

A comparative analysis of fisheries research publications

Paul Fernandes, Heriot Watt University

Introduction

1. Fisheries research in the United Kingdom is conducted primarily at universities and at two government institutions: the Centre for Environment Fisheries and Aquaculture Science (CEFAS) and Marine Directorate (formerly Marine Scotland Science, henceforth referred to here as MSS). Most nations have similar situations, with e.g. Norway having the government funded Institute of Marine Research (IMR), Ireland have their Marine Institute (MI), France have IFREMER, Denmark has DTU-aqua, and the Netherlands, IMARES.
2. MSS & CEFAS continue to provide scientific advice to the respective national administrations to manage fisheries in the UK. This scientific activity is separate from any associated research into fish and fisheries which may be peer reviewed and published in academic journals.
3. The number of publications in academic journals is a reasonable indicator of such research activity. Although it may be argued that this activity is not essential to the provision of advice in the short term, in the medium to long term the respect of scientists providing advice will be judged by their research activity as evidenced in their publication record. Research is a necessary capacity building element to scientific expertise. Scientists involved in research are much better acquainted with current science, have stronger networks of expertise and a greater depth of understanding of the issues on which advice is sought.
4. The workload for the provision of advice has increased since Brexit, as the UK became an independent coastal state with a requirement to draft its own fisheries management plans. However, anecdotal evidence has indicated that fisheries research in Scotland had diminished prior to this, over the last decade. This has been affected by new efforts to provide advice in relation to the utilisation of ever more marine space, notably for marine conservation and marine renewables. As the number of staff at MSS has remained at about 300 since 2009, the resources required for this new scientific activity were no doubt drawn from the larger scientific pool, which included fisheries scientists.

Purpose of this paper

5. The purpose of this note is to provide evidence for any changes in research activity at MSS and compare it to that of equivalent institutions in England (CEFAS) and elsewhere in Europe.

Methods

6. The Web of Science is an online database of scientific publications which can be searched for various terms under a variety of headings. It is used to find scientific articles, to conduct systematic reviews and analyse scientific output. Here it is used to search for all scientific articles produced by MSS, CEFAS, IMR, MI, IFREMER, DTU-aqua and IMARES (including their former names). Data were truncated to the period from 1970 to 2023. All articles with an address at these institutions/countries were sought and then filtered by subject area = "Fisheries"; these were compared with articles in all other subject areas ("Not Fisheries"). These are further compared to all articles published in the UK, Scotland (by all institutions), USA, Canada and globally, with "fish" or "fisheries" in article titles.

Results

7. Figure 1 shows the number of publications with “fish” or “fisheries” in the title from the whole of the UK (including universities) and just Scotland (including universities), since 1970. Both show a steady increase over the last 50 years, with a slight drop in 2022 & 2023, since the peak in 2021 for the UK, and 2016 for Scotland.
8. Figure 2 shows the equivalent number of publications for the USA and Canada since 1970. They also show a steady increase over the last 50 years, with a slight drop in 2022 & 2023 since the peak in 2019 for the USA and Canada.
9. Figure 3 shows the equivalent data for all countries in the world and has a similar pattern, with a peak in 2021.
10. Figure 4 shows the timeline of the number of scientific publications from MSS, compared to those from CEFAS and the equivalent institution in Norway (IMR). Two distinctions are made for each institution: all publications from other research areas (Not Fisheries, left hand figures) and those in the “Fisheries” research area (right hand figures).
11. Figure 5 shows the timeline for the four other comparative institutions in Europe: MI (Ireland), IFREMER (France), DTU-aqua (Denmark) and IMARES (Netherlands).
12. The absolute numbers of publications (y axis in all figures) are less relevant, as they are proportional to the number of staff. CEFAS (n~530), IMR (n~1050), and IFREMER (~1500), have more staff than DTU-aqua (360), MSS (~300) and MI (189). In this respect IFREMER performed best (0.76 maximum publications per staff) and Irelands Marine Institute does very well (0.51 maximum publications per staff). CEFAS and DTU did slightly better (0.38 and 0.34) than MSS and IMR, which were similar (0.3 maximum publications per staff).
13. What is of interest is the trend in the publication numbers over time. Publication numbers in areas other than fisheries have grown since around 1990 and only dipped in the last 2 or 3 years at most institutes, in common with global trends.
14. This rising trend is generally consistent when considering fisheries publications. In nearly all institutions including UK overall, Scotland overall (Fig. 1), USA and Canada (Fig. 2), globally (Fig. 3), CEFAS, IMR (Fig. 4), MI, IFREMER, DTU and IMARES (Fig. 4), fisheries publications have risen consistently with a dip, in many cases, in the last two years. Numbers at IMARES peaked in 2015 (117 publications) but have remained similar but variable since then.
15. In all institutes, except MSS, recent fisheries publication numbers are several times higher than those in the 1990s.
16. In all institutes, except MSS, there is little difference between the other publication trends and the fisheries publications.

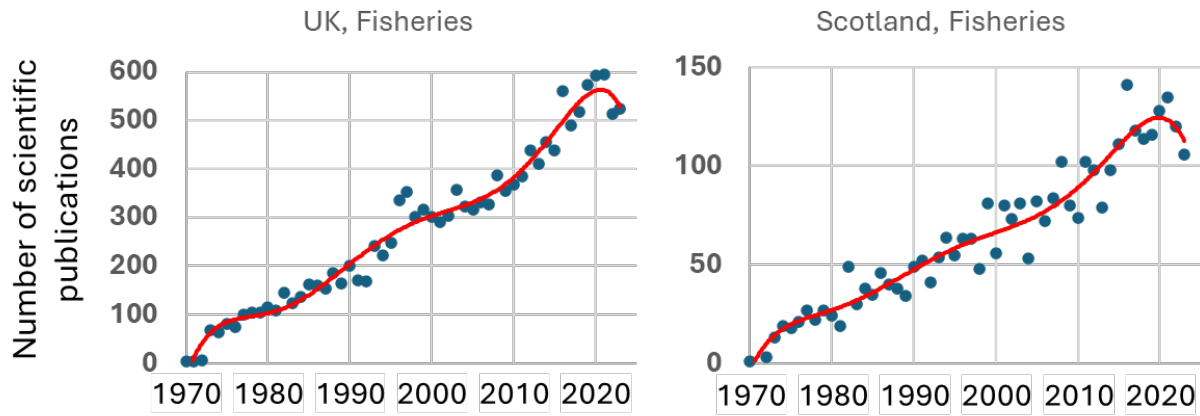


Figure 1. Number of scientific publications (articles, review articles or books) taken from Web of Science with Fish or Fisheries in the title, from (left) the UK, England, Scotland, Wales, or Northern Ireland; and (right) Scotland alone. Fitted trend line in red (6th order polynomial).

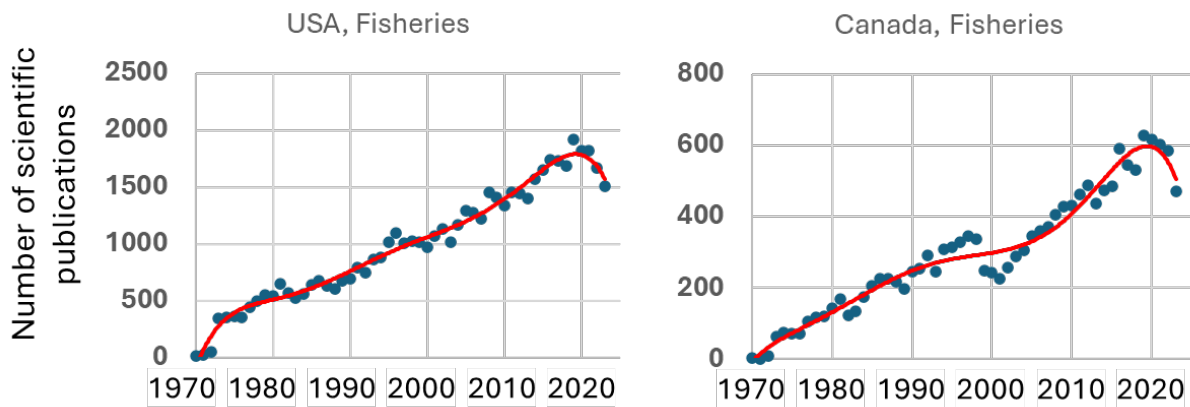


Figure 2. Number of scientific publications (articles, review articles or books) taken from Web of Science with Fish or Fisheries in the title, from (left) the USA; and (right) Canada. Fitted trend line in red (6th order polynomial).

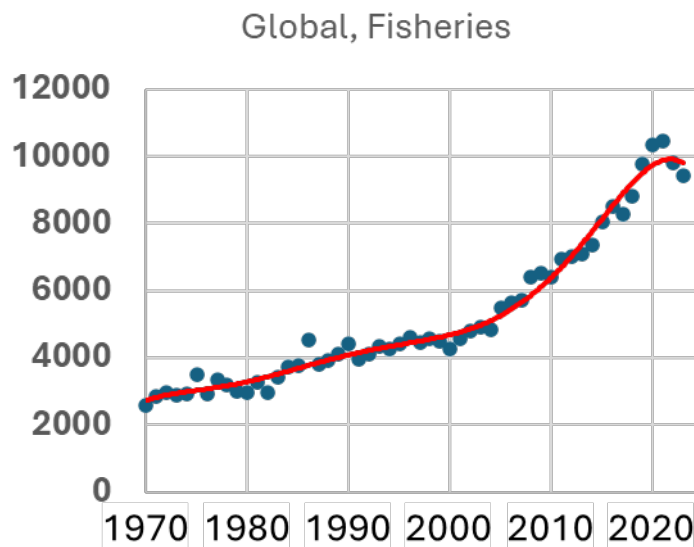


Figure 3. Number of scientific publications (articles, review articles or books) taken from Web of Science with Fish or Fisheries in the title, from the entire world. Fitted trend line in red (6th order polynomial). Note that prior to circa 1970 publication records did not have fully populated fields, hence countries may not be listed.

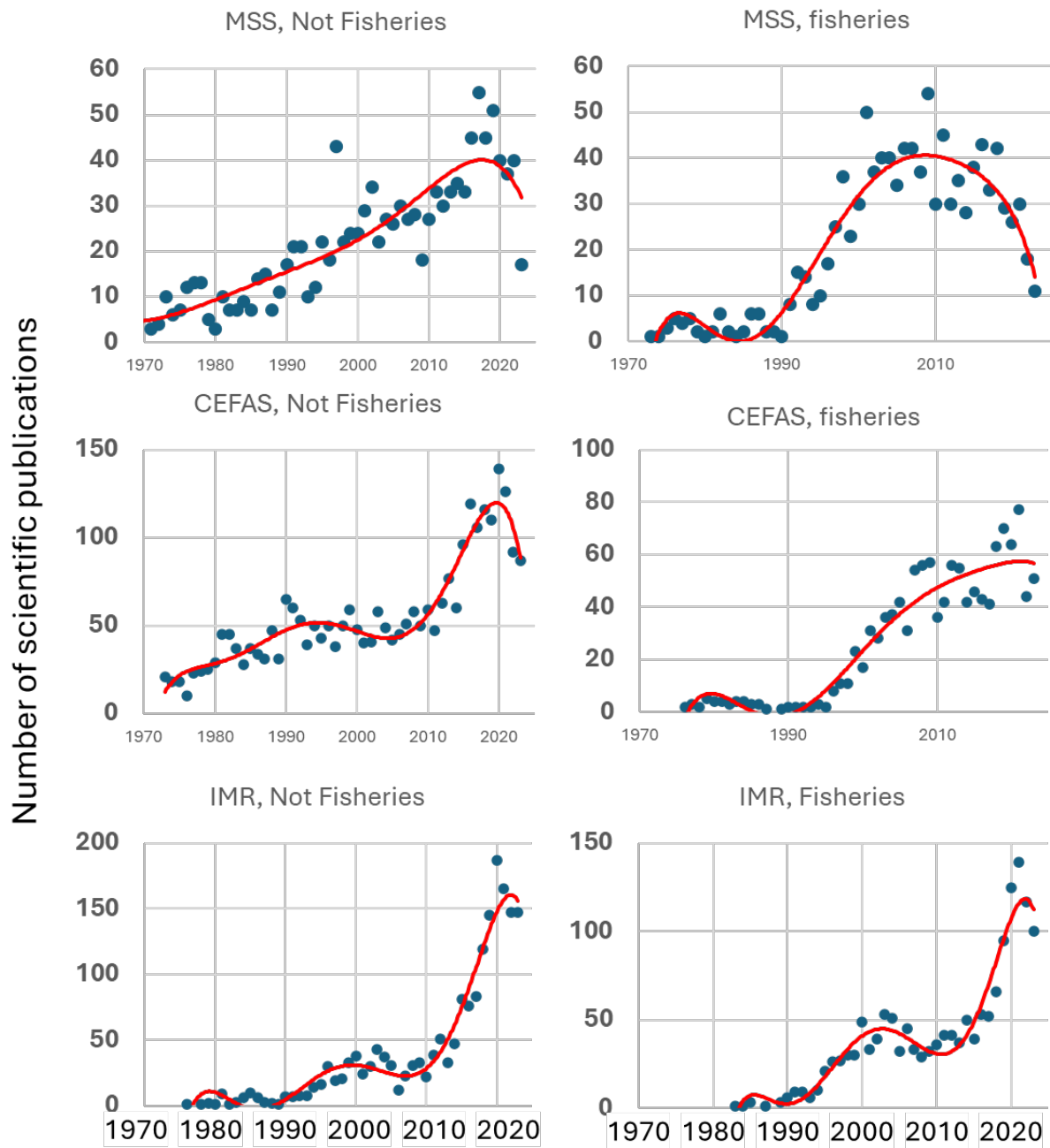


Figure 4. Number of scientific publications (articles, review articles or books) taken from Web of Science from MSS (top), CEFAS (England, middle) and IMR (Norway, bottom) for all scientific activity except “Fisheries” (left hand figures) and those in the “Fisheries” research area (right hand figures). Fitted trend line in solid red (6th order polynomial).

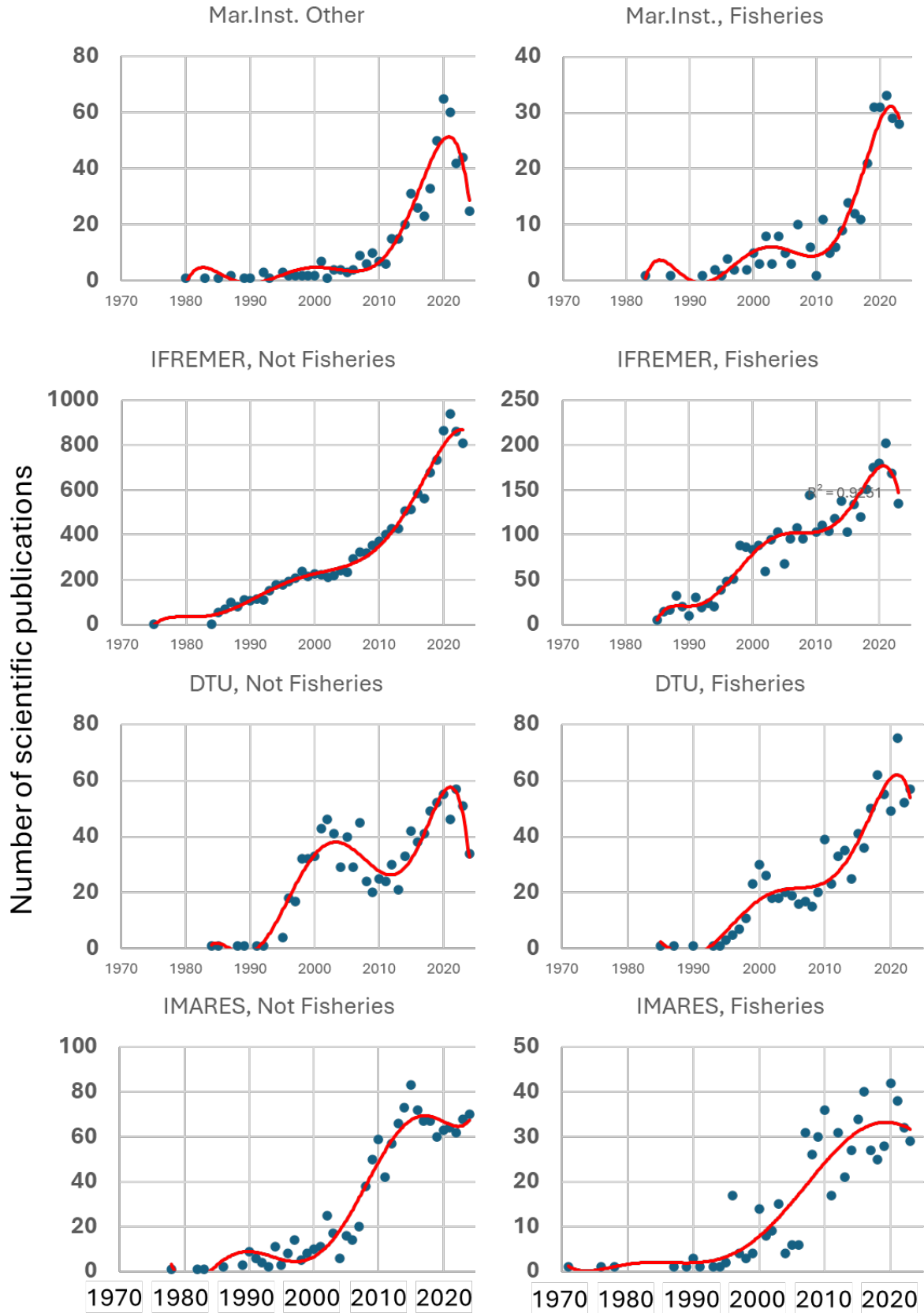


Figure 5. Number of scientific publications (articles, review articles or books) taken from Web of Science from the Marine Institute (Ireland, top), IFREMER (France), DTU-aqua (Denmark), and IMARES (Netherlands, bottom) for all scientific activity except “Fisheries” (left hand figures) and those in the “Fisheries” research area (right hand figures). Fitted trend line in red (6th order polynomial).

17. MSS publications trends are, therefore, different in two respects.
- i. Firstly, the trend in publications other than fisheries reached a peak with maximum numbers in 2017 (55), but only really declined in the last year (28 publications in 2023). However, this low number was equivalent to the number of publications in the mid-1990s and represents a much bigger drop relative to other institutions. This trend is evident in marine directorate data (Fig. 6) with 23 publications reported in the year 2022-2023.
 - ii. Secondly, and by contrast, MSS' fisheries publications peaked much earlier, over a decade ago (maximum of 54 in 2009). They have been in precipitous decline since then, to very low numbers in 2023 (11), again not seen since the 1990s.
18. Figure 6 shows the publication output from MSS for all research areas combined. The MSS data taken from the web of science (blue dots) differ slightly from the data provided by the Marine Directorate (MD numbers, black crosses)¹. The difference may be attributed to the reporting periods in the latter, which may be financial year (so 2022-23 was taken as the number for 2023 for comparisons here). The total number of publications reported by the marine directorate for the ten-year period from 2009-2010 to 2022-2023 was 1096 which is more than the web of science entries for the period 2010 to 2023 (959). For comparative purposes, applying the same search terms from the same data source (WoS) for all institutions is essential, so the WoS numbers were used here.

Implications

19. This indicates that fisheries research at MSS, unlike equivalent institutions, has indeed been in decline for over a decade and is now at very low levels. As indicated earlier, the pressures on MSS to undertake scientific work relating to advice in other areas have increased. In the absence of increased resources, and specifically the lack of replacement of suitably qualified staff, the amount and quality of research in the traditional core area of fisheries has diminished.
20. This is of a concern for Scottish fisheries, some of which remain in parlous state, particularly to the west of Scotland. Without an adequate understanding of their demise, nor appropriate scientific research into how they might recover, their status, and those of the rural and island communities that depend on them, remain in the balance.

¹ Data submitted as part of further information attached to a letter from the Cabinet Secretary for Rural Affairs, Land Reform, and Islands, Mairi Gougeon, available at <https://www.parliament.scot/-/media/files/committees/rural-affairs-and-islands-committee/correspondence/2024/prebudget-scrutiny-2025-to-2026-of-22-july-2024.pdf>

MSS, all

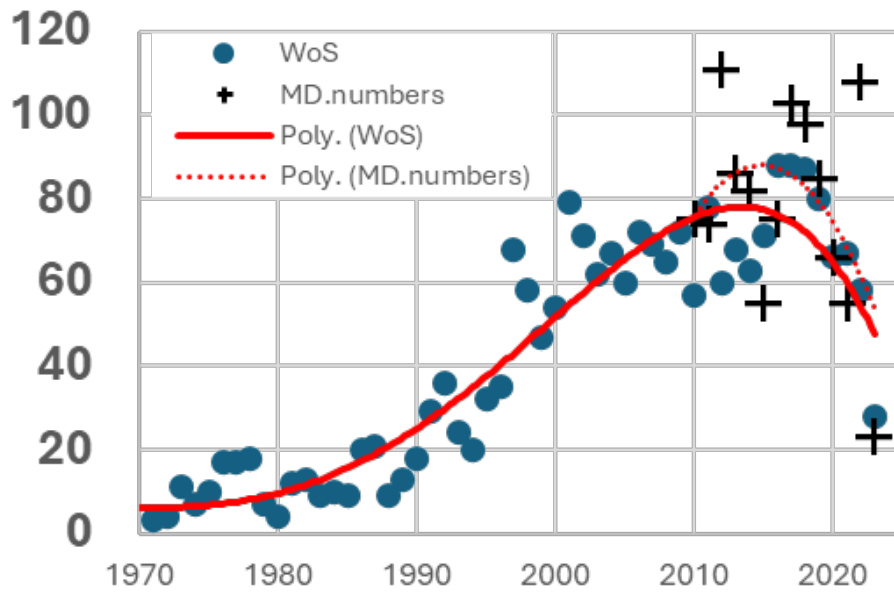


Figure 6. Total number of scientific publications (articles, review articles or books) taken from Web of Science from MSS (blue dots), and marine directorate numbers (black crosses). Fitted trend line to WoS data is solid red (6th order polynomial) and dotted red line for marine directorate numbers (2nd order polynomial).