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Nýtt innan vísindi 2004

Fríðbjørg Biskopstød

Cenozoic structural and stratigraphic development of the Faroe-Shetland Basin and Faroe Graben

Ph.D.-thesis at the University of Edinburgh, Dep. of Geology and Geophysics, 13 December 2004.

Seismic stratigraphic analyses of the late Palaeocene-Present transitional to post-rift succession in the Faroe-Shetland Basin and Faroe Graben (FSC) on the NE Atlantic volcanic passive continental margin have revealed the occurrence of an Early Eocene dendritic palaeo-drainage system and Middle Eocene-Miocene contractional inversion structures.

The palaeo-drainage system consists of a significant NNW-SSE trending distributary channel (40km long, 5km wide and up to 400m deep), fed by numerous tributaries (100m deep). The drainage system incised into a major delta system (Colsay Sandstone Member) and was subsequently infilled and draped by estuarine deposits (Hildasay Sandstone Member and Balder Formation). The excellent preservation of the palaeo-valleys indicates that uplift, incision and subsequent infilling of the drainage system occurred relatively rapid (biostratigraphically constrained to ca. 1 My). The uplifting responsible for the incision event (at c. 54.7 Ma, earliest Ypresian) was widespread and extends as far as the North Sea (Bressay area) and SE England (London Basin). Furthermore, coeval volcanic activity is consistent with the drainage system having resulted from transient uplift driven by a mantle-plume. This transient uplift event (incision and infill) in the FSC provides important new evidence for the evolution of the ancestral Iceland mantle plume and its influence on stratigraphic development.

The inversion structures, developed in Middle Eocene, Oligocene and Middle Miocene, are marked by folding with the syn/post inversion stratigraphy onlapping and thinning over the structures. The location and orientation of the inversion structures suggest that the underlying Mesozoic structural configuration, especially the NW-SE transfer zones, influenced their development. Temporal and spatial relationships between the inversion structures in the FSC and similar structures identified along the length of the NW Atlantic margin suggest that a complex interaction of different forces (related to plate-reorganizations and plume activity) acted in concert and are responsible for their generic development. The timing and na-

ture of the movement of the inversion structures in the FSC provide new temporal constraints which help to understand better the controlling mechanism of passive continental margins.

Jákup Reinert Hansen,
Mellem kor og skib. Jacob Dahls færøske postiller.
(477 p. mit deutscher Zusammenfassung)
Føroya Fróðskaparfelag, Supplementum XXXIX. Tórshavn 2004.

Ph.D.-ritgerð vard á Det teologiske Fakultet. Aarhus Universitet 26. aug. 2004.
Jákup Reinert Hansen, Between Chancel and Nave. Jacob Dahl's Faroese Church Postils. Ph.D.-thesis. The defence took place at Faculty of Theology. University of Aarhus. Denmark on 26th August 2004.

Samandráttur

Jacob Dahl, próstur, (1878-1944) er alment viðurkendur sum faðir at tí føroyska kirkjumálinum. Nýggja Testamenti, kirkjunnar altar- og ritualbøkur, Luthers lítla katekismus og nógvir sálmar verða framvegis nýtt, soleiðis sum tey vórðu sett í gildi í hansara umseting. Haraftrat hevur hann mýkt tað føroyska málið og lagað tað til sum prædikumál. Hetta kemur til sjóndar í teimum nógvu talum og prædikum, hann helt á føroyskum máli og seinni gav út. Fremstar teirra millum eru tær báðar lestrabøkurnar *Í lýsing* frá 1934 og *Meðan hildið verður heilagt* frá 1948, sum her verða viðgjørdar.

Tær prentaðu prædikurnar verða í ritgerðini samanbornar við upprunahandritini og tulkaðar við at greina týðandi hugtøk í teimum. Gjøgnumgongdin er trinitariskt skipað á sama hátt sum hin apostólska trúarjáttanin og sálmabókin.

Eftir at hvør trúargrein er tulkað, verður mett um úrslitið eftir einum modelli, sum í sínum uppruna stavar frá týska gudfrøðinginum Schleiermacher, men verður sett fram av Dahl sjálvum í prædikuni, sum hann helt í Havnar kirkju 1. sunnudag í advent 1934. Dahl nýtir kirkjurúmið við kóri, skipi og altari sum fyrimynd, tá ið hann skal lýsa, hvat ein prædika er.

Kórið ímyndar í hesum høpi Guðs orð og gudfrøðina, og víst verður á, at Dahl ikki sum væntað í serligan mun er ávirkaður av eldri, lutherskt ortodoksari ella pietistiskari læru. Heldur er tað undirvísingin á lærda háskúlanum í Keypmannahavn við lærarum sum Peder Madsen, C. Henrik Scharling og V. Ammundsen, sum hevur dánað gudfrøði hansara: ein liberal gudsfatan, ein subjektiv sáttargerð, eitt trúarlív, sum í stóran mun byggir á egnar kenslur og royndir, sinnalagsetikkur.

Skipið ímyndar bæði í Dahls prædikufatan og í hesi tulking kirkjufólkið,

meinigheitina ella áhoyrararnar. Hvørt ættarlið eigur at fáa orðið boðað á tann hátt, sum hóskar til tíðarskeið tess, sigur Dahl, og hetta sjónarmið sæst aftur í tí kontekstualiteti, sum sermerkir prædikur hansara. Hetta eru prædikur, sum eru hildnar í Føroyum, og tað sæst aftur hjá Dahl. Lívið á hesum oyggjum við sínum gleðum og sorgum, tað viðbrekna fiskivinnusamfelagið, aktuellar hendingar bæði uttan úr heima og her á klettunum, náttúrufyribrigdi sum tiltak - alt hetta gevur prædikum hansara ein serligan, heimligan dám. Dahl stendur í so máta eisini í skuld til stórar, samtíðar prædikumenn sum Th. Klaveness og Olfert Ricard, hóast hesir tala inn í sítt norska ella donska umhvørvi.

Prædikustólurin, sum í teimum føroysku kirkjunum stendur á markinum millum kór og skip, kemur sum tað triðja rákið í prædikunum at ímynda prestin sjálvan. Áðrenn prestur kann boða orðið til onnur, má hann hava hoyrt tað sjálvur, og tískil slepst ikki undan, at hansara egnu lívsroyndir, hansara kenslur, hansara persónligi stílur og hjartalag fáa ávirkan á, hvussu hesar prædikur verða bornar fram.

Av tí at prædikurnar, sum eru prentaðar í *Í lýsing* og *Meðan hildið verður heilagt*, eru valdar út og lagdar til rættis at verða lisnar sum lestrar, hevur verið hildið, at tað var ein almenn gudfrøði, sum ráddi í teimum, at tær vóru tíðarleysar, og at høvundurin í størstan mun gav seg sjálvan til viks. Ritgerðin sýnir, at hetta er ikki so, og at tað beinleiðis er samspælið millum kórið, skipið og prædikustólin, sum í hesum føri avger tað snið, innihald og endamál, hesar prædikur fáa. Mest eru tær átøkar tí, sum við Niebergall verður kallað "Hin modernaða prædikan." Í niðurstøðuni verður tí tikið undir við Blicher-Winther, sum til jarðarferðina hjá Jacob Dahl metti, at lestrar hansara komu at verða nógv lisinir, av tí at orð hansara í teimum fóru at koma til hjørtuni

í móðurmálsins heimliga búna,
við sannførandi hjartahita,
við hjálp og troyst úr erva.

Summary

The dean Jacob Dahl (1878-1944) has been widely recognised as the father of the Faeroese church language. The New Testament, the agenda and rituals, Martin Luthers Little Catechism, and a number of hymns are still being used, as they were authorised in Dahl's translation. He also moulded and shaped the faeroese language so that it could be used in preaching. This is evident in the large amount of sermons that Dahl preached in Faeroese and later published, culminating in two volumes of homilies intended to be read aloud in the lay preachers' services, *Í lýsing* from 1934 and *Meðan hildið verður heilagt* from 1948, which are the subject of this research.

In this thesis the printed sermons are compared with the original manuscripts and significant terms are analysed in the trinitarian disposition known from The Creed of the Apostles and the Hymnal of the Faroese Church.

Having analysed the articles of the faith the result is again scrutinised according to

a model which originates to Schleiermacher, but has been presented in a unique way by Dahl himself in his sermon in Tórshavn on the first Sunday in Advent 1934. In his homiletical distinction Dahls makes use of the Faeroese church with its chancel, nave, and pulpit.

In this connection the chancel is said to symbolise the Word of God and the theology. The investigation shows, however, that Dahl is not significantly influenced by an older, lutheran orthodox or pietistic conception of the faith as claimed by previous scolars. He has rather been affected by professors like P. Madsen, C. Henrik Scharling, and V. Ammundsen, whom he heard during his studies at the University of Copenhagen. His sermons reveal a liberal conception of God, a subjective understanding of the atonement, a faith that is at large based on subjective feelings and experiences, and an ethics of the mind.

Furthermore the nave is seen as a symbol of the congregation or the listeners. Dahl claims that the Gospel must be announced to every new generation in its own way, and this understanding is obvious in the strong element of contextuality that caracterises his sermons. Clearly his sermons have been preached in the Faeroes. The conditions of island life with its joys and sorrows, the fragile structures of the fishing society, actual events abroad or at home, nature as a metaphor of the heart - all these elements render a clearly felt homely touch to his preaching. In this matter Dahl is indebted to men like Th. Klaveness and Olfert Ricard, great nordic preachers of his days, who addressed their Norwegian or Danish context in a similar way.

In the Faeroese churches the pulpit is always placed at the border between the chancel and the nave, and this dialectical position describes the third aspect of the sermon: the preacher himself. The preacher must have heard the message of the Word, before it can be announced to others, and so it is inevitable, that the experiences of life and faith and emotions, the personal style and mood of the preacher have a deep inpact on the way, the sermons are shaped and presented.

Since the sermons published in the volumes *Í lýsing* and *Meðan hildið verður heilagt* were edited for the purpose of the readers' service, it has been presumed that they were characterised by a general theological understanding and a timeless form, and that the preacher had anonymised himself as well as possible. The thesis show that this was not the case. On the contrary it is the specific interplay between chancel, nave, and pulpit that has determined the shape, content, and purpose of these sermons. They tend to be "modern sermons" in the way described by the German homiletician Niebergall. The conclusion can fully agree with Blicher-Winther, who at Dahl's funeral foresaw, that his sermons would be read for many years to come, because they brought his words to the hearts

In the homely dress of the mother tounge,
with the convincing heat of the heart,
with help and comfort from above.

Hjálmar Hátún

The Faroe Current

Ph.D.-thesis at the University of Bergen, Norway.

The Atlantic inflow is of key importance for the marine ecology in the Nordic Seas and for the climate in the countries surrounding these waters. This thesis focuses on the large inflow branch between Iceland and the Faroe Islands, but the inflow between the Faroes and Scotland is also discussed.

Comprehensive hydrographic and current data, obtained along a north-south standard section crossing the Faroe Current to the north of the Faroes, have been analyzed. The principal patterns of hydrographic and current variation along this section were identified. These represent a pulsation in the near core current velocities, lateral fluctuations of the current core and vertical movements of the main pycnocline, which constitutes the sub-surface signature of the Iceland-Faroe Front in the region. A connection was found between the current mode representing the lateral fluctuations and the hydrographical pattern linked to the vertical movement of the pycnocline. Daily information on the temperature and the salinity fields was obtained from the current field via this relation.

Combining the current data and the additional hydrographic information, a relatively accurate volume transport estimate of the Atlantic inflow could be obtained. The mean transport for the period July 1997 to June 2001 was estimated to be 3.5 ± 0.5 Sv (1 Sv = 10^6 m^3s^{-1}). The eastward (downstream) current velocities are largest in March-April, but the spatial coverage of Atlantic water is also smallest during this period, resulting in an Atlantic water transport with only a weak seasonal signal. Most transport variation was seen at timescales between a half and two months, but a secondary peak in the spectrum was found at five to seven days. A reversal of the flow with transport towards the west was not observed, illustrating the persistency of the Faroe Current. The transport was not found to be correlated to wind, wind stress, or sea surface air pressure.
The potential of using sea level gradients for transport estimation has been examined. This approach was not found to be viable unless other monitoring as e.g. seabed pressure, inverted echo sounders or similar is conducted concurrently. The possibility of using the Nansen Center version of the Miami Isopycnal Coordinate Ocean Model (MICOM) for transport estimation was likewise studied. Some of the observed transport variability is correctly simulated, but the model is not yet at the stage where it can replace the current observations. The relatively expensive current profilers are thus the only option for reliable transport estimation at present.

Regular fluctuations with periods between four and seven days are identified

in the Atlantic inflow. Similar oscillations were also observed throughout the water column under the Faroe Current and as deep as 1700 m. These oscillations are explained as southward propagating Topographic Rossby waves impinging onto the Faroe Slope. A simple two-layer analytical model explains the salient features of the current intensification and the vertical pycnocline deflection as the wave propagates onto the slope. The waves may influence the bifurcation of the Faroe Current at the northeastern corner of the Faroe Plateau.

This bifurcation is decisive for how much of the Atlantic water, enters the slope current west of Norway and how much continues in the outer branch of the Norwegian Atlantic Current. It may also influence, how much ends as the recirculated Faroe Current in the Norwegian Sea and how much continues all the way to the Arctic regions. Significant correlations were found between current measurements to the north and to the east of the Faroe Shelf. Altimeter data, combined with hydrographic data in the FSC, are used to estimate the seasonality of the Faroe Current transport southwards into the FSC. No seasonality was seen in the Southern Faroe Current prior to 1995, but during the subsequent years a clear seasonal cycle with a maximum in February-April and an amplitude of ~ 0.6 Sv was found. More data is needed in order to understand the fate of the Faroe Current in the Nordic Seas.

The analyzed current time series are short in a climatic context and the MICOM model was invoked to get a longer time perspective. A 53 years hind-cast simulation with the regional model version was conducted to explore the nature of the pole-ward flowing Atlantic water in the Iceland-Scotland region. It was found that the simulated seasonal and long-term temperature variations in the Continental Shelf Current closely resemble observations from the North Atlantic Ocean, the Faroe Shetland Channel, and from the Norwegian Sea. The simulated temperature on the Faroe Plateau was compared to a long-term time-series of daily coastal temperature. In addition to correctly simulated seasonal and long-term temperature variations, a realistic seasonal modulation with a varying amplitude and phase was also found. The potential for using the simulations as a support when interpreting long-term hydrographic records and as a guide for future monitoring, has been examined.

Bergur Rønne Moberg:
At genfortrylle verden. En hermeneutisk undersøgelse af tab og genvindelse i William Heinesens senprosa.

Ph.D.-afhandling. Forsvaret fandt sted d. 18. marts 2004 ved Det Humanistiske Fakultet på Københavns Universitet.

Samanfatan
Afhandlingen har undersøgt udvalgte dele af William Heinesens mytisk-fabulerende forfatterskab med særlig vægt på temaet tab og genvindelse. Med udgangspunkt i Paul Ricoeurs hermeneutik giver den en tilbundsgående forståelse af den kunstneriske modernitet i den senere prosa.

Analyserne beskæftiger sig med Heinesens brug af myten, og myten analyseres ved hjælp af Ricoeurs opfattelse af begreberne symbol, metafor og fortælling. Disse litterære grundformer afspejler tre forskellige måder at fortolke mytens oprindelige symbolunivers på. Såvel symbolet, metaforen som fortællingen viser en bevidsthed om spændingen mellem deres formidling af meningsoverskud og deres splittede virkelighedsrepræsentation.

Heinesens mytetolkninger skal således opfattes som metapoesi, der fremstiller myten som et velegnet udgangspunkt for æstetiske konflikter. Afhandlingen forklarer symbol, metafor og fortælling som tre afgørende positioner i forfatterskabets mytetolkninger ved at udlede dem: symbolet i romanerne *De fortabte Spillemænd* og *Moder Syvstjerne*, metaforen i novellen *Grylen* og fortællingen i romanen *Tårnet ved verdens ende* og novellecyklussen *Laterna Magica*. Tilsammen viser disse tre hovedanalyser en spænding mellem tab som livets irreversibilitet og genvindelse som kunstens fortolkninger.

Ved at forholde sig til de tre analysebegreber kaster afhandlingen nyt lys over Heinesen som en realist med modernistiske træk. Mytens dramatiske form gør, at Heinesen forlader den naive mimetiske fortælleform til fordel for en form, der er spændt ud mellem beskrivelser af kunstværkets vanskelige ontologi og dets kreative mimesis. Heinesen distancerer sig samtidig fra modernismens helhedstolkninger og den for ham overdrevne interesse for subjektets konstitution. Han fordyber sig i erfaringens form gennem erindringen, og skaber sammenhæng i den splittede modernitet uden at splittelsens vilkår fortrænges. De eksistentielle erfaringer fortolkes også i en almenkulturel kontekst ved at myte, videnskab og kunst fremstilles som tre diskurser, hvor kunstens genfortryllende evne danner en kunstnerisk fortolket syntese af de to første. Heinesen anvender erindringen som metode i sit narrative forsøg på at holde det modernistiske og det moderne menings-, sprog- og erfaringstab lidt på afstand. Poesien er den forløsende meningsgarant.

Summary
The thesis has examined a selected part of the mythical-imaginative work with spe-

cial emphasis on the theme loss and recovery. By use of the hermeneutic analysis given by Paul Ricoeur I give a thorough understanding of the artistic modernity in the later prose.

The analysis' focus is on Heinesen's use of the myth, and the myth is analysed by means of Ricoeur's notion of the conceptions of symbol, metaphor and narrative. These literary core concepts depicts three different ways of interpreting the original symbolic univers of the myth. The symbol, metaphor as well as the narrative demonstrates an awareness of the tension between their surplus of meaning and their disparate representation of reality.

Heinesen's interpretations of myth shall be conceived as a meta poetry which sets forth the myth as a very suitable point of departure for aestethic conflicts. The thesis explains symbol, metaphor, and narrative as three decisive positions in the authorship's interpretations of myths by inferring them: the symbol in the novels *The lost Musicians* and *The Kingdom of the Earth*, the metaphor ind the short story *Grylen*, and the narrative in the novel *The Tower at the Edge of the World* and the cycle of short stories *Laterna Magica*. Together these three analyses show a tension between the loss as life's irreversibility and recovery as the interpretation of art.

The three analysis concepts in the thesis throw a new light on Heinesen as a realist with modernistic traits. The dramatic form of myth does that Heinesen leaves the naiv mimetic narrative form in favour of a form which is streched between descriptions of the difficult ontology of a moderne work of art and its creative mimesis. At the same time Heinesen distances himself from the interpretations of wholeness and the exaggerated interest for the constitution of the subject in modernism. He becomes absorbed in the form of experience through remembering and creates coherence in the disunite modernity without regressing the conditions of disruption. The existential experience is also interpreted in an public cultural context whereby myth, science and art are recounted as three discourses where the reenchanted ability of the art makes an artistic synthesis of the first two. Heinesen uses remembering as a method in his attempt to keep the modernistic and the moderne loss of meaning, language and experience at a distance. The poetry is the releasing warrant of meaning.

Durita Nielsen
Herring – living resources and good productions

Ph.D.-thesis at Danmarks Fiskeriundersøgelser, Afd. for Fiskeindustriel Forskning, Lyngby, Denmark, 11 June 2004.

Summary

The main objective of this project was to investigate to what extent the biological differences between herring stocks in the waters surrounding Denmark influence the quality characteristics of marinated herring.

Sensory analysis of marinated herring processed within a few hours *post mortem* showed fishing ground, i.e. areas with different herring stocks, to have no influence on odour, flavour or texture, but there was an apparent difference between herring caught at the same place in two succeeding years. Very small variations were encountered in the appearance of marinated herring fillets, and therefore no further efforts were made to develop a quality scheme for marinated herring. The sensory properties in this part of the study were influenced by body weight, but not by age, sex or gonad maturity. The influence of varying lipid content, water content and liquid holding capacity resulted in similar effects showing the high correlation between these properties. The results showed that the variation in sensory quality observed by the industry is not primarily due to fishing ground. Therefore another study was conducted using herring from commercial catches to investigate the effect of onboard storage methods.

Sensory evaluations of the raw material from commercial catches showed clear effects from onboard storage methods. The quality of iced herring was superior to the quality of tank-stored herring during the entire storage period. Off odours developed faster in tank-stored herring, and tank-storage resulted in more discoloured gills and duller skin than ice storage. Ice storage on the other hand induced more blood on gill covers. Large spawning herring with high lipid contents had higher quality than small immature herring with low lipid content. The high lipid content was correlated to low scores for all descriptors except “blood on gill cover”, which was the only descriptor not dependent on biological or chemical parameters. Some shortcomings were recognised with the QIM scheme. It could clearly differentiate between the quality of iced and tank-stored herring, but could not be used to calculate the remaining shelf life. The variations in raw material quality were retrieved in the sensory properties of marinated herring fillets. Marinated herring fillets produced from iced herring smelled and tasted more of fresh herring and were juicier than herring from storage tanks. This study also showed the sensory profile of marinated herring from the North Sea to be influenced by season and the

variations coincided with the cycle of feeding and spawning. During the spawning period the texture was soft and the muscle more susceptible for lipid oxidation. Texture became firmer and fatter during the feeding period and odour and flavour characteristics less rancid. These effects were explained by the chemical composition and biological parameters. The sensory profile of the products in this part of the study was influenced by herring size and age, but not by sex or gonad maturity.

Although the sensory results in this project were obtained during a long-term period, they were not subjected to any assessor "drifting" that could not be removed by mathematic corrections. This was due to the intensive training and the use of reference material. By serving the same product as a reference before each session assessors could recapitulate the descriptors easily and recalibrate their evaluations both qualitatively and quantitatively. Serving the reference as an unknown sample made it possible to monitor the performance of the panel. Multivariate data analytical techniques allowed for quick calculations and results were easily interpreted with the visual layout. Assessors differing from the rest of the panel could be identified quickly as well as the descriptors involved in the deviations.

The lipid content was one of the primary factors influencing the sensory quality. A broad variation was found within catches and some of this variation could be ascribed to differences in size. However, neither herring size nor maturity could be used to sort herring according to lipid content, due to very broad distributions within especially maturity classes. As sorting the raw material according to lipid content could help the processors to differentiate the raw material and obtain a better utilisation of the resources, efforts were made to investigate the possibilities of developing a quick-and-easy non-destructive lipid measuring method. The lipid content was measured by chloroform/methanol/water extraction and correlated to Fatmeter-, NIR- and NMR-measurements. The results showed the Fatmeter, NIR and NMR to have different suitability and applicability. The Fatmeter readings rely on the correlation between water and lipid contents. This relation varied during the maturation cycle, which altered the Fatmeter values especially from whole herring. Fatmeter measurements can therefore only be used in a broad primary sorting of fillets. High correlation was found between NIR and solvent extraction, but measuring point influenced the prediction results. Measurements performed by NIR and Fatmeter on meat side of fillets could not predict the lipid content in herring fillets. The average lipid content in a fillet or whole herring could be predicted from single NIR spectra, if measurements were performed in the middle section on the skin side of the sample. A high correlation was also found with the NMR measurements on mince. The NIR technique showed highest potentiality as a production line measurement for sorting whole herring or fillets into more homogenous batches.

Two other important quality parameters liquid holding capacity and texture were

found to be influenced by a variety of factors. Increases in body size, age, and lipid content were inter-correlated and resulted in marinated herring being more firm, elastic, juicy and fatty. The sensory texture parameters were also highly inter-correlated. Instrumental texture measurements performed on raw herring fillets could only partly describe the sensory texture of marinated herring fillets. Firmness and elasticity could be predicted from the maximum compression force. The compression curve contained information concerning all the measured sensory texture parameters, while the fitted polynomials in addition to firmness could describe fatty mouthfeel.

This study showed only minor quality differences that could be related to the herring stock structure in Danish waters. However, it has provided valuable information about the quality variations in herring and some of the factors governing these variations. The results can be used by the herring industry as a tool for optimising the quality and obtaining a better utilisation of the resources.

Samandráttur

Høvuðsendamálið við hesi verkætlan var at kanna í hvønn mun lívfrøðiligar variatiónir í sildastovnunum á leiðunum kring Danmark ávirka góðskueginleikarnar í marineraðari sild.

Sensoriskar kanningar av marineraðari sild, framleidd fáar tímar *post mortem*, vístu, at sjóøki, tvs. umráði við ymiskum sildastovnum, ikki hevði ávirkan á lukt, smakk ella tekstur, men ein ávísur munur var kortini funnin millum sild fiskað sama stað tvey ár á rað. Sera smá frávik vóru funnin viðvíkjandi útsjóndini av marineraðum sildafløkum, og tí vóru ikki fleiri royndir gjørdar at gera eina talvu til góðskumeting av marineraðum sildafløkum. Teir sensoriisku eginleikarnar, funnir í hesum partinum av verkætlanini, vóru ávirkaðir av sildastøddini, men ikki av aldri, kyni ella búningarstigi. Broytingar í vatn- og fitiinnihaldi og vætubindingarevni viðførdu nøkulunda somu góðskubroytingar. Úrslitini vístu, at tað í enn minni mun enn vænta er munur millum sjóøkini, sum er orsøkin til góðskufrávikini, sum av og á eru at síggja í sildaídnaðinum. Tí varð ein onnur kanning gjørd, har ið endamálið var at kanna, hvørja møguliga ávirkan goymslan av sild umborð á skipinum hevur á góðskuna.

Sensoriskar rávørukanningar av donskum landingum vístu, at goymslan umborð hevði stóra ávirkan á góðskuna. Sild, goymd í ísi hevði munandi betri góðsku enn sild, goymd í kølitangum. Óynsktir luktir komu skjótari fram í sild, sum var goymd í kølitangum, og hendan sildin hevði mislittar táknur og døkka skræðu. Harafturímóti gjørdist kápan á tí ísaðu sildini lættari blóðugt. Góðskan av stórari gýtandi sild við nógvari fiti var betri enn góðskan av smáari óbúnari sild við lítlari fiti. Tað høga fitiinnihaldið samsvaraði við góða góðsku, sambært øllum góðskueginleikunum uttan "blóð á kápu". Hesin eginleikin var tann einasti, sum ikki var ávirkaður av lívfrøðiligum ella evnafrøðiligum faktorum. Tann nýtta

QIM-talvan hevði ávísar avmarkingar. Hon vísti tíðiligan mun millum sild goymda í ávíkavist ísi og kølitangum, men kundi ikki nýtast til at rokna út manglandi haldføri. Somu frávik, sum vóru funnin í rávøruni, vóru eisini funnin, tá sildin var marinerað. Marinerað fløk framleidd av ísaðari sild luktaðu og smakkaðu feskari og vóru sevjumiklari enn marinerað fløk framleidd av sild goymdari í kølitangum. Kanningin vísti, at teir sensorisku eginleikarnari av marineraðari Norðsjóvarsild vóru ávirkaðir av árstíðini og harvið teimum skiftandi búningarstigunum. Undir gýting vóru fløkini bleyt og høvdu lættast við at trána. Økt føði viðførdi, at fløkini vóru fastari og feitari, samstundis sum luktur og smakkur gjørdust feskari og minni tránað. Hesar broytingarnar kundu greinast út frá evnafrøðiligum og lívfrøðiligum frávikum. Teir sensorisku eginleikarnar í tí marineraðu sildini í hesum partinum av kanningunum vóru ávirkaðir av sildastøddini og aldrinum, men ikki av kyni ella búningarstigi.

Sjálvt um tær sensorisku kanningarnar fóru fram yvir eitt longri tíðarskeið, vóru eingi frávik funnin millum dómararnar, sum ikki kundu takast burtur við fáum útrokningum. Hetta var orsakað av tí nógvu venjingini og at tilvísingartilfar varð nýtt. Dómararnir høvdu støðugt møguleika fyri at minnast aftur á teir sensorisku eginleikarnar og stilla sansirnar, tí borðreitt varð við sama tilfari hvørjaferð. Borðreitt varð eisini við hesum tilfarinum uttan, at dómararnir kendu upprunan, og tí var møguligt alla tíðina at kanna, hvussu tað gekk hjá dómarunum. Multivariat støddfrøði gjørdi tað møguligt skjótt at rokna út úrslitini, sum vóru løtt at greina við tí visuellu uppsetingini. Tað var lætt at útpeika teir dómarar, sum dømdu øðrvísi enn restin, og teir eginleikar, sum trupulleikar vóru við.

Fitiinnihaldið var ein av teimum týdningarmiklastu faktorunum, sum ávirkaðu góðskuna. Eisini var sera stór variatón í sild, sum var fiskað samstundis og ein partur av hesari variatión kundi tilskrivast støddarmuninum. Tó kundi hvørki støddin ella búningarstigið nýtast til at flokka sildina eftir fitiinnihaldi, tí tað var stórur munur á fitiinnihaldinum í sild á sama búningarstigi. Av tí at tað kundi verið ein hjálp hjá virkjunum at fáa sum best burtur úr tilfonginum við at flokka sildina eftir fitiinnihaldi, áðrenn hon varð virkað, varð kannað eftir um møguleikar vóru fyri at máta fitiinnihaldið lætt og skjótt uttan at skaða sildina. Fitiiinnihaldið varð mált við evnaúrdrátti (kloroform/metanol/vatn) og samanborið við mátingar við Fatmeturi, NIR og NMR. Úrslitini vístu, at brúksmøguleikarnir av Fatmeturinum, NIR og NMR vóru ymiskir. Fatmeturúrslitini byggja á sambandið millum vatn- og fitiinnihaldini, og av tí at hetta sambandið broyttist undir búningini, vóru serliga úrslitini frá rundari sild ávirkað av búningarstiginum. Fatmetur-mátingarnar kunnu tí bert nýtast til leysliga flokking av sildafløkum eftir fitiinnihaldi. Góð úrslit vóru eisini funnin við NIR, men mátingarnar vóru ávirkaðar av mátistaði. Hvørki mátingar gjørdar við NIR ella Fatmetrinum á kjøtsíðuni kundu nýtast til at lýsa fitiinnihaldið við. Eitt miðaltal

fyri fituna fekst út frá bert einum NIR-spektri, um málts varð mitt á skræðusíðuni á fløkum ella rundari sild. Góð úrslit vóru eisini funnin, tá NMR varð mált á sildafarsi. Samanumtikið vísti NIR seg at vera tann best egnaði hátturin til at máta fitiinnihaldið á virkislinjuni, so tað gerst møguligt at flokka runda sild ella sildfløk eftir fitiinnihaldinum.

Tveir aðrir týdningarmiklir góðskueginleikar vóru vætubindingarevni og teksturur. Hesir vóru ávirkaðir av ymiskum faktorum. Økingar í støddd, aldri og fitiinnihaldi fylgdust. Hetta gjørdi at marineraða sildin, varð føst, elastisk, sevjumikil og feit. Teir sensorisku tekstureginleikarnir fylgdust eisini. Mekaniskar teksturmátingar av ráum sildafløkum kundu lutvíst lýsa tekstureginleikarnar í marineraðum sildafløkum. Tann størsta kompressiónkraftin segði nakað um fastleika og smidleika. Kompressiónskurvarnar bóru vitan um allar teir tekstureginleikarnar, sum vóru kannaðir, meðan tey tilpassaðu polynomiuni lýstu fastleika og feittuta munnkenslu.

Hendan verkætlanin hevur víst, at góðskueginleikarnir í sild kunnu bert í avmarkaðan mun tilskrivast lívfrøðiligum munum millum ymiskar sildastovnar á donskum fiskileiðum. Harafturímóti gevur hon týdningarmikla vitan um góðskubroytingarnar í sild og um nakrar av teimum ávirkandi faktorunum, sum liggja aftanfyri. Úrslitini kunnu nýtast í vinnuni til at betra um góðskuna av sild og gagnnýta tilfeingið betri.

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Variability in circulation and hydrography in North Norwegian coastal waters

Ph.D.-thesis at Akvaplan-niva, Polarmiljøsenteret, Tromsø, Norway.

In this work, the roles of different physical forcing mechanisms on the dynamics over the rough topography of the shelf region off Troms were investigated. Furthermore, temperature ranges and variation patterns in the North Norwegian fjords and coastal waters were examined. The combined effects of topography, seasonal stratification, wind and tides on circulation and shelf-ocean interaction off Troms, Northern Norway, were investigated with field measurements and numerical model simulations of hydrography and currents. Temperature ranges and variations patterns in the North Norwegian fjords and coastal waters were examined by use of time series of sea and air temperature data from the period 1980–2003, representing three transects from fjord to outer coast in north Norway (Balsfjord, Altafjord and Porsanger).

Effects of wind, tides and topography on the currents were shown to be strongly dependent on the stratification, which showed large seasonal variations in the

area. Topographical effects on surface circulation were weakened when stratification increased. During stratified conditions winds had a strong impact on surface circulation and shelf-ocean exchange, and the wind direction was crucial for drift paths and residence times for particles (e.g. plankton) in the shelf area. When stratification was weak, tidal effects combined with topographic steering dominated the circulation. The tidal currents are strong over the shelf, where the enhancement of the K1 component was most pronounced for weak stratification. The M2 component was shown to be more prominent during stratified conditions. Freshwater runoff combined with northerly winds along the coast can result in a shallow and low salinity surface layer over the shelf, as observed in summer, and also during anomalous melting events during winter and spring. Thus, local fjord/near coast processes can very well influence stratification and dynamics over the shelf, and factors such as prevailing wind direction and the amount of freshwater supply from the adjacent coast are important when interpreting variability in biological production and plankton distribution in this region. Air and sea surface temperatures were well inter-correlated between all stations along the fjord-coast transects, indicating that the fjord and coastal region in question (i.e. Troms north of Vesterålen, and Finnmark) is a coherent climatic region. The sea temperatures in this region are to a higher degree being controlled by local climatic processes (i.e. air-sea heat exchange) than what is the case further south. Our analysis showed that the mean heat loss to the atmosphere from Porsanger, a fjord with no sill, was twice as large as the mean heat loss from the sill-fjord Balsfjorden. This difference can be explained by different inflow of water carrying heat to the fjords, controlled by the topographic differences. No clear heating or cooling trends could be seen from our temperature time series, and additional periodic data back to 1930 revealed anomalies well within the ones observed for the 1980–2003 period.