



Sediment Dispersal in The Kobbe Fm. Shelf (Hammerfest Basin, Sw Barents Sea)

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The Barents Sea is a frontier basin with areas, like the Hammerfest Basin, of proven hydrocarbon potential. However, the Hammerfest Basin presents several intervals, in particular the Triassic, whose depositional history and sedimentary systems are still not well understood.

This study focuses on the Anisian-Early Ladinian Kobbe Fm, which represents one of the sedimentary wedges infilling the basin from the East and from the South. This work is based on seismic data, well logs and on a process-based investigation of available cores.

Images from 2D seismic lines show the development of shelf margin clinoforms up to 300 m thick, and shelf-edge trajectory analysis reveals the occurrence of intervals with ascending trajectories and intervals with flat/descending trajectories, during which sediment can be bypassed to deep-water areas. The growth of the Kobbe Fm. shelf-margin prism was generated by repeated cross-shelf (regressive-transgressive) transits of deltaic systems. Mapping of the shelf-edge locations shows that the shelf-margin prism prograded ca. 30-50 Km in a north-westward direction. The farthest basinward extent of the sedimentary prism appears to have been controlled, at least in part, by the topographic relief of the paleo-Loppa High, as the bottomsets pinch out against this structural high. The plan-view layout of the latest shelf-edge positions is characterized by some marked protrusions of the shelf edge, which can be associated to sediment fairways.

In the Kobbe Fm. shelf-margin prism, shelf, deltas, coastal plain, estuarine and deep-water slope and basin floor environments are present. On the shelf, during the regressive transits of deltaic systems, deltaic and coastal plain deposits prograded, potentially reaching the shelf edge position. During retrogradation of the system, transgressive deposits formed on the shelf (including estuaries and lagoon/barrier islands), as confirmed by core analysis. This work recognizes, for the first time, the presence of thick transgressive packages within the Kobbe Fm., represented by fluvial/estuarine sequences. The estuarine sequence at the top of the Kobbe Fm. is up to 50 m thick, and it is interpreted as stacked estuarine valley fills. In the Goliat area, the presence of an expanded sedimentary sequence, compared to adjacent areas, suggests a tectonic control in this area. Tectonic activity may have also influenced the development of stacked estuarine valleys in the same location, therefore controlling sand storage on the shelf during transgressive phases, and sediment routing farther into the basin during regressive phases. This work shows how the ultimate sediment sink in this basin is dependent on the regressive-transgressive cyclicality. During regressive phases the sink is the shelf edge and basin floor, whereas during transgressive phases the sink is the shelf.