DISTRIBUTION PATTERNS OF BENTHIC FORAMINIFERS IN THE MESOBATHYAL ZONE (DEEPER THAN 1000 m) IN THE TYRRHENIAN SEA AND SICILY CHANNEL CENTRAL MEDITERRANEAN

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The present study is part of the activities of Progetto Finalizzato Oceanografia of CNR, Unità Operativa Istituto di Geologia dell'Università di Milano, Contract 79.01403.88.

The study was aimed at providing an actualistic model for paleobathymetric evaluation of fossil faunas in deep-sea sediments. It was carried out on tops of gravity cores raised by Laboratorio di Geologia Marina of CNR in the years I968-74 in the Tyrrhenian Sea and Sicily Channel (Selli I974; Selli, I975).

Twentyeight core tops were considered (see Table 1 for sample location). The methodology followed is the same previously used by Massiotta Cita e Mancuso (I976) and by Cita and Zocchi (I978) for Mediterranean deep-sea cores. The following parameters were considered: (1) composition of the foraminiferal fauna; (2) faunal density, expressed by the number of benthic foraminifers per gram of dry sediment (B foraminiferal number = C in Table 1); (3) faunal density, expressed by the number of species identified (B in Table 1); (4)degree of specialisation , expresssed by the percentage abundance of the five more frequent species (Specialisation index = D in Table 1). Numerical data resulting from the investigation are plotted in Table 1.

The present study supports the assumption that faunal density decreases as a function of increasing depth, and that this parameter can be used to distinguish three subzones (I000-I800 m; I800-2500 and 2500-4000 m) within the mesobathyal zone. It also shows that faunal density is greater in the Sicily Channel than in the Tyrrhenian Sea at comparable depths.

Faunal diversity decreases as a function of increasing depth. Species numbers are slightly higher in the Sicily Channel than in the Thyrrhenian.

CORE	Lat.	Long.	Water depth (m)	(A)	(B)	(C)	(D)
CS 70-2	35°48.4'N	I4°03.9'E	10I8	I282	97	136	46.64
CS 73-30	36°13.1'N	12°54.4'E	1060	1112	75	141	58.81
CS 72-38	36°28.5'N	12°34.0'E	1293	843	61	125	55.39
CS 72-37	36°41.3'N	12°17.0'E	1304	553	39	89	76.13
CS 70-5	35°44.4'N	13°11.0'E	1486	985	77	124	67.10
CS 72-39	36°29.1'N	13°11.1'E	1709	359	69	71	37.60
T 74-42	39°09.9'N	15°34.2'E	1003	2795	87	157	57.60
T 69-72	40°14.2'N	10°31.6'E	1063	485	57	1127	47.42
T 69-85	38°28.6'N	15°21.15'E	1124	552	68	32	58.33
T 69-91	38°47.0'N	15°34.2'E	1229	467	52	49	52.24
T 72-44	40°47.6'N	11°43.3'E	1444	533	44	55	65.47
T 68-30	41°47.4'N	10°42.8'E	1713	773	52	63	76.06
T 73-35	39°50.3'N	10°07.2'E	1744	1456	95	179	52.34
T 69-88	38°58.0'N	15°26.05'E	2239	863	89	58	39.62
T 75-10	38°48.8'N	14°07.9'E	2386	705	72	58	64.25
T 69-46	39°59.5'N	11°48.8'E	2393	201	17	24	93.53
T 69-43	40°14.7'N	12°15.0'E	2397	850	14	76	97.64
T 70-50	40°02.0'N	11°29.3'E	2860	429	26	53	85.08
T 69-96	39°31.9'N	11°08.15'E	2860	1525	108	236	33.04
T 69-53	39°41.3'N	11°59.4'E	3500	190	34	18	72.10
T 69-31	39°27.9'N	13°19.7'E	3547	742	20	68	94.74
T 69-94	40°33.6'N	12°46.1'E	3588	232	30	27	84.91
T 69-32	39°35.4'N	12°53.0'E	3593	452	14	40	97.34

TABLE 1 - Location, water depth and numerical data on core tops analysed from Tyrrhenian Sea and Sicily Channel.

The degree of specialisation increases regularly with depth in the Tyrrhenian, with a few exceptions which are interpreted as resulting from faunal displacement. One hundred fifteen species of benthic foraminifers have been identified overall, but only one dozen are important quantitatively. Percentage abundance of the five more frequent species range from 37.6 to 76.1 % in the Sicily Channel; from 33.04 to 97.64 % in the Tyrrhenian. The only quantitatively important species of agglutinated foraminifers is Glomospira charoides , a typical deep-water form, which represents up to 80 % of the benthic fauna in the middle and lower mesobathyal zones. Its frequency is not strictly dependant from water depth, however. Also the imperforate Articulina tubulosa and the perforate Anomalinoides minima are deep-water species not strictly associated with water depth, unlike Uvigerina mediterranea, Robertina translucens, Cassidulina crassa and Gyroidina (various species) which decrease in abundance at depths in excess of 1800 m and disappear beyond the 3000 m isobath.

Eponides tumidulus is characteristic for its high frequency (up to 20 %) in the Tyrrhenian , but rapidly decreases at depth, and disappears at approximately 2500 m. This taxon is conspicuously absent from the assemblages of the Sicily Channel.

Imperforate forms bathymetrically and areally meaningful include : Miliolinella subrotunda, the only species which increases in abundance as a function of increasing depth. It rises from a few percent to 50 % or more in the deepest parts of the Tyrrhenian. Ophthalmidium acutimargo and Biloculinella labiata are much better represented in the Sicily Channel than in the Tyrrhenian at comparable depths.

The composition of foraminiferal faunas seem not to be strictly dependent from the local substratum, as resulting from the analysis of clay minerals (by X-ray diffractometry) of nine core tops from the Tyrrhenian.

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