

DOCTORAL CANDIDATE: Irfan Baig
DEGREE: Philosophiae Doctor
FACULTY: Faculty of Mathematics and Natural Sciences
DEPARTMENT: Geosciences
AREA OF EXPERTISE: Petroleum Geosciences
SUPERVISORS: Jan Inge Faleide, Jens Jahren, MD Nazmul
Haque Mondol
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DISSERTATION TITLE: *Burial and thermal histories of sediments in the southwestern Barents Sea and North Sea areas: evidence from integrated compaction, thermal maturity and seismic stratigraphic analyses*

Kunnskap om begravelse og den termiske historien til sedimenter er viktig for å kunne anslå sannsynlige petroleumsressurser. I avhandlingen er det undersøkt områder i Barentshavet og Nordsjøen, og studien viser at opptil 1–3 km med sedimenter er blitt erodert fra bassengkantene i øst for begge bassengområdene, og at disse er deponert i de dype bassengområdene i vest. Dette skjedde i løpet av flere perioder med avsetninger og heving de siste 23 millioner årene. En ytterligere årsak for erosjonen har vært isdekket i kvartærtida.

The southwestern Barents Sea shelf and the North Sea basin margin cover a huge area, and so far only a small fraction of the total area has been explored. This thesis is focused on the Barents Sea and the North Sea areas. It is shown that up to 1-3 km of sediments are eroded in the margin areas to the east of both basins and subsequently deposited in the deep basin areas to the west. This has been caused by several periods of uplift and erosion in the last ~23 million years. Another reason for erosion is extensive glaciation and deglaciation of these areas during the Quaternary.

A better understanding of late burial and exhumation histories of the sediments is important for targeting hydrocarbon exploration. Uplift and erosion can have diverse effects, both positive and negative, on the rock properties and petroleum system prospectivity. The thesis presents work on formerly deeply buried basins and contributes to the understanding of the burial and thermal histories of the areas.

This study used an integrated approach based on compaction, thermal maturity and seismic stratigraphic analyses to investigate the distribution of exhumation across the study area. Potential driving mechanisms for the observed distribution, timing and magnitudes of exhumation were identified and the implications of exhumation results for hydrocarbon exploration and its effect on physical properties of rocks were discussed.

The Ph.D. thesis work was carried out at the Department of Geosciences, University of Oslo.