

Cenozoic volcanism II: the Canary Islands

By: Juan Carlos Carracedo, (coordinators), Francisco José Pérez Torrado, Eumenio Ancochea, Joaquín Meco, Francisco Hernán, Carmen Rosa Cubas, Ramón Casillas, Eduardo Rodríguez Badiola and Agustina Ahijado
DOI: 10.1144/GOSPP.18

Abstract

The Canary archipelago comprises seven main volcanic islands and several islets that form a chain extending for c. 500 km across the eastern Atlantic, with its eastern edge only 100 km from the NW African coast (Fig. 18.1). The islands have had a very long volcanic history, with formations over 20 million years old cropping out in the eastern Canaries. Thus all stages of the volcanic evolution of oceanic islands, including the submarine stage as well as the deep structure of the volcanoes, can be readily observed. Rainfall and vegetation cover are relatively low, with the exception of the island of La Palma, favouring both geological observation and rock preservation. Furthermore, the absence of surface water has promoted groundwater mining by means of up to 3000 km of subhorizontal tunnels (locally known as 'galerías'). These galerías are especially numerous in Tenerife, La Palma and El Hierro, and allow the direct observation and sampling of the deep structure of the island volcanoes without requiring expensive and indirect geophysical methods (Carracedo 1994, 1996a,b).

Since the early work of famous naturalists such as Leopold von Buch, Charles Lyell, and Georg Hartung, the Canaries have been viewed as a 'special' volcanic island group and their origin has been closely related to African continental tectonics (Fúster et al. 1968a,b,c,d; McFarlane & Ridley 1969; Anguita & Hernán 1975; Grunau et al. 1975). However, a wealth of geological data made available in recent years, especially on the western islands, has led to the conclusion that the Canaries (and the Cape Verde islands) are similar in many aspects to hotspot-induced oceanic island volcanoes, such as the Hawaiian archipelago (for recent maps an aerial photographs see info@grafcan.rcanaria.es, ign@ign.es, igme@igme.es, info@grafcan.rcanaria.es). However, although the Canarian and Hawaiian volcanoes show common constructional and structural features (rift zones, multiple gravitational collapses), they also show some interesting differences in the geochemical evolution of their magmas and the amount of subsidence (Schmincke 1973, 1976, 1982; Carracedo 1984, 1999; Carracedo et al. 1998).