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**MAGIC Breakthrough in Surface Multiple Elimination on Ormen Lange**

The Ormen Lange field was discovered in 1997 and is the second largest gas discovery offshore Norway with estimated reserves of 400 billion Sm<sup>3</sup>. Situated in 1000 m water depth, it is Norway's first commercial deep-water discovery.

The field is located under a huge slide with extremely rough seabed topography. Diffraction multiples caused by the seabed deteriorate the seismic data significantly. Previous efforts to improve the Ormen Lange 3D survey were not satisfactory. Despite direct hydrocarbon indicators, uncertainties remained in the reservoir definition. For the development, a better definition of the reservoir segmentation was required.

The Ormen Lange partners recommended reprocessing with Pre-Stack Depth Migration and a benchmark of demultiple techniques. This included Shell's MAGIC3D, previously untested in production processing and the industry's first 3D surface multiple elimination method. Wavefield sampling and computing requirements were major challenges for MAGIC3D, but its feasibility and superior results were demonstrated in the benchmark. As a consequence, Shell was awarded the reprocessing of the 1400 km<sup>2</sup> survey.

The new data shows dramatic improvements. The combined effect of advanced multiple elimination and depth migration resulted in significantly enhanced continuity of the Paleocene reservoir. The fault imaging improved considerably, enabling accurate fault throw analysis and reducing segmentation uncertainties. The improved fault positioning confirmed the production test of an appraisal well for the first time on seismic. The Ormen Lange MAGIC3D reprocessing is a compelling example for the value of leading edge seismic technology in deepwater frontier areas and will form the basis for the field development.