

A Natural Portrait of Makkah

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The Makkah Region lies almost at the centre of the Arabian Shield. The Arabian Shield itself is part of the great Afro-Arabian Shield. As the Afro-Arabian Shield drifted, it split apart to form the Gulf of Aden, Red Sea, Gulf of Aqaba, Wadi Araba, Dead Sea, and the Jordan Valley Rift System.

The Arabian Shield tilted, because of the rifting and possibly some ramping processes, rising along the Red Sea coasts and sinking in the east. This tilting had a very marked effect on rainwater runoff, such that the water divide is about 120 km from the Red Sea and about 1200 km from the Arabian Gulf. The position of the coastline changed as the main shield rose and fell in slow pulsations of the oceans. Minor subsidence permitted small ingression of the sea, while major subsidence resulted in great marine transgressions. Since the surface of the Shield was relatively level, small changes in elevation of the land or the ocean resulted in great lateral change of the coastlines.

The Arabian Shield may be considered to have three components – the Western Arabian Shield, which forms central Najd, Hijaz and Asir, the Yemen-Aden plateau; and the Southern Arabian Shield which extends along the shores of the Arabian Sea. The Western and Southern Arabian Shields have been essentially stable since Cambrian times. The Yemen-Aden Plateau has been rather less stable.

Urban Makkah has two major geologic units of Precambrian age. They are granite and granite gneiss, which dominate about 75 per cent of the area. The wadis in urban Makkah area are covered with gravel,

sand, silt and clay which are derived from the parent material in the adjacent mountains. The southern and mid-western portions of the area are intersected by swarms of almost parallel dykes of rhyolite, diabase and andesite. The oldest type of rock, which is basic intrusive rock, dating back over a billion years, is present in small quantities in Jabal Thowr and Jabal Khandama.

Topography

Urban Makkah lies in a series of valleys, known as *wadis*, in general between 200 and 350m above mean sea level. Localised hills defining the wadis are at elevations of 500-1000m above mean sea level.

The extreme western part of Urban Makkah consists of two wadis with general north/south trend. They are Wadi al-Mansuriyyah and Wadi al-Hudaibiyah. Their elevations range from 100-180m above mean sea level. This part of urban Makkah is almost flat and has an average slope of less than one per cent. The rest of urban Makkah consists of broken hilly terrain. The hills have varying elevations.

Among the prominent mountains in Makkah is Jabal Hira (also known as Jabal Noor) located between the Holy Mosque and Mina. It starts from an elevation of 380m with steep slope up to 500m, and then it continues from there almost in a vertical manner to its peak (elevation 632m).

To the south of Jabal al-Hira is Jabal Thowr. The latter mountain is almost round and has four peaks ranging in elevation between 670 to 756 m. The cave where the Prophet ﷺ and Syedna Abu Bakr took shelter at the time of Hijra is at 712m.

East of Mina Valley is a series of high altitude hills separated by wadis. Some of these hills are Jabal Thaqabah, Jabal Thabeer, Jabal al-Ahdab, Jabal Khushrub and Jabal at-Tarqi. The peaks range from 710 and 990m in altitude. The side slopes of these are steep, similar to the rest of the hills in urban Makkah.

The steep and high hills affect the future expansion of the Holy City. The broken terrain of urban Makkah restricts the physical development of the city to the relatively flat parts of the area.

Wild Plants

The coastal plain along the western coast of Saudi Arabia runs along the Red Sea. It is sandy and mostly flat. This flat strip is called the Tihama, and its width varies from 50-70 km. It is known for high temperatures and light winds. The ground is formed mainly by sedimentary coral formations with erosion by wind and water. In a broad context, these form the conditions for the endemic plants of Makkah.

The plants native to this environment include Acacia and other plants for sandy soils such as *Panicum turgidum* in areas exposed to strong winds. In areas with silt deposited by floods, there are Acacia trees as well as *Commiphora*. On the shores of the Red Sea, there are salt-tolerant plants, halophytes, such as *Salsola* sp. and *Limnium* sp. In the bays, there are growths of *Avicinnia officinalis*. The shrubs 'Harmal' *Rhazya stricta* and *Origanum isthmicum* play an important role in stabilising the sand.

The environment of Makkah was described by the Prophet Ibrahim saying: "I am leaving my offspring in a valley without cultivation...". Though there was no cultivation, the valleys and mountains of Makkah were rich with many wild plants, but their benefits at that time were not yet known. Many of the benefits were recommended by Prophet Muhammad, such as for the plant Senna. The Prophet said it is a cure for every illness except poison. When asked which poison, he said "death".

It is worth noting that date palms are not endemic in Makkah or in nearby areas, such as Jeddah, al-Lith, or Tā'if. The soil, groundwater, and weather conditions were not suitable for natural growth of dates. Recently, there has been extensive planting of dates, and now the date palm tree is a common sight in and around Makkah.

In the old days, date palms were endemic in other parts of the Arabian Peninsula. North of Makkah, at a distance of four hundred kilometres, the oasis of Madinah was famous for dates. Other well-known centres for dates were places such as Qassim (600km NE) and Hofuf (1000km ENE).

Climate

Makkah's climate is very hot in the summer and warm in the winter. In some years, there is little if any rainfall. However, there have been instances of excessive rainfall causing considerable damage, though such damaging rains are infrequent. The last major rainfall occurred in 1968 (1388 AH).

More recently, there was a flash flood in eastern Jeddah on 7th Dhul Hijja 1430 (January 2010) which also affected parts of western Makkah and caused considerable problems for pilgrims in Mina and for the movement of pilgrims from Madinah to Makkah.

Wind conditions in the city are variable. About 50 per cent of the time, the winds are from a south-westerly direction. The remaining winds are predominantly northwesterly and northeasterly. These winds are relatively cool, except in summer when they are hot and carry dust and sand from the south.

The annual average temperature is 30.7°C. Makkah's overall high temperature is due to its location away from the climatic effects of the sea. The high mountains surrounding the city prevent cool winds from reaching Makkah. Additionally, Makkah is within the tropics, which means that at midday during the summer, the sun is almost perpendicular overhead. In the summer, the average high temperature in August is 42.7°C. The highest temperature recorded was in July at 49.8°C, and the lowest temperature was 29.3°C.

The weather in the winter seasons tends to be warm. The minimum temperature in December was 12.4°C and 10.0°C in February. However, the maximum temperature was 37.8°C in December and 38.3°C in February, indicating that winters are relatively pleasant and can be quite warm.

The total average annual rainfall for Makkah is 110.1 mm. Most of the rain takes the form of short sharp rain showers. Such rain showers occur throughout the year except in June and July. However, the entire rainfall for a month may occur within one or two days, causing flash floods.

The rain most likely occurs in the winter months of November, December, and January. The average rainfall in January is 20.6mm, and the December average is 21.4mm. Consequently, winter is the season when rain showers are expected. E

Jabal Noor (Mountain of Light) on the outskirts of Makkah, where the Prophet Muhammad received the first Revelation



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