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Globalization, marine regime shifts and the Soviet Union

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Regime shifts have been observed in marine ecosystems around the world, with climate and fishing suggested as major drivers of such shifts. The global and regional dynamics of the climate system have been studied in this context, and efforts to develop an analogous understanding of fishing activities are developing. Here, we investigate the timing of pelagic marine regime shifts in relation to the emergence of regional and global fishing activities of the Soviet Union. Our investigation of official catch statistics reflects that the Soviet Union was a major fishing actor in all large marine ecosystems where regime shifts have been documented, including in ecosystems where overfishing has been established as a key driver of these changes (in the Baltic and Black Seas and the Scotian Shelf). Globalization of Soviet Union fishing activities pushed exploitation to radically new levels and triggered regional and global governance responses for improved management. Since then, exploitation levels have remained and increased with new actors involved. Based on our exploratory work, we propose that a deeper understanding of the role of global fishing actors is central for improved management of marine ecosystems.

1. Introduction

The scale of human actions and the speed and connectivity of globalization play out in new ways [1,2]. Global interconnections can propagate and cascade across countries and regions [3–5], shaping marine ecosystems and seafood production worldwide [6,7]. In this new context, human actions are not external to marine ecosystems, but shape and determine their dynamics in what we refer to as social–ecological systems [8,9]. The imprint on marine ecosystem dynamics of this global human enterprise is reflected in climate effects (e.g. temperature change and ocean acidification), marine pollution (e.g. chemicals and nutrients) and worldwide fishing (coastal, offshore and deep sea), all influencing productivity, species, functional groups, food web interactions, habitats and disturbance events [10,11]. A growing human population and rapidly increasing demand for seafood and other marine ecosystem services are expected to increase the frequency, magnitude and duration of such pressures [12,13].

A number of studies have documented the profound effects of fishing on the structure and function of marine ecosystems [14,15], including the depletion of individual fish stocks [16,17] and associated cascading ecological effects [18–20]. Overfishing may result in long-term changes at the individual stock level [21], and may also cause marine regime shifts [22,23]. A growing recognition of the critical role of human activities in regime shifts [10] provides challenges for current institutions and the capacity to manage marine ecosystems [24].

In this study, we explore links between globalization of human activities, such as fisheries, and marine regime shifts. Although fishing has been described as a contributing factor to several regime shifts, there has been limited attention given in these studies to the social and political context that shapes global dynamics of fishing activities. Here, we investigate the rapid expansion of fishing activities of the Soviet Union following World War II to explore the links between the globalization of fishing activities, the social and political context that shape them and their potential effects on the dynamics of marine ecosystems. The Soviet Union has been one of the largest actors ever in global seafood exploitation

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and pioneered the global expansion of fishing activities at an unprecedented scale. We investigate fishing activities of the Soviet Union in relation to all large marine ecosystems [25] of the world from 1950 until the collapse of the Soviet Union in 1991. We relate the reported annual catches of the Soviet Union to documented marine regime shifts influenced by fisheries. We propose that individual actors of global importance may play a significant role in the dynamics and management of marine resources, ecosystems and regime shifts.

2. Material and methods

We used data from the Sea Around Us project (www.seaaroundus.org), which provides a globally consistent ecosystem-based approach to the reporting of wild marine fisheries catches, based on FAO (Food and Agriculture Organization of the United Nations) statistics. Although officially reported catches have been shown to contain substantial biases in several countries [26–28], we use these data as a proxy for Soviet catches and their changes over time. Here, officially reported data are spatially disaggregated and assigned to 65 individual large marine ecosystems (LMEs) [29], the geographical scale commonly used for the analysis of regime shift dynamics. Catches, reported by the Soviet Union to the FAO have been disaggregated in the database [30] and we pooled these existing data for Estonia, Georgia, Latvia, Lithuania, Ukraine and Russia.

First, we reviewed the temporal dynamics and spatial expansion of Soviet fishing activities on a decadal time scale (1950–1989), where we pooled information on catches from 65 LMEs into 18 ecological and geopolitical units (electronic supplementary material, table S1). Second, we investigated the LME-specific temporal catch dynamics of the Soviet Union and other major fishing nations, in relation to well-documented marine regime shifts in the Baltic Sea, the Black Sea and the Scotian Shelf. In these areas, fishing has been described as a key mechanism for marine regime shifts. We also investigate Soviet fishing in relation to regime shifts in the North Pacific (including the California Current, the Eastern Bering Sea and the Gulf of Alaska), the Humbolt upwelling system, the Oyashio Current and the Sea of Japan/East Sea (all described as primarily influenced by climate), the Benguela Current and the North Sea (where there does not appear to be consensus about mechanisms) and finally the Antarctic, the Barents Sea and the Mediterranean Sea (systems that have been less intensely studied in this context). Additional LMEs where regime shifts have been documented (although not in the English primary scientific literature) include the Sea of Okhotsk, the West Bering Sea and the Yellow Sea [31]. The authors that have identified regime shifts in these LMEs (electronic supplementary material, table S2) use different methods, approaches and definitions of regime shifts, which limit the degree to which they are comparable. However, for the purpose of this paper, we find it sufficient to define these regime shifts as abrupt transitions between (relatively stable) states [10].

3. Results

(a) Soviet catches and geographical expansion

In the early 1950s, the Soviet Union caught around 1 million tons of wild fish (electronic supplementary material, figure S1) corresponding to 6% of global marine catches, which were derived from some 30 of the LMEs investigated. In the 1970s, catches exceeded 8.5 million tons (electronic supplementary material, figure S1) corresponding to 17% of global catches and were derived from more than 63 LMEs. Catches dropped in the late 1970s, stabilized during the 1980s and declined dramatically after the fall of the Soviet Union in 1991 (electronic supplementary material, figure S1). Peru and increasingly China have emerged as new global actors following the dramatic decline in Soviet fishing activities (electronic supplementary material, figure S1).

Catches in the 1950s were primarily generated from ecosystems close to the Soviet Union, e.g. in the Barents Sea and adjacent waters, in the Baltic and Black Seas and in the Russian Far East. Limited catches were also derived from European waters and around Japan (figure 1*a*). Fishing activities expanded substantially during the 1960s, with the Pacific and Atlantic coasts of North America as major catch areas, as well as minor catches in the Mediterranean, and around West and South Africa (figure 1*b*). In the 1970s, catches increased substantially in the Russian Far East, in European waters, in West, South and East Africa, and in South East Asia. Catches declined substantially however in the Mediterranean (figure 1*c*). In the 1980s, following the establishment of Exclusive Economic Zones (EEZs) in the late 1970s by many countries [33], catches declined dramatically along the Pacific and Atlantic coasts of North America and in Europe. Catches remained substantial along African Coasts in the 1980s and increased in ecosystems along the Pacific and Atlantic coasts of South America, as well as in the Southern Ocean. Catches in the Russian Far East and elsewhere in East Asia increased dramatically in importance (figure 1*d*).

Soviet fishing increased dramatically in several distant water fisheries concurrent with changes in Five Year Plans (FYP), i.e. during the Seventh (1959–1965), Eight (1966–1970) and Tenth (1976–1981) Plans. These increases include almost 50 times larger catches between 1959 and 1965 in the Gulf of Alaska compared with the previous FYP period and an almost seven times increase in the Eastern Bering Sea during the same time period. Catches increased even more dramatically in the California Current, i.e. almost 80 times between 1959 and 1965 and a further four times during 1966–1970. Catches increased threefold between 1976 and 1981 in the Benguela Current, compared with the previous FYP period.

(b) Soviet fishing and observed marine regime shifts

The Soviet Union has been a major fishing actor in all LMEs where regime shifts have been documented (electronic supplementary material, table S2). This is hardly surprising given the global presence of the Soviet fleet. However, more interesting is the dominance of Soviet fishing in ecosystems where regime shifts have been attributed to overfishing. The Soviet Union was the largest fishing actor in the Baltic Sea prior to the regime shift in the late 1980s (figure 2*a*). It was also the largest and second largest fishing actor prior to the Black Sea regime shifts in the 1970s and late 1980s, respectively (figure 2*b*). The Soviet Union was the second largest catch nation prior to the 1976 regime shift in the Scotian Shelf, but only had a minor share of total catches in this system prior to the regime shift in 1990 (figure 2*c*).

The regime shift in the North Pacific is a classic example of a climate-driven shift, but a recent re-analysis [34] illustrates the importance also of fishing (electronic supplementary material, table S2). The Soviet Union was the largest catch nation in the North Pacific prior to the 1977 regime shift, but only a minor actor at the time of the 1989 regime shift in this region, when this role had been taken over by the USA (see the electronic supplementary material, table S2, also for details of the Soviet Union in the California Current, the Gulf of Alaska and the Eastern Bering Sea, all part of the described North Pacific regime shift).

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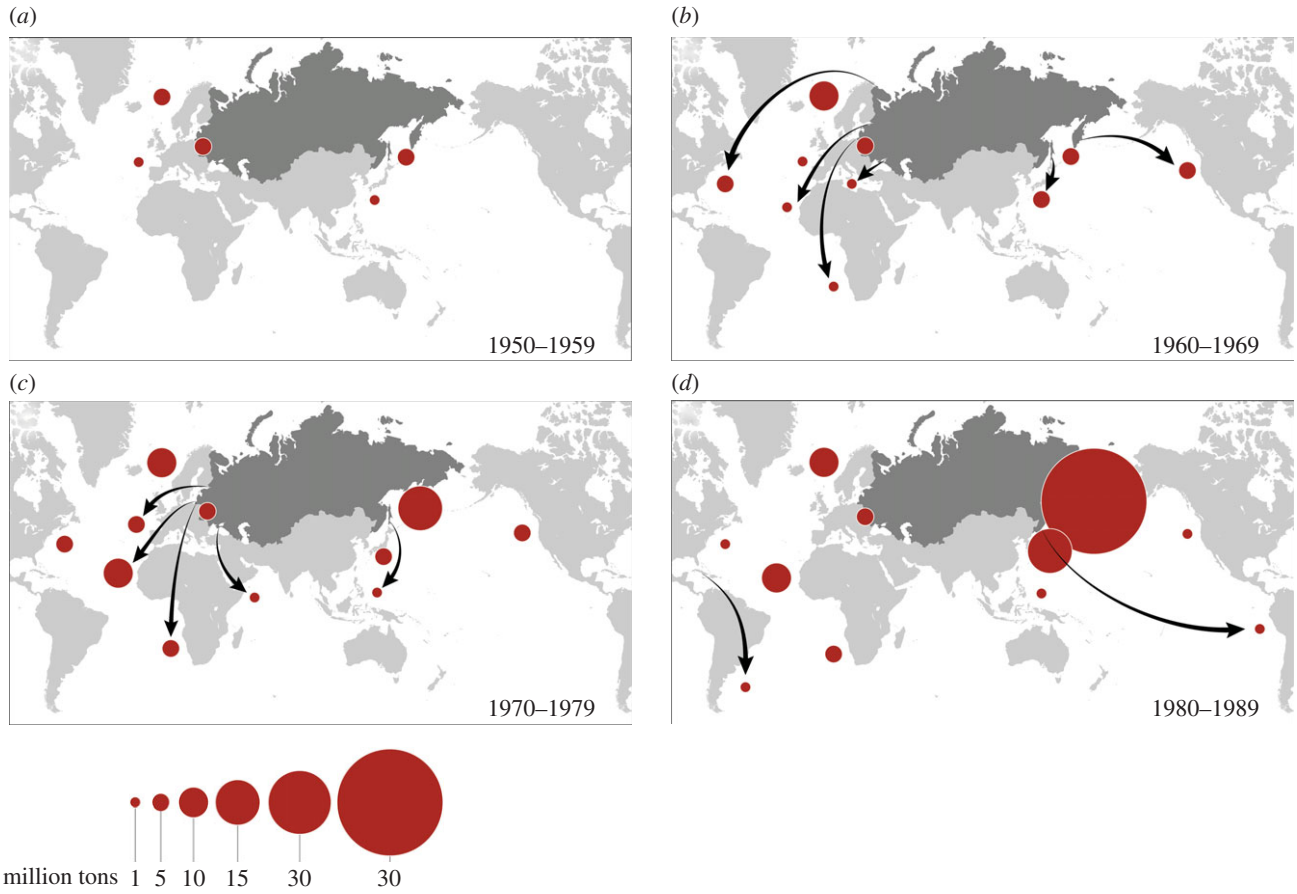

Figure 1. Global decadal expansion of Soviet fishing activities. The sum of Soviet catches during: (*a*) 1950–1959, (*b*) 1960–1969, (*c*) 1970–1979 and (*d*) 1980–1989 for 65 large marine ecosystems pooled in 18 regions (see the electronic supplementary material, table S1) and major pathways of expansion of fishing activities (arrows). The Soviet expansion originated, for example, from the harbours of Murmansk by the Barents Sea, Kaliningrad and Saint Petersburg (former Leningrad) in the Baltic Sea, Sevastopol in the Black Sea and Vladivostok and Nakhodka in the Russian Far East [32]. Catch data from the Sea Around Us Project (www.seaaroundus.org).

Regime shifts in the Humboldt upwelling system, the Oyashio Current and the Sea of Japan/East Sea, have all been attributed to climate-related dynamics (electronic supplementary material, table S2). The Soviet Union had been the third largest catch nation in the Humboldt upwelling system (electronic supplementary material, table S2) and the second largest catch nation in the Oyashio Current (following Japan) prior to documented regime shifts. Prior to the 1986–1988 regime shift in the Sea of Japan/East Sea (electronic supplementary material, table S2), the Soviet Union was the second largest fishing actor after Japan.

A range of different analyses associated with drivers of regime shifts in the Benguela and North Sea ecosystems suggest a number of complexities associated with these shifts (see references in electronic supplementary material, table S2). The Soviet Union was one of the largest catch nations in the Benguela Current, but did not constitute one of the largest fishing actors in the North Sea after the 1970s (electronic supplementary material, table S2). The Soviet Union dominated fisheries in the Antarctic prior to the identified regime shift. In the Barents Sea, the Soviet Union, together with Norway, dominated fisheries catch statistics. Regime shifts in these two regions appear to have been less studied, but have been attributed to a combination of climate and overfishing (electronic supplementary material, table S2). The Soviet Union was a major fishing nation in the Mediterranean in the 1960s, but not prior to the identified regime shift in the late 1980s (although descriptions of this regime shift only have limited data from upper trophic levels).

Soviet catches have exceeded 10% in 14 out of the 17 LMEs where regime shifts have been documented (electronic supplementary material, table S2) between 1950 and 1991 (electronic supplementary material, table S3). The proportion of Soviet fishing was significantly higher in the 17 LMEs with regime shift (mean = 24.0, s.d. = 18.4), than in the 48 LMEs without documented regime shifts (mean = 11.9, s.d. = 22.4), $t_{63} = -2.1$, $p < 0.05$. LMEs with a high proportion of Soviet Union catches, but where regime shifts have not been documented, include several of the high Arctic LMEs (the Laptev, East Siberian and Kara Sea and the Arctic Ocean), the Canary Current and the East Greenland Shelf/Sea (electronic supplementary material, table S3).

4. Discussion

The Soviet Union emerged as the major global fishing nation after the Second World War with close to 20% of global catches in its peak years. Our presentation of Soviet Union catch data in relation to LMEs, despite the inherent uncertainty in such data, illustrates the global nature of Soviet Union fishing activities and highlights the disproportional and dominant role of this individual actor in fishing activities of large marine ecosystems worldwide (electronic supplementary material, table S2). The rapid emergence of the globally interconnected operations of this 'marine superpower' enabled Soviet adaptation to local and regional ecosystem change, but not without ecological impact or political consequences. The data presented here illustrate that the Soviet Union was an important pre-runner of

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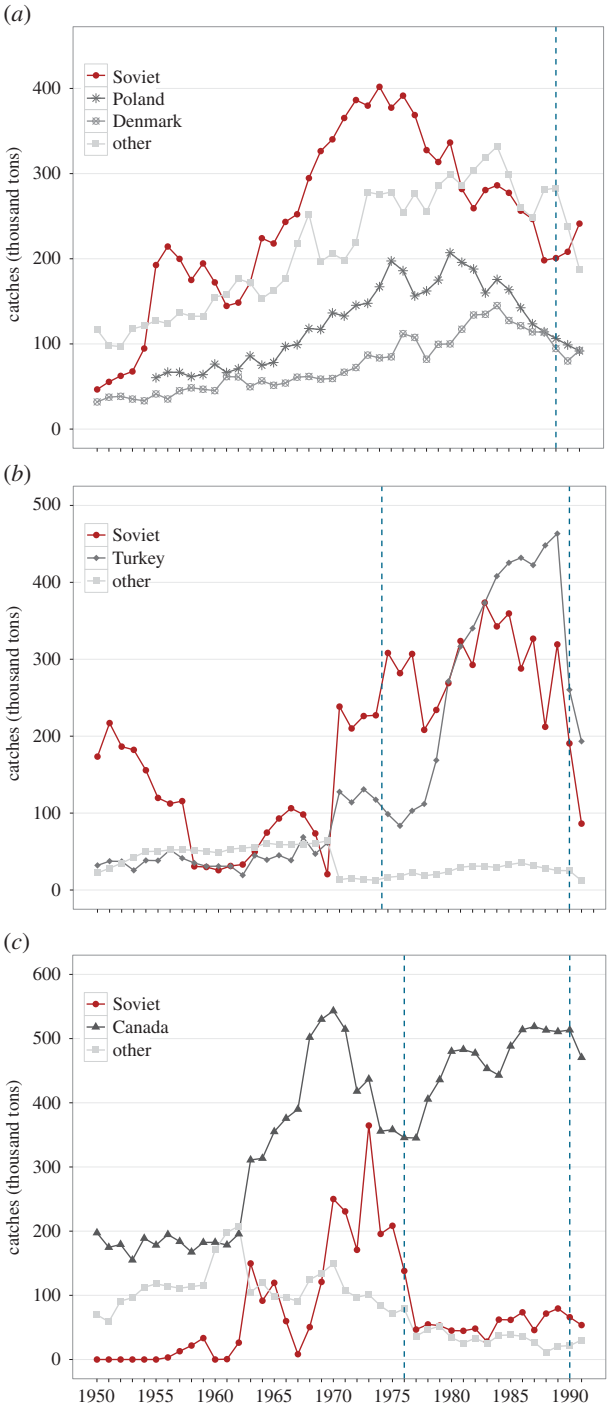

Figure 2. Fisheries-driven pelagic regime shifts and Soviet fishing. Catches of the Soviet Union and other major fishing nations in (*a*) the Baltic Sea, (*b*) the Black Sea and (*c*) the Scotian Shelf. The timing of each regime shift (electronic supplementary material, table S2) is indicated by the dotted line. Catch data from the Sea Around Us Project (www.seaaroundus.org).

globalization of fisheries. Our exploratory study does not claim that Soviet Union fishing was a necessary or sufficient condition for marine regime shifts. However, we propose that the fisheries-related dynamics of global key actors like the Soviet Union can serve an interesting complement to analyses of global and regional synchrony of regime shifts (cf. [35]).

To better understand and learn from the pervasive Soviet Union fishing experience for improved stewardship of marine ecosystems, we discuss our findings in the context of (i) state-supported innovation and geographical expansion of Soviet Union fisheries, (ii) Soviet Union fishing and marine regime shifts, (iii) the changing pressures exerted on marine ecosystems by global fisheries actors, (iv) the significance of the global political, economic and institutional dimensions, and (v) globalization and the prospects for managing marine ecosystems, their resilience and regime shifts.

(a) State-supported innovation and geographical expansion of Soviet fisheries

Rebuilding the Soviet Union following the Second World War required a substantial increase in the production of protein for human consumption. Consistent failures in livestock production systems [36], combined with declining freshwater fish catches (resulting from pollution and river regulation), created vulnerabilities that led to an increased focus on marine capture fisheries [37]. Production of fish protein was perceived as economically more efficient than protein produced in agriculture, and less vulnerable to drought, floods and other extreme events [33].

Soviet marine fisheries, which received a dramatic increase in government funding after the War [33,37], expanded faster than all other nations [38,39] and enhanced the resilience of the Soviet food production system [33]. This expansion was based on (i) the massive construction of fishing vessels [39], (ii) the use of large factory trawlers and mother ships for processing catches (figure 3), (iii) conducting fishing operations in coordinated fleets (i.e. including fish carriers that transported processed products to port and supply ships) and (iv) close cooperation between research for developing new fishing methods [39].

Soviet fishing innovation, including super deep-water and pelagic trawling, enabled exploitation of several deep-water and virgin stocks around the world [38,39,41], including previously unexploited halibut stocks on North American fishing grounds [40]. These deep-water innovations preceded subsequent global expansion of deep-sea fishing [42]. The most extreme example of Soviet expansion is represented by their Southern Ocean fishing activities. Overexploitation of several previously unfished stocks of finfish species in the 1960s and 1970s [43] was followed by a substantial increase in unexploited Antarctic krill, *Euphausia superba*, stocks. Prior to its collapse, the Soviet Union even managed to catch substantial quantities of lanternfish *Myctophidae* [44], which, to our knowledge, no other nation (before or since) has ever achieved. Estimates of the abundance of these fat- and protein-rich fish in the Southern Ocean range between 70 and 200 million tons [45], but recent global estimates indicate that biomasses of these mesopelagic organisms may be substantially larger [46]. Combined with krill, lanternfish constitute a major global marine protein source left to be commercially exploited at large scales.

Government subsidies and fixed price and wage systems [37] enabled the Soviet fishing fleet to expand into economically less favourable regions, such as the Southern Ocean and elsewhere, and to conduct fishing operations over an extended time period (several months) at large distances from port. The Soviet Union owned and controlled its whole seafood supply chain across its worldwide operations. The collapse of the Soviet Union resulted in a collapse of the fisheries supply chain and support system, which made far ranging fleets unable to maintain their activities [47].

(b) Soviet fishing and marine regime shifts

Marine ecosystem dynamics and regime shifts have often been described as driven by large scale and synchronized bottom-up

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Figure 3. A Soviet mother ship. The Soviet vessel *Vostok*, 'Восток' (IMO 6915805) built in 1971, with homeports in Odessa and Vladivostok, was the largest of all mother ships ever constructed at the time. She measured 225 m in length and had a capacity to produce 150 000 cans and to freeze 200 tons of fish per day. The vessel contained a movie theatre and swimming pool [39]. She was scrapped around 2002 [40]. Photo: Gena Anfimov.

(resource driven) control, but recent analyses also highlight the importance of fishing or top-down control [20].

For instance, re-analysis of the well-documented (and presumably climate driven) North Pacific regime shifts [48] illustrate, for the first time, that fishing was indeed an important contributing factor for this shift [34]. Regime shifts are, in fact, the consequence of a combination of different drivers [10], and ecosystems differ substantially in their resilience to fishing, for example depending on species richness and temperature [20].

Soviet fishing was global and highly synchronized. Fishing activities were coordinated through a system of FYP, which enabled centrally placed decision makers to define clear production targets for marine resource extraction. Although we were unable to obtain the detailed fisheries goals in historical FYPs, the close association between several examples of dramatic expansions of distant water fishing with changes in such plans, suggests a well-developed capacity for centralized control of global expansion.

Soviet fishing played a major role in LMEs where fishing has been described as an important anthropogenic driver of regime shifts (figure 2 and electronic supplementary material, table S2). Although we found that there was a significantly higher proportion of Soviet fishing in LMEs with regime shifts, we conclude that to test whether a high proportion of Soviet fishing was in fact positively associated with a higher probability of regime shifts would also require testing for presence or absence of regime shifts in all LMEs, an analysis that is currently unavailable. Our exploratory analysis based on available data on the globalization of fisheries is thus insufficient to establish a clear link between Soviet fishing and marine regime shifts. Nevertheless, we have established that the Soviet Union indeed was a key fishing actor in all LMEs where regime shifts have been documented. Further analysis, including species-specific biomass removals by the Soviet Union, can contribute to an understanding of potential cascading effects from such removal and their associations with regime shifts. The regions where Soviet fishing may have been especially important includes the Baltic and Black Seas, where the consequences of such cascading effects have been well established in the context of regime shifts (see references in the electronic supplementary material, table S2).

Accuracy of data is an important challenge when analysing regime shifts. We do not know to what extent changes in fishing activities (e.g. temporal and spatial patterns of catches, species harvested) by different nations may have influenced the collection and availability of data subsequently used in regime shift analysis. Fisheries-dependent data have also been part of several of the original regime shift analyses, which may bias the results. The important role of Soviet fishing in marine ecosystems worldwide specifically illustrates the importance of accurate catch statistics. There are arguments to suggest that there were incentives for both the over reporting and under reporting of Soviet catches [32]. The profession of Soviet fisherman or woman attracted qualified personnel [39], but catch records suggest evidence of a remarkably inefficient fishing fleet, when compared with *per capita* production figures for Japan or the USA [39]. It is unknown whether such low productivity figures can be explained by systematic under reporting of fish catches, similar to official misreporting of Soviet whale catches [49]. The extent of suspected significant Soviet under reporting from, for example, Africa and South America [50] is not known, but a catch reconstruction of Soviet fishing activities in the Baltic Sea does not suggest any difference between officially reported catches and reconstructed catches [51]. Misreporting of large actors, such as the Soviet Union historically (in relation to whaling), or China more recently [26,52], illustrates the global relevance of accurate data from such major actors.

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(c) New global actors filling the niche after the Soviet Union

The Soviet Union developed a number of fisheries around the world that subsequently were continued by other countries. A shift in the dominance of Soviet Union fisheries to other nations is evident in many of the large marine ecosystems investigated, but also at the global level, where China and Peru have become the two largest fishing nations following the collapse of the Soviet Union. At the start of the 1950s, four countries (the Soviet Union, Japan, Norway and the United States) dominated world fisheries, with catches in the order of 1 million tons. In 2006, however, several countries are exceeding such catch levels including Chile, China, Peru and India (electronic supplementary material, figure S1).

The sequential exploitation of the Soviet Union, resembling a pulse disturbance like a forest fire, has developed into a press disturbance performed by a diversity of fishing actors. This has led to a saturation of the global capacity to harvest marine resources. As an example, Soviet Union fishing, during only 1 year (1967) on the Patagonian Shelf, represented a massive increase in catches [50]. This level of fishing pressure became normality only a decade later. Catches in this region are now persistently exceeding such levels several fold (www.seaaroundus.org).

Globalization in general is contributing to an increased role of the private sector in relation to governments [53,54]. Increasingly integrated global markets for fish and fish products, combined with vertical integration of product chains, is increasing the influence also of major seafood companies [55]. Financially powerful private seafood actors are increasing their ability to engage in innovations (including new harvesting technologies) with high risks and potentially high rewards, as exemplified by recent increases in krill harvesting in the Southern Ocean by companies from South Korea, Norway and also, increasingly, China [56,57]. Krill represent an important resource for a rapidly growing aquaculture market, and such global pressures are likely to increasingly challenge existing institutions.

(d) Fishing embedded in global politics, economics and governance

Soviet expansion in the 1950s and 1960s was initially characterized by open access to unused resources and a lack of governance. However, increased competition with North American fishermen [58] combined with Cold War fears of espionage [59,60] contributed to an increasing antipathy towards Soviets fishing around North America, leading to a subsequent dramatic decrease of Soviet fishing in these areas following the US and Canadian designation of EEZ, both in 1977 [33]. These actions effectively shut out the Soviets from these productive fishing grounds. Close political cooperation with Cuba, conversely, and the construction of a Cuban fishing port for Soviet vessels in 1965, provided access to the remote, productive and virgin fish stocks in the southwest Atlantic and beyond [33,50].

A dramatically rapid expansion of Soviet fishing on the Argentinean Patagonian Shelf in the 1960s, however, led to increased antipathy towards Soviet fishermen, armed Argentinean enforcement and political sensitivities [50]. Initial Soviet fishing in the southwest Atlantic in the 1960s contributed substantially to the Argentinean (1967), Uruguayan (1969) and Brazilian (1970) designation of territorial seas [33]. Relations with Argentina were sensitive following Soviet overfishing in the 1960s, but improved after the Falklands war in the 1980s, where Argentinean and Soviet fishing agreement generated important political support for Argentinean claims to the Falklands Islands/Islas Malvinas and adjacent fishing grounds [50].

The Soviet expansion in the Southern Ocean raised global concerns and contributed substantially to the establishment of CCAMLR, the Commission for the Conservation of Antarctic Marine Living Resources [43,61]. Political responses associated with designation of EEZs and other governance initiatives thus restricted Soviet fishing and had a direct negative impact on catch volumes, resulting in a substantial drop in catches during the late 1970s, and limited the prospects for increasing catches in the 1980s [33,50] (electronic supplementary material, figure S1).

Following these designations of EEZs, the Soviets substantially expanded their fishing activities through joint ventures and fishing agreements where they had previously been less active, including in Africa [33,59]. Fishing and other Soviet interests in Africa increased substantially during the 1970s, and included support (arms and training) in countries with socialist movements for independence from former colonies [62]. Increased fisheries and military cooperation with African states was consistent with Soviet goals to improve food security, increase income from export earnings (arms sales) and destabilize the influence of Western powers in the region [62]. Angola and Mozambique were two of the most important fishing regions, and were also two of the largest importers of Soviet arms during this time period [62].

The Soviets also expanded their fishing agreements in the East Pacific, with Peru as a central partner. Cooperation developed following the Peruvian military coup in 1968 and included arms transfer, military capacity building and access agreements to important fish resources, combined with the construction of Peruvian port facilities to support Soviet fishing activities [63]. The Soviet agreements involving arms exports and fishing rights in Africa and Peru resulted in the establishment of regular Soviet airline routes, which improved logistic support for both fishing activities and transportation of other equipment and personnel [59,63]. Such cooperation was part of a global strategy to increase the credibility of the Soviet Union as a world power. Although fishing vessels have been documented to smuggle weapons [64], it is not known whether analogous allegations directed at Soviet fishing vessels [50] contain any substance. Soviet fishing was in any case closely related to military and other political interests. Political shifts and armed conflict, for example, in South America and Southern Africa, appear to have generated important windows of opportunity for re-organizing the Soviet fishing efforts following a period of widespread implementation of EEZs.

(e) Globalization and the management of regime shifts

Climate change is often regarded as an ultimate global driver of change in marine ecosystem. In a globalized world, however, powerful actors can exert strong and globally persistent pressures across marine ecosystems. Although several studies have documented the globalization of fisheries [65], few studies describe factors behind this change [66]. Here, we have presented one actor involved in the process of globalization, the social and political context influencing this process and describe its potential effects on marine ecosystems. The escalating global activities of the Soviet Union contributed substantially to

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triggering new global and regional legal frameworks for the oceans. The dominance of the Soviet Union has subsequently been substituted by other nations and private corporations, which push the frontiers of resource extraction. We expect that the era of Soviet Union dominance in fisheries will, in a globally interconnected world, only represent a shadow of the future scale and rate of human influences on marine ecosystem dynamics. A key question will be how national and global institutions can adapt to the activities of these new global actors in order to improve management of marine resources and ecosystems in relation to marine regime shifts.

5. Conclusion

The rise and fall of the Soviet Union did not only represent one of the major social changes during the twentieth century—it also contributed to a transition in the way marine resources were extracted and governed. The rapid expansion and pervasive role of the Soviet Union in fisheries of large marine ecosystems world-wide illustrate the importance of accounting for and understanding key actors and how they influence and drive marine ecosystem dynamics. Here, we have explored this role by relating Soviet Union catches to large marine ecosystems subject to regime shifts. We propose that sustainable management of marine ecosystems is not just a matter of fisheries decisions, but also requires understanding of major actors and how they are embedded in a broader social–ecological context of political and economic tensions and power dynamics. Decisions, strategies and political alliances of global actors will inevitably influence marine ecosystem dynamics and regime shifts.

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