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## Geological history and the development of Brendan's dome

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A dome-shaped structure "Brendan's dome" (also referred to as Ben Nevis) lies beneath a Late Paleocene thin basalt layer approximately 200 km north of Shetland Island. This feature was modelled by Shell/BPA using high resolution gravity and magnetic datasets, which reflected a large gravity and magnetic anomaly. Conclusion from this survey were made that, although the anomalies were generated from the igneous intrusive, Brendan's dome is also composed of sedimentary material. The 3D seismic survey over Brendan's Dome was subsequently acquired to improve the imaging of the sub-basalt dome and also to display fine details of the intra-basalt structure.

The structure was penetrated by well 219/12-1A to test its hydrocarbon prospectivity. The likely geological scenario, assembled prior to drilling was that, the structure contained shale, sand, some volcanic and isolated limestone stringers of Mid to Lower Cretaceous age, but drilling results gave a different scenario. The alternative interpretations after drilling included a structure containing only shale, volcanic, intrusive volcanic or limestone. Up to date the origin of the perhaps unique Brendan's dome is unknown. Perhaps it is sensible to pay attention to the regional tectonic history, volcanic activities in the area, and features such as intrusion-related vent structures found within the overlying basalt and near the Paleocene-Eocene transition. This will Help to understand the age relationship by constrain the approximate timing of these events and duration of hydrothermal activity and in the end providing possible scenarios to explain the phases of development. These structures and their timing of formation have important implications for basin scale processes including tectonic events resulting in the formation of this structure.

This project is aimed at looking at likely discrete phases of volcanic intrusion that took place at different periods in time and possible mechanisms involved and create a model for development of the Brendan's dome. This is done through seismic interpretation, by looking at any feature such as vent structures, igneous intrusion and any possible effects of volcano in its structural development.

After considering several models for the formation of Brendan's dome, the most preferred model is that the dome structure was probably formed by localised inversion of a cretaceous graben fill during the first phase of igneous intrusion that initiated the uplifting of a Permo-Triassic fault block

