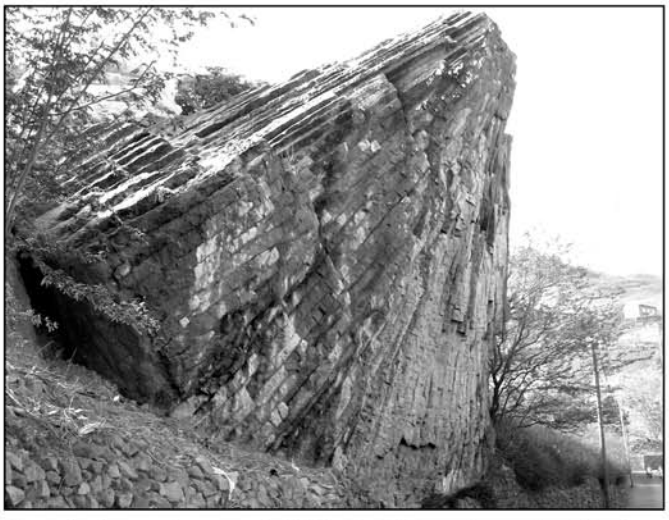
HOLIDAY GEOLOGY

Cape Verde Islands

The Islands stand in the Atlantic Ocean, 460 km west of Senegal and 1000 km south of the Canary Islands.

Early in the 20th Century, Alfred Wagner suggested that continents might have moved apart and created oceans between them. Although there was supporting palaeontological evidence, no mechanism was suggested, and the idea was widely dismissed. By the middle of the century advances in oceanography had revealed the spreading nature of the Mid-Atlantic Ridge. Matching paleo-magnetic reversals on each side of the ridge, and then the realisation that trenches were subduction zones, gave credence to the theory of Plate Tectonics. The mechanism however remained elusive. Some eminent speakers at Society meetings have favoured the concept of gravity pulling down the subducting plate, thus pulling it away from a spreading zone. Others have favoured gravity acting on the new ocean floor material on the sides of the ridge, pushing the plates along. Understanding improved when it was noticed that most volcanoes lie above the spreading and subduction zones. There remain a few isolated volcanoes, and the theory of mantle hot spots was proposed for these - it works well with the Hawaiian Islands whose chain aligns with the plate movement, with older islands further from the latest activity.

Limited data on the Atlantic islands make note of mantle hot spots. The geological museum on Lanzarote, Canaries, suggests that, as there is no subduction zone on the eastern side of the Atlantic Ocean, the eastward moving oceanic plate is actually an extension of the Africa plate; stresses in the oceanic section cause it to buckle and crack around the continental slab, thus allowing magma to rise from the mantle to form the Islands. This theory explains why the islands form a scatter, and why there is no obvious relationship between the individual locations and ages of the islands and the movement of the plate. It seems possible that the same theory could be applied to the Cape Verde Islands. Seismic studies have detected a swell under the islands. Perhaps this is over a hot spot, or it could be just a feature of the crustal buckling. Could it be that a future subduction zone might develop between these two island groups off Africa?



Fan of columns in an eroded dike in Ribiera Brava, Sao Nicolau

Of the Cape Verde Islands, Fogo is the youngest, with its oldest surface rocks dated to 100 ka. It is the only island with current volcanic activity; the last eruption was in 1995. The oldest island, Boa Vista, dates to 26 Ma. The group of islands shows a clear evolution among the individuals. They start mountainous and thus attract clouds and rainfall. This allows vegetation to develop, while runoff from torrential rainfall rapidly erodes dramatic gorges and valleys from the highest land to the sea. These are known as ribeiras, and today are cultivated throughout their length. As erosion progresses, the reduction in mountain height reduces rainfall until trees can no longer be sustained. This further reduces rainfall, yet increases erosion. Finally, dust-laden winds from the Sahara take over as the agents of erosion, and an island is slowly reduced to a barren plain.

The Windward Islands (Ilhas do Barlavento) form the northerly chain with Sal, Sao Vicente, Sao Nicolau and Santo Antao. Visitors arrive at the international airport on Sal, one of the older islands, a barren wind swept plain rising to only 400 m. Those looking for sun sand and sea head for the beach resort at the south of the island. Everyone else catches an inter-island flight to a more interesting island.

Sao Vicente is barren with some mountains rising to 750 m, but it has the second largest town in the Cape Verde Islands, Mindelo. This exists because of its magnificent natural harbour, in fact half of a collapsed caldera, which has long been used a transit point from Europe to the southern lands. From Mindelo there is a ferry to Santo Antao, the second highest island, reaching up to 1979 m. The journey from the port to the capital, Ribeira Grande, across the mountainous centre of the island is said be one of the most dramatic anywhere - particularly when sitting on a park bench in the back of a pickup truck. The plunging ribeiras and coastal cliffs give excellent cross sections though the volcanic pile. Successive basalt lava flows showing all the expected features, with ash layers and lahars, are stacked up and perfectly exposed. Later dikes radiate from the peaks and in many places form walls across the eroded landscape. Sao Nicolau is a little older and rises to 1312 m, revealing very similar volcanic features.

There are only a few roads on the islands, and these, together with most of the extensive path network, are paved with basalt sets, making it easy to explore on foot or by public transport. No rain is normal from January to July, but strong winds carry in Saharan dust. In January the mountains may be in cloud, but sunshine and 28ºC is normal elsewhere.

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