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New insights of the nature of the Porcupine Median Ridge using Refraction Seismic Data

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The Porcupine Basin is a narrow V-shaped failed rifted basin of Permo-Triassic to Cenozoic age, with the main rifting phase in the Late Jurassic to Early Cretaceous. It is located offshore SW Ireland, showing increasing stretching factors from less than 1.5 to the North to more than 6 to the South. A ridge feature, the Porcupine Median Ridge, has been identified in the middle of the southernmost part of the basin. During the last three decades, this ridge has been successively interpreted as a volcanic structure, a diapir of partially serpentinized mantle, or a block of continental crust. Its nature is still remains debated today. The most recent study uses velocity analysis of long streamer seismic reflection data to support the volcanic ridge hypothesis. In this study we use refraction seismic data acquired across the Porcupine Basin to derive a better constrained P-wave velocity structure across the basin, and in particular across the Porcupine Median Ridge. We use the data from a 300 km long shot line recorded on 32 ocean-bottom seismometers and an inline land seismometer. This profile is oriented West-East and crosses the entire basin in its southernmost part. Thus, we image the deep structure of the thinnest part of the basin, the geometry of the continental thinning from margin to margin, with a central focus on the Porcupine Median Ridge. Analysis of P-wave and S-wave seismic arrivals, together with gravity modelling, gives new insights into the nature of this structure and allows for a better understanding of the rifting process of Porcupine Basin and its thermal state during the rifting. Defining the nature of the Porcupine Median Ridge will also give us more information about when the ridge formed and its role in rifting processes. This project is funded by the Irish Shelf Programme Study Group (ISPSG) of the Petroleum Infrastructure Programme (PIP).