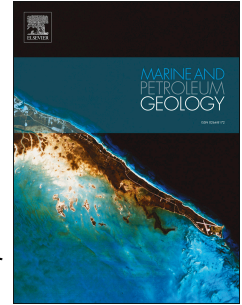


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The importance of sill thickness and timing of sill emplacement on hydrocarbon maturation

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Abstract

Magmatic sills in sedimentary basins can be relatively easy to interpret on seismic data because they stand out due to their high acoustic impedance in relation to the sediments. However, determining sill thickness is challenging unless the sills are drilled. This study explores the influence of magmatic sill thickness and timing of emplacement on temperature and hydrocarbon maturation in sedimentary basins. A 230 km long 2D transect through the Vøring Basin in the Norwegian Sea is modeled and sill thickness and timing of emplacement are the only parameters varied. The transect holds ~ 40 sills that intruded at ~ 55 Ma with a temperature of 1000 °C in a shale-dominated sequence. Several sill thickness scenarios were tested, but results for 0 m (no sills), 50 m and 100 m are presented here. Furthermore, the 50 m and 100 m thick sills were tested to intrude as upper and lower clusters separated by time intervals of 10 and 100 kyr. To study the effect of sills below seismic resolution, 1D modelling of well 7316/5-1 in the Barents Sea was performed. This well contains 9 sills distributed in an upper and a lower group. Vitrinite reflectance data from the well allow

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