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Preface

Recent processes on Iberian Continental Shelf

The continental shelf is the undersea extension of the continents, comprising about the 8% of the total earth surface. This is a complex region between the continental and marine environments, extending from the shoreline into shelf break (between 150-200 m) with an average slope of 0.1º and an average width of 65 km. This area receives terrestrial (fluvial discharge, anthropogenic pressure) and marine (waves, currents, tides) influences. In this sense, continental shelf is exposed to numerous and varied environmental risks, such as coastal contamination, sea level rise or tsunamis, that directly impact the coastal settlements. Recent events like the 2002 Prestige oil spill on NW Spain, the 2006 Tsunami at Indonesia and the 2011 earthquake and subsequent tsunami in Japan have surprised the society to confront the fact the coastal risks are a reality completely connected with our day by day.

From another point of view, continental shelf is an interesting area that holds many natural resources and singular habitats for marine life. Oil, gas, marine aggregates, fisheries among others are currently exploited around the world. The existence of valuable resources easily extractable in this relatively shallow environment, have prompted the International community to clearly define the outer limits of the juridical continental shelf in the coastal States. The Convention on the Continental Shelf (1958) established that "… the continental shelf comprises the seabed and subsoil of the submarine areas that extends to the outer edge of the continental margin, or to a distance of 200 nautical miles, for the purpose of exploring it and exploiting its natural resources", incorporating in their legal definition many aspects of the traditional geologic definition.

In the future, the good management of the marine resources would require a deep knowledge of the present and past processes occurring on the Continental shelf, and the development of frontier technology to tackle the challenges to prevent the main geological risks, allowing to save human lives and to protect and sustain their economic resources.

The risks, resources and records of the continental shelf have been the main objective of the IGCP 526 project (http://igcp526.io.usp.br/). The International Geological Correlation Program (IGCP) is a joint initiative of United Nations Education, Scientific and Cultural Organization (UNESCO) and the International Union of Geological Sciences (IUGS), born to favor comparative studies in the Earth Sciences, and to improve the interaction and networking between multidisciplinary scientists. IGCP 526 has gathered together researchers from different countries (Canada, Australia, Brasil, Italy, Spain, Morocco, Ireland or France) and disciplines (stratigraphy, sedimentology, ecology and oceanography) under a common objective: to enhance a better global understanding of the processes and recent evolution of continental shelf and their influence and relevance to human society.

Through the annual IGCP 526 conferences, this global and interdisciplinary knowledge have been put in common. The first annual meeting was held in Cairns (Australia) on 2007. On November 2008, the second annual meeting was organized in Natal (Brazil) and on 2009 the meeting was held in Rabat (Morocco). In the present volume of JIG, we present a compilation of the 4th Conference of IGCP526 that was held on Vigo (Spain) on 2010. This meeting brought together more than 30

different works and five plenary conferences about several continental shelves around the world. This volume presents a collection of state of the art works focused on the Iberian Continental Shelf comprising the study of different recent processes mostly related to sedimentary dynamics and anthropogenic contamination.

Rodríguez-Vidal *et al.* (in this volume) show evidences of the AD 1755 tsunami at the coast of Gibraltar. This work shows that the re-deposition of earlier sediments, typical of this extreme event, as they has been recorded at three different heights, both in subaerial and subtidal levels: on sandy coast reaching 2-3 m above the mean sea level (msl), on rocky coast surpassing 5 m and on submerged platform to a depth of 22 m below msl. All these sediments were dated by historical and radiocarbon methods.

Westerly on the northern Alboran Sea margin, Bárcenas et al (in this volume) reveal the high spatial variability of sedimentary processes in a relatively small and abrupt area. Mainly based on the correlation between surface sediments and backscatter distribution and the use of hydrodynamic model, three main shelf environments are identified: storm-dominated, mixed and fluvially-dominated. Across-shelf, a consistent surficial pattern defines a gravelly sandy infralittoral zone, subjected to a strongly fluctuating climate. Along- shelf, the Carchuna Canyon limits a western shelf mostly covered by fluvially-derived sediments and an eastern current-controlled shelf, in the deeper shelf area.

The Ría de Aveiro (NW Portugal) is one of the most studied areas in the Portuguese continental shelf. Martins *et al.* (in this volume, a and b) present two works focused on this zone. Martins et al (a) analyses the sedimentary exchange between shelf and Ría through the ria inlet. Seasonal data of suspended sediment concentration (SSC) in the inlet suggested significant temporal variability. Sediments were imported from the ocean sink and deposited on the inlet margins, favoring the stabilization of the harbor structures. On the entrance channel, high tidal current velocities contribute to increase the erosion of this area. SSC was higher during the winter and during ebb and low tide throughout the year. The lagoon also exported to continental shelf mostly muddy sediments.

Martins *et al.* (b) use a multiproxy approximation to establish the environmental quality of the sediment and to evaluate the suitability of benthic foraminifera as a proxy of the environmental quality of an ecosystem. The load pollution index (LPI), based on heavy metals concentrations, a sequential chemical extraction (SCE) to evaluate the toxic heavy metal availability, and biotic variables (benthic foraminifera study) are the main tools of the study. Most of the element concentration in the sediments is retained in the resistant mineralogical phase, but higher bioavailability of some toxic elements is also found in some areas of the Ria. The last have a generic negative impact on benthic foraminifera of the Aveiro lagoon. Differential sensitivity of benthic foraminifera to high concentrations of heavy metals is established.

This special section of the Journal of Iberian Geology is one of the many outcomes of the IGCP 526 project that allow transferring the research developed along Iberian Continental Shelf and interchanging methodologies among scientific community and around the world.

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