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Tectono-stratigraphic evolution of Late Cretaceous basins into Veslemøy High, SW Barents Sea

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The Veslemøy High is located in the southwestern sector of the Barents Sea and its geological evolution is strictly linked to the geodynamic development of the Norwegian continental margin. In order to reconstruct the geological history of the Veslemøy High area, this study used well data that is integrated with multiple 2-D and a 3-D seismic data . The methods applied here include seismic-well data calibration, seismic interpretation of several horizons and faults, and multiple seismic attributes analyses. Our results showed that the Veslemøy High has been affected by several phases of compressional and extensional tectonics. The oldest compressional phase is Late Cretaceous and clearly evident by large-scale anticlines and synclines (ca. 10 km in wavelength). Following this phase, the tectonic framework of the area consists of a system of mainly west-dipping normal faults and half graben. In some cases, these grabens show evidences of slight tectonic reactivation. In particular, seismic facies analyses of two Late Cretaceous sub basins provides interesting indications of sediments infilling history, depositional environments, lithofacies identification and the description of deformation phases. The Lower Regional Unconformity (LRU) is a key stratigraphic and tectonic marker across the Veslemøy High providing proof for regionally uplift during the early Paleogene. In addition, folding of the LRU signified a post-Eocene compressional phase followed by the development of the present-day passive margin. This study demonstrates the importance of the Late Cretaceous basins for reconstructing local and regional geodynamic and tectonic events.