

The Tertiary-Quaternary geodynamic evolution of the Africa-Europe collisional zone has been characterized by an extraordinary variety of processes that resulted in the segmentation and rotation of the Alpine orogenic belts that encircle the Mediterranean sea, and the rapid opening of back-arc basins, such as the Ligurian-Provençal and the Tyrrhenian basins. Such rapid evolution in rather small regional compartments has resulted in the superposition and overlapping of compressional, transcurrent and extensional phases, as well as a wealth of magmatic products, both intrusive and volcanic in origin, which have attracted the attention of the scientific community and the development of a variety of geodynamic interpretations. A large part of the volcanic activity associated with the geodynamic evolution of the Mediterranean developed in submarine environments as seamounts and emergent islands. A significant improvement in the knowledge of these seamounts and of the submerged parts of volcanic islands has been achieved in the last three decades thanks to high resolution bathymetric studies, new sampling campaigns, geophysical and geochemical studies, as well as investigations for ore deposits and geothermal energy. And yet, by comparing what is known with what is still unknown or very poorly known, the submarine domains remain certainly the frontier of geosciences, which need large efforts for improving our observational and analytical capabilities, as well as the summary of the existing knowledge and its rationalized use to provide comprehensive interpretations.

The European Marine Observation and Data Network (EMODnet) is a Project funded by the European Commission Directorate-General for Maritime Affairs and Fisheries (DG MARE) in the frame of the Blue Growth, a long term strategy to achieve the goals of Europe 2020, and carried out by a network of research institutions and organizations working together.

EMODnet aims at the collection and harmonization in European Seas of as many existing marine data as possible, to be represented on digital maps at different resolutions and to make products and metadata on European coastal and ocean waters freely available through a dedicated portal (<http://www.emodnet.eu/>). It is subdivided into several Lots: Bathymetry, Geology, Biology, Chemistry, Physics, Seabed Habitats and Human activities. Data currently displayed on the Portal, has been harmonized at 1:250,000 scale, whereas the present phase of the Project foresees a 1:100,000 scale of representation.

The EMODnet Geology Lot is realized by a Consortium of European Geological Surveys covering all of the European Seas. Its Portal (<http://www.emodnet-geology.eu/>) provides access to information elaborated by institutions of 30 European countries. It requires the compilation of a number of layers subdivided into Work Packages (WP), regarding seafloor sediments grainsize, sedimentation rates, Quaternary geology, pre-Quaternary geology and stratigraphy, coastal behaviour (migration, erosion, accretion, resilience/vulnerability), geological events, mineral resources. One of the main objectives is the interoperability of data, in order to offer more complete, error-free and reliable information and to facilitate exchange and re-use of data even between non-homogeneous systems.

The Geological Survey of Italy - ISPRA is Partner of the Consortium and Work Package Leader for "Geological events and probabilities" (WP6), which include earthquakes, volcanoes, landslides, tsunamis, fluid emissions and Quaternary faults. In order to represent the diverse characteristics of each occurrence, deriving also from the different geological settings of European seas, it has been necessary to elaborate a comprehensive and detailed pattern of Attributes for each feature. Datasets consist of shapefiles (polygons, lines and points) representing each kind of event. Each occurrence reported must be complemented by the appropriate reference; additional information, including the names of specific features, can also be provided if available. The elaboration of guidelines to compile the shapefiles and attribute tables was aimed at identifying parameters that should be used to characterize events and any additional relevant information. Particular attention has been devoted to the definition of the Attribute table in order to achieve the best degree of harmonization and standardization according to the European INSPIRE Directive.

To collect and standardize existing data on submerged volcanoes, the Geological Survey of Italy cooperates with the Department of Sciences - Geology of Roma TRE University. The results obtained have gone well beyond what was foreseen for EMODnet Geology. The wide survey, data organization and validation of submerged volcanic structures, together with the characterization of new structures and elaboration of original data (e.g. volume of the volcanic structures), makes this publication unique, comprehensive and easy to consult.

This volume is organized in two parts. The first part presents three contributions on general topics: the first on the Tertiary-Quaternary geodynamic evolution of the Central Mediterranean region; the second on the relevance of the study of emerged submarine volcanic deposits for the understanding of the submerged seamounts; the third on the economic relevance of volcanic seamounts in the Tyrrhenian region.

The second part of this volume is the Atlas of the Italian Submerged Volcanic Structures presented individually in dedicated sheets and organized in seven sectors.

The volcanic centers identified have been complemented by very detailed information, collected analyzing more than 230 publications. From a thorough literature search, including seismic lines from Oceanic Cruises (eg. CROP Project), it was possible to collect and enter information related to different characteristics such as morphological and structural seafloor maps, chemical composition of dredged samples, geophysical surveys, and additional information where available.

However, published data on submerged volcanoes in Italian seas are rather scattered, not uniform, not in digital format, often based on poorly detailed bathymetry.

Altogether information on 127 seamounts, 76 of which of volcanic nature, has been catalogued concerning:

- geographic location
- geological and geomorphological information
- geophysical data: heat flow, magnetic / geothermal anomalies, etc.
- presence / absence of collected samples
- geochemical compositions
- age
- type of volcanic activity
- gas / fluid emissions information

The methodology of compilation and validation of existing data and the elaboration of new data are given in the opening section of the Atlas.

A map of the Italian volcanic seamounts at the 1:1,600,000 scale, including all the identified structures, is enclosed as an insert to this volume.

We hope that this volume will be useful to all marine researchers who are involved in studies about and around volcanic seamounts.

*Silvana D'Angelo, Andrea Fiorentino, Guido Giordano,
Alessandra Pensa, Annamaria Pinton, Letizia Vita*