The Biological Geography of the European Seas: results from the macrofaunal inventory of the soft-substrate communities

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This work has been carried out in the context of the MarBEF (Marine Biodiversity and Ecosystem Functioning) EU Network of Excellence. The hypothesis tested is whether the zoogeographical divisions as defined across the European seas can be validated by soft-bottom macrobenthic community data or not. The systems considered were those proposed by OSPAR, ICES, IHO, LMEs, Longhurst (1998) and Fredj (1974). Data on soft-bottom communities have been stored in the largest data base of this kind ever developed in the EU. Three criteria were proposed to test the biological relevance of the above zoogeographical classification schemas, and tested with each of the faunal groups: (i) proximity, which refers to the expected closer faunal resemblance of the adjacent sectors/provinces/regions; (ii) differentiation, which provides a measure of the uniqueness of the pattern; (iii) randomness, which accepts the inventories of the various sectors, provinces or regions as random samples of the total inventory of each of the systems considered. Results show that only the classification proposed by Longhurst meets the three criteria and that only the polychaete data were showing this. Average island distance from the nearest coast, number of islands and the island surface area were the geographic variables best correlated with the pattern produced by polychaetes. These results are consistent with those produced by datasets previously collected from narrower geographic scales. Zoogeographic patterns suggest a vicariance model dominating over the founder-dispersal except for the semi-closed regional Seas (Baltic, Mediterranean Black Seas) in which, however, a model substantially modified from the second option could be supported.