

# ICES SYMPOSIA REPORT 2016

ICES CM 2016/GEN:01

**The 6th International Zooplankton Production Symposium:  
New challenges in a changing Ocean**  
Bergen, Norway, 9–13 May 2016

**Understanding marine socio-ecological systems:  
including the human dimensions in Integrated Ecosystem Assessments**  
Brest, France, 30 May – 3 June 2016



**ICES**  
**CIEM**

International Council for  
the Exploration of the Sea  
Conseil International pour  
l'Exploration de la Mer

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## 1 The 6th International Zooplankton Production Symposium: New challenges in a changing Ocean

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**Venue and dates: Bergen, Norway, 9–13 May 2016**

**Astthor Gislason and Padmini Dalpadado**

The 6th International Zooplankton Production Symposium was held in Bergen, Norway, 9–13 May 2016. The conference was attended by 387 persons from 38 countries and was thus the best attended ICES/PICES Zooplankton Production Symposium ever held.

The major sponsors of the symposium were the International Council for the Exploration of the Sea (ICES), the North Pacific Marine Science Organisation (PICES), the Institute of Marine Research (IMR) and the Norwegian Research Council (NRC). The symposium was co-convened by Atsushi Tsuda (PICES, Japan), Astthor Gislason (ICES, Iceland) and Padmini Dalpadado (ICES, Norway) who also chaired the Local Organizing Committee. Assisting these people were the other members of the Scientific Steering Committee, Se-Jong Ju (Republic of Korea), Desiree Tommasi (USA), Piotr Margonski (Poland) and Lidia Yebra (Spain) and coordinators from both ICES (Adi Kellermann) and PICES (Hal Batchelder).

The 5-day conference consisted of an opening session, plenary sessions, parallel theme sessions, workshops, poster presentations and a plenary summing up session.

Theme session were preceded with six excellent plenary talks:

- *Calanus* species in the Arctic Mediterranean: from life history to ecosystem dynamics, by Hein Rune Skjoldal (Norway);
- Echosounders: Non-intrusive observations of the pelagic, by Stein Kaartvedt (Norway);
- Does climate change matter for zooplankton production in upwelling systems? by Ruben Escribano (Chile);
- Discovery of the new through scrutiny of the old: Odate Collection and future of zooplankton monitoring in the global observation initiatives, by Sanae Chiba (Japan);
- Modeling Southern Ocean Food Webs - Approaches and Challenges, by Eileen Hoffman (USA);
- On the adaptive potential of marine zooplankton to global change, by Erica Goetze (USA).

The symposium programme consisted of 8 sessions and 7 workshops.

The theme sessions were run in parallel on Days 1, 2, 4 and 5 and included 117 oral presentations, there of 14 invited talks, and 170 posters. The theme sessions were:

- S1: Application of optical and acoustical methods in zooplankton studies. Conveners: Mark Benfield (USA) and Ian H. McQuinn (Canada);
- S2: Response of zooplankton communities to changing ocean climate. Conveners: Todd O'Brien (USA) and Tone Falkenhaug (Norway);
- S3: The diversity and role of macrozooplankton in marine ecosystems. Conveners: Priscilla Licandro (UK), Stig Falk-Petersen (Norway), and Se-Jong Ju (Republic of Korea);

- S4: Zooplankton diversity in the oceans by integrative morphological and molecular techniques. Conveners: Ann Bucklin (USA) and Ryuji Machida (Republic of China);
- S5: The role of microzooplankton in marine foodwebs. Conveners: Albert Calbet (Spain) and Karen E. Selph (USA);
- S6: Individual level responses of zooplankton to environmental variability and climate change. Conveners: Eva Friis Møller (Denmark) and Pamela Hidalgo (Chile);
- S7: Zooplankton in high-latitude ecosystems. Conveners: Kim Bernard (USA) and Rolf Gradinger (Norway);
- S8: New technologies and approaches in zooplankton trophic studies. Conveners: Monika Winder (Sweden) and Antonio Bode (Spain).

The workshops were run concurrently in the morning on Day 3, and as the theme sessions they included both oral and poster presentations, with 31 talks (5 invited) and 27 posters:

- W1: Use of zooplankton indicators to characterize state of pelagic ecosystems. Conveners: Alessandra Conversi (Italy), Hongsheng Bi (USA), and Sun Song (Chinese Academy of Sciences, China);
- W2: ICES/PICES cooperative research initiative: towards a global measurement of zooplankton production. Conveners: Lidia Yebra (Spain) and Toru Kobari (Japan);
- W3: Zooplankton as a potential harvestable resource. Conveners: Webjørn Melle (Norway) and So Kawaguchi (Australia);
- W4: Effects of microplastics on zooplankton. Conveners: Elaine Fileman (UK) and Maiju Lehtiniemi (Finland);
- W5: Zooplankton as the “to” in end-to-end models. Conveners: Geir Huse (Norway) and Rubao Ji (USA);
- W6: A hands-on Introduction to time series analysis, visualization, and inter-comparison of plankton survey data. Instructor: Todd O’Brien (USA);
- W7: Toward a taxonomically-comprehensive global reference database for DNA barcodes of marine zooplankton. Conveners: Tone Falkenhaug (Norway) and Silke Laakmann (Germany).

Almost 200 posters were on display, and due to the high enrolment and the limited space, these were displayed in two sessions in the afternoons on Day 2 and Day 3, with ca. 100 on each day. In addition, Per Flood exhibited a selection of his excellent photographs of zooplankton during the conference.

In the Closing Ceremony, which began after the sessions on Friday, 13 May, Hal Batchelder Deputy Executive Secretary of PICES offered a few summarizing remarks, pointing out the great success and the large attendance of the 6th Zooplankton Production Symposium signifying its importance. This was followed by Piotr Margonski Chair of the Awards Committee, who presented best presentation awards to early career scientists. The best talks awards were given to Michael Blackett (National Oceanography Centre Southampton & Sir Alister Hardy Foundation for Ocean Science, UK), for his talk on ‘Biology and ecology of the siphonophore *Muggiaeae atlantica* in the northeast Atlantic’, and Helena Hauss (GEOMAR, Germany) for her presentation titled ‘Dead zone or oasis in the open ocean? Zooplankton distribution and migration in low-oxygen mode water eddies’. The best poster awards went to Ana Luisa

Moran Ahern (Scripps Institution of Oceanography, USA), for her poster on 'Monitoring Spawning Activity in Cabo Pulmo National Park Using Molecular Identification of Fish Eggs and Larvae', and Carolyn L Faithfull (University of Hawaii, USA) for her poster titled 'Can nauplii use bacteria as a phosphorus or energy source?'.

After the awards presentations, Michelle Jungbluth (USA) and Svein Sundby (Norway), presented a few closing scientific remarks, Michelle from her perspectives as a young scientist and Svein as a senior one. The work of those who contributed most in the organizing and preparatory work was then acknowledged by Hal Batchelder, who then officially closed the symposium.

The proceedings of the symposium will be published in the *ICES Journal of Marine Science* in 2017.

In summary, the meeting by all accounts was a great success, and helped to summarize and synthesize the information we have on zooplankton ecology.

## 2 Understanding marine socio-ecological systems: including the human dimensions in Integrated Ecosystem Assessments (MSEAS 2016)

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**Venue and dates: Brest, France, 30 May – 3 June 2016**

**Jason Link, David Smith, Olivier Thébaud**

What do you get when a lawyer, a modeller, an economist, a social scientist and an ecologist talk about the ocean? Besides an interesting conversation, it is likely there will be some consideration of how to solve many of the problems facing marine ecosystems around the world. That is precisely what the MSEAS symposium aimed to do. From May 30th to June 3rd in Brest, France the symposium gathered over 230 participants from around the world (28 countries) and from multiple disciplines to discuss the challenge of explicitly considering the human component in producing synoptic assessments of marine social-ecological systems. The symposium fostered dynamic debates on the inter-disciplinary collaborations needed to support management of ongoing and anticipated growth in multiple ocean uses, with particular consideration of the triple bottom line of ecological, economic and social sustainability. As a first attempt to bring together scholars from separate networks in marine research, the initiative met with the enthusiasm of participants and the suggestion to hold a follow-up meeting in 2019, at which progress in addressing some of the key research questions identified in Brest could be assessed. In the meantime, benefits were also seen in connecting existing research endeavours in this domain worldwide, through an international networking initiative. Selected contributions and the main conclusions from MSEAS 2016 will be compiled in a special issue of the ICES Journal.

Studies conducted over the past several decades have highlighted the causes and consequences of marine ecosystem degradation. Numerous public policies have been established to reverse these trends. Despite these efforts, pressures from human forcing and climate change continue to increase. Raising awareness, modifying behaviours, adapting exploitation and utilization techniques, and defining and enforcing more efficient public policies requires a better understanding and consideration of the values, practices and governance associated with human uses of marine and coastal ecosystems. Improving this understanding was the focus of the MSEAS symposium. The meeting sought to establish an inter-disciplinary, international dialogue on how to include human dimensions within research, science and management efforts to support the long-term management of marine and coastal ecosystems.

### **MSEAS 2016: an international première**

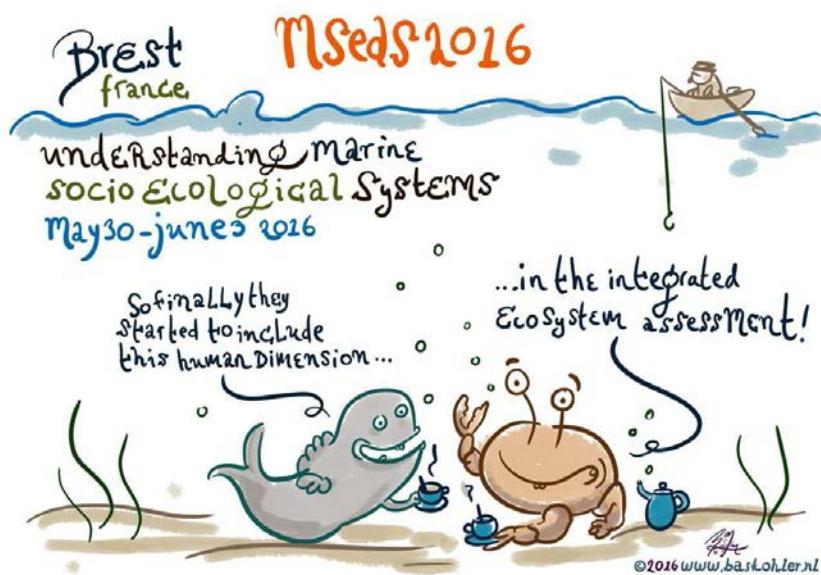
The sea as a source of energy, goods, services and vector for maritime transit is an essential component of world economic development. Around the planet, investments in « blue growth » are escalating, supported by both well-established economic sectors (shipping, fishing and seafood processing, traditional marine aquaculture, coastal tourism, conventional exploitation of oil and gas, etc.) and emerging sectors (renewable energies, deep-sea energy and mineral resources, new aquaculture, marine biotechnologies; etc.). The challenge is to enable the current and future growth of maritime activities, while ensuring their long-term viability from ecological, economic and social points of view. This challenge im-

plies managing human impacts on marine ecosystems and, in turn, managing the impacts of ecological changes on coastal populations, industries and society at-large.

Taking up this challenge involves developing truly integrated assessments of marine socio-ecological systems, accounting for the relationships between the functioning of marine ecosystems and the development of the blue economy. Methods and tools available for such assessments are constantly developing but have not been subject to systematic review. Entitled MSEAS, for "Marine Social-Ecological Systems", the symposium aimed to identify recent advances and scientific challenges raised by the consideration of human dimensions in the study of marine socio-ecological systems (SES). 236 participants from 98 different research and higher education organizations discussed both methodological and case studies dedicated to the integration of approaches that, along with natural sciences, incorporate economic, sociological, cultural, psychological, political and regulatory facets.

Co-sponsored by ICES and PICES, the symposium was organized by the research unit AMURE – Centre for the Law and Economics of the Sea, and supported by IFREMER (France), NOAA (USA) and CSIRO (Australia). The Centre for Marine Socio-ecology (Australia), the Fisheries Research and Development Corporation (Australia), the Belmont Forum (SEAVIEW project), the local authorities of Brest Métropole, the Department of Finistère and the region of Brittany (France), as well as the European University Institute of the Sea and Labex MER also provided support.

Just under two thirds (59%) of the participants were government and academic researchers, while 25% were students and post-doctoral students and 17% from other backgrounds including industry, government and non-governmental organizations. MSEAS 2016 participants came from 28 different countries from all around the world, including France (37%), other European countries (38%), North America (13%), Australia (5%), Africa (4%), Asia (2%) and South America (1%).



### A program with 186 contributions

The final symposium program was composed of 178 oral presentations and 8 posters. Invited keynote addresses from seven globally recognized experts were pivotal in

setting the scene: Dr **Serge Garcia**, former director of the Fisheries Department of FAO (Italy), discussed research requirements in terms of the human dimensions of ocean management; Dr **Beth Fulton** (CSIRO, Australia), expert in the modelling of marine socio-ecological systems, presented recent advances in this domain; Dr **Linwood Pendleton** (UBO-AMURE, France), coordinator of the Marine Ecosystem Partnership, addressed the question of designing indicators for the assessment of marine socio-ecological systems; Pr **Anthony Charles** (Univ. Halifax, Canada) discussed the importance of partnerships between scientists and stakeholders; Dr **Jake Rice**, former scientific director at the Canadian Department Fisheries and Oceans, stressed the importance of governance systems for a sustainable exploitation of the oceans; Pr **Edward Allison** (Univ. Washington, USA), presented his research experience at the interface between human considerations and ecosystem understanding. Finally, Pr **Simon Levin** (Univ. Princeton, USA), emphasized the similarities between living systems and the social organizations governing human activities.

A key question that the symposium aimed to address was related to the nature of information required in support of management decision-making for both government and industry. Six experts addressed this question in the plenary session. **Tor-geir Edvardsen** (OECD) presented a recently released study of the future of the world maritime economy. **Paul Holthus'** (World Ocean Council) presented a perspective from maritime economy stakeholders and **Pim Visser** (European Association of Producer Organisations) shared his experience of coordination between fisheries management and the protection of marine biodiversity. **François Gauthier**, deputy director of the Marine Protected Areas Agency, detailed the experience of the Agency in the understanding and management of marine socio-ecological systems. Finally, **Mark Dickey-Collas**, from the ICES secretariat (Denmark) and **Alida Bundy**, from the Bedford Institute of Oceanography (Canada), provided a synthesis of recent research advances: respectively on the way to operationalize the ecosystem approach, and on the integration of social and life sciences in scientific recommendations supporting management. The discussion on research needs was continued in a parallel session with 10 additional talks.

In the 5 remaining parallel sessions, participants focused on the following questions:

- What methodologies and tools can be used to build scenarios integrating our understanding of ecological, economic and social dimensions? (34 presentations)
- How can we translate scientific data into performance measures, in terms of sustainability of blue economy? (35 presentations)
- What are the opportunities and challenges associated with science-stakeholder partnerships in research? (31 presentations)
- What aspects of governance systems favour a greater integration of our knowledge of marine socio-ecological systems into management decision-making? (30 presentations)
- What lessons can be learned from practical research of specific case studies? (25 presentations)

Selected contributions and the main conclusions from these debates will be presented in a special issue of the ICES Journal (deadline for submissions currently set to 1 September 2016).

### **Young researcher's workshop: a privileged space for dialogue**

Three one-hour sessions were organized by 4 young researchers from AMURE (France) and IMARES (Netherlands). 15 young scientists from different countries were given the opportunity to present their ideas, ask their questions and interact in an informal setting with an international group of 17 senior researchers. With an average number of 50 to 60 participants per session, a significant diversity of topics related to marine SES was discussed during the workshop. Three main themes received special attention: (i) *Basic tools and methods for marine SES assessments: indicators, measuring and data visualization*; (ii) *Conceptual considerations of marine SES research: the role of Social in SES*; and (iii) *Evidence from the field: Research-practice integration*. By confronting different perceptions among marine SES researchers, the workshop successfully fostered discussion about the conceptual and operational issues researchers face in their work. This collective experience also contributed to highlight directions that research should explore to meet the challenge of informing operational integrated management of SES.

### **Outreach**

MSEAS was not only present in Brest but was also active on internet in order to achieve a wider audience outreach. Between its creation in April and the end of the symposium, the twitter account of MSEAS2016 had published 500 posts reaching 122k and leaving 660k impressions, covering the presentation content and associated debates. Its dynamism -95.6k positive impressions over the existence of the account- has attracted the attention of a wide array of users covering various disciplines (from academics to NGOs, fishermen and industrial manufacturers) and over 30 nationalities. Becoming a temporarily trending topic in several countries (e.g. the UK, USA and Norway), the account has been credited with an expert level on ecosystem issues and was linked to accounts advertising science courses and research projects. In addition, a professional cartoonist was present throughout the conference to capture some of the salient points made by the participants. The cartoons will be made available on the MSEAS 2016 web site.

### **Participant evaluation of the symposium**

A conference “evaluation target” was posted in the main open area of the venue for the purpose of gathering feedback from conference participants on the symposium, rating different aspects of the meeting from 1 (poor) to 8 (great!). Based on the 73 opinions expressed, the ranks were 7/8 for symposium length and scientific quality, 6.5/8 for symposium registration costs but 5/8 for the number of parallel sessions. Additional feedback was provided by participants in the closing session, via an interactive survey the results of which will be included in a symposium overview paper. Key feedback included the need for such meetings to incorporate a broader range of maritime industries, the importance of considering political dimensions and issues of power, as well as the value of having parts of such symposia organized in workshop formats, to discuss real-life cases and solutions.

### **Where to from here?**

Given the success of this international premiere, participants suggested there would be value in planning a follow-up MSEAS 2019. The opportunity of establishing an international networking initiative was also discussed, with the aim to connect exist-

ing activities in the field of the symposium across ICES, PICES and the other supporting organizations, including Ifremer, UBO, NOAA and CSIRO.

### **Acknowledgements**

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