Calanus hyperboreus and the lipid pump

Lipid-fuelled overwintering by copepods can be a regionally important contribution to carbon sequestration in the deep oceans. Here, we estimate the contribution for Calanus hyperboreus, found in abundance in the northern reaches of the North Atlantic and Arctic Ocean. Estimates for regions with high overwintering populations, Fram Strait, Greenland Sea and Iceland Sea lie between 3.5 gC m\(^{-2}\) yr\(^{-1}\) and 6.0 gC m\(^{-2}\) yr\(^{-1}\) at depths of 1000–3000 m, comparable to the flux of detrital organic carbon at commensurate depths. Apart from the variation in the abundance of overwintering populations, these estimates are most sensitive to mortality rates. We present a general model based on metabolic theory and isomorphism that can be used to constrain estimates for data poor species in other parts of the global ocean.
Connectivity and Dispersal of Salmon Lice in a Tidal Energetic Island System: Faroe Islands

General information
State: Published
Organisations: National Institute of Aquatic Resources, Centre for Ocean Life, Section for Marine Ecology and Oceanography, Aquaculture Research Station of the Faroes
Authors: Kragesteen, T. J. (Intern), Simonsen, K. (Ekstern), Visser, A. (Intern), Andersen, K. H. (Intern)
Publication date: 2017
Dynamics of phytoplankton blooms in turbulent vortex cells

Turbulence and coherent circulation structures, such as submesoscale and mesoscale eddies, convective plumes and Langmuir cells, play a critical role in shaping phytoplankton spatial distribution and population dynamics. We use a framework of advection-reaction-diffusion equations to investigate the effects of turbulent transport on the phytoplankton population growth and its spatial structure in a vertical two-dimensional vortex flow field. In particular, we focus on how turbulent flow velocities and sinking influence phytoplankton growth and biomass aggregation. Our results indicate that conditions in mixing and growth of phytoplankton can drive different vertical spatial structures in the mixed layer, with the depth of the mixed layer being a critical factor to allow coexistence of populations with different sinking speed. With increasing mixed layer depth, positive growth for sinking phytoplankton can be maintained with increasing turbulent flow velocities, allowing the apparently counter-intuitive persistence of fast sinking phytoplankton populations in highly turbulent and deep mixed layers. These dynamics demonstrate the role of considering advective transport within a turbulent vortex and can help to explain observed phytoplankton biomass during winter in the North Atlantic, where the overturn of deep convection has been suggested to play a critical role in phytoplankton survival.
Effect of exposure on salmon lice Lepeophtheirus salmonis population dynamics in Faroese salmon farms

We assessed variations in salmon lice Lepeophtheirus salmonis population dynamics in Faroese salmon farms in relationship to their physical exposure to local circulation patterns and flushing with adjacent waters. Factors used in this study to quantify physical exposure are estimates of the freshwater exchange rate, the tidal exchange rate and dispersion by tidal currents. Salmon farms were ranked according to the rate of increase in the average numbers of salmon lice per fish. In a multiple linear regression, physical exposure together with temperature were shown to have a significant effect on the rate of lice infection. The sites with low exposure revealed higher rates of self-infection and internally driven outbreak dynamics, while high-exposure sites showed lower rates of self-infection, tending towards externally driven outbreak dynamics. The low-exposure sites also appeared to have a lower threshold of salmon stocking numbers for outbreaks of infection. The study presents a simple method of characterizing salmon farming fjords in terms of their different exposure levels and how they relate to potential self-infection at these sites.

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Ecology and Oceanography, Aquaculture Research Station of the Faroes
Authors: Patursson, E. J. (Ekstern), Simonsen, K. (Ekstern), Visser, A. (Intern), Patursson, Ø. (Ekstern)
Pages: 33-43
Publication date: 2017
Main Research Area: Technical/natural sciences

Publication information
Journal: Aquaculture Environment Interactions
Volume: 9
Issue number: 1
ISSN (Print): 1869-215X

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 2.19 SJR 0.945 SNIP 1.051
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.867 SNIP 0.867 CiteScore 2.25
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.861 SNIP 1.047 CiteScore 2.25
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.253 SNIP 1.495 CiteScore 2.45
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.729 SNIP 1.108 CiteScore 1.19
ISI indexed (2012): ISI indexed no
Web of Science (2012): Indexed yes
Scopus rating (2011): SJR 1.144 SNIP 1.167
Web of Science (2011): Indexed yes
Original language: English
Electronic versions:
Effects of high-frequency strobed laser light on Atlantic cod (Gadus morhua) physiology and behavior

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Ecology and Oceanography, Section for Aquaculture, Centre for Ocean Life, SINTEF, Swedish University of Agricultural Sciences
Authors: Behrens, J. (Intern), Jarnit, S. (Intern), Methling, C. (Intern), Mariani, P. (Intern), Thorstensen, J. (Ekstern), Risholm, P. (Ekstern), Thielemann, J. T. (Ekstern), Haugholt, K. H. (Ekstern), Gräns, A. (Ekstern), Visser, A. (Intern)
Publication date: 2017
Event: Abstract from Dansk Havforskermøde, Helsingør, Denmark.
Main Research Area: Technical/natural sciences
Publication information
Journal: Aquaculture Environment Interactions
ISSN (Print): 1869-215X
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 2.19 SJR 0.945 SNIP 1.051
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.867 SNIP 0.867 CiteScore 2.25
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.861 SNIP 1.047 CiteScore 2.25
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.253 SNIP 1.495 CiteScore 2.45
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.729 SNIP 1.108 CiteScore 1.19

Identifying salmon lice transmission characteristics between Faroese salmon farms

Sea lice infestations are an increasing challenge in the ever-growing salmon aquaculture sector and cause large economic losses. The high salmon production in a small area creates a perfect habitat for parasites. Knowledge of how salmon lice planktonic larvae disperse and spread the infection between farms is of vital importance in developing treatment management plans to combat salmon lice infestations. Using a particle tracking model forced by tidal currents, we show that Faroese aquaculture farms form a complex network. In some cases as high as 10% of infectious salmon lice released at one farm site enter a neighboring fjord containing another farm site. Farms were characterized as emitters, receivers or isolated, and we could identify two clusters of farms that were largely isolated from each other. The farm characteristics are a valuable input for the development of management plans for the entire Faroese salmon industry.

General information
State: Accepted/In press
Organisations: National Institute of Aquatic Resources, Centre for Ocean Life, Section for Oceans and Arctic, Aquaculture Research Station of the Faroes
Authors: Kragesteen, T. J. (Intern), Simonsen, K. (Ekstern), Visser, A. (Intern), Andersen, K. H. (Intern)
Publication date: 2017
Main Research Area: Technical/natural sciences
Seasonal succession in zooplankton feeding traits reveals trophic trait coupling

The seasonal forcing of pelagic communities invokes a succession of the dominant phytoplankton and zooplankton species. Here, we characterize the seasonal succession of the plankton traits and their interactions using observations and model simulations of the plankton community in the western English Channel. We focus on activity traits that characterize the defensive and feeding abilities of zooplankton and distinguish between low risk, low return ambush feeders and high risk, high return feeding-current feeders. While the phytoplankton succession depends on traits related to nutrient acquisition and photosynthesis, it also depends on grazing which couples feeding and motility traits across trophic guilds. Despite interannual variations in the species dominating the protist plankton community, the seasonal trait distribution reveals robust and repeatable seasonal patterns, changing between non-motile cells flourishing in spring and motile community dominating during summer. The zooplankton community is dominated by active feeding-current feeders with peak biomass in the late spring declining during summer. The model reveals how zooplankton grazing reinforces protist plankton seasonal succession and shows how the physical environment controls the vertical structure of plankton communities, where ambush feeders exhibit a preference for greater depths during summer. We characterize the seasonal succession as trophic trait coupling and conjecture that this coupling leads to a trophic trait cascade where successive trophic levels alternate in their expression of activity traits further up in the food chain.

General information
State: Published
Organisations: National Institute of Aquatic Resources, Centre for Ocean Life, Section for Marine Ecology and Oceanography
Authors: Kenitz, K. (Intern), Visser, A. (Intern), Mariani, P. (Intern), Andersen, K. H. (Intern)
Pages: 1184-1197
Publication date: 2017
Main Research Area: Technical/natural sciences

Publication information
Journal: Limnology and Oceanography
Volume: 62
Issue number: 3
ISSN (Print): 0024-3590
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 3.5 SJR 1.712 SNIP 1.225
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 2.472 SNIP 1.422 CiteScore 3.93
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 2.112 SNIP 1.584 CiteScore 3.73
BFI (2013): BFI-level 2
Scopus rating (2013): SJR 2.256 SNIP 1.587 CiteScore 3.98
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
Seasonal succession in zooplankton feeding traits reveals trophic trait coupling

General information
State: Published
Organisations: National Institute of Aquatic Resources, Centre for Ocean Life, Section for Marine Ecology and Oceanography
Authors: Kenitz, K. (Intern), Visser, A. (Intern), Mariani, P. (Intern), Andersen, K. H. (Intern)
Publication date: 2017
Event: Abstract from Dansk Havforskmøde, Helsingør, Denmark.
Main Research Area: Technical/natural sciences
Publication: Research › Conference abstract for conference – Annual report year: 2017

Adult lifetime reproductive value in fish depends on size and fecundity type

In a stable population, the adult lifetime reproductive value must be balanced against early life survival. Although delaying maturity may increase fecundity, it also reduces survival. Larger size at maturity therefore not only allows for higher fecundity, but requires it. Using simple arguments from life history, we derive a direct proportionality relationship between
the adult lifetime reproductive value and weight at maturation and find that this relationship is consistent with empirical
evidence from 28 stocks and species of bony fish from temperate–boreal environments. However, the expected
proportionality falls off if
mortality increases to include fishing. Furthermore, we find that the fecundity type (determinate or indeterminate) affects
the predicted adult reproductive value, which is significantly (10-fold) higher for an indeterminate spawner than for a
determinate spawner of the same weight. These differences may relate to trade-offs in the adult life history traits and (or)
to seasonality in the
spawning environment, with subsequent consequences for early life stage survivorship

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Ecology and Oceanography, Section for
Ecosystem based Marine Management
Pages: 1405-1412
Publication date: 2016
Main Research Area: Technical/natural sciences

Publication information
Journal: Canadian Journal of Fisheries and Aquatic Sciences
Volume: 73
Issue number: 9
ISSN (Print): 0706-652X
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 2.56 SJR 1.322 SNIP 1.163
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 1.256 SNIP 1.051 CiteScore 2.22
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 1.443 SNIP 1.379 CiteScore 2.6
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): SJR 1.421 SNIP 1.081 CiteScore 2.25
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): SJR 1.324 SNIP 1.196 CiteScore 2.29
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): SJR 1.423 SNIP 1.09 CiteScore 2.13
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 2
Scopus rating (2010): SJR 1.425 SNIP 1.118
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 2
Scopus rating (2009): SJR 1.451 SNIP 1.196
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 2
Scopus rating (2008): SJR 1.589 SNIP 1.379
Web of Science (2008): Indexed yes
Carbon export by vertically migrating zooplankton: Optimal vertical migration and carbon export

Through diel vertical migration (DVM), zooplankton add an active transport to the otherwise passive sinking of detrital material that constitutes the biological pump. This active transport has proven difficult to quantify. We present a model that estimates both the temporal and depth characteristic of optimal DVM behavior based on a trade-off between feeding opportunity and predation risk; factors that vary with latitude, time of year, and the size of the migrating animal. This behavioral component, coupled to a nutrient-phytoplankton-zooplankton (NPZ) productivity model provides estimates of the active transport of carbon by different size fractions of the migrating zooplankton population as function of time and space. The approach is motivated by the difficulty in incorporating behavioral aspects of carbon transport into large scale carbon budgets of the world's oceans. The results show that despite their lower abundance, large zooplankton (length circa 1–2 mm) migrate deeper and transport approximately twice as much carbon as do the smaller zooplankton (length circa 0.2–0.3 mm). In mid-latitudes (~30°N to ~45°N), where pronounced spring blooms are observed, up to 20% more carbon is transported than at either equatorial or boreal latitudes. We estimate that the amount of carbon transported below the mixed layer by migrating zooplankton in the North Atlantic Ocean constitutes 27% (16–30%) of the total export flux associated with the biological pump in that region.

General information
State: Published
Organisations: National Institute of Aquatic Resources, Centre for Ocean Life, Section for Marine Ecology and Oceanography
Authors: Hansen, A. N. (Intern), Visser, A. W. (Intern)
Pages: 701-710
Publication date: 2016
Main Research Area: Technical/natural sciences

Publication information
Journal: Limnology and Oceanography
Volume: 61
Issue number: 2
ISSN (Print): 0024-3590
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 3.5 SJR 1.712 SNIP 1.225
Functional responses of North Atlantic fish eggs to increasing temperature

Temperature increase associated with global climate change can be expected to directly influence the spawning success of fish species, with implications for abundance and distribution. We conducted a meta-analysis to investigate and compare responses of development time, cumulative degree-days and survival of fish eggs from 32 populations of 17 species in the North Atlantic to different temperatures in order to determine potential consequences of global warming for these species. The response of development time exhibited a similar decreasing trend with respect to temperature across species. The similar slopes of regression lines relating Intransformed development time and temperature indicate similar sensitivity to temperature changes. Across-species differences were mainly driven by intercept values, indicating up to 8-fold differences in development time at given temperature. There was an overall decrease, across species, in an index of thermal requirement (cumulative degree-days) for egg development with increasing temperature. Within an empirically derived optimal thermal range for egg survival, the thermal requirement was more variable in species adapted to cold waters compared to species adapted to warmer waters. Moreover, the sensitivity of survival of eggs from different species to increases in temperature differed, reflecting a pattern of sensitivity along a stenotherm-eurytherm gradient of vulnerability to temperature among species. The results quantify physiological effects of temperature on the eggs, and we propose that such effects are major factors leading to a close correspondence between the physiological optimal temperature for survival and observed temperature at spawning sites. Temperature during egg development appears to be a key evolutionary force affecting spawning time and location.
UTOFIA: Time-of-Flight camera for underwater applications

Today’s ever increasing proliferation of information, real-time data feeds and overwhelming sensor coverage, can often make the world feel small and constrained. However, the oceans and seas contain some of the world’s most unexplored and uncharted regions, and hold valuable physical and informational resources for the planet’s population. As well as the obvious mineral wealth, knowledge regarding the health and well-being of the underwater environment will become critical information over the coming years. Understanding and monitoring fish stocks, mapping the sea floor and assessing the health of the ecosystem, whilst noting the impact of human activity are becoming an increasing concern for both public and commercial bodies. UTOFIA is a H2020 project (633098) is undertaking the development, testing and commercialization of a new, compact and cost-efficient concept for underwater range-gated imaging system. It will offer a compact and cost-effective underwater imaging system for turbid environments. Using range-gated imaging, the system will extend the imaging range by factor 2 to 3 over conventional video systems. At the same time, the system will provide video-rate 3D information. This will fill the current gap between short-range, high-resolution conventional video and long-range low-resolution sonar systems. UTOFIA offers a new modus operandi for the main targeted domains of application: marine life monitoring, harbour and ocean litter detection, fisheries and aquaculture stock assessment, and seabed
mapping. Progress in UTOFIA has been rapid, and we present here a summary of results from deployments of prototypes in observing marine organisms – as a demonstration of the application of the system in monitoring underwater habitats, stock assessment and for use in offshore fish farms.

**General information**
State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Ecology and Oceanography
Authors: Visser, A. (Intern)
Number of pages: 1
Publication date: 2016
Main Research Area: Technical/natural sciences
Links: http://www.sustain.dtu.dk/

**Bibliographical note**
Sustain Abstract S-4
Publication: Research - peer-review › Conference abstract for conference – Annual report year: 2016

**Advective loss of overwintering Calanus finmarchicus from the Faroe-Shetland Channel**
The flow of deep water from the Norwegian Sea to the North Atlantic via the Faroe-Shetland Channel is one of the critical bottlenecks in the meridional overturn circulation. It is also a flow that potentially carries with it a large number of the overwintering copepod, Calanus finmarchicus, a regionally important secondary producer. Using a high resolution hydrodynamic model, MIKE 3 FM, we simulate the overflow of deep water and estimate the associated loss rate of C. finmarchicus as a function of the water depth strata within which they reside. We estimate a net advective loss from the Norwegian Sea population of 80 +/- 10 kt carbon bound in lipids of C finmarchicus biomass per year, a number that constitutes about 50% of the total overwintering population. Estimates of water mass characteristics and particle tracking suggest that the fate of individuals transported in the overflowing water is to be entrained into warmer waters of the North Atlantic Basin, a habitat that appears to be unsuitable for successful overwintering. (C) 2015 Elsevier Ltd. All rights reserved.

**General information**
State: Published
Organisations: Centre for Ocean Life, National Institute of Aquatic Resources, Section for Marine Ecology and Oceanography
Authors: Rullyanto, A. (Intern), Jonasdottir, S. H. (Intern), Visser, A. W. (Intern)
Pages: 76-82
Publication date: 2015
Main Research Area: Technical/natural sciences

**Publication information**
Volume: 98
ISSN (Print): 0967-0637
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 1.45 SNIP 1.119 CiteScore 2.76
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.369 SNIP 1.174 CiteScore 2.77
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.557 SNIP 1.279 CiteScore 2.67
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 2.077 SNIP 1.314 CiteScore 3.11
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
An effective algorithm for approximating adaptive behavior in seasonal environments

Behavior affects most aspects of ecological processes and rates, and yet modeling frameworks which efficiently predict and incorporate behavioral responses into ecosystem models remain elusive. Behavioral algorithms based on life-time optimization, adaptive dynamics or game theory are unsuited for large global models because of their high computational demand. We compare an easily integrated, computationally efficient behavioral algorithm known as Gilliam’s rule against the solution from a life-history optimization. The approximation takes into account only the current conditions to optimize behavior; the so-called "myopic approximation", "short sighted", or "static optimization". We explore the performance of the myopic approximation with diel vertical migration (DVM) as an example of a daily routine, a behavior with seasonal dependence that trades off predation risk with foraging opportunities in aquatic environments. The myopic approximation proves to be a robust replacement for the life-history optimization, deviating only up to 25% in regions of strong seasonality. The myopic approximation has additional advantages in that it can readily accommodate density dependence and inter-annual variations, aspects that can only be accessed in dynamic programming approaches with escalating computational costs. Furthermore, the explanatory power of the myopic approximation is notably higher than when behavior is not implemented, highlighting the importance for adaptive DVM behavior in ecological models where techniques such as dynamic programming are simply too computational demanding to be implemented.

General information

State: Published

Organisations: National Institute of Aquatic Resources, Centre for Ocean Life, Department of Applied Mathematics and Computer Science, Section for Marine Living Resources, Section for Marine Ecology and Oceanography, University of Bergen

Authors: Sainmont, J. (Intern), Andersen, K. H. (Intern), Thygesen, U. H. (Intern), Visser, A. W. (Intern), Fiksen, Ø. (Ekstern)

An effective algorithm for approximating adaptive behavior in seasonal environments

Behavior affects most aspects of ecological processes and rates, and yet modeling frameworks which efficiently predict and incorporate behavioral responses into ecosystem models remain elusive. Behavioral algorithms based on life-time optimization, adaptive dynamics or game theory are unsuited for large global models because of their high computational demand. We compare an easily integrated, computationally efficient behavioral algorithm known as Gilliam’s rule against the solution from a life-history optimization. The approximation takes into account only the current conditions to optimize behavior; the so-called "myopic approximation", "short sighted", or "static optimization". We explore the performance of the myopic approximation with diel vertical migration (DVM) as an example of a daily routine, a behavior with seasonal dependence that trades off predation risk with foraging opportunities in aquatic environments. The myopic approximation proves to be a robust replacement for the life-history optimization, deviating only up to 25% in regions of strong seasonality. The myopic approximation has additional advantages in that it can readily accommodate density dependence and inter-annual variations, aspects that can only be accessed in dynamic programming approaches with escalating computational costs. Furthermore, the explanatory power of the myopic approximation is notably higher than when behavior is not implemented, highlighting the importance for adaptive DVM behavior in ecological models where techniques such as dynamic programming are simply too computational demanding to be implemented.

General information

State: Published

Organisations: National Institute of Aquatic Resources, Centre for Ocean Life, Department of Applied Mathematics and Computer Science, Section for Marine Living Resources, Section for Marine Ecology and Oceanography, University of Bergen

Authors: Sainmont, J. (Intern), Andersen, K. H. (Intern), Thygesen, U. H. (Intern), Visser, A. W. (Intern), Fiksen, Ø. (Ekstern)
Deep water overflow in the Faroe Bank Channel; modelling, processes, and impact
More than 70% of the earth surface is covered by the ocean. The ocean is not static; it is in constant motion at many scales and circulates waters in coastal regions, the open seas and across ocean basins. The flow not only occurs in the surface of the ocean, as we can see in the form of waves or tides, but also deep beneath the surface, where deep-water currents circulate waters throughout the world’s oceans.
In certain very-localized regions, the flow of the deep-water has to travel over a sill in a narrow submarine channel. This overflow process mixes the deep water with overlying waters, creating new water masses with distinct temperature, salinity and density characteristics. The change of water mass characteristics not only affects the local environment, but also far distant regions. The Faroe Bank Channel, which is located in the southern part of Faroe Islands, is one of the most important overflow regions in the world. It connects two huge ocean basins, the North Atlantic Ocean and the Nordic Seas, and the water mass produced there is an important ingredient of North Atlantic Deep Water, a water mass that found very nearly everywhere in the deep basins of the world’s oceans.
In this thesis, I use a high-resolution hydrodynamic model to study in detail the physics of deep-water overflows. Such models are a powerful research tool that can be used to study phenomena that are otherwise difficult to observe, and, when properly calibrated, can be used to predict how circulation may change under different circumstances. The focus is on the Faroe Bank Channel, a relatively small region, which has a significant impact on the global ocean circulation and marine organisms that live in its environment.

General information
State: Published
Fisheries oceanography of northern pelagic fish species

People are familiar with marine fish species and the great variety of different species that are available in the market, such as herring, cod and sole. What may not be well known is that every individual fish goes through a long, risky journey during its life before reaching maturity. Most of the marine fish species are important prey for larger predators, such as larger fish in the ocean, marine mammals, birds and humans. Every individual female fish can produce many thousands to millions of eggs every year during the spawning season. The eggs (usually less than 2 mm in diameter) that live free in the environment, and depending on species, eggs either drift/float in the water or are attached to the bottom close to each other. The larvae that hatch from the eggs grow in size continuously until they reach a certain size and become adults. The first few weeks of its life are the riskiest and most of the eggs and larvae become prey for other organisms living in the sea or perish due to unfavorable conditions, for example high or low temperature or salinity. Those that survive to adulthood will participate with the rest of the population to the reproductive process, called spawning which takes place every year. The period of time that spawning takes place depends on the environmental conditions that each species has adapted to during the life of the species.

Here, I have found that temperature is a significant factor that strongly affects egg development and survival. There are large differences in the temperature range that maximizes survival among different species, but the sensitivity of egg development rate in a degree of temperature increase is similar among the 32 species and populations I analysed. I also found that adults spawn at temperature conditions that are generally close to the egg preferences, indicating that the egg stage is critical to the population abundance.

Two significant factors that regulate the time of spawning are the temperature at which the eggs and larvae can survive best and the availability of food for larvae. In general, at higher latitudes (northern North Atlantic) the optimal conditions are found during a narrower period and at lower latitudes (southern North Atlantic) the optimal conditions last longer. Temperature is also one of the factors that gives the signal to adults that the time to spawn has come. Another finding of my study is that species that have longer spawning seasons, at lower latitudes, are able to produce 10 times more eggs during their life time than species than have a limited spawning season. This may reflect the more un-predictable environmental conditions at lower latitudes. People are also familiar with the words "climate change" and "warming of the oceans". There is already evidence in the scientific community that the temperature in the surface water (0-75m depth) of the North Atlantic has been increasing by 0.11 °C per decade since the 1970s. This will lead to a significant cumulative increase in the next few decades, with many consequences for marine organisms. One of the impacts will be the time that species start to spawn, and there is already evidence for earlier spawning in some North Sea fish species. A change like that may likely have a chain reaction, affecting larval stages and whether they will live in environments with high food availability. Warming temperature may also result in changes in the geographical distributions of species. If the environment becomes too warm at the areas that species live now, they may move to northern or deeper waters. This will leave space for other species, now living southern to move north. As a result the composition of the communities in the oceans will probably change. In my thesis, I also evaluated how expected climate change could affect the timing, location and success of spawning by herring in the North Sea. This species is an important species for the food-web and has an important commercial value for countries bordering the North Sea. I first developed a model that could describe the most important environmental conditions that determine herring spawning areas and times in the North Sea, and then used these model with future temperatures estimated by climate change models to estimate where and when spawning might occur in future. I found that egg survival will generally remain high but that spawning times and locations will likely change. These changes could affect herring ecology (e.g., survival rates), if the larvae experience substantially different levels of food or predators than at present, and subsequently the North Sea herring populations. However, there can be differences in the sensitivity of some species to temperature changes, which for some will be greater compared to others. From the global perspective, humans will likely see the effects of climate change in the oceans by reduced availability of the species they consume now and increased availability of new species. In addition, there will likely be economic impacts on the local fishing communities. How species respond to climate change is a field of research that receives great attention because the responses will affect the management of fisheries.
Functional responses of North Atlantic fish eggs to increasing temperature

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Ecology and Oceanography, University of Copenhagen
Authors: Tsoukali, S. (Intern), Visser, A. (Intern), MacKenzie, B. (Intern)
Number of pages: 2
Publication date: 2015
Event: Abstract from ICES Annual Science Conference 2015, Copenhagen, Denmark.
Main Research Area: Technical/natural sciences

Modelling emergent trophic strategies in plankton
Plankton are typically divided into phytoplankton and zooplankton in marine ecosystem models. Yet, most protists in the photic zone engage in some degree of phagotrophy, and it has been suggested that trophic strategy is really a continuum between pure phototrophs (phytoplankton) and pure phagotrophs (unicellular zooplankton). Such a continuum of trophic strategies is well represented by trait-based modelling techniques. A key model ingredient is the size of individual cells, as size constrains affinities for nutrient uptake, photosynthesis and active encounter with other cells. We outline a general trait-based model of a unicellular planktonic organism where size is a central trait and where nutrient uptake, photosynthesis and phagotrophy are determined by investments into these functions and by the physical constraints imposed by organism size. This framework provides simple predictions of how trophic strategy correlates with size.

General information
State: Published
Organisations: National Institute of Aquatic Resources, Centre for Ocean Life, Section for Marine Ecology and Oceanography, University of Copenhagen, University of Bergen
Authors: Andersen, K. H. (Intern), Aksnes, D. L. (Ekstern), Berge, T. (Ekstern), Fiksen, Ø. (Ekstern), Visser, A. (Intern)
Pages: 862-868
Publication date: 2015
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Plankton Research
Volume: 37
Issue number: 5
ISSN (Print): 0142-7873
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 1.92 SJR 1.098 SNIP 0.848
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.025 SNIP 0.796 CiteScore 1.77
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.095 SNIP 1.255 CiteScore 2.24
Processes governing productivity at the base of the pelagic food web of the southern Indian Ocean are influenced primarily by physical–chemical conditions with implications for the structure and function of the entire pelagic food web. Here, we report observations along a great circle transect from Cape Town, South Africa, to Broome in north western Australia. Primary production was tightly linked to water column stability and nutrient availability, with high productivity (1144 mg C m⁻² day⁻¹) in the sub-tropical convergence zone, and falling off by an order of magnitude in the sub-tropical gyre and tropical waters off northwest Australia. Primary production was largely confined to the GF/F fraction (GF/F >75% of total production and usually much higher) and the photosynthetic parameters showed adaption to the prevailing light levels. Bacterial production ranged from 19 to 155 mg C m⁻² day⁻¹. No relationships were found between bacterial production and primary production or phytoplankton biomass and bacterial production seem more related to the state of the phytoplankton community as high bacterial production was observed in a post-bloom situation. The average BP:PP ratio was 31% (range 3.5–71%)
Predicting future shifts in herring spawning habitat in the North Sea

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Living Resources, Section for Marine Ecology and Oceanography, Danish Meteorological Institute
Authors: Tsoukali, S. (Intern), Christensen, A. (Intern), Tian, T. (Ekstern), Visser, A. (Intern), MacKenzie, B. (Intern)
Number of pages: 2
Publication date: 2015
Event: Abstract from ICES Annual Science Conference 2015, Copenhagen, Denmark.
Main Research Area: Technical/natural sciences

Seasonal copepod lipid pump promotes carbon sequestration in the deep North Atlantic

Significance Every autumn across the North Atlantic, large numbers of zooplankton copepods migrate from the surface waters into the ocean's interior to hibernate at depths of 600–1,400 m. Through this migration, they actively transport lipid carbon to below the permanent thermocline, where it is metabolized at a rate comparable to the carbon delivered by sinking detritus. This "lipid pump" has not been included in previous estimates of the deep-ocean carbon sequestration, which are based on either measurements of sinking fluxes of detritus, or estimates of new primary production. Unlike other components of the biological pump, the lipid pump does not strip the surface ocean of nutrients, and decouples carbon sequestration from nutrient replenishment, a process we term the "lipid shunt."

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Ecology and Oceanography, University of Copenhagen, University of Strathclyde
Authors: Jonasdottir, S. (Intern), Visser, A. (Intern), Richardson, K. (Ekstern), Heath, M. R. (Ekstern)
Pages: 12122-12126
Publication date: 2015
Main Research Area: Technical/natural sciences
Size structures sensory hierarchy in ocean life

Life in the ocean is shaped by the trade-off between a need to encounter other organisms for feeding or mating, and to avoid encounters with predators. Avoiding or achieving encounters necessitates an efficient means of collecting the maximum possible information from the surroundings through the use of remote sensing. In this study, we explore how sensing mode and range depend on body size. We reveal a hierarchy of sensing modes (chemosensing, mechanosensing, vision, hearing, and echolocation) where body size determines the available battery of sensing modes and where larger body size means a longer sensing range. The size-dependent hierarchy and the transitions between primary sensory modes are explained on the grounds of limiting factors set by physiology and the physical laws governing signal generation, transmission and reception. We characterize the governing mechanisms and theoretically predict the body size limits for various sensory modes, which align very well with size ranges found in literature. The treatise of all ocean life, from unicellular organisms to whales, demonstrates how body size determines available sensing modes, and thereby acts as a major structuring factor of aquatic life.

General information
State: Published
Organisations: National Institute of Aquatic Resources, Department of Physics, Biophysics and Fluids, Centre for Ocean Life, Section for Marine Ecology and Oceanography
Number of pages: 9
Publication date: 2015
Main Research Area: Technical/natural sciences

Publication information
Journal: Royal Society of London. Proceedings B. Biological Sciences
Volume: 282
Issue number: 1815
Article number: 201513469
ISSN (Print): 0962-8452
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
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2016): CiteScore 3.89 SJR 2.541 SNIP 1.474
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 2.948 SNIP 1.535 CiteScore 4.08
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 2.916 SNIP 1.673 CiteScore 4.18
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): SJR 3.091 SNIP 1.762 CiteScore 5.08
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): SJR 2.947 SNIP 1.881 CiteScore 4.99
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): SJR 3.234 SNIP 1.789 CiteScore 5.02
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 2
Scopus rating (2010): SJR 2.894 SNIP 1.61
Web of Science (2010): Indexed yes
Synoptic-scale analysis of mechanisms driving surface chlorophyll dynamics in the North Atlantic
Several hypotheses have been proposed for the onset of the spring phytoplankton bloom in the North Atlantic. Our main objective is to examine which bottom-up processes can best predict the annual increase in surface phytoplankton concentration in the North Atlantic by applying novel phenology algorithms to ocean colour data. We construct indicator fields and time series which, in various combinations, provide models consistent with the principle dynamics previously proposed. Using a multimodel inference approach, we investigate the evidence supporting these models and how it varies in space. We show that, in terms of bottom-up processes alone, there is a dominant physical mechanism, namely mixed-layer shoaling, that best predicts the interannual variation in the initial increase in surface chlorophyll across large sectors of the North Atlantic. We further show that different regions are governed by different physical phenomena and that wind-driven mixing is a common component, with either heat flux or light as triggers. We believe these findings to be relevant to the ongoing discussion on North Atlantic bloom onset.
Phytoplankton phenology (the timing of seasonal events) is a commonly used indicator for evaluating responses of marine ecosystems to climate change. However, phenological metrics are vulnerable to observation-(bloom amplitude, missing data, and observational noise) and analysis-related (temporal resolution, preprocessing technique, and phenology metric) processes. Here we consider the impact of these processes on the robustness of four phenology metrics (timing of maximum, 5% above median, maximum growth rate, and 15% of cumulative distribution). We apply a simulation-testing approach, where a phenology metric is first determined from a noise- and gap-free time series, and again once it has been...
modified. We show that precision is a greater concern than accuracy for many of these metrics, an important point that has been hereto overlooked in the literature. The variability in precision between phenology metrics is substantial, but it can be improved by the use of preprocessing techniques (e.g., gap-filling or smoothing). Furthermore, there are important differences in the inherent variability of the metrics that may be crucial in the interpretation of studies based upon them. Of the considered metrics, the 15% of cumulative distribution metric best satisfies the precision criteria. However, the 5% above median metric is comparable in terms of precision and exhibits more inherent variability. We emphasize that the choice of phenology metric should be determined by the specific nature of the question being asked. We believe these findings to be useful to the current discussion on phenology metrics of phytoplankton dynamics.

**General information**

State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Ecology and Oceanography, Centre for Ocean Life
Authors: Ferreira, A. S. (Intern), Visser, A. (Intern), MacKenzie, B. (Intern), Payne, M. (Intern)
Pages: 8438-8453
Publication date: 2014
Main Research Area: Technical/natural sciences

**Publication information**

Journal: Journal of Geophysical Research: Oceans
Volume: 119
Issue number: 12
ISSN (Print): 2169-9275
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
- Web of Science (2016): Indexed yes
- BFI (2015): 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
- Web of Science (2015): Indexed yes
- BFI (2014): BFI-level 2
- Scopus rating (2014): SJR 2.324 SNIP 1.349 CiteScore 3.27
- Web of Science (2014): Indexed yes
- BFI (2013): BFI-level 2
- Scopus rating (2013): SJR 2.357 SNIP 1.44 CiteScore 3.38
- ISI indexed (2013): ISI indexed yes
- Web of Science (2013): Indexed yes
- BFI (2012): BFI-level 2
- Scopus rating (2012): SJR 2.365 SNIP 1.35 CiteScore 2.93
- ISI indexed (2012): ISI indexed yes
- Web of Science (2012): Indexed yes
- BFI (2011): BFI-level 2
- Scopus rating (2011): SJR 2.239 SNIP 1.301 CiteScore 3.03
- ISI indexed (2011): ISI indexed yes
- Web of Science (2011): Indexed yes
- BFI (2010): BFI-level 2
- Scopus rating (2010): SJR 2.449 SNIP 1.324
- Web of Science (2010): Indexed yes
- BFI (2009): BFI-level 2
- Scopus rating (2009): SJR 2.347 SNIP 1.359
- Web of Science (2009): Indexed yes
- BFI (2008): BFI-level 2
- Scopus rating (2008): SJR 2.101 SNIP 1.296
- Web of Science (2008): Indexed yes
Analysis of self-overlap reveals trade-offs in plankton swimming trajectories

Movement is a fundamental behaviour of organisms that not only brings about beneficial encounters with resources and mates, but also at the same time exposes the organism to dangerous encounters with predators. The movement patterns adopted by organisms should reflect a balance between these contrasting processes. This trade-off can be hypothesized as being evident in the behaviour of plankton, which inhabit a dilute three-dimensional environment with few refuges or orienting landmarks. We present an analysis of the swimming path geometries based on a volumetric Monte Carlo sampling approach, which is particularly adept at revealing such trade-offs by measuring the self-overlap of the trajectories. Application of this method to experimentally measured trajectories reveals that swimming patterns in copepods are shaped to efficiently explore volumes at small scales, while achieving a large overlap at larger scales. Regularities in the observed trajectories make the transition between these two regimes always sharper than in randomized trajectories or as predicted by randomwalk theory. Thus, real trajectories present a stronger separation between exploration for food and exposure to predators. The specific scale and features of this transition depend on species, gender and local environmental conditions, pointing at adaptation to state and stage-dependent evolutionary trade-offs. © 2014 The Author(s) Published by the Royal Society. All rights reserved.
Scopus rating (2016): CiteScore 3.04
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 3.5
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 3.59
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 4.88
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 5.06
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): CiteScore 4.53
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
BFI (2008): BFI-level 1
Original language: English
Encounter rate, Prey-predator interaction, Searching strategy, Self-overlap, Zooplankton, Biology, Economic and social effects, Monte Carlo methods, Plankton, Environmental conditions, Monte Carlo sampling, Swimming trajectories, Three-dimensional environment, Trajectories, Research articles
DOIs: 10.1098/rsif.2014.0164
Source: Findit
Source-ID: 267082986
Publication: Research - peer-review › Journal article – Annual report year: 2014

Capital versus income breeding in a seasonal environment
The allocation of resources between growth, storage, and reproduction is a key trade-off in the life-history strategies of organisms. A central dichotomy is between capital breeders and income breeders. Capital breeders build reserves that allow them to spawn at a later time independently of food availability, while income breeders allocate ingested food directly to reproduction. Motivated by copepod studies, we use an analytical model to compare the fitness of income with capital breeding in a deterministic seasonal environment. We analyze how the fitness of breeding strategies depend on feeding season duration and size at maturity. Small capital breeders perform better in short feeding seasons but fall behind larger individuals when the length of the feeding season increases. Income breeding favors smaller individuals as their short generation time allows for multiple generations within a year and thereby achieve a high annual growth rate, outcompeting capital breeders in long feeding seasons. Therefore, we expect to find a dominance of small income breeders in temperate waters, while large capital breeders should dominate high latitudes where the spring is short and intense. This pattern is evident in nature, particularly in organisms with a generation time of a year or less.

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Ecology and Oceanography, Centre for Ocean Life, Akvaplan-niva AS
Authors: Sainmont, J. (Intern), Andersen, K. H. (Intern), Varpe, O. (Ekstern), Visser, A. W. (Intern)
Pages: 466-476
Publication date: 2014
Main Research Area: Technical/natural sciences

Publication information
Journal: American Naturalist
Volume: 184
Issue number: 4
ISSN (Print): 0003-0147
From fish to phytoplankton

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Ecology and Oceanography, Centre for Ocean Life
Authors: Ferreira, A. S. (Intern), Visser, A. (Intern), MacKenzie, B. (Intern), Payne, M. (Intern)
Publication date: 2014
Event: Abstract from NorMER Annual Meeting 2014, Copenhagen, Denmark.
Main Research Area: Technical/natural sciences
Publication: Research - peer-review › Journal article – Annual report year: 2014
Phytoplankton bloom and subpolar gyre induced dynamics in the North Atlantic

Several hypotheses have been promoted for phytoplankton bloom onset in the North Atlantic. First we show that the bloom dynamics in the northeastern corner stand out from the rest of the subpolar Atlantic, and thus warrants focused attention. We hypothesized that, for this region, late and weak blooms are expected in years of a strong subpolar gyre, i.e. strong atmospheric forcing, and cold and low saline conditions. We apply novel phenology algorithms to satellite ocean colour data, and analyse the outcome together with the subpolar gyre index.

We find that the relationship between the bloom dynamics and the subpolar gyre is complex, showing no clear spatial pattern. Our hypothesis is therefore partly refuted, probably due to the disparity in the temporal and spatial resolutions of the subpolar gyre index, compared to indices describing spring bloom dynamics. The annually averaged gyre index represents the integrated oceanic dynamics over the Northern North Atlantic, while the timing of the spring bloom is more governed by direct atmospheric forcing during the pre-bloom weeks.

We, therefore, further investigate which published theories (Sverdrup [1953], Siegel et al [2002], Huisman et al [2002], Townsend et al [1994], and Taylor and Ferrari [2011]) for bloom onset are suited for this region. We construct indicator fields and time series which in various combinations provide models consistent with the principle dynamics proposed in these theories. Using a multi-model inference approach, we investigate the spatially dependent ranking of these models. It appears that different theories apply at different regions within the North-East Atlantic, depending on the local physical dynamics.

The Biological carbon pump in the North Atlantic

Mediated principally by the sinking of organic rich particles from the upper ocean, the Biological Carbon Pump (BCP) is a significant component of the global carbon cycle. It transfers roughly 11 Gt C yr$^{-1}$ into the ocean’s interior and maintains atmospheric carbon dioxide at significantly lower levels than would be the case if it did not exist. More specifically, export by the BCP in the North Atlantic is $\sim$0.55–1.94 Gt C yr$^{-1}$. A rich set of observations suggests that a complex set of processes drives this export. However, significant uncertainties exist regarding the BCP in the North Atlantic, including both the magnitude of the downward flux and the ecological, chemical and physical processes by which it is sustained and controlled. Our lack of detailed mechanistic understanding has also hindered modelling attempts to quantify and predict changes to the BCP. In this paper, we assess current knowledge concerning the BCP in the North Atlantic in order to identify priorities for future research, as well as suggesting how they might be addressed.
Control of plankton seasonal succession by adaptive grazing

The ecological succession of phytoplankton communities in temperate seas is characterized by the dominance of nonmotile diatoms during spring and motile flagellates during summer, a pattern often linked to the seasonal variation in the physical environment and nutrient availability. We focus on the effects of adaptive zooplankton grazing behavior on the seasonal succession of temperate plankton communities in an idealized community model consisting of a zooplankton grazer and two phytoplankton species, one motile and the other nonmotile. The grazer can switch between ambush feeding on motile cells or feeding-current feeding on nonmotile cells. The feeding-current behavior imposes an additional mortality risk on the grazer, whereas ambush feeding benefits from small-scale fluid turbulence. Grazer–phytoplankton feeding interactions are forced by light and turbulence and the grazer adopts the feeding behavior that optimizes its fitness. The adaptive grazing model predicts essential features of the seasonal plankton succession reported from temperate seas, including the vertical distribution and seasonal variation in the relative abundance of motile and nonmotile phytoplankton and the seasonal variation in grazer abundance. Adaptive grazing behavior, in addition to nutrient and mixing regimes, can promote characteristic changes in the seasonal structure of phytoplankton community observed in nature.

General information
State: Published

Diel vertical migration arising in a habitat selection game

Predator and prey react to each other, adjusting their behavior to maximize their fitness and optimizing their food intake while keeping their predation risk as low as possible. In a pelagic environment, prey reduce their predation mortality by adopting a diel vertical migration (DVM) strategy, avoiding their predator during their peak performance by finding refuge in deep layers during daylight hours and feeding at the surface during the night. Due to the duality of the interaction between prey and predator, we used a game theory approach to investigate whether DVM can be a suitable strategy for the predator as well as the prey. We formulated three scenarios in plankton ecology in order to address this question. A novel finding is that mixed strategies emerge as optimal over a range of the parameter space, where part of the predator or prey population adopts a DVM while the rest adopt one or other "sit and wait" strategies.
Estimating phytoplankton phenology metrics from noisy, gappy data

General information
State: Published
Organisations: National Institute of Aquatic Resources, Centre for Ocean Life
Publication date: 2013
Event: Poster session presented at International Workshop on Trait-based approaches to Ocean Life, Copenhagen, Denmark.
Main Research Area: Technical/natural sciences
Publication: Research › Poster – Annual report year: 2013

Feeding season duration and the relative success of capital and income spawning copepods
In high latitude environments, two closely related Calanus copepods have developed opposite reproduction strategies to cope with the strongly seasonal fluctuation. Calanus finmarchicus copepods breeds relying on the available food (income breeder), while Calanus hyperboreus copepods spawn prior to the spring bloom, using only its reserves accumulated the previous year (capital breeder). The success of these two strategies is related to the length of the spring bloom, the only source of nutrients for these copepods. We use an individual based model to approach the question of income versus capital breeders in a highly seasonal environment, and find that the capital breeders have a higher fitness during short spring bloom while the income breeder has an improved performance over long productive seasons

General information
State: Published
Organisations: National Institute of Aquatic Resources, Centre for Ocean Life, Section for Marine Ecology and Oceanography
Authors: Sainmont, J. (Intern), Varpe, Ø. (Ekstern), Andersen, K. H. (Intern), Visser, A. (Intern)
Publication date: 2013
Event: Abstract from ASLO 2013 Aquatic Sciences Meeting, New Orleans, United States.
Main Research Area: Technical/natural sciences
Publication: Research › Conference abstract for conference – Annual report year: 2013

From phytoplankton to fish

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Ecology and Oceanography, Centre for Ocean Life
Authors: Ferreira, A. S. (Intern), Visser, A. (Intern), MacKenzie, B. (Intern), Payne, M. (Intern)
Publication date: 2013
Event: Abstract from NorMER Annual Meeting 2013, Reykjavik, Iceland.
Main Research Area: Technical/natural sciences
Publication: Research › Conference abstract for conference – Annual report year: 2014

Optimal foraging and diel vertical migration in a life history model
Zooplankton such as copepods are known to perform diel vertical migration, avoiding the food rich surface during bright hours to avoid visual predator when they are most dangerous, and returning to the surface to feed at night. The resolution of this foraging behaviour requires fine time scale in the model, unsuited for life history modeling. We propose a method based on optimal foraging theory to take into account the emergent feeding rates as a function of the copepod metabolic cost, latitude, time and predation. We predict that copepods will balance their growth rate and mortality, playing a safe strategy when food is plentiful, but taking greater risks at low food concentrations. We apply these concepts to high latitude ecosystems where there is a strong seasonal variation in both food availability and day length. Specifically, during the
summer, the midnight sun will force the animals to take more risk and maintain some feeding at the surface to cover their nutritional needs, compensate for predation mortality and sustain their growth.

Optimal foraging in marine ecosystem models: selectivity, profitability and switching

One of the most troubled aspects of ecosystem models is the use of rather arbitrary feeding and preference functions. The predictions of plankton functional type models have been shown to be highly sensitive to the choice of foraging model, particularly in multiple prey situations. Here we propose ecological mechanics and evolutionary logic as a solution to diet selection in ecosystem models. When a predator can consume a range of prey items it has to choose which foraging mode to use, which prey to ignore and which ones to pursue, and animals are known to be particularly skilled in adapting their diets towards the most profitable prey items. We present a simple algorithm for plankton feeding on a size-spectrum of prey with particular energetic content, handling times and capture probabilities. We show that the optimal diet breadth changes with relative densities, but in a different way to the preference functions commonly used in models today. Indeed, depending on prey class resolution, optimal foraging can yield feeding rates that are considerably different from the 'switching functions' often applied in marine ecosystem models. Dietary inclusion is dictated by two optimality choices: 1) the diet breadth and 2) the actual feeding mode. The optimality model does not generate 'safety in low densities', as the 'switching function' does in ecosystem models, unless predators are shifting feeding mode adaptively. The actual diet, feeding rate and energy flux in ecosystem models can be determined by letting predators maximize energy intake or more properly, some measure of fitness where predation risk and cost are also included. An optimal foraging or fitness maximizing approach will give marine ecosystem models a sound principle to determine trophic interactions.
Trait-based plankton trophic interactions and community composition in a global ocean ecosystem model

General information
State: Published
Organisations: National Institute of Aquatic Resources, Centre for Ocean Life, Section for Marine Ecology and Oceanography
Authors: Prowe, F. (Intern), Andersen, K. H. (Intern), Kiørboe, T. (Intern), Visser, A. (Intern)
Publication date: 2013
Event: Abstract from Annual Meeting of the German Limnological society, Potsdam, Germany.
Main Research Area: Technical/natural sciences
Publication: Research - peer-review › Journal article – Annual report year: 2013

Zooplankton feeding traits and community composition in a global ecosystem model

General information
State: Published
Organisations: National Institute of Aquatic Resources, Centre for Ocean Life, Section for Marine Ecology and Oceanography
Authors: Prowe, F. (Intern), Andersen, K. H. (Intern), Kiørboe, T. (Intern), Visser, A. (Intern)
Publication date: 2013
Event: Abstract from International Liège Colloquium, Liège, Belgium.
Main Research Area: Technical/natural sciences
Publication: Research › Conference abstract for conference – Annual report year: 2013

Zooplankton feeding traits and community composition in a global ecosystem model

General information
State: Published
Organisations: National Institute of Aquatic Resources, Centre for Ocean Life, Section for Marine Ecology and Oceanography
Adaptive behaviour, tri-trophic food-web stability and damping of chaos

We examine the effect of adaptive foraging behaviour within a tri-trophic food web with intra-guild predation. The intra-guild prey is allowed to adjust its foraging effort so as to achieve an optimal per capita growth rate in the face of realized feeding, predation risk and foraging cost. Adaptive fitness-seeking behaviour of the intra-guild prey has a stabilizing effect on the tri-trophic food-web dynamics provided that (i) a finite optimal foraging effort exists and (ii) the trophic transfer efficiency from resource to predator via the intra-guild prey is greater than that from the resource directly. The latter condition is a general criterion for the feasibility of intra-guild predation as a trophic mode. Under these conditions, we demonstrate rigorously that adaptive behaviour will always promote stability of community dynamics in the sense that the region of parameter space in which stability is achieved is larger than for the non-adaptive counterpart of the system.

General information

State: Published
Organisations: Section for Ocean Ecology and Climate, National Institute of Aquatic Resources
Authors: Visser, A. (Intern), Mariani, P. (Intern), Pigolotti, S. (Ekstern)
Pages: 1373-1380
Publication date: 2012
Main Research Area: Technical/natural sciences

Publication information

Journal: Journal of the Royal Society. Interface
Volume: 9
Issue number: 71
ISSN (Print): 1742-5689
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 3.04
  Web of Science (2016): Indexed yes
  BFI (2015): BFI-level 1
  Scopus rating (2015): CiteScore 3.5
  BFI (2014): BFI-level 1
  Scopus rating (2014): CiteScore 3.59
  Web of Science (2014): Indexed yes
  BFI (2013): BFI-level 1
  Scopus rating (2013): CiteScore 4.88
  ISI indexed (2013): ISI indexed yes
  Web of Science (2013): Indexed yes
  BFI (2012): BFI-level 1
  Scopus rating (2012): CiteScore 5.06
  ISI indexed (2012): ISI indexed yes
  Web of Science (2012): Indexed yes
  BFI (2011): BFI-level 1
  Scopus rating (2011): CiteScore 4.53
  ISI indexed (2011): ISI indexed yes
  Web of Science (2011): Indexed yes
  BFI (2010): BFI-level 1
  Web of Science (2010): Indexed yes
  BFI (2009): BFI-level 1
How the Subpolar gyre strength influences phytoplankton blooms dynamics in the North Atlantic

Changes in the North Atlantic Subpolar gyre (NASPG) have been linked to the interannual variability of primary production. However, little is known about the mechanisms behind both environmental processes, and how the NASPG strength may extend its potential impacts to higher trophic levels, including early life stages of commercial fish species. We assess NASPG strength effect on North Atlantic phytoplankton bloom dynamics. We analyse time-series (from 1998 to 2010) of chlorophyll a (Chl a, from the Globcolour project) annual anomaly as a proxy of phytoplankton abundance, and of sea surface height (SSH, from the AVISO project) as a proxy of current strength. Three regions were strategically chosen to characterize positions relative to the NASPG, describing: region 1—the northern part of NASPG, including the Irminger Current (IC); region 2—the North Atlantic Current (NAC), its northwards drift, and the influence of the NASPG strength; and region 3—the within-NASPG dynamics. It is hypothesized that a strong NASPG index will be associated with a low-abundance, late phytoplankton bloom, possibly induced by higher heat losses, and thus lower temperatures. A correlation between the annual anomaly in chlorophyll concentrations and the gyre index was found for the southern region (region 3).

Indications of a strong influence of NASPG index are related to areas within the gyre, which may have an impact in the ecosystem functioning. The results also suggest that physical forcing other than the strength of the NASPG influence the primary production of the more northerly regions east and west of Iceland.

Subpolar gyre strength influences phytoplankton bloom dynamics

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Ecology and Oceanography, Centre for Ocean Life, Faroe Marine Research Institute
Number of pages: 7
Publication date: 2012
Main Research Area: Technical/natural sciences
Publication: Research › Conference abstract for conference – Annual report year: 2012

Weak subpolar Gyre lead to early blooms

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Ecology and Oceanography, Centre for Ocean Life, Faroe Marine Research Institute
Number of pages: 7
Publication date: 2012
Event: Abstract from NorMER Annual Meeting 2012, Helsinki, Finland.
Main Research Area: Technical/natural sciences
Publication: Research › Conference abstract for conference – Annual report year: 2012
Phytoplankton spring bloom influence on larval and juvenile fish survival

**General information**
State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Ecology and Oceanography, Centre for Ocean Life
Authors: Ferreira, A. S. (Intern), Visser, A. (Intern), MacKenzie, B. (Intern), Payne, M. (Intern)
Publication date: 2011
Event: Abstract from NorMER Annual Meeting 2011, Oslo, Norway.
Main Research Area: Technical/natural sciences
Publication: Research › Conference abstract for conference – Annual report year: 2011

Small, wet & rational: Individual based zooplankton ecology

**General information**
State: Published
Organisations: Section for Ocean Ecology and Climate, National Institute of Aquatic Resources
Authors: Visser, A. (Intern)
Number of pages: 225
Publication date: 2011

**Publication information**
Place of publication: Kgs. Lyngby, Denmark
Publisher: Technical University of Denmark (DTU)
ISBN (Print): 978-87-7481-126-8
Original language: English
Main Research Area: Technical/natural sciences
Electronic versions:
Visser 2011 Small wet and rational.pdf
Source: orbit
Source-ID: 281248
Publication: Research › Doctoral thesis – Annual report year: 2011

Optimization and emergence in marine ecosystem models
Ingestion rates and mortality rates of zooplankton are dynamic parameters reflecting a behavioural trade-off between encounters with food and predators. An evolutionarily consistent behaviour is that which optimizes the trade-off in terms of the fitness conferred to an individual. We argue that interaction rates used in models, rather than being prescribed, should be dynamic emerging properties that reflect this optimization. A simple example illustrates how predator and prey abundance, and prey community structure, can instigate prey switching with cascading trophic effects. (C) 2009 Elsevier Ltd. All rights reserved.

**General information**
State: Published
Organisations: Section for Ocean Ecology and Climate, National Institute of Aquatic Resources
Authors: Mariani, P. (Intern), Visser, A. (Intern)
Pages: 89-92
Publication date: 2010
Main Research Area: Technical/natural sciences

**Publication information**
Journal: Progress in Oceanography
Volume: 84
Issue number: 1-2
ISSN (Print): 0079-6611
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 3.4 SJR 1.922 SNIP 1.278
We utilized the varying fatty acid composition of phytoplankton to create 19 different food treatments based on different ratios of 5 potentially important fatty acids and offered these to the copepod Temora longicornis. Egg production and hatching was monitored and related to ingested carbon, dietary fatty acids and the utilization of maternal fatty acid reserves. Egg production rates depended on ingested carbon and the fatty acid 20:5n-3 from the diet and from the female reserves. Hatching success showed a significant dependence on the ingested and maternal fatty acids 22:6n-3, 18:5n-3 and 18:3n-3. Production of nauplii as a combination of egg production and hatching was highly dependent on the fatty acid
22:6n-3 and carbon ingestion. The study confirms the importance of n-3 polyunsaturated fatty acids for copepod reproduction and indicates that the female differentially utilizes its fatty acid reserves depending on dietary fatty acid availability during reproduction and that egg production and hatching are dependent on different dietary fatty acids.

**General information**

State: Published  
Organisations: Section for Ocean Ecology and Climate, National Institute of Aquatic Resources  
Authors: Jonasdottir, S. (Intern), Visser, A. (Intern), Jespersen, C. (Ekstern)  
Publication date: 2009  
Main Research Area: Technical/natural sciences

**Publication information**  
Journal: Marine Ecology Progress Series  
Volume: 382  
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  
BFI (2009): BFI-level 2  
Web of Science (2009): Indexed yes  
BFI (2008): BFI-level 2  
Web of Science (2008): Indexed yes  
Web of Science (2007): Indexed yes  
Web of Science (2006): Indexed yes  
Web of Science (2005): Indexed yes  
Web of Science (2004): Indexed yes  
Web of Science (2003): Indexed yes  
Web of Science (2002): Indexed yes  
Web of Science (2001): Indexed yes  
Web of Science (2000): Indexed yes
Ecosystem productivity: From: DTU Climate Change Technologies

General information
State: Published
Organisations: Institute Management, National Institute of Aquatic Resources, Biosystems Division. Management, Biosystems Division, Risø National Laboratory for Sustainable Energy, Ecosystems, Section for Ocean Ecology and Climate, Research Secretariat
Publication date: 2009

Evolutionens matematik

General information
State: Published
Organisations: Section for Population- and Ecosystem Dynamics, National Institute of Aquatic Resources, Section for Ocean Ecology and Climate
Authors: Thygesen, U. H. (Intern), Visser, A. (Intern)
Number of pages: 282
Pages: 22-35
Publication date: 2009

Optimal behaviour and dynamical impact in a plankton predator-prey system

General information
State: Published
Organisations: Section for Population- and Ecosystem Dynamics, National Institute of Aquatic Resources, Section for Ocean Ecology and Climate
Authors: Mariani, P. (Intern), Kiørboe, T. (Intern), Visser, A. (Intern), Andersen, K. H. (Intern)
Publication date: 2009
**Preferential concentration of plankton by turbulence; a critical examination of mechanisms**

**General information**
- **State:** Published
- **Organisations:** Section for Ocean Ecology and Climate, National Institute of Aquatic Resources
- **Authors:** Visser, A. (Intern)
- **Publication date:** 2009

**Significance of swimming and feeding currents for nutrient uptake in osmotrophic and interception feeding flagellates**

**General information**
- **State:** Published
- **Organisations:** Department of Physics, Biophysics and Fluids, National Institute of Aquatic Resources, Section for Ocean Ecology and Climate, Center for Fluid Dynamics
- **Authors:** Langlois, V. (Intern), Andersen, A. P. (Intern), Bohr, T. (Intern), Visser, A. (Intern), Kjaerboe, T. (Intern)
- **Pages:** 35-44
- **Publication date:** 2009

**Publication information**
- **Journal:** Aquatic Microbial Ecology
- **Volume:** 54
- **Issue number:** 1
- **ISSN (Print):** 0948-3055
- **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 0.805 SNIP 0.567 CiteScore 1.77
  - BFI (2015): BFI-level 1
  - Scopus rating (2015): SJR 1.124 SNIP 0.768 CiteScore 2.21
  - Web of Science (2015): Indexed yes
  - BFI (2014): BFI-level 1
  - Scopus rating (2014): SJR 0.893 SNIP 0.699 CiteScore 1.88
  - BFI (2013): BFI-level 1
  - Scopus rating (2013): SJR 1.021 SNIP 0.844 CiteScore 2.16
  - ISI indexed (2013): ISI indexed yes
  - BFI (2012): BFI-level 1
  - Scopus rating (2012): SJR 1.389 SNIP 0.921 CiteScore 2.49
  - ISI indexed (2012): ISI indexed yes
  - BFI (2011): BFI-level 1
  - Scopus rating (2011): SJR 1.423 SNIP 0.879 CiteScore 2.45
  - ISI indexed (2011): ISI indexed yes
  - BFI (2010): BFI-level 1
  - Scopus rating (2010): SJR 1.282 SNIP 0.888
  - Web of Science (2010): Indexed yes
Swimming in turbulence: zooplankton fitness in terms of foraging efficiency and predation risk
Turbulence impacts zooplankton fitness in opposing manners, by increasing contacts with prey but at the same time increasing contacts with predators. We investigate the fitness of individual zooplankton in terms of a trade-off between energetic gains and costs, and risk of predation. Through idealized descriptions of foraging and predation in a turbulent water column, we determine how fast a zooplankter should swim, if at all, and where should it position itself in the vertical to maximize its fitness given certain environmental conditions. Suspension feeding has an advantage over ambush feeding at high turbulence levels, whereas cruise feeding becomes optimal at low turbulence levels. In general, behaviours that seek out low levels of turbulence increase an individual’s fitness, a prediction that runs counter to turbulent encounter rate arguments, and exposes the fallacy of examining only the foraging aspects of the fitness trade-off.

General information
State: Published
Organisations: Section for Ocean Ecology and Climate, National Institute of Aquatic Resources, Section for Population- and Ecosystem Dynamics
Authors: Visser, A. (Intern), Mariani, P. (Intern), Pigolotti, S. (Ekstern)
Pages: 121-133
Publication date: 2009
Main Research Area: Technical/natural sciences

Publications information
Journal: Journal of Plankton Research
Volume: 31
Issue number: 2
ISSN (Print): 0142-7873
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Web of Science (2017): Indexed yes

BFI (2009): BFI-level 2
Scopus rating (2009): SJR 1.078 SNIP 0.787
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 2
Scopus rating (2008): SJR 1.373 SNIP 0.905
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 1.336 SNIP 1.02
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 1.389 SNIP 0.979
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 1.549 SNIP 1.113
Scopus rating (2004): SJR 1.466 SNIP 1.095
Web of Science (2004): Indexed yes
Scopus rating (2003): SJR 1.288 SNIP 1.063
Web of Science (2003): Indexed yes
Scopus rating (2002): SJR 1.57 SNIP 1.082
Web of Science (2002): Indexed yes
Scopus rating (2001): SJR 1.804 SNIP 1.099
Web of Science (2001): Indexed yes
Scopus rating (2000): SJR 1.872 SNIP 1.077
Web of Science (2000): Indexed yes
Scopus rating (1999): SJR 2.292 SNIP 1.439
Original language: English
DOIs:
10.3354/ame01253
Source: orbit
Source-ID: 234703
Publication: Research - peer-review › Journal article – Annual report year: 2009
Lagrangian modelling of plankton motion: From deceptively simple random walks to Fokker-Planck and back again

The movement of plankton, either by turbulent mixing or their own inherent motility, can be simulated in a Lagrangian framework as a random walk. Validation of random walk simulations is essential. There is a continuum of mathematically valid stochastic integration schemes upon which random walk simulations depend, each of which lead to radically different macro-scale dynamics as expressed in their corresponding Fokker-Planck equations. In addition, diffusivity is not a unique parameter describing a random walk and its corresponding Fokker-Planck equation. Spatially varying translation speed and turn frequency have different effects on population distributions. Validation requires extra information either in the form of the well-mixed condition for physical diffusion, or in detailed information on the sensing ability, internal state modulation and swimming response for plankton motility. (C) 2007 Elsevier B.V. All rights reserved.

General information
State: Published
Organisations: Section for Ocean Ecology and Climate, National Institute of Aquatic Resources
Authors: Visser, A. (Intern)
Pages: 287-299
Publication date: 2008
Main Research Area: Technical/natural sciences
Publication information
Journal: Journal of Marine Systems
Volume: 70
Issue number: 3-4
ISSN (Print): 0924-7963
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 1.403 SNIP 1.282 CiteScore 2.61
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.093 SNIP 1.033 CiteScore 2.19
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.231 SNIP 1.494 CiteScore 2.69
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.609 SNIP 1.457 CiteScore 2.99
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 1.534 SNIP 1.276 CiteScore 2.51
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 1.51 SNIP 1.289 CiteScore 2.43
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
Biomixing of the oceans?

General information
State: Published
Organisations: Section for Ocean Ecology and Climate, National Institute of Aquatic Resources
Authors: Visser, A. (Intern)
Pages: 838-839
Publication date: 2007
Main Research Area: Technical/natural sciences

Publication information
Journal: Science
Volume: 316
Issue number: 5826
ISSN (Print): 0036-8075
Ratings:
BFI (2018): BFI-level 3
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 12.012 SNIP 8.269 CiteScore 12.68
Grazing effects of blue mussel Mytilus edulis on the pelagic food web under different turbulence conditions

General information
State: Published
Organisations: Section for Ocean Ecology and Climate, National Institute of Aquatic Resources
Authors: Maar, M. (Ekstern), Nielsen, T. G. (Intern), Bolding, K. (Ekstern), Burchard, H. (Ekstern), Visser, A. (Intern)
Pages: 199-213
Individual based model of cod larvae feeding behavior: interaction with turbulence and search shape

General information
State: Published
Organisations: Section for Population- and Ecosystem Dynamics, National Institute of Aquatic Resources, Section for Ocean Ecology and Climate
Authors: MacKenzie, B. (Intern), Mariani, P. (Intern), Visser, A. (Intern)
Publication date: 2007
Main Research Area: Technical/natural sciences

Bibliographical note
Oral presentation and abstract
Source: orbit
Source-ID: 242019
Publication: Research › Conference abstract for conference – Annual report year: 2007

Individual-based simulations of larval fish feeding in turbulent environments

General information
State: Published
Organisations: Section for Population- and Ecosystem Dynamics, National Institute of Aquatic Resources, Section for Ocean Ecology and Climate
Authors: Mariani, P. (Intern), MacKenzie, B. (Intern), Visser, A. (Intern), Botte, V. (Ekstern)
Pages: 155-169
Publication date: 2007
Main Research Area: Technical/natural sciences

Publication information
Journal: Marine Ecology - Progress Series
Volume: 347
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
Ratings:
BFI (2018): BFI-level 3
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 12.012 SNIP 8.269 CiteScore 12.68
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 2
Scopus rating (2013): SJR 12.305 SNIP 7.87 CiteScore 12.43
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): SJR 13.159 SNIP 8.124 CiteScore 12.39
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): SJR 14.049 SNIP 8.309 CiteScore 11.97
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 2
Scopus rating (2010): SJR 13.216 SNIP 7.791
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 2
Scopus rating (2009): SJR 11.644 SNIP 7.033
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 2
Scopus rating (2008): SJR 10.996 SNIP 6.09
Web of Science (2008): Indexed yes
Web of Science (2007): Indexed yes
Web of Science (2006): Indexed yes
Web of Science (2005): Indexed yes
Scopus rating (2004): SJR 11.249 SNIP 7.255
Web of Science (2004): Indexed yes
Web of Science (2003): Indexed yes
Scopus rating (2002): SJR 10.5 SNIP 7.071
Web of Science (2002): Indexed yes
Web of Science (2001): Indexed yes
Scopus rating (2000): SJR 12.983 SNIP 7.088
Web of Science (2000): Indexed yes
Scopus rating (1999): SJR 16.117 SNIP 7.073
Original language: English
DOIs:
Motility of zooplankton: fitness, foraging and predation

General information
State: Published
Organisations: Section for Ocean Ecology and Climate, National Institute of Aquatic Resources
Authors: Visser, A. (Intern)
Pages: 447-461
Publication date: 2007
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Plankton Research
Volume: 29
Issue number: 5
ISSN (Print): 0142-7873
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 1.92 SJR 1.098 SNIP 0.848
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.025 SNIP 0.796 CiteScore 1.77
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.095 SNIP 1.255 CiteScore 2.24
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.289 SNIP 1.109 CiteScore 2.39
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 1.557 SNIP 1.101 CiteScore 2.43
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 1.158 SNIP 1.045 CiteScore 1.99
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 1.186 SNIP 0.98
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.922 SNIP 1.046
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 1.174 SNIP 1.037
Nye optiske instrumenter ved Danmarks Fiskeriundersøgelser

General information
State: Published
Organisations: Section for Ocean Ecology and Climate, National Institute of Aquatic Resources, Institute Management
Authors: Jakobsen, H. H. (Intern), Thomsen, H. A. (Intern), Visser, A. (Intern), Kiørboe, T. (Intern)
Pages: 1-2
Publication date: 2007

Host publication information
Title of host publication: 14. danske havforskermøde, Syddansk Universitet, 23-25 januar 2007
Main Research Area: Technical/natural sciences

Bibliographical note
Abstract
Source: orbit
Source-ID: 225948
Publication: Research › Conference abstract in proceedings – Annual report year: 2007

The fate of discarded appendicularian houses: degradation by the copepod, Microsetella norvegica, and other agents

General information
State: Published
Organisations: Section for Ocean Ecology and Climate, National Institute of Aquatic Resources
Authors: Koski, M. (Intern), Møller, E. (Ekstern), Maar, M. (Ekstern), Visser, A. (Intern)
Pages: 641-654
Publication date: 2007
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Plankton Research
Volume: 29
Issue number: 7
ISSN (Print): 0142-7873
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 1.92 SJR 1.096 SNIP 0.848
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.025 SNIP 0.796 CiteScore 1.77
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.095 SNIP 1.255 CiteScore 2.24
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.289 SNIP 1.109 CiteScore 2.39
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 1.557 SNIP 1.101 CiteScore 2.43
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 1.158 SNIP 1.045 CiteScore 1.99
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 1.186 SNIP 0.98
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.922 SNIP 1.046
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 1.174 SNIP 1.037
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 1.31 SNIP 1.225
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 1.19 SNIP 1.118
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 1.116 SNIP 1.068
Web of Science (2005): Indexed yes
Scopus rating (2004): SJR 1.035 SNIP 1.101
Scopus rating (2003): SJR 1.315 SNIP 1.299
Web of Science (2003): Indexed yes
Scopus rating (2002): SJR 1.239 SNIP 1.068
Web of Science (2002): Indexed yes
Scopus rating (2001): SJR 1.234 SNIP 1
Web of Science (2001): Indexed yes
Scopus rating (2000): SJR 1.226 SNIP 1.049
Web of Science (2000): Indexed yes
Scopus rating (1999): SJR 1.598 SNIP 1.191
Original language: English
DOIs:
10.1093/plankt/fbm046
**Plankton motility patterns and encounter rates**

Many planktonic organisms have motility patterns with correlation run lengths (distances traversed before direction changes) of the same order as their reaction distances regarding prey, mates and predators (distances at which these organisms are remotely detected). At these scales, the relative measure of run length to reaction distance determines whether the underlying encounter is ballistic or diffusive. Since ballistic interactions are intrinsically more efficient than diffusive, we predict that organisms will display motility with long correlation run lengths compared to their reaction distances to their prey, but short compared to the reaction distances of their predators. We show motility data for planktonic organisms ranging from bacteria to copepods that support this prediction. We also present simple ballistic and diffusive motility models for estimating encounter rates, which lead to radically different predictions, and we present a simple criterion to determine which model is the more appropriate in a given case.

**General information**

State: Published
Organisations: Section for Ocean Ecology and Climate, National Institute of Aquatic Resources
Authors: Visser, A. (Intern), Kiørboe, T. (Intern)
Pages: 538-546
Publication date: 2006
Main Research Area: Technical/natural sciences

**Publication information**

Journal: Oecologia
Volume: 148
Issue number: 3
ISSN (Print): 0029-8549
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): SJR 1.72 SNIP 1.262 CiteScore 3.23
- Web of Science (2016): Indexed yes
- BFI (2015): BFI-level 2
- Scopus rating (2015): SJR 1.974 SNIP 1.287 CiteScore 3.16
- Web of Science (2015): Indexed yes
- BFI (2014): BFI-level 2
- Scopus rating (2014): SJR 1.809 SNIP 1.418 CiteScore 3.24
- BFI (2013): BFI-level 2
- Scopus rating (2013): SJR 1.867 SNIP 1.427 CiteScore 3.41
- ISI indexed (2013): ISI indexed yes
- Web of Science (2013): Indexed yes
- BFI (2012): BFI-level 2
- Scopus rating (2012): SJR 1.964 SNIP 1.42 CiteScore 3.28
- ISI indexed (2012): ISI indexed yes
- BFI (2011): BFI-level 2
- Scopus rating (2011): SJR 2.235 SNIP 1.451 CiteScore 3.54
- ISI indexed (2011): ISI indexed yes
- BFI (2010): BFI-level 2
- Scopus rating (2010): SJR 2.282 SNIP 1.556
- Web of Science (2010): Indexed yes
- BFI (2009): BFI-level 2
- Scopus rating (2009): SJR 2.075 SNIP 1.426
Turbulence and feeding behaviour affect the vertical distributions of Oithona similis and Microsetella norwegica

The small copepods Oithona similis and Microsetella norwegica are often numerically abundant and widely distributed, but the factors controlling their vertical distributions and role in carbon cycling are yet unknown. Here we examined the vertical distributions of copepods during spring and summer in the Skagerrak and during autumn in the North Sea with respect to different physiochemical factors including turbulent dissipation rate. The ambush feeder O. similis numerically dominated the copepod community; they were located in the layers with high microzooplankton abundance. M. norwegica were dominant in the Skagerrak and were observed within or just below the pycnocline; they are assumed to feed on sinking detrital aggregates. Both copepods use remote detection of either hydromechanical (O. similis) or chemical signals (M. norwegica) generated by the prey and both species migrated to deeper depths in response to elevated surface turbulence. The potential effect of turbulence on both types of feeding is theoretically shown to be negative and we suggest a turbulent dissipation rate in the range $10^{-7}$ to $10^{-6}$ m$^2$ s$^{-3}$ as a threshold triggering the observed avoidance responses.

General information

State: Published
Organisations: Section for Ocean Ecology and Climate, National Institute of Aquatic Resources
Authors: Maar, M. (Ekstern), Visser, A. (Intern), Nielsen, T. G. (Intern), Stips, A. (Ekstern), Saito, H. (Ekstern)
Pages: 157-172
Publication date: 2006
Main Research Area: Technical/natural sciences

Publication information
Journal: Marine Ecology - Progress Series
Volume: 313
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
Vejret og vandmiljøet

General information
State: Published
Organisations: Section for Ocean Ecology and Climate, National Institute of Aquatic Resources
Authors: Søndergaard, M. (Ekstern), Closter, R. (Ekstern), Erichsen, A. (Ekstern), Garde, K. (Ekstern), Gustavson, K. (Ekstern), Mahlenberg, F. (Ekstern), Nyborg, L. (Ekstern), Rasch, P. (Ekstern), Richardson, K. (Ekstern), Stæhr, P. (Ekstern), Visser, A. (Intern)
Pages: 13-28
Publication date: 2006

Host publication Information
Title of host publication: Vand og vejr om 100 år - klimaforandringer og det danske vandmiljø
Volume: 2
Place of publication: Højbjerg
Publisher: Hovedland
Editors: Søndergaard, M., Kronvang, B., Pejrup, M., Sand-Jensen, K.
ISBN (Print): 978-87-7739-889-6
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 227626
Publication: Research › Book chapter – Annual report year: 2006
Effects of prey motility and concentration on feeding in Acartia tonsa and Temora longicornis: the importance of feeding modes

General information
State: Published
Organisations: Section for Ocean Ecology and Climate, National Institute of Aquatic Resources
Authors: Jakobsen, H. H. (Intern), Halvorsen, E. (Ekstern), Hansen, B. (Ekstern), Visser, A. (Intern)
Pages: 775-785
Publication date: 2005
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Plankton Research
Volume: 27
Issue number: 8
ISSN (Print): 0142-7873
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 1.92 SJR 1.098 SNIP 0.848
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.025 SNIP 0.796 CiteScore 1.77
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.095 SNIP 1.255 CiteScore 2.24
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.289 SNIP 1.109 CiteScore 2.39
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 1.557 SNIP 1.101 CiteScore 2.43
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 1.158 SNIP 1.045 CiteScore 1.99
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 1.186 SNIP 0.98
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.922 SNIP 1.046
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 1.174 SNIP 1.037
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 1.31 SNIP 1.225
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 1.19 SNIP 1.118
Web of Science (2006): Indexed yes
Vertikal fordeling af vandlopper i forhold til føde og turbulens

General information
State: Published
Organisations: Section for Ocean Ecology and Climate, National Institute of Aquatic Resources
Authors: Maar, M. (Ekstern), Visser, A. (Intern), Nielsen, T. G. (Intern), Stips, A. (Ekstern)
Publication date: 2005
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 225941
Publication: Research - peer-review › Journal article – Annual report year: 2005

Characteristics of the chemical plume behind a sinking particle in a turbulent water column

General information
State: Published
Organisations: Section for Ocean Ecology and Climate, National Institute of Aquatic Resources
Authors: Visser, A. (Intern), Jackson, G. (Intern)
Pages: 55-71
Publication date: 2004
Main Research Area: Technical/natural sciences

Publication information
Journal: Marine Ecology - Progress Series
Volume: 283
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
Escape responses of copepod nauplii in the flow field of the blue mussel, Mytilus edulis

General information
State: Published
Organisations: Section for Ocean Ecology and Climate, National Institute of Aquatic Resources
Authors: Green, S. (Ekstern), Visser, A. (Intern), Titelman, J. (Ekstern), Kiørboe, T. (Intern)
Pages: 727-733
Publication date: 2003
Main Research Area: Technical/natural sciences

Publication information
Journal: Marine Biology
Volume: 142
Issue number: 4
ISSN (Print): 0025-3162
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 2.41 SJR 1.198 SNIP 0.993
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.315 SNIP 0.932 CiteScore 2.21
Microscale distribution of zooplankton in relation to turbulent diffusion

General information
State: Published
Organisations: Section for Ocean Ecology and Climate, National Institute of Aquatic Resources
Authors: Maar, M. (Ekstern), Nielsen, T. G. (Intern), Stips, A. (Ekstern), Visser, A. (Intern)
Pages: 1312-1325
Publication date: 2003
Main Research Area: Technical/natural sciences
Publication information
Journal: Limnology and Oceanography
Volume: 48
Issue number: 3
ISSN (Print): 0024-3590
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 3.5 SJR 1.712 SNIP 1.225
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 2.472 SNIP 1.422 CiteScore 3.93
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 2.112 SNIP 1.584 CiteScore 3.73
BFI (2013): BFI-level 2
Scopus rating (2013): SJR 2.256 SNIP 1.587 CiteScore 3.98
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): SJR 2.456 SNIP 1.5 CiteScore 3.81
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): SJR 2.374 SNIP 1.445 CiteScore 3.59
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 2
Scopus rating (2010): SJR 2.38 SNIP 1.425
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 2
Scopus rating (2009): SJR 2.329 SNIP 1.682
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 2
Scopus rating (2008): SJR 2.381 SNIP 1.615
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 2.361 SNIP 1.682
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 2.38 SNIP 1.641
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 2.302 SNIP 1.697
Web of Science (2005): Indexed yes
Scopus rating (2004): SJR 2.463 SNIP 1.778
Web of Science (2004): Indexed yes
Scopus rating (2003): SJR 2.685 SNIP 2.004
Web of Science (2003): Indexed yes
Scopus rating (2002): SJR 2.605 SNIP 1.798
Web of Science (2002): Indexed yes
Scopus rating (2001): SJR 2.91 SNIP 1.892
Web of Science (2001): Indexed yes
Scopus rating (2000): SJR 3.103 SNIP 2.016
Random motility of plankton: diffusive and aggregative contributions

General information
State: Published
Organisations: Section for Ocean Ecology and Climate, National Institute of Aquatic Resources, Section for Population- and Ecosystem Dynamics
Authors: Visser, A. (Intern), Thygesen, U. H. (Intern)
Pages: 1157-1168
Publication date: 2003
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Plankton Research
Volume: 25
Issue number: 9
ISSN (Print): 0142-7873
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 1.92 SJR 1.098 SNIP 0.848
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.025 SNIP 0.796 CiteScore 1.77
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.095 SNIP 1.255 CiteScore 2.24
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.289 SNIP 1.109 CiteScore 2.39
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 1.557 SNIP 1.101 CiteScore 2.43
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 1.158 SNIP 1.045 CiteScore 1.99
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 1.186 SNIP 0.98
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.922 SNIP 1.046
Web of Science (2009): Indexed yes
Turbulence and zooplankton production: insights from PROVESS

Zooplankton are directly influenced by turbulence in both a passive and an active manner. Passively, zooplankton are at the mercy of turbulence in how it affects their vertical mixing, encounter rate, detection abilities and feeding current efficiency. Many zooplankton species, however, are actively able to mitigate the effects of turbulence by modifying their behaviour, e.g. vertical migration, prey switching and habituation to hydromechanical stimuli. Both theoretical treatments of these processes and field observations from the northern North Sea are examined. Field observations show that some copepod species actively migrate to avoid high turbulence levels in surface waters. Furthermore, observations show a negative relationship between turbulence and zooplankton ingestion rates. This supports the paradigm of a dome-shaped response for zooplankton production with environmental turbulence. A theoretical treatment shows that the reaction distance, R, for an ambush-feeding copepod feeding on swimming organisms follows R \propto \epsilon^{-1/6} where \epsilon is the turbulent dissipation rate, a result that shows close agreement with previously reported experimental results. (C) 2002 Elsevier Science B.V. All rights reserved.
Udvalget om Miljøpåvirkninger og fiskeriressourcer : Delrapport vedr. klimaændringer

General information
State: Published
Organisations: Section for Population- and Ecosystem Dynamics, National Institute of Aquatic Resources, Section for Ocean Ecology and Climate
Authors: MacKenzie, B. (Intern), Visser, A. (Intern), Fenger, J. (Ekstern), Holm, P. (Ekstern)
Number of pages: 34
Publication date: 2002

Publication information
Place of publication: Lyngby
Det turbulente liv i havet

General information
State: Published
Organisations: Section for Ocean Ecology and Climate, National Institute of Aquatic Resources
Authors: Visser, A. (Intern)
Pages: 10-17
Publication date: 2001
Main Research Area: Technical/natural sciences

Publication information
Journal: Fisk og Hav
Issue number: 52
ISSN (Print): 0105-9211
Ratings:
ISI indexed (2013): ISI indexed no
ISI indexed (2012): ISI indexed no
ISI indexed (2011): ISI indexed no
Original language: Danish
Links:
http://www.difres.dk/dk/publication/files/22122003$FH52.pdf
Source: orbit
Source-ID: 227750
Publication: Research › Journal article – Annual report year: 2001

Fisheries and climate change: the danish perspective

General information
State: Published
Organisations: Section for Population- and Ecosystem Dynamics, National Institute of Aquatic Resources, Section for Ocean Ecology and Climate
Authors: MacKenzie, B. (Intern), Visser, A. (Intern)
Publication date: 2001

Host publication information
Title of host publication: Climate change research - Danish contributions
Volume: 19
Place of publication: Copenhagen
Publisher: Danish Climate Centre, Danish Meteorological Institute
Editors: Jørgensen, A., Fenger, J., Halsnæs, K.
ISBN (Print): 87-12-03775-3
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 226517
Publication: Research - peer-review › Book chapter – Annual report year: 2001
Hydromechanical signals and turbulent noise

General information
State: Published
Organisations: Section for Ocean Ecology and Climate, National Institute of Aquatic Resources
Authors: Visser, A. (Intern), Kiørboe, T. (Intern)
Publication date: 2001
Event: Abstract from Ocean Sciences at the New Millennium.
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 232852
Publication: Research › Conference abstract for conference – Annual report year: 2001

Hydromechanical signals in the plankton
The distance at which plankters can detect and thus interact with each other depends on their sensitivity, size, and motion, as well as the hydrodynamic characteristics of their behaviour. Through a simple consideration of the distribution of forces exerted on the ambient fluid by different plankton behaviours, it is possible to deduce the spatial scale over which the associated hydromechanical disturbance propagates. At low Reynolds numbers, for passive sinking or for a feeding current, the associated hydromechanical velocity, \( u \), attenuates with distance, \( r \), as \( u \propto r^{-1} \) where \( a \) is the length scale of the organism and \( U \) is its velocity relative to the fluid. Similarly, for a self-propelled organism, \( u \) is proportional to \( a^2 U^{-1} \). In contrast, at high Reynolds numbers, a self-propelled organism generates a forward hydromechanical disturbance that has the form \( u \propto a^3 U^{-3} \). Within this context, observed planktonic interactions, particularly for copepods, were analysed and showed reasonably good support for the theory. The remote detection of inert particles by feeding-current-generating and free-swimming copepods was found to be feasible for known copepod sensitivities. Directional information and signal timing for flow disturbances and vortices provided a means of locating active organisms. Finally, the effect of turbulence was considered, as it can impair a copepod’s detection ability. A simple analysis of ambush-feeding copepods detecting swimming ciliates under turbulent conditions showed good agreement with previously reported observations.

General information
State: Published
Organisations: Section for Ocean Ecology and Climate, National Institute of Aquatic Resources
Authors: Visser, A. (Intern)
Pages: 1-24
Publication date: 2001
Main Research Area: Technical/natural sciences

Publication information
Journal: Marine Ecology - Progress Series
Volume: 222
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
Observations of copepod feeding and vertical distribution under natural turbulent conditions in the North Sea

We present results of simultaneous measurements of turbulent-dissipation rate, zooplankton vertical distribution and copepod gut pigments in the northern North Sea. Analysis shows that some, but not all, copepods (by species, sex and stage) exhibit significant dependence on turbulence in respect to vertical distribution and feeding rate. Oithona similis (female and copepodite stages) exhibits an avoidance of the surface layer when turbulence is strong there. For the range
of turbulence (10(-7) to 10(-3) m(2) s(-3)) and ambient chlorophyll concentration (0.5-0.8 mug l(-1)) encountered, Calanus spp. and Metridia lucens exhibited a significant negative response in feeding-rate index with increasing turbulence. Centropages typicus and Pseudocalanus spp, also exhibited a negative response but of less significance.

General information
State: Published
Organisations: Section for Ocean Ecology and Climate, National Institute of Aquatic Resources
Authors: Visser, A. (Intern), Saito, H. (Ekstern), Saiz, E. (Ekstern), Kiørboe, T. (Intern)
Pages: 1011-1019
Publication date: 2001
Main Research Area: Technical/natural sciences

Publication information
Journal: Marine Biology
Volume: 138
Issue number: 5
ISSN (Print): 0025-3162
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 2.41 SJR 1.198 SNIP 0.993
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.315 SNIP 0.932 CiteScore 2.21
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.204 SNIP 1.041 CiteScore 2.32
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.272 SNIP 1.064 CiteScore 2.4
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 1.306 SNIP 1.107 CiteScore 2.43
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 1.145 SNIP 1.073 CiteScore 2.22
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 1.235 SNIP 1.069
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 1.178 SNIP 1.052
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 2
Scopus rating (2008): SJR 1.236 SNIP 1.022
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 1.348 SNIP 1.21
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 1.195 SNIP 1.09
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 1.253 SNIP 1.198
Web of Science (2005): Indexed yes
Phaeosystis globosa (Prymnesiophyceae) and the planktonic food web: Feeding, growth, and trophic interactions among grazers

General information
State: Published
Organisations: Section for Ocean Ecology and Climate, National Institute of Aquatic Resources, Danish Institute for Fisheries Research
Authors: Tang, K. (Ekstern), Jakobsen, H. H. (Intern), Visser, A. (Intern)
Pages: 1860-1870
Publication date: 2001
Main Research Area: Technical/natural sciences

Publication information
Journal: Limnology and Oceanography
Volume: 46
Issue number: 8
ISSN (Print): 0024-3590
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 3.5 SJR 1.712 SNIP 1.225
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 2.472 SNIP 1.422 CiteScore 3.93
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
Scopus rating (2014): SJR 2.112 SNIP 1.584 CiteScore 3.73
BFI (2013): BFI-level 2
Scopus rating (2013): SJR 2.256 SNIP 1.587 CiteScore 3.98
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 2
Scopus rating (2012): SJR 2.456 SNIP 1.5 CiteScore 3.81
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 2
Scopus rating (2011): SJR 2.374 SNIP 1.445 CiteScore 3.59
ISI indexed (2011): ISI indexed yes
The influence of tidal straining and wind on suspended matter and phytoplankton distribution in the Rhine outflow region

To study the short-term effects of the physical environment on phytoplankton dynamics in the Rhine outflow area. Changes in salinity, beam attenuation and phytoplankton distribution were observed in a series of high resolution measurements. During periods of weak wind and neap tide (low turbulent kinetic energy, TKE), the system was dominated by tidal straining that resulted in semi-diurnal oscillations in stratification. Phytoplankton was kept in resuspension at about 10-15 m depth. Subsequent strong wind and tidal mixing (high TKE) broke down stratification, enhanced horizontal gradients and suppressed estuarine transport. It is hypothesised that during low TKE, tidal straining and frontal circulation determined the phytoplankton distribution; and at high TKE, input by wind and tide enhanced conditions for growth, which resulted in a bloom in the surface layer of the Rhine Plume, where light and nutrients were available. (C) 2001 Elsevier Science Ltd. All rights reserved.

General information
State: Published
Organisations: Section for Ocean Ecology and Climate, National Institute of Aquatic Resources
Authors: Joordens, J. (Ekstern), Souza, A. (Ekstern), Visser, A. (Intern)
Pages: 301-325
Publication date: 2001
Main Research Area: Technical/natural sciences

Publication information
Journal: Continental Shelf Research
Volume: 21
Issue number: 3
ISSN (Print): 0278-4343
Ratings:
BFI (2018): BFI-level 1
Modelling the attack success of planktonic predators: patterns and mechanisms of prey size selectivity

A mathematical model of the attack success of planktonic predators (fish larvae and carnivorous copepods) is proposed. Based on a geometric representation of attack events, the model considers how the escape reaction characteristics (speed and direction) of copepod prey affect their probability of being captured. By combining the attack success model with previously published hydrodynamic models of predator and prey perception, we examine how predator foraging behaviour and prey perceptive ability affect the size spectra of encountered and captured copepod prey. We examine food size spectra of (i) a rheotactic cruising predator, (ii) a suspension-feeding hovering copepod and (iii) a larval fish. For rheotactic predators such as carnivorous copepods, a central assumption of the model is that attack is triggered by prey escape reaction, which in turn depends on the deformation rate of the fluid created by the predator. The model
demonstrates that within a species of copepod prey, the ability of larger stages to react at a greater distance from the predator results in increased strike distance and, hence, lower capture probability. For hovering copepods, the vorticity field associated with the feeding current also acts in modifying the prey escape direction. The model demonstrates that the reorientation of the prey escape path towards the centre of the feeding current's flow field results in increased attack success of the predator. Finally, the model examines how variability in the kinetics of approach affects the strike distance of larval fish. In cases where observational data are available, model predictions closely fit observations.
On the reorientation of non-spherical prey particles in a feeding current

Potentially, non-spherical prey can be re-oriented in a flow field and impact on the predator's feeding structures in a non-random manner. Herein, we quantify a process whereby this passive reorientation occurs, and present a model that predicts the orientation of a spheroidal prey as a function of its shape, size and the characteristics of the fluid flow. For a radial flow field, elongated prey tend to align with their long axis parallel to streamlines. This theory is well supported by our results from a laboratory study of cylindrical particles in a siphon flow. The model is extended to a more realistic representation of copepod feeding currents. In this context, the spatial scale over which this process is active is proportional to epsilon (-1/4) where epsilon is the turbulent dissipation rate. For a range of natural turbulence levels, re-orientation efficiency can range from >90% (low turbulence) to

General information
State: Published
Organisations: Section for Ocean Ecology and Climate, National Institute of Aquatic Resources
Authors: Visser, A. (Intern), Jonsson, P. (Ekstern)
Pages: 761-777
Publication date: 2000
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Plankton Research
Volume: 22
Issue number: 4
ISSN (Print): 0142-7873
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 1.92 SJR 1.098 SNIP 0.848
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 1.025 SNIP 0.796 CiteScore 1.77
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 1.095 SNIP 1.255 CiteScore 2.24
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 1.289 SNIP 1.109 CiteScore 2.39
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 1.557 SNIP 1.101 CiteScore 2.43
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 1.158 SNIP 1.045 CiteScore 1.99
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 1.186 SNIP 0.98
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 0.922 SNIP 1.046
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 1
Scopus rating (2008): SJR 1.174 SNIP 1.037
Web of Science (2008): Indexed yes
Scopus rating (2007): SJR 1.31 SNIP 1.225
Web of Science (2007): Indexed yes
Scopus rating (2006): SJR 1.19 SNIP 1.118
Web of Science (2006): Indexed yes
Scopus rating (2005): SJR 1.116 SNIP 1.068
Web of Science (2005): Indexed yes
Scopus rating (2004): SJR 1.035 SNIP 1.101
Scopus rating (2003): SJR 1.315 SNIP 1.299
Web of Science (2003): Indexed yes
Scopus rating (2002): SJR 1.239 SNIP 1.068
Web of Science (2002): Indexed yes
Scopus rating (2001): SJR 1.234 SNIP 1
Web of Science (2001): Indexed yes
Scopus rating (2000): SJR 1.226 SNIP 1.049
Web of Science (2000): Indexed yes
Scopus rating (1999): SJR 1.598 SNIP 1.191
Original language: English
Source: orbit
Source-ID: 227758
Publication: Research - peer-review › Journal article – Annual report year: 2000

**Subsurface phytoplankton blooms fuel pelagic production in the North Sea**

The seasonal phytoplankton biomass distribution pattern in stratified temperate marine waters is traditionally depicted as consisting of spring and autumn blooms. The energy source supporting pelagic summer production is believed to be the spring bloom. However, the spring bloom disappears relatively quickly from the water column and a large proportion of the material sedimenting to the bottom following the spring bloom is often comprised of intact phytoplankton cells. Thus, it is easy to argue that the spring bloom is fueling the energy demands of the benthos, but more difficult to argue convincingly that energy fixed during the spring bloom is fueling the pelagic production occurring during summer months. We argue here that periodic phytoplankton blooms are occurring during the summer in the North Sea at depths of >25 m and that the accumulated new production [sensu (Dugdale and Goering, Limnol. Oceanogr., 12, 196-206, 1967)] occurring in these blooms may be greater than that occurring in the spring bloom in the same regions. Thus, such blooms may explain apparent discrepancies in production yields between different temperate marine systems

**General information**

State: Published
Organisations: Section for Ocean Ecology and Climate, National Institute of Aquatic Resources, Aarhus University
Authors: Richardson, K. (Ekstern), Visser, A. (Intern), Pedersen, F. (Ekstern)
Buoyancy control of Calanus finmarchicus

General information
State: Published
Organisations: Section for Ocean Ecology and Climate, National Institute of Aquatic Resources
Authors: Jonasdottir, S. (Intern), Visser, A. (Intern)
Pages: 5-6
Publication date: 1999
Main Research Area: Technical/natural sciences

Hydrodynamic signal perception in the copepod Acartia tonsa

Copepods may remotely detect predators from the velocity gradients these generate in the ambient water. Each of the different components and characteristics of a velocity gradient (acceleration, vorticity, longitudinal and shear deformation) can cause a velocity difference between the copepod and the ambient water and may, therefore, be perceived by mechanoreceptory setae. We hypothesised that the threshold value for escape response to a particular component depends solely on the magnitude of the velocity difference (= signal strength) it generates. In experiments we isolated the different components and noted the minimum intensities to which the copepod Acartia tonsa responded. As hypothesised, threshold signal strengths due to longitudinal and shear deformation were similar, ~0.015 cm s⁻¹, and were invariant with developmental stage. The latter implies that the threshold deformation rate for response scales inversely with size, i.e. that large stages respond to lower fluid deformation rates than small stages and, hence, may detect predators at longer distances. Signals due to vorticity and acceleration did not elicit escape responses, even though their magnitude exceeded threshold signal strength due to deformation. We suggest that A. tonsa cannot distinguish such signals from those due to their own behaviour (sinking, swimming, passive reorientation due to gravity) because they cause a similar spatial distributions of the signal across the body. Reinterpretation of data from the literature revealed that threshold signal strength due to deformation varies by ca 2 orders of magnitude between copepods and exceeds the neurophysiological response threshold by more than a factor of 10. In contrast, threshold deformation rates vary much less, ~0.5 to 5 s⁻¹. Model calculations suggest that such threshold deformation rates are just sufficient to allow efficient predator detection while at the same time just below maximum turbulent deformation rates, thus preventing inordinate escapes.

General information
State: Published
Organisations: Section for Ocean Ecology and Climate, National Institute of Aquatic Resources
Authors: Kiørboe, T. (Intern), Saiz, E. (Ekstern), Visser, A. (Intern)
Pages: 97-111
Publication date: 1999
Main Research Area: Technical/natural sciences

Publication information
Journal: Marine Ecology - Progress Series
Volume: 179
ISSN (Print): 0171-8630
Ratings:
BFI (2018): BFI-level 2
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 2
Lipids, buoyancy and the seasonal vertical migration of Calanus finmarchicus

General information
State: Published
Organisations: Section for Ocean Ecology and Climate, National Institute of Aquatic Resources
Authors: Visser, A. (Intern), Jonasdottir, S. (Intern)

Bibliographical note
Copyright (1999) Inter-Research
Source: orbit
Source-ID: 226207
Publication: Research - peer-review > Journal article – Annual report year: 1999
Predator and prey perception in copepods due to hydromechanical signals

Copepods can perceive moving predators and prey by means of the hydrodynamical disturbances these generate. We formulate a simplified, general model of the fluid disturbance generated by a plankter that is moving or generating a feeding current and we estimate the magnitude and attenuation of the different components of the fluid disturbance. We use this model to argue that prey perception depends on the absolute magnitude of the fluid velocity generated by the moving prey, while predator perception depends on the magnitude of one or several of the components of the fluid velocity gradients (deformation rate, vorticity, acceleration) generated by the predator. On the assumption that hydrodynamic disturbances are perceived through the mechanical bending of sensory setae, we estimate the magnitude of the signal strength due to each of the fluid disturbance components. We then derive equations for reaction distances as a function of threshold signal strength and the size and velocity of the prey or predator. We provide a conceptual framework for quantifying threshold signal strengths and, hence, perception distances. The model is illustrated by several examples, and we demonstrate, for example, (1) how larval fish behaviour is adapted to allow their undetected approach up to the strike distance of their copepod prey, (2) that prey velocity is much more significant for prey encounter rates than traditionally assumed, even for cruising predators, (3) that prey perception is strongly biased towards large and rapidly swimming/sinking prey particles, and (4) that the model can accommodate the 3 orders of magnitude variation in clearance rates observed in the copepod Oithona similis feeding on motile protists and sinking particles. We finally discuss the implications of hydromechanical predator and prey perception to trophic interactions and vertical particle fluxes, and suggest important research questions that may be addressed.

General information
State: Published
Organisations: Section for Ocean Ecology and Climate, National Institute of Aquatic Resources
Authors: Kiørboe, T. (Intern), Visser, A. (Intern)
Environmental variability along the drift track of larval haddock in the east Shetland Atlantic inflow

General information
State: Published
Organisations: Section for Population- and Ecosystem Dynamics, National Institute of Aquatic Resources, Section for Ocean Ecology and Climate
Pages: 1-16
Publication date: 1998
Main Research Area: Technical/natural sciences

Intensive aggregate formation with low vertical flux during an upwelling-induced diatom bloom
The surfaces of most pelagic diatoms are sticky at times and may therefore form rapidly settling aggregates by physical coagulation. Stickiness and aggregate formation may be particularly adaptive in upwelling systems by allowing the retention of diatom populations in the vicinity of the upwelling center. We therefore hypothesized that upwelling diatom blooms are terminated by aggregate formation and rapid sedimentation. We monitored the development of a maturing diatom (mainly Chaetoceros spp.) bloom in the Benguela upwelling current during 7 d in February. Chlorophyll concentrations remained consistently high during the observation period (similar to 500 mg Chi m(-2)) and phytoplankton grew at an average specific rate of 0.25 d(-1). The diatoms were extraordinarily sticky, with stickiness coefficients of up to 0.40, which is the highest ever recorded for field populations. Combined with estimates of turbulent shear in the ocean such stickiness coefficients predict very high specific coagulation rates (0.3 d(-1)). In situ video observation demonstrated the occurrence of abundant diatom aggregates with surface water concentrations between 1,000 and 3,000 ppm. Despite the very high concentration of aggregates, vertical fluxes of phytoplankton were very low, with fractional losses

General information
State: Published
Organisations: Section for Ocean Ecology and Climate, National Institute of Aquatic Resources
Authors: Kiørboe, T. (Intern), Tiselius, P. (Ekstern), Mitchell-Innes, B. (Ekstern), Hansen, J. (Ekstern), Visser, A. (Intern), Mari, X. (Ekstern)
Pages: 104-116
Publication date: 1998
Main Research Area: Technical/natural sciences

Publication information
Journal: Limnology and Oceanography
Volume: 43
Issue number: 1
ISSN (Print): 0024-3590
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 3.5 SJR 1.712 SNIP 1.225
Predation vulnerability of planktonic copepods: consequences of predator foraging strategies and prey sensory abilities

We investigated the vulnerability of 2 copepod species (Eurytemora affinis and Temora longicornis) to predation by predators with different foraging modes, three-spined stickleback Gasterosteus aculeatus juveniles and mysid shrimps Neomysis integer. Copepods were videofilmed escaping from predators and from an artificial flow field, and the results were used in a model of hydrodynamic disturbance generated by a predator. The copepods detected mysids from a significantly larger distance than they detected sticklebacks (0.45 and 0.24 cm, respectively). Consequently, the capture success of the sticklebacks was higher than that of mysids. In the case of sticklebacks foraging on E. affinis, copepod
reaction distance was significantly correlated with stickleback approaching speed; sticklebacks captured a copepod only if they were able to slowly approach to within a strike distance of

**General information**

State: Published
Organisations: Section for Ocean Ecology and Climate, National Institute of Aquatic Resources, Technical University of Denmark
Authors: Vitasalo, M. (Ekstern), Kiørboe, T. (Ekstern), Flinkman, J. (Ekstern), Pedersen, L. W. (Ekstern), Visser, A. (Intern)
Pages: 129-142
Publication date: 1998
Main Research Area: Technical/natural sciences

**Publication information**

Journal: Marine Ecology - Progress Series
Volume: 175
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
BFI (2009): BFI-level 2
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 2
Web of Science (2008): Indexed yes
Web of Science (2007): Indexed yes
Web of Science (2006): Indexed yes
Web of Science (2005): Indexed yes
Web of Science (2004): Indexed yes
Web of Science (2003): Indexed yes
Web of Science (2002): Indexed yes
Web of Science (2001): Indexed yes
Web of Science (2000): Indexed yes
Role of diatoms in copepod production: good, harmless or toxic?

General information
State: Published
Organisations: Section for Ocean Ecology and Climate, National Institute of Aquatic Resources, Section for Population Ecology and Genetics
Authors: Jonasdottir, S. (Intern), Kiørboe, T. (Intern), Tang, K. (Ekstern), St. John, M. (Intern), Visser, A. (Intern), Saiz, E. (Ekstern), Dam, H. (Ekstern)
Pages: 305-308
Publication date: 1998
Main Research Area: Technical/natural sciences

Publication information
Journal: Marine Ecology - Progress Series
Volume: 172
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
Turbulence-induced contact rates of plankton: the question of scale

Modelling encounter rates between planktonic predators and prey in turbulent waters requires an estimate of a spatial scale. One spatial scale proposed in the literature based on prey concentration is shown to be systematically inconsistent and its use is shown to imply that plankton sampling methodology can bias encounter rate estimates in turbulent situations. We show that a scale based on the predator’s reactive distance is more appropriate, as it has clear theoretical support, and is consistent with other mathematical treatments of encounter problems. Applying the reactive distance as the length scale produces encounter rates for small (e.g. 4 to 10 mm) fish larvae 2- to 3-fold lower than those using prey separation distance.

General information
State: Published
Organisations: Section for Ocean Ecology and Climate, National Institute of Aquatic Resources, Section for Population- and Ecosystem Dynamics
Authors: Visser, A. (Intern), MacKenzie, B. (Intern)
Pages: 307-310
Publication date: 1998
Main Research Area: Technical/natural sciences

Publication information
Journal: Marine Ecology - Progress Series
Volume: 166
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
The Rhine outflow: a prototypical pulsed discharge plume in a high energy shallow sea

General information
State: Published
Organisations: Section for Ocean Ecology and Climate, National Institute of Aquatic Resources
Authors: de Ruijter, W. (Ekstern), Visser, A. (Intern), Bos, W. (Ekstern)
Pages: 263-276
Publication date: 1997
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Marine Systems
Volume: 12
Issue number: 1-4
ISSN (Print): 0924-7963
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Using random walk models to simulate the vertical distribution of particles in a turbulent water column

Random walk simulation has the potential to be an extremely powerful tool in the investigation of turbulence in environmental processes. However, care must be taken in applying such simulations to the motion of particles in turbulent marine systems where turbulent diffusivity is commonly spatially non-uniform. The problems associated with this nonuniformity are far from negligible and have been recognised for quite some time. However, incorrect implementations continue to appear in the Literature. In this note computer simulations are presented to illustrate how and why these implementations are incorrect, and a simple technique that can properly simulate turbulent diffusion in the marine environment is discussed.
Shear dispersion in a wind and density driven plume

**General information**
State: Published
Organisations: Section for Ocean Ecology and Climate, National Institute of Aquatic Resources
Authors: Visser, A. (Intern)
Number of pages: 359
Pages: 31-45
Publication date: 1996

**Host publication information**
Title of host publication: Buoyancy Effects on Coastal and Estuarine Dynamics
Volume: 53
Place of publication: Washington, DC
Publisher: American Geophysical Union
ISBN (Print): 0875902677
Series: Coastal and Estuarine Studies
Number: 53
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 259211
Publication: Research - peer-review › Book chapter – Annual report year: 1996

The use of models in eutrophication studies

**General information**
State: Published
Organisations: Section for Ocean Ecology and Climate, National Institute of Aquatic Resources
Authors: Visser, A. (Intern), Kamp-Nielsen, L. (Ekstern)
Number of pages: 280
Pages: 221-242
Publication date: 1996

**Host publication information**
Title of host publication: Eutrophication in Coastal Marine Ecosystems
Place of publication: Washington, DC
Publisher: American Geophysical Union
Editors: Jørgensen, B. B., Richardson, K.
ISBN (Print): 978-08-7590266-1
Series: Coastal and Estuarine Studies
Number: 52
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 259212
Publication: Research - peer-review › Book chapter – Annual report year: 1996

On tidal rectification, friction and geostrophic degeneracy

**General information**
State: Published
Organisations: Utrecht University
Authors: Visser, A. (Intern)
The effect of stratification on tidal current profiles in a region of freshwater influence

General information
State: Published
Organisations: University Colleges of North Wales, Universität Hamburg, Utrecht University
Authors: Visser, A. (Intern), Souza, A. J. (Ekstern), Hessner, K. (Ekstern), Simpson, J. H. (Ekstern)
Pages: 369-381
The Rose Spit Eddy in Dixon Entrance: Evidence for its existence and underlying dynamics

General information
State: Published
Organisations: Unknown
Authors: Bowman, M. (Ekstern), Visser, A. (Intern), Crawford, W. (Ekstern)
Pages: 70-93
Publication date: 1992
Main Research Area: Technical/natural sciences

Publication information
Journal: Atmosphere - Ocean
Volume: 30
ISSN (Print): 0705-5900
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 0.975 SNIP 0.73 CiteScore 1.44
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.965 SNIP 0.556 CiteScore 1.21
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.823 SNIP 0.686 CiteScore 1.26
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.919 SNIP 0.776 CiteScore 1.29
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 1.099 SNIP 0.751 CiteScore 1.42
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 1.149 SNIP 0.728 CiteScore 1.47
ISI indexed (2011): ISI indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 1.051 SNIP 0.718
Lagrangian tidal stress and basin–wide residual eddy dynamics in wide coastal sea straits

General information
State: Published
Organisations: State University of New York
Authors: Visser, A. (Intern), Bowman, M. J. (Ekstern)
Pages: 113-145
Publication date: 1991
Main Research Area: Technical/natural sciences

Publication information
Journal: Geophysical and Astrophysical Fluid Dynamics
Volume: 59
ISSN (Print): 0309-1929
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 0.83 SJR 0.399 SNIP 0.666
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 0.619 SNIP 0.684 CiteScore 0.93
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 0.507 SNIP 0.65 CiteScore 0.9
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 0.563 SNIP 0.67 CiteScore 0.92
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 0.49 SNIP 0.616 CiteScore 0.86
ISI indexed (2012): ISI indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 0.602 SNIP 0.782 CiteScore 0.88
ISI indexed (2011): ISI indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 0.898 SNIP 0.767
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 1.041 SNIP 0.94
Dynamics of tidally forced basin–wide coastal eddies

General information
State: Published
Organisations: Institute of Ocean Sciences, State University of New York
Authors: Visser, A. (Intern), Bowman, M. (Ekstern), Crawford, W. (Ekstern)
Number of pages: 544
Publication date: 1990

Host publication information
Title of host publication: Residual Currents and Long–term Transport
Place of publication: New York
Publisher: Springer Verlag
Editor: Cheng, R.
ISBN (Print): 0387973761

Series: Lecture Notes on Coastal and Estuarine Studies: Physics of Shallow Bays and Estuaries
Main Research Area: Technical/natural sciences
Source: orbit
Source-ID: 259217
Publication: Research - peer-review › Book chapter – Annual report year: 1990

Experiences with the Brillinger spectral estimator applied to simulated irregularly observed processes

General information
State: Published
Organisations: Victoria University of Wellington, State University of New York
Authors: Moore, M. I. (Ekstern), Visser, A. (Intern), Shirtcliffe, T. G. (Ekstern)
Pages: 433-442
Publication date: 1987
Main Research Area: Technical/natural sciences

Publication information
Journal: Journal of Time Series Analysis
Volume: 8
ISSN (Print): 0143-9782
Ratings:
BFI (2018): BFI-level 2
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 1.214 SNIP 1.285 CiteScore 1.08
Projects:

**Trait-based modelling of copepod communities**

National Institute of Aquatic Resources  
Period: 01/10/2017 → 30/09/2020  
Number of participants: 4  
Phd Student:  
Serra Pompei, Maria Camila (Intern)  
Supervisor:  
Kiørboe, Thomas (Intern)  
Visser, Andre (Intern)  
Main Supervisor:  
Andersen, Ken Haste (Intern)

**Financing sources**  
Source: Internal funding (public)  
Name of research programme: Samfinansieret - Andet  
Project: PhD

**Vertical migration and the structure and function of pelagic ecosystems**

National Institute of Aquatic Resources
Mechanistic approach to ocean ecology (39427)

The overarching goal of the proposed research is to develop a mechanistically underpinned, trait-based model of marine plankton ecosystems ranging across multiple trophic levels from bacteria to zooplankton. The rationale and methods and rooted in the trait-based approach developed by the Centre for Ocean Life. Zooplankton has a key role in the model, and the themes guiding model design are trait biogeography (i.e., spatio-temporal distributions of traits) and vertical material fluxes and carbon sequestration.

The work will be organized in four interlinked work packages (WPs), each guided by a particular research question. All models will be implemented in a physical setting, and WPs 1-3 represent an increasing degree of complexity from unicellular plankton in a 0D environment toward a full size-based model in 2D environment. WP1 and 2 develop the unicellular and multicellular components, WP3 the full size based model, and WP4 sets up the model for the California Current system and tests the model against field observations collected by the Zooglider and through the CalCOFI monitoring program.

The project is coordinated by DTU Aqua.

The project is funded by Gordon and Betty Moore Foundation.

National Institute of Aquatic Resources

Centre for Ocean Life

Scripps Institution of Oceanography

Reduktion af lakseinfektioner

National Institute of Aquatic Resources

Phd Student:
Kragsteen, Tróndur Jónsson (Intern)

Contact:
Simonsen, Knud (Ekstern)
Visser, Andre (Intern)
Andersen, Ken Haste (Intern)

Main Supervisor:
Andersen, Ken Haste (Intern)
Financing sources
Source: Internal funding (public)
Name of research programme: Industrial PhD
Project: PhD

Reconfigurable Modular Robotic System for Aquatic Environment
Department of Electrical Engineering
Automation and Control
Centre for Playware
National Institute of Aquatic Resources
Section for Oceans and Arctic
Department of Mechanical Engineering
Engineering Design and Product Development
Fluid Mechanics, Coastal and Maritime Engineering
Period: 01/02/2016 → 31/01/2018
Number of participants: 6
Acronym: REMORA
Project participant:
Christensen, David Johan (Intern)
Mariani, Patrizio (Intern)
Visser, Andre (Intern)
Özkil, Ali Gürçan (Intern)
Nielsen, Ulrik Dam (Intern)
Project Manager, academic:
Galeazzi, Roberto (Intern)
Project

Collaborative modular underwater robotic system for long-term autonomous operations (REMORA) (39341)
In this project we aim to bootstrap new high-impact underwater robotics activities at DTU. We propose to develop a novel robotic platform, the REMORA1 system, for research, education and innovation. The objectives of the project are to develop the necessary infrastructure, i.e., underwater robotic system, test facilities, educational framework and external collaboration, to perform world-class research and innovation in the area of offshore underwater robotic technology.

With this project we aim to eventually strengthen the Danish maritime sector in dealing with the high cost and technical challenges of inspections and maintenance in increasing amount of offshore installations. The project is a collaboration between DTU Electrical Engineering, DTU Mechanical Engineering and DTU Aqua who have complementary expertise within development and innovation of robotic technology and applications of underwater robotics.

This project is coordinated by DTU Electrical Engineering.

The project is funded by A/S Dampskibsselskabet Orients Fond.

National Institute of Aquatic Resources
Section for Marine Ecology and Oceanography
Technical University of Denmark
Period: 21/12/2015 → 21/12/2017
Number of participants: 2
Research areas: Oceanography & Observation Technology & Marine Populations and Ecosystem Dynamics
Project participant:
Mariani, Patrizio (Intern)
Visser, Andre (Intern)
Project

Benefits, cost, and trade-off of defense mechanisms in marine phytoplankton

National Institute of Aquatic Resources
Period: 01/11/2015 → 28/12/2018
Number of participants: 3
Phd Student: Pancic, Marina (Intern)
Supervisor: Visser, Andre (Intern)
Main Supervisor: Kiørboe, Thomas (Intern)

Financing sources
Source: Internal funding (public)
Name of research programme: Samfinansieret - Andet
Project: PhD

Underwater time of flight image acquisition system (UTOFIA) (39240)
This project offers a compact and cost-effective underwater imaging system for turbid environments and will fill the current gap between short-range, high-resolution conventional video and long-range low-resolution sonar systems. The camera system utilizes high frequency laser pulses synchronized with rapid shutter operations on nano second time scales to radically reduce the interference of back scatter on visual images. Using this range-gated imaging technology, the system will extend the imaging range by factor 2 to 3 over conventional video systems. At the same time, the system will provide video-rate 3D information. UTOFIA offers a new modus operandi for the main targeted domains of application: marine life monitoring, harbour and ocean litter detection, fisheries stock assessment and aquaculture, seabed mapping, offshore industry and civil security.

The project is a collaborative effort between engineering companies producing the laser components, the camera systems, the software control and processing systems as well as the deployment platforms. The project also involves companies charged with integrating the system and its commercialization into the market place. The role of DTU Aqua is twofold; it is responsible for a series of field and laboratory trials to demonstrate the proof-of-concept and to feed back into the engineering design process, and it is responsible for the exploitation and dissemination dimension of the project, particularly with respect to marine science, fisheries and aquaculture applications.

The consortium is coordinated by SINTEF, Norway.

The project is funded by EU, Horizon2020.
National Institute of Aquatic Resources
Section for Oceans and Arctic
SINTEF
Odos Imaging
Fraunhofer Gesellschaft
Bright Solutions
Subsea Tech
AZTI-Tecnalia
Period: 01/02/2015 → 30/04/2018
Number of participants: 7
Research areas: Oceanography & Fish Biology & Observation Technology
Contact person:
Visser, Andre (Intern)
Project participant:
Mariani, Patrizio (Intern)
Jonasdottir, Sigrun (Intern)
Stage, Bjame (Intern)
Bridda, Jacopo (Intern)
Thøgersen, Thomas Lindberg (Intern)
Behrens, Jane (Intern)
Project
Our goal is to develop a fundamental understanding and predictive capability of marine ecosystems through the use of novel trait-based approaches and models.

The Centre is organized around three main research activities:
- Identification and mechanistic description of the traits and trade-offs required to characterize the main Darwinian missions (feed, survive, reproduce) of the various life forms in the ocean through experimental and theoretical work, as well as analysis of literature data.
- Models: scaling of individual behavior to population and ecosystem dynamics through the development of trait-based models.
- Testing model prediction by comparing to observed trait patterns in the ocean.

The Centre involves biologists, physicists, chemists, and mathematicians and has a very strong training component through the supervision of master students, and about 30 PhD and postdoctoral fellows as well as offering PhD summer schools and organizing international workshops. The Centre in addition host many visiting students and scientists.

The Centre is lead by DTU Aqua.

The project is funded by the Villum Kahn-Rasmussen Foundation (Velux Foundations) as well as through various national and European fellowship programs (Research Council, H.C. Ørsted Fellowship programme, Marie Curie, Carlsberg Foundation, etc).

National Institute of Aquatic Resources
Centre for Ocean Life
Roskilde Universitet
University of Copenhagen
Massachusetts Institute of Technology
University of Oxford
Michigan State University
University of Bergen
Kiel University

Period: 01/01/2012 → 31/12/2017
Number of participants: 10
Research areas: Oceanography & Marine Populations and Ecosystem Dynamics & Marine Living Resources & Ecosystem based Marine Management

Project participant:
Andersen, Ken Haste (Intern)
Visser, Andre (Intern)
Stedmon, Colin (Intern)
Gislason, Henrik (Intern)
Payne, Mark (Intern)
Thygesen, Uffe Høgsbro (Intern)
MacKenzie, Brian (Intern)
Mariani, Patrizio (Intern)
Nielsen, Torkel Gissel (Intern)

Project Manager, academic:
Kiørboe, Thomas (Intern)

Fisheries Oceanography of Northern Pelagic Fish Populations
National Institute of Aquatic Resources
Period: 15/12/2011 → 02/09/2015
Number of participants: 6
Phd Student:
Tsoukali, Stavroula (Intern)

Supervisor:
Visser, Andre (Intern)

Main Supervisor:
MacKenzie, Brian (Intern)

Examiner:
Nielsen, Torkel Gissel (Intern)
Folkvord, Arild (Ekstern)
Miller, Thomas J. (Ekstern)

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

PhD Scholarship in Marine Ecology and Climate
National Institute of Aquatic Resources
Period: 15/09/2011 → 01/04/2015
Number of participants: 6
Phd Student:
Ferreira, Ana Sofia (Intern)

Supervisor:
MacKenzie, Brian (Intern)
Climate change on marine ecosystems and resource economics (NorMER) (38898)

Marine ecosystems are under pressure from both anthropogenic climate change and high exploitation rates. A major challenge to managers and scientists is to identify ways that oceans can provide food and other services in a sustainable way under changing climatic and socioeconomic conditions. As physical, biological and socioeconomic factors interact at several levels, cross-disciplinary approaches are needed to meet this challenge.

This Nordic project has
(1) evaluated climate effects on Nordic marine ecosystems,
(2) Build new tools for predicting biological consequences of climate change,
(3) quantified impacts on profit, employment, and harvesting of cod.

This has been achieved through the work of 16 PhDs, 4 postdocs, 1 climate scientist, and the combined expertise of 45 senior scientists located at 10 institutions in 8 Nordic countries.

The project was coordinated by University of Oslo, Norway.

The project was funded by Nordforsk, Nordic Council of Ministers.

National Institute of Aquatic Resources
Centre for Ocean Life
University of Oslo
Stockholm University
Åbo Academy University
University of Helsinki
Swedish Meteorological and Hydrological Institute
University of Iceland
University of the Faroe Islands
Greenland Institute of National Resources

University of Bergen
Period: 01/01/2011 → 31/12/2015
Number of participants: 6
Research areas: Oceanography & Marine Population and Ecosystem Dynamics & Population Genetics
Project participant:
Andersen, Ken Haste (Intern)
Visser, Andre (Intern)
Thygesen, Uffe Høgsbro (Intern)
Eg Nielsen, Einar (Intern)
MacKenzie, Brian (Intern)
Project Manager, academic:
Kiørboe, Thomas (Intern)
Project

North Atlantic - Arctic coupling in a changing climate: Impacts on ocean circulation, carbon cycling and sea-ice (NAACOS) (38888)
Climate change is most pronounced at high latitudes, with rapid and dramatic changes observed in sea-ice coverage, circulation and the ecosystem. These changes have profound effects both at the regional scale as well as globally.

The North Atlantic and Arctic Ocean are the headwaters of the thermohaline circulation (THC), the global heat engine responsible, amongst other things, for the relatively mild climate we experience in Denmark. Subtle change in sea-ice formation, deep water circulation, and freshwater supply on a relatively local scale will have repercussions around the world. More subtle still are the feed-back controls these processes have on climate change. Sea-ice coverage and the earth’s albedo is one feed-back, but there is also the draw down and sequestering of atmospheric CO2 in deep waters by physical and biological processes. The whole is an intricate weave of interrelated mechanisms: the scientific challenge to draw together expertise across disciplines to address these issues was accomplished; the strategic outcome was a suite of knowledge-based tools designed to reduce the uncertainty and contribute to climate policies.

The NAACOS team comprised a number of well-recognized scientists with profound experience and a significant international collaboration. NAACOS developed and refined oceanographic models using remote sensing and observations to evaluate the impact of high latitude climate change on circulation, deep water formation, sea-ice and carbon flux, and their implications at regional scales.

The project was coordinated by DTU Aqua.

The project was funded by the Danish Council for Strategic Research and a DHI student stipend.

National Institute of Aquatic Resources
Section for Marine Ecology and Oceanography
Danish Meteorological Institute
Aarhus University
DHI Denmark
Faroe Research Institute
University of Copenhagen
Period: 01/01/2011 → 31/12/2014
Number of participants: 6
Research areas: Oceanography & Marine Populations and Ecosystem Dynamics & Marine Living Resources
Project participant:
Stedmon, Colin (Intern)
Koski, Marja (Intern)
Mariani, Patrizio (Intern)
Christensen, Asbjørn (Intern)
Jonasdottir, Sigrun (Intern)
Project Manager, academic:
Visser, Andre (Intern)

Modelling the competition between two closely-related copepod species in Arctic under climate change

National Institute of Aquatic Resources
Period: 01/12/2010 → 07/05/2014
Number of participants: 6
Phd Student:
Sainmont, Julie (Intern)
Supervisor:
Andersen, Ken Haste (Intern)
Main Supervisor:
Visser, Andre (Intern)
Examiner:
Mariani, Patrizio (Intern)
Aksnes, Dag L. (Ekstern)
Banas, Neil S. (Ekstern)

Financing sources
Source: Internal funding (public)
European basin-scale analysis, synthesis and integration (EURO-BASIN) (38899)
EURO-BASIN was designed to advance our understanding on the variability, potential impacts, and feedbacks of global change and anthropogenic forcing on the structure, function, and dynamics of the North Atlantic and associated shelf sea ecosystems as well as the key species influencing carbon sequestering and ecosystem functioning. Like the entire biosphere, marine ecosystems such as the North Atlantic and its associated shelf sea ecosystems can be characterized by emergent properties controlled by a dynamic network of interactions and relationships and not static entities. This system complexity is what Martin Luther King Jr. called "an inescapable network of mutuality" scientists today define as complex adaptive systems (CASs).

EURO-BASIN has represented the first attempt of creating future prognosis of marine ecosystem states sensitive to CAS dynamics using as its test case the North Atlantic. Long-term prediction of the status of these CAS systems, population dynamics of key species and hence management of marine systems requires the implementation and advancement of an ecosystem approach for the management of marine resources sensitive to CAS dynamics. What is the ecosystem approach? Unlike a single species approach, the ecosystem approach takes into account population and ecosystem responses to changes in the Earth's climate, fisheries, and interactions between them. In EURO-BASIN not only did we monitor and assess how North Atlantic marine ecosystems behaved in the past, but also predict how they will respond under possible future climate change scenarios. Hence, the results of this project have provided important recommendations for better marine resource management in the European Union.

The project had participants from 23 European universities and research institutions as well as collaborations with key institutions and Universities in the US and Canada.

The project was coordinated by DTU Aqua.

The project was funded by EU, Framework Programme 7.

National Institute of Aquatic Resources
Section for Marine Ecology and Oceanography
Period: 01/01/2010 → 31/12/2014
Number of participants: 12
Research areas: Marine Populations and Ecosystem Dynamics & Oceanography & Marine Living Resources
Acronym: EURO-BASIN
Number of related Ph.D. students: 4
Contact person:
Grigorov, Ivo (Intern)
Project participant:
Andersen, Ken Haste (Intern)
Jonasdottir, Sigrun (Intern)
Kiørboe, Thomas (Intern)
Koski, Marja (Intern)
Munk, Peter (Intern)
Stæhr, Karl-Johan (Intern)
Vinther, Morten (Intern)
Visser, Andre (Intern)
Project Manager, organisational:
Köster, Fritz (Intern)
MacKenzie, Brian (Intern)
Project Manager, academic:
St. John, Michael (Intern)

Relations
Activities:
40th CIESM Mediterranean Science Commission Congress: Mediterranean Science Commission, Annual Congress
Publications:
Acclimation, adaptation, traits and trade-offs in plankton functional type models – seeking clarity in terminology
Size structures sensory hierarchy in ocean life
Gut evacuation rate and grazing impact of the krill Thysanoessa raschii and T. inermis
Long-term retrospective analysis of mackerel spawning in the North Sea
Winter–spring transition in the subarctic Atlantic: microbial response to deep mixing and pre-bloom production

Challenges in integrative approaches to modelling the marine ecosystems of the North Atlantic: Physics to fish and coasts to ocean

Fishing out collective memory of migratory schools

Interactive effects of temperature and light during deep convection: a case study on growth and condition of the diatom Thalassiosira weissflogii

Identifying marine pelagic ecosystem management objectives and indicators

Effects of temperature and food availability on feeding and egg production of Calanus hyperboreus from Disko Bay, Western Greenland

The rise and fall of the NE Atlantic blue whiting (Micromesistius poutassou)

Physiological constrains on Sverdrup's Critical-Depth-Hypothesis: the influences of dark respiration and sinking

Effects of a future warmer ocean on the coexisting copepods Calanus finmarchicus and C. glacialis in Disko Bay, Western Greenland

Long-term changes of euphausiids in shelf and oceanic habitats southwest, south and southeast of Iceland

Pseudocollapse and rebuilding of North Sea mackerel (Scomber scombrus)

Distributions and seasonal abundances of krill eggs and larvae in the sub-Arctic Godthåbsfjord, SW Greenland

Distribution of phytoplankton functional types in high-nitrate low-chlorophyll waters in a new diagnostic ecological indicator model

A resolution to the blue whiting (Micromesistius poutassou) population paradox?

Effects of climate-induced habitat changes on a key zooplankton species

Patchy zooplankton grazing and high energy conversion efficiency: ecological implications of sandeel behavior and strategy

A cascade of warming impacts brings bluefin tuna to Greenland waters

Migration and fisheries of North East Atlantic mackerel (Scomber scombrus) in autumn and winter

Spatially explicit estimates of stock sizes, structure and biomass of herring and blue whiting, and catch data of bluefin tuna

Krill diversity and population structure along the sub-Arctic Godthåbsfjord, SW Greenland

Spatial segregation within the spawning migration of North Eastern Atlantic mackerel (Scomber scombrus) as indicated by juvenile growth patterns

Trophic position of coexisting krill species: a stable isotope approach

Marine snow, zooplankton and thin layers: indications of a trophic link from small-scale sampling with the Video Plankton Recorder

Bridging the gap between marine biogeochemical and fisheries sciences; configuring the zooplankton link

Comparative ecology of widely distributed pelagic fish species in the North Atlantic: Implications for modelling climate and fisheries impacts

Population structure of Atlantic Mackerel (Scomber scombrus)

Press / Media items:

Data sharing: An open mind on open data: The move to make scientific findings transparent can be a major boon to research, but it can be tricky to embrace the change.

Project

Physical oceanography in Greenland waters under climate change (38767)

Changing climatic conditions will have considerable effects on the seas around Greenland. Melting glaciers, the formation of sea ice, large scale circulation of the Atlantic Ocean as well as more local changes in weather patterns will have direct impact, with cascading effects to biological processes and sustainable harvesting of marine resources. The aim of this project is to prepare modeling tools and analyses to describe expected oceanic conditions around Greenland under climate change. Particular focus will be on coupling these models and process studies to biology, biogeochemical cycling, and sea ice processes, with eventual feed backs to climate itself.

The project is coordinated by DTU Aqua.

National Institute of Aquatic Resources
Centre for Ocean Life
Danish Meteorological Institute
VitusLab
Activities:

ICES - Working Group on Oceanic Hydrography - WGOH (External organisation)
Period: 2012 → …
Andre Visser (Participant)

National Institute of Aquatic Resources
Section for Ocean Ecology and Climate
Degree of recognition: International

Related external organisation

ICES - Working Group on Oceanic Hydrography - WGOH
Activity: Membership › Membership of committees, commissions, boards, councils, associations, organisations, or similar