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Sedimentological and stratigraphic evolution of synrift silicoclastic shallow marine environments (Halten Terrace, Norwegian Sea, Middle Jurassic to Lower Cretaceous)

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The terrigenous formations of passive margins are significant hydrocarbon reservoirs. They result in particular from synrift deposits in shallow environments alternating coastal and deltaic processes. These deposits are well represented on the Halten Terrace in the Norwegian Sea. However, the geometry of the sedimentary bodies, the spatial distribution and the continuity of the sandstones and conglomerates are poorly characterized for the southern part of the terrace, and the reservoirs remain difficult to model. To better constrain these formations and their architecture, we conducted a sedimentological and stratigraphic study using interpreted seismic data (3D seismic cube), logs, and detailed descriptions of sedimentary cores (~ 500m). We identified 11 sedimentary facies, showing an alternation between a wave-dominated coastal paleoenvironment and a subaqueous delta environment. We determined 7 stratigraphic sequences with their sequence boundaries (SB) and maximum flooding surfaces (mfs). We constrained their ages by biostratigraphy (dinocysts). In addition, we characterized a set of seismic horizons and key faults. Our results confirm that synrift environments are controlled as much by tectonic activity as by sea level variations and climate change. Relay ramps deliver sediments to coarse-grained deltas along major active faults. But in the case of minor or less active faults, wave-dominated coastal environments develop. Thereby, at the end of the rifting, sea level rise combined with aridification of the climate favour wave-dominated beach systems at the expense of deltas.

Mots-Clés : Coarse-grained deltas, biostratigraphy, sequence stratigraphy, rift-climax

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