HISTORICAL PERSPECTIVES ON THE ELEMENTS AND DYNAMICS OF THE MARINE SOCIO-ECOLOGICAL SYSTEM

Abstract Book

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Keynote

“Nurture” and the “Anthropocene”: new perceptions of the Oceans’ Past dynamics

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Abstract

Currently, the concerns of researchers, ecologists and public powers focus on environmental changes and ecological imbalances as a result of human actions. The concept of the “Anthropocene” (The Age of Humans) implies the recognition of a new geological era dominated by the impact of humankind upon the environment. A recent paper in Nature opens a new debate, claiming that the Anthropocene began much earlier than traditionally assumed. (Lewis and Maslin, 2015).

“Nurture”, understood as the result of an active interplay between Nature and Culture refers to the interaction between both dimensions (Goldhaber 2012; Keller 2010) and treats space and time and their interdependence on an equal footing (Santos, Pacheco, Lenaerts 2006b; Levin 1992).

Based on these two concepts and their implications for a different understanding on how humankind and cultural patterns became crucial agents of ecological change, this contribution will reflect on how a historian of the Early Modern Age tries to deal with the empirical and methodological challenges implied by these operative concepts, within an interdisciplinary set-up.
Session 1: Changing values and perceptions of species
Understanding the public perception of sharks

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Abstract

The image of sharks as obtuse ferocious predators of the oceans has been well shaped throughout human history by various myths, stories and contemporary movies. Nowadays, almost one third of the shark species are threatened due to human-based activities. Thus, there is an increasing need for conservation measures able to effectively preserve the threatened populations. Public perception towards wildlife is a key factor for the implementation of conservation planning, since the public can direct management priorities through its support and engagement. Our study aims at understanding the public perception towards sharks at a global scale, unravel potential factors and drivers shaping public opinion and highlighting paradigms. For this, an online questionnaire was used, consisting of three parts. The first part collects demographic and general information; the second part is a closed-formed Likert scale matrix investigating the attitude, based on the attitudinal scale of Kellert (1985); the third part evaluates the knowledge of the responder on sharks. The questionnaire is translated in 19 languages and, in four months, got more than 8000 answers from 104 countries. Our results reveal interesting facts about the public attitude towards sharks and the relation between attitudes, knowledge and preferences with cultural and demographic parameters.
Assessment of the shifts in perception and changing distribution of *Sabellaria alveolata* reefs in Europe: the REEHAB project

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Abstract

Numerous important reef-forming species have been subject to dramatic declines over the centuries as a result of anthropogenic disturbance. Many of these losses have probably passed undocumented and the information is often anecdotal and hard to access. The honeycomb worm *Sabellaria alveolata* (L.) is a tube-building polychaete that can form large reefs, providing important ecosystem services such as coastal protection and habitat provision. Its current known distribution is Scotland to Morocco. Long-term datasets on the distribution and abundance of *S. alveolata* (L.) are available from the United Kingdom and Ireland, and are currently being collated for the rest of its distribution as part of the REEHAB project (www.honeycombworms.org). One of the objectives of this study is to combine historical records and contemporary data to document changes in the distribution and abundance of *S. alveolata*, in order to elucidate which biotic and abiotic factors shape them. In parallel, the study of historical, local and grey literature has also brought to light a shifting perception in the value of *S. alveolata* reefs. Past literature and local vernacular names reveal that these constructions have often been viewed as pests or parasites, particularly in areas with shellfish aquaculture, or even as an exploitable resource.
Of seals and men: past and future of Baltic seal hunting

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Abstract

In autumn 2016, a fisherman drowned near the coast of Saaremaa when hauling in a net where three seals had been accidentally stuck. Local fishermen express their frustration about seal damage regularly, using both legal channels (media) and illegal actions (lynching of seal colonies). In the presentation, the current antagonism of seals and men is discussed on the basis of less drastic examples. The paper focuses on the social dimension of seal–human relationship, combining ecosemiotic approach, ethnographic data and environmental history.

Traditionally, seal hunting was an important communal activity containing a number of rituals and taboos, a complex set of material culture, as well as specific know-how about how to use the raw material (skin, fat, meat, bones) of the caught seals. This centuries-long tradition came to an abrupt end during WWII.

Seal hunting was legalised in 2015, after a halt of 50 years. Comparing the traditional and contemporary seal–human relations, the presentation asks, what is the social significance of seal hunt and how does it translate to the 21st century?
The European early modern taste for the exotic and its influence in the continued intense exploitation of tropical marine resources over the centuries

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Abstract
Exotic to Europe, and tropical in its distribution range, Atlantic marine animals discovered since the early 15th century soon enough became important economic resources for Portugal, Spain and other European nations. Within this array of aquatic animals, seals, sea turtles and manatees are included, and products such as oil, butter, hide, shells, stones, teeth and bones. These exotic items were used for different purposes, from tools to medicine. The demand for and utilization of these products became a part of the daily life of early modern European societies, both in Europe and the Overseas, and turn them into targets of continuous exploitation over the centuries. These captures associated with local use and consumption of the same resources (Africa and South America) resulted in the severe decrease of their natural populations and contributed to the critical conservation status of several species, presently endangered or near extinction. Evidence of such can be withdrawn from the written sources for the 15th to 18th centuries, as well as from the national statistics’ books (fishing, import/export) from the 19th and 20th century. This research project aims to understand narratives of marine resources’ uses, human activities, trends in capture and overexploitation, and trajectories of changes in the environment and in human practices.
Session 2: Socio-ecological approaches
The Sea is All about Us. Why we need to engage people’s perceptions with the past for our future sustainable management of the marine environment

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Abstract

The concept of a marine socio-ecological system itself asserts the multi-disciplinary character of our relationships with the marine environment and the integrative approaches, spanning the sciences and humanities, needed to address sustainability issues of the present and guide planning for the future. That thinking underpins the European Landscape Convention, which covers marine areas, and lies at the heart of the European Science Foundation Policy Briefing *Landscape in a Changing World*. Both distinguish the singular objective but external reality of ‘the environment’ from our minds’ plural subjective perceptions that we call ‘landscape’. Although we inhabit both, it’s our perceptions that drive both our research understandings and societies’ actions in the marine environment. But there’s an imbalance here. While research reveals major sustainability issues arising from our marine exploitation and climate change effects, most people whose needs are provided by that exploitation have poorly developed perceptions of ‘a marine environment’: for many it remains ‘out of sight, out of mind’. This paper discusses Historic England’s work that helps redress this imbalance, mapping the historic character of past and present marine cultural activity across England’s seas to inform popular landscape perceptions and engage public interest in a culturally and ecologically sustainable marine future.
Exploitation and resilience: balancing economics and biology in the management of a South African natural resource.

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Abstract

Natural populations of marine organisms offer an important source of food and income for many people around the world, particularly where coastal communities are relatively poor. Often this can lead to problems of overexploitation and environmental degradation, with negative ecological and socio-economic consequences. Various management tools exist to deal with such situations, but in some cases there is a separation between the human side of the problem, which concerns political, legislative and enforcement aspects, and the biological side. Wild populations respond to both ecological and human pressures and successful management of artisanal fisheries needs to incorporate sociology, economics and biology. Here I describe a situation on the Indian Ocean coast of South Africa in which there is a mismatch between the intensity of human exploitation and the natural ability of rocky shore populations to withstand that exploitation. I discuss how biogeographic effects on biology reduce the resilience of mussel populations precisely where exploitation levels are highest, how this results in environmental degradation, how the use of marine protected areas to manage the situation has limited effectiveness, and how active rehabilitation involving the participation of local communities can successfully reverse the situation.
The changing faces of Penang Island, Malaysia: past paradigms as a guide to sustainable coastal development in the future

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Abstract

Habitat loss associated with land reclamation and shoreline development is becoming increasingly prevalent as coastal cities expand. Natural habitats are being replaced by artificial shorelines, with implications for connectivity among marine and terrestrial systems. In some developing countries, limited baseline data means that important habitats and biodiversity are lost before it is even known what was there. Using a combination of topographical maps and GoogleEarth we quantified changes in the areal extent of mangroves, urbanized and reclaimed land from the 1950s until 2015. Results revealed a dramatic increase in urbanized and reclaimed land, coupled with an increase in the linear extent of artificial shoreline. Mangroves experienced a decline from 1960-1980 but have since recovered in areal extent. A paucity of baseline data meant it was not possible to quantify similar changes for coral reefs and seagrass beds. In 2016 construction began on two artificial islands off the north coast of Penang and there are future plans for large-scale artificial islands to be constructed along the entire south coast. The environmental problems illustrated by Penang, and the potential future solutions we discuss, provide potential guidance for urban marine conservation in areas that are experiencing rapid development and land use change.
Social, historical and cultural influences on marine resource governance in a small Scottish island

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Abstract

There are growing calls for the articulation and consideration of different value systems in shaping conservation and natural resource management decisions and participatory resource governance. This requires recognition of historically-embedded socio-cultural relations attached to landscape and seascape in marine conservation policy. Taking into account the relationship between the socio-natural environment and socio-political institutions and processes complicates conservation. Making human values and assumptions explicit within the conservation discourse reveals the inadequacy of conservation that is focused on a biodiversity that is framed only as other-than-human nature. This presentation considers how the perceived separation between nature and culture underpinning conservation policy and practice exacerbated a conflict between members of a small Scottish island community and the Scottish Government around the creation of a marine protected area (MPA) off the coast of the island. A rich maritime heritage and a distinctive way of knowing the sea collided with values driving the MPA designation process. Social, historical and cultural forces have shaped the perceptions of landscape and seascape of many of the islanders and can help to explain the local resistance to the MPA. This case-study offers insights into different ways in which marine spaces are conceptualised and how this relates to marine resource governance.
A socio-ecological marine history of East Australian subtropics: from reconstructing baselines to assessing resilience

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Abstract

This assessment of resilience set historical baseline reconstructions into a dynamic socio-ecological context. In terms of the adaptive cycle of the resilience model, subtropical Byron Bay and neighbouring places of East Australia experienced a socio-ecological regime shift from early 1800s, moving into the dissipative stage during the 1960s-80s. Significant contrasts between these regimes are depicted as two culture webs: kincentric and anthrocentric. The differences between the two regimes are deeply philosophical and ecological, fostering a range of human impacts. This socio-ecological history identifies positive options for deep resilience, affecting the futures for ecological and social keystone marine species as well as different peoples. But their implementation is uncertain as the cash economy has now shifted from primary production to real estate development and tourism based on gentrification. Options may be closing out. In addition to this summary of place-based research about a region of the Pacific, I will explain the interdisciplinary methods used. Critical discourse analysis, close reading and case studies were all used with the largely qualitative historical and scientific resources to inform this narrative.
The historical development of cultural ecosystem services and the socio-ecological system along the German Baltic Sea coast

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Abstract
The Western Baltic Sea coast has undergone considerable ecological changes in the past 140 years, both caused by and impacting on developments in sociocultural dynamics. BACOSA II (Baltic Coastal System Analysis and Status Evaluation), an ongoing research project involving ecologists, economists and ethicists from three universities in Northern Germany, addresses these changes against the background of the provision and demand of aquatic and terrestrial ecosystem services. Ecosystem services refer to the benefits humans derive from ecosystems and cover many different value dimensions.

We will be able to present initial results concerning the social and cultural changes along the German Baltic coast since the 1880s (concentrating on the years between 1880 and 1914, the 1960s and 1970s, and the period after German reunification in 1990), and the impact of these changes on the provision of ecosystem services, with a focus on cultural services such as tourism, aesthetics, cultural heritage and regional identity. These dynamics reflect the historical changes in values, perceptions and management of the Baltic Sea coast in Germany and underline the multiple ways in which the sea is essential for human well-being. We will explore these links from an ethical point of view.
Session 3: socio-political and gender aspects of marine resource use
Fisheries, canning and women employment in 19th-20th centuries – a Portuguese picture

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Abstract

The canny industry acquired its nodal expression in the late 19th century, both in Portugal as in Europe (France, Spain, Norway) and opened a growing scale of territorial tensions into the sea shore and high sea. For the eighties of the 19th century an environmental change with a concentration of sardines on the Iberia led to a greater pressure in the Portuguese and Galician coasts. The introduction of French and Spanish capital in the south (Algarve), the north (Matosinhos) and near Lisbon (Setúbal to Peniche) explains the international levels of Portuguese canning exportation characterized by irregularity of purchasers in an international concurrence (after the second World War).

Against the difficulties of adapting to this framework the State and the Factories defined a program in order to invest in oceanographic research, compilation of accurate statistics and to adopt protectionist measures against markets concurrence. In this picture, our aim is to observe the evolution and the adaptation of social division of work behavior. A question worthy of study is extent to which links with sectors related to fishing cannery have created hierarchies of values, promoting or degrading female roles and how the canning industries survived combining technological advances and women employment.
Changing gender roles, division of labour and household strategies in Finnish small-scale fisheries

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Abstract
The roles of women, men and other family members have changed during the history of Finnish small-scale fisheries. The household has been major economic unit of the fishing livelihood, but especially in the past also the local community was of great significance e.g. in providing wage work in fish processing factories. Today, many coastal fisher families process their own catches and sell the products directly to consumers in fish marketing events. In this marketing strategy women are typically in core role. Today 9% of Finnish small-scale fishers are women. In many cases fishing is not the only source generating income in a fisher household, and often the wife of the family earns a steady income that keeps up opportunities to sustain the uncertain fishing livelihood. My study is about the historical perspectives in gender roles, division of labour and household strategies, and rests on case analyses and a collection of literature and interviews.
Balancing gender roles in fisheries: the case of the Gandia fishers guild (Spain)
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Abstract
If considering work that only happens in monetary valued spheres, then most women in the Gandia fishers guild are left out of this enunciation. The presence of women in both economic and domestic spheres results in a double absence; they don’t work at sea, however they sustain this activity and make it possible. Nevertheless, in most cases, the work women do is neither economically nor institutionally recognized.

In the European Union, policies work towards integrating women into the labour market and to hold positions of responsibility. The purpose of these policies is to achieve equality, however most of the time it just leads to an overload of work; little attention is paid to the family duties that women continue developing, which are assumed to be their responsibility. Traditional patterns of sexual division of labour that put women at a disadvantage are still in existence.

In the case of the Spanish Mediterranean, this situation is perpetuated at academic and administrative levels, with a lack of data about the role that women play in fishery activities. From a case study in the Gandia guild (Valencia), this research aims to contribute to a better understanding of women’s work as a first step for further recognition. Besides this, it investigates women’s perceptions of their past and current status.
The role of women in European coastal communities: An overview.

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Abstract

European coastal communities have experienced major changes over recent decades. These changes had economic impacts on the fishing and aquaculture activities and modified the social role in coastal societies, with new social organisations and cultural processes emerging in coastal areas. Research on gender and gender relations, as well as on women, in fisheries and aquaculture and their role in communities is not abundant, despite the changes impacting men and women differently. Research on gender relations in coastal communities constitute a valuable contribution to knowledge and the current paper will identify research gaps and needs on the field. It will also provide examples from different coastal communities across Europe to highlight the role of women in the fishing sector, households and communities, as well as women empowerment and participation in the decision-making process in fisheries.
Historical evolution of women’s contribution in fisheries and shellfish farming in France

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Abstract

Women participated on informal basis to fisheries and shellfish farming activities since centuries. Wives and windows of fishers were allowed by the king to harvest by foot shellfish, fish, crustaceans, seaweed, etc... on the shore to sustain family livelihood while men were incorporated to the Royal Navy. During men absence, women carried out different activities and one of them was foot harvesting on the shore. Harvesting freely on the shore and at sea was a privilege granted by the King of France to soldiers and their families.

Selling fish was another activity run by women. Different historical sources but also pictures point out this contribution by women. Another activity undertaken by women was also to sort oysters. This presentation will highlight the role of women in the development of oysters’ culture in Cancale city in Brittany. The presentation will highlight the historical evolution of women’s contribution in fisheries and shellfish sector and women’s action to obtain a legal recognition.
Keynote

Fighting for Fish: An Historical Perspective on Fish Wars

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Abstract

The world’s seas are heavily overfished and competition for scarce fish stocks is increasing. The development of Exclusive Economic Zones (EEZs) has raised potential for conflict, as control of resources in EEZs often becomes a symbol of national sovereignty and jurisdiction.

Fishing disputes are common—nations have even fought wars over fish—and arguably, fisheries disputes have contributed to an upsurge in gunboat diplomacy. The existence of asymmetrical power does not always mean, however, that the stronger state will prevail over the weaker one in negotiations. International dispute settlement procedures for fisheries have had little impact so far. Case studies of selected fisheries jurisdictional conflicts from Europe, South America and Asia, are used to consider two main questions: first, are fisheries responsible for an upsurge in gunboat diplomacy; second, are fisheries one of the last *casus belli*?
Session 4: Whales and whaling 1
Cultural and economic drivers of domestic whaling in Iceland

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Abstract

In the 17th century Basque and later Dutch whalers attempted to establish commercial whaling stations in Iceland. The Basques soon disappeared but the Dutch carried out their whaling operations in Iceland until the late 17th century. Subsequently commercial whaling was abandoned in Iceland until technical innovations in the mid 19th century transformed the commercial whaling industry, allowing whalers to target new whale species, which they had previously been unable to target. In 1883 Norwegian whalers established whaling stations in Iceland with rapid negative impacts on a number of whale species. Despite the economic importance of the Norwegian whaling industry at the time, Icelanders were in general against whaling and in 1915 they banned all commercial whaling in Iceland for 10 years. In this talk I will examine the cultural and economic drivers for domestic whaling in Iceland. Even though Icelanders knew how to hunt and process whales for oil, Icelandic whaling was only haphazard and opportunistic and did not become commercial until the mid 20th century. While the whaling industry was driven by an increasing demand for whale oil, from the 16th century and onwards, political and cultural factors caused Icelandic society to resist all attempts for commercial whaling.
Using Catch Data as Proxy for Historical Cetacean Cultures
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Abstract
Over the past twenty years cetalogists have gathered increasingly persuasive evidence that whales possess culture, and that their cultures are in constant process of change. This insight has major implications for historians, who usually understand past human-animal relations as a story merely of changing human actions. In part, this is because past animal cultures are mostly thought to be unrecoverable through traditional historical methodologies. However, whales present an intriguing potential exception. Because Euroamerican whalers in the 19th- and 20th-centuries kept detailed catch records, it is possible to aggregate large amounts of data on the moments of whales’ deaths and near deaths. Historical ecologists have worked with this data to piece together past whale distributions, but more can be done. By looking at changing patterns of whales’ ability to evade human capture, historians can begin to demonstrate shifts in cetacean cultures. In this paper I will show how it is possible to do this, and explore some of the implications taking changing animal cultures seriously has for human histories, with the case of the oceans around Australia and New Zealand as a particularly useful example.
Creation of an Osteological Cetacean Reference Manual

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Abstract

The field of zooarchaeology is concerned with reconstructing human-animal interaction in the past. The field is however mainly focused on terrestrial (domesticated) mammals, frequently ignoring all other animal groups. The group of animals that is most regularly neglected in the field of zooarchaeology are cetaceans. This can partly be ascribed to the fact that their remains are often extremely fragmented and there is a lack of high-quality osteological reference collections. These factors render identification to the species level problematic, resulting in a poor understanding of human-cetacean interaction in the past.

In order to fully understand human-cetacean interaction to the species level, an osteological cetacean reference manual has to be created. Osteological manuals are an invaluable source to zooarchaeologists to help identify zooarchaeological remains to the species level, however one for cetaceans does not exist. As part of my research I am attempting to create an extensive manual at the Natural History Museum, Smithsonian, Washington DC and this will hopefully optimize research on zooarchaeological (and palaeontological) research on cetaceans and will lead us to reconstruct the early beginnings of cetacean exploitation.
Session 5: Whales and whaling 2
An assessment of historical whaling catches in the coast of Brazil (16th to 18th centuries)

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Abstract

Commercial whaling in the coast of Brazil was established in 1602. Whaling was a royal monopoly (1614-1801) and a relevant economic source for the Portuguese Crown and its territoriality in America. Since the first descriptions of the territory in the 16th century, to the European scenario of commercial and maritime power of the 18th century, the value of the whale was always present.

Here a compilation of whale catches, as also of species and location whenever possible, was conducted using historical sources. Different types of sources were used considering the chronological range of this work and assuming that for the early period quantitative data is scarce. As whaling was highly profitable, information could be extracted from written sources that are supported by iconographic, literary and artistic material.

Besides numbers of animals captured, a preference for hunting calves and females is commonly reported, covering the total analysed period. By the late 18th century this is pointed as one of the reasons for the activity decline, and should further be considered for discussion of possible effects on whales’ populations demography.

This work is a preliminary output of ongoing research and is expected that historical whaling data can largely contribute to whales’ populations history.
Whaling in Setúbal and Sesimbra (Portugal, 20th century): Changing perspectives from exploration to conservation

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Abstract

The regular presence of cetaceans in the coastal waters of Portugal has been documented since the antiquity, as by then their products were already used in several coastal communities, like in Sado estuary (Setúbal) by the Romans. Presently, the region between Sesimbra and Setúbal, is known as one of the regions with high cetacean diversity in Portugal mainland and recently this region has been proposed to be a special area for conservation for small cetaceans. Due to this and with the existence of a resident population of bottlenose dolphin in the Sado estuary, several whale watching companies operates in the area and several conservation actions regularly take place. However, this region was the main whaling ground during the 20th century in Portugal mainland, where commercial whaling occurred intermittently until 1984. Few studies have focused on this subject, despite a collective whaling memory is present at those fishing villages that continue to subsist from sea related activities. Here, a review was conducted in order to obtain information about the importance of whaling in this particular region to the local communities of Sesimbra and Setúbal, and its impact in the national economy, also contributing to the analysis of a trajectory of changing attitudes from whaling to conservation in such a short time.
Whaling in bays in Norway. To reveal whaling traditions by combining local names and archaeological bone remains.

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Abstract

Old legal documents (i.e. Magnus Lagerbøters landslov, Gulatingsloven) illustrate that whales were hunted in open waters as well as in bays and inlets, and indicate that that such whaling dates back to at least the 9th C AD in Norway. The statute regulates i.e. the closure of whales in bays. In the osteological collection at the University Museum of Bergen there are more 7000 whale bone remains, from ~250 archaeological sites from along the Norwegian coast.

The whale bones may have been long or short distance transported goods, or possibly in the medieval towns, imported from abroad. Furthermore it is not possible to access if the whaling have been in open waters or bays.

Names like Kvalvåg/Kvalvik (Whale bay) and Kvalsund (Whale inlet) are quite common in Norway. The names probably date back hundreds of years and have traditionally been associated to whaling in bays. The official Norwegian Mapping Authority [http://www.kartverket.no/en/About-The-Norwegian-Mapping-Authority/] provide information on topographic names from Norway. Names that relate to whaling in bays, in total 74 names; have been mapped according to municipality and county. The highest concentration of names has been recorded in Nordland county, Northern Norway (26) and Møre and Romsdal (12) and Hordaland (11) counties in western Norway while there are no names relating to this kind of whaling from Eastern Norway. Next step will be to combine these data with records on the archaeological whale remains and thereby, hopefully, be able to find data on which species that were hunted in the different regions along the Norwegian coast and also provide information on regional whaling traditions.
Archaeology in Shetland Island (Antarctica). 19th century capitalism expansion strategies

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Abstract
Shetland Islands archaeological sites were part of economic strategies ordering marine resources exploitation in the early nineteenth century. They represent the earliest human occupations in Antarctica. Those remains are one of the sources of information about the daily lives of subaltern whalers groups who have lived in that territory, which are studied by the laboratory Laboratório de Estudos Antárticos e Ciências Humanas (Leach/UFMG) currently. One of the central themes worked on the lab is the diversity of human strategies in occupying the continent throughout history. There’s a special focus on whalers activities during nineteenth century on the Shetland islands beaches, where there’s a high archaeological sites concentration. These beaches were chosen by the complementary seal hunting, when British and American companies were looking for new hunting territories to supply resources demand of the market that has expanded in the industrialization phase.
Session 6: Insights from archaeology
Can knowledge of early-Māori practises help restore a collapsed fishery?

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Abstract

Toheroa (Paphies ventricosa), an endemic shellfish of cultural importance to Māori, was formally abundant on a number of New Zealand’s west coast beaches. Unsustainable commercial and recreational harvesting during the early to mid-1900s led to the collapse of the fishery. Despite 40+ years of protection, toheroa populations have, for unknown reasons, failed to recover. A genetic analysis of toheroa mitochondrial DNA supplemented with Māori environmental knowledge, has led us to hypothesise that human-mediated translocations have strongly influenced the present-day distribution of this taonga (treasured) species. If the hypothesis is proven, translocation would explain the disjointed modern distribution and the limited success achieved in managing what may in fact be ecologically isolated populations located outside their natural distribution and preferred niche. Working in partnership with local māori, this hypothesis is being tested through a multidisciplinary research programme examining Māori knowledge and Māori oral histories in conjunction with archaeological records and further genetic analyses. By gaining a better understanding of the extent to which early Māori manipulated and managed their marine environment, fisheries managers and kaitiaki (guardians) will be better equipped to support the recovery of this iconic species.
Archaeological case study of the 14\textsuperscript{th} century shipwreck found in Tallinn, Estonia: evidence of the long distance fish trade

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Abstract

The archaeological excavations of shipwreck that was found at a construction site in Kadriorg, Tallinn, Estonia in 2015, have resulted in a large amount of spectacular finds. The wreck originates from the 14\textsuperscript{th} century and is a medieval cog-like merchant ship. Many everyday items made of metal, wood, birch bark, leather, textile, clay and stone, have been found both inside and around the ship. There are some burn marks visible on the wreck, which gives reason to assume that there was a fire that caused the shipwreck. Probably the lower part, which was not damaged so much sinked and became covered by sandy sediments quite fast. This caused good preservation conditions also for organic compounds of the materials, including different animal products. The paper focuses on the animal remains found \textit{in situ} in the wreck with special emphasis on fish. This is a unique evidence supporting the information we get often only from the written sources like medieval inventory books or chronicles. The distances involved in the trade of fish can be estimated based on the remains found from shipwreck.
Data about fishing from medieval sites of Bulgarian Black Sea coast

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Abstract

During the excavations on the medieval castles and settlements of Bulgarian Black Sea coast are known finds which bear the signs of information concerning fishing activities and utilization of marine resources by the local population. Here are presented three sites which a located in different location along the coast and chronologically belonged to whole Medieval period.

From Durankulak are known iron finds which have relation with the practice of fishing by the locals. The big iron hook evidences for fishing using rod. From the site are excavated bones of dolphins, as well as shells of black mussel *Mytilus galloprovincialis* and oyster *Ostrea edulis*.

During the excavation of medieval castle Kastritsi at the Residence Euxinogard were recorded finds which are directly related to the practice of fishing by the medieval people. There have been found a numerous net weights, weights for rods and fishing hooks. In the layers of dwellings were found bone remains of whitefish, mullet, bonito, turbot and skate. The local population practiced harvesting of black mussels and oysters also.

A large quantity of sea shells and crab pincers were recorded during the excavation at Akin site. Two species of the mollusca are most abundant: black mussels and oysters.

This evidenced the using of marine fauna in everyday life of the people at the time. The marine resources were a very important source of food with great economic potential. Data from these three sites show that the medieval population in the Black Sea practiced intensive fishing and shellfish harvesting.
Diversity of marine resource use in South Baltic shore in Middle Ages based on zooarchaeology

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Abstract

Polish archaeological research which pays attention to the centers developed on the Baltic coast, shows that consideration on marine resources use has been one of the most important issues among archaeologists, historians and archaeozoologists. Excavation curried out in Wolin, Szczecin, Kolobrzeg, Gdansk and Elbląg delivered numerous assemblages of faunal remains. They were analyzed in papers, chapters and books but mostly separately as a study for each site. This paper is an overview and, at the same time, a comparative study of archaeozoological data for the mentioned places. Even though vertebrates related to marine ecosystem will be considered, the fish are special component for the analysis and interpretation of this presentation. The lists of fish, sea mammals and birds are presented with support of archaeological, cultural and historical context with attempt to indicate differences and similarities between the centers. One of the most important factors considered in the study is water condition of the south Baltic.
Hindcasting to forecast: archaeo-biology of the european hake (*merluccius merluccius*, linnaeus 1758): iberia and beyond

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Abstract

From an archaeozoological standpoint, the European hake (*Merluccius merluccius*) is one of the most peculiar fishes of the NE Atlantic. Indeed, although the species presently ranges from Scandinavia to Mauritania, and also throughout most of the Mediterranean Sea, its archaeozoological finds are essentially restricted to the Northern shores of the Iberian Peninsula. Likewise, and although we are concerned with a commercially important species, finds of hakes in archaeological deposits do not reveal it to be an important element of the fish assemblages. Both patterns have been explained on account of the fact that, hake being presently a deep-water fish, it would have been unlikely for it to be accessible to inshore fisheries, as have been European fisheries for centuries. This presentation will provide an overview of archaeozoological finds of hakes on coastal and inland sites from Iberia that are currently under study and frame these from the standpoint of the biology of the species with the help of some historical data.
Session 7: Various Anthropogenic impacts
Modern Age port spaces governance of the Portuguese Atlantic islands. Pollution and debris as a threat to navigation, public health and local order

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Abstract

During Modern age (16th-18th centuries), ships movement in the most important Portuguese islands such as Azores and Madeira was intense. Cargo, people and all types of trash would be left inside the harbours. The type of debris considered in this period are useless objects, nautical objects, parts of ships from accidents (such as shipwrecks), trash or goods. For local authorities, such as city hall, port space management demanded the establishment of rules for these spaces. Consciousness of what pollution was by that period is something I propose to discuss, as well as how local authorities managed this issue in order to avoid accidents/diseases.

It is also an aim of this presentation to classify different types of debris and discuss how these were considered a public issue. Not considered pollution, as the way we understand it today, the idea is to comprehend how debris were looked at as threat to ships’ good circulation, disease spreading and threat to the order.
Chemical and biological pollution history of the Black Sea and their effects on Turkish fisheries

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Abstract
The Black Sea which is nearly 87% of its entirely anoxic containing high levels of hydrogen sulphide is a semi-closed basin with relatively great depths and almost completely isolated from the world oceans. The only connection of Black Sea is provided by Turkish Strait System (Bosphorus-Sea of Marmara-Dardanelle) to Mediterranean Sea. This is the result of past geological conditions, and so it has a specific sensitive water balance. Ecosystem has been affected by loaded some chemicals resulting environmental pollution since many rivers flow but the major including the Danube and the Dnipro into the Black Sea. Regarding biological pollution the most significant case is invasion of comb jelly (Mnemiopsis leidyi) via ballast water to the Black Sea so it caused to be exploited exclusively anchovy stock. In Turkish coast of Black Sea, the marine biodiversity also fish stocks have been known to be affected through a combination of overfishing, pollution, climate changes and the invasion of alien species due to the pressures exerted by mankind during the years. Keeping in mind all of these issues, the aim of this study is to evaluate using the reported studies including recorded official data the impacts of environmental pollution on marine resources and fisheries considering both chemical and biological pollutants.
Historical baselines in marine bioinvasions

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Abstract

An ancient phenomenon, introduction of non-indigenous species (NIS), has been acknowledged only recently as a major driver of change in marine ecosystems. Early marine introductions were often overlooked because they occurred centuries before the onset of biogeographical studies. Yet even throughout much of the 20th century, as records of shipping and mariculture-introduced species kept appearing in the scientific literature, their number and impact were considered largely inconsequential. Concerns were raised only in the 1980s following conspicuous outbreaks with dire environmental, economic, and public health impacts. Some intentional and accidental introductions have significant economic benefits in increased employment and revenues. Several of the releases into the wild risked introductions of pathogens, parasites and myriad other associated biota. The development and implementation of management policies have been a mostly reactionary process, evolving from local and voluntary to widespread and mandatory. A major gap between management and policy needs, and the capability of scientists to address these needs, impedes management of unintentional introductions. Yet, the lessons learnt in the past should be used in management of the major introduction vectors and pathways to reduce the risk for further harming marine ecosystems. We summarise key historical baselines in marine bioinvasions, including invasion vectors histories, dynamics of drivers and perceptions, methodologies in detection, identification and surveillance, and management actions and policies.
Aquaculture development in Iceland

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Abstract
Since 1985 there has been increasing interest for aquaculture in Iceland. The total fin fish production increased from 150 tonnes 1985 to about 3000 t in 1990. It was then relatively steady until 2002 after which it increased to a peak of 10.000 tonnes in 2006. In 2007 the production declined drastically and was about 5000 t until 2011. After that it has been steadily increasing and reached a maximum of 15.000 t in 2016. The main aquaculture species in the beginning was Atlantic salmon, reaching peak production in 2006 (7000 t). It lowered again to only 300 t in 2008 and has been increasing since and was 8500 t in 2016. The production of Arctic charr started in 1990 and has been increasing more or less evenly since. From 2007-2015 Arctic charr was the dominant aquaculture species mainly grown in land based stations. Today Iceland is the world’s biggest producer of Arctic charr with a harvest of 4000 t in 2016. Production of rainbow trout has been conducted since 1985, at first based on local spawning, but since 2007 fertilized eggs have been imported from Denmark. The production has been small but has increased steadily since 2011 and reached 2100 t in 2016. Small scale cod aquaculture has been carried out since 1992. The cod was reared in sea cages but without much success. The maximum production was about 1800 t in 2009. Only 59 tonnes were harvested in 2016. In 2013 juveniles of Senegalese sole were imported from Spain for growing in a land based station. In 2016 360 t were harvested. Mussel culture on long lines started in 2000. The yearly production has been very small, about 100 t, sold on the local marked. Additionally, small scale experiments have been done in culture of several other fish species crustaceans, molluscs and algae.
From fishing tours to eco-tours: recent major changes in the Western Australian Charter Boat Industry

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Abstract

This paper examines the recent history of the Charter Boat industry in Western Australia. It shows how an industry that developed to provide access to offshore fishing grounds, where the promise of large and high-grade fish catches was paramount, has diversified against a backdrop of declining demersal fish stocks, changing regulatory frameworks, and shifting social values towards the exploitation and conservation of the marine environment. In particular, the paper examines the impact of major changes to the management of demersal fishing stocks in the West Coast Bioregion over the last decade, identifying five principal responses of the Charter Boat industry: (i) an accelerated decline of fishing effort; (ii) an increase alternative (non-demersal) fishing activity; (iii) an increase in non-extractive activity; (iv) a transfer of some effort outside of the West Coast Bioregion; (v) and the exit of active operators and the retirement of inactive licenses. In each case, the effect of the recent fisheries management reforms has been to accelerate social and economic changes that have shaped the development of the Charter boat industry since the industry was brought under management in 2001.

This paper addresses the conference theme ‘Historical changes in values, perceptions, and governance of marine systems’.
Keynote

Ignore historical data and miss the boat: role of past information on quantitative analysis of marine resources

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Abstract

Quantitative methods and ecosystem models are increasingly requested as tools for understanding, assessing and for providing the basis for management of marine resources. Such methods, however, are inherently complex, embed several processes and a large number of species. Being a simplification of reality, their accuracy is always questionable for the relevant amount of data required to represent the internal interactions (*parametrization*), to drive the interaction between modeled elements and the non-modeled environment (*forcings*) and possible relevant ecosystem processes not *integrated* into the model. In this context, for example, a complex model might appear equally calibrated with very different parametrizations clearly affecting negatively the accuracy of its predictions. Furthermore, in food web models the analysis of the “memory time” reveals the unexpected long-term persistence of perturbations in ecosystem model components, thus highlighting the low power of models calibrated over short time series of data.

Here we show how historical perspective can help quantitative analysis of marine resources by reinforcing the ecosystem-based models in terms of initial conditions and parametrization, forcings and integrated processes, and analysis of results. In particular, historical quantitative and semi-quantitative findings are explored on their role in i) providing past *initial conditions* for ecosystem models; ii) highlighting main *forcings* to ecosystem dynamics thus helping to integrate different drivers; iii) better placing *model results* into management context.

The historical approach not only helps to improve ecosystem-based quantitative methods, but it also results in embedding a precautionary approach. The discussion is stimulated by providing examples on how historical data of different quality are made useful for historical reconstruction.
Session 8: Impacts and insights into changing climate
Bivalve *Glycymeris pilosa* as archive of changes in the marine environment – A sclerochemical perspective

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Abstract

Investigation of the geochemical composition of bivalve shells can provide information on the changes in the marine environment occurring during the organism’s life span. *Glycymeris pilosa* is a relatively large (>8 cm) and long lived bivalve (>60 years) that is locally abundant in the Adriatic Sea. Its growth lines are clearly visible in shell cross sections. This enables to assign geochemical data obtained from different shell parts precisely to distinct periods of shell growth. In this study we applied LA-ICP-MS in line scan mode to determine the elemental composition in shells of *G. pilosa*. Sodium, magnesium, strontium, and barium composition in shell material was measured for the period from the 1950s until today. Interannual and seasonal changes were observed. These variations are relatively synchronous between different analyzed individuals, suggesting that they reflect changes in environmental parameters. Obtained data were compared with data of two commercially important and shorter lived bivalve species – *Callista chione* and *Venus verrucosa* – collected from the same location in the north Adriatic Sea. In addition, the potential of *G. pilosa* as $^{14}$C-archive in the Mediterranean Sea will be discussed.
Long-term recruitment dynamics of a small Baltic herring population located at the edge of the species distribution area

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Abstract

Scientific interest in dynamics of the fish recruitment dates back to at least the beginning of the 20th century, when it was first understood that variations in catch are related to variations in year-class strength. Several studies have shown that the environment has a stronger influence on recruitment (R) than spawning biomass (SSB), and inclusion of environmental drivers significantly improve the predictions of the recruitment variability. Current paper investigates individual factors and their combinations that best explain the inter-annual variability of the Gulf of Riga spring herring recruitment during 1957-2012, identifying the temporal and functional links between R and its potential controlling variables. The annual sum of sunshine hours and water temperature in January-March ($T_{JFM}$) was the combination of variables with highest explanatory power of R over the entire time series, while $T_{JFM}$ and the Baltic Sea Index in December-March were the best predictors of R during the periods of low and high SSB. Importantly, SSB didn’t qualify as a significant predictor of R. Therefore, a relatively small spring herring population situated at the edge of the distribution area of the species appears to mainly controlled by abiotic factors. Nonlinear functional relationships were established between R and its controlling factors over time depending on the mean level of SSB. The non-stationarity and non-linearity in the environment-recruitment relationship over time poses major challenges in forecasting Gulf of Riga spring herring recruitment.
Climate driven changes of the copepod *Limnocalanus macrurus* in the Baltic Sea, and its links to individual performance of herring

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Abstract

Like *Calanus* species in the North Sea and North Atlantic, the large cold-water copepod *Limnocalanus macrurus* is a key to the changing body size of herring in the Baltic Sea, essentially in its NE parts. The long-term dynamics of *L. macrurus* with respect to climate variability bare some resemblance to the *Calanus* dynamics in the North Sea – both become more abundant in colder periods, and are usually linked to the higher abundance and larger body size of the fish that prey on them. Due to general warming, abundance of *L. macrurus* drastically dropped in 1980s in the Baltic Sea, and was believed to have partly caused the drastic decline in the herring body size. We will review the literature on the links between *L. macrurus* and climate in the past, and use the updated long-term zooplankton data from Baltic Sea (1951-2015) to re-assess the most recent trends and current status of *L. macrurus* in the Baltic Sea. Considering that in the period from 1990 to 2010 the winters became gradually colder again, we expect to see this copepod to recover. We also expect that, there is a positive link between *L. macrurus* abundance and individual growth of herring.
Examining growth and trophic patterns of Northeast Atlantic cod across a millenium

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Abstract

The medieval and early modern periods were characterized by rapid increase in marine fisheries in the North Atlantic, at the same time as the climate cooled with the onset of the “little ice age” and subsequent temperature fluctuation. Reconstructing growth and trophic ecology of Northeast Atlantic cod in this period is therefore of particular interest. In the current study, we examine Atlantic cod otoliths and vertebrae from an archaeological excavation of a historical fishing site in NW-Iceland, dated to AD 970 – AD 1910. First, we use otoliths to estimate and examine change in growth curves and second, we examine stable isotope values $\delta^{13}$C and $\delta^{15}$N from the cod vertebrae. There was a notable reduction in size at age during the 17th century and this was primarily explained by reduced juvenile growth and conversely slower adult growth during the warmer periods. Growth reconstructions coincide with trophic and environmental patterns, as inferred from stable isotopes. We discuss these findings in context of historical documents describing fishing and local climate. The temporal resolution and scale of the current results allows a valuable baseline for modern fisheries science focusing on Atlantic cod.
Session 9: Trajectories of change 1
Archival records reveal a century of diminishing returns for recreational fishers

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Abstract

World-wide, millions of people take part in recreational fishing activities. In Australia, recreational fishing forms a significant component of the total harvest for many coastal marine species. Despite this, our understanding of recreational resource use trends, and how recreational fishers’ values and targeting choices have altered over time, remain limited. For a Queensland estuary, we examined archival records with the aim to uncover long-term recreational catch and societal trends. Data extracted from these sources allowed us to analyse the species composition of recreational catches and construct catch and effort time series over the course of the 20\textsuperscript{th} century. Rich qualitative detail also provided insights into changing social norms and attitudes held by recreational fishers, aiding our interpretation of observed changes. Our findings demonstrate that exceptionally long time series of recreational catch and effort exist in public archives. Moreover, these data enable us to anchor ecological changes using metrics and species that many people are familiar with, and at a spatial scale that resonates with peoples’ personal experiences, potentially providing a bridge between science and policy.
The North Atlantic Fish Revolution, c. 1400-1700. Traded Volumes, Landed Volumes, Total Catches

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Abstract

The paper will present estimates of total catches and traded volumes of major North Atlantic commercial species, cod and herring, between c.1400 and 1700, and discuss some possible economic and climatic drivers. In the medieval period the trade in herring seems to have been more important than cod while the cod fisheries were much more important in the early modern age. Herring supplies did not increase much between the fourteenth and the seventeenth centuries, while cod supplies rose ten-fold. The geographical shifts from east to west are clear. Herring was increasingly sourced in the North Sea rather than the Baltic, and cod in the Northwest Atlantic rather than the Northeast. The importance of the New World fisheries stands out. Interestingly, there seems to be a see-saw phenomenon: when the extractions (and possibly the productivity) of the NW North Atlantic were up, the NE Atlantic were down, and vice-versa. By 1800 there was a marked reassertion of Norwegian cod, concomitant with a sharp decline of the Grand Banks fishery. I shall discuss the extent to which this phenomenon is related to oceanic and to human factors.
Shifting baselines of artisanal fisheries in the west Mediterranean (Murcia, Spain)

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Abstract

The over-exploitation of marine resources has degraded marine ecosystems worldwide leading to loss of biodiversity and ecosystems goods and services. Increasing fishing activity decreased the abundance of many stocks over time. But as new fishers arise, their perception of local abundance changes can result in a different perception of quantities compared to past decades – i.e. “shifting baselines syndrome”. This study investigates how the fishers’ perception of abundance of target fish species changed in the last 50 years in the context of a local Western Mediterranean artisanal fishery (coast of Murcia, Spain). The survey was conducted through a snowball sampling method and with fisher consensus (40 fishers from 23 to 82 years old). The survey comprehended closed questions related to personal information, to how the fisher perceived the fishing of each species through time, and the evolution of the fishing effort. We investigated the relationships of fish abundance scores as perceived by fishers’ with time, age and port through a series of univariate and multivariate analyses. This study aims to identify changes in abundance of commercial species captured in artisanal fisheries in the west Mediterranean and to investigate if local knowledge can be used as a tool for fisheries management.
Spatio-temporal changes in coral reef communities of Brazil evaluated by historical data

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Abstract

Conservation of marine ecosystems aims to maintain or restore sites to a more natural, pristine state. However, one of the challenges in setting conservation goals is to determine appropriate baselines and to precisely define what constitutes “pristine”, especially in places where observational data are recent or where time series do not exist. Historical ecology is a potentially rich source of information that can help reconstruct the past state of marine ecosystems and aid in better understanding how they have evolved over time. In Brazil, the first extensive surveys and descriptions of coral reefs were conducted in the late 1960s in the seminal work of Jacques Laborel. After Laborel, research on coral reefs in the region was generally quiescent until the 1990's. In this study, historical data, including the field notes of Laborel, spoken accounts of Laborel’s contemporaries and what is believed to be the first underwater photographs taken of Brazilian coral reefs, will be used to reconstruct temporal changes in marine communities at various locations along the coast of Brazil. Geographic information system (GIS) will be used to geo-localise the presence of key reef species observed in historical records from the 1960-1980s, as well as information on the occurrences of the same taxa known from present-day surveys. With this approach, we aim to have a better understanding of the spatio-temporal changes in the marine coastal environment in Brazil over the past 50 years.
Session 10: Trajectories of change 2
Reconstructing past coastal fish communities based on fisheries data

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Abstract

Fisheries data is often an extremely biased source of information regarding fish abundance, due to different aspects, namely the selectivity of fishing gears, spatial and temporal variation of the fishing effort and consumers behavior through time, among many others. Nonetheless, this data may be the only tool in order to infer past fish communities diversity and fish abundance. In Portugal, the first global and integrative study dates from the end of the 19th century. António Baldaque da Silva was a navy officer that conducted an extensive work on several marine sciences related topics, including a detailed report on the status of Portuguese fisheries in 1981. Besides this source of information, the Portuguese Institute of Statistics maintain a detailed statistics reports since 1928 until present, in coordination with National Fisheries Institutes (from 1919 onwards). In the present work, we analysed these different sources and tried to reconstruct past fish communities and identify major changes until present times. Results evidenced pronounced changes for certain coastal areas, especially estuarine systems, as well as in targeted-species by fisheries. Possible causes of these changes were discussed and included overfishing, pollution and climate changes.
Scientific expeditions in the Adriatic Sea (Mediterranean) suggest long-term changes in size of exploited species

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Abstract

After World War II, several scientific expeditions were conducted in the Adriatic Sea, with the aim of studying the distribution, biology and ecology of marine species. The expedition HVAR (1948-1949) was one of the first large-scale fishery-independent trawl-survey ever performed in the Mediterranean area. The survey was conducted with a bottom otter trawl-net, in the period when the demersal fish and invertebrate communities were not intensely exploited (“post-war conditions”). After this expedition, many other studies were organized including historical scientific expeditions (1948-1949, 1963-1971) and modern ones (1994-2001, 2002-2014). The use of different gears and nets through time hamper comparisons of catches, thus we used catch and abundance indexes (kg/h and n/h) per species and per haul to derive the mean individual weight as a proxy for fish size. This allowed comparing mean size of some demersal species over more than 60 years. We choose an area (Croatian coastal waters between Split and Šibenik, in the area of the Jabuka Pit) and a season (spring-summer) for which an overlap of scientific expeditions occurred. A significant decline in average size was observed for several species, e.g. the Blackbellied angler (Lophius budegassa), the European hake (Merluccius merluccius) and the Atlantic horse mackerel (Trachurus trachurus). These results highlight the importance of historical scientific expeditions for describing long-term changes of marine resources.
Historical data on fish and fisheries in the Adriatic Sea (Mediterranean)

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Abstract

Historic data on biodiversity and drivers provides the historical context for present observations and allows studying long-term changes in marine populations and ecosystems. Here we present a database on fish and fisheries of the Adriatic Sea covering two centuries, and including from qualitative observations to standardized scientific monitoring. The database consists of three parts: 1) Naturalists’ descriptions of fish fauna, including information on 139 fish species reported in 24 books for the period 1818-1936. Species are described in terms of presence/absence, perceived abundance, habitat preferences, seasonality, size, and other life-history traits. 2) Historical disaggregated yearly landings (kg per species) from the Trieste (1902-1968), Venice (1905-1927) and Rijeka (1914-1932) fish-markets, Italian official landings for the Northern and Central Adriatic (1955-2012), and landings from the Lagoon of Venice (1945-2001). 3) Historical trawl-survey data from seven surveys performed with bottom otter-trawl nets and spanning the period 1948-1991. Catch data (kg/h and/or n/h) by species for 956 hauls performed at 301 stations is reported. The integration of these datasets has already demonstrated to be useful to analyze historical marine community changes over time, and its availability through open-source data portal is going to increase analyses in the framework of marine historical ecology.
Uncovering the Past Dynamics of a Collapsed Fish Stock: Gulf of Riga Autumn-Spawning Herring

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Abstract

Fishery resilience to perturbations is promoted by a diverse assemblage of stocks and species to support fishing yields. Reductions in the diversity of the resource base on which fisheries depend can make fishery-dependent societies more vulnerable to future natural and human-induced perturbations. Here we describe and quantify the loss of the fall spawning component of herring from the Gulf of Riga ecosystem of the Baltic Sea in the 1960s-1970s. The reasons for the decline are unknown and there are no biomass targets that can guide potential recovery actions. We compile and analyse existing fishery and biological data to investigate hypotheses regarding the reason for the decline (e.g., role of overexploitation, changes in productivity) and to derive a new baseline of stock biomass. Our results show that exploitation occurred both on juveniles and adults and was probably too high to ensure long-term sustainability (i.e., F > Fmsy). These findings provide a quantified perspective to the historical dynamics and potential targets for recovery actions.
A century of change in South Africa's inshore trawl communities: 1903/4 vs 2015

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Abstract

A recently-digitised historical dataset details exploratory trawl surveys conducted along South Africa's south coast from 1897 to 1904, which preceded and coincided with the beginnings of a trawl industry. As prior fishing capacity was very low and occurred close to shore, it is argued that these surveys sampled a demersal ecosystem that had incurred minimal human impacts and hence captured baselines that were close to pristine. To quantify how present species composition and abundances differ from those catches, repeat surveys were conducted at three sites in 2015, using carefully replicated trawl gear and methods. Results showed substantial changes in assemblage structure, including the depletion or disappearance of previously dominant taxa. Recent catches were instead made up largely of small, generalist taxa and those that associate with unconsolidated sediments. Size data showed that fish lengths had declined between periods, substantially so in certain species. Habitat preferences and the scale of geographic and depth distributions appeared to contribute towards the fate of demersal populations during a century of expanding human pressures. As most regions lack comparable baseline data, the estimates of community change and abundance shifts on the inshore Agulhas Bank provide a rare, empirical case study of cumulative anthropogenic impacts on ichthyofauna.
Session 11: Acquiring and communicating knowledge of marine systems
Abstract

Fundied by the Irish Research Council, Deep Maps: West Cork Coastal Cultures is an interdisciplinary project investigating the biological, cultural and historical context of the south-west coast of Ireland from 1700 to 1920. The focus is on the rich maritime environment found along the arc of Cork’s Roaring Water Bay, from Clonakilty to the tip of the Beara peninsula, as it is shaped by sea and land, and as it is imagined within eighteenth- and nineteenth-century cultural texts.

We commence our presentation with an introduction to some of the environmental priorities that relate to the West Cork coastal region. Next, we consider how these priorities have emerged over time, analysing their portrayal in cultural data including folklore, historical writing, literature and visual arts. We then discuss some of the ways in which we have been working with local communities to understand the significance of this coastal region to them, in terms of what they value most about it, and their environmental concerns. Our findings consist of multiple stories, and we are developing new ways of presenting them, including timelines and maps, and it is these that will be the focus of the last section of our presentation.
Reframing Ocean Decline: A complexity narrative from the Swedish seas

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Abstract

Knowledge of the state of environmental conditions in the Swedish coastal seas was once fragmented and fragile. Scientific enquiry becomes more systematic in the late 1800s and has improved continuously since then. Before the mid-twentieth century, there was no comprehensive narrative about these conditions; variability was the overarching understanding and some long-term climatic trends on different time scales were observed. In the 1950-1970s, this view changed profoundly in line with growing marine and oceanographic research: framing environmental conditions as a ‘narrative of decline’. However global in scale, it was also applied to Swedish coastal seas.

Nonetheless, there is a discord between the historical data and a unified narrative of decline. The eutrophication process is now in an early phase of reverse, contaminants are decreasing, and apex species such as sea eagle and seals are recovering. On the other hand, fisheries are not fully recovering, sediments still leak unhealthy compounds and, above all, climate change will inevitably put ecosystem under even more stress. We take this as an indication of being at a critical point where there is a need for re-articulating the narrative of Swedish coastal seas, from decline to complexity. To recognise complexity, we need particularising rather than generalising.

This study is based on new research emanating from a group of marine historians, where the interdisciplinary analysis includes environmental historians and literary scholars.
Colonial and national marine science round the World, ca. 1900-1930

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Abstract

Deep sea research and circumnavigating expeditions are costly types of marine research. To fund such endeavors scientists often need to align with political and business interests. This paper explores how in the pre-WWII era Denmark emerged as a global player in exactly this type of marine science. Within a core group of marine scientists, Johannes Schmidt functioned and flourished as the spider in a web spanning the Danish state, the Carlsberg Foundation, a string of private companies and the International Council for the Exploration of the Sea (ICES). From this platform Schmidt was able to launch a spectacular series of oceanographic expeditions in the Atlantic Ocean, driven not least by an almost 20 year long quest to discover the breeding grounds of the Atlantic freshwater eel, which he eventually found in the great depths of the Sargasso Sea. The crowning achievement however, was the 2 year long Carlsberg Foundation Oceanographic Expedition Round the World from 1928-30. This was a display of publicity around the world. Schmidt connected PR-work and promotion of Denmark, with the promotion and communication of his own research, The diaries kept by Schmidt and Anton Bruun provide a clear picture of ‘life on board’ the research vessel, and they give a rare insight into the prevailing colonial attitude in the worldviews of the Danish explorers.
What are the practitioners views about the history of marine science communication? A case-study from Portugal

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Abstract

The history of the marine science communication is still scarcely documented in the literature. This study had the objective of reconstructing the long-term history of marine science communication in Portugal through interviews with practitioners. More specifically, it aimed to identify perceived key historical events and protagonists, strategies of communication and the relationship between national and international initiatives. Data collection involved 12 semi-structured with professionals from different institutions, backgrounds, ages, geographical regions and stages of career. Findings show that the international world exhibition in 1998, which implied the construction of the Lisbon Oceanarium, is considered almost unanimously as a turning point in this history. International nature documentaries which began in the 1970s are also seen as a crucial element, with frequent mentions to the pioneer research and outreach of the Portuguese King Charles and the first national aquarium (Vasco da Gama, Lisbon) in the transition to the 20th century. Other actors such as science centers and museums, universities and NGOs are also pointed. Moreover, practitioners argued for deficits in national science communication, deficient literacy of audiences and scarcity of venues for marine sciences. Finally, it is also mentioned a lack of strategy, consistency and originality in communication at national level.
POSTERS
Bivalve aquaculture in Croatia – historical perspective

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Abstract

Bivalve aquaculture has centuries-long tradition along the eastern shores of the Adriatic Sea, dating back to Roman times. Historical records contain data European flat oyster (Ostrea edulis) culture in 17th and 18th century, with modern shellfish farming dating back to the end of the 19th century (Basioli, 1981). Aquaculture of the second most important species, Mediterranean mussel (Mytilus galloprovincialis) did not start prior to the 20th century. Historical trends, with data for bivalve aquaculture for Mali Ston bay dating back to 1930s, as well as production occurring over last few decades along the Croatian coast are presented. Impact of the Second World War as well as recent Croatia’s War of Independence on bivalve aquaculture is analyzed. Croatia’s bivalve production is still negligible when compared with that of the main Mediterranean producers, namely France, Spain and Italy and perspective on principle constrains and potentials for development will be presented.
Current status and trends of swordfish (Xiphias gladius L. 1758) fishery in Turkey, Mediterranean basin

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Abstract

Swordfish fishery has been carried out in the Mediterranean basin since ancient times. The oldest written record of Turkish swordfish fishery goes back to 17th century. Swordfish (Xiphias gladius L. 1758), which was fished in the Black Sea and Sea of Marmara until 25 years ago, are no longer encountered in these seas due to pollution, marine traffic and other ecological destructions. Today, the fisheries are remained on the coasts of Aegean Sea and Mediterranean Sea. In the Mediterranean basin, the fishery of swordfish is performed by long lines, harpoons, tuna traps as well as sport and recreational fisheries. Currently, the swordfish fishery is widely made by longline but traditionally the harpoons-especially in the Aegean and Levantine Sea- are still used for catching this species in Turkish waters. Comparison of total swordfish landings for the years it can be clearly seen that there is an increasing trend up to date from 2007. The purpose of this study is to present a summary of the swordfish fishery which has a major economic contribution, using the data obtained from swordfish fisheries and official records, emphasizing on the variation of this fishery during the years and providing some useful suggestions for further sustainability of this fishery which have been performed in this region.
A focus on development of sustainable small-scale fisheries management in Turkey

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Abstract

Regarding rich marine biodiversity, fishery is an important economic activity in the Turkish coastlines which has four different characteristic seas surrounded by Black Sea, Sea of Marmara, Aegean Sea and Mediterranean Sea from north to south where an important fishing ground is for small and large scale fisheries. Especially, small-scale fisheries which is known more than 1000 years play a significant commercial role along the Turkish coasts and it is an important source of livelihood for the people. There are 14340 fishing vessels which are composed of more than 80 % below 12 meters and mostly made of wood licensed in Turkey according to year of 2015 government statistics. Passive gears such as gillnets, hook and lines, or pots and traps are mostly used for small-scale fisheries. However mobile gears such as dredges and beam trawls are performed by vessels over 8 m in length. In this study, concerning on small-scale fisheries sustainability in Turkey, sustainability of small-scale fisheries have been examined and evaluated using reported studies and official data on this issue. Long term and current practices within fisheries management and advanced policy have also been discussed in order to develop regarding sustainable small-scale fisheries.
The state of conservation and management for highly migratory species fishery in Turkey, Mediterranean basin

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Abstract

The fishery of highly migratory species (HMS) has been known since ancient times in Anatolian peninsula which is surrounded by four different seas i.e. Black Sea, Sea of Marmara, Aegean Sea and Mediterranean Sea. Currently, *T. thynnus*, *X. gladius*, *T. alalunga*, *A. rochei/A. thazard*, *E. aletteratus*, and *S. saurus* are commercially HMS caught in Turkey. In the Mediterranean basin, where the fisheries of the HMS are made intensely, Turkey is in the top 10 in landing of these cited commercial species above among of the other countries. In 2015 according to EUROSTAT report the average annual landing was around 46686 metric tons of tunas, bonitos and billfishes for the 28 EU countries during 2009 to 2013 and Turkey has taken part with the amount of 41.94%. In the Mediterranean basin, several stocks are overexploited, some with a high risk of collapse, and that sustainable management requires that measures aimed at limiting the capture of juveniles are implemented. Fisheries targeting highly migratory fish species must be managed at community level. In order to gain insight into highly migratory stocks, the study presented here is aimed to provide the information on HMS fisheries in Turkey using the best available information from researches and official statistical data.
On the diversity and distribution of the bioengineer *Sabellaria alveolata* in Ireland: past and present

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Abstract

Biogenic reefs are important for habitat provision and coastal protection. Long-term datasets on the distribution and abundance of the reef-forming polychaete *Sabellaria alveolata* (L.) are available from Ireland. The aim of this study was to combine historical records and contemporary data to (1) describe spatio-temporal variation in temperatures, (2) document changes in the distribution and abundance of *S. alveolata* and discuss these changes in relation to extreme weather events and recent warming, and (3) identify *S. alveolata* ‘hotspots’ and (4) assess the potential for this species to provide habitat for infauna and a refuge from grazing activity for epibiotic algae. A semi-quantitative abundance scale (ACFOR) was used to compare broadscale, long-term and interannual abundance of *S. alveolata* at >100 sites around the Island of Ireland. *S. alveolata* was only found at 25 out of 133 sites. Populations appeared to be relatively stable at the majority of sites, but appeared to have disappeared from sites in Northern Ireland where it was recorded in the 1950s. It is thought that these populations were wiped out during the extremely cold winter of 1962/63 but failed to recolonise due to the isolated nature of these sites and thus, lack of larval supply. Despite the paucity of sites supporting *S. alveolata*, ‘hotspots’ were identified in Galway Bay, Cork, Duncannon and Lough Swilly. We present preliminary results on the role of *S. alveolata* in providing habitat and refuge for infauna and epibiotic algae respectively.
Manila and tar: South Africa's first survey trawl gear (1897-1904)

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Abstract

Long-term change in marine environments is frequently investigated by comparison of historical and contemporary trawl catches. Such efforts frequently suffer from unquantified catchability biases caused by changes in fishing technology. To address this problem, historical surveys can be repeated by imitating historical trawl gear and methods. With this goal in mind we investigated the trawl gear used in 1897-1904 surveys by South Africa’s first research vessel, the SS Pieter Faure. Trawl gear materials and dimensions were captured from historical reports, literature and photographs, providing a detailed plan for reconstruction of a trawl net with replicated functionality. The gear consisted of a primitive ‘Granton’ otter trawl net made of tarred manila hemp. The otter doors were flat wooden boards in a steel frame, connected directly to the net headline and ground-rope. The towing speed was estimated to be 1.34 m s⁻¹ (2.6 knots). The historical surveys provide valuable insight to demersal marine ecosystems prior to the development of industrial fisheries in the region. As similar trawling equipment was used globally during the early 20th century, including the UK, Europe, USA and Australia, this information provides an internationally-relevant foundation for studies interested in historical trawl records and associated fishing technology.
Fishing along the shore: the maritime cultural landscape of Fayal-Pico-S. Jorge (Azores) from 17th to 20th century

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Abstract

Since early times that fishing became an important natural resource for populations settled along the shore. In the Atlantic islands it was one of the most important survival resources, and fishing spots were known to the populations and present in the toponymy along the coast. Expressions like pesqueiro do Varadouro or pesqueiro Longo are common along the islands shore. Searching the cultural integration of this maritime culture, we intend to approach the landscape evolution, by mapping these sites and how its knowledge and representation in the landscaped evolved between the 17th and the 20th centuries using written and iconographic sources and archaeological and architectural features.
Uses and descriptions of marine natural elements in the report of S. Francisco trip (16th century) across the Atlantic

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Abstract
The “História Trágico-marítima” (Tragic History of the Sea) is a compilation of shipwrecks’ records made by cartographers, apothecaries, religious or anonymous that happened during the Portuguese maritime journeys between 1552 and 1602 and published in 1735/36. The “relação de viagem da Nau S. Francisco” (Report of S. Francisco trip), relates the events of the voyage that began in April 1596 in Lisbon until March 1599 in Porto Rico. Throughout the discourse, Father Gaspar Afonso made very complete descriptions of various marine natural elements, opening up a window of these distant lands to those who had never visited them. Most of the elements are described due to their utilitarian value for people, mostly as a food source. However, animals that may endanger human integrity are also referred. Moreover, it is common to compare what was observed in these distant lands with what was known in Portugal or Europe, not just to approximate the realities but also to explain the new or. Exuberance is still another criteria for something to be described. The study of these types of sources can be very useful to characterize the coastal and oceanic environments in the past as well as the uses and perceptions that people had of natural elements.
The ancient tunafish village of Barril. Algarve. Awareness for maritime heritage

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Abstract

The former tuna trap fishing village of Barril is located on Barril Beach, in the parish of Santa Luzia, municipality of Tavira, in the leeward region of the Algarve.

Between 1841 and 1966, "Armação dos Três Irmãos" or "Armação do Barril" was settled on the beach of Barril. Between April and September the preparation of the trap, the fishing season, the lifting, and the packing of the fishing gear for the next season took place. Of this unique maritime heritage we can still see in situ the housing structures, the village, as well as a significant set of 248 large anchors, accounted for until the now, placed on the dunes. In 2015, the Lais de Guia - Maritime Cultural Heritage Association was founded in Santa Luzia, developing a series of activities with the former community of fishermen and their families who experienced the Barril with the objective of bringing the material heritage back together with the intangible heritage. We intend to work on the preservation, safeguarding, promotion and enhancement of maritime cultural heritage.
Analysis of long-term changes in a Mediterranean marine ecosystem based on fishery landings

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Abstract

We used seven decades (1945–2014) of landings for the Adriatic Sea (Mediterranean) to infer changes in the ecosystem. A suite of ecological indicators (e.g., primary production required to sustain the catches—PPR; large species indicator—LSI; elasmobranchs-bony fish ratio—E/B ratio) was applied to landings and compared with main ecosystem drivers. Species most vulnerable to fishing dramatically declined at the beginning of the industrialization of fishery, as can be inferred by the negative drop of LSI and E/B ratio in the mid-1950s. However, until the mid-1980s landings and PPR increased due to increasing fishing capacity and high productivity. Overall, the effects of fishing were buffered by an increase in productivity in the period of high nutrient discharge, while significant changes in fish community structure were already occurring. From the mid-1980s, a reduction in nutrient load caused a decline in productivity and the food-web structure was already modified and unable to support such unbalanced situation, resulting in the collapse of landings. The work highlights that landings derived ecological indicators might help to shed light on the long-term dynamics of marine communities, thus contributing to place current situation in an historical framework with potential for supporting management.
Reconstructing the dynamics of small pelagics in the Adriatic Sea over more than a century (1902-2014)

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Abstract

Catch data regarding fisheries that have been subjected to relatively small modifications over time can represent an important source of information in the framework of marine historical ecology. The lampara purse seine in the Gulf of Trieste (Northern Adriatic Sea, Mediterranean), for instance, in spite of improvements in the technology, has remained similar through the last century especially in terms of fishing areas and fishing techniques. Moreover, the local demand for the main target resources, anchovy (Engraulis encrasicolus) and sardine (Sardina pilchardus) has always remained high, making the landings data reliable. Therefore, we used lampara’s catch data for anchovy and sardine from 1902 to 2014 together with average individual size, environmental factors and changes in fishing capacity through time to reconstruct dynamics of small pelagics in the Northern Adriatic Sea. A preliminary time series analysis of monthly landing shows a steady seasonality through years, while analysis with environmental variables showed that local strong wind, by hampering fishing operations, can influence monthly catches. All quantitative and anecdotic information were integrated in a model that enabled estimating long-term trends of anchovy and sardine in the Adriatic Sea possibly supporting management actions.
Crossing epistemological seas: reflections about the multiple routes of the (non-monumental) History of Ethology

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Abstract

In general terms, the Ethology is the biological study of animal behavior. However, its development as a scientific discipline has undergone controversial interdisciplinary dialogues and crossings of epistemological borders. Because it is the behavior study, ethology needs observations and descriptions of the different perceptions and actions, points of view and life forms of the animals, involving beyond the biological-evolutionary dimension, the social and cultural dimensions of the animal worlds. Some species, such as marine mammals, are difficult to observe and follow without a deep knowledge of the marine environment, requiring dialogue with local populations ontologically connected to the sea (seamen, fishermen) or underwater monitoring technologies, here considered as *actants* in this sociotechnical network for the knowledge production about marine animals. In addition, Portuguese researchers have revealed links between the knowledge of marine mammal hunters since the time of the great navigations and discoveries, and the first naturalistic / scientific knowledge about these species, indicating possible contributions of local knowledge and anecdotal reports about the sea for the emergence of the first studies of marine mammals behavior. In this work, I intend to raise reflections about the nonlinear dynamics of this sociotechnical network of scientific practices of marine mammal ethology, involving the dissolution of ontological and epistemological boundaries, and the agency of different *actants*, in order to make explicit the multiple dimensions of the History of Ethology.