

Hypsometry of the Tyrrhenian Sea

by

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Abstract

The results of hypsometric researches in the Tyrrhenian Sea are here described. The frequency distribution of depths has been determined on the basis of classes with intervals of 200 m using the bathymetric charts of the Italian Institute of the Navy and the data resulting from cruises of the R/V *Bannock*.

Introduction

The hypsometric studies were made to update our knowledge of the morphology of the Tyrrhenian Sea floor by obtaining quantitative data about the size and distribution of the physiographic provinces. They were based on numerous data, recently collected, and they are therefore detailed and up to date. Until now the only available data on the subject were obtained by MENARD [1966], they were however related to all the oceans.

TAB. 1. — Depth distribution in the Tyrrhenian Sea.

Depth m	Area		Cumulative area	
	Km ²	Per cent	Km ²	Per cent
0 - 200	25482,8	12.5	25482,8	12.5
200 - 400	9431,5	4.6	34914,3	17.1
400 - 600	10584,1	5.1	45498,4	22.2
600 - 800	12919,8	6.3	58418,2	28,5
800 - 1000	13349,3	6.5	71767,5	35,0
1000 - 1200	12143,5	5.9	83911,0	40.9
1200 - 1400	12212,1	5.9	96123,1	46.8
1400 - 1600	12249,4	6.0	108372,5	52.8
1600 - 1800	10753,3	5.2	119125,8	58.0
1800 - 2000	8135,5	3.9	127261,3	61.9
2000 - 2200	7785,8	3.8	135047,1	65.7
2200 - 2400	8113,0	3.9	143160,1	69.6
2400 - 2600	9021,7	4.4	152181,8	74.0
2600 - 2800	11407,2	5.5	163589,0	79.5
2800 - 3000	10069,1	4.9	173658,1	84.4
3000 - 3200	6976,5	3.4	180634,6	87.8
3200 - 3400	8868,6	4.3	189503,2	92.1
3400 - 3600	14875,7	7.3	204378,9	99.4
3600 - 3800	1156,0	0.6	205534,9	100.0
	205534,9	100.0		

Sea boundaries

The geographic limits of the Tyrrhenian Sea are based on geological and morphological criteria defined by R. SELLI [1970].

To the North : the line joining Piombino — Capo della Vita (Elba island) — Punta Polveraia (Elba island) — Punta Zenobito (Capraia island) — Finocchiarola (Corsica).

To the East : the coast of the Italian peninsula as far as Messina Strait.

To the South : the coast of north Sicily from Messina Strait to Capo Lilibeo continuing along the line joining Capo Lilibeo, Marettimo island and Capo Spartivento (Sardinia).

To the West : the east coasts of Sardinia and Corsica joined by Bocche di Bonifacio.

Bathymetric sources

The charts used were the bathymetric charts N.1501 in Mercator projection (scale 1 :750000 at lat. 40°04'); the bathymetric chart N. 1502 in Mercator projection (scale 1 :750000 at lat. 40°04'); the bathymetric chart N. 1250 in Mercator projection (scale 1 :750000 at lat. 40°30') all edited by the Italian Institute of the Navy and especially the data collected by R/V *Bannock* during cruises run by Laboratorio di Geologia Marina of Bologna and Osservatorio Geofisico Sperimentale of Trieste.

Measuring procedures

The Tyrrhenian Sea has been divided into 19 areas limited by isobaths of 200 meters. This interval is the lowest available today and has allowed to produce a frequency curve for statistical study. The areas have been measured by a polarplanimeter Salmoiraghi mod. 236. To avoid the errors due to deformations in the Mercator projection, the measured areas have been corrected by comparison with actual areas of the corresponding spherical trapezes of 1° of latitude and 1° of longitude dimensions.

Results

The hypsometry of Tyrrhenian Sea floor is shown in a histogram (Fig. 1) and a cumulative frequency curve (Fig. 2), to the values of Table 1.

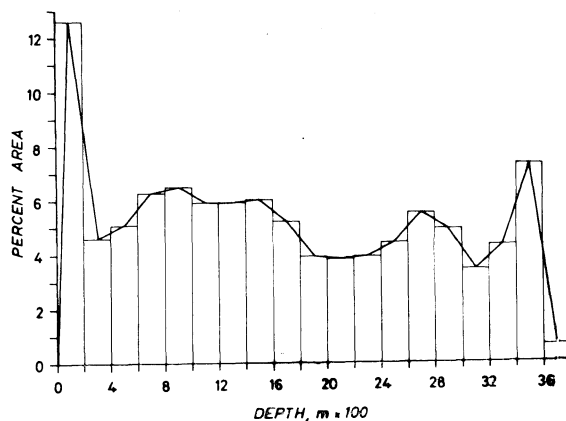


FIG. 1. — Hypsometry of the Tyrrhenian Sea.

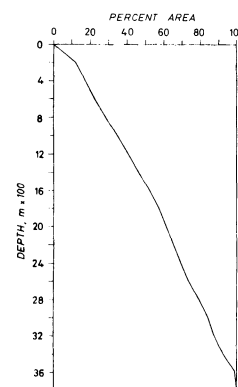


FIG. 2. — Cumulative frequency curve of the Tyrrhenian Sea.

The two main modal classes correspond to the intervals 0-200 m (approximately the continental shelf) and 3400-3600 m (the most developed area, 42% of the bathyal plain). A secondary mode (800-1000 m) corresponds to the perityrrhenian basins. The less frequent depths are below 3600 m, 3000-3200 m, 1800-2400 m and 200-400 m.

The mean depth in the Tyrrhenian Sea, calculated by the weighted mean procedure, is about 1600 m.

Further research planned in near future foresees the determination of the influence of the seamounts. However it is clear even now that the numerous seamounts, many with tops up to 600 m depth, occurring mainly in the bathyal plain, decrease the frequency of areas in this physiographic province and increase that one of the continental slope.

References

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