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Surveying the Alentejo continental shelf for minerals and Quaternary environmental changes: preliminary results of the MINEPLAT project survey

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The tectonic uplift of South Portugal in the last 5 Million years (My) was firstly identified on the basis of morphologic criteria by Mariano Feio (1952, “The evolution of the relief of Baixo Alentejo and Algarve”, transl.). However, the assessment of continental vertical movements off Portugal and its relation with tectonics was only initiated in the 1990-ies. This work was carried out in the framework of FP6 and FP7 in the domains of Natural Hazards funded by the European Community. The swath bathymetry cartography of the southwest part of the Iberian Peninsula resulted from the effort of European and national projects, of 19 oceanographic surveys, a total of 200 ship time days executed from 2000 to 2006, involving 14 research institutions from 7 European countries. As a result of this effort together with acquisition and interpretation of thousands of km of seismic reflection profiles, the Pliocene-Quaternary uplift of the Alentejo continental margin (SW Portugal) is now widely accepted by the scientific community. This uplift has not been yet quantified but it is possible that can have contributed to erosion and deposition of metallic ores as placers in the continental shelf.

This argues in favor of the potential existence of placers in the continental shelf and the need for the detailed investigation that will allow determination of ideal location for placers deposition in the past Pliocene-Quaternary (5 My). The source for metals can arguably be associated to the Iberian Pyrite Belt ores hosted in the Alentejo Paleozoic formations and to the hyper-alkaline intrusions of Sines and Monchique of Late Cretaceous age.

Artificial renourishment of beaches with offshore sand has not been assessed for the Alentejo littoral, despite that the coast located to the south of the Sines segment shows high susceptibility to erosion. This has been observed on a regular basis as the beaches are frequently devoid of sand, thus jeopardizing their touristic potential. The detailed assessment of good quality sand deposits between approximately 30m and 50m below sea level aims at minimizing this problem that affects the economy of littoral of Alentejo.

The MINEPLAT project (Assessment of the mineral resources potential in the continental shelf of Alentejo and of the environmental conditions caused by the tectonic uplift in the Pliocene-Quaternary) aims at assessing the existence of mineral deposits off the Alentejo. The MINEPLAT-1 geophysical survey acquired very high resolution multi-channel reflection seismics, swath bathymetry, backscatter and magnetic data in a test area.

The preliminary results show: previously unknown NNW-SSE aligned magnetic anomalies, possibly corresponding to buried Late Cretaceous alkaline rocks; faults affecting recent sediments; well defined patches of sediments associated to morphologic traps.

Future work will involve ground-truthing to characterize the shallow deposits.

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