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Poster

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Imaging the 3D seismic velocity structure of the Scanner pockmark, central North Sea

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Carbon dioxide capture and storage (CCS) has proven to be an important mitigation strategy to reduce CO2 emission and combat the increase of potential greenhouse gases in our atmosphere. However, natural fluid migration structures such as pipes and chimneys close to possible deposits are potential leakage pathways for CO2. The detailed structure and the physical properties of these fluid migration structures are poorly understood and may be highly variable. Here, we present a detailed 3D seismic refraction tomography of the pipe structure beneath a large pockmark in the central North Sea (Scanner Pockmark) using high resolution ocean bottom seismometer data. Our results show that the seismic velocities below the pockmark are about 200 m/s slower than to the surrounding strata. The zone of low seismic velocities extends from the seafloor down to at least 600 m depth below the seafloor. This broadly coincides with a seismic amplitude anomaly observed in 3D reflection seismic data although the velocity anomaly covers a wider area. Based on the velocity reduction we propose that the pipe structure represents a network of open fractures that may be partially filled with gas. The observations suggest that the Scanner pockmark was formed by fluid and gas emission through a deep-seated pipe structure that is still an open pathway for fluid advection.