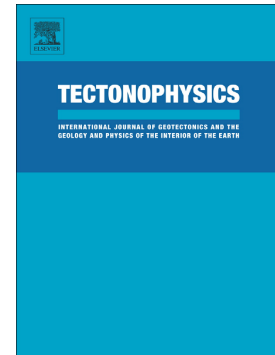


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The nature of crustal reflectivity at the southwest Iberian margin

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Abstract

Reprocessing of multi-channel seismic reflection data acquired over the northern margin of the Gulf of Cádiz (SW Iberian margin) places new constraints on the upper crustal structure of the Guadalquivir-Portimão Bank. The data presented have been processed with optimized stacking and interval velocity models, a better approach to multiple attenuation, preserved amplitude information to derive the nature of seismic reflectivity, and accurate time-to-depth conversion after migration. The reprocessed data reveal a bright upper crustal reflector just underneath the Paleozoic basement that spatially coincides with the local positive free-air gravity high called the Gulf of Cádiz Gravity High. To investigate the nature of this reflector and to decipher whether it could be associated with pieces of mantle material emplaced at upper crustal levels, we calculated its reflection coefficient and compared it to a buried high-density ultramafic body (serpentinized peridotite) at the Goringe Bank. Its reflection coefficient ratio with respect to the sea floor differs by only 4.6% with that calculated for the high-density ultramafic body of the Goringe Bank, while it differs by 35.8% compared to a drilled Miocene limestone unconformity. This means that the Gulf of Cádiz reflector has a velocity and/or density contrast similar to the peridotite at the Goringe Bank. However, considering the depth at which it is found (between 2.0 and 4.0 km) and the available geological information, it seems unlikely that the estimated shortening from the Oligocene to present is sufficient to emplace pieces of mantle material at these shallow levels. Therefore, and despite the similarity in its reflection coefficient with the peridotites of the Goringe Bank, our preferred interpretation is that the upper crustal Gulf of Cádiz reflector represents the seismic response of high-density intracrustal magmatic intrusions that may partially contribute to the Gulf of Cádiz Gravity High.

Keywords: Gulf of Cádiz, Goringe Bank, Multichannel seismic processing, Central Atlantic Magmatic Province, high-velocity/high density-bodies.

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