Table II. Species richness (number of species), density (ind·100 m^{-2}) and diversity (H', Shannon index; J, evenness) of the macrobenthic crustaceans sampled with sled and box-corer within sites A and B of the Capbreton canyon.

	Site A				Site B			
	Sled		Box-corer		Sled		Box-corer	
No. species (%)								
Mysidacea	5	7.9	0	0.0	0	0.0	0	0.0
Amphipoda	35	55.5	11	64.6	27	42.8	9	34.6
Cumacea	8	12.7	2	11.8	18	28.6	4	15.4
Isopoda	9	14.3	2	11.8	11	17.4	9	34.6
Tanaidacea	2	3.2	2	11.8	3	4.8	3	11.5
Euphausiacea	1	1.6	0	0.0	1	1.6	0	0.0
Decapoda	3	4.8	0	0.0	3	4.8	1	3.9
Total	63		17		63		26	
Density								
Mysidacea	–	0.7	0.0	0.0	–	0.0	0.0	0.0
Amphipoda	–	38.0	85.8	75.0	–	47.4	51.8	45.0
Cumacea	-	4.1	8.8	7.7	-	32.9	7.6	6.8
Isopoda	–	32.6	4.4	3.8	–	11.3	40.4	35.0
Tanaidacea	-	24.0	15.4	13.5	-	7.8	13.4	11.7
Euphausiacea	–	0.2	0.0	0.0	–	0.2	0.0	0.0
Decapoda	–	0.4	0.0	0.0	–	0.4	1.9	1.7
Total	–		114.4		–		115.1	
Diversity								
H'	3.04		3.76		5.03		4.29	
J	0.51		0.92		0.84		0.91	

San Sebastian; aperture dimensions: 28 cm wide, 23 cm high; weight: 160 kg; mesh size of the net: 0.5 mm); and one series of quantitative samples performed with a Flusha box-corer (KF; area sampled by the core box: 650 cm^2). Each KF sample (10 cm surficial sediment layer) was passed through a 0.5-mm mesh size sieve. The DI and KF collected material was preserved in 10 % buffered formaldehyde before subsequent laboratory analysis (identification of crustacean species and counts of individuals in each of these species; the non-crustacean components sorted from this material were not considered in this study). In both sites, the mean density of taxa (expressed in ind·100 m^{-2} in order to compare with other studies on suprabenthic crustaceans from the SE Bay of Biscay area) was calculated from the KF samples (site A: seven samples; site B: eight samples) whereas only specific abundance percentages were given by non-quantitative sled samples (see *appendix I, II*). ***The species diversity of each site was depicted by the Shannon index H' (log_2) and evenness J [27]. Finally, the faunistical similarity between benthic communities from the two sites was estimated by means of the Schoener index [28].***

4. RESULTS

4.1. Sled samples (DI19; DI66)

The analysis of the qualitative samples obtained from the two sites A and B is presented in *table II* and *appendix I*. Although the two samples contained the same number of species (63 species), the high difference in the abundance of collected individuals is certainly related to the duration of the sled contact with the sea-floor (ca. 15 min for DI19, only 5 min for DI66). The species collected by this sled at the water-sediment interface and in the uppermost surficial sediments were mainly represented by amphipods, cumaceans and isopods. Mysids were curiously absent from the more oceanic sample. The relative abundance of the main dominant taxa was slightly different in the two sites: amphipods, isopods and tanaids at site A; amphipods, cumaceans and isopods at site B (decreasing rank of abundance). The species diversity indices

Table III. Percentage contribution of the main dominant benthic crustaceans in sled and box-corer samples from sites A and B of the Capbreton canyon. AMP, Amphipoda; CUM, Cumacea; ISO, Isopoda; TAN, Tanaidacea.

	Site A			Site B		
Sled	DI19		(%)	DI66		(%)
	AMP	*Bonnierella abyssorum*	26.5	AMP	*Chevreuxius grandimanus*	10.6
	TAN	*Apseudes spinosus*	23.9	AMP	*Ampelisca pusilla*	8.4
	ISO	*Arcturopsis giardi*	21.7	CUM	*Leucon (Leucon) serratus*	7.0
	ISO	*Chelator insignis*	9.6	AMP	*Arrhis mediterraneus*	4.0
	CUM	*Makrokylindrus longipes*	2.4	CUM	*Procampylaspis armata*	3.4
		Total	84.1		Total	33.4
Box-corer	KF50-60		%	KF38-45		%
	AMP	*Ampelisca pusilla*	13.5	AMP	*Harpinia latipes*	13.3
	AMP	*Harpinia latipes*	11.6	AMP	*Leptophoxus falcatus*	11.6
	AMP	*Harpinia truncata*	9.6	TAN	*Sphyrapus malleolus*	8.3
	AMP	*Metaphoxus simplex*	5.8	ISO	*Bullowantura aquitanica*	6.6
	TAN	*Apseudes spinosus*	5.8	ISO	*Desmosoma elongatum*	6.6
		Total	46.3		Total	46.4

(H' and J) showed lower values at site A due to the numerical dominance of a few species, namely the amphipod *Bonnierella abyssorum*, the tanaid *Apseudes spinosus* and the isopod *Arcturopsis giardi* which represented 72.1 % of the total collected fauna in DI19 (*table III*). Such a dominance of some species is also reflected in the low similarity between the two sled samples (Schoener index: 17.3 %). In contrast, the five dominant species from DI66 did not represent more than 33.4 % of the total collected fauna (*table III*).

4.2. Box-corer samples (KF50-60; KF38-45)

Results are presented in *table II* and *appendix II*. In each KF sample from both series, the number of species as well as the abundance of individuals were very low in comparison to the corresponding sled samples. The cumulative number of identified species was lower at site A (17 species) than at site B (26 species). The crustacean fauna was represented by endobenthic amphipods, isopods and cumaceans, as expected with this kind of sampler. The more motile taxa such as mysids and euphausiids were not sampled at all by the box-corer. Calculated from the overall material collected in each series, the Shannon diversity index was higher at site B than at site A while evenness J showed the same high value at both sites. Furthermore, both indices from box-corer samples were higher than the corresponding values from sled samples. The overall mean density values from both sites were not statistically different (114.1 and 115.1 ind·100 m^{-2} at sites A and B, respectively; t_{obs} = 0.01; df = 13; $P > 0.05$). However, both communities differed with respect to the rank and contribution of their main dominant components, especially in the case of isopods which were more abundant at the oceanic site B. As shown in *table III*, the five dominant species from each series did not represent more than 46.4 % of the total collected fauna. Finally, although slightly higher than for the sled samples, the low similarity between sites A and B calculated from the KF sample series (Schoener index: 33.1 %) confirmed the existence of distinct macrobenthic communities in these areas.

5. DISCUSSION

First of all, it must be emphasised that the two samplers used in this study give different complementary information on the structure of the macrobenthic communities from the two sampling sites. The Fusha box-corer samples only a very small area. It allows the estimation of the density of endobenthic taxa but generates a bow-wave on the sea-floor which sweeps away the motile near-bottom fauna (mysids and euphausiaceans). The epibenthic sled samples simultaneously the uppermost surficial sediment layer as well as the near-bottom water layer allowing the more motile animals from the water-sediment interface to be caught. Such methodological remarks on benthic samplers were also discussed by Rallo et al. [21]

(epibenthic sled and dredge, otter trawl) and Elizalde et al. [9] (box-corer, multiple corer, Smith-McIntyre grab).

Although located at the same depth within the Capbreton canyon, the sampling sites A and B shelter two different macrobenthic communities as demonstrated by the comparison of their main characteristics derived from the analysis of the sled and box-corer samples. Furthermore, such a difference in the community structure of these sites is more evident in the case of the epibenthic fauna sampled by the sled at the sediment-water interface than for the endobenthic components from the box-corer samples. The low diversity indices at site A as well as the low similarity between sites result from the dominance of a few number of epibenthic species, which were mainly or exclusively collected by the sled within the confinement area of the upper canyon, such as the amphipod *Bonnierella abyssorum*, the tanaid *Apseudes spinosus* and the isopod *Arcturopsis giardi*. These species respectively represented 26.5, 23.9 and 21.7 % of the total abundance in the DI19 sled sample. The first two species were also present although with low abundances in sled samples from site B, whereas the last one was not sampled at this site.

Apart from the preliminary data published by Urzelai et al. [36] on the deep macro- and megabenthic communities (major zoological groups) from the Capbreton canyon which revealed an heterogeneous distribution of the fauna within the submarine valley, the present results can be compared to the data published by Elizalde et al. [8] on the structure of a bathyal suprabenthic community located at about 1 000 m depth on the southern margin of the Cap Ferret canyon (SE Bay of Biscay). Within the 10–40-cm water layer sampled by the sled above the sea-floor, the structure of this suprabenthic community was similar to the one from the oceanic site B (sled sample): high species richness (97 species, mainly amphipods, cumaceans, isopods and mysids); high diversity values (H' = 5.75; J = 0.87); numerical dominance of amphipods (50.2 %); and cumaceans (28.6 %) and low contribution of the five dominant species which represented no more than 26.1 % of the total. Furthermore, *A. spinosus* and *B. abyssorum* were also recorded from the Cap-Ferret bathyal community whereas *A. giardi* was apparently absent from this area [7].

Bonnierella abyssorum [3] was first described as *Gammaropsis abyssorum* from the material collected by the RV *Caudan* at 950 m depth (station 13; three specimens) in the south-eastern Bay of Biscay and later assigned to the genus *Bonnierella* by Chevreux [4]. Apart from recent notations from bathyal communities of the south-eastern Bay of Biscay [6, 7, 8, 33], this amphipod was apparently not recorded after its discovery although it was actually mentioned by Le Danois [16] in a list of macrobenthic species from the Capbreton canyon. Its systematic position is dubious (Ischyroceridae? according to Barnard and Karaman [2]) and almost nothing is known about its ecology except it shows a bathyal distribution [2].

Apseudes spinosus (M. Sars, 1858) is a common tanaid collected on a variety of sediments between 18 and 1 300 m depth from Iceland to the Bay of Biscay [12] and recently mentioned in coarse sand from the Portuguese continental shelf [5]. It was reported by Bonnier [3] in the south-eastern Bay of Biscay (*Caudan* cruise; station 13, 950 m depth) and also mentioned by Le Danois [16] in the Capbreton canyon. According to Holdich and Jones [12], several *Apseudes* species are known to burrow into the surficial sediment with their antennules, antennae and pereopod 1.

Arcturopsis giardi [3] was first described as *Astacilla giardi* from the material collected by the RV *Caudan* at 650 m (station 11; fourteen specimens) and 950 m depth (station 13; two specimens) in the south-eastern Bay of Biscay and later assigned to the genus *Arcturopsis* by Koelher [14]. It was also mentioned by Le Danois [16] from the Capbreton canyon. Surprisingly, it was not recorded during a recent intensive sampling programme in an area located near *Caudan* station 11 ([7, 8] and unpubl. data). This species is morphologically characterised by its sexual dimorphism related to the lengthening of pereonite 4 and to the presence of a curious median appendix on the ventral face of pereonite 3 in adult males. As for the other mentioned species, little information is available on their benthic ecology. This new finding of an abundant population in the south-eastern Bay of Biscay will allow a detailed morphological and biometric redescription of this interesting species.

Unusual at 1 000 m depth in the south-eastern Bay of Biscay [7, 8, 33], the lower diversity values recorded at site A suggests that the macrobenthic community from this deeply embanked and sinuous portion of the Capbreton canyon is not biologically but physically controlled by some restraining environmental factors, as demonstrated for coastal suprabenthic communities mainly structured by hydrodynamism [30, 31]. Due to their relatively high abundance at site A (more than 900 individuals in one sled sample) and their apparent rarity or absence in other bathyal sampling stations from the south-eastern Bay