The ridges of the northern Porcupine Bank, west of Ireland: discussion on their structure, sedimentology and potential subglacial origin

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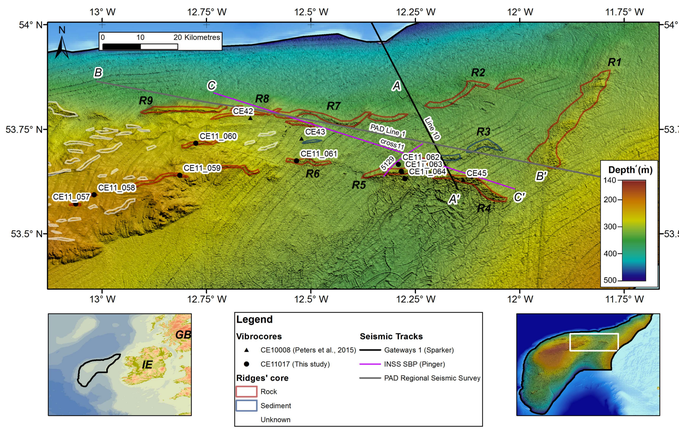

Figure 1: Location map for the seismic and groundtruthing datasets of the area.

The Irish National Seabed Survey (INSS) data uncovered unprecedented details on the Porcupine Bank's bathymetry and allowed the identification of a large number of bedforms and mounds as well as ridges (Thébaudeau et al., 2015). These ridges are found in the northern third of the Bank and extending in to the western Irish shelf to the east (Figure 1).

A potential subglacial origin for these ridges (due to the still unknown western extent of the British-Irish Ice Sheet) prompted further expeditions to gather groundtruthing evidence and further seismic datasets; CE09-03, GLAMAR (McCarron et al., 2013), CE10-08 (Peters et al., 2015), Gateways 1 and CE11-17 (This Study). A Petroleum Affairs Division (PAD) commissioned multichannel Regional Seismic Survey line has profiled the bedrock accross the region (Figure 4). The correlation of the various seismic datasets suggests that the geometry of the ridges is strongly influenced by the local bedrock (Figure 1).

Two distinct diamicts were found in the vicinity of these ridges (Figures 6 and 7). Diamict Dm1 is relatively unconsolidated and occurs as the upper unit below seabed sands (Figures 5 and 6). It appears to correlate with lithofacies Dmm from Peters et al. (2015) and the extended seismic unit 2 forming the core of ridge R3 (Figures 2 and 3). New radiocarbon dates confirm its LGM origin (Figures 6 and 7). Below a thin stratified lithofacies, a relatively overconsolidated diamict Dm2 is present and predates the LGM (and tentatively correlates with Dmc (Peters et al., 2015)).

Acknowledgements & References

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Peters, J. L., Benetti, S., Dunlop, P., & Ó Cofaigh, C. (2015). Maximum extent and dynamic behaviour of the last British–Irish Ice Sheet west of Ireland. Quaternary Science Reviews, 128, 48-68.

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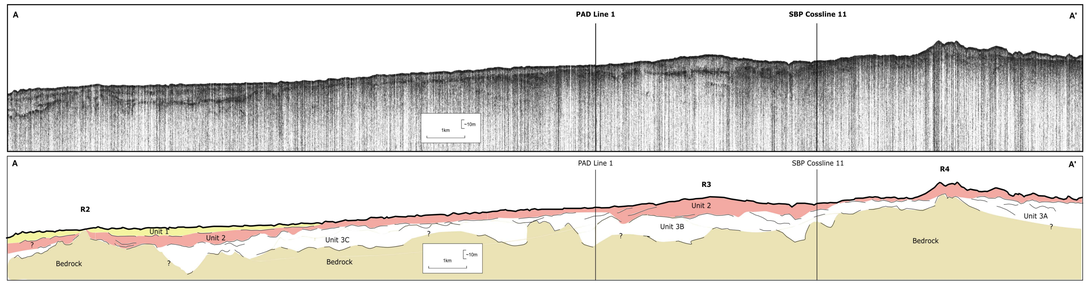

Figure 2: Section of Gateways 1 Sparker line 10 with associated interpretation diagram.

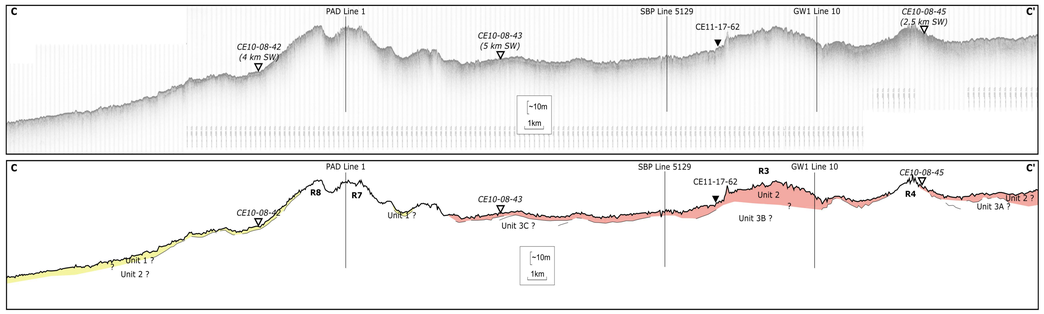

Figure 3: Section of INSS Sub-Bottom Pinger crossline 11 with associated interpretation diagram and projected locations of vibrocores.

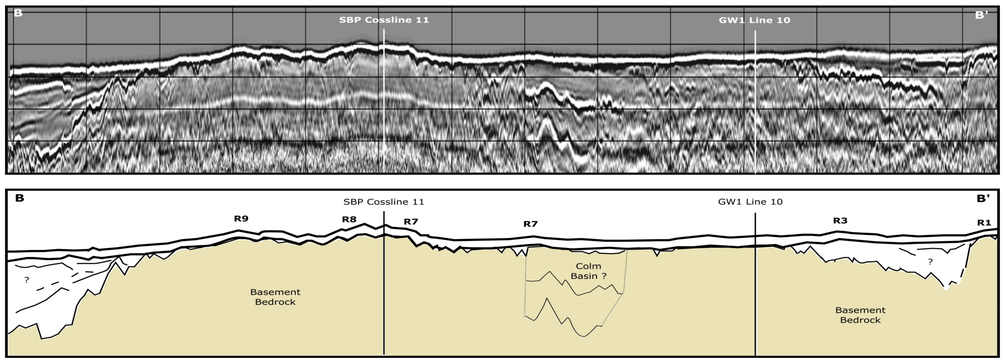

Figure 4: Section of PAD line 1 with associated interpretation diagram.

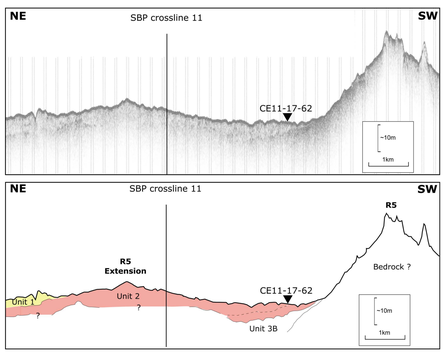

Figure 5: Section of INSS Sub-Bottom Pinger line 5129 with associated interpretation diagram and projected location of core CE11-17-62

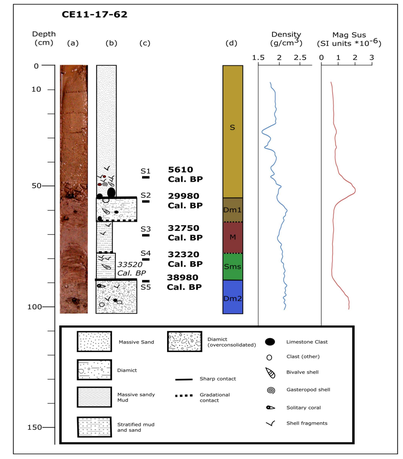

Figure 6: Description of core CE11-17-62: (a) real colour picture, (b) sediment, (c) location of subsamples, (d) summary lithofacies description with MSCL density and magnetic susceptibility scan.

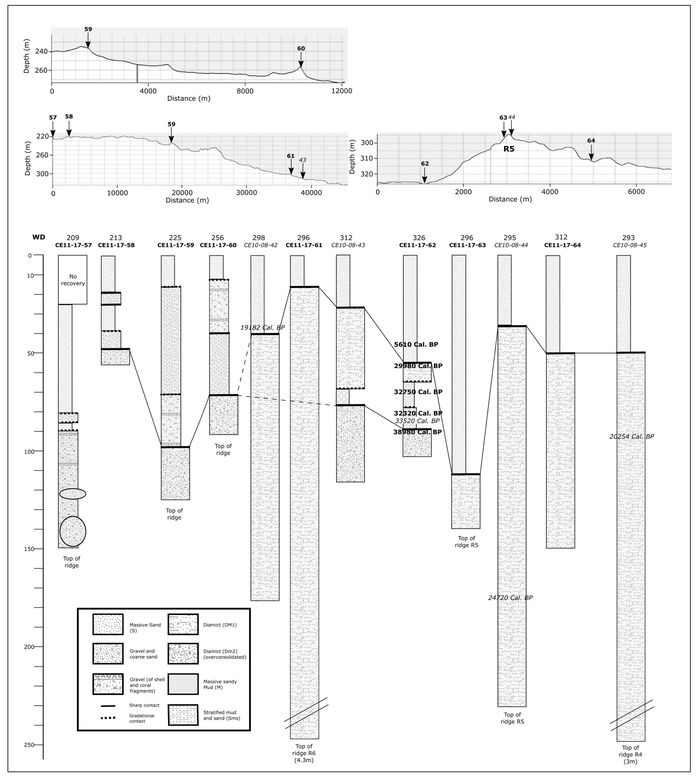

Figure 7: Summary core logs with associated dated samples. Three topographic sections show the locations of the cores described in their local context. Cores from the Peters et al. (2015) study are in italic. Dates obtained from macrofossils are also in italic.

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