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Helge Løseth[1], Lars Wensaas[1], Børge Arntsen[1], nils martin hanken[2], Basire Christophe[1], Knut Gaue[3] (1) Statoil research centre, Trondheim, Norway (2) University of Tromsø, Tromsø, Norway (3) Statoil, Forhus, Norway

1000 Meter Long Gas Blow-Out Pipes

A cluster of circular depressions with underlying pipe-like structures has been observed on 3-D seismic data in the southern Niger Delta slope. The aim of this paper is to describe the seabed craters and associated pipe structures and to suggest a formation model with reference to outcrop analogues on Rhodes, Greece.

A cluster of approximately 100 large craters, 100 m to 500 m in diameter, is observed at seabed in a 65 km2 large area. The craters are located above a dome defining a 4-way closure. An active N-S striking transtensional fault is subdividing the dome structure that is located just south of a southward moving thrust plane. Cone structures and underlying thin pipe-like noise zones are observed below the craters. A typical crater is 20 m deep and 300 m in diameter, the underlying cone is approx. 60 m deep, and the pipe-like noise zones can be traced continuously approximately 1000 m down to interpreted sandy reservoir. The seismic anomalies are interpreted as a scaled up version of near circular fracture pipes in Plio-Pleistocene clay cropping out at the Greek island of Rhodes. Seismic modelling proves that such structures should be visible on seismic data. The pipes are believed to have developed by a rapid pressure increase in the reservoir, most likely related to fault activity. The pipe outcrops prove the existents of naturally hydraulic fracture pipes forming in relatively soft clay cap rock. The seismic observations indicate that similar scaled-up processes are ongoing in hydrocarbon related systems today.