



Thrusting between exhumed mantle blocks at the Gorringe Bank (SW Iberian margin): Evidence from combined seismic and gravity modeling

V. Sallarès (1), S. Martinez-Loriente (1), M. Prada (1), A. Gailler (2), M.-A. Gutscher (3), R. Bartolome (1), and E. Gracia (1)

(1) Unidad de Tecnologia Marina - CMIMA - CSIC, Barcelona, Spain (vsallares@cmima.csic.es), (2) Commissariat d'Energie Atomique, DAM/DIF, Arpajon, France, (3) Université de Brest, Laboratoire Domaines Océaniques, UMR6538 CNRS/UBO, IUEM, Plouzané, France

The Gorringe Bank is a massive seamount located offshore the SW Iberian margin that displays one of the largest gravity anomalies on Earth's oceans. To determine its deep seismic structure, a wide-angle seismic transect with OBS/H crossing it from the Tagus to Horseshoe Abyssal plains, was acquired in 2008. The corresponding velocity model, obtained by joint refraction and reflection travel-time inversion, displays a variably-thick sedimentary layer on top of a basement showing a strong vertical velocity gradient and no evidence for a crust-mantle boundary, not only in the Gorringe Bank but also in the adjacent segments of the deep oceanic basins. The seismic structure closely resembles that of exhumed mantle sections described along the Western Iberian margin and largely differs from that of either oceanic or extended continental crust. A velocity-derived density model assuming that the basement is made of serpentinitized peridotite matches well the observed gravity anomaly, showing a basement with a variable degree of serpentinitization, decreasing from $\sim 90\%$ at the seafloor to $\sim 20\%$ at 10 km deep. Our preferred interpretation is that the Gorringe Bank was initially the central segment of an exhumed mantle band that included also the present-day Eastern Tagus and Western Horseshoe basins. This band, which constitutes the southernmost and oldest section of the Western Iberia oceanic domain, was probably exhumed in the Earliest Cretaceous, during the onset of the North Atlantic opening. During the WNW-ESE Neogene compression, the westernmost Horseshoe basin was thrust on top of the easternmost Tagus basin, uplifting the Gorringe Bank.