

The reactivation of the SW Iberian passive margin: a brief review

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On the morning of the 1st of November of 1755 a major earthquake struck offshore the Southwest Iberian margin. This was the strongest earthquake ever felt in Western Europe. The shake, fire and tsunami devastated Lisbon, was felt as far as Finland and had a profound impact on the thinkers of that time, in particular on the Enlightenment philosophers such as Voltaire, Rousseau and Kant. The Great Lisbon Earthquake is considered by many as the event that marks the birth of modern geosciences; and made of this region one of the most well studied areas in the world. After the 1755 earthquake, Kant and others authors wrote several treaties dealing with the causes and dynamics of earthquakes and tsunamis and were close to identify some key elements of what we now call plate tectonics. More than two hundred years later, in the year of 1969, the region was struck by another major earthquake. This was precisely during the period in which the theory of plate tectonics was being built. Geoscientists like Fukao (1973), Purdy (1975) and Mackenzie (1977) immediately focused their attention in the area. They suggested that these events were related with “transient” subduction of Africa below Iberia, along the East-West Azores-Gibraltar plate boundary. Several years later, Ribeiro (1989) suggested that instead of Africa being subducted below Iberia, it was the West Iberian passive margin that was being reactivated, a process that may, in time, lead to the formation of a new subduction zone. In the turning of the millennium, a subducting slab was imaged below the Gibraltar Straits, a remnant of the Western Mediterranean arc system that according to Gutscher et al. (2002) was related with ongoing subduction. Recently, it was proposed that a causal link between the Gibraltar subduction system and the reactivation of the SW Iberian margin might exist. In addition, the large-scale Africa-Eurasia convergence is inducing compressive stresses along the West Iberian margin. The margin reactivation is expressed by the presence of several active lithospheric-scale thrust faults. In this communication, we will highlight the main moments of the journey that lead to the understanding that the Southwest Iberian is in fact being reactivated. We will present some of the data and ideas that were gathered over the years, including the most recent findings. Finally, we will see that despite the numerous endeavours and the substantial improvements in our tectonic knowledge of the region there are still many enigmas waiting to be resolved.

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