# Results and regional context of outcrop samples and shallow cores on the outer continental margin of the Norwegian Sea.

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Presence of basaltic volcanic rocks severly hampers seismic imaging of the pre-Eocene strata in the western part of the Norwegian Sea. Therefore, very little information is available regarding the sub-basalt strata. In order to obtain geological more information from this geological province, the Norwegian Petroleum Directorate (NPD) decided to carry out a rock sampling program in the area.

In 2013, the NPD in collaboration with the University of Bergen conducted seafloor sampling along the steep escarpment formed by the Jan Mayen Fracture Zone along the southern flanks of the Vøring Marginal High and the Vøring Spur. The sampling sites include the southern termination of the Gjallar Ridge. The operations was carried out by using a remotely operated underwater vehicle (ROV). The ROV was equipped with a hydraulic chain saw, making it possible to sample directly from the exposed outcrops. In the Vøring Marginal High, the sampling proved intrusives, in part dacitic, intercalated by mudstones of Late Cretaceous age. Mudstones of the same age in rock falls adjacent to alkaline basalts in the Vøring Spur escarpment indicate that parts of this spur may be of continental origin. The bare rock surfaces are ubiquitously covered by manganese crust.

In 2014, the NPD carried out a shallow drilling program in more than 2000 meters water depth on the Møre Marginal High. The objective was to acquire further knowledge about the geological evolution of this structural element and its delta like features in these outermost, deepwater parts of the Norwegian Sea.The cores showed massive Eocene hyaloclastites representing volcanic deposits in direct contact with water, which seems to make up large parts of the lava deltas that form the Møre and Vøring Escarpments.

The results points to a complicated continental break-up and early ocean spreading history of the Møre-Vøring Margin. It shows the need for more detailed understanding of the interaction between the seafloor spreading and the broad Jan Mayen Fracture Zone system. The individual timing of a set of separate, minor spreading segments within this fracture zone system seems to be of particular interest. In general, the results may also have implications for the understanding of the evolution of the geology at sub-volcanic levels in the Jan Mayen Micro-Continent.