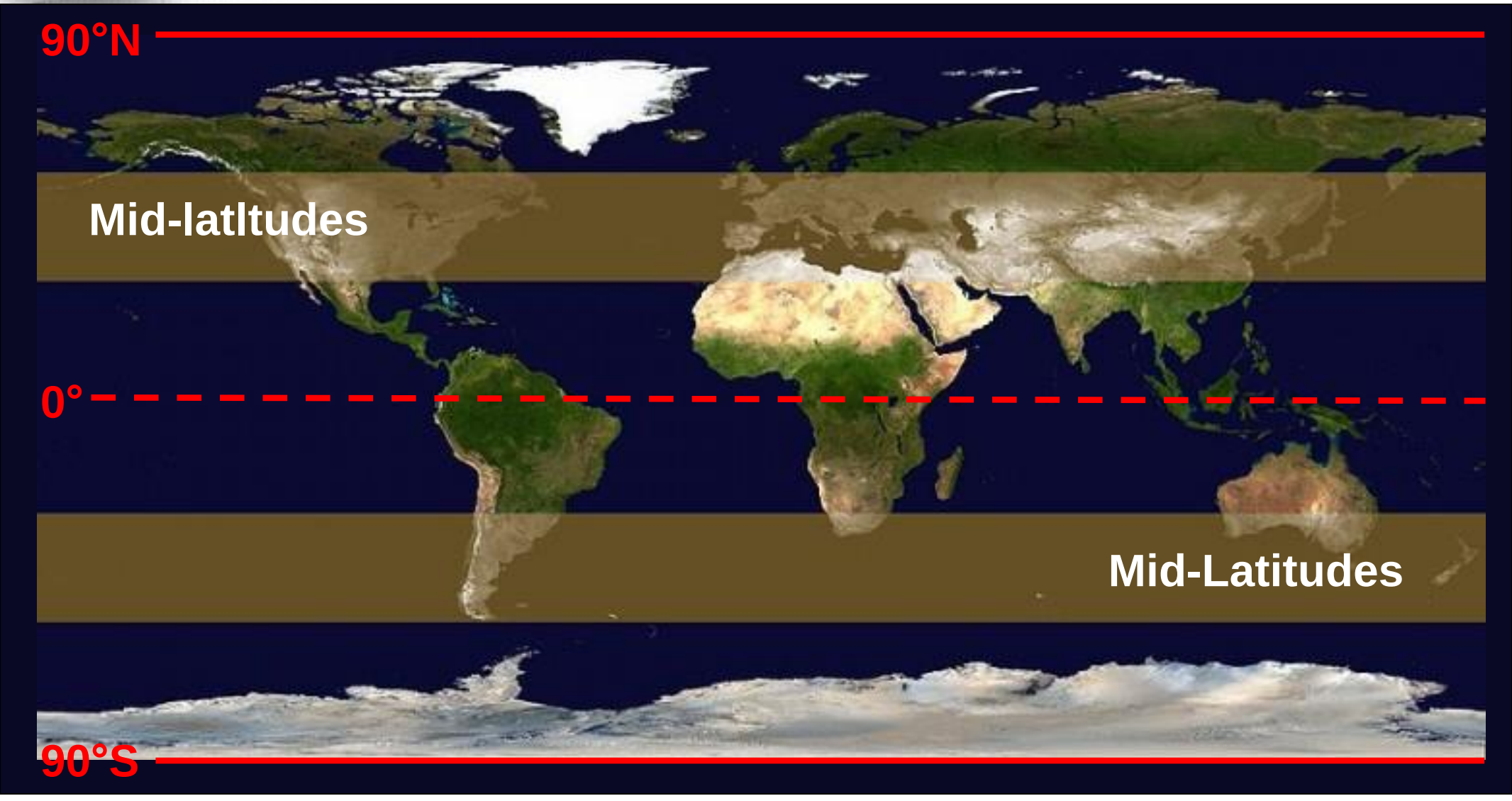
Glenn.Samaai@westerncape.gov.za

MID-LATITUDE CYCLONES

1. Cold and warm fronts
2. Characteristics
3. Stages
4. Weather



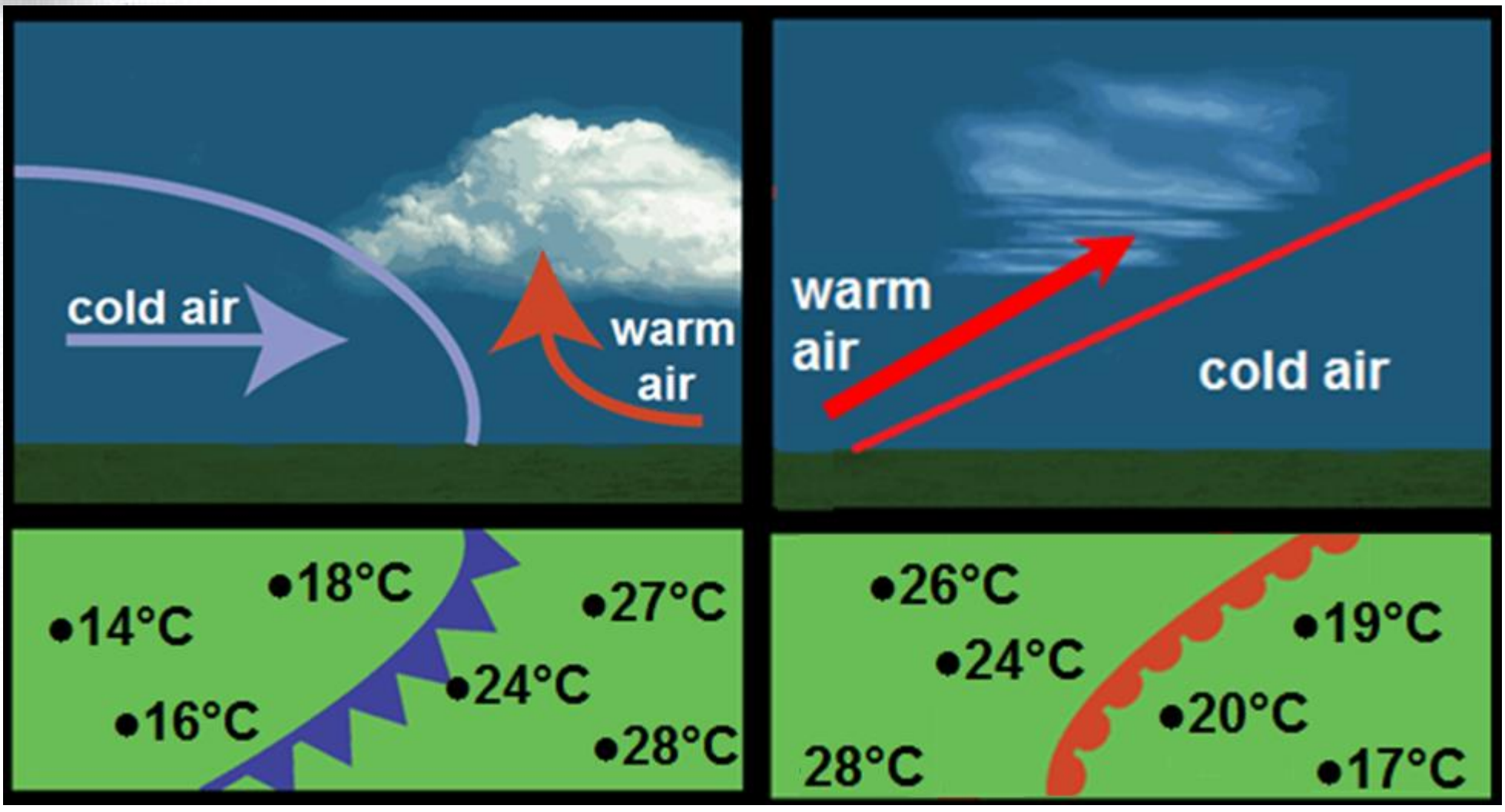
Where do mid-latitude cyclones form?



What are warm and cold fronts?

COLD FRONT

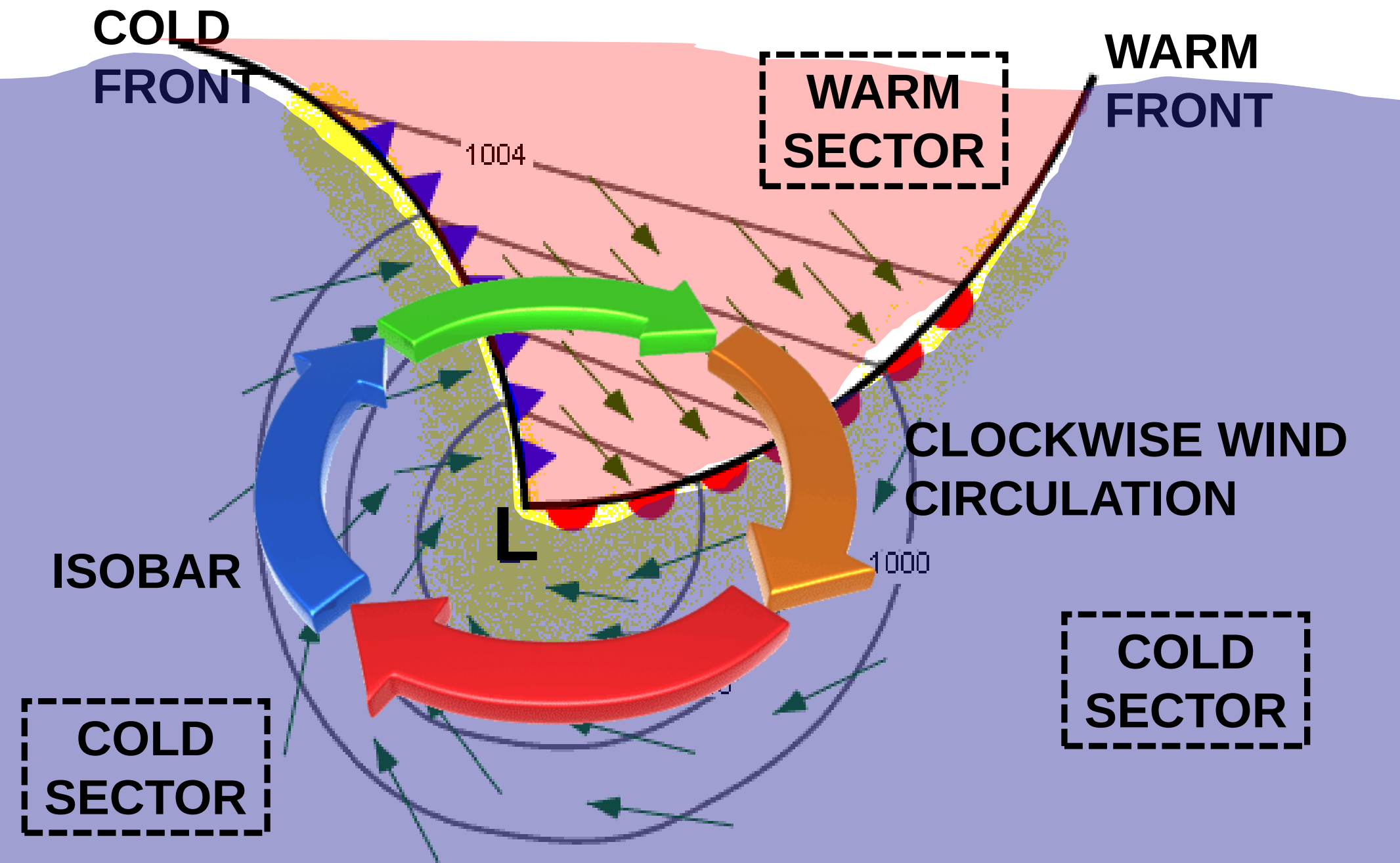
WARM FRONT



Cold air behind cold front

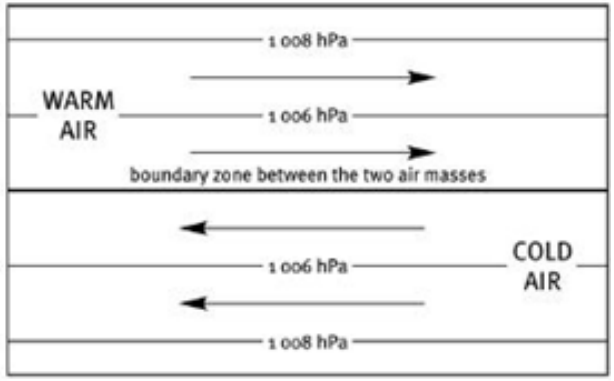
Warm air behind warm front

Mid-latitude cyclones: Characteristics

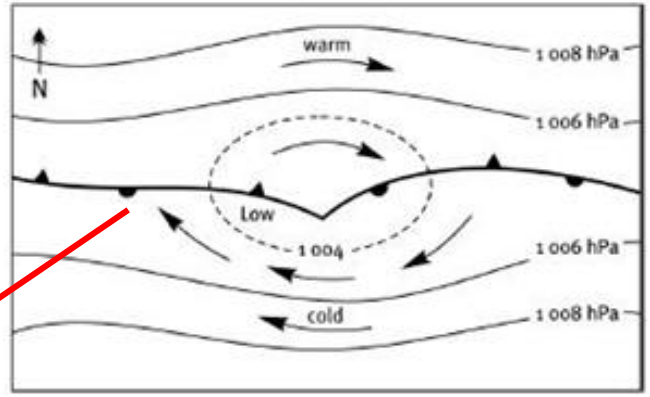


MIDLATTITUDE CYCLONE: DEVELOPMENT

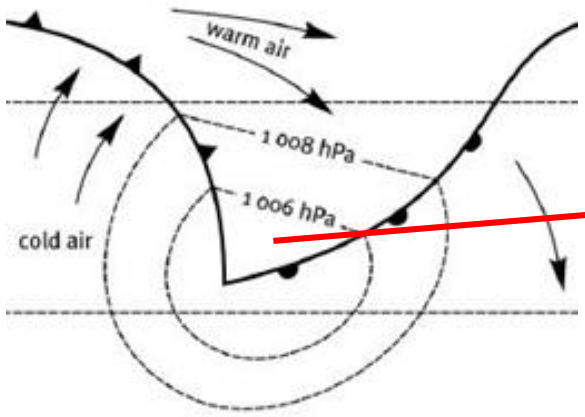
1 INITIAL STAGE

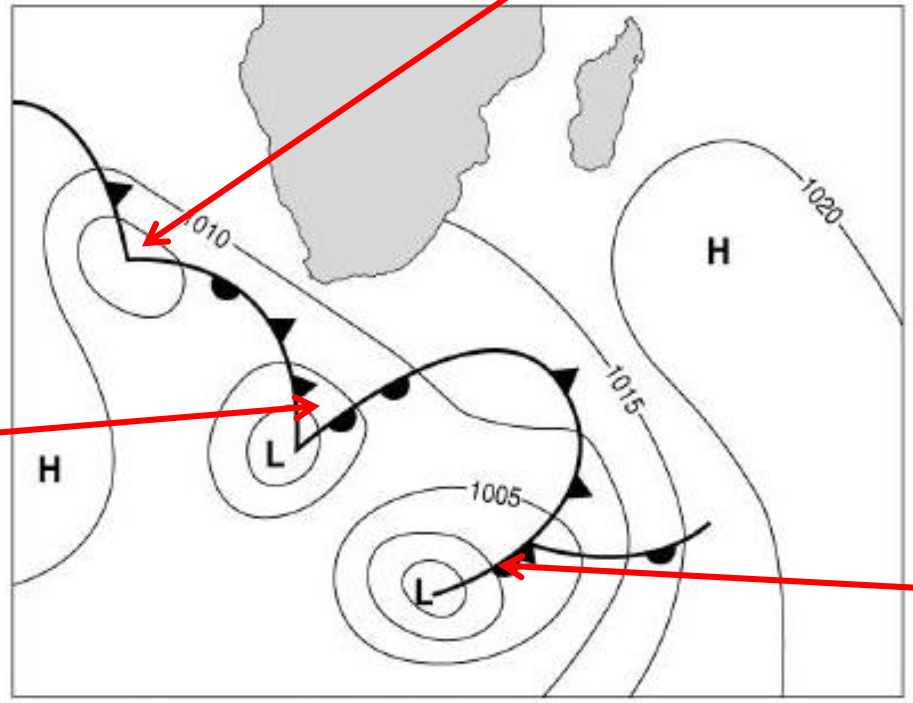


2 DEVELOPMENT STAGE

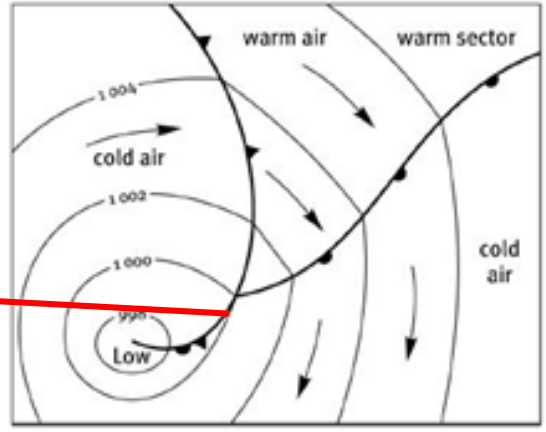


3 MATURE STAGE



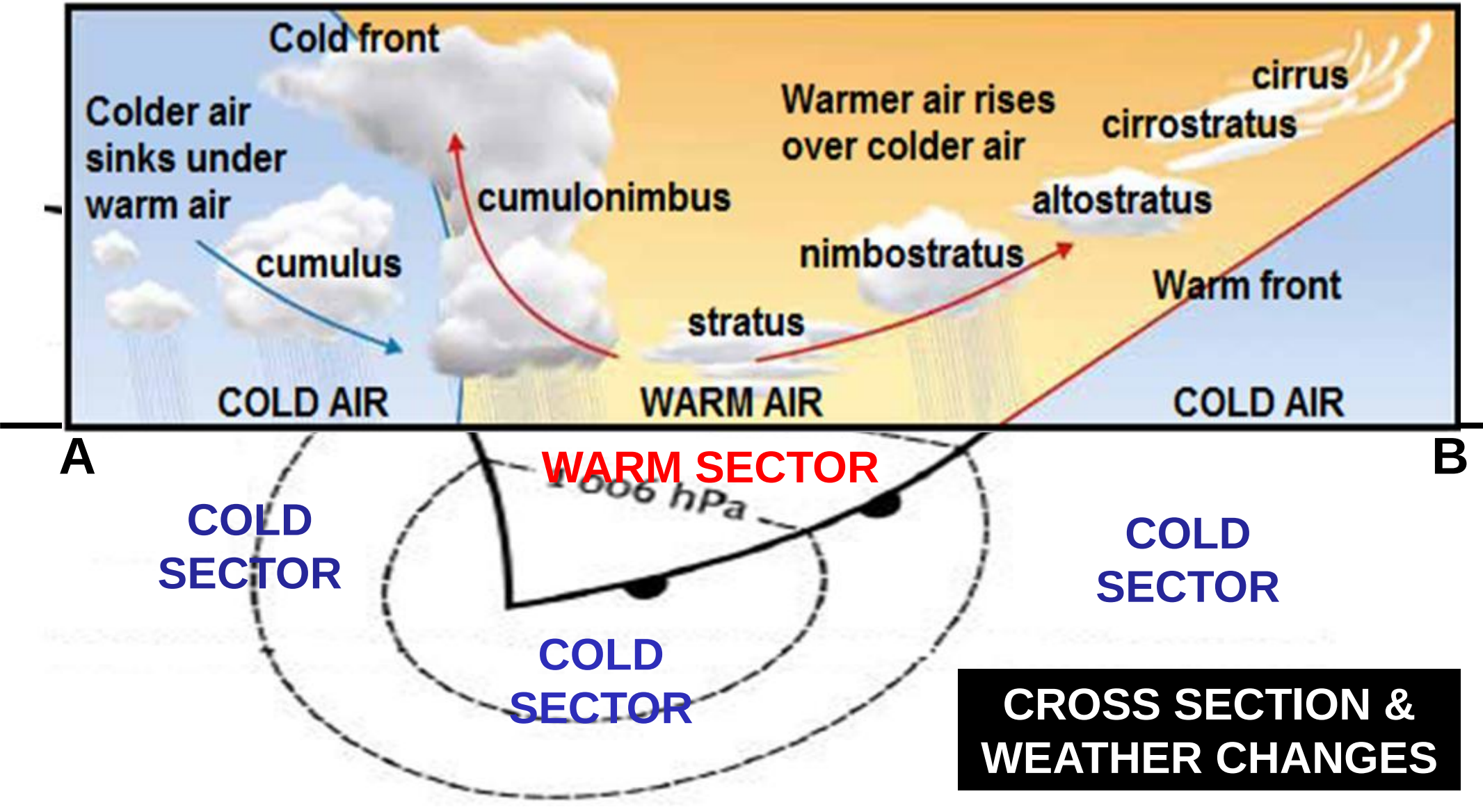


4 OCCLUSION



FAMILY OF CYCLONES

• 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

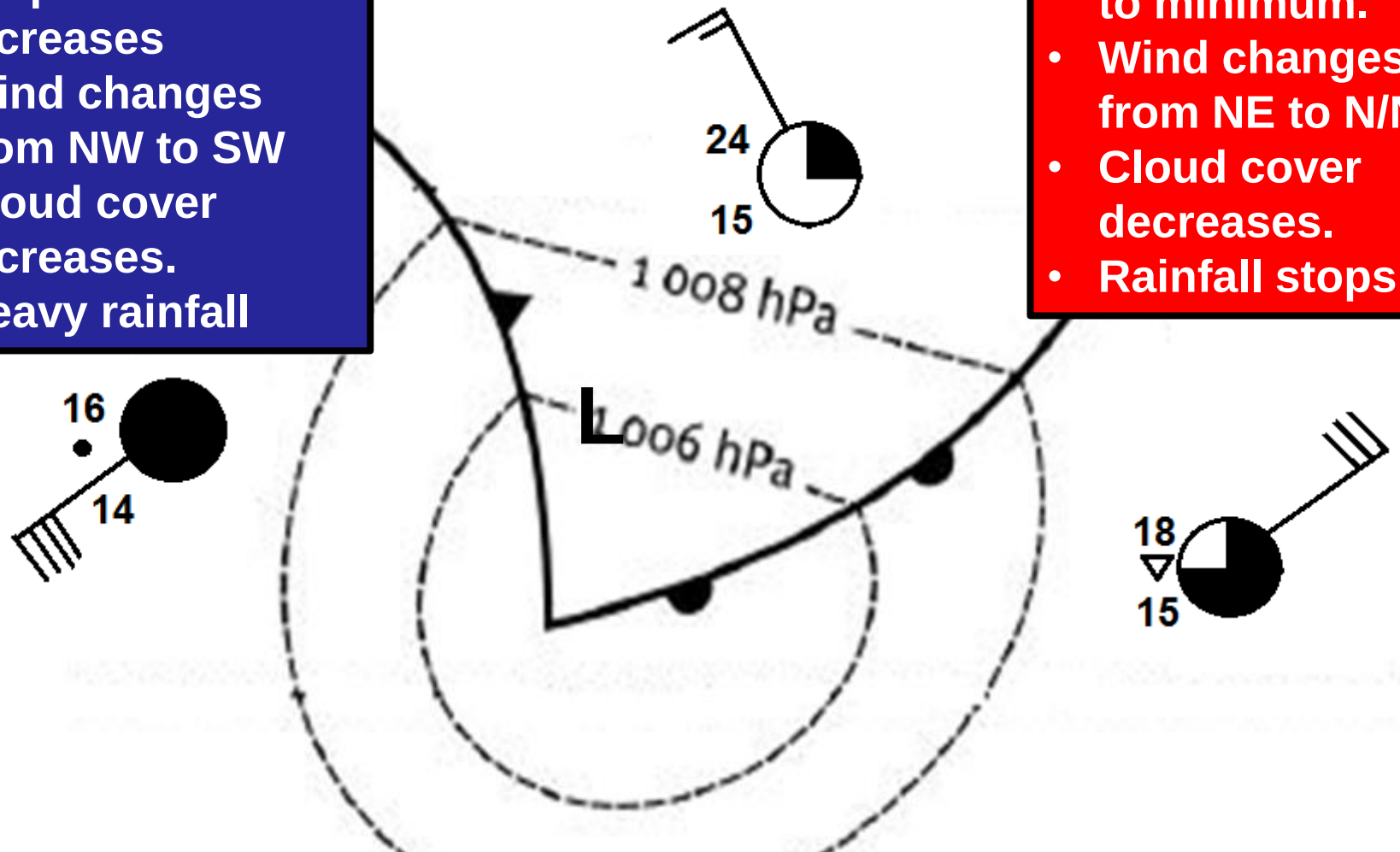


CROSS SECTION & WEATHER CHANGES

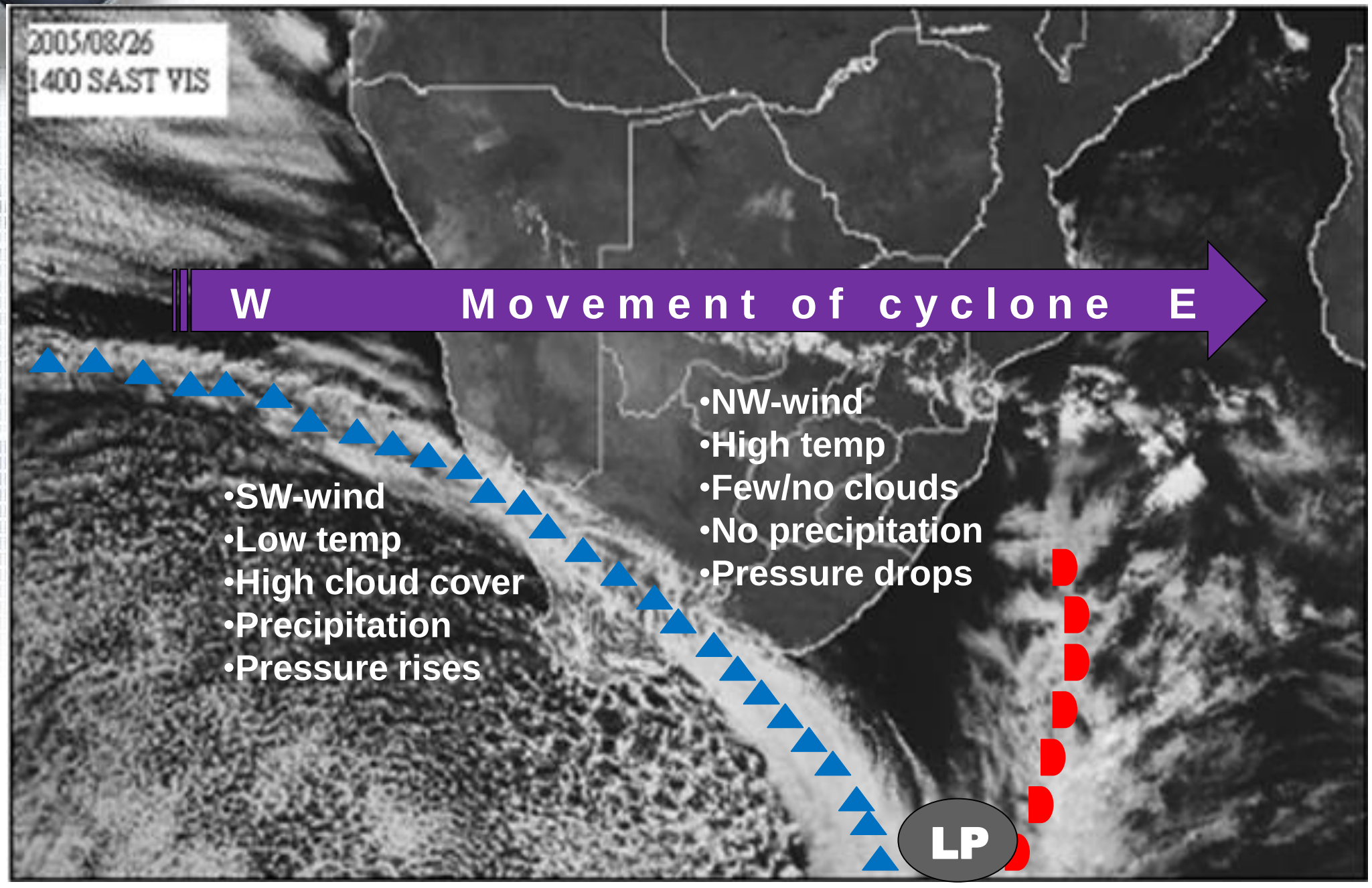
Describe the weather changes associated with the passing of a warm/cold front.

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

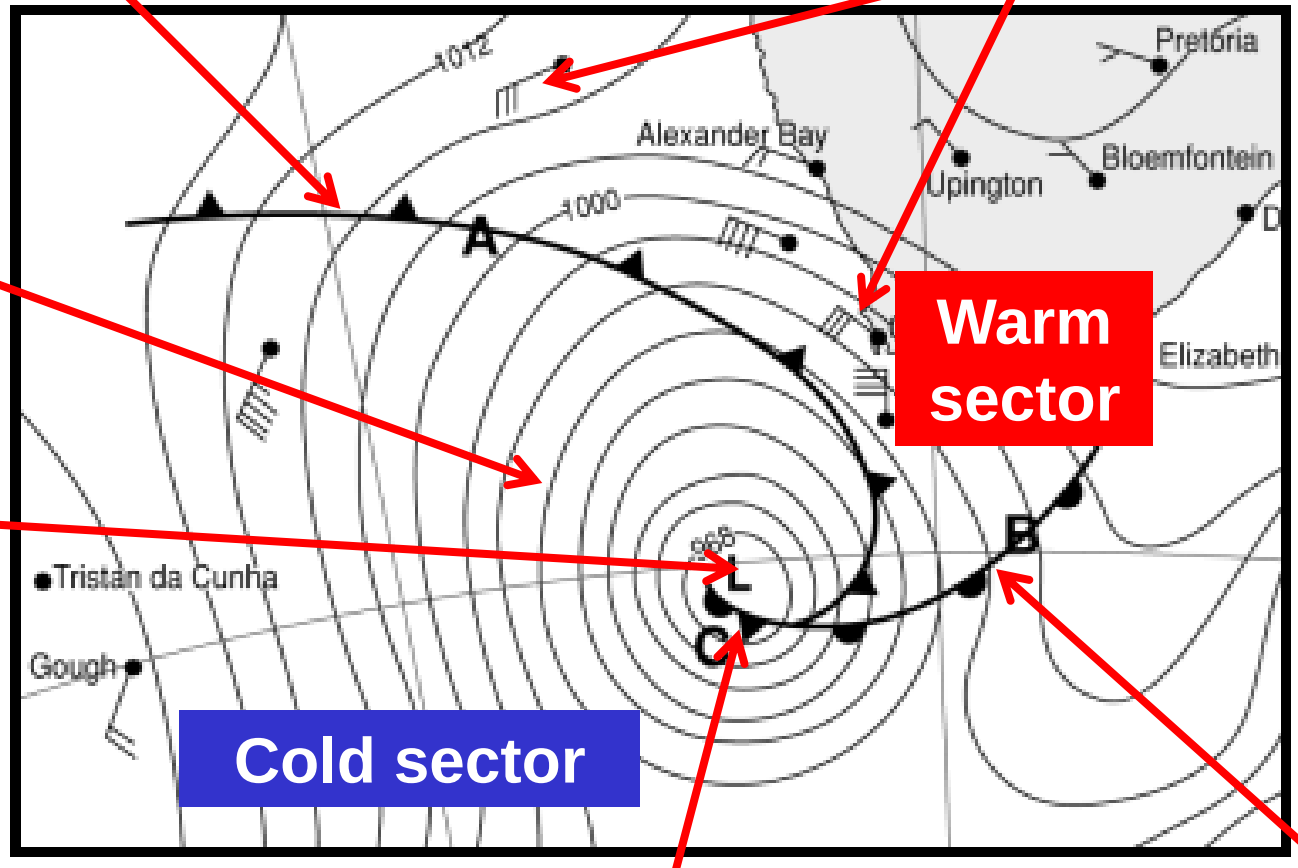
WARM FRONT
- Temp rises to max
- Air pressure drops to minimum.
- Wind changes from NE to N/NW
- Cloud cover decreases.
- Rainfall stops



WEATHER CHANGES: COLD FRONT



Mid-latitude cyclones – Synoptic Weather map



Tropical cyclones

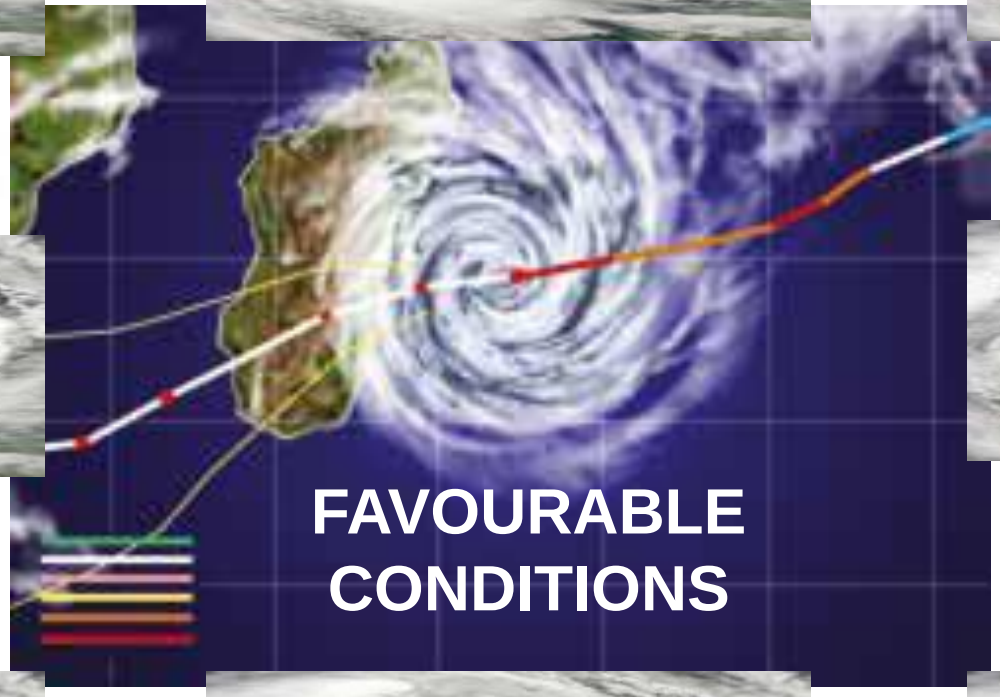
1. Favourable conditions
2. Characteristics
3. Location
4. Weather patterns
5. Development stages
6. How managed

CONDITIONS FOR TROPICAL CYCLONES TO FORM

Divergence in upper air levels

Sea temperature at least 26º C

High humidity



Air pressure below 950hPa

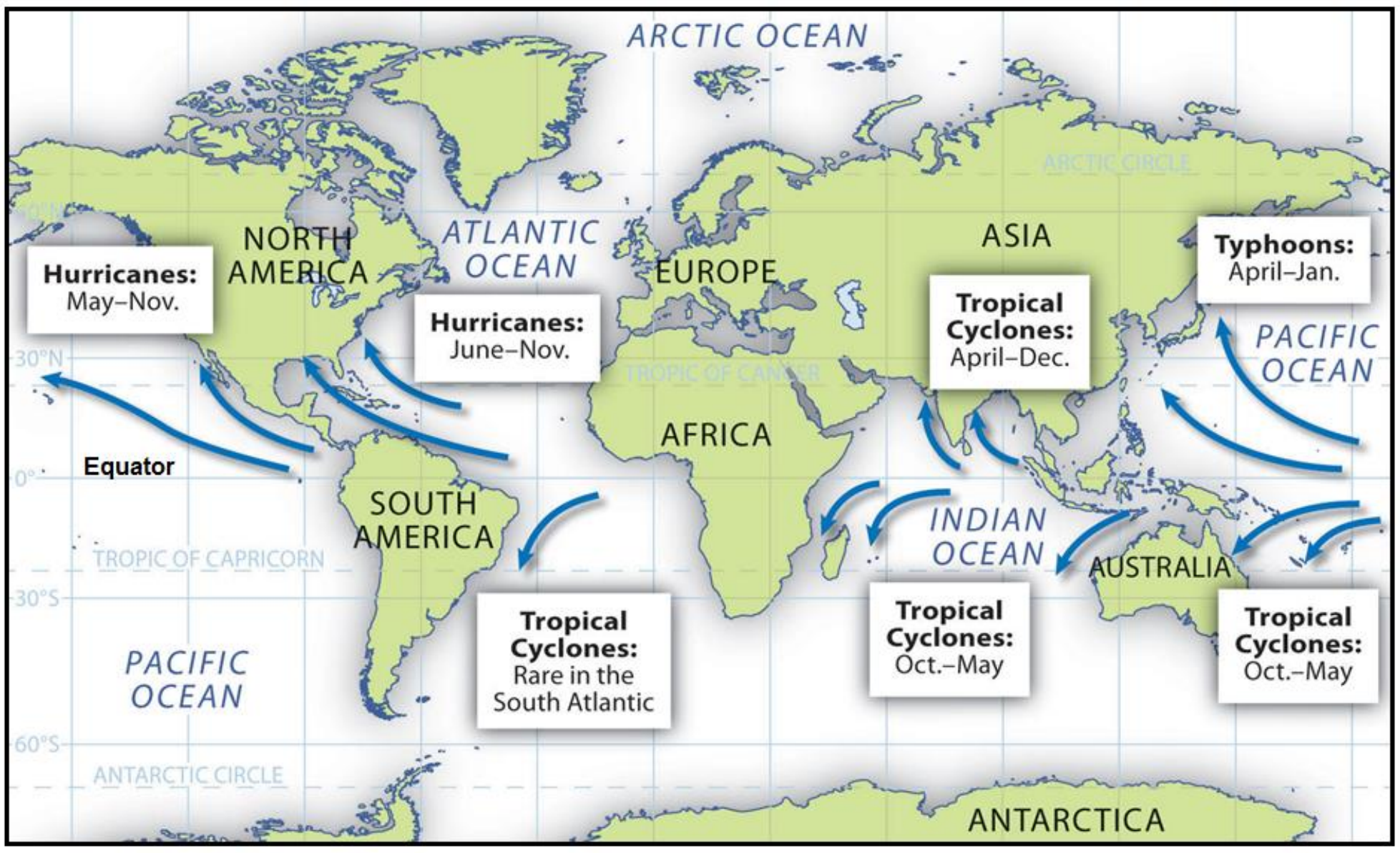
Coriolus force

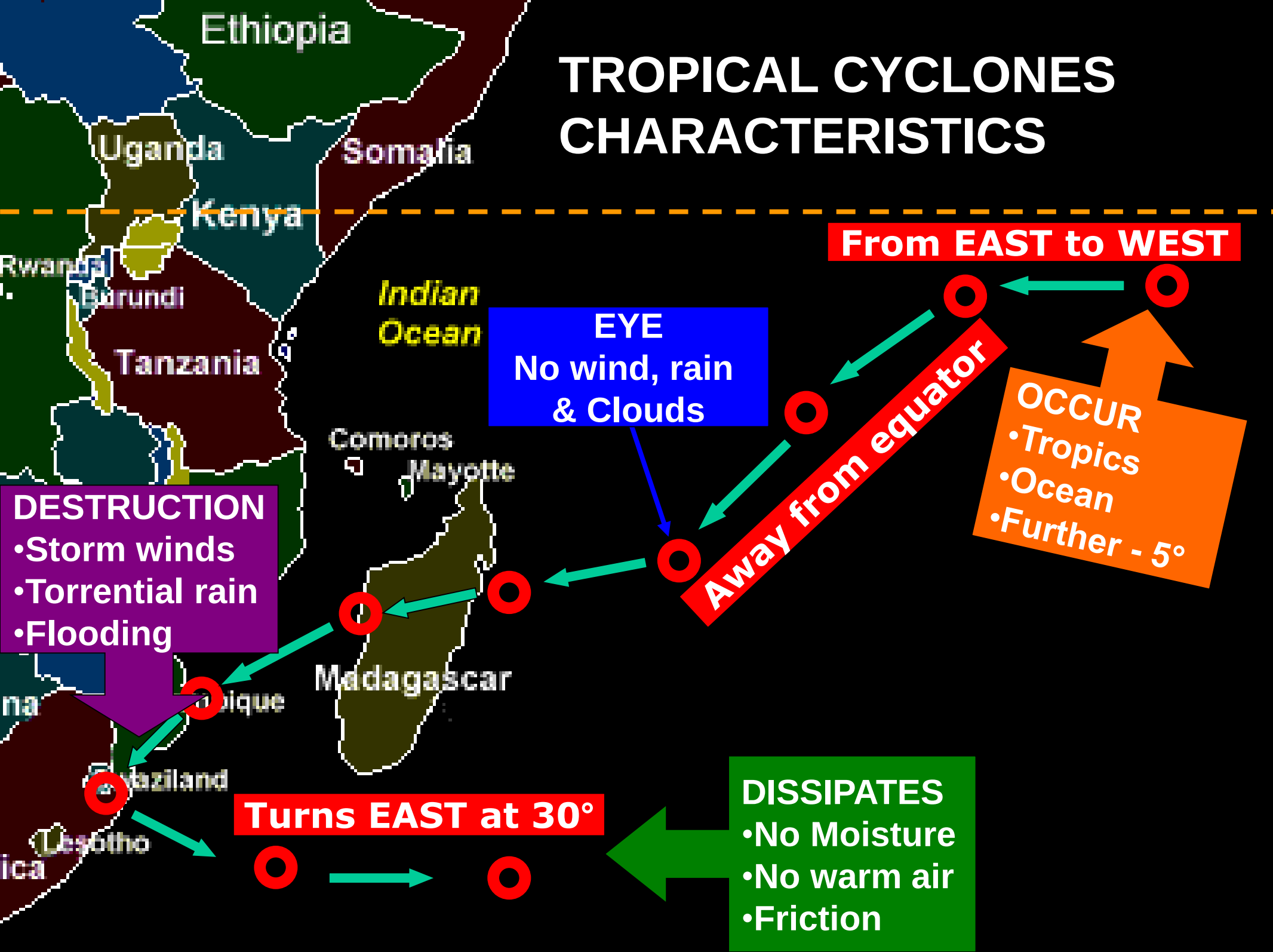
Light variable winds

Little surface friction

Unstable air

Where do tropical cyclones form?

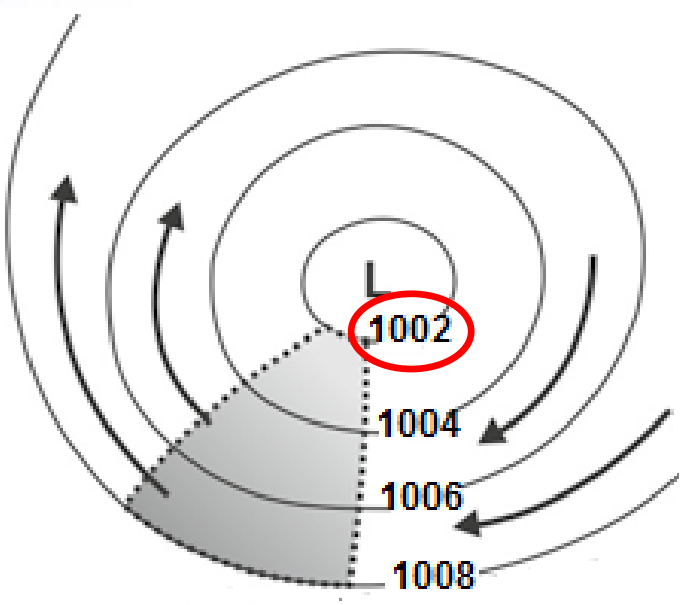


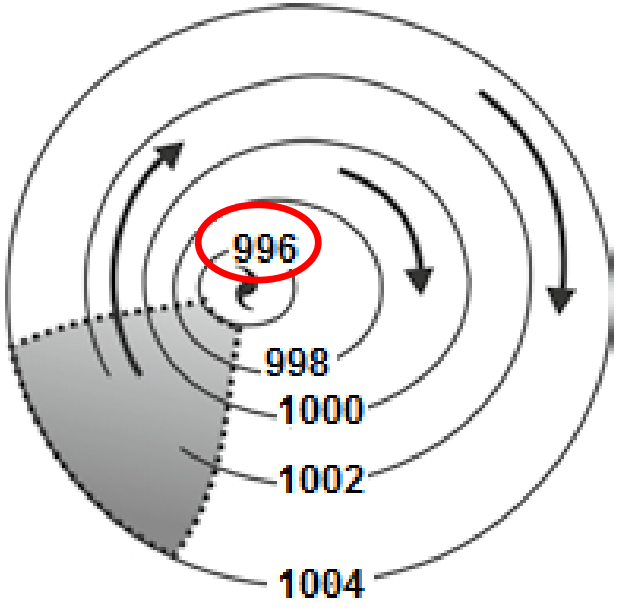

TROPICAL CYCLONES
CHARACTERISTICS
Ethiopia
Uganda
Somalia
Kenya
Rwanda
Burundi
Tanzania
Indian
Ocean
Comoros
Mayotte
Madagascar
From EAST to WEST
EYE
No wind, rain
& Clouds
Away from equator
OCCUR
•Tropics
•Ocean
•Further - 5°
DESTRUCTION
•Storm winds
•Torrential rain
•Flooding
Turns EAST at 30°
DISSIPATES
•No Moisture
•No warm air
•Friction

TROPICAL CYCLONE: DEVELOPMENT

1

FORMATIVE
Pressure
ABOVE
1000 hPa



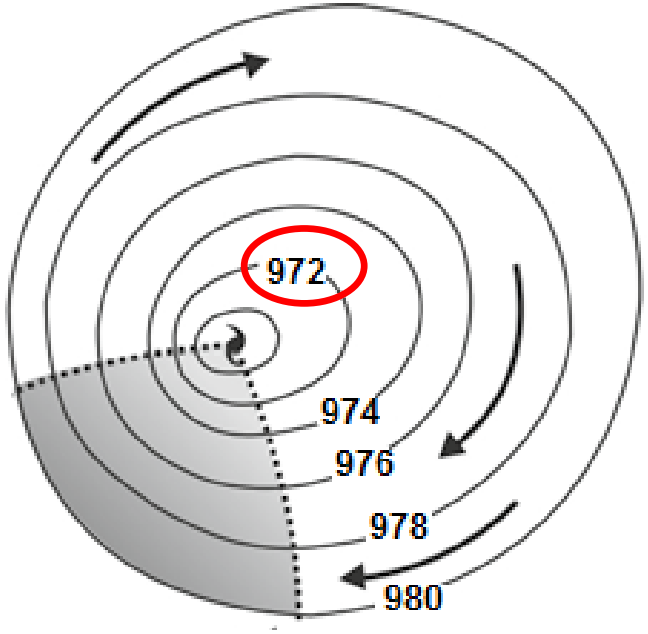


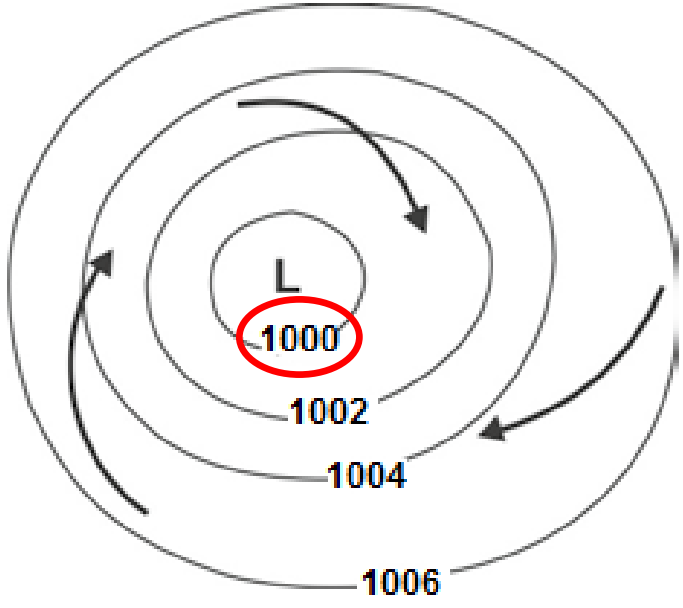
2

IMMATURE
Pressure
BELOW
1000 hPa

3

MATURE
Pressure
WELL
BELOW
1000hPa

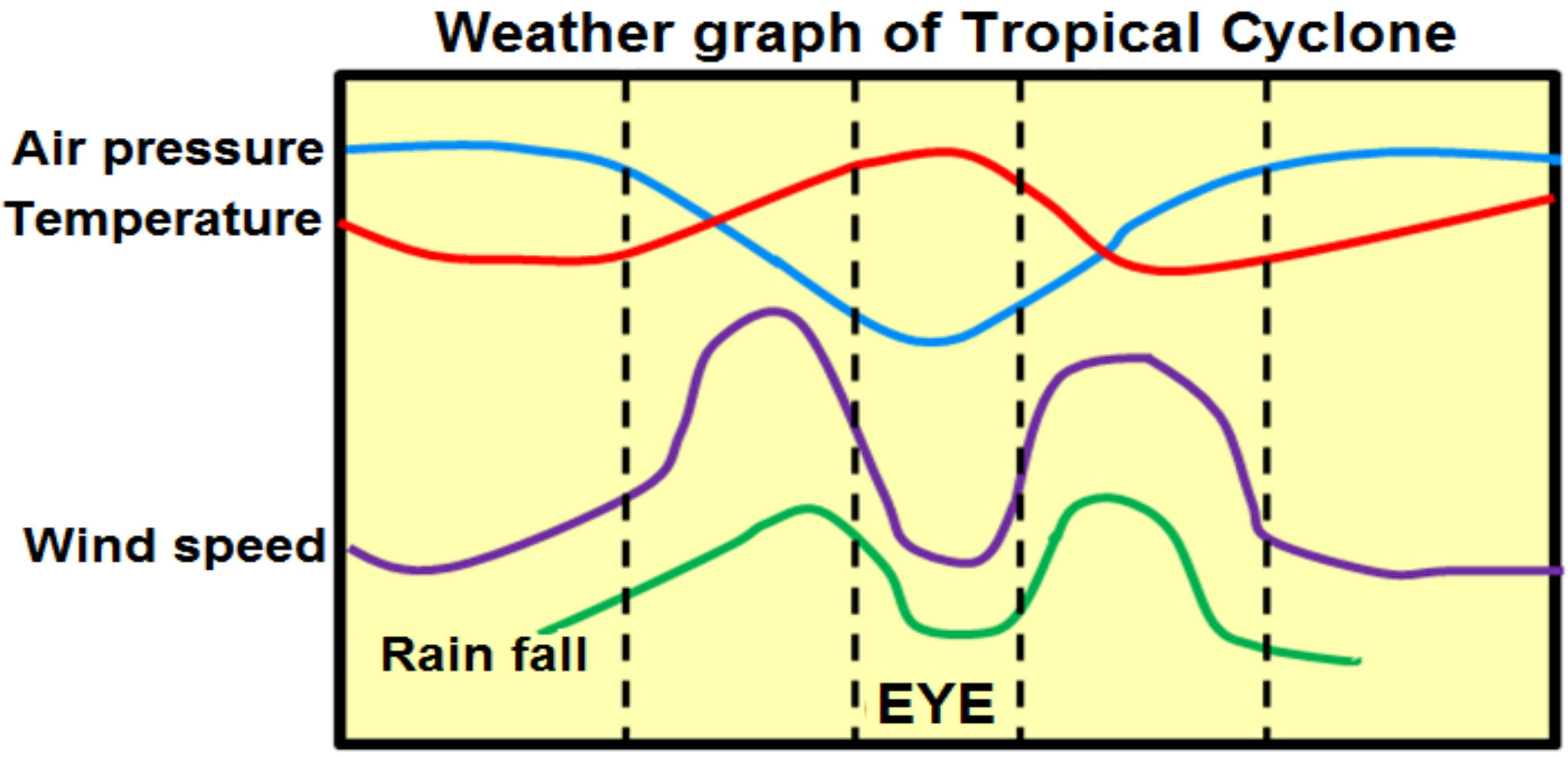




4

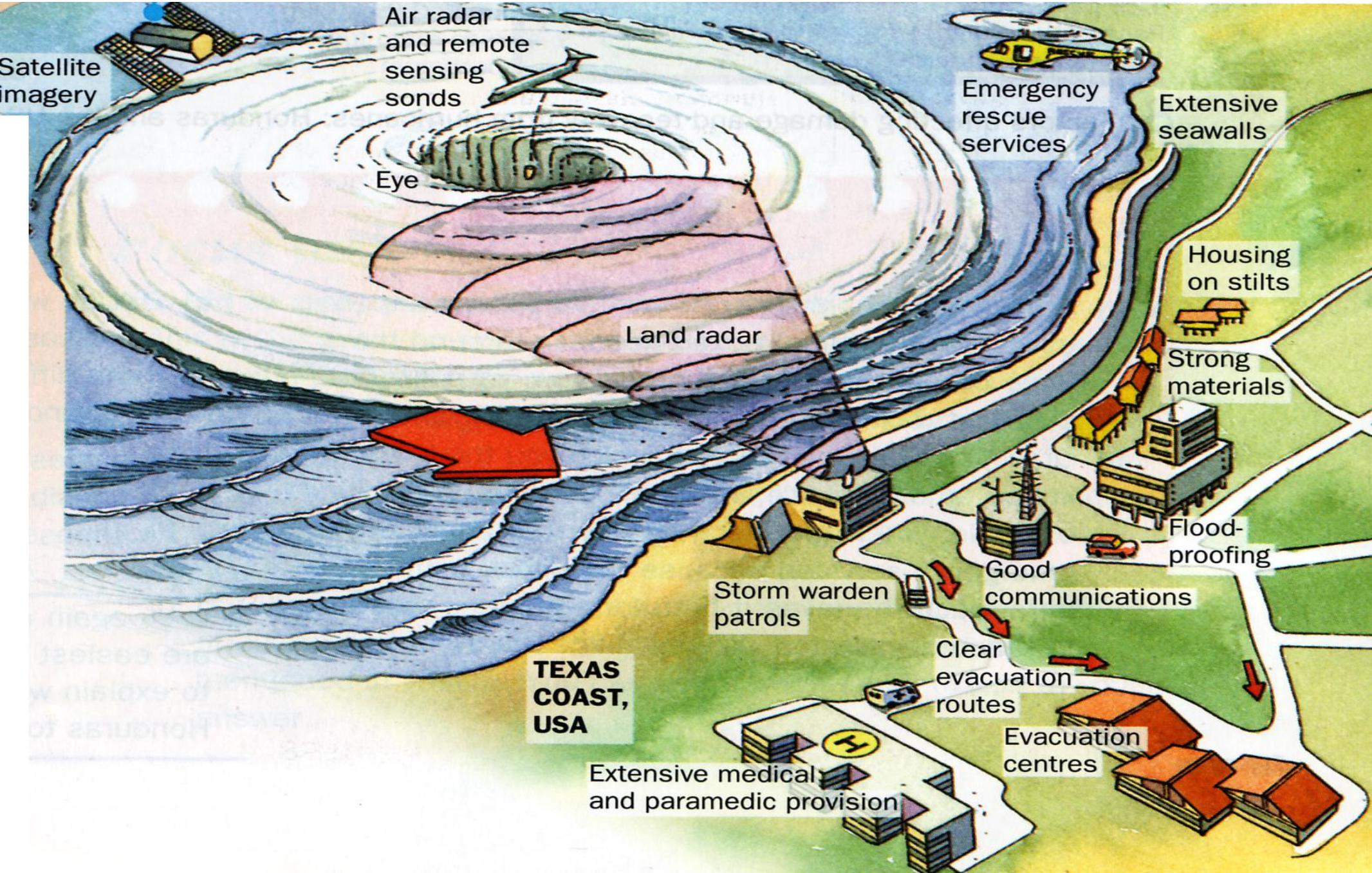
DISSI-
PATION
Pressure
RISES

Tropical Cyclones: Weather patterns

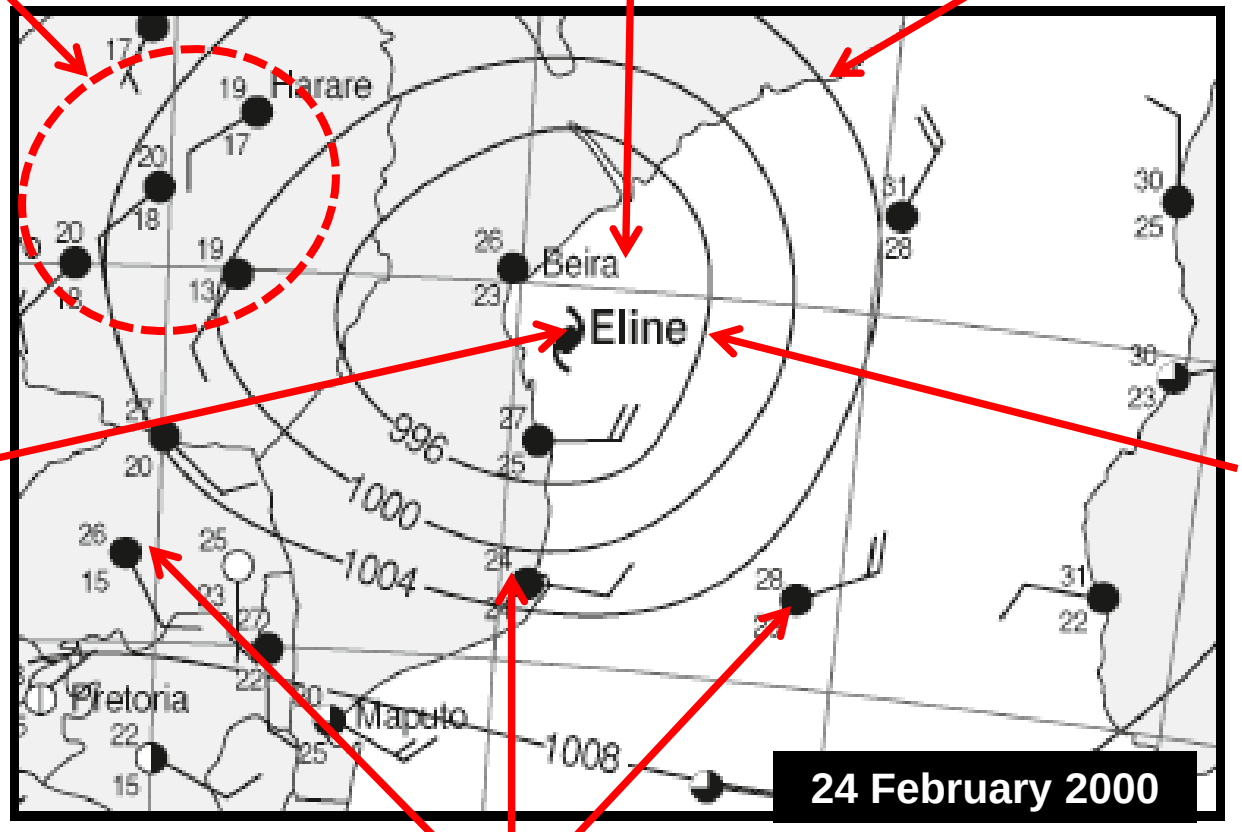


BEFORE EYE (SH)	IN EYE	AFTER EYE (SH)
• Wind direction: South • Wind: Hurricane • Air pressure decreases • Very heavy rainfall	• No wind • No rain • No clouds • Lowest air pressure • Temp increases	• Wind direction: North • Wind: storm to hurricane • Air pressure increases • Heavy rainfall • Starts to dissipate

TROPICALCYCLONE - MANAGEMENT



Tropical Cyclones: Synoptic weather maps



Overcast

Low pressure

East coast

Symbol

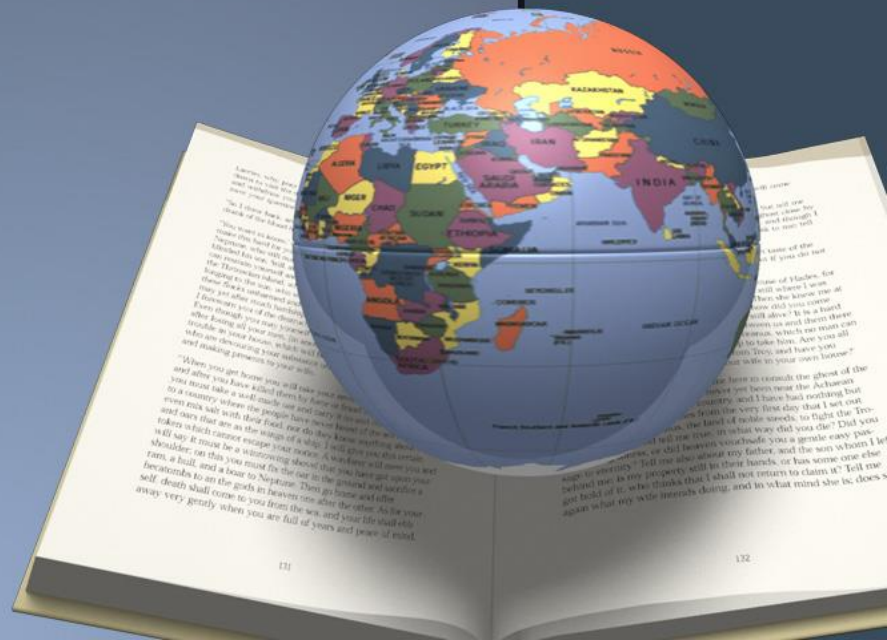
Name
Eline 5th

Clockwise
rotation

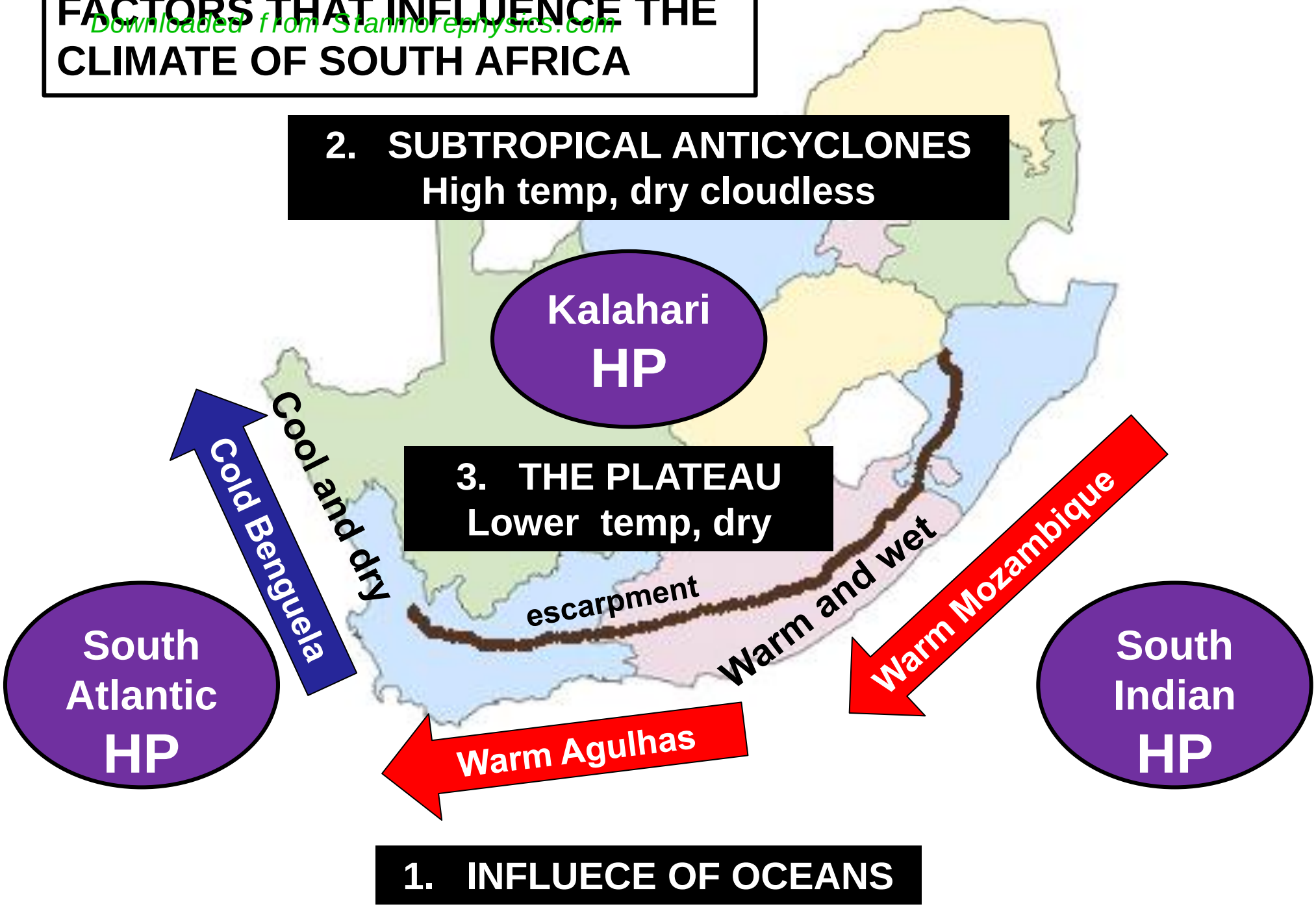
Date

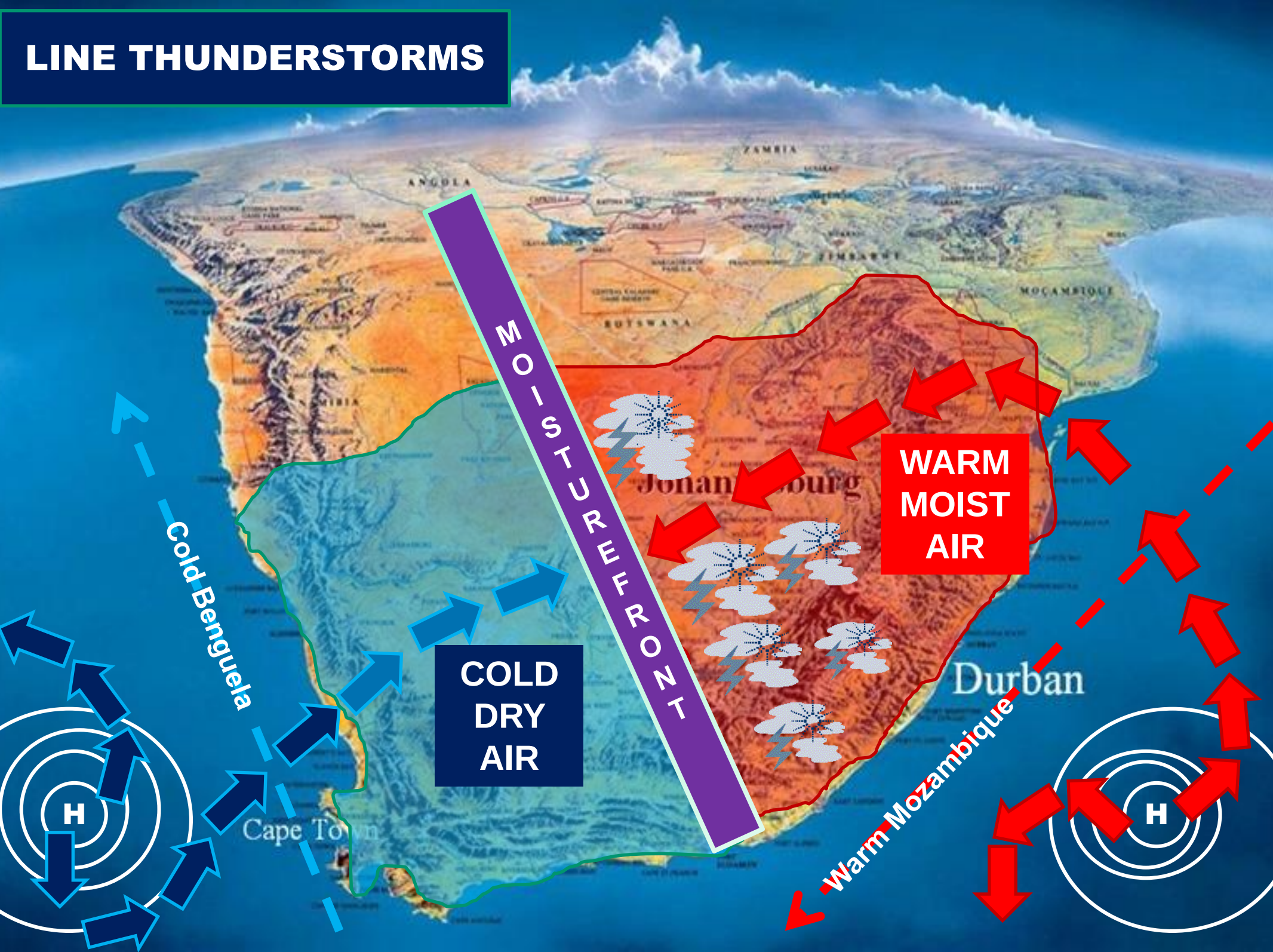
SUBTROPICAL ANTICYCLONES AND ASSOCIATED WEATHER

1. Factors influencing climate of SA
2. Line Thunderstorms
3. SA Bergwind

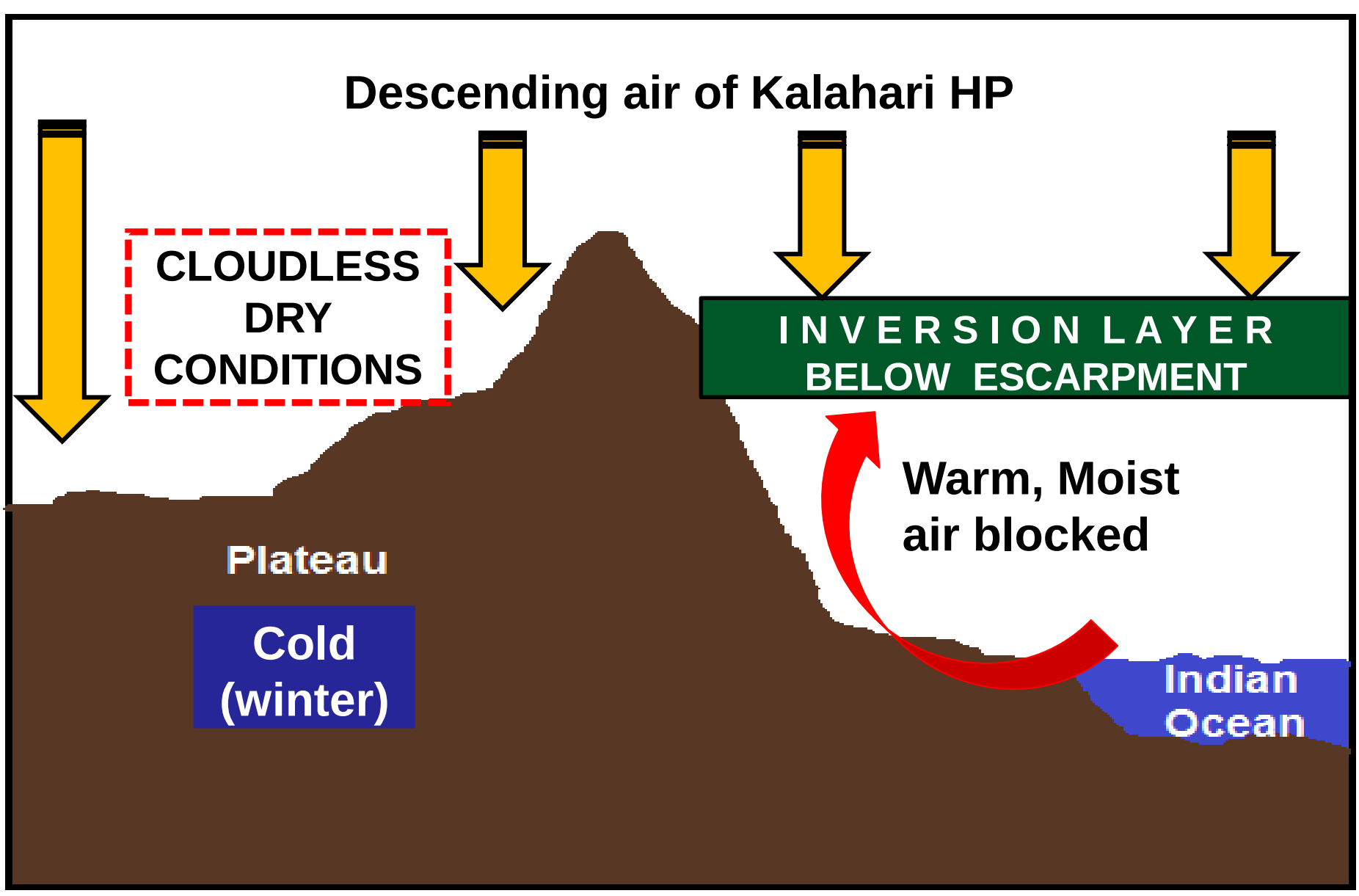


FACTORS THAT INFLUENCE THE CLIMATE OF SOUTH AFRICA

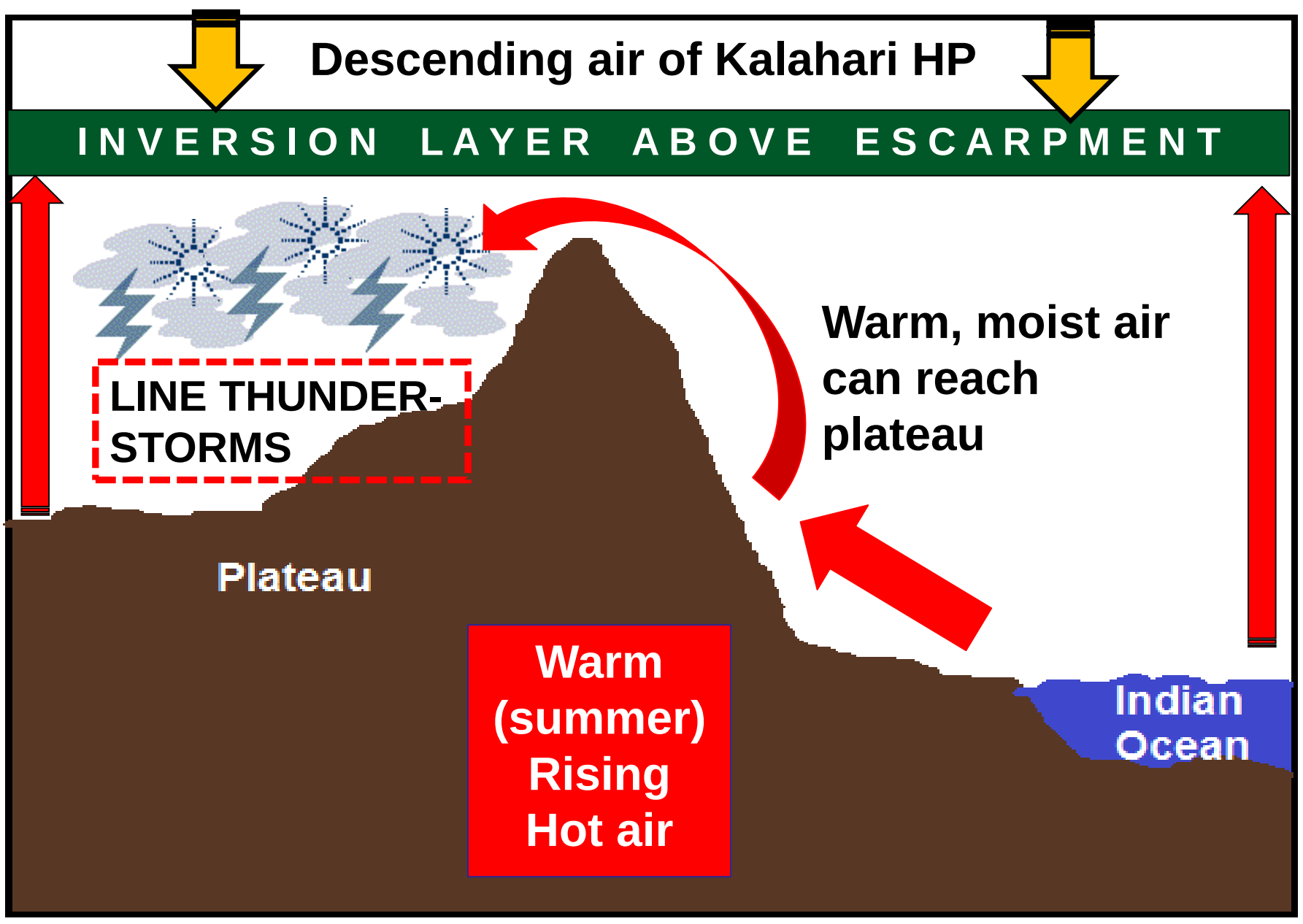



LINE THUNDERSTORMS
ANGOLA
ZAMBIA
ZIMBABWE
MOÇAMBIQUE
BOTSWANA
NAMIBIA
MOISTUREFRONT
WARM MOIST AIR
COLD DRY AIR
Cold Benguela
Warm Mozambique
Durban
Cape Town
H
H

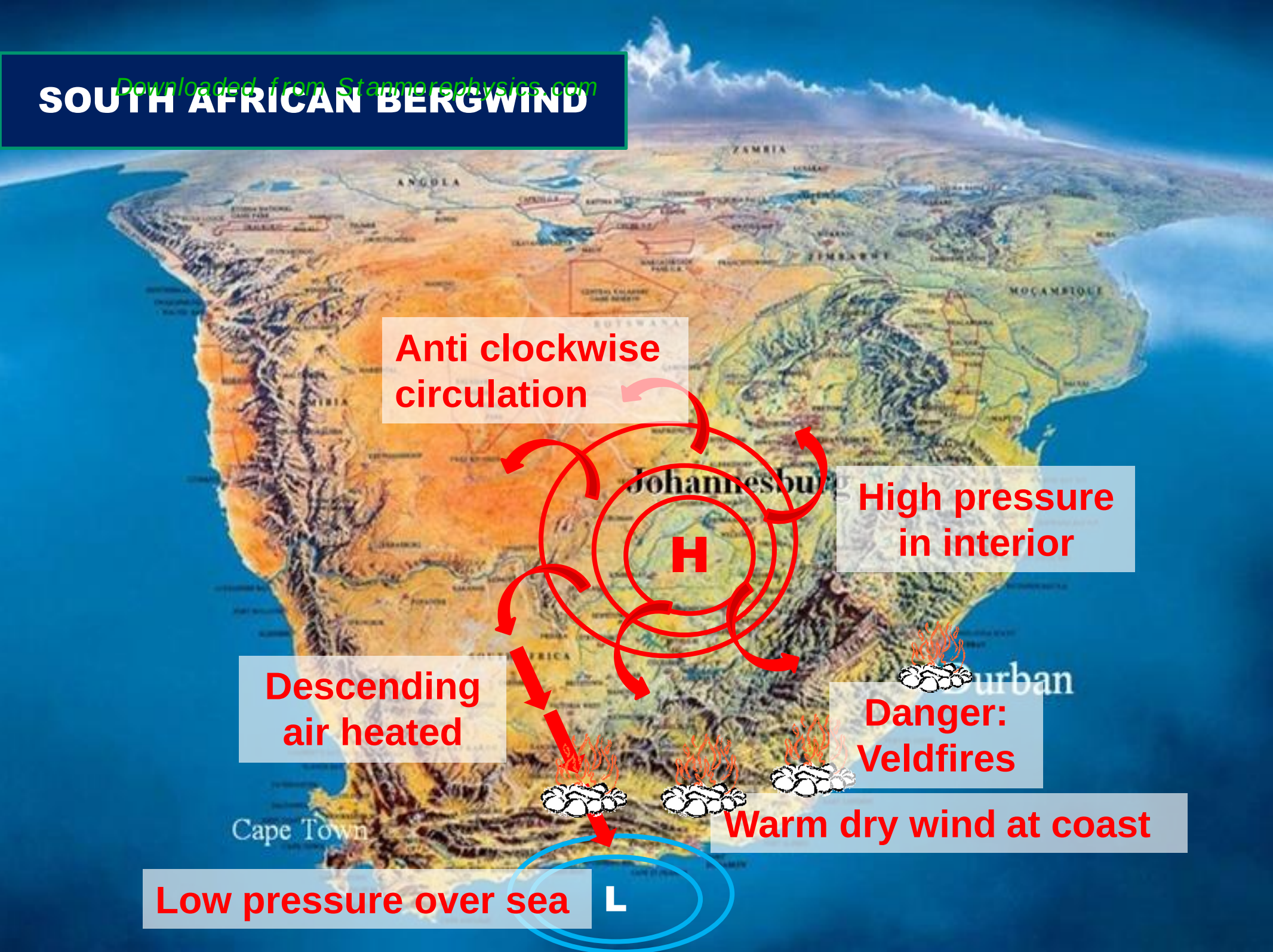
WINTER



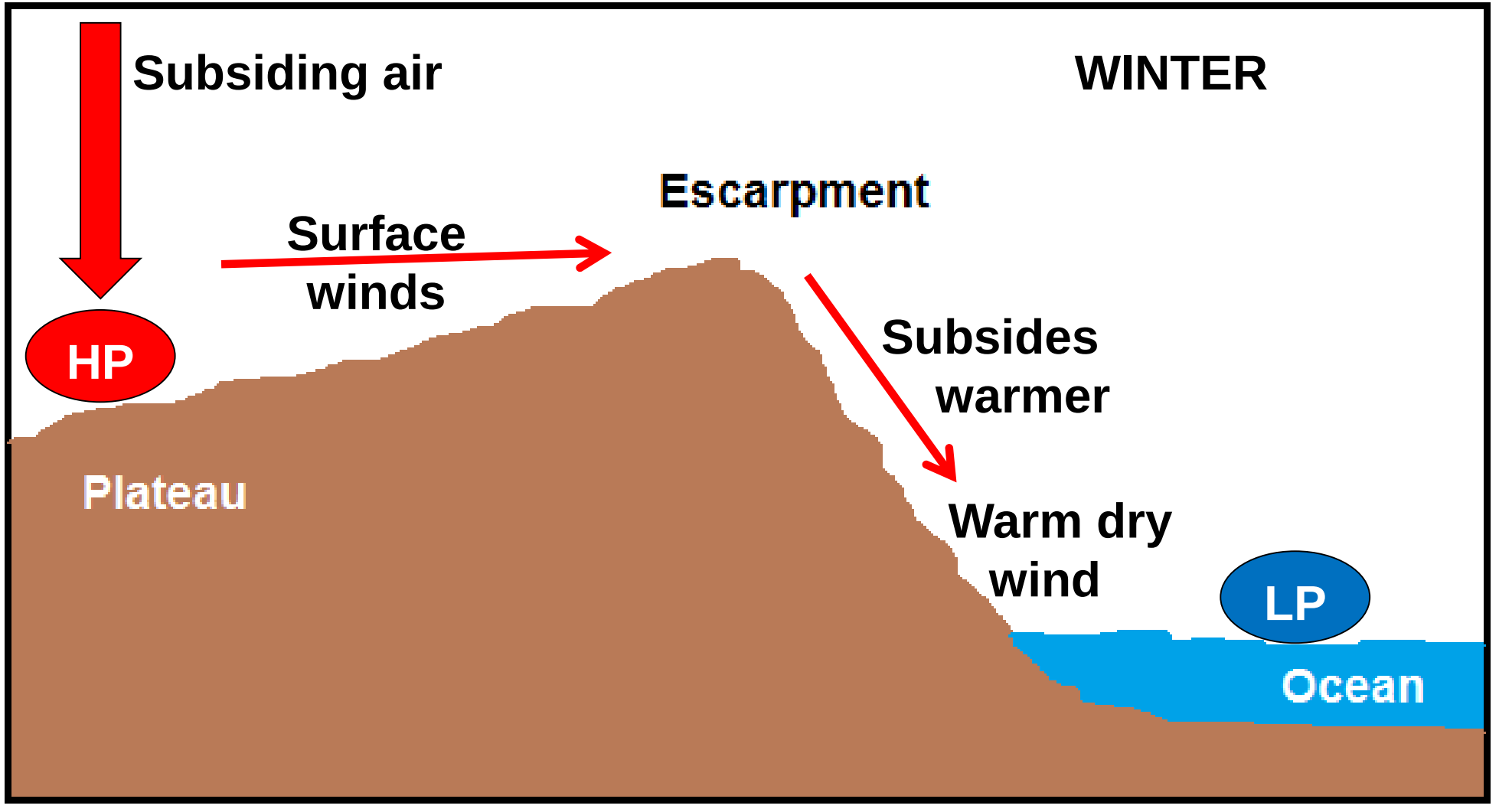
SUMMER


Descending air of Kalahari HP
INVERSION LAYER ABOVE ESCARPMENT
LINE THUNDER-STORMS
Warm, moist air can reach plateau
Plateau
Warm (summer) Rising Hot air
Indian Ocean

SOUTH AFRICAN BERGWIND

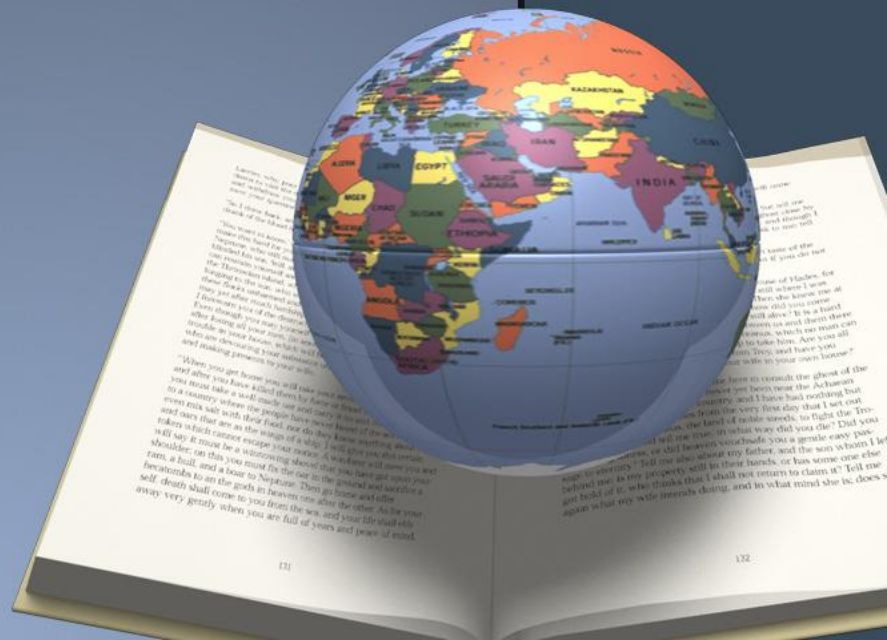


SOUTH AFRICAN BERGWIND



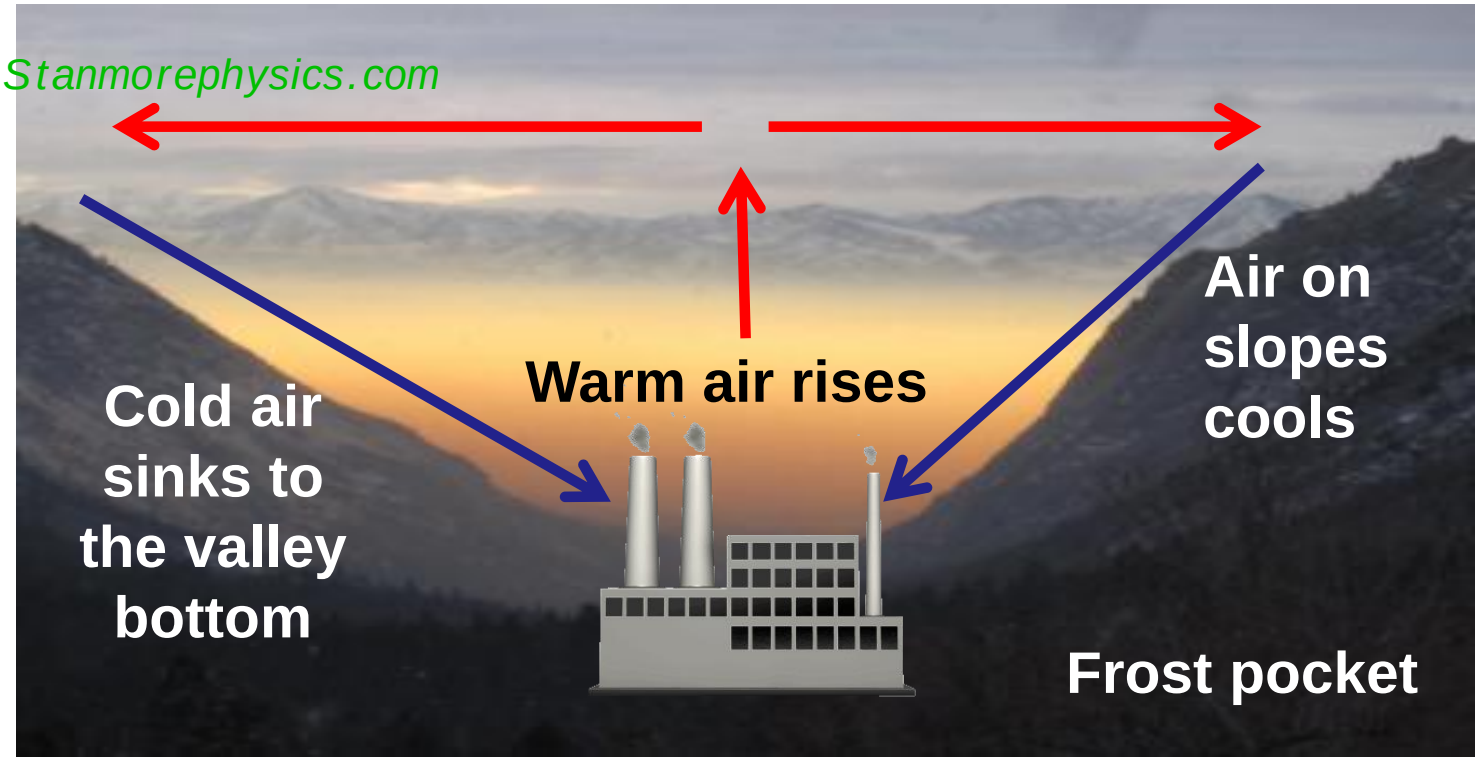
Valley Climates

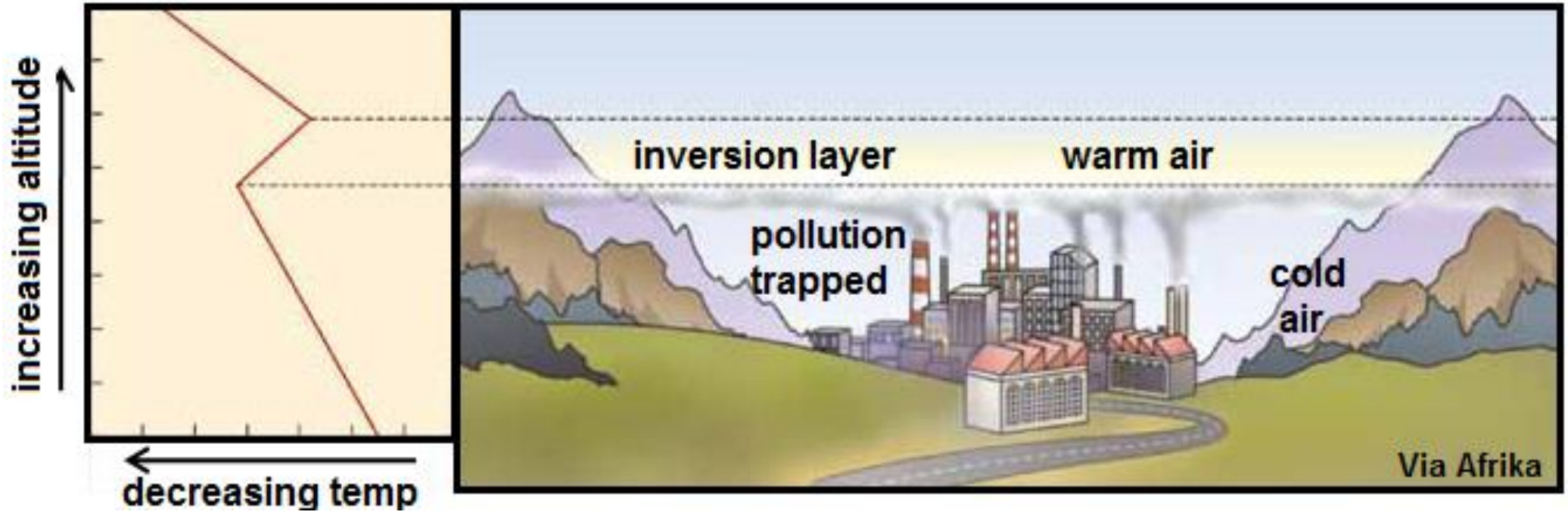
1. Effect of the slope (aspect)
2. Inversions
3. Frost pockets / Smog



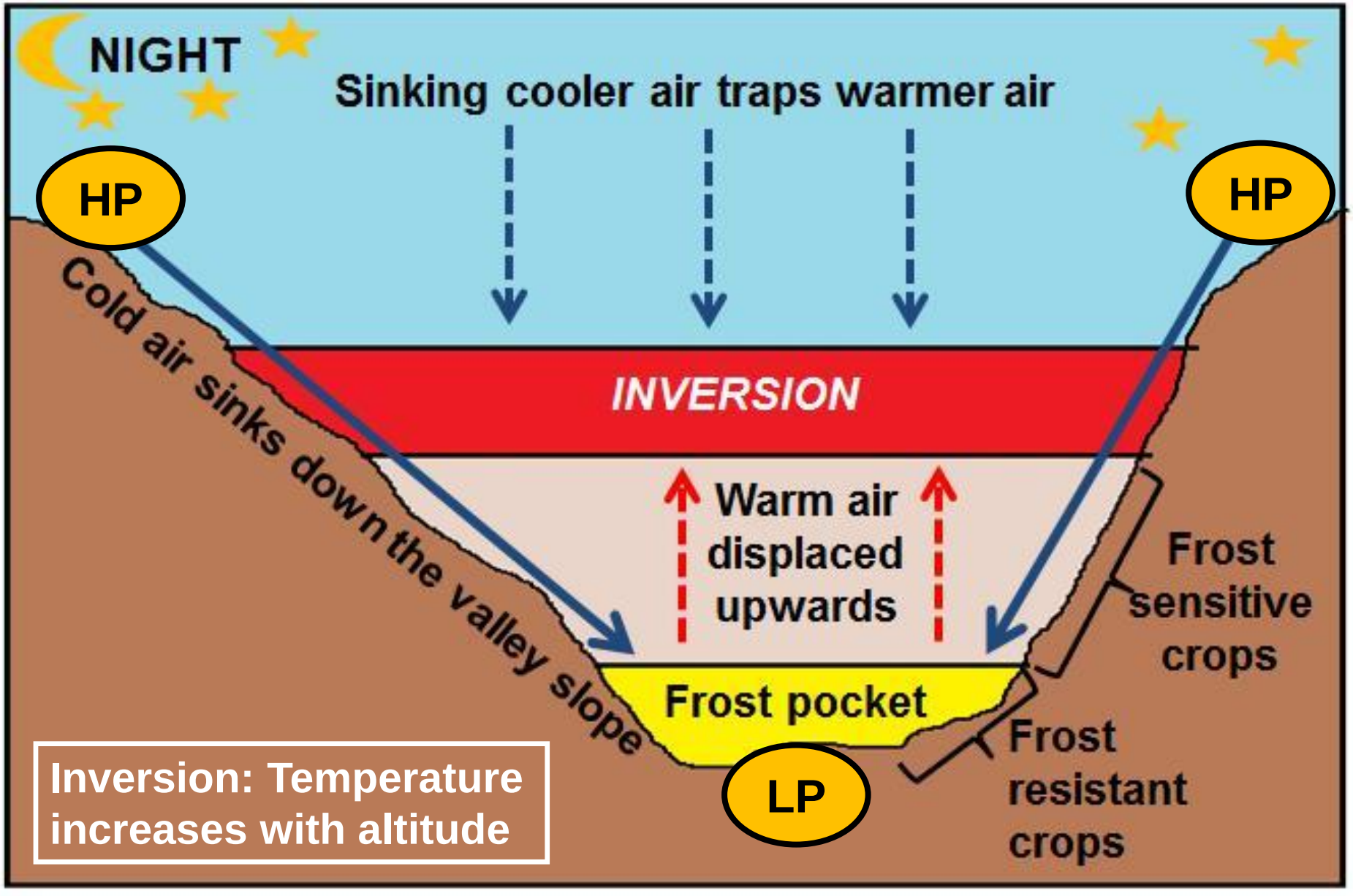
VALLEY CLIMATES ASPECT (SH)

INVERSIONS



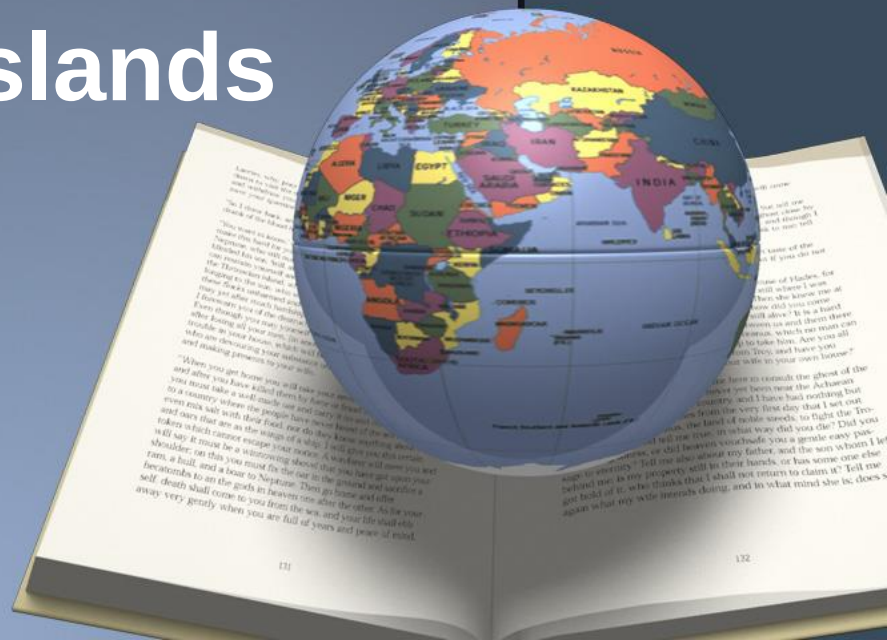


Katabatic winds and Inversions

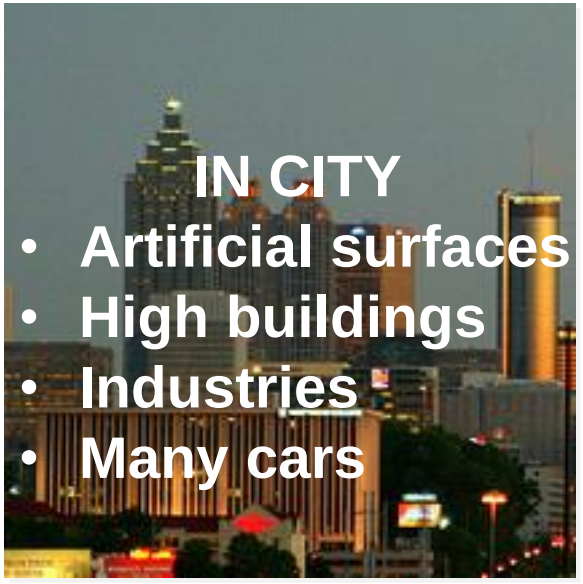


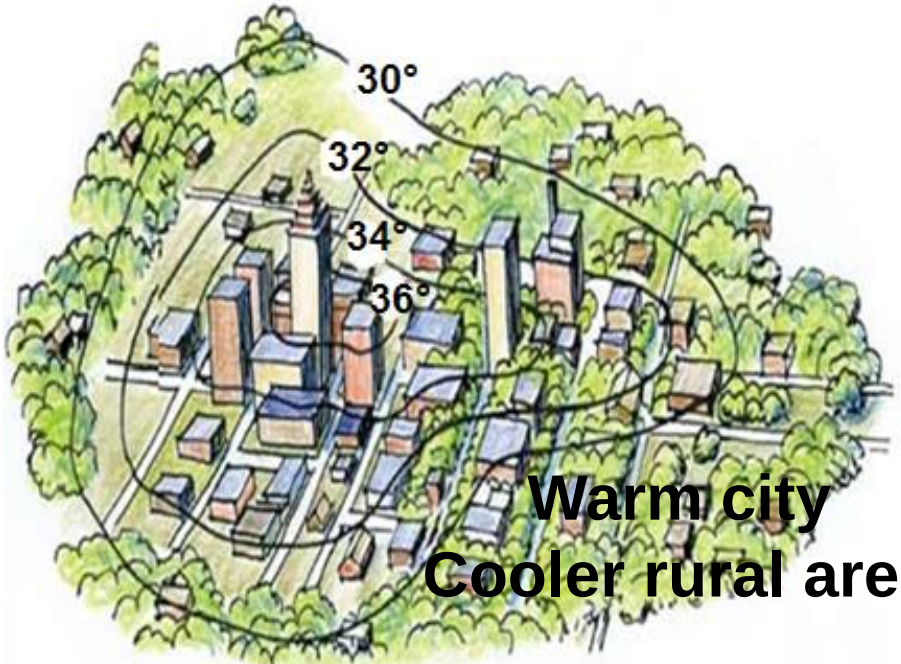
URBAN CLIMATES

1. Reasons for differences
2. Causes of heat islands
3. Pollution domes
4. Effects of heat islands



Differences between city & rural areas

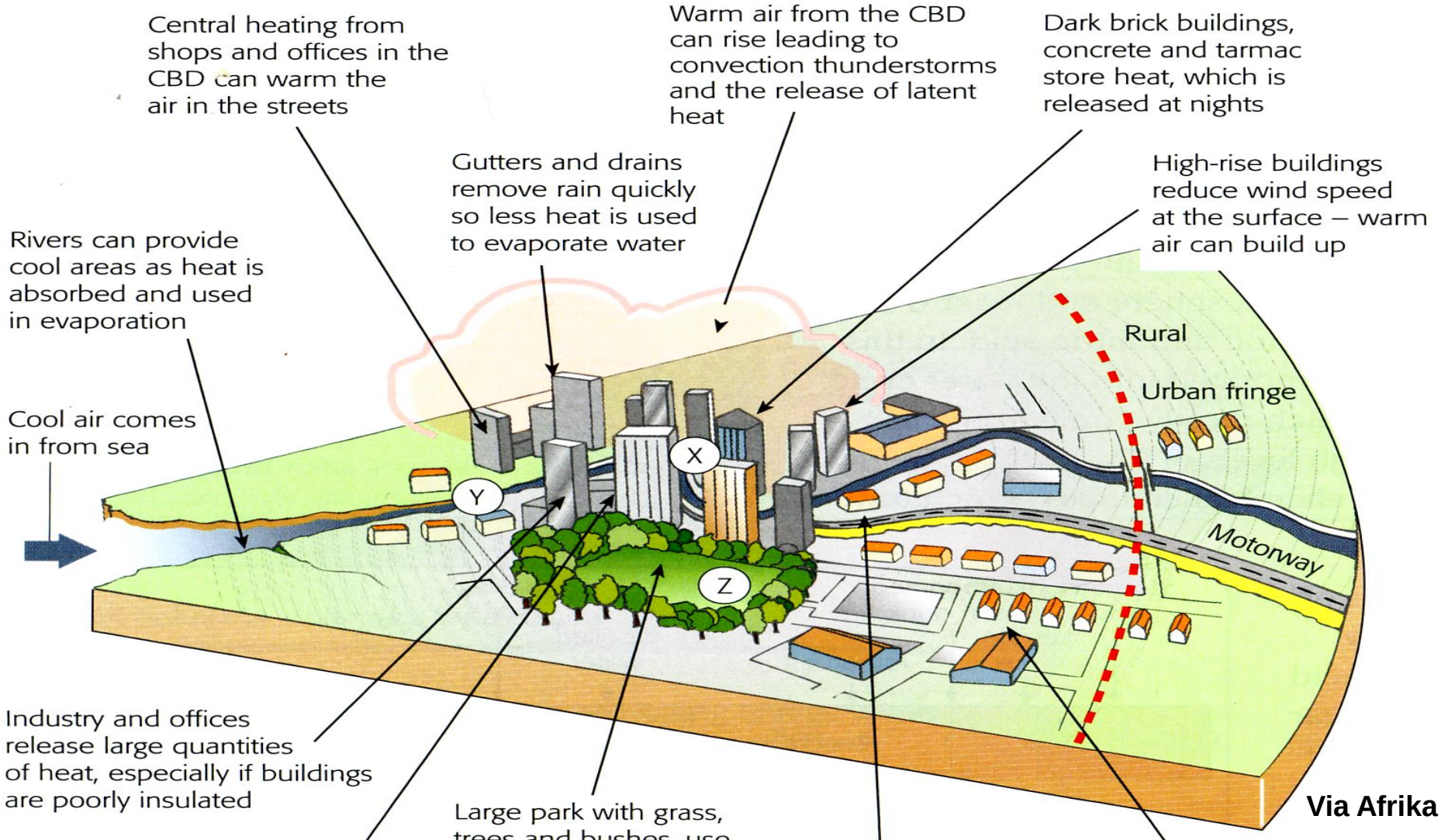




Warm city
Cooler rural area

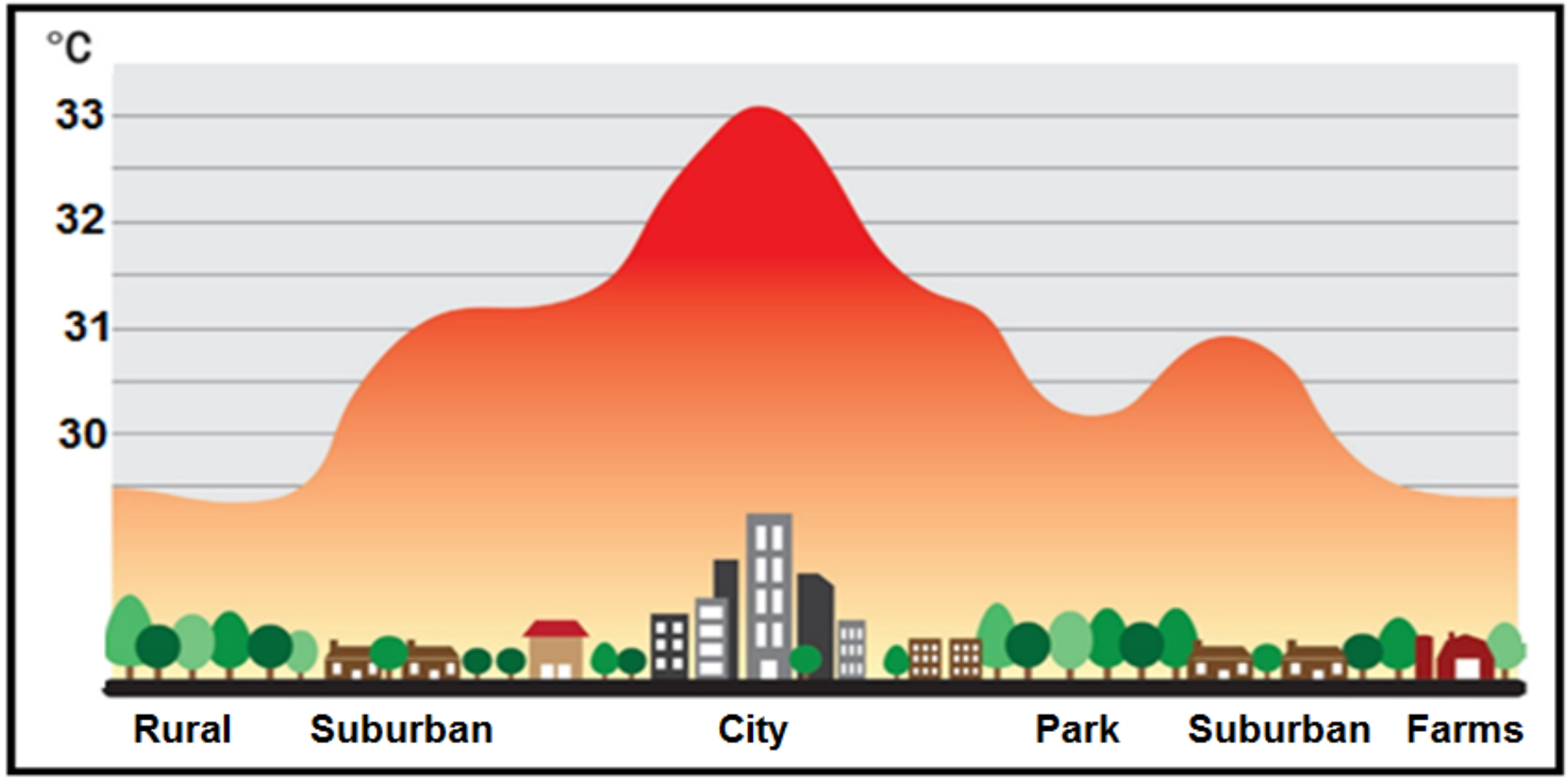
Mass of polluted air trapped by inversion layer and prevented to rise.

CAUSES OF URBAN HEAT ISLANDS



Via Afrika

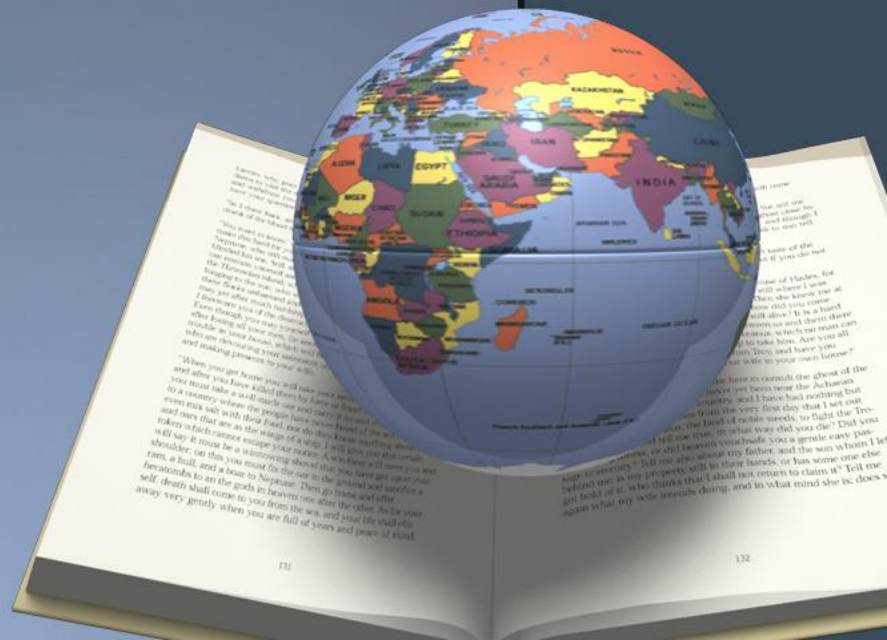
EFFECTS OF URBAN HEAT ISLANDS



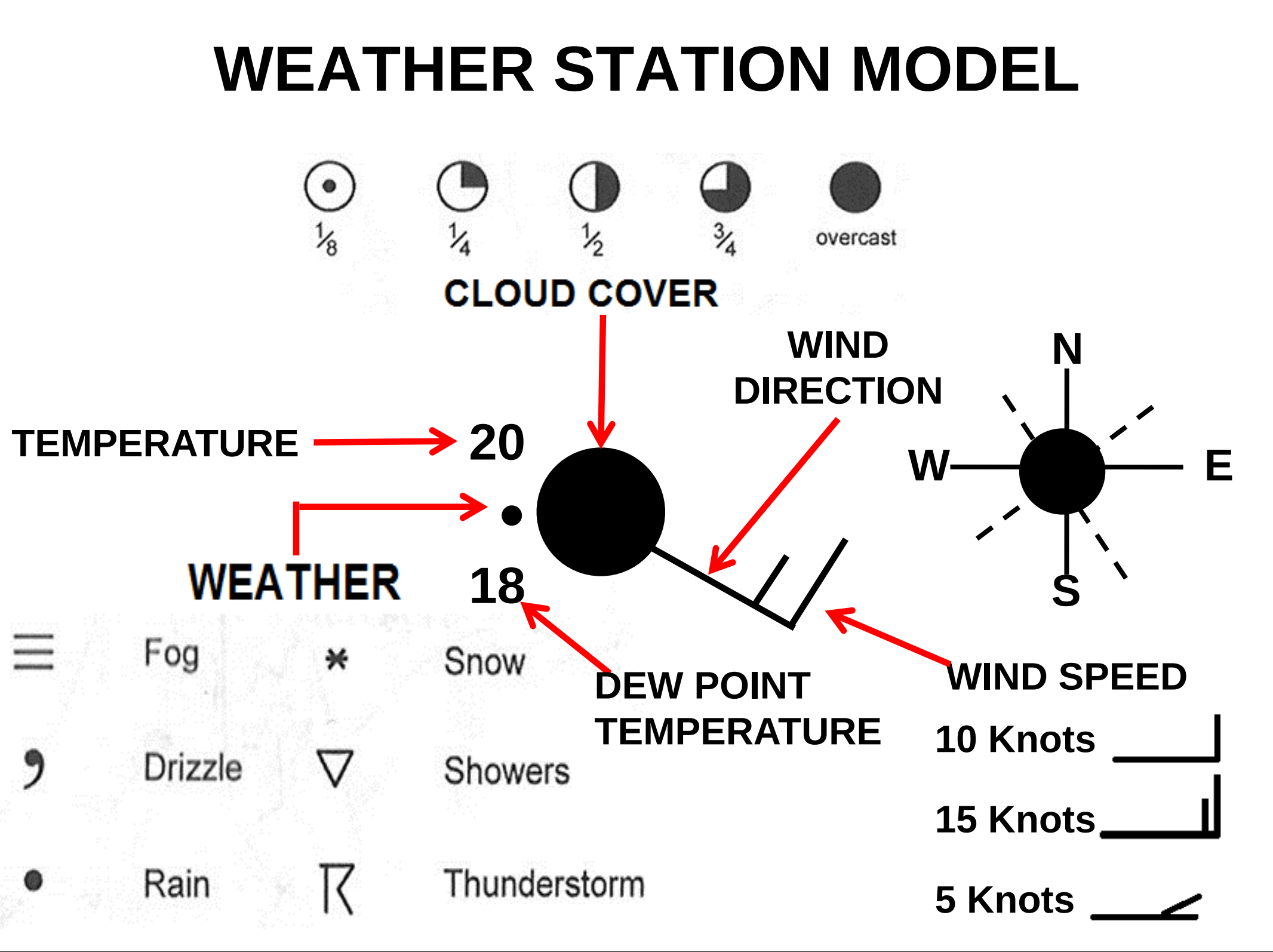
- Human discomfort
- Heat stroke-deaths
- Reduced visibility (smog)
- Increased energy use
- Air conditioners
- Increase in air pollution
- Increase in greenhouse gasses
- Respiratory discomfort. Asthma
- Increased precipitation
- Reduced insolation (pollution)

Synoptic Weather maps

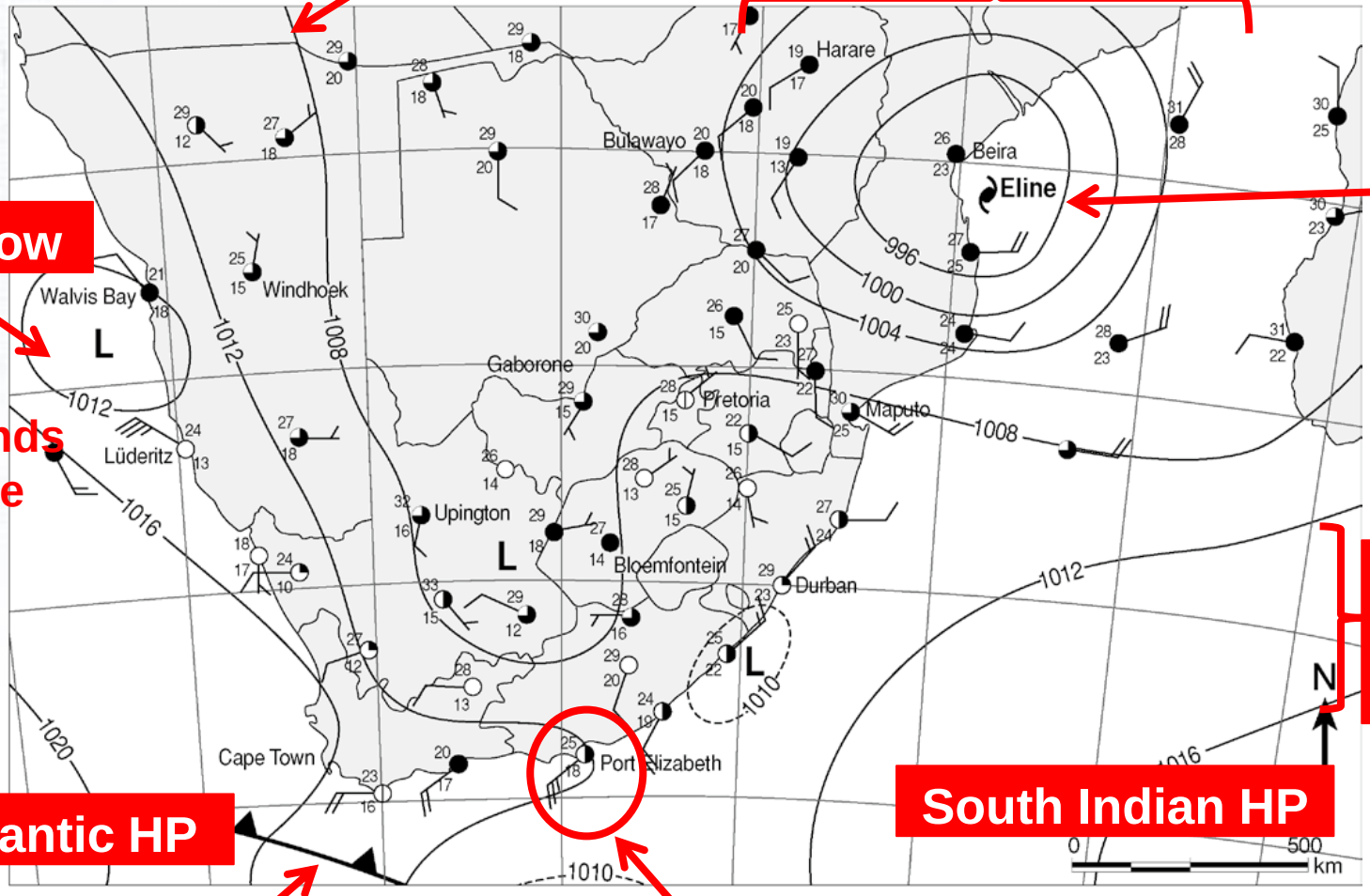
1. Station Models
2. Features on SA weather maps
3. Satellite images



WEATHER STATION MODEL



FEATURES ON A SOUTH AFRICAN SYNOPTIC WEATHER MAP



Isobar

Clockwise movement around LP

Tropical cyclone

Coastal low

H

HP air descends anti-clockwise

L

LP air rises clockwise

Isobar interval 4hPa

South Indian HP

South Atlantic HP

Cold front

Weather at PE

HOW TO INTERPRET A SATELLITE IMAGE