

# EXCESS PRESSURE & RESERVOIR COMPARTMENTALIZATION IN THE PORCUPINE BASIN (IRELAND) & SABLE SUBBASIN (NOVA SCOTIA)

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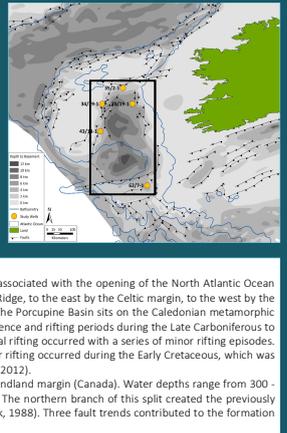


## I INTRODUCTION

**Statement of Motivation**  
 Pressures in pore spaces of rocks are crucial for petroleum exploration and production. However, the sudden onset of excess pressure when drilling is a potentially dangerous situation if not properly identified, understood, and managed. Increased understanding of the geological context and contributing factors to excess pressure in pressure cells or compartments can reduce drilling and environmental risks, and financial costs during exploration and development of offshore resources. Excess pressure has been identified as a poorly understood risk element in the Porcupine Basin, with limited previous study. Pressure data has been collected in several wells, providing a preliminary dataset to begin investigating pressure behaviour in the basin. The results for the Porcupine Basin have then been compared to a previously completed study on the Sable Subbasin, which had a more robust dataset for analysis.

**Study Area**  
 The Porcupine Basin is a deep water basin located on the continental margin, southwest of Ireland, and is part of a series of interconnected basins related to a failed rift structure associated with the opening of the North Atlantic Ocean (Ryan, Helland-Hansen, Johannessen, & Steel, 2009). The basin trends north-south and is an area of approximately 60,000 km<sup>2</sup>. It is bordered to the north by the Slyne Ridge, to the west by the Porcupine Bank, and to the south by the Goban Spur. Water depth in the basin ranges from 400 m in the north to over 3000 m in the south (Dorschel, Wheeler, Montey, & Verbruggen, 2010). The Porcupine Basin sits on the Caledonian metamorphic basement and comprises up to 12 km of sedimentary material from Late Paleozoic to Quaternary (Ryan, Helland-Hansen, Johannessen, & Steel, 2009).

**Objectives**  
 The objectives of this study were to: (1) resolve the behaviour of excess pressure within the Porcupine Basin, (2) determine how excess pressure may be migrating and dissipating, and (3) clarify the role of faults and fault juxtaposition of permeable units with respect to (1) and (2). This study utilized Petrel™, Techlog™, and Microsoft Excel™ to complete the analysis.



FORMATION	AGE	THICKNESS (m)	DESCRIPTION
PLIOCENE	5.3-2.6	10-20	Claystone, Sandstone
QUATERNARY	0-0.02	0-10	Clay, Silt, Sand
CHALK	110-115	10-15	Chalk
UPPER CRETACEOUS	115-145	30-40	Claystone, Sandstone
MIDDLE CRETACEOUS	145-160	15-20	Claystone, Sandstone
LOWER CRETACEOUS	160-180	20-30	Claystone, Sandstone
TRIASSIC	250-252	2-3	Sandstone
PERMIAN	252-260	8-10	Sandstone, Shale
DEVONIAN	260-360	100-100	Sandstone, Shale
CARBONIFEROUS	360-400	40-40	Sandstone, Shale
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