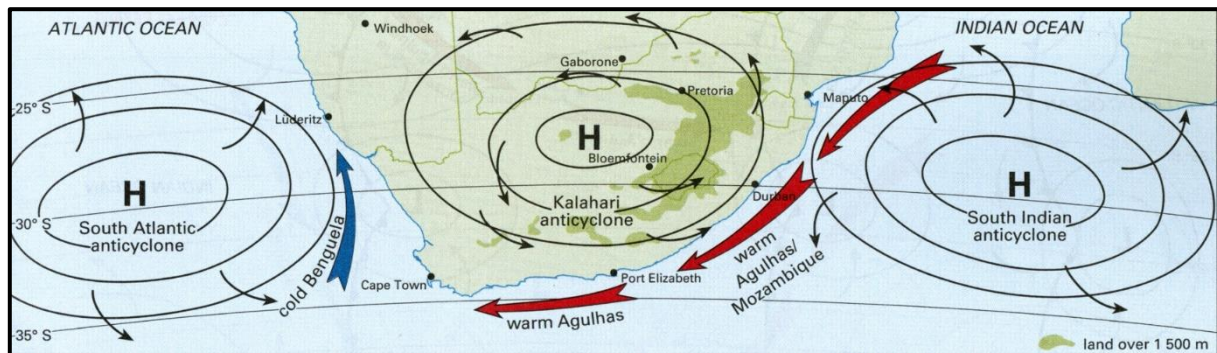
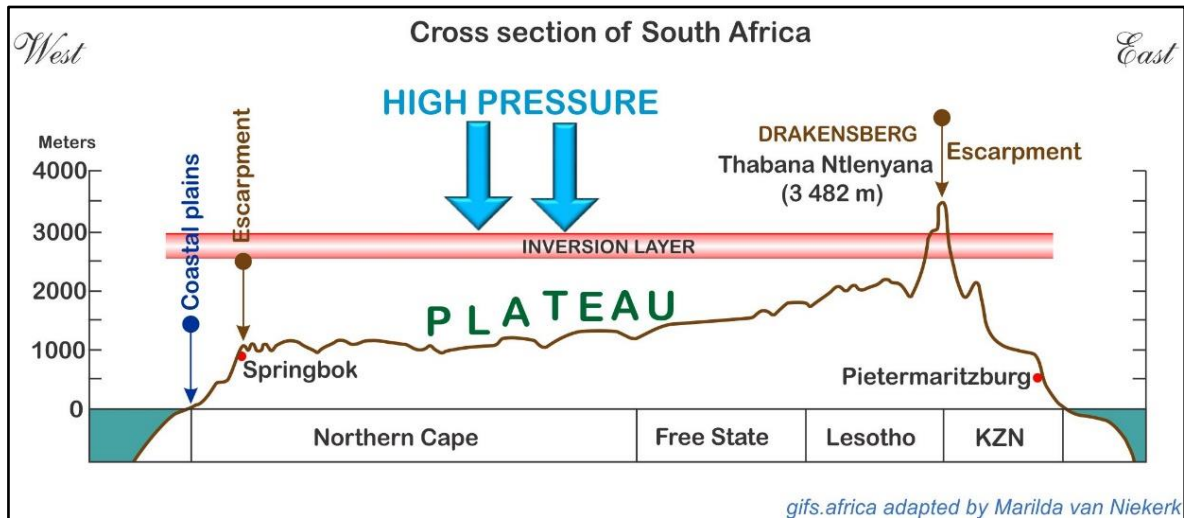




Focus Geography Gr 12

South Atlantic High Pressure

- The HP causes stable conditions on the west coast.
- The HP can ridge in behind a cold front and cause it to move across the country.

South Indian High Pressure

- The HP causes north easterly or south easterly onshore moist air to reach South Africa.
- Brings rain to the eastern side of SA.
- It's further north in summer but moves south in winter.

Kalahari High Pressure

- The HP is lower in winter, as the landmass is cold and there is less air rising.
- Temperature inversion develops below the level of the escarpment (Drakensberg Mountains) **in winter**.
- Moist air is unable to reach the plateau.
- The inversion lies at an altitude higher than the escarpment **in summer**, which allows moist air to reach the plateau.
- The descending air of the HP leads to stable conditions, clear skies and no rain over the plateau in winter. This leads to frost in winter.
- In winter, the off-shore air flow can cause berg wind conditions.

4. TRAVELLING DISTURBANCES THAT AFFECT SOUTH AFRICA'S WEATHER

When given a synoptic weather map to interpret and you are asked to explain or predict the weather conditions, always consider the following:

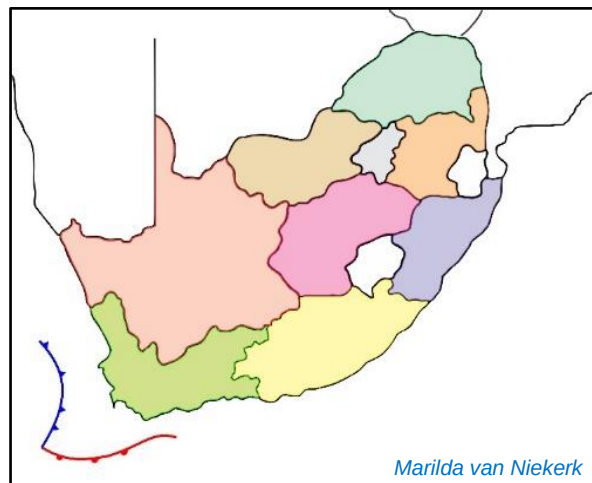
Locate the high and low pressures because that will indicate the wind movement. When wind is off-shore (blowing from land to sea), there is less chance of cloud and rain.

When the wind is on-shore (sea to land), there is a good chance of cloud and rain. This does not apply to the west coast because the air is too dry.

Outlined below are **six examples** of common pressure patterns, with their associated weather.

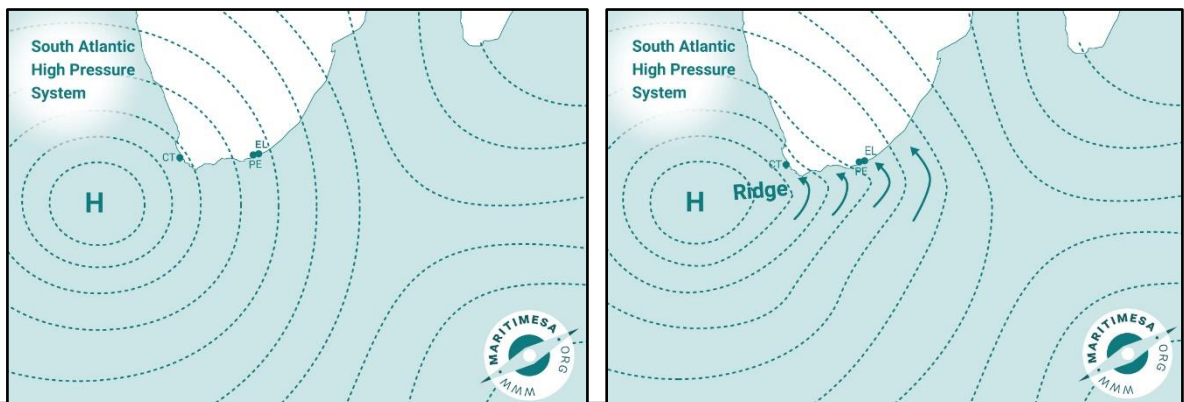
4.1. Mid-Latitude Cyclone approaching from the west

- Mid-Latitude cyclones are driven by the Westerly Wind Belt, so they come in from the west.
- The clockwise air movement around the low pressure cell turns the warm front away from South Africa
- Therefore, it is the cold front that affects South Africa's weather, causing winter rainfall in south-western parts of the country.
- It only reaches South Africa in winter, when all the pressure belts have shifted north.



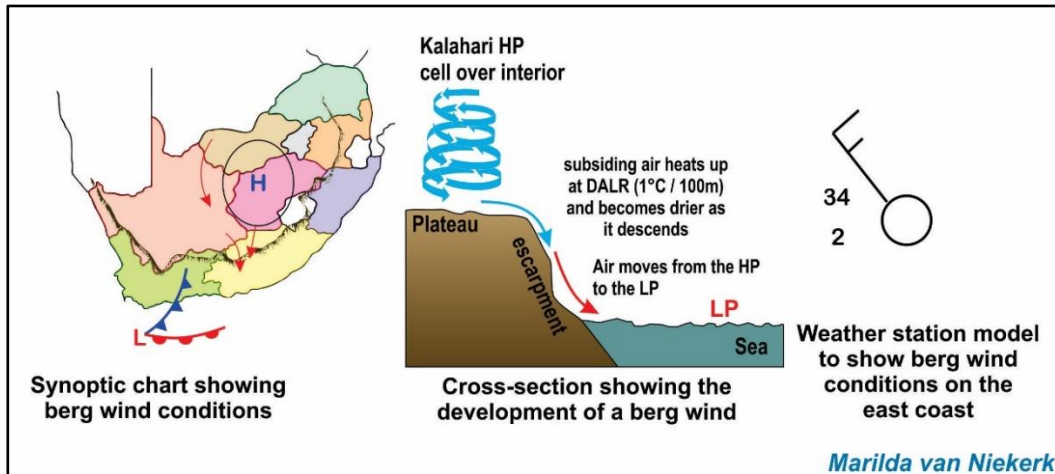
4.2. South Atlantic Anticyclone ridging south of the country

- In summer, when the pressure belts are further south than normal, the South Atlantic Anticyclone often extends south of the country.
- The anticlockwise air movement drives moist air from the Indian Ocean, over the land.
- This causes cloud and rainfall over the land.



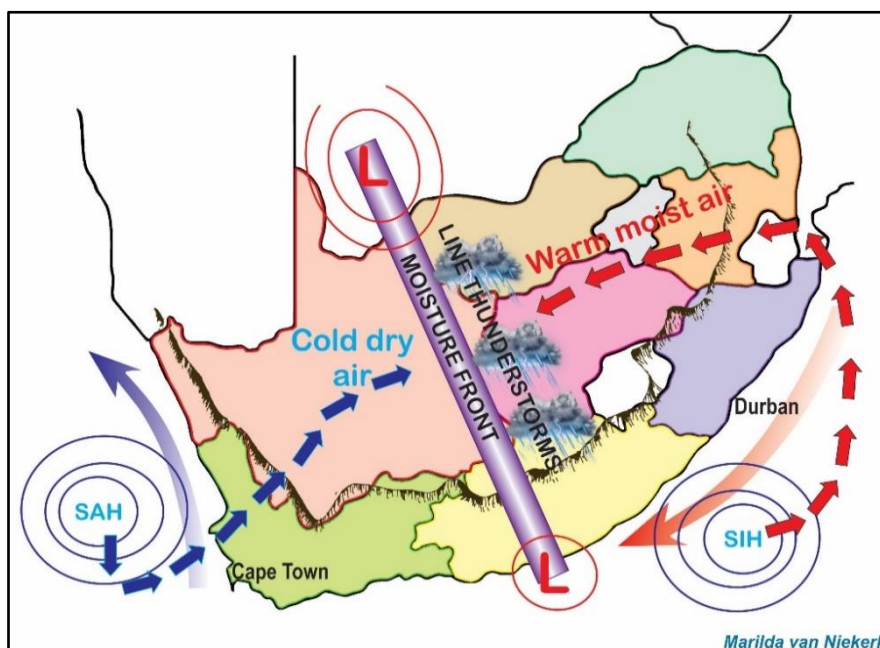
4.3. Berg Wind conditions

- In winter (between April and September), the Kalahari High Pressure dominates the eastern side of the country.
- Anti-clockwise air movement cause air to subside down the escarpment, heating adiabatically.
- This results in hot, dry conditions.
- Although it is winter, temperatures over 30 °C will be experienced.
- Run-away veld fires may occur because the air and the vegetation are dry.
- If a mid-latitude cyclone follows shortly afterwards, temperatures may drop by as much as 20 °C in a few hours.



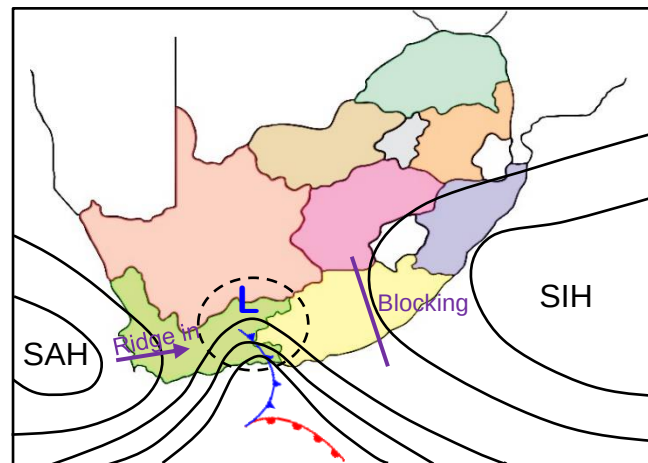
4.4. Moisture front and Line thunderstorms

- In summer, the hot land surface contributes to a trough of low pressure developing over the land.
- This trough usually extends from the northwest towards the southeast.
- Air is drawn to the low pressure, where it converges and rises.
- Warm, moist northeast winds come from the South Indian High Pressure (SIH).
- Cooler air from the South Atlantic high pressure (SAH) is moving in from the southwest.
- Clouds and rain (line thunderstorms) often occur to the east of the **trough / moisture front**.



4.5. Cut-off Low

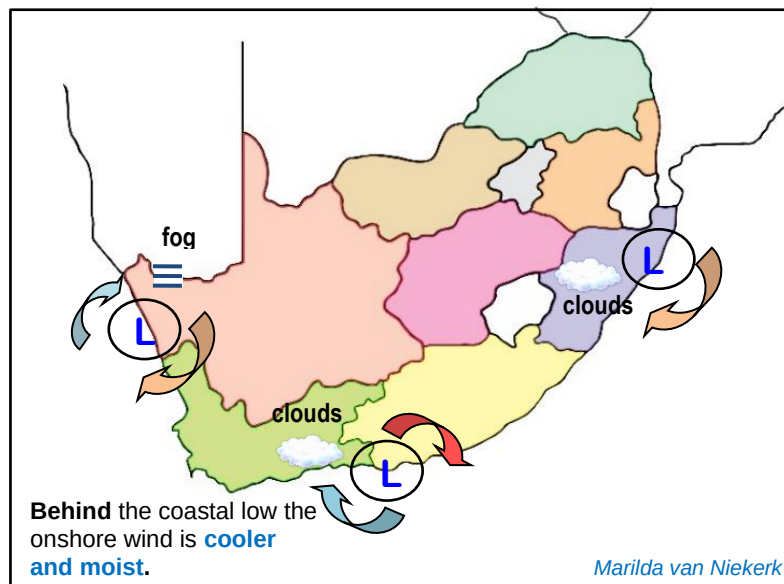
- Normally the anticlockwise air movement around the South Atlantic and South Indian Anticyclones keep the low-pressure cells in the West Wind Belt away from the country.
- Sometimes the South Atlantic Anticyclone pushes a low-pressure cell further north, onto the land.
- If the South Indian Anticyclone is too close to the land, it may trap that low pressure cell over the land.
- Moist air converges in this pressure cell, cause set-in rain for a few days.
- This is a major cause of flooding in the southern and central parts of the country.



Marilda van Niekerk

4.6. Coastal Lows

- A Coastal Low is a low pressure cell that lies half over the land and half over the sea.
- Normally only one will be seen at a time.
- They can occur along any part of our coastline.
- Remember that air move clockwise around the low pressures, so where there is on-shore flow, clouds and rain is likely and where there is off-shore flow, dry conditions prevail.

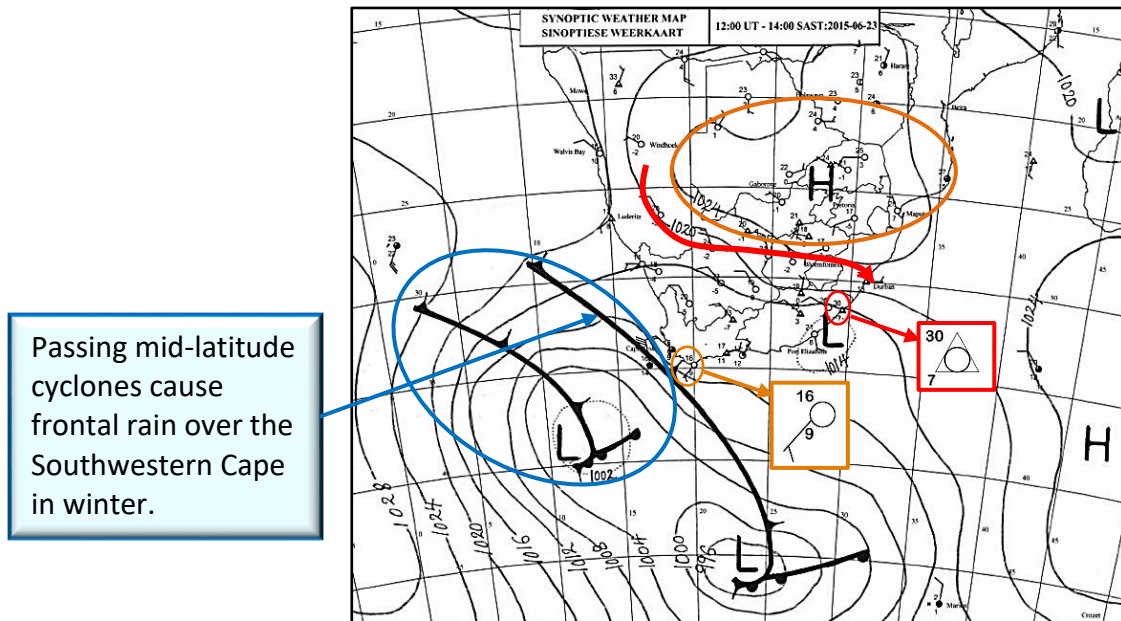


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4.7. Satellite images and synoptic weather maps that illustrate weather associated with subtropical anti-cyclonic conditions

4.7.1. Winter Synoptic Chart – 23 June 2015

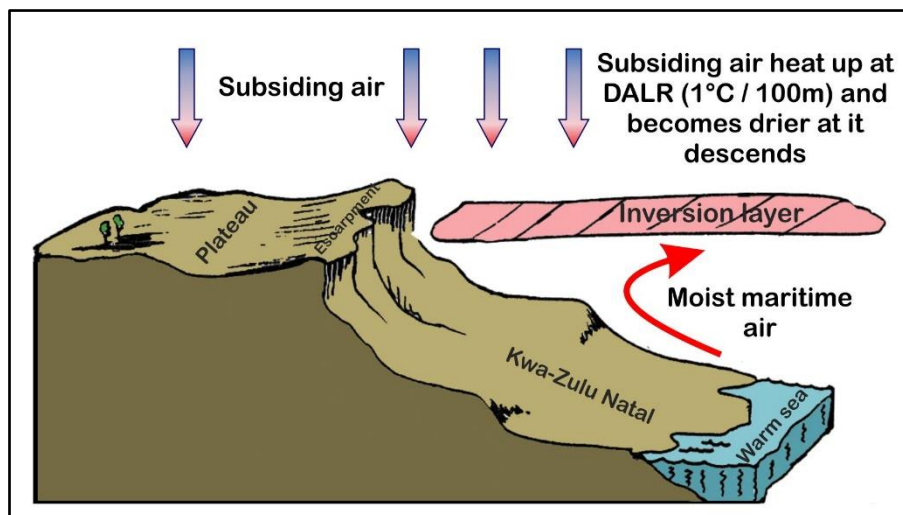
- Notice the following winter conditions:
 - **Low temperatures** (and **dew point temperatures**) over the land
 - **Dominant Kalahari High Pressure** over the interior
 - **Mid-latitude cyclones** cross over South Africa
 - **Berg winds** are common



weathersa.co.za adapted by Marilda van Niekerk

4.7.2. The effect of the interior plateau on South Africa's weather in winter

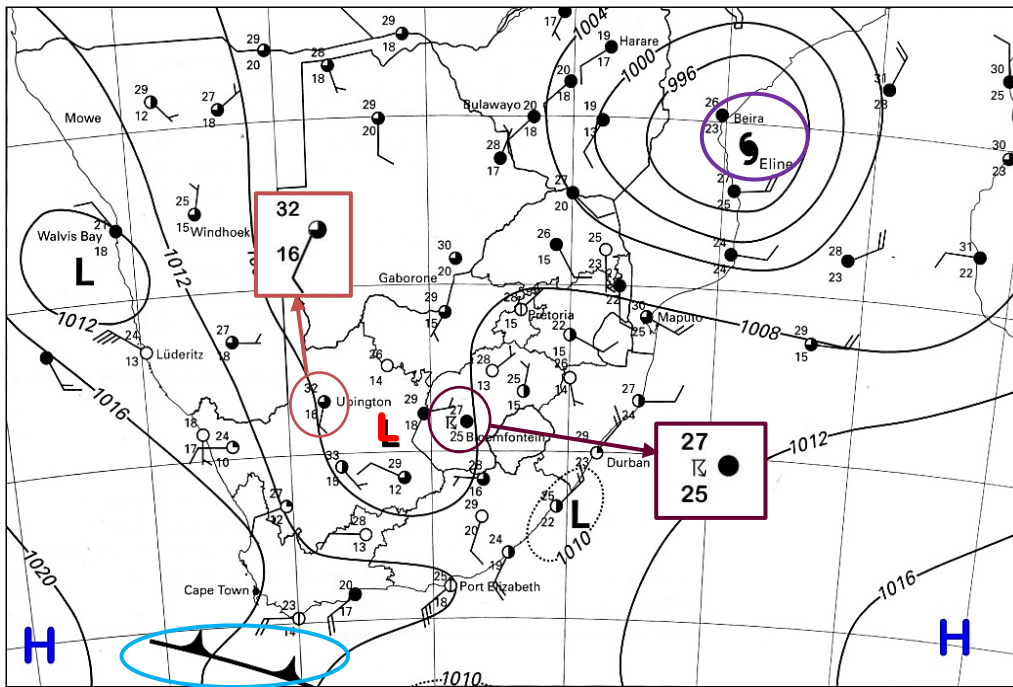
- The subsiding air in the Kalahari high pressure cell heats up at the dry adiabatic lapse rate and is warmer than the air from the coastal areas.
- This causes a temperature inversion (inversion layer) to form.
- The inversion layer sinks below the escarpment and prevents any moist air from reaching the central plateau.
- Therefore, no or very little rain occurs over the interior in winter.



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4.7.3. Summer Synoptic Chart – 22 February 2000.

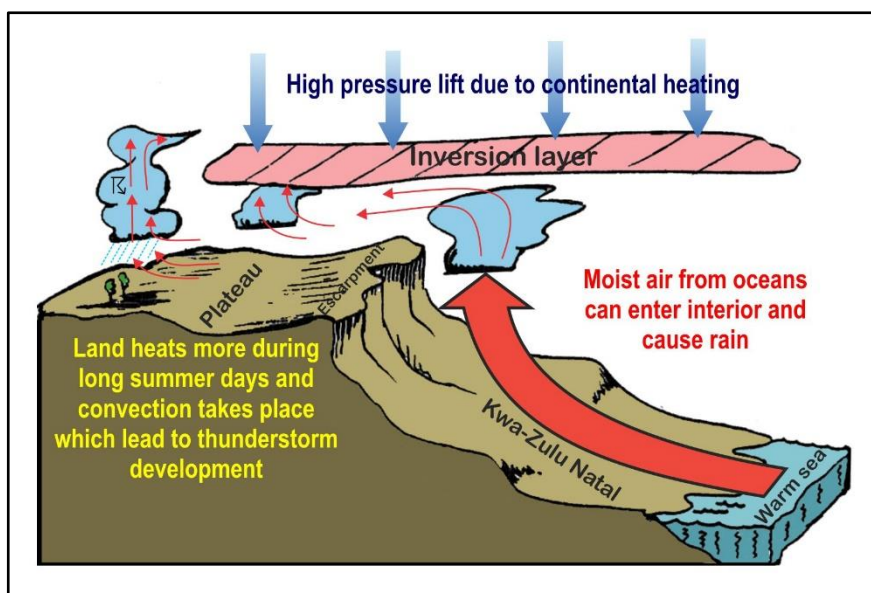
- Notice the following summer conditions:
 - **High temperatures** over the interior with **thunderstorms**
 - **Heat low** dominant over the interior and **NO Kalahari HP**
 - **Mid-latitude cyclones** pass south of South Africa
 - **High pressures** south of South Africa
 - **Tropical cyclones** and **line thunderstorms** can occur



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4.7.4. The effect of the interior plateau on South Africa's weather in winter

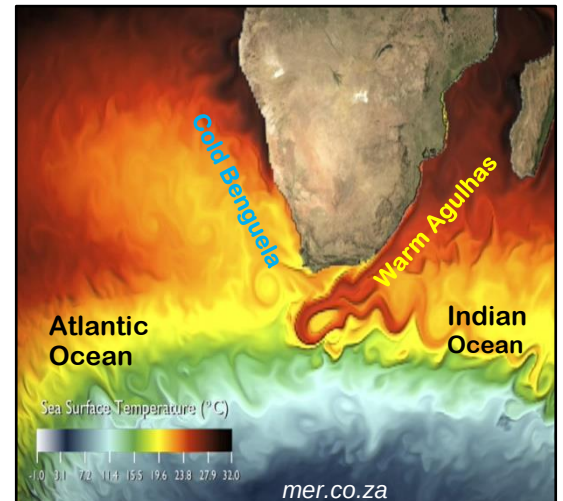
- In summer, the Kalahari high pressure system lifts due to continental heating.
- This allows the moist air from the coast to reach the interior and results in summer rain.



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4.7.5. The influence of the oceans

- Ocean currents influence the areas adjacent to them.
- The cold **Benguela Current** is found on the west coast. It causes cold air above the ocean which holds very little moisture. Fog can form on the west coast with very little rainfall.
- The warm **Agulhas current** on the east coast causes the air to be warm, humid and unstable. This increases the likelihood of rain.
- Oceans moderate temperatures along the coast, causing summers to be less hot and winters to be less cold, than in the interior.



4.7.6. The influence of South Africa's altitude



- Most of South Africa is situated on a plateau.
- The areas situated on the **plateau** are generally cooler.
- The steep **escarpment** along the eastern side of the plateau prevents moist air reaching the interior in winter, resulting in dry conditions over the plateau.

Pinterest

5. VALLEY CLIMATES

Valley climate questions can come up in the Mapwork Paper as well as Question 1 or Question 2 of the theory paper.

Need to know:

- What is the micro-climate of valleys?
- Influence of slope aspect.
- Valley winds.
- Thermal belt, frost pocket and radiation fog.

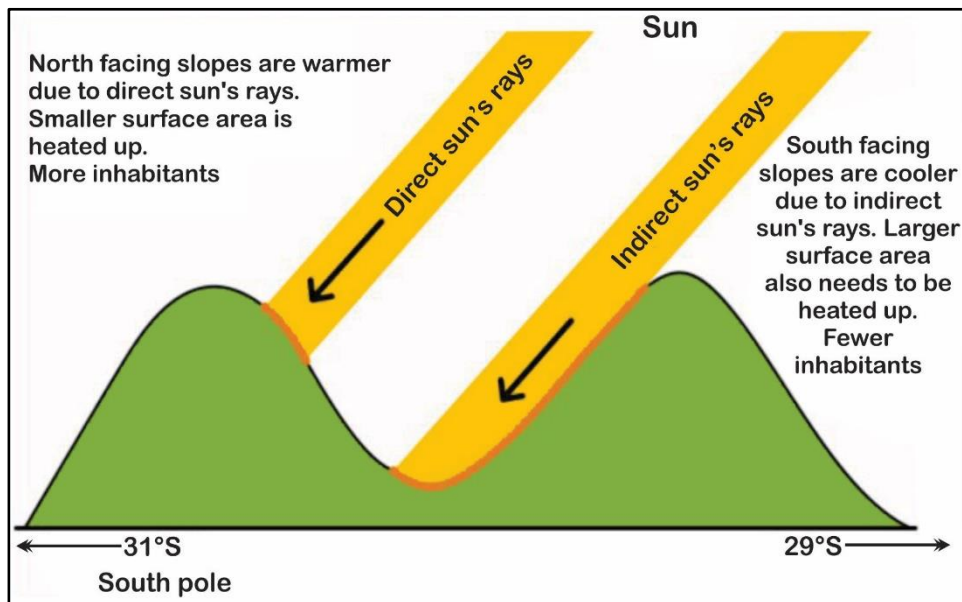
5.1. What are the micro-climates of valleys?

- Micro-climate refers to the climate of a small or local area
- Valley climates are local, small scale variations in weather that takes place in valleys.
- They have their own particular temperature, pressure and wind conditions.



5.2. Influence of slope aspect on temperature in valleys

- Aspect refers to the direction that a slope face.
- Slope aspect is the angle at which the sun's rays strike a slope.
- Slopes facing the equator will be warmer than slopes facing away from the equator.
- In the southern hemisphere, north facing slopes receive direct rays from the sun and are warmer.



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- People living in the southern hemisphere choose to live on the warmer north-facing slopes so that they can receive the maximum amount of sunlight, especially in the winter.

5.3. Valley Winds

5.3.1. Anabatic wind / Upslope wind

- This is a wind that blows up the slopes of a mountain during the day.
- They occur during the day due to the heating of the earth's surface.
- Sun's rays heat up the slopes.
- Hot air is less dense and therefore rises, hence the winds blowing up the slope.
- This is called an upslope wind or **anabatic wind** (ana means 'up').
- Anabatic winds are gentle and can reach speeds up to 18,5 km/h.