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Extending the life of mature basins in the North Sea and imaging sub-basalt and sub-intrusive structures using seismic intensity monitoring.

Luca De Siena and Nicholas Rawlinson

School of Geosciences, University of Aberdeen, Geology and Petroleum Geology, Aberdeen, United Kingdom (lucadesiena@abdn.ac.uk)

Non-standard seismic imaging (velocity, attenuation, and scattering tomography) of the North Sea basins by using unexploited seismic intensities from previous passive and active surveys are key for better imaging and monitoring fluid under the subsurface. These intensities provide unique solutions to the problem of locating/tracking gas/fluid movements in the crust and depicting sub-basalt and sub-intrusives in volcanic reservoirs. The proposed techniques have been tested in volcanic Islands (Deception Island) and have been proved effective at monitoring fracture opening, imaging buried fluid-filled bodies, and tracking water/gas interfaces. These novel seismic attributes are modelled in space and time and connected with the lithology of the sampled medium, specifically density and permeability with as key output a novel computational code with strong commercial potential.