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The equatorial climate

Equatorial climates – hot and wet

The equatorial climate is also known as the tropical rainy climate, tropical wet climate or equatorial lowlands climate. This climate type is hot and very wet and supports tropical rainforest. It is found between the Tropic of Cancer (23½°N) and the Tropic of Capricorn (23½°S), usually within 10° of the equator, and normally extends up to 1000 metres above sea level where the air becomes too cool to support lowland rainforest. It is characterised by:

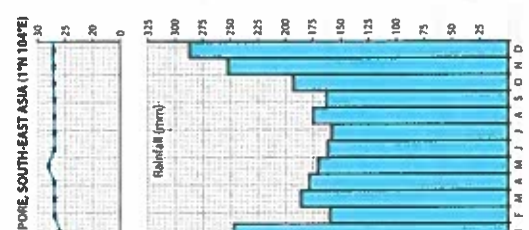
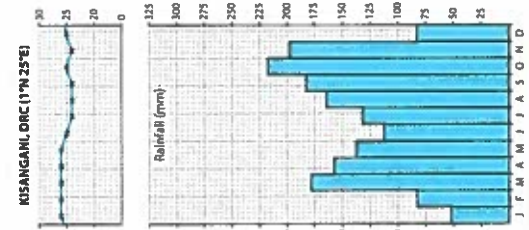
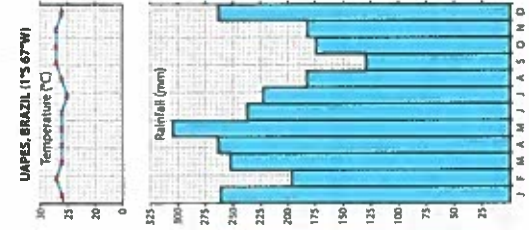
- low pressure all year along the equator – an area known as the Doldrums
- the midday sun almost always at a vertical angle, giving maximum **insolation**
- average temperature around 26 °C – lower than some other climate types due to heavy cloud and rainfall
- a small annual and daily (diurnal) temperature range
- heavy convective rainfall and thunderstorms in the afternoon after the sun has warmed the ground, causing air to rise

TASK 1: Study Source A

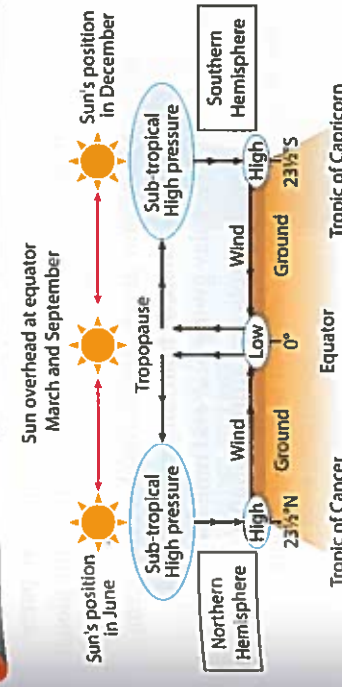
- a Write down **four** characteristics of the equatorial climate that support tropical rainforest.
- b On an outline map of the world, shade and label areas that experience an equatorial climate and have tropical rainforests.
- c Name and label Uapés, Kisingani and Singapore on the map.
- d Describe the global distribution of rainforests.
- e Write down **three** similarities between the climate of the three places.
- f Write down **three** differences between the climates of the three places.
- g Suggest why the temperature and rainfall are lower at Kisingani than that at Uapés and Singapore.
- h Compare the climate for Cambridge on page 113 with any one of those in Source A.

- average annual rainfall of over 1500 millimetres distributed fairly evenly throughout the year
- high relative humidity, usually above 75%.

A Equatorial climate = tropical rainforest



B What causes the equatorial climate?



This diagram shows the position of the sun, pressure systems and wind movement in March and September when the sun is directly overhead the equator. The low and high pressure belts move north and south with the sun during the year, giving summer and winter seasons to both hemispheres as follows:

- 21 March: sun overhead Tropic of Cancer (Solstice) – northern summer/southern winter
- 21 June: sun overhead Tropic of Cancer (Solstice) – northern summer/southern winter
- 21 September: sun overhead equator (Equinox)
- 21 December: sun overhead Tropic of Capricorn (Solstice) – northern winter/southern summer.

C Convective rainfall



The mean annual rainfall of the equatorial climate is high – usually over 1500 mm. This is caused by air masses from the subtropics converging here as winds blow from high pressure to low pressure at the equator. Warm, unstable air rises to give convective rainfall. Where highlands occur along the equator, such as in eastern Brazil, there can also be orographic (relief) rainfall.

TASK 2: Study Sources B and C

- a Describe the location of the sub-tropical high pressure areas in March and September.
- b Explain how and why air from the sub-tropical high pressure systems converges at the equator.
- c Explain why heavy cloud and thunderstorms:
 - take place along the equator
 - take place mostly in the afternoon.
- d Explain why areas to the north and south of the two tropics have summer and winter seasons, whereas the equatorial climate has no real seasons during the year.

TASK 3: Study Source D

- a What is meant by convective rainfall?
- b Explain how and why convective rainfall takes place along the equator.
- c Suggest how the presence of mountains along the equator can increase the amount of rainfall in these regions.

TASK 3: Study Source D

- a How different was the climate likely to be in June in Manaus for both the England and Italian teams? Use data in your answer.
- b Suggest how this might have affected their performance over 90 minutes during the game.
- c How did the climate in Manaus affect other preparations for the match?
- d Suggest why using average climate figures from London and Rome may not be the best way of judging how players would adapt to the climate in Manaus.
- e USA and Colombia also played in Manaus. Which of these teams should have been more comfortable in this climate? Explain your answer.

D 2014 World Cup worries about the weather

ITALY AND MANAUS TOO HOT FOR ENGLAND IN WORLD CUP OPENER

England 1 Italy 2
 'It's going to be hot in all respects,' a spokesman for the World Cup organisers had warned. 'From the weather to the warmth of the fans. They're going to experience an Amazonian summer.' He was proved right. As the evening kick-off time approached, temperatures soared to 34°C. Manaus was the city that the England manager had wanted to avoid when the draw was made. There were other weather-related problems. In constructing the new stadium all the welding was delayed by tropical storms and the new grass, which was grown locally, was either saturated with heavy rain or dried out in the tropical heat. Players of both teams had trained with equipment that simulated the equatorial climate, so it was only in the second half that players began to show fatigue – but not before Mario Balotelli had headed the winning goal to leave England with an uphill struggle to qualify for the next stage.

From *Our man in Manaus* – 15 June 2014

Average climate statistics for June

	Manaus, Brazil	London, England	Rome, Italy
Daily temperature – high (°C)	31	21	27
Average daily temperature (°C)	26	16	21
Daily temperature – low (°C)	23	13	15
Average monthly rainfall (mm)	256	50	34
Relative humidity (%)	87	76	58