Integrated ecological-economic fisheries models - evaluation, review and challenges for implementation

Marine ecosystems evolve under many interconnected and area-specific pressures. In order to fulfill society's intensifying and diversifying needs whilst ensuring ecologically sustainable development, more effective marine spatial planning and broader-scope management of marine resources is necessary. Integrated ecological–socioeconomic fisheries models (IESFM) of marine systems are needed to evaluate impacts and sustainability of potential management actions and understand, and anticipate ecological, economic, and social dynamics at a range of scales from local to national and regional. To make these models most effective, it is important to determine how model characteristics and methods of communicating results influence the model implementation, the nature of the advice that can be provided and the impact on decisions taken by managers. This paper presents a global review and comparative evaluation of 35 IESFM’s applied to marine fisheries and marine ecosystem resources to identify the characteristics that determine their usefulness, effectiveness and implementation. The focus is on fully integrated models that allow for feedbacks between ecological and human processes though not all the models reviewed achieve that.

General information

State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Section for Marine Living Resources, Section for Oceans and Arctic, National Oceanographic and Atmospheric Administration, Christian-Albrechts-Universität zu Kiel, CSIRO, University of Washington, Plymouth Marine Laboratory, IFREMER, Thünen Institute of Sea Fisheries, New Economics Foundation, University of British Columbia, University of Vigo, AZTI-Tecnalia, Université Bretagne Loire, Institut de Ciències del Mar-CSIC, Wageningen University, National Marine Fisheries Research Institute, Scottish Pelagic Fishermen’s Association, AZTI Technalia, University of Southern Denmark, Swiss Federal Institute of Aquatic Science and Technology, Wageningen IMARES, Commonwealth Scientific and Industrial Research Organisation, University of Copenhagen, Swedish Agency for Marine and Water Management, Stockholm University, Lund University
Pages: 1-29
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Main Research Area: Technical/natural sciences
Assessing the role of environmental factors on Baltic cod recruitment, a complex adaptive system emergent property
Characteristic sizes of life in the oceans - from bacteria to whales

State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Ecology and Oceanography, Centre for Ocean Life, Section for Ecosystem based Marine Management
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Main Research Area: Technical/natural sciences

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Web of Science (2016): Indexed yes
Scopus rating (2015): SJR 11.289 SNIP 6.025 CiteScore 17.32
Scopus rating (2014): SJR 8.365 SNIP 5.568 CiteScore 14.2
Scopus rating (2013): SJR 10.664 SNIP 5.51 CiteScore 16.42
An integrated end-to-end modeling framework for testing ecosystem-wide effects of human-induced pressures in the Baltic Sea

We present an integrated end-to-end modeling framework that enables whole-of ecosystem climate, eutrophication, and spatial management scenario exploration in the Baltic Sea. The framework is built around the Baltic implementation of the spatially-explicit end-to-end ATLANTIS model, linked to the high-resolution coupled physical-biological model HBM-ERGOM and the fisheries bio-economic FishRent model. We investigate ecosystem-wide responses to changes in human-induced pressures by simulating several eutrophication scenarios that are relevant to existing Baltic Sea management plans (e.g. EU BSAP, EU CFP). We further present the structure and calibration of the Baltic ATLANTIS model and the operational linkage to the other models. Using the results of eutrophication scenarios, and focusing on the relative changes in fish and fishery production, we discuss the robustness of the model linking with respect to the underlying assumptions, strengths and weaknesses of individual models. Furthermore, we describe how to possibly expand the framework to account for spatial impacts and economic consequences, for instance by linking to the individual-vessel based DISPLACE modeling approach. We conclude that the proposed model integration and management scenario evaluation scheme lays the foundations for developing a robust framework for management strategy evaluation that is of strategic importance to stakeholders from around the Baltic Sea.

Evaluation of integrated ecological-economic models – Review and challenges for implementation

Evaluation of integrated ecological-economic models – Review and challenges for implementation

Bibliographical note
ICES CM 2015/M:12
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General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Ecology and Oceanography, Section for Ecosystem based Marine Management, Section for Marine Living Resources, Section for Monitoring and Data, Technical University of Denmark, Aarhus University, University of Southern Denmark, CSIRO Ocean and Atmospheres, University of Copenhagen
The Baltic ATLANTIS model: Implementing a holistic framework to evaluate ecosystem wide responses to changes in climate and anthropogenic forcing

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Ecology and Oceanography, Section for Ecosystem based Marine Management, Section for Marine Living Resources, Section for Monitoring and Data, Centre for Ocean Life, Aarhus University
Authors: Palacz, A. (Intern), Nielsen, J. R. (Intern), Christensen, A. (Intern), Gislason, H. (Intern), Bastardie, F. (Intern), Geitner, K. (Intern), Maar, M. (Ekstern), Lindegren, M. (Intern), Hufnagl, M. (Intern), Fulton, E. (Ekstern)
Number of pages: 1
Publication date: 2015
Event: Poster session presented at 18. Danske Havforskermøde, Copenhagen, Denmark.
Main Research Area: Technical/natural sciences
Links: http://www.marine-vectors.eu/Core_pages/The_Baltic_ATLANTIS_model_a_holistic_framework_to
Publication: Research › Poster – Annual report year: 2015

Evaluation of integrated ecological-economic models - What are they used for?

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Ecosystem based Marine Management, Section for Marine Ecology and Oceanography, Lund University
Publication date: 2014
Main Research Area: Technical/natural sciences
Publication: Research › Conference abstract for conference – Annual report year: 2014

The Baltic ATLANTIS model: Implementing a holistic framework to evaluate ecosystem wide responses to changes in climate and anthropogenic forcing

General information
State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Ecology and Oceanography, Section for Ecosystem based Marine Management, Section for Marine Living Resources, Section for Monitoring and Data, Centre for Ocean Life, Aarhus University
Authors: Palacz, A. (Intern), Nielsen, J. R. (Intern), Christensen, A. (Intern), Gislason, H. (Intern), Bastardie, F. (Intern), Geitner, K. (Intern), Maar, M. (Ekstern), Lindegren, M. (Intern), Hufnagl, M. (Intern), Fulton, E. (Ekstern)
Number of pages: 1
Publication date: 2014
Event: Poster session presented at EU-FP7-VECTORS Symposium, La Grande Motte, France.
Main Research Area: Technical/natural sciences
Publication: Research › Poster – Annual report year: 2014
Distribution of phytoplankton functional types in high-nitrate low-chlorophyll waters in a new diagnostic ecological indicator model

Modeling and monitoring plankton functional types (PFTs) is challenged by insufficient amount of field measurements to ground-truth both plankton models and bio-optical algorithms. In this study, we combine remote sensing data and a dynamic plankton model to simulate an ecologically-sound spatial and temporal distribution of phyto-PFTs. We apply an innovative ecological indicator approach to modeling PFTs, and focus on resolving the question of diatom-coccolithophore co-existence in the subpolar high-nitrate and low-chlorophyll regions. We choose an artificial neural network as our modeling framework because it has the potential to interpret complex nonlinear interactions governing complex adaptive systems, of which marine ecosystems are a prime example. Using ecological indicators that fulfill the criteria of measurability, sensitivity and specificity, we demonstrate that our diagnostic model correctly interprets some basic ecological rules similar to ones emerging from dynamic models. Our time series highlight a dynamic phyto-PFT community composition in all high latitude areas, and indicate seasonal co-existence of diatoms and coccolithophores. This observation, though consistent with in situ and remote sensing measurements, was so far not captured by state-of-the-art dynamic models which struggle to resolve this "paradox of the plankton". We conclude that an ecological indicator approach is useful for ecological modeling of phytoplankton and potentially higher trophic levels. Finally, we speculate that it could serve as a powerful tool in advancing ecosystem-based management of marine resources.
Spatial and temporal variability in nutrients and carbon uptake during 2004 and 2005 in the eastern equatorial Pacific Ocean
The Eastern Equatorial Pacific plays a great role in the global carbon budget due to its enhanced biological productivity linked to the equatorial upwelling. However, as confirmed by the Equatorial Biocomplexity cruises in 2004 and 2005, nutrient upwelling supply varies strongly, also due to the Tropical Instability Waves. The aim of this study is to examine patterns of spatial and temporal variability in the biological uptake of NO₃⁻, Si(OH)₄ and carbon.
in this region, and to evaluate the role of biological and physical interactions controlling these processes over seasonal and intra-seasonal time scales. Here, high resolution Pacific ROMS-CoSiNE model results are combined with in situ and remote sensing data. The results of model-data comparison reveal an excellent agreement in domain-average hydrographic and biological rate estimates, and patterns of spatio-temporal variability in primary productivity. We demonstrate for the first time that Tropical Instability Waves can be directly linked to increased NO$_3$ and Si(OH)$_4$ upwelling supply and enhanced nutrient and carbon uptake, in particular by large phytoplankton such as diatoms. In order to fully resolve the complexity of biological and physical interactions in the Eastern Equatorial Pacific, we recommend improving the CoSiNE model by introducing more phytoplankton groups and a variable Redfield ratio.

**General information**
State: Published
Organisations: Section for Population Ecology and Genetics, National Institute of Aquatic Resources
Authors: Palacz, A. P. (Intern), Chai, F. (Ekstern)
Pages: 701
Publication date: 2012
Main Research Area: Technical/natural sciences

**Publication information**
Journal: Biogeosciences Discussions
Volume: 9
Issue number: 1
ISSN (Print): 1810-6277
Ratings:
- BFI (2018): BFI-level 1
- BFI (2017): BFI-level 1
- Scopus rating (2017): SNIP 0.129 SJR 0.228 CiteScore 0.34
- BFI (2016): BFI-level 1
- Scopus rating (2016): CiteScore 0.6 SJR 0.276 SNIP 0.156
- BFI (2015): BFI-level 1
- Scopus rating (2015): SJR 0.235 SNIP 0.114 CiteScore 0.25
- BFI (2014): BFI-level 1
- Scopus rating (2014): SJR 0.129 SNIP 0.23 CiteScore 0.25
- BFI (2013): BFI-level 1
- Scopus rating (2013): SJR 1.608 SNIP 0.67 CiteScore 1.25
- ISI indexed (2013): ISI indexed no
- BFI (2012): BFI-level 1
- Scopus rating (2012): SJR 3.916 SNIP 4.37
- ISI indexed (2012): ISI indexed no
- Web of Science (2012): Indexed yes
- BFI (2011): BFI-level 1
- Scopus rating (2011): SJR 5.168 SNIP 4.396
- ISI indexed (2011): ISI indexed no
- BFI (2010): BFI-level 1
- Scopus rating (2010): SJR 1.68 SNIP 1.681
- BFI (2009): BFI-level 1
- BFI (2008): BFI-level 1
- Original language: English
- Source: dtu
- Source-ID: n:oai:DTIC-ART:doaj/320452819::15288
- Publication: Research - peer-review > Journal article – Annual report year: 2012

**Spatial and temporal variability in nutrients and carbon uptake during 2004 and 2005 in the eastern equatorial Pacific Ocean**
The eastern equatorial Pacific plays a great role in the global carbon budget due to its enhanced biological productivity linked to the equatorial upwelling. However, as confirmed by the Equatorial Biocomplexity cruises in 2004 and 2005, nutrient upwelling supply varies strongly, partly due to the tropical instability waves (TIWs). The aim of this study was to examine patterns of spatial and temporal variability in the biological uptake of NO$_3$, Si(OH)$_4$ and carbon in this region, and to evaluate the role of biological and physical interactions controlling this variability over seasonal and intra-seasonal time scales. Here, high resolution Pacific ROMS-CoSiNE (Regional Ocean Modeling System-Carbon, Silicon, Nitrogen Ecosystem) model results were evaluated with in situ and remote sensing data. The results of model-data comparison
revealed a good agreement in domain-average hydrographic and biological rate estimates, and patterns of spatio-temporal variability in primary productivity. We confirmed that TIWs have the potential to enhance phytoplankton biomass through an increased supply of nutrients and elevated local and instantaneous phytoplankton nutrient uptake as opposed to only advecting biomass. Furthermore, we concluded that initial biological conditions (e.g., zooplankton biomass) may play an important additional constraint on biological responses, in particular of large phytoplankton such as diatoms, to TIW-induced perturbations in the physical and biogeochemical fields and fluxes. In order to fully resolve the complexity of biological and physical interactions in the eastern equatorial Pacific, we recommended improving CoSiNE and other models by introducing more phytoplankton groups, variable Redfield and carbon to chlorophyll ratios, as well as resolving the Fe-Si co-limitation of phytoplankton growth.

**General information**

State: Published
Organisations: National Institute of Aquatic Resources, Section for Marine Ecology and Oceanography, University of Maine
Authors: Palacz, A. P. (Intern), Chai, F. (Ekstern)
Pages: 4369-4383
Publication date: 2012
Main Research Area: Technical/natural sciences

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BFI (2017): BFI-level 1
Scopus rating (2017): SNIP 1.235 SJR 2.072 CiteScore 3.96
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 4.25 SJR 2.397 SNIP 1.315
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): SJR 2.444 SNIP 1.326 CiteScore 4.04
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): SJR 2.237 SNIP 1.373 CiteScore 4.03
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): SJR 2.451 SNIP 1.422 CiteScore 4.21
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): SJR 2.4 SNIP 1.304 CiteScore 3.92
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): SJR 2.542 SNIP 1.164 CiteScore 3.86
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1
Scopus rating (2010): SJR 2.373 SNIP 1.083
Web of Science (2010): Indexed yes
BFI (2009): BFI-level 1
Scopus rating (2009): SJR 1.979 SNIP 1.211
Web of Science (2009): Indexed yes
BFI (2008): BFI-level 1
Controlling mechanisms in nutrient dynamics and biological productivity in the eastern equatorial Pacific Ocean

General information
State: Published
Organisations: University of Maine
Authors: Palacz, A. (Intern)
Publication date: 2011

Publication information
Place of publication: Orono
Publisher: University of Maine Press
Original language: English
Main Research Area: Technical/natural sciences
Publication: Research › Ph.D. thesis – Annual report year: 2011

Estimating iron and aluminum removal rates in the eastern equatorial Pacific Ocean using a box model approach

Iron limitation plays an important role in maintaining the high-nitrate low-chlorophyll (HNLC) condition in the equatorial upwelling zone. The rate and depth of upwelling control Fe supply to the euphotic zone. This study constrains the transport fluxes and budget of two trace metals, Fe and Al, in the upper ocean. They are co-delivered to the eastern equatorial Pacific surface waters via the Equatorial Undercurrent and upwelling but show distinct biogeochemical cycling processes. We combine the results of the in situ measurements of dissolved Fe and Al (dFe and dAl) with the modeled velocity fields to calculate the physical fluxes. The model calculations are evaluated with the conservation of heat, volume transport, NO3 and Si(OH)4 budgets for the equatorial Pacific. The vertical flux due to upwelling provides averaged dFe and dAl supply rates of 1.45μmolm−2d−1 and 11.51μmolm−2d−1, respectively. The sum of the net physical fluxes in the eastern equatorial Pacific for dFe and dAl are 0.41μmolm−2d−1 and 2.77μmolm−2d−1, respectively. These estimates are equal to the net biological and chemical removal rates of dFe and dAl. The calculated dFe:C net removal ratio is in the range of 3-9μmol:mol, which agrees with most other estimates. This suggests that the majority of net dFe removal is due to biological uptake in the upper water column. The results of this box model approach illustrate the usefulness of combining the modeled outputs and in situ measurements, which provide additional constraints on Fe transport and cycling in the equatorial Pacific and possibly other HNLC regions.

General information
State: Published
Organisations: University of Maine, San Francisco State University, University of Hawaii
Authors: Palacz, A. P. (Intern), Chai, F. (Ekstern), Dugdale, R. C. (Ekstern), Measures, C. I. (Ekstern)
Pages: 311-324
Publication date: 2011
Iron flux induced by Haida eddies in the Gulf of Alaska

Mesoscale anticyclonic Haida eddies are proposed to deliver a substantial amount of iron into the Gulf of Alaska (GOA) central gyre, where surface waters experience high-nitrate low-chlorophyll conditions. In this study we calculate an averaged upwelling flux of dissolved iron into the euphotic zone (100 m) of 1.17 mol m⁻² d⁻¹ based on observed iron profiles and modeled eddy dynamics and resultant vertical velocities. This estimated eddy-derived iron supply rate is comparable with new estimates of pulsed iron fertilization rates from rare volcanic ash deposition events. Despite the relatively small area affected by Haida eddies, they are estimated to contribute about 4.6 × 10⁶ moles of dissolved iron yearly to the GOA, which is equivalent to the annual atmospheric dust deposition. Haida eddies therefore represent a major iron source that should strongly influence the regional biological productivity and carbon budget of the GOA.

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Seasonal and inter-annual changes in the surface chlorophyll of the South China Sea

General information
State: Published
Organisations: University of Maine
Authors: Palacz, A. P. (Intern), Xue, H. (Ekstern), Armbrrecht, C. (Ekstern), Zhang, C. (Ekstern), Chai, F. (Ekstern)
Publication date: 2011
Main Research Area: Technical/natural sciences

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Web of Science (2017): Indexed yes
BFI (2016): BFI-level 2
Scopus rating (2016): CiteScore 3.36 SJR 2.369 SNIP 1.558
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 2
Scopus rating (2015): SJR 2.754 SNIP 1.605 CiteScore 3.39
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 2
The impact of equatorial Pacific tropical instability waves on hydrography and nutrients: 2004-2005

This paper documents the variability in physics and nutrients during two cruises spanning 110°W to 140°W in December 2004 and September 2005. The goal of this work is to set the hydrographic framework for companion papers which quantify the role of iron, silicon and grazing in maintaining the high nitrate, low chlorophyll (HNLC) conditions in the equatorial Pacific. The two cruises were conducted almost a year apart, at different phases of the El Niño cycle, but during similarly intense tropical instability wave (TIW) seasons. The higher phytoplankton biomass observed on the 2005 cruise was due to a combination of time of year and a weakening El Niño. A general relationship between TIWs and Si cycling is...
described. TIWs advect the equatorial upwelling plume alternately to the north and south, and also generate localized enhanced upwelling. The distorted upwelling plume is a region of enhanced biogenic silica production and export. Away from regions of active upwelling, Si remineralization is enhanced and export is significantly reduced or absent. [All rights reserved. Elsevier]

**General information**

State: Published
Organisations: University of Tasmania, University of Maine, San Francisco State University
Authors: Strutton, P. G. (Ekstern), Palacz, A. P. (Intern), Dugdale, R. C. (Ekstern), Chai, F. (Ekstern), Marchi, A. (Ekstern), Parker, A. E. (Ekstern), Hogue, V. (Ekstern), Wilkerson, F. P. (Ekstern)
Pages: 284-295
Publication date: 2011
Main Research Area: Technical/natural sciences

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- BFI (2018): BFI-level 1
- Web of Science (2018): Indexed yes
- BFI (2017): BFI-level 1
- Scopus rating (2017): SJR 1.352 SNIP 0.975 CiteScore 2.65
- Web of Science (2017): Indexed Yes
- BFI (2016): BFI-level 1
- Scopus rating (2016): CiteScore 2.35 SJR 1.389 SNIP 0.999
- BFI (2015): BFI-level 1
- Scopus rating (2015): SJR 1.394 SNIP 1.128 CiteScore 2.5
- BFI (2014): BFI-level 1
- Scopus rating (2014): SJR 1.755 SNIP 1.113 CiteScore 2.68
- Web of Science (2014): Indexed yes
- BFI (2013): BFI-level 1
- Scopus rating (2013): SJR 2.226 SNIP 1.345 CiteScore 3.06
- ISI indexed (2013): ISI indexed yes
- BFI (2012): BFI-level 1
- Scopus rating (2012): SJR 1.936 SNIP 1.185 CiteScore 2.59
- ISI indexed (2012): ISI indexed yes
- Web of Science (2012): Indexed yes
- BFI (2011): BFI-level 1
- Scopus rating (2011): SJR 1.901 SNIP 1.125 CiteScore 2.6
- ISI indexed (2011): ISI indexed yes
- Web of Science (2011): Indexed yes
- BFI (2010): BFI-level 1
- Scopus rating (2010): SJR 1.97 SNIP 1.131
- BFI (2009): BFI-level 1
- Scopus rating (2009): SJR 1.794 SNIP 1.137
- Web of Science (2009): Indexed yes
- BFI (2008): BFI-level 1
- Scopus rating (2008): SJR 1.451 SNIP 1.025
- Web of Science (2008): Indexed yes
- Scopus rating (2007): SJR 1.582 SNIP 1.041
- Scopus rating (2006): SJR 1.786 SNIP 1.011
- Scopus rating (2005): SJR 2.091 SNIP 1.102
- Web of Science (2005): Indexed yes
- Scopus rating (2004): SJR 1.913 SNIP 1.102
- Scopus rating (2003): SJR 2.431 SNIP 1.03
Decadal signals in the South China Sea. Is there a regime shift after the 97-98 El Niño?

General information
State: Published
Organisations: Unknown
Authors: Hue, X. (Ekstern), Nan, F. (Ekstern), Palacz, A. (Intern), Shi, L. (Ekstern), Chai, F. (Ekstern), Chao, Y. (Ekstern)
Publication date: 2010
Main Research Area: Technical/natural sciences

Publication information
Volume: 91-26
Issue number: Abstract U32A-03
Original language: English
Publication: Research › Conference abstract in journal – Annual report year: 2010

Interannual variation of biological productivity in the Arabian Sea - An analysis of multiple remote sensing products

General information
State: Published
Organisations: Unknown
Authors: Armbrecht, C. (Ekstern), Palacz, A. (Intern), Millar, A. (Ekstern), Hue, X. (Ekstern), Chai, F. (Ekstern)
Publication date: 2010
Main Research Area: Technical/natural sciences

Publication information
Volume: 91-26
Issue number: Abstract IT35K-06
Original language: English
Publication: Research › Conference abstract in journal – Annual report year: 2010

An introduction to global climate change

General information
State: Published
Organisations: University of Maine
Authors: Grigholm, B. (Ekstern), Dixon, D. (Ekstern), Korotkikh, E. (Ekstern), Spaulding, N. (Ekstern), Palacz, A. (Intern), Potocki, M. (Ekstern), Brothers, L. (Ekstern), Maasch, K. (Ekstern), Mayewski, P. (Ekstern)
Publication date: 2008
Event:
Main Research Area: Technical/natural sciences
Publication: Research › Paper – Annual report year: 2008

Modeling iron, aluminum and carbon cycle in the eastern equatorial Pacific Ocean

General information
State: Published
Organisations: University of Maine
Authors: Palacz, A. (Intern), Measures, C. (Ekstern), Chai, F. (Ekstern)
Physical and biological factors controlling iron, nitrate, silicate and carbon fluxes in the eastern equatorial Pacific Ocean

General information
State: Published
Organisations: Unknown
Authors: Palacz, A. (Intern), Chai, F. (Ekstern), Measures, C. (Ekstern), Dugdale, R. (Ekstern)
Publication date: 2008
Main Research Area: Technical/natural sciences

Publication information
Volume: 91-26
Issue number: Abstract 1493
Original language: English
Publication: Research › Conference abstract in journal – Annual report year: 2008

Flume tank experiments on feeding behaviour of the deep-water coral Lophelia pertusa

General information
State: Published
Organisations: Jacobs University Bremen
Authors: Palacz, A. (Intern), Maier, C. (Ekstern)
Publication date: 2006
Event: Abstract from International Society for Reef Studies, Bremen, Germany.
Main Research Area: Technical/natural sciences

Publication information
Journal: Hotspot Ecosystem Research on the Margins of European Seas (HERMES) Newsletter
Issue number: 4
Original language: English
Publication: Research › Journal article – Annual report year: 2006

Flume tank experiments on tentacle behaviour and particle encounter of the cold-water coral Lophelia pertusa at varying flow speed

General information
State: Published
Organisations: Unknown
Authors: Palacz, A. (Intern), Maier, C. (Ekstern), Thomsen, L. (Ekstern), Duineveld, G. (Ekstern)
Publication date: 2006
Event: Abstract from International Society for Reef Studies, Bremen, Germany.
Main Research Area: Technical/natural sciences

Publication information
Journal: Hotspot Ecosystem Research on the Margins of European Seas (HERMES) Newsletter
Issue number: 4
Original language: English
Publication: Research › Conference abstract for conference – Annual report year: 2006
Background and Objectives
Management of terrestrial and aquatic ecosystems is legally defined in several European directives. The scientific basis for implementing the directives has been limited by insufficient models, deficiencies in terms of uncertainties, local and regional aspects and lack of knowledge on the interplay between agriculture, fishery, environmental qualities in all surface waters, and economy. The project aimed to establish an interdisciplinary and international approach designed to establish a body of knowledge to develop tools, models, scenarios and predictions in order to integrate science and management from agriculture, fishery, aquatic environments and economy into a common platform. The main aims were to link the complex interplay between land use in the drainage basins, the transport of nutrients to water bodies, biogeo-chemistry of freshwater and marine water, marine ecosystem dynamics and the removal of biomass and nutrients in marine fisheries all integrated into a management strategy evaluation (MSE) framework consisting of linked catchment area and river-run-off models, marine bio-geo-chemical models, end-to-end marine ecosystem models, fishery models, economic and cost-minimization models, and ecosystem services assessments models. Such a complex model and MSE framework could be used to assess effects of changing market conditions, changed agricultural and fishery support policies, as well as fulfillments of water related directives.

Tasks and Deliverables
The Danish Strategic Research Council financed project IMAGE was a strategic research alliance between central Danish and international fisheries and marine environment based university institutes. The project integrated, educated, and trained new researchers and private and public end-users to develop and work with a number of empirical and dynamic models and management tools, further developed into cross traditional media and science-based decision support systems, to strengthen national and international environmental management. The results published in a high number of scientific peer reviewed articles have provided major scientific progress. The results and research quality included analyses of novel processes and development of new and improved models, integrated prognoses and scenarios for the interplay between changes in the drainage basins and the ecological and economic consequences, and a number of science-based decision support tools. The work involved (i) identification of key elements and reduction of uncertainties in using complex models, (ii) designing, developing and integrating important new concepts in the models, (iii) linking models and evaluating their ability to detect and follow changes in terrestrial environments into ecological and economic consequences, and (iv) strengthened Danish research in linking science, modeling and management of the environment and economics and thereby consolidating a strong international position. The DTU Aqua has focused on further development, implementation and validation of advanced models and fisheries and ecosystem management evaluation tools: Development, calibration and implementation of the Baltic ATLANTIS end-to-end ecosystem and tropho-dynamic model linked to the HBM-ERGOM physical and bio-geo-chemical models and the FISHRENT fishery economic model; Further development and implementation of the bio-economic and individual vessel based multi-stock-multi-fleet DISPLACE simulation model; Dynamic coupling of the Baltic FLR multi-stock-multi-fleet bio-economic model to the SMS-Multi-Species model. The focus has been on biological interactions and integrated fisheries interactions.

Partners
The project had 12 project partners mainly from Danish universities (AU, DTU, KU, SDU) and national fisheries economics and fisheries research institutes (SMHI Sweden), but also from American, Swedish and Finnish universities as well as SMEs (e.g. DHI). The project was coordinated by Aarhus University. DTU Aqua was main project developer, WP4 leader
and member of the Project Steering Group.
This project was funded by the Danish Council for Strategic Research.

National Institute of Aquatic Resources
Section for Ecosystem based Marine Management
Period: 01/01/2010 → 31/12/2015
Number of participants: 7
Research areas: Fisheries Management & Ecosystem based Marine Management
Project participant:
Bastardie, Francois (Intern)
Ross, Stine Dalmann (Intern)
Eigaard, Ole Ritzau (Intern)
Christensen, Asbjørn (Intern)
Palacz, Artur (Intern)
Andersen, Bo Sølgaard (Intern)
Project Manager, academic:
Nielsen, J. Rasmus (Intern)

Activities:

ICES - Herring Assessment Working Group for the Area South of 62ºN - HAWG (External organisation)
Period: 2015
Artur Palacz (Participant)
National Institute of Aquatic Resources
Section for Marine Ecology and Oceanography
Degree of recognition: International

Related external organisation
ICES - Herring Assessment Working Group for the Area South of 62ºN - HAWG
Activity: Membership › Membership of committees, commissions, boards, councils, associations, organisations, or similar

ICES - ICES/HELCOM Working Group on Integrated Assessments of the Baltic Sea - WGIAB (External organisation)
Period: 2015
Artur Palacz (Participant)
National Institute of Aquatic Resources
Section for Marine Ecology and Oceanography
Degree of recognition: International

Related external organisation
ICES - ICES/HELCOM Working Group on Integrated Assessments of the Baltic Sea - WGIAB
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