A World Map of Seabed Sediment Based on 50 Years of Knowledge

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Abstract : Production of a global sedimentological seabed map has been initiated in 1995 to provide the necessary tool for searches of aircraft and boats lost at sea, to give sedimentary information for nautical charts, and to provide input data for acoustic propagation modelling. This original approach had already been initiated one century ago when the French hydrographic service and the University of Nancy had produced maps of the distribution of marine sediments of the French coasts and then sediment maps of the continental shelves of Europe and North America. The current map of the sediment of oceans presented was initiated with a UNESCO's general map of the deep ocean floor. This map was adapted using a unique sediment classification to present all types of sediments: from beaches to the deep seabed and from glacial deposits to tropical sediments. In order to allow good visualization and to be adapted to the different applications, only the granularity of sediments is represented. The published seabed maps are studied, if they present an interest, the nature of the seabed is extracted from them, the sediment classification is transcribed and the resulted map is integrated in the world map. Data come also from interpretations of Multibeam Echo Sounder (MES) imagery of large hydrographic surveys of deep-ocean. These allow a very high-quality mapping of areas that until then were represented as homogeneous. The third and principal source of data comes from the integration of regional maps produced specifically for this project. These regional maps are carried out using all the bathymetric and sedimentary data of a region. This step makes it possible to produce a regional synthesis map, with the realization of generalizations in the case of over-precise data. 86 regional maps of the Atlantic Ocean, the Mediterranean Sea, and the Indian Ocean have been produced and integrated into the world sedimentary map. This work is permanent and permits a digital version every two years, with the integration of some new maps. This article describes the choices made in terms of sediment classification, the scale of source data and the zonation of the variability of the quality. This map is the final step in a system comprising the Shom Sedimentary Database, enriched by more than one million punctual and surface items of data, and four series of coastal seabed maps at 1:10,000, 1:50,000, 1:200,000 and 1:1,000,000. This step by step approach makes it possible to take into account the progresses in knowledge made in the field of seabed characterization during the last decades. Thus, the arrival of new classification systems for seafloor has improved the recent seabed maps, and the compilation of these new maps with those previously published allows a gradual enrichment of the world sedimentary map. But there is still a lot of work to enhance some regions, which are still based on data acquired more than half a century ago.

Keywords : marine sedimentology, seabed map, sediment classification, world ocean

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