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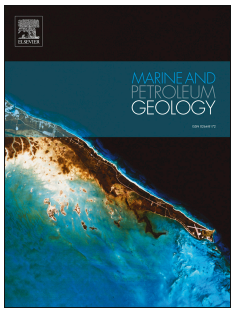

Repeated post-Caledonian intra-cratonic rifting in the central North Sea: Evidence from the volcanic record in the Embla oil field

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Repeated post-Caledonian intra-cratonic rifting in the central North Sea: evidence from the volcanic record in the Embla oil field

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Key words: North Sea; Embla oil field; volcanism; geochemistry; HFS element signature

Abstract

Intrusive and extrusive mafic igneous rocks in the Embla oil field, central North Sea, testify to repeated post-Caledonian magmatism on the northern flank of the Mid North Sea High. The igneous rocks are highly clay- and carbonate-altered, but retain their High Field Strength element signatures on the sample scale. These signatures are used to group, classify and investigate the tectonic significance of the rocks. Three magmatic events are identified. Late Devonian transitional basalts are interpreted as part of a bimodal volcanic assemblage that includes ca. 375 Ma alkali rhyolites, suggested to record rifting in a proto-Central Graben. Early Permian volcanic and hypabyssal alkaline rocks in the Embla oil field display lamprophyric traits and represent low degree melts. They likely correlate either to ca. 300 Ma lamprophyre magmatism leading up to, or ca. 298-292 Ma alkaline magmatism in the Midland Valley - Southern Uplands coeval with the northwest European magmatic flare-up at

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