
Introduction

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The archipelago of the Azores comprises nine inhabited islands and is an autonomous region of Portugal. It stretches more than 600 km in an E–W direction and is separated by the Mid-Atlantic Ridge (MAR). Two of the islands (Flores and Corvo, the Western Group) are situated on the American plate while the seven eastern islands of the Central (Faial, Graciosa, Pico, Terceira and São Jorge) and Eastern Groups (Santa Maria and São Miguel) are located on (sub-)parallel transform faults extending eastwards from the MAR that define the complex plate boundary between Eurasia and Africa (see Vogt and Jung, Chapter “The “Azores Geosyndrome” and Plate Tectonics: Research History, Synthesis, and Unsolved Puzzles”).

Volcanism started at different times for these islands, manifested by significantly different ages constrained for the oldest rocks of individual islands (Santa Maria 8 my, Pico 0.25 my). Since the earliest permanent settlements in the 15th century, approx. 30 volcanic eruptions have taken place in the archipelago, half of which

from subaerial vents. Important examples took place on Faial (1672 and 1957/8), Pico (1562, 1718, 1720), São Jorge (1580 and 1808), São Miguel (1563/4 and 1652) and Terceira (1761). In submarine settings, eruptions repeatedly produced new islands, most of which were eroded within few weeks or months, as e.g. at the Banco D. João do Castro (1720) or the Ilha Sabrina (1811). As of today, Corvo, Flores, Graciosa and Santa Maria are considered extinct while some volcanic center on the other islands are considered dormant. The last confirmed eruption took place between 1998 and 2001 at a water depth of 200–300 m, few kilometres off the Western tip of Terceira. Today, all islands are monitored in detail for indications of tectonic but more importantly magmatic activity by the *Centro de Informação e Vigilância Sismovulcânica dos Açores* (<http://www.cvarg.azores.gov.pt/civisa/Paginas/homeCIVISA.aspx>).

The book aims at presenting a comprehensive view of the Azores geology, reviewing the scientific literature of past decades. We do not aim at covering the entire geological history and knowledge of the archipelago for which the reader is referred to the individual peer-reviewed publications in detail in each respective chapter. It rather covers a wide range of geological subjects that have been addressed on these islands in the past and for which these islands are famous. This book addresses the fields of Geochemistry, Geology, Geophysics, Palaeontology, Petrology and Volcanology, Chapters “The “Azores

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Geosyndrome” and Plate Tectonics: Research History, Synthesis, and Unsolved Puzzles”–“Surface and Groundwater in Volcanic Islands: Water from the Azores Islands”. We have also added a chapter on interesting outcrops (see Kueppers et al., Chapter “Where to Go? A Selection and Short Description of Geological Highlights in the Azores”) which will be of interest to those readers travelling to the Azores, accompanied by a chapter addressing the social and linguistic evolution within the Azores (see Chapter by Beier and Kramer, Chapter “A Portrait of the Azores: From Natural Forces to Cultural Identity”).

The impact of volcanism on the formation of the Azores, on their geological and biological evolution and on the socio-economic development of the islands is unique amongst the world’s volcanoes due to the isolated positioning in the Atlantic albeit close connection to mainland Portugal and the United States and certainly will remain a topic of intense scientific debates in the future as much as is has been in the past. All this has made all of the Azores islands a worthwhile destination for both holiday and work trips which both of the editors and many of the authors of this volume have experienced or are experiencing during finalizing their manuscripts.