

Syn depositional faulting in the Late Triassic succession of Kvalpynten, Edgeøya, East Svalbard

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The Late Triassic De Geerdalen Formation, exposed in Kvalpynten on Edgeøya (East Svalbard) comprises two parts: a faulted array of half-graben basins with a complex stratigraphic architecture related to syn depositional faulting, and an overlying, less disturbed, deltaic or estuarine succession. The seismic-scale (ca. 8 km x 500 m) cliff exposure allows detailed analyses of the sedimentary architecture within individual half-grabens, along with the identification of sedimentary facies assemblages. The basin-bounding faults are generally E-W to NW-SE-trending, with a subordinate NE-SW trend. These faults show listric appearance, ductile character and displacements in the order of meters to tens of meters, flattening and soling out in the basal shale interval. Some more brittle, deeply rooted, sharp faults without evidence of rotation are also observed. The half-graben successions consist of unconformably stacked and interfingering composite sandstone bodies arranged in coarsening and thickening upward units up to tens of meters thick, reflecting different stages of fault growth. The component layered wedges of fine-grained sandstones, heterolithic strata and mudstones thicken towards the footwall and are overlain by sandstone units that show apparent lateral progradations in the hanging wall direction. These are, in turn, capped by several meters of thick, massive sandstone wedges that thicken towards the footwall. The sedimentary structures observed in the composite sandstone units are: 1) symmetrical wave ripples, 2) reworked current ripples and 3) small-scale, trough- (sigmoidal?) and planar cross-bedding. Bidirectional foresets has been observed locally, and hummocky cross-stratified beds occur within the mudstones, especially in the lower half of the succession. Heterolithic intervals are commonly intercalated within the composite sandstone bodies, displaying wavy, lenticular and/or flaser bedding. The overlying draping sandstones display more laterally continuous bedsets, channel infills and localized meter-scale clinofolds. The main inferred sediment transport is approximately towards the west, consistent with the overall direction indicated by larger bedforms. The sedimentary unit draping the half-grabens appears also to have been sourced from the east. In this framework, the lower De Geerdalen Formation exposed at Kvalpynten reflects mixedshallow marine conditions with combined tidal to distal deltaic/estuarine influence that prevailed within the half-grabens, whereas a west-northwestward deltaic progradation seems to characterize the upper part. The origin of these structures has been recently attributed to the reactivation of Paleozoic basement-rooted fault zones during the Uralide foreland deformation, in turn promoting the development of the shallower synsedimentary faults in the upper Triassic section (Anell et al., 2013).

Anell I., Braathen A., Olausen S., Osmundsen P.T. 2013. Evidence of faulting contradicts a quiescent northern Barents Shelf during the Triassic. *First Break*, 31, 67-76.