Dipole vortices in the Great Australian Bight

Shipboard measurements from late 2006 made by the Danish Galathea 3 Expedition and satellite sea surface temperature images revealed a chain of cool and warm mushroom' dipole vortices that mixed warm, salty, oxygen-poor waters on and near the continental shelf of the Great Australian Bight (GAB) with cooler, fresher, oxygen-rich waters offshore. The alternating jets' flowing into the mushrooms were directed mainly northwards and southwards and differed in temperature by only 1.5 degrees C; however, the salinity difference was as much as 0.5, and therefore quite large. The GAB waters were slightly denser than the cooler offshore waters. The field of dipoles evolved and distorted, but appeared to drift westwards at 5km day^{-1} over two weeks, and one new mushroom carried GAB water southwards at 7km day^{-1}. Other features encountered between Cape Leeuwin and Tasmania included the Leeuwin Current, the South Australian Current, the Flinders Current and the waters of Bass Strait.

General information
State: Published
Organisations: Department of Civil Engineering, ARTEK, Section for Arctic Engineering and Sustainable Solutions, Aarhus University, CSIRO Marine and Atmospheric Research
Authors: Cresswell, G. R. (Ekstern), Lund-Hansen, L. C. (Ekstern), Nielsen, M. H. (Intern)
Number of pages: 10
Pages: 135-144
Publication date: 2015
Main Research Area: Technical/natural sciences

Publication information
Spreading of sediment due to underwater blasting and dredging: Field observations from quay Construction in Sisimiut, Greenland

The primary objectives of this study were to quantify the spreading of suspended sediment from underwater blasting and subsequent dredging of bedrock and to understand the physical processes governing the spreading of suspended
sediment due to underwater blasting. The investigations were carried out in connection with the construction of a new quay at the existing harbour of Sisimiut, Greenland. Subsequent to the largest of a series of underwater blasts, the distribution of suspended sediment in the water column at and around the construction site was observed using a CTD (Conductivity, Temperature, Depth) equipped with a turbidity meter. The observations show that sediment was brought into suspension near the surface and at internal density gradients in the water column, where it became subject to prevailing flow conditions. The observations further show what was probably a turbidity current, flowing down the steeply sloping seabed away from the construction site. The spreading of sediment due to this turbidity current could not be assessed, but could have been considerable. Observations made using sediment traps over much of the period of construction show that the total spreading of sediment was roughly the same for blasting of bedrock and dredging of the blasted material and that much of the sediment that was brought into suspension settled near the construction site. Furthermore, these observations indicate that blasting leads to a wider spreading of sediment, but that dredging leads to a wider spreading of the organic part of the sediment. Almost all material less than 2 μm, including surficial clay minerals and much organic material, was transported away from the construction site and its vicinity, which could imply mobilization and export of pollutants. Environmental impacts of suspended sediment from underwater blasting, which could include coverage of the benthos or increased turbidity, can be managed by timing the blast favourably relative to currents, waves and stratification. It is argued that the environmental impact of blasting can be minimized by decreasing or maybe even increasing the spreading of sediment, depending on, e.g., the resilience of the flora and fauna and the surficial sediment and the pollution therein.

**General information**
State: Published
Organisations: Department of Civil Engineering, ARTEK, Section for Arctic Engineering and Sustainable Solutions, Aarhus University
Authors: Nielsen, M. H. (Intern), Bach, L. (Ekstern), Bollwerk, S. (Intern)
Pages: 512-522
Publication date: 2015
Main Research Area: Technical/natural sciences

**Publication information**
Journal: Ocean & Coastal Management
Volume: 116
ISSN (Print): 0964-5691
Ratings:
  - BFI (2018): BFI-level 1
  - Web of Science (2018): Indexed yes
  - BFI (2017): BFI-level 1
  - Web of Science (2017): Indexed yes
  - BFI (2016): BFI-level 1
  - Scopus rating (2016): CiteScore 2.23 SJR 0.887 SNIP 1.123
  - BFI (2015): BFI-level 1
  - Scopus rating (2015): SJR 0.783 SNIP 1.002 CiteScore 1.92
  - Web of Science (2015): Indexed yes
  - BFI (2014): BFI-level 1
  - Scopus rating (2014): SJR 0.883 SNIP 1.306 CiteScore 2.05
  - Web of Science (2014): Indexed yes
  - BFI (2013): BFI-level 1
  - Scopus rating (2013): SJR 0.719 SNIP 1.394 CiteScore 1.84
  - ISI indexed (2013): ISI indexed yes
  - BFI (2012): BFI-level 1
  - Scopus rating (2012): SJR 0.724 SNIP 1.061 CiteScore 1.72
  - ISI indexed (2012): ISI indexed yes
  - Web of Science (2012): Indexed yes
  - BFI (2011): BFI-level 1
  - Scopus rating (2011): SJR 0.85 SNIP 0.986 CiteScore 1.65
  - ISI indexed (2011): ISI indexed yes
  - Web of Science (2011): Indexed yes
  - BFI (2010): BFI-level 1
  - Scopus rating (2010): SJR 0.852 SNIP 0.958
  - BFI (2009): BFI-level 1
  - Scopus rating (2009): SJR 0.539 SNIP 0.875
Deep primary production in coastal pelagic systems: importance for ecosystem functioning

Monitoring data (1999 to 2012) and data from a 2 wk field study at a seasonally stratified station in the Aarhus Bight near the Danish coast were used to demonstrate that the vertical distribution of photosynthesis influences both water column oxygen conditions and the fate of the organic material produced. The primary production (PP) occurring below the surface layer, i.e. in the pycnocline-bottom layer (PBL), is shown to contribute significantly to total PP. Oxygen concentrations in the PBL are shown to correlate significantly with the deep primary production (DPP) as well as with salinity, phosphate loading, wind and transparency in the surface layer. The phytoplankton communities detected in the surface layer and PBL during the field study were very different. Large cells, especially Ceratium spp., dominated in the PBL, while small diatoms, mainly Proboscis alata, dominated in surface waters. On the basis of chlorophyll-normalised photo synthetic parameters and variable fluorescence, it is shown that the 2 populations were physiologically distinct. The population in the PBL was photosynthetically active and adapted/acclimated to lower light than the population in the surface layer. Sinking rates (based on sediment trap collections) of carbon and nitrogen were highest in the PBL. Lyngsgaard et al. (2014; Limnol Oceanogr 59: 1679-1690) have demonstrated that the vertical distribution of PP in this region is influenced by anthropogenic nutrient loading. Thus, the present study indicates that eutrophication effects may include changes in the structure of planktonic food webs and element cycling in the water column, both brought about through an altered vertical distribution of PP.

General information

State: Published
Organisations: Arctic Technology Centre, ARTEK, Department of Civil Engineering, University of Copenhagen, Aarhus University
Authors: Lyngsgaard, M. M. (Ekstern), Richardson, K. (Ekstern), Markager, S. (Ekstern), Nielsen, M. H. (Intern), Olesen, M. (Ekstern), Christensen, J. P. A. (Ekstern)
Number of pages: 19
Pages: 15-33
Publication date: 2014
Main Research Area: Technical/natural sciences

Publication information
Journal: Marine Ecology - Progress Series
Volume: 517
ISSN (Print): 0171-8630
Ratings:
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 2.4
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Localised mixing and heterogeneity in the plankton food web in a frontal region of the Sargasso Sea: implications for eel early life history?

Previous studies have demonstrated that patches of eel larvae are found in the frontal region of the Subtropical Convergence Zone (STCZ), but to date no clear evidence of why this region might confer advantage to the larvae has been presented. This study demonstrates that there may be localized patches within a frontal region in the STCZ in the Sargasso Sea that experience elevated vertical mixing and an associated vertical flux of nutrients. This localized vertical mixing was suggested by a group of stations within the frontal region that exhibited a greater similarity (Jaccard index) between the diatom communities at 10 m and > 100 m (in the deep chlorophyll maximum, DCM) than in other parts of the frontal region. Thorpe displacements supported the hypothesis of elevated mixing intensities around these stations, as did vertical mixing rates inferred from stratification and vertical current shear calculated from acoustic Doppler current profiler (ADCP) measurements. Combining these mixing estimates with vertical nutrient gradients suggests that nutrient fluxes to the euphotic zone at these mixing sites may be an order of magnitude greater than elsewhere in the frontal region. This mixing may influence the plankton food web, as indicated by elevated values/concentrations of (1) primary production, (2) variable fluorescence (F-v/F-m) and (3) total seston. In addition, the fraction of the total biomass of both copepods and nauplii found closest to the DCM in the frontal region correlated with the stratification (Brunt-V is V frequency), with the greatest fractions found below 75 m at the most weakly stratified stations. While this study cannot directly link these
observations to eel larvae ecology, Munk et al. (2010; Proc R Soc B 277: 3593-3599) reported that eel larvae were most abundant at locations where we found evidence for elevated vertical mixing.
Removal of snow cover inhibits spring growth of Arctic ice algae through physiological and behavioral effects

The snow cover of Arctic sea ice has recently decreased, and climate models forecast that this will continue and even increase in future. We therefore tested the effect of snow cover on the optical properties of sea ice and the biomass, photobiology, and species composition of sea ice algae at Kangerlussuaq, West Greenland, during March 2011, using a snow-clearance experiment. Sea ice algae in areas cleared of snow was compared with control areas, using imaging variable fluorescence of photosystem II in intact, unthawed ice sections. The study coincided with the onset of spring growth of ice algae, mainly an increase in two pennate diatoms (Achnanthes taeniata and Navicula directa), as temperature increased and ice thickness and brine volume stabilized. The increase in biomass was accompanied by an increase in minimum variable fluorescence (F o) and the maximum quantum yield of PSII (F v/F m) and filling of brine channels with fluorescing cells. In contrast, in the minus snow area, PAR transmittance increased sixfold and there was an exponential decrease in chl-a and no increase in F o, and the area of fluorescing biomass declined to become undetectable. This study suggests that the onset of the spring bloom is predominantly due to temperature effects on brine channel volume, and that the algal decline after snow removal was primarily due to emigration rather than photodamage.

General information
State: Published
Organisations: Department of Civil Engineering, Arctic Technology Centre, ARTEK, Aarhus University, University of Canterbury
Authors: Lund-Hansen, L. (Forskerdatabase), Hawes, I. (Ekstern), Sorrell, B. K. (Forskerdatabase), Nielsen, M. H. (Intern)
Pages: 471-481
Publication date: 2014
Main Research Area: Technical/natural sciences

Publication information
Journal: Polar Biology
Volume: 37
Issue number: 4
ISSN (Print): 0722-4060
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 1.72 SJR 0.866 SNIP 0.761
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.985 SNIP 0.751 CiteScore 1.62
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.931 SNIP 0.81 CiteScore 1.75
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.109 SNIP 1.054 CiteScore 2.07
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 1.029 SNIP 0.891 CiteScore 1.89
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 0.857 SNIP 0.925 CiteScore 1.77
ISI indexed (2011): ISI indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.868 SNIP 0.885
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.785 SNIP 0.871
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 0.953 SNIP 0.877
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 0.976 SNIP 0.936
Scopus rating (2006): SJR 0.946 SNIP 0.958
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 0.851 SNIP 0.86
Scopus rating (2004): SJR 1.046 SNIP 0.957
Scopus rating (2003): SJR 0.967 SNIP 0.898
Web of Science (2003): Indexed yes
Scopus rating (2002): SJR 0.871 SNIP 0.848
Web of Science (2002): Indexed yes
Scopus rating (2001): SJR 0.85 SNIP 0.989
Scopus rating (2000): SJR 0.884 SNIP 0.92
Web of Science (2000): Indexed yes
Scopus rating (1999): SJR 1.101 SNIP 0.937
Original language: English
DOIs:
10.1007/s00300-013-1444-z
Source: dtu
Source-ID: n:oai:DTIC-ART:springer/437056203::38216
Publication: Research - peer-review › Journal article – Annual report year: 2014

Estuarine morphometry governs optically active substances, $K_d$(PAR) and beam attenuation: assessments from a tropical ria and a temperate coastal plain estuary

Data on optical properties such as diffuse attenuation coefficient $K_d$(PAR), beam attenuation coefficient ($c_p$) and the optically active constituents (OACs) CDOM, Chl-a and suspended particulate matter were obtained in a Danish temperate coastal plain estuary (56°N) and a Vietnamese tropical ria (12°N) at high discharges. The major difference was the spatial distribution of the optical properties against distance, best described by significant power functions in the ria, compared to significant linear functions in the coastal plain. It was hypothesized that estuarine morphometry could explain this spatial distribution. Partition and multiple regression analyses showed that Chl-a governed $K_d$(PAR) and beam attenuation coefficient in both estuaries. Significant, high correlations were obtained by multiple regression analyses in the estimation of $K_d$(PAR) and beam attenuation coefficients in the two estuaries using OACs as input parameters. It is concluded that there are no large differences in OAC concentrations between the two estuaries. The spatial distributions of OACs and optical properties were significantly different and governed by the estuary morphometry, i.e. a power distribution in the tropical ria and a linear function in the temperate coastal plain estuary, and applicable to similar estuary types.

General information
State: Published
Organisations: Department of Civil Engineering, Section for Arctic Technology, Section for Geotechnics and Geology, Aarhus University, Stockholm University, Danish Meteorological Institute, Institute of Oceanography
Authors: Lund-Hansen, L. C. (Forskerdatabase), Nielsen, J. M. (Ekstern), Blüthgen, J. (Forskerdatabase), Hai, D. N. (Ekstern), Nielsen, M. H. (Intern), Lam, N. N. (Ekstern)
Pages: 19-30
Publication date: 2013
Main Research Area: Technical/natural sciences

Publication information
Journal: Hydrobiologia
Volume: 711
Issue number: 1
ISSN (Print): 0018-8158
Ratings:
BFI (2018): BFI-level 1
Jokulhlaups and sediment transport in Watson River, Kangerlussuaq, West Greenland

For 3 years, during a 4-year observation period (2007-2010), jokulhlaups were observed from a lake at the northern margin of Russells Gletscher. At a gauging station located on a bedrock sill near the outlet of Watson River into Sdr Stromfjord, discharge and sediment transport was monitored during the jokulhlaups. The stage rose up to 5.3 m and a maximum discharge of 1,430 m$^3$ s$^{-1}$ was recorded. The jokulhlaups were very different, indicating varying influences of weather and englacial drainage conditions. Although the jokulhlaups caused high discharge and sediment transport rates, their share of the annual discharge and sediment transport were less than 2%.

General information
State: Published
Organisations: Department of Civil Engineering, Section for Arctic Technology, Aarhus University, University of Copenhagen
Authors: Mikkelsen, A. B. (Ekstern), Hasholt, B. (Forskerdatabase), Knudsen, N. T. (Ekstern), Nielsen, M. H. (Intern)
Pages: 58-67
Publication date: 2013
Main Research Area: Technical/natural sciences
Observations of runoff and sediment and dissolved loads from the Greenland Ice Sheet at Kangerlussuaq, West Greenland, 2007 to 2010

Observations from 2007 to 2010 of runoff, sediment and solute delivery from a segment of the Greenland Ice Sheet (GrIS) and the proglacial landscape draining into the fjord at Kangerlussuaq are presented. The observations include at least three jökulhlaups and extreme recordings from 2010. The average runoff from the 9743 km2 catchment was 377 mm (min. 267 mm and max. 565 mm) and the sediment delivery was 744 t km\(^{-2}\) y\(^{-1}\) with (min. 493 and max. 1221t km\(^{-2}\) y\(^{-1}\)). Solute transport was only 0.4 % of the total load (sediment load + dissolved load). These new values are a factor two higher than values previously published for 2007 and 2008. The average effective erosion from the catchment was 0.28 mm (min. 0.18 and max. 0.45 mm). The erosion is larger than indicated from most other locations along the GrIS, but in the same order of magnitude as erosion in other glaciated areas at the same latitude, e.g. Norway. The sandur in the proglacial area acts as a sediment sink for a lot of the sediments from the GrIS.

General information
State: Published
Organisations: Department of Civil Engineering, Section for Arctic Technology, University of Copenhagen
Authors: Hasholt, B. (Ekstern), Mikkelsen, A. P. B. (Ekstern), Nielsen, M. H. (Intern), Larsen, M. A. D. (Intern)
Pages: 3-27
Publication date: 2012
Main Research Area: Technical/natural sciences

Publication information
Journal: Zeitschrift fuer Geomorphologie
Volume: 57
Issue number: Suppl. 2
ISSN (Print): 0372-8854
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 1
Scopus rating (2016): SJR 0.337 SNIP 0.491 CiteScore 0.86
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.384 SNIP 0.36 CiteScore 0.77
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.374 SNIP 0.484 CiteScore 0.74
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.444 SNIP 0.497 CiteScore 0.76
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.374 SNIP 0.649 CiteScore 0.69
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 0.422 SNIP 0.514 CiteScore 0.66
ISI indexed (2011): ISI indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.244 SNIP 0.387
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.446 SNIP 0.526
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 0.461 SNIP 0.591
Scopus rating (2007): SJR 0.353 SNIP 0.473
Scopus rating (2006): SJR 0.412 SNIP 0.736
Photobiology of sea ice algae during initial spring growth in Kangerlussuaq, West Greenland: Insights from imaging variable chlorophyll fluorescence of ice cores

We undertook a series of measurements of photophysiological parameters of sea ice algae over 12 days of early spring growth in a West Greenland Fjord, by variable chlorophyll fluorescence imaging. Imaging of the ice–water interface showed the development of ice algae in 0.3–0.4 mm wide brine channels between laminar ice crystals in the lower 4–6 mm of the ice, with a several-fold spatial variation in inferred biomass on cm scales. The maximum quantum yield of photosynthesis, $F_v/F_m$, was initially low (~0.1), though this increased rapidly to ~0.5 by day 6. Day 6 also saw the onset of biomass increase, the cessation of ice growth and the time at which brine had reached ~2 °C. We interpret this as indicating that the establishment of stable brine channels at close to ambient salinity was required to trigger photosynthetically active populations. Maximum relative electron transport rate ($rETR_{max}$), saturation irradiance ($E_s$) and photosynthetic efficiency ($\alpha$) had also stabilised by day 6 at 5–6 relative units, ~30 μmol photons m$^{-2}$ s$^{-1}$ and 0.4–0.5 μmol photons m$^{-2}$ s$^{-1}$, respectively. $E_s$ was consistent with under-ice irradiance, which peaked at a similar value, confirming that daytime irradiance was adequate to facilitate photosynthetic activity throughout the study period. Photosynthetic parameters showed no substantial differences with depth within the ice, nor variation between cores or brine channels suggesting that during this early phase of ice algal growth cells were unaffected by gradients of environmental conditions within the ice. Variable chlorophyll fluorescence imaging offers a tool to determine how this situation may change over time and as brine channels and algal populations evolve.

General information
State: Published
Organisations: Department of Civil Engineering, Section for Arctic Technology, Section for Geotechnics and Geology, Gateway Antarctica, Aarhus University
Authors: Hawes, I. (Ekstern), Lund-Hansen, L. C. (Forskerdatabase), Sorrell, B. K. (Forskerdatabase), Nielsen, M. H. (Intern), Borzák, R. (Ekstern), Buss, I. (Forskerdatabase)
Pages: 103-115
Publication date: 2012
Main Research Area: Technical/natural sciences

Publication information
Journal: Photosynthesis Research
Volume: 112
Issue number: 2
ISSN (Print): 0166-8595
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 1
Scopus rating (2016): SJR 1.617 SNIP 1.247 CiteScore 3.66
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.265 SNIP 1.243 CiteScore 3.44
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.198 SNIP 1.094 CiteScore 3.02
BFI (2013): BFI-level 1
Distribution and trophic links of gelatinous zooplankton on Dogger Bank, North Sea

The ecology of small, gelatinous zooplankton is not integrated into management of Dogger Bank (54° 00′ N, 3° 25′ E to 55° 35′ N, 2° 20′ E). In pursuit of this goal, gelatinous zooplankton and their potential prey were sampled along a transect across the bank on June 10–16, 2007. Eleven species of small medusae and ctenophores were collected, with six abundant taxa occurring in greater numbers below the thermocline and in the shallower, southeastern portion of the bank. There were no statistically significant diel changes in distribution. In contrast, potential prey were distributed more evenly across the bank and throughout the water column. Isotopic analyses revealed that gelatinous zooplankton fed on both smaller (100–300 μm) and larger (>300 μm) mesozooplankton, but also potentially on each other. These ecological insights suggest that small medusae and ctenophores should be integrated into sustainable management of Dogger Bank.
Kangerluarsuk Ungalleq - et makroskala-studium af fremtidige klimaeffekter i det arktiske marine miljø

General information
State: Published
Organisations: Section for Arctic Technology, Department of Civil Engineering, Arctic Technology Centre, National Environmental Research Institute
Authors: Nielsen, M. H. (Intern), Dahlöf, I. (Ekstern)
Publication date: 2011
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 274354
Publication: Research › Conference abstract for conference – Annual report year: 2011

Økologi i tropernes flodmundinger: Kultursystem med moderat 'naturindflydelse': Eksempelstudie fra et sydvietnamesisk estuarie

General information
State: Published
Organisations: Section for Arctic Technology, Department of Civil Engineering, Arctic Technology Centre, Marine Ecology, Institute of Oceanography
Authors: Jensen, K. T. (Ekstern), Lund-Hansen, L. C. (Ekstern), Nielsen, M. H. (Intern), Nguyen Ngoc, L. (Ekstern), Doan Nhu, H. (Ekstern)
Publication date: 2011
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 274353
Publication: Research › Conference abstract for conference – Annual report year: 2011

Towards an adaptive model for simulating growth of marine mesozooplankton: A macromolecular perspective

General information
State: Published
Organisations: Section for Arctic Technology, Department of Civil Engineering, Section for Population Ecology and Genetics, National Institute of Aquatic Resources
Authors: Acheampong, E. (Ekstern), Nielsen, M. H. (Intern), Mitra, A. (Ekstern), St. John, M. (Intern)
Pages: 1-18
Publication date: 2011
Main Research Area: Technical/natural sciences

Publication information
Journal: Ecological Modelling
Volume: 225
ISSN (Print): 0304-3800
Ratings:
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Web of Science (2017): Indexed Yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 2.43 SJR 0.941 SNIP 1.089
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 1.087 SNIP 1.112 CiteScore 2.43
Web of Science (2015): Indexed yes
A Decoupled Fjord-ocean System - Observations And Modelling Of Kangerlussuaq, Greenland

General information
State: Published
Organisations: Section for Arctic Technology, Department of Civil Engineering, Arctic Technology Centre, Aarhus University, University of Copenhagen
Authors: Nielsen, M. H. (Intern), Lund-Hansen, L. C. (Ekstern), Andersen, T. J. (Ekstern), Pejrup, M. (Ekstern)
Publication date: 2010
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 314572
Publication: Research - peer-review › Journal article – Annual report year: 2011
Optical properties of a tropical estuary during wet and dry conditions in the Nha Phu estuary, Khanh Hoa Province, southeast Vietnam

There has been a strong research focus on optical properties in temperate estuaries but very much less in tropical estuaries. These properties comprise light and beam attenuation dominated by suspended particulate matter, Chl a, and
CDOM. Spatially and temporally distributed data on optical properties in a tropical wet and dry estuary are compared and discussed in relation to those of temperate estuaries. Sampling in the Nha Phu estuary, Vietnam, consisted of five stations on a transect from head to mouth that was sampled four times during dry conditions and three times during wet conditions between May 2006 and April 2008. Methods comprised CTD, optical measurements, and water sampling for suspended matter, Chl a, and CDOM. Results showed high light attenuation—K d(PAR)—in wet conditions and low in dry. K d(PAR) was highest at the estuary head and lower in the outer part. Spatial and temporal variations in K d(PAR) were in general dominated by variations in suspended particulate matter concentrations in both wet and dry conditions. Chl a concentrations were low and showed no strong variations between wet and dry conditions. CDOM absorption coefficients were higher in wet conditions with high values at the head and lower in the central part of the estuary. The depth of the photic zone was reduced by up to 50% during wet conditions. A residence time in the estuary of 5–6 days was derived from the rate of change of K d(PAR) after a period of heavy rain and discharge of freshwater into the estuary. This complied with a residence time of four and a half days derived from a basic physical relation. Optical properties were in general comparable to temperate estuaries in dry conditions although Chl a concentrations were lower in Nha Phu. A second distinctive point, as compared to temperate estuaries, was the episodic character with days of strong rainfall followed by longer periods of dry weather. All sampling, both wet and dry, was carried out in the dry season which implies a less definitive perception of wet and dry seasons.

**General information**

State: Published
Organisations: Section for Arctic Technology, Department of Civil Engineering, Arctic Technology Centre, Aarhus University, Institute of Oceanography
Authors: Lund-Hansen, L. C. (Ekstern), Hai, D. N. (Ekstern), Lam, N. N. (Ekstern), Nielsen, M. H. (Intern)
Pages: 207-216
Publication date: 2010
Main Research Area: Technical/natural sciences

**Publication information**

Journal: Hydrobiologia
Volume: 644
Issue number: 1
ISSN (Print): 0018-8158
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 2.27
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 2.16
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 2.22
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 2.02
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 2.13
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): CiteScore 1.98
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Web of Science (2010): Indexed yes
Sediment structures in Kangerlussuaq (Sdr. Strømfjord), West Greenland: A preliminary study of the deposition and erosion of sediments and slide structures

General information
State: Published
Organisations: Department of Civil Engineering, Section for Arctic Technology, Arctic Technology Centre, Aarhus University
Authors: Ploug, J. (Intern), Lykke-Andersen, H. (Ekstern), Nielsen, M. H. (Intern)
Publication date: 2010
Event: Poster session presented at International Polar Year Closing Symposium, Copenhagen.
Main Research Area: Technical/natural sciences

Suspended Matter, Chl-a, CDOM, Grain Sizes, and Optical Properties in the Arctic Fjord-Type Estuary, Kangerlussuaq, West Greenland During Summer

Optical constituents as suspended particulate matter (SPM), chlorophyll (Chl-a), colored dissolved organic matter (CDOM), and grain sizes were obtained on a transect in the arctic fjord-type estuary Kangerlussuaq (66A degrees) in August 2007 along with optical properties. These comprised diffuse attenuation coefficient of downwelling PAR (K(d)(PAR)), upwelling PAR (K(u)(PAR)), particle beam attenuation coefficient (c(p)), and irradiance reflectance R(-0, PAR). PAR is white light between 400 and 700 nm. The estuary receives melt water from the Greenland Inland Ice and stations covered a transect from the very high turbid melt water outlet to clear marine waters. Results showed a strong spatial variation with high values as for suspended matter concentrations, CDOM, diffuse attenuation coefficient K(d)(PAR), particle beam attenuation coefficients (c(p)), and reflectance R(-0, PAR) at the melt water outlet. Values of optical constituents and properties decreased with distance from the melt water outlet to a more or less constant level in central and outer part of the estuary. There was a strong correlation between inorganic suspended matter (SPMI) and diffuse attenuation coefficient K(d)(PAR) (r(2) = 0.92) and also for particle beam attenuation coefficient (c(p); r(2) = 0.93). The obtained SPMI specific attenuation-K(d)(*) (PAR) = 0.13 m(2) g(-1) SPMI-and the SPMI specific particle beam attenuation-c(p)(*) = 0.72 m(2) g(-1)-coefficients were about two times higher than average literature values. Irradiance reflectance R(-0, PAR) was comparatively high (0.09-0.20) and showed a high (r(2) = 0.80) correlation with K(u)(PAR). Scattering dominated relative to absorption-b(PAR)/a(PAR) = 12.3. Results strongly indicated that the high values in the optical properties were related to the very fine particle sizes (mean = 2-6 mu m) of the suspended sediment. Data and results are discussed and compared to similar studies from both temperate and tropical estuaries.

General information
State: Published
Organisations: Section for Arctic Technology, Department of Civil Engineering, Arctic Technology Centre
Authors: Lund-Hansen, L. C. (Ekstern), Andersen, T. J. (Ekstern), Nielsen, M. H. (Intern), Pejrup, M. (Ekstern)
Pages: 1442-1451
Publication date: 2010
Main Research Area: Technical/natural sciences

Publication information
Journal: Estuaries and Coasts
Volume: 33
Issue number: 6
ISSN (Print): 1559-2723
Ratings:
Water masses in Kangerlussuaq, a large fjord in West Greenland: the processes of formation and the associated foraminiferal fauna

The water masses in Kangerlussuaq (Søndre Strømfjord) in West Greenland were studied during both a summer and a winter field survey. In order to obtain an improved understanding of the relationship between the physical oceanography and modern foraminiferal assemblage distributions, conductivity–temperature–density measurements were carried out in connection with sediment surface sampling along a transect through the 180 km long fjord. The exchange between the inner part of Kangerlussuaq (275 m deep) and the ocean is restricted by an almost 100 km long outer, shallow part. Our study shows that the water mass in this inner part is almost decoupled from the open ocean, and that in winter the inner part of the fjord is ice covered and convection occurs as a result of brine release. These processes are reflected in the foraminiferal assemblage, which consists of a sparse agglutinated fauna, indicative of carbonate dissolution. A
monospecific, calcareous assemblage (Elphidium excavatum forma clavata) occurs in the innermost, shallow part, which is strongly influenced by sediment-loaded meltwater during the summer. The outer, shallow part of the fjord is dominated by strong tidal mixing, and in summer the density of the incoming water does not exceed the bottom water density in the inner fjord. The foraminiferal assemblage here reflects high bottom water current velocity and an influence of water with relatively high salinity. Kangerlussuaq can be regarded as a modern analogue for ice-proximal environments in the Quaternary, with a strong seasonal forcing caused by freshwater run-off and sea-ice formation.
Observations and effects of internal hydraulic control in the Danish waters

General information
State: Published
Organisations: Unknown
Authors: Nielsen, M. H. (Intern)
Publication date: 2009

Publication information
Original language: English
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 232523
Publication: Research - peer-review › Journal article – Annual report year: 2010

Sedimentation of fine-grained particles in the arctic fjord Kangerlussuaq – modeling and observations

General information
State: Published
Organisations: Section for Arctic Technology, Department of Civil Engineering, Arctic Technology Centre, Aarhus University, University of Copenhagen
Authors: Nielsen, M. H. (Intern), Andersen, T. J. (Ekstern), Pejrup, M. (Ekstern), Lund-Hansen, L. C. (Ekstern)
Publication date: 2009
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 256166
Publication: Research › Conference abstract for conference – Annual report year: 2009

The Climate Record in Kangerlussuaq

General information
State: Published
Organisations: Unknown
Authors: Nielsen, M. H. (Intern)
Publication date: 2009

Publication information
Original language: English
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 256173
Publication: Research › Sound/Visual production (digital) – Annual report year: 2009

The Lighthouse Project in Sarfannguq

General information
State: Published
Organisations: Unknown
Authors: Nielsen, M. H. (Intern)
Publication date: 2009

Publication information
Original language: English
A consistent high primary production and chlorophyll-a maximum in a narrow strait – effects of hydraulic control

4 years long time-series of primary production, Chl-a, salinity, oxygen, and Secchi depth sampled weekly or bi-weekly along a transect in the narrow (~ 1 km) Little Belt and Little Belt region are analysed. Little Belt (LB) is one of the three Danish straits that connect the Baltic Sea and the North Sea. The time-series were supplemented with Scan Fish transects, a towed CTD, ADCP measurements, and nutrient data. There is a significant maximum in primary production (mg C m⁻² day⁻¹) in central LB, which is 30% higher than outside the LB region. Chl-a concentrations are 30% higher in central LB where Secchi depth reaches a minimum. Stratification showed a clear minimum in central LB where extended mixing prevails whereas strong stratification occurred in northern and southern LB. It is shown that mixed conditions in central LB were related to hydraulic control and super-critical flow conditions, as current derived energy for the mixing by comparison was too low. Nutrient (NO₂ + NO₃) concentrations remained high (~ 5 μM) in the bottom layer following the spring bloom. It is shown that there is a more or less continuous inflow of nutrient rich bottom water into central LB, which through the strong mixing sustains the high primary production of organic material. The frequency of the hydraulic control governed mixing is presumably high and with a tidal frequency. It was estimated that the 30% higher primary production equalled an annual export out of Little Belt of 142 tons Chl-a or about 4261 tons C that might add to the observed oxygen depletion in the area.
Attenuation, absorption, scattering, and high reflectance in the glacio-marine Kangerlussuaq Fjord, West Greenland

General information
State: Submitted
Organisations: Section for Geotechnics and Geology, Department of Civil Engineering, Arctic Technology Centre, Aarhus University, University of Copenhagen
Authors: Lund-Hansen, L. C. (Ekstern), Andersen, T. J. (Ekstern), Nielsen, M. H. (Intern), Pejrup, M. (Ekstern)
Publication date: 2008
Main Research Area: Technical/natural sciences

Publication information
Feasibility study for small-scale hydropower in Sarfannguaq, West Greenland

General information
State: Published
Organisations: Section for Geotechnics and Geology, Department of Civil Engineering, Arctic Technology Centre, Technical University of Denmark
Authors: Nielsen, M. H. (Intern), Holm, F. M. (Ekstern)
Number of pages: 120
Pages: 46-51
Publication date: 2008

Host publication information
Title of host publication: Sustainable Energy Supply in the Arctic
ISBN (Print): 9788778772589
Main Research Area: Technical/natural sciences
Conference: Sustainable Energy Supply in the Arctic, Sisimiut, Greenland, 01/01/2008
Source: orbit
Source-ID: 232530
Publication: Research › Article in proceedings – Annual report year: 2008

Forskningsprojekt fra idé til virkelighed

General information
State: Published
Organisations: Section for Geotechnics and Geology, Department of Civil Engineering, Arctic Technology Centre
Authors: Nielsen, M. H. (Intern)
Publication date: 2008

Publication information
Original language: Danish
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 232533
Publication: Education › Sound/Visual production (digital) – Annual report year: 2008

Klimaets fodspor i mudderet

General information
State: Published
Organisations: Section for Geotechnics and Geology, Department of Civil Engineering, Arctic Technology Centre, Aarhus University, University of Copenhagen
Authors: Nielsen, M. H. (Intern), Lund-Hansen, L. C. (Ekstern), Erbs-Hansen, D. R. (Ekstern), Andersen, T. J. (Ekstern)
Pages: 8-11
Publication date: 2008
Main Research Area: Technical/natural sciences

Publication information
Journal: Aktuel Naturvidenskab
Volume: 5
ISSN (Print): 1399-2309
Ratings:
ISI indexed (2013): ISI indexed no
ISI indexed (2012): ISI indexed no
ISI indexed (2011): ISI indexed no
Original language: Danish
Source: orbit
Source-ID: 232527
Publication: Communication › Journal article – Annual report year: 2008
Mega-banker i Great Australian Bight; økologi eller fysik

General information
State: Published
Organisations: Section for Geotechnics and Geology, Department of Civil Engineering, Arctic Technology Centre, University of Aberdeen, Aarhus University, Commonwealth Scientific and Industrial Research Organisation, University of Copenhagen
Publication date: 2008
Event: Abstract from Galathea 3-arrangement, Copenhagen, Denmark.
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 232532
Publication: Research › Conference abstract for conference – Annual report year: 2008

Nutrient and phytoplankton dynamics influenced by hydraulic control in the Little Belt, Denmark

General information
State: Submitted
Organisations: Section for Geotechnics and Geology, Department of Civil Engineering, Arctic Technology Centre, Aarhus University
Authors: Bruhn, A. (Ekstern), Lund-Hansen, L. C. (Ekstern), Mouritzen, L. T. (Ekstern), Richardson, K. (Ekstern), Nielsen, M. H. (Intern), Vang, T. (Ekstern)
Publication date: 2008
Main Research Area: Technical/natural sciences

Publication information
Journal: Marine Ecology Progress Series
ISSN (Print): 0171-8630
Ratings:
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 2.4
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): CiteScore 2.56
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): CiteScore 2.75
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): CiteScore 2.79
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): CiteScore 2.9
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): CiteScore 2.85
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 2
Web of Science (2010): Indexed yes
Oceanographic conditions in the Great Australian Bight. Leg 8 of the Galathea 3 Expedition, November 2006

General information
State: Published
Organisations: Section for Geotechnics and Geology, Department of Civil Engineering, Arctic Technology Centre, Aarhus University, Commonwealth Scientific and Industrial Research Organisation, University of Aberdeen, University of Copenhagen
Publication date: 2008
Event: Abstract from Galathea 3-arrangement, Copenhagen, Denmark.
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 232531
Publication: Research › Conference abstract for conference – Annual report year: 2008

Physical oceanographic conditions and recent foraminifera in Kangerlussuaq, in large fjord in West Greenland

General information
State: Published
Organisations: Section for Geotechnics and Geology, Department of Civil Engineering, Arctic Technology Centre, Aarhus University
Authors: Nielsen, M. H. (Intern), Reng, D. (Ekstern), Knudsen, K. L. (Ekstern)
Publication date: 2007
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 208599
Publication: Research › Conference abstract for conference – Annual report year: 2007

Recent foraminifera and physical oceanographic conditions in Kangerlussuaq, in large fjord in West Greenland

General information
State: Published
Organisations: Section for Geotechnics and Geology, Department of Civil Engineering, Arctic Technology Centre, Aarhus University
Authors: Reng, D. (Ekstern), Nielsen, M. H. (Intern), Knudsen, K. L. (Ekstern)
Publication date: 2007
Event: Poster session presented at International Arctic Workshop, University of Iceland.
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 208600
Publication: Research › Poster – Annual report year: 2007
A consistent high primary production and chlorophyll-a maximum in a narrow strait – Effects of hydraulic control

General information
State: Published
Organisations: Section for Geotechnics and Geology, Department of Civil Engineering, Arctic Technology Centre, Aarhus University, Vejle County
Authors: Lund-Hansen, L. C. (Ekstern), Nielsen, M. H. (Intern), Bruhn, A. (Ekstern), Vang, T. (Ekstern)
Publication date: 2006
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 193604
Publication: Research › Poster – Annual report year: 2006

Fyrtånsbygd - 083 Sarfannguaq: Forprojekt

General information
State: Published
Organisations: Section for Building Physics and Services, Department of Civil Engineering, Fluid Mechanics, Department of Mechanical Engineering, Electric Power Engineering, Department of Electrical Engineering, Section for Geotechnics and Geology, Arctic Technology Centre, Nuuk
Authors: Andersen, E. (Intern), Furbo, S. (Intern), Hansen, K. S. (Intern), Hansen, M. O. L. (Intern), Kjeldmann, P. (Ekstern), Larsen, E. (Intern), Nielsen, M. H. (Intern), Villumsen, A. (Intern)
Number of pages: 82
Publication date: 2006

Publication information
Place of publication: Lyngby
Publisher: Technical University of Denmark (DTU)
Original language: Danish
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 195052
Publication: Research › Report – Annual report year: 2006

Physical oceanographic conditions in West Greenland with reference to environmental issues

General information
State: Published
Organisations: Arctic Technology Centre, Section for Geotechnics and Geology, Department of Civil Engineering
Authors: Nielsen, M. H. (Intern)
Number of pages: 103
Pages: 23-30
Publication date: 2006

Host publication information
Title of host publication: The Greenland Environment : Pollution and Solutions
Place of publication: Kgs. Lyngby
Publisher: ARTEK, BYG.DTU
Main Research Area: Technical/natural sciences
Conference: The Greenland Environment : Pollution and Solutions, Sisimiut, 01/01/2006
Source: orbit
Source-ID: 193602
Publication: Research › Article in proceedings – Annual report year: 2006

The influence of hydraulic control on nutrient and phytoplankton dynamics in the Little Belt

General information
State: Published
Organisations: Section for Geotechnics and Geology, Department of Civil Engineering, Arctic Technology Centre, Aarhus University
Transport and hydraulically-induced recycling of phosphorous in the North Sea-Baltic Sea transition zone

Bottom-mounted acoustic Doppler current profiler measurements indicate that the net transport of water (844 m$^3$ s$^{-1}$) in the Little Belt makes up only 6% of the total transport between the Baltic Sea and the North Sea. This is a smaller percentage than the 9% commonly found in the literature. Owing to barotropic and tidal currents the gross transport is 5 times larger. The net transport is directed towards the North Sea mainly in the top 32 m of the water column but towards the Baltic Sea it occurs in the lower 5 m of the water column. The resulting transport of phosphorus is strongly affected by vertical mixing in an area of hydraulic control in the narrow part of the Little Belt. Comparisons of phosphorus profiles in stratified waters and in the mixing area indicate a yearly entrainment of 15 tonnes P from the bottom water to the surface layer. This vertical transport of P forms part of an internal loop in the general transport between the Baltic Sea and the North Sea. Compared to the transport observed 15-16 years ago, the present net phosphorus transport of 163 tonnes yr$^{-1}$ from the Baltic Sea through the Little Belt is substantially lower.

Udnyttelse af vedvarende energikilder: Vandkraft

Vind- og solprojekt i Uummannap Kommunia: Forprojekt
Chlorophyll maximum in the Little Belt – the effect of hydraulic control?

Havets græsmark vokser ujævnt: Om strøm og algevækst i Lillebælt

Hydraulic control in the Little Belt – indications and effects
Mixing and entrainment in hydraulically-driven, stratified sill flows

General information
State: Published
Organisations: Section for Building Materials and Geotechnics, Department of Civil Engineering, Arctic Technology Centre, Woods Hole Oceanographic Institution
Authors: Nielsen, M. H. (Intern), Pratt, L. R. (Ekstern), Helfrich, K. R. (Ekstern)
Number of pages: 4,820
Publication date: 2005

Host publication information
Title of host publication: Geophysical Research Abstract
Volume: 7
Publisher: European Geophysical Union
Main Research Area: Technical/natural sciences
Conference: European Geophysical Union General Assembly, Vienna, Austria, 01/01/2005
Source: orbit
Source-ID: 185093
Publication: Research - peer-review › Conference abstract in proceedings – Annual report year: 2005

The influence of the hydrography on the transport of nutrients in the Little Belt

General information
State: Published
Organisations: Section for Building Materials and Geotechnics, Department of Civil Engineering, Arctic Technology Centre, Vejle County, University of Copenhagen
Authors: Kepp, R. (Ekstern), Struve, A. (Ekstern), Christiansen, C. (Ekstern), Vang, T. (Ekstern), Nielsen, M. H. (Intern)
Publication date: 2005
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 185090
Publication: Research › Poster – Annual report year: 2005

The Little Belt 2004

General information
State: Published
Organisations: Section for Building Materials and Geotechnics, Department of Civil Engineering, Arctic Technology Centre, Vejle County
Authors: Vang, T. (Ekstern), Nielsen, M. H. (Intern)
Number of pages: 97
Publication date: 2005

Publication information
Publisher: Fyns Amt, Sønderjyllands Amt, Vejle Amt
ISBN (Print): 87-7343-603-8
Original language: Danish
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 185101
Publication: Research - peer-review › Report – Annual report year: 2005

Intern hydraulisk kontrol og blanding i Øresund og Lillebælt

General information
State: Published
Organisations: Section for Geotechnics and Geology, Department of Civil Engineering, Arctic Technology Centre, Aarhus University, Vejle County
Authors: Nielsen, M. H. (Intern), Lund-Hansen, L. C. (Ekstern), Vang, T. (Ekstern)
Publication date: 2004
Mixing and entrainment in hydraulically driven stratified sill flows
The investigation involves the hydraulic behaviour of a dense layer of fluid flowing over an obstacle and subject to entrainment of mass and momentum from a dynamically inactive (but possibly moving) overlying fluid. An approach based on the use of reduced gravity, shallow-water theory with a cross-interface entrainment velocity is compared with numerical simulations based on a model with continuously varying stratification and velocity. The locations of critical flow (hydraulic control) in the continuous model are estimated by observing the direction of propagation of small-amplitude long-wave disturbances introduced into the flow field. Although some of the trends predicted by the shallow-water model are observed in the continuous model, the agreement between the interface profiles and the position of critical flow is quantitatively poor. A reformulation of the equations governing the continuous flow suggests that the reduced gravity model systematically underestimates inertia and overestimates buoyancy. These differences are quantified by shape coefficients that measure the vertical non-uniformities of the density and horizontal velocity that arise, in part, by incomplete mixing of entrained mass and momentum over the lower-layer depth. Under conditions of self-similarity (as in Wood's similarity solution) the shape coefficients are constant and the formulation determines a new criterion for and location of critical flow. This location generally lies upstream of the critical section predicted by the reduced-gravity model. Self-similarity is not observed in the numerically generated flow, but the observed critical section continues to lie upstream of the location predicted by the reduced gravity model. The factors influencing this result are explored.
Mixing and entrainment in hydraulically-driven, stratified sill flows

General information
State: Published
Organisations: Section for Geotechnics and Geology, Department of Civil Engineering, Arctic Technology Centre, Woods Hole Oceanographic Institution
Authors: Nielsen, M. H. (Intern), Pratt, L. (Ekstern), Helfrich, K. (Ekstern)
Publication date: 2004

Publication information
Original language: English
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 154143
Publication: Research - peer-review › Journal article – Annual report year: 2004

Mixing and entrainment in hydraulically-driven, stratified sill flows

General information
State: Published
Organisations: Section for Geotechnics and Geology, Department of Civil Engineering, Arctic Technology Centre, Woods Hole Oceanographic Institution
Authors: Nielsen, M. H. (Intern), Pratt, L. (Ekstern), Helfrich, K. (Ekstern)
Publication date: 2004

Publication information
Original language: English
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 154160
Publication: Research › Sound/Visual production (digital) – Annual report year: 2004
Strøm, blanding og primær-produktion i Lillebælt

General information
State: Published
Organisations: Section for Geotechnics and Geology, Department of Civil Engineering, Arctic Technology Centre, Aarhus University, Vejle County
Authors: Lund-Hansen, L. C. (Ekstern), Nielsen, M. H. (Intern), Vang, T. (Ekstern)
Publication date: 2004

Evidence for internal hydraulic control in the northern Øresund
New observations of mainly flow velocity, salinity, and temperature are used to show and discuss some of the physical conditions in Øresund, the strait between Denmark and Sweden, one of three connections between the brackish Baltic Sea and the saline North Sea. The main geometric features are a contraction in the northern Øresund and the shallow Drogden sill at the entrance to the Baltic. The observations show that the two-layer flows through the contraction are often hydraulically controlled. The observations also reveal details of the transition from subcritical to supercritical flow. In terms of the composite Froude number, on the basis of local flow parameters these details are that the flow may be subcritical as well as supercritical in different areas of some cross section. Existing theories on rotating hydraulics are unable to account for these circumstances, which are due to the strong influence of the Earth's rotation and the curvature of the streamlines. In the present study it is not attempted to explain these conditions, but the probable effects of rotation and curvature on the controlled flow rate are discussed briefly. Also, the possible effects of hydraulic control on the exchange of the Baltic are discussed. It is argued that the stratification in the Kattegat, the sea to the north, is more important than the presence of the Drogden sill for the amount of high saline water to enter the Baltic through Øresund. This result is supported by observations of the stratification in Øresund and the flow at the sill. The observations show that the interface in Øresund rises significantly during flow to the Baltic and that the transport of saline water into the Baltic is closely connected to the shallowness of the interface in Øresund.

General information
State: Published
Organisations: Department of Hydrodynamics and Water Resources
Authors: Nielsen, M. H. (Intern)
Pages: 14055-14068
Publication date: 2001
Main Research Area: Technical/natural sciences

Publication Information
Journal: Journal of Geophysical Research
Volume: 106
Issue number: C7
ISSN (Print): 0148-0227
Ratings:
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 3.36 SJR 1.996 SNIP 1.313
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 2.288 SNIP 1.362 CiteScore 3.39
Modelling thermal stratification in the North Sea: Application of a 2-D potential energy model

The spatial and temporal dynamics of the North Sea ecosystem are dependent upon vertical mixing processes which modify the availability of light and limit nutrients for phytoplankton production. In order to examine the effects of inter and intra annual variations in stratification on ecosystem dynamics we have developed and tested a potential energy model of thermal stratification based on the energy equation (for turbulence). The energy equation relates the temporal and spatial changes of turbulent kinetic energy (TKE), the production of TKE and the dissipation of TKE to the change of potential energy as water masses of different densities are mixed in the field of gravity. A constant ratio between the gain in potential energy and the production of TKE is assumed, known as the flux Richardson number. The model is comprised of 0.5m vertical layers with a temporal time step of 1 day. The model is forced with wind, dew point temperature from Ekofisk.
oilfield in the central North Sea, and tidal current and atmospheric radiation. The model is used to simulate the seasonal cycle of stratification in the central North Sea in the years 1988, 1989 and 1990 and is compared to density profiles in these years available from the ICES hydrographic database. We find that the model is able to simulate variations in thermal stratification including the seasonal onset and breakdown of stratification, the thermocline depth, and the effects of discrete wind and cooling events. For the years 1988–1990 we find an R²=0.97 between observed and predicted upper layer temperatures. However, the model is less successful in the prediction of temperatures of the intermediate and deep layers (R²=0.46 and 0.14) due to small deviations in thermocline depth and variations in tidal amplitude. The model was then applied to examine potential differences in stratification between the years 1990 and 1996. Simulations suggested that the development of stratification is very rapid in 1990 and that the spring of 1996 is very cold. Both of these observations having the potential to impact on the efficiency of lower trophic level coupling and production.

**General information**
State: Published
Organisations: Department of Hydrodynamics and Water Resources, Section for Population Ecology and Genetics, National Institute of Aquatic Resources
Authors: Nielsen, M. H. (Intern), St. John, M. (Intern)
Pages: 607-617
Publication date: 2001
Main Research Area: Technical/natural sciences

**Publication information**
Journal: Estuarine, Coastal and Shelf Science
Volume: 53
Issue number: 5
ISSN (Print): 0272-7714
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 2.43 SJR 0.997 SNIP 1.127
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.107 SNIP 1.186 CiteScore 2.44
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.067 SNIP 1.257 CiteScore 2.28
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.323 SNIP 1.439 CiteScore 2.64
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 1.256 SNIP 1.419 CiteScore 2.52
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 1.383 SNIP 1.325 CiteScore 2.52
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 1.231 SNIP 1.202
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 1.169 SNIP 1.262
BFI (2008): BFI-level 2
Scopus rating (2008): SJR 1.244 SNIP 1.302
Rotational Baroclinic Adjustment: Surface Fronts in the Kattegat

General information
State: Published
Organisations: Department of Hydrodynamics and Water Resources
Authors: Holtegård Nielsen, S. M. (Intern)
Number of pages: 151
Publication date: 1998

Publication information
Place of publication: Lyngby
Publisher: Department of Hydrodynamics and Water Resources, Technical University of Denmark
Original language: English
Source-ID: 171172
Publication: Research - peer-review › Book – Annual report year: 1998

Projects:

Fate and distribution of mine tailings in marine sediments – a pilot study on the effects of geochemistry and organisms
Due to future increase of mining activity in Greenland, the problem of handling mine tailings (contaminated waste material) will occur. One solution, which is often used elsewhere, is to deposit the waste material in the sea. Negative environmental impacts are expected. Therefore a pilot experiment should be initiated, which should examine how deposited waste materials from mine tailings might react with the marine environment. Sediment, pore water and seawater will be analysed for heavy metal concentrations and other geochemical parameters as a function of time and other variables.

Department of Civil Engineering
Section for Geotechnics and Geology

Section for Arctic Technology
Period: 01/08/2012 → 31/10/2013
Number of participants: 3
Project participant:
Bollwerk, Sandra (Intern)
Bach, Lis (Ekstern)
Nielsen, Morten Holtegaard (Intern)

Project
Erosion, transport og aflejring af glaciale sedimenter ved Kangerlussuaq, Grønland

Department of Civil Engineering
Period: 01/05/2010 → 05/03/2014
Number of participants: 4
Phd Student:
Ploug, Johan (Intern)
Supervisor:
Andersen, Thorbjørn Joest (Ekstern)
Villumsen, Arne (Intern)
Main Supervisor:
Nielsen, Morten Holtegaard (Intern)

Financing sources
Source: Internal funding (public)
Name of research programme: Institut stipendie (DTU)
Project: PhD

Hydro Power Potentials in Southern Greenland

Department of Civil Engineering
Period: 01/09/2008 → 13/07/2010
Number of participants: 4
Phd Student:
Choma, Mojmir (Intern)
Supervisor:
Hardenberg, Svend (Ekstern)
Nielsen, Morten Holtegaard (Intern)
Main Supervisor:
Villumsen, Arne (Intern)

Financing sources
Source: Internal funding (public)
Name of research programme: Ansat eksternt
Project: PhD

Climate Change : Adapting to The Impacts, by Communities in Northern Peripheral Regions

Aim The overall objective of the project is to establish a sustainable advice and training service for community climate change adaptation across the whole of the Northern Periphery. The project, and the eventual information, training, and advice service, will have a particular emphasis on identifying how climate change may bring opportunities for fostering the sustainability of communities in the Northern Periphery through local employment opportunities, social benefits, and environmental management. Participating regions: Scotland - Cairngorms National Park and Glen Urquhart Sweden - Lycksele and Äre Finland - City of Rovaniemi, Kittilä and Kolari Norway - County of Sogn og Fjordane and Flora Greenland - Sisimiut, Ilulissat and Uumanaq Objectives The project will undertake a number of key activities over a three-year period, with communities and community sector stakeholders across five regions of the Northern Periphery, to build the necessary knowledge: Investigation, collation and communication of relevant information on potential direct and indirect impacts of climate change to small peripheral rural communities; Development of adaptation strategies by these communities to avoid or reduce the negative impacts of climate change, while taking advantage of opportunities; Implementation of adaptation demonstration projects with a focus on trans-national activities; Establishment of a formal mechanism to disseminate knowledge for community adaptation. Five work packages will jointly contribute to the overall objective. Work packages 2 and 3 will develop the capacity for adaptation, work package 4 will evaluate the realities of delivering adaptation actions, and work package 5 will bring all the lessons together and create a sustainable service, providing information, training and advice relating to community climate change adaptation. Outcomes The knowledge gained will initially be made available to all those participating, and then to non-participating communities and stakeholders, through a variety of regional and international dissemination events throughout the project and, in the long term, through the establishment of a formal service. This will ensure a high quality in the content and delivery of information, and the capacity to remain abreast of emerging knowledge relating to climate change, likely impacts, and
opportunities for adaptation.

Department of Civil Engineering

Arctic Technology Centre
Period: 01/03/2008 → 28/02/2011
Number of participants: 7
Acronym: Clim-ATIC
Project ID: 25943
Contact person:
Villumsen, Arne (Intern)
Project participant:
Nielsen, Morten Holtegaard (Intern)
Jensen, Pernille Erland (Intern)
Thrane, Helle Wingaard (Intern)
Gunnarsdottir, Ragnhildur (Intern)
Jørgensen, Marianne Willemoes (Intern)
Dragsted, Janne (Intern)

Financing sources
Source: Forsk. EU - Andre EU-midler
Name of research programme: Forsk. EU - Andre EU-midler
Amount: 18,000,000.00 Danish Kroner

Dynamics of the seas and straits around Denmark
Based on a time series of satellite images the dynamics of the waters around Denmark is studied. By focussing on different parts of the area the thermal data may be used to reveal upper layer structures and their development during several days. Together with oceanographic and meteorological observations the thermal images provide a strong tool for studying sea and strait dynamics which is very much influenced by the rotation of the earth.

Department of Hydrodynamics and Water Resources

Danish Meteorological Institute
Period: 01/10/1998 → 14/12/1999
Number of participants: 1
Project Manager, organisational: Nielsen, Morten Holtegaard (Intern)

The coupling between the dynamics and the biology in the North Sea
In stratified waters there may be a close connection between the dynamics and the biology of the water masses. Recent research suggests that this circumstance is responsible for the fact that the North Sea is among the world's most important with respect to the production of fish. The project aims at studying this possible close connection by considering the course of the thermal stratification in the North Sea and the abundance of cod larvae for the past 40 years.

Department of Hydrodynamics and Water Resources

National Institute of Aquatic Resources

Department of Environmental Engineering
Period: 01/10/1998 → 14/12/1999
Number of participants: 2
Project participant: St. John, Michael (Intern)
Project Manager, organisational: Nielsen, Morten Holtegaard (Intern)

The dynamics of large baroclinic currents
The rotation of the earth is of major importance for large baroclinic currents as eg. the Gulfstream. The aim of the project is to study the dynamics of large baroclinic currents and their driving and controlling mechanisms. Large baroclinic currents are of great importance for the biology and the production of fish in the world's seas and oceans. Also, such currents influence the global climate as became apparent in connection with the 1997 El Niño event in the Pacific.
The hydraulics of channels influenced by rotation of the earth

Controlled flow in ordinary channels occurs when the fluid flows through a contraction or over a barrier as e.g. a dam. The same effect takes place in very wide channels although the rotation of the earth makes the description far more complicated. This is due to the considerable cross-channel variations of depth and speed that are induced by rotation. Based on observations from the northern Øresund where one may observe a two-layered version of the phenomenon the project aims at giving a physical and mathematical description of the problem.

Overfladefronters dynamik og biologi

Department of Hydrodynamics and Water Resources
Period: 01/10/1998 → 14/12/1999
Number of participants: 1
Project Manager, organisational:
Nielsen, Morten Holtegaard (Intern)

Financing sources
Source: Internal funding (public)
Name of research programme: DTU-Su Stipendium, Eksperiment
Project: PhD