Following the tuna trail: Contrasting global catch estimates from FAO and RFMOs

Bastien Grasset[1,2] Emmanuel Chassot[3] Julien Barde[1,2] James Geehan[4]
Fabio Fiorellato[4]

Abstract

This study compares annual catch statistics from the Global Tuna Atlas (GTA) and FAO FishStat (FS) marine capture datasets, with a focus on tuna and tuna-like species. The analysis first describes the differences between both dataset structures, then applies a harmonized mapping and filtering procedure to enable consistent inter-comparison. At the global scale, total catches from both datasets are highly consistent (differences < 0.1%), yet this apparent agreement conceals substantial variations at finer levels, particularly by species and fishing fleet. These discrepancies often compensate each other across years, producing an illusion of equivalence in aggregated time series. A regional focus on the Indian Ocean Tuna Commission (IOTC) management area confirms this pattern: while temporal trends are parallel overall, differences emerge for some species such as bigeye tuna and Albacore, often linked to specific fleets. In recent years (post-2014), several species show nearly identical values in both datasets, reflecting cases where one source adopts figures from the other when deemed more reliable. However, differences persist for certain taxa and, in some cases, where the underlying data flows or integration processes differ between the two datasets. This analysis highlights both the complementarity and the limitations of GTA and FS: GTA provides detailed fishing gear and fishing mode, while FS offers finer spatial resolution and broader taxonomic coverage. Understanding these structural and procedural differences is essential for ensuring the comparability and reproducibility of global fisheries statistics.

Keywords: Global Tuna Atlas; FishStat; FAO; Fisheries statistics; Data harmonization; Open data; CWP standards; Tuna fisheries

[1]Institut de Recherche pour le Développement (IRD), 34203 Sète Cedex, France
[2]MARBEC, University of Montpellier, CNRS, Ifremer, IRD, Sète, France
[3]Indian Ocean Tuna Commission (IOTC) Secretariat, Victoria, Mahé, Seychelles
[4]Food and Agriculture Organization of the United Nations (FAO), 00153 Rome, Italy

Introduction

Reliable and comprehensive catch statistics are fundamental for monitoring fisheries, assessing stocks, and supporting international policy and management decisions. However, uncertainties in catch data remain a major challenge in global fisheries statistics. These uncertainties arise from a range of factors, including incomplete or inconsistent data collection, limited monitoring capacity, reporting errors, differences in national data compilation and submission procedures, and the varying levels of aggregation and validation applied during data processing. At the global scale, fishery catches are generally considered to be widely underestimated (Clarke et al. 2006, Agnew et al. 2009, Pauly & Zeller 2016), although the extent of this underestimation remains difficult to quantify (Yimin Ye 2017).

The Food and Agriculture Organization of the United Nations (FAO) and the tuna Regional Fisheries Management Organizations (t-RFMOs) represent two of the main institutional frameworks responsible for compiling and disseminating global and regional fishery statistics. Both rely on data originally collected by national authorities, yet they follow distinct workflows for validation, standardization, and dissemination. Comparing their outputs provides an opportunity to better understand how these processes influence the resulting estimates of catch, and to assess the magnitude and nature of uncertainties embedded in global fishery statistics.

In this study, we compare the FAO Global Capture Production Database and the nominal catch dataset compiled through the FIRMS Global Tuna, with a particular focus on tuna and tuna-like species caught in the Indian Ocean. By examining differences between these two datasetseach compiled through independent but interrelated reporting mechanismswe aim to highlight the potential sources of divergence and provide insights into the consistency and reliability of global tuna catch statistics.

Materials

Both FishStat and the GTA have been developed by FAO to disseminate fisheries data, but they differ greatly in scope and design. Each encompasses multiple datasets and analytical tools, and both contribute to FAO's global fisheries data governance in complementary ways.

The FAO Global Capture Production Database

The FAO maintains the Global Capture Production Database (FAO 2025), which provides harmonized statistics on marine and inland capture fisheries production at the global level. The database is compiled annually by the FAO Statistics Division from information submitted by Member States and regional fishery bodies through the National Statistical Questionnaire 1 (NS1) survey. Reported data include annual catch quantities (in tonnes live weight) by country or territory, species (FAO ASFIS list), major fishing area (FAO statistical areas), and production source (marine or inland waters). Following submission, FAO performs quality control, validation, and standardization procedures to ensure internal consistency and comparability across countries and years.

As of today, the FAO's FishStat data, including the global and regional capture production data, are disseminated through a desktop client application (FishStatJ)[1] as well as through a CSV dataset accessible from the FAO Fisheries and Aquaculture Statistics online portal as a zipped file[2]. FS constitutes the official global reference for capture fishery production statistics. The version used in this study corresponds to the dataset available from March 2025.

The FS dataset is compact, with only seven columns (Table X). It focuses on annual national statistics of capture production. In FS, information on the type of measurement is implicit: all records correspond to nominal catches ("catch"), without discards, and are expressed in metric tonnes ("t") - the same unit used in the GTA dataset- and in number for a reduced set of species. In GTA, these details are explicitly defined through the columns *measurement*, *measurement_type*, and *measurement_unit*. For some groups, such as tunas and billfishes, FAO integrates best scientific estimates provided by regional tuna commissions.

[1] Available at: https://www.fao.org/fishery/en/topic/166235/en
[2] Available at: https://www.fao.org/fishery/static/Data/Capture_2025.1.0.zip

The FIRMS Global Tuna Atlas (GTA)

The GTA is a global repository of harmonized nominal and geo-referenced catch datasets from tuna and tuna-like fisheries, developed under the auspices of the Fisheries and Resources Monitoring System (FIRMS) of the FAO (FAO-FIRMS 2025). The GTA compiles, standardizes, and disseminates public-domain catch data submitted by the five tuna Regional Fisheries Management Organizations (t-RFMOs) the Commission for the Conservation of Southern Bluefin Tuna (CCSBT), the Inter-American Tropical Tuna Commission (IATTC), the International Commission for the Conservation of Atlantic Tunas (ICCAT), the Indian Ocean Tuna Commission (IOTC), and the Western and Central Pacific Fisheries Commission (WCPFC, in collaboration with the Pacific Community, SPC).

The GTA was developed through a coordinated process between the FIRMS Secretariat and the t-RFMOs to establish a common data exchange format consistent with the standards of the Coordinating Working Party on Fishery Statistics (CWP) (FAO Coordinating Working Party on Fishery Statistics (CWP) 2024a, b). This process enables the systematic integration and annual update of harmonized nominal catch data from all t-RFMOs into a single global dataset.

The GTA currently disseminates catch data for tuna and tuna-like species, including principal market tunas, billfishes, coastal or neritic tunas, and associated species such as bonitos, mackerels, and pelagic sharks. All GTA datasets are openly accessible on Zenodo with complete metadata and transparent versioning, and are outputs of an R data generation workflow and inputs for Shiny applications for visualization and analysis[3]. The nominal catch dataset component of the GTA, covering the period 1918-2023, is publicly available from the Zenodo repository[4]. The full processing workflow is also openly available, with a DOI for the source code[5].

The GTA is an open, reproducible data system focused on tuna and tuna-like species. The GTA dataset follows the CWP standards. The data structure is made of 16 columns categorizing catches by using multiple dimensions: species, fleet, gear, fishing_mode, area, and time (Table IX). Among these, four temporal columns *time_start*, *year*, *month*, and *quarter* deliberately provide redundant but complementary time references which facilitate filtering and aggregation at multiple temporal scales. The exchange format is available as JSON file from the Fisheries Data Interoperability Working Group GitHub Repository[6].

Methods

Scope and datasets

In this study, we focus only on one specific dataset type shared by both systems, the annual global capture data, to compare their structure, coverage, and consistency. Specifically, we use the datasets *FishStat - Global Capture Production.* (FAO 2025) and *Global Tuna Atlas - Global nominal catches* (FAO-FIRMS 2025), corresponding respectively to FAO's global capture production statistics and the harmonized nominal catch data compiled from t-RFMOs. Only marine capture data were retained (excluding inland records), and the analysis focuses on ISSCAAP groups 36 (Tunas and tuna-like species) and 38 (Sharks, rays, chimaeras). All measurement_value entries represent nominal catches in metric tonnes (t).

[3] Accessible at: https://tunaatlaspiemapinseetuto.lab.dive.edito.eu/
[4] DOI: https://doi.org/10.5281/zenodo.8034730
[5] DOI: https://zenodo.org/records/15312151
[6] Available at: https://github.com/fdiwg/fdi-formats/blob/main/cwp_rh_generic_gta_taskI.json

Global comparison of available dimensions

The GTA dataset explicitly includes several descriptive dimensions such as gear_type, fishing_fleet, fishing_mode, and source_authority, consistent with CWP standards. These fields make it possible to group, filter, or compare data by gear, fleet, or reporting authority.

In contrast, FS provides a more aggregated representation: it does not include specific gear or fleet categories, and the reporting entity corresponds to the national authority. However, some missing dimensions can be inferred indirectly - for example, the tRFMO can generally be deduced from the geographic area code (i.e., FAO Major Fishing area). This correspondence is not always unique in the Pacific Ocean, where RFMO boundaries overlap. Table I summarizes the correspondence between key dimensions in the two datasets.

Table I: Summary of key structural differences between FS and GTA datasets

Dimension	FS	GTA	Key differences
Species	337 species	65 species	FS has broader taxonomic coverage; GTA focuses on tuna and tuna-like species.
Fishing Fleet	169 (country/territory level)	158 (aggregated categories)	FS distinguishes individual territories; GTA merges some under national or RFMO entities.
Gear Type	Not specified	Reported	Absent in FS; enables stratification by fishing practice.
Fishing Mode	Not specified	Reported	Absent in FS; adds contextual information (e.g. free school vs associated school).
Source Authority	National authority	RFMO or source agency	Absent in FS; improves traceability and attribution of data.
Area / Region	17 FAO subregions	10 RFMO-based management areas	Partial overlap between spatial frameworks (see Table XII).
Measurement Type	Nominal Landings (NL) only	Nominal Catch + NL (+ few discards)	Combined as equivalent for analysis.
Temporal Range	1950-2023	1918-2023	Analyses restricted to 1950-2023, the common period covered by both datasets.

Taxonomic coverage

FishStat includes 337 species, whereas the GTA dataset lists only 65 (Table: I). GTA deliberately focuses on a restricted set of 32 key species, considered the most relevant for tuna and tuna-like fisheries. For the remainder of this analysis, only this 32 species included in both FS and GTA are considered, with specific focus given to the main tuna species in the following sections. (See Appendix XI). Catches of species not present in the GTA, but present in FS, represent 28% of total catches, for over 250 additional species.

Fleet coverage

Fishing fleet categories are slightly more numerous in FishStat (169) than in GTA (158), reflecting a slightly higher reporting granularity (Table: I). FishStat distinguishes individual countries and territories, while GTA aggregates certain entities under broader national or regional categories. This difference mainly reflects variations in national reporting practices and data compilation rules.

Geographic coverage

The GTA defines 10 RFMO-based management regions, while FS subdivides the world into 17 FAO Major Fishing Areas and subregions. GTA thus relies on large, RFMO-oriented areas or aggregated FAO regions, whereas FS follows a finer spatial framework defined by FAO statistical divisions. As a result, spatial identifiers between the two datasets only partially overlap. Table XII, in appendix summarizes the correspondence between GTA management regions and FAO fishing areas by ocean basin, illustrating the partial overlap between the two spatial frameworks.

Exact correspondences exist only for the Mediterranean and Black Sea (MD) and the Indian Ocean (IOTC_WEST and IOTC_EAST). In contrast, the Atlantic and Pacific basins are divided into multiple FAO subregions in FS, making direct mapping with GTA's broader RFMO areas more complex. Antarctic areas, which have no direct equivalent in GTA, include marginal species in FS (e.g. *Porbeagle*, *Rays*, *Mantas nei*), while in GTA, only Southern Bluefin Tuna (SBF) partially overlaps these regions under the CCSBT mandate.

Measurement type

In the GTA dataset, the variable measurement_type includes both Nominal Catch (NC) and Nominal Landings (NL), with a few occasional records of Dead Discards (DD) and Discarded Live (DL) following CWP standards (FAO Coordinating Working Party on Fishery Statistics (CWP) 2024b, a). In contrast, FishStat reports only Nominal Landings (NL). According to the CWP Handbook of Fishery Statistical Standards, Nominal Catch represents "nominal landings plus the component of the catch discarded dead, and post-release mortality of fish discarded alive", approximating the total biomass removed.

Despite this conceptual difference, the sum of Nominal Catch and Nominal Landings in GTA are generally of the same order of magnitude as Nominal Landings in FS. Although Nominal Catch theoretically includes dead discards and post-release mortalities, it is not possible to quantify how much these components contribute in practice.

For this reason, both NC and NL values are combined in the global analysis and compared directly with FS NL data, as a pragmatic approximation pending more detailed metadata on discard estimates.

Temporal coverage

The time series of FS catch data start in 1950, whereas GTA catch data begin in 1918, thus providing 32 additional years of historical coverage (Table I). Note that dates prior to 1950 are not available for all ocean basins in GTA.

Harmonization and mapping process

Mapping of fishing fleets

Establishing a sound correspondence between the categories fishing_fleet, country, etc. is a complex task: FS offers a much finer level of detail in terms of capture production quantities at country or territorial entity level, and does not aggregate certain entities (e.g., Jersey, or Zanzibar), unlike GTA. In addition, geopolitical developments over the past years have made mapping difficult. We therefore propose a provisional mapping (see Table XIII) for not specific countries/territories, that enables us to analyze certain trends between the data sets, without claiming to be exhaustive for each country.

Mapping of geographic areas

Given the differences highlighted earlier, spatial comparisons between GTA and FS are conducted at the major ocean-basin level (Atlantic, Indian, and Pacific), rather than by FAO subregion. Antarctic areas, which concern only marginal species (Porbeagle and Rays, stingrays, mantas nei in FS, and Southern bluefin tuna in GTA, absent from FS), were excluded to maintain analytical consistency. The goal of this harmonization is not to reproduce fine-scale geographic details but to identify broad inter-basin patterns in reported catches.

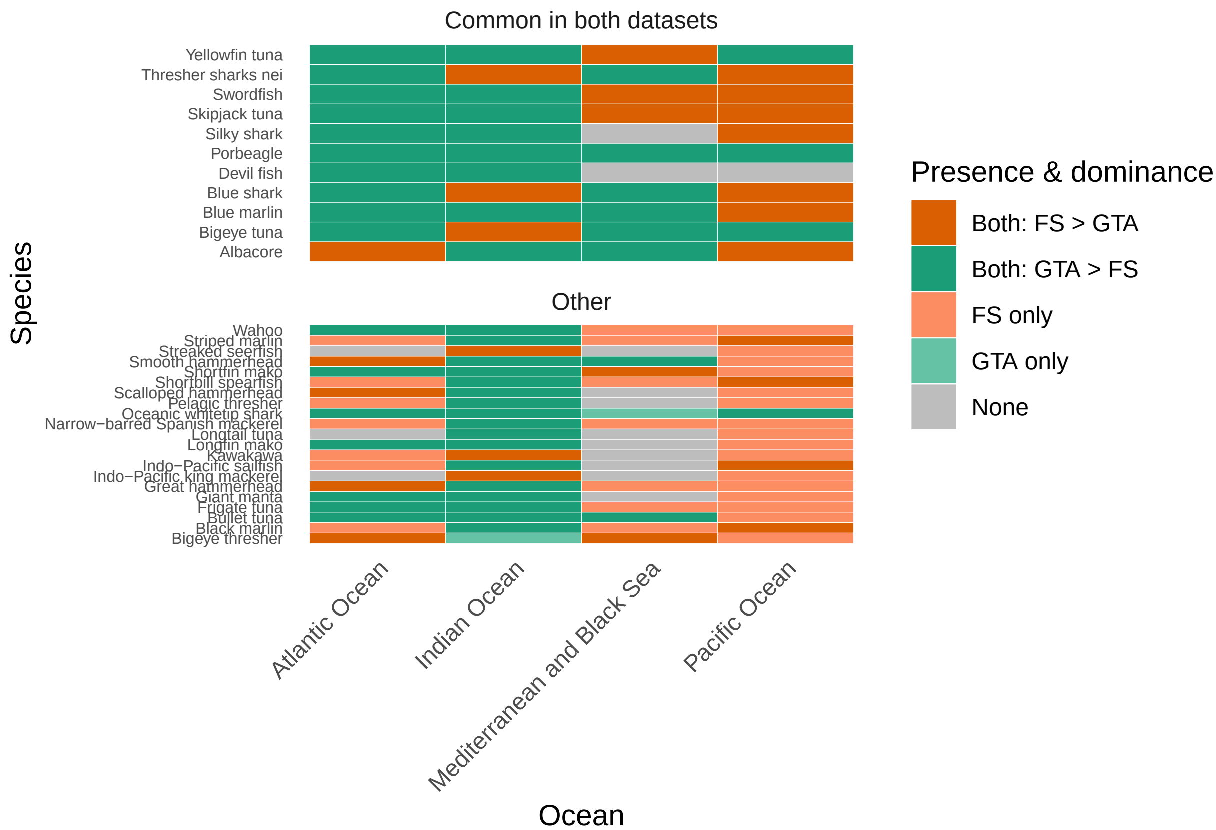


Figure 1: Presence and absence of the main species for each ocean

Filtering of comparable strata

We compared the presence and absence of the 32 retained species across all ocean basins. This comparison reveals that only two species are present in the GTA dataset but absent from FishStatJ in one or more basins, whereas the opposite situation is much more frequent: 21 species reported by FishStatJ are not represented in GTA for several basin-species combinations (Figure: 1). To ensure consistent coverage across basins, only species–ocean pairs present in both datasets were retained for the subsequent analyses.

However, this assessment should not be interpreted as a direct measure of completeness. Differences in taxonomic mapping, aggregation, or naming conventions between the two datasets, particularly for sharks and other elasmobranchs, can explain apparent absences. In many cases, catches may simply be recorded under broader nei or synonym categories rather than truly missing.

The goal of this comparison is therefore to illustrate the broader coverage of FishStat and to justify the application of a harmonized filtering by area and species in the subsequent analyses, rather than to infer which dataset is superior.

We choose not to include the fishing_fleet dimension in this filtering step, because it is not always possible to verify that fleets are not reported under NEI in one of the datasets. For species, we therefore remove all UNK categories to avoid ambiguities.

Global comparison of captures

In the following subsections we detail the results obtained by comparing the remaining rows of the initial FS and GTA datasets, after applying the previous filters (see explanations in previous section).

Overall differences and total values

Table II: Total catch (t) for each dataset and relative differences

FishStat	GTA	Difference	Difference (in %)
241,264,575	240,268,384	-996,191	-0.41

When considering total global captures over the entire time series from 1950 to 2023, the two datasets show remarkably close aggregated values, with less than 0.5% difference between them. (Table II). Such apparent similarity suggests that, at a broad scale, both FishStat and GTA provide coherent global estimates of total catches over the studied period. However, this global agreement can mask substantial differences when exploring specific dimensions, such as species composition or fishing fleet contributions, which may compensate each other when aggregated.

Temporal evolution of global captures

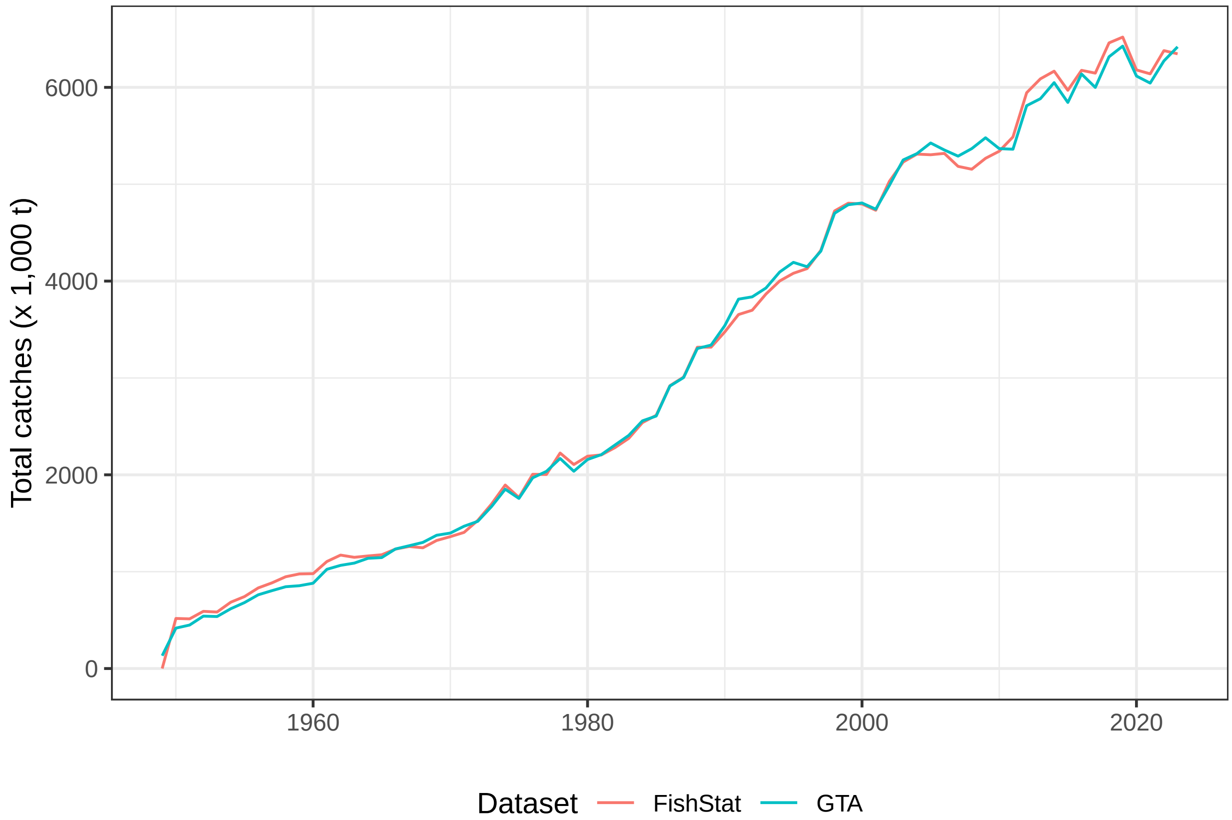


Figure 2: Comparison of annual time series of catch (t) of tuna and tuna-like species in the Indian Ocean between for FishStat and GTA datasets for the period 1950-2023

The temporal trends in total catches (Figure: 2) confirm this overall consistency. Both datasets exhibit parallel trajectories, however, this apparent alignment does not imply full equivalence. In some years, FishStat reports higher values, while in others GTA exceeds it, suggesting that small interannual compensations between datasets smooth out when aggregated. These offsetting variations contribute to the impression of overall agreement, even though substantial compositional differences may persist beneath the global totals.

Breakdown by species and fleet

Table III: Comparison of total catch (t) by taxon between the Global Tuna Atlas and Fishstat database for a set of selected taxa

Loss / Gain	Per species	Values dataset 1 (FS)	Values dataset 2 (GTA)	Difference (in %)	Difference in value
Gain					
	Frigate tuna	1,659,080	3,456,781	108.36	1,797,700
	Yellowfin tuna	61,818,850	63,410,344	2.57	1,591,494
	Bigeye tuna	19,860,483	21,322,080	7.36	1,461,597

Table III: Comparison of total catch (t) by taxon between the Global Tuna Atlas and Fishstat database for a set of selected taxa

Loss / Gain	Per species	Values dataset 1 (FS)	Values dataset 2 (GTA)	Difference (in %)	Difference in value
	Bonitos nei	463	664,823	143,490.28	664,360
	Tunas nei	27,390	638,674	2,231.75	611,284
	Others	14,579,905	16,591,098	13.79	2,011,192
Loss					
	Rays, stingrays, mantas nei	3,349,905	660	-99.98	-3,349,245
	Skipjack tuna	100,198,153	98,364,215	-1.83	-1,833,938
	Swordfish	5,015,175	4,353,926	-13.18	-661,249
	Kawakawa	4,288,368	3,856,577	-10.07	-431,791
	Requiem sharks nei	449,155	48,776	-89.14	-400,380
	Others	30,017,646	27,560,431	-8.19	-2,457,216

A more detailed examination by species reveals significant discrepancies between the two datasets (Table III). For example, yellowfin tuna and bigeye tuna show higher total catches in GTA (+2.57% and +7.36% respectively), whereas skipjack tuna and swordfish present lower estimates compared to FishStat (-1.83% and -13.18%). Some taxa grouped under generic categories such as “Bonitos nei” or “Tunas nei” exhibit particularly large increases in GTA, suggesting possible reclassification or aggregation effects within these groups.

Table IV: Comparison of total catch (t) by Area between the Global Tuna Atlas and Fishstat database for a set of selected taxa

Loss / Gain	Area	Values dataset 1 (FS)	Values dataset 2 (GTA)	Difference (in %)	Difference in value
Gain					
	Indian Ocean	58,543,797	61,531,160	5.10	2,987,363
	Atlantic Ocean	35,395,843	35,929,359	1.51	533,516
	Mediterranean and Black Sea	3,881,728	4,266,803	9.92	385,075
Loss					
	Pacific Ocean	143,443,207	138,541,062	-3.42	-4,902,145

When aggregated by ocean basin, the overall distribution of catches shows moderate differences between the two datasets (Table IV). The Indian Ocean displays the largest positive deviation, with total catches about 5.1% higher in GTA than in FishStat, followed by the Mediterranean and Black Sea (+9.9%), though the latter represents a smaller share of global totals. The Atlantic Ocean shows near equivalence between datasets (+1.5%), indicating relatively consistent reporting. In contrast, the Pacific Ocean is the only basin showing lower totals in GTA (-2.6%), yet it is also the largest contributor to global tuna and tuna-like catches. This implies that small percentage differences in the Pacific have a disproportionate influence on global totals. Overall, these results suggest that, despite local discrepancies, compensating differences between ocean basins largely smooth out at the global scale.

Table V: Comparison of total catch (t) by fishing fleet between the Global Tuna Atlas and Fishstat database for a set of selected taxa

Loss / Gain	Per fishing fleet	Values dataset 1 (FS)	Values dataset 2 (GTA)	Difference (in %)	Difference in value
Gain					
	Other nei	2,750,113	6,113,059	122.28	3,362,946
	United States of America	15,111,553	15,882,261	5.10	770,708
	Oman	1,627,533	1,986,866	22.08	359,333
	Sri Lanka	4,471,308	4,737,107	5.94	265,799
	Curaçao	319,588	572,231	79.05	252,643
	Others	41,464,345	43,909,534	5.90	2,445,190
Loss					
	Indonesia	24,611,290	22,978,388	-6.63	-1,632,901
	Japan	40,963,164	39,756,844	-2.94	-1,206,319
	Peru	1,108,921	548,931	-50.50	-559,990
	Malaysia	1,309,017	778,972	-40.49	-530,044
	El Salvador	765,410	364,983	-52.32	-400,427
	Others	106,426,241	102,637,029	-3.56	-3,789,212

Similarly, when comparing the distribution of catches across fishing fleets, the detected differences are substantial (Table V). While some fleets, such as those of the United States, Oman, and Sri Lanka, report higher catches in GTA, others, notably Indonesia, Japan, and Malaysia, show marked decreases. A notable example concerns the Indonesian fleet, whose total catches are about 6.6% lower in GTA than in FishStat.This difference appears to stem from historical revisions to Indonesia's Indian Ocean catch data, which have been integrated into the GTA dataset but are not yet reflected in FishStatJ.

Such temporal lags in data harmonization between sources can explain part of the residual discrepancies observed at the fleet level. This highlights the dynamic nature of reporting workflows between national authorities, RFMOs, and FAO, and suggests that discrepancies may often arise from asynchronous updates rather than conflicting information.

Discussion

At the global level, total catches appear broadly consistent between the two datasets, with differences smaller than 0.1%. However, this apparent agreement conceals significant internal discrepancies across species, fleets, and regions. These differences likely result from the distinct data integration processes and levels of aggregation used by each system, as well as from variations in data provenance, whether the figures derive directly from national submissions, regional estimates, or FAO harmonized compilations.

In FishStat, data originate from official national submissions reviewed and adjusted by FAO when necessary, sometimes incorporating "best scientific estimates" from regional bodies to improve global consistency. In contrast, the Global Tuna Atlas (GTA) directly integrates the datasets produced by tuna RFMOs, which already represent the best validated scientific estimates endorsed by their respective scientific committees. GTA then harmonizes these data structurally but does not modify their quantitative content.

Given these methodological differences, identifying a single authoritative dataset is neither feasible nor desirable. Instead, a case-by-case comparison, by country, species, and ocean, is required to understand where and why divergences occur. Each system has complementary strengths:

1. FishStat offers the most comprehensive and institutionally harmonized view of global fisheries, with broader taxonomic coverage;
2. GTA provides finer thematic and methodological consistency within tuna fisheries, with full transparency and reproducibility of processing steps.

Understanding how these complementary data flows interact will be essential for future harmonization work between FAO and the RFMOs.

Finally, the preliminary filtering analysis (Figure: 1) showed that several species recorded in FishStat are absent or only partially represented in GTA. This incomplete taxonomic coverage reflects differences in reporting and aggregation rules. Explicitly documenting, within metadata or as an additional field, the oceanic coverage and potential gaps for each species in the GTA would greatly enhance comparability, interoperability and help users better interpret spatial completeness.

Regional Focus: IOTC Area (FAO 51 & 57)

After assessing global patterns, this section focuses on the Indian Ocean Tuna Commission (IOTC) area to examine whether the general trends observed at the global scale also hold regionally ; namely, a broad similarity between aggregated datasets but significant differences when disaggregated by specific dimensions such as species or fleet.

Definition of the harmonized comparison scope

This regional focus on the Indian Ocean is particularly relevant because both datasets share approximately the same geographical coverage (FAO areas 51 and 57) and the same temporal extent (1950-2023), which allows for a straightforward spatial and temporal comparison. Both datasets also report the same measurement type, corresponding to Nominal Landings, ensuring conceptual consistency in the comparison of catch values. The analysis therefore uses the same subset of 32 common species identified in the global comparison, ensuring consistency in taxonomic scope across scales.

Before applying any filtering, it is worth noting that, when restricted to FAO areas 51 and 57, the FishStat dataset still includes a greater number of species and fleets than GTA (appendix: Table XIV). This observation is consistent with the global comparison presented earlier and confirms that the broader taxonomic scope of FishStat persists even within a single regional focus. For the subsequent analyses, this difference is acknowledged but not further detailed, as it primarily reflects the structural design of the two datasets rather than a regional anomaly.

Nominal landings values comparison

At the aggregated level, the total catches recorded in GTA are slightly higher than those in FishStat, with a difference of about 5.1% (Table IV). This discrepancy, although moderate, indicates that the datasets are broadly consistent in magnitude. However, such global differences may conceal higher variations when disaggregated by species, fleet, or year.

The temporal evolution of total catches in both datasets shows very similar trajectories throughout the period 1950-2023, with parallel growth patterns reflecting the progressive expansion of tuna fisheries in the Indian Ocean. Overall, GTA values are slightly higher than those of FishStat for most years, except in 2012 and 2013, when the two curves briefly intersect.

This pattern indicates that the higher total catches observed in GTA do not result from a systematic annual difference but rather from small cumulative deviations spread across the time series. In other words, although the overall mag-

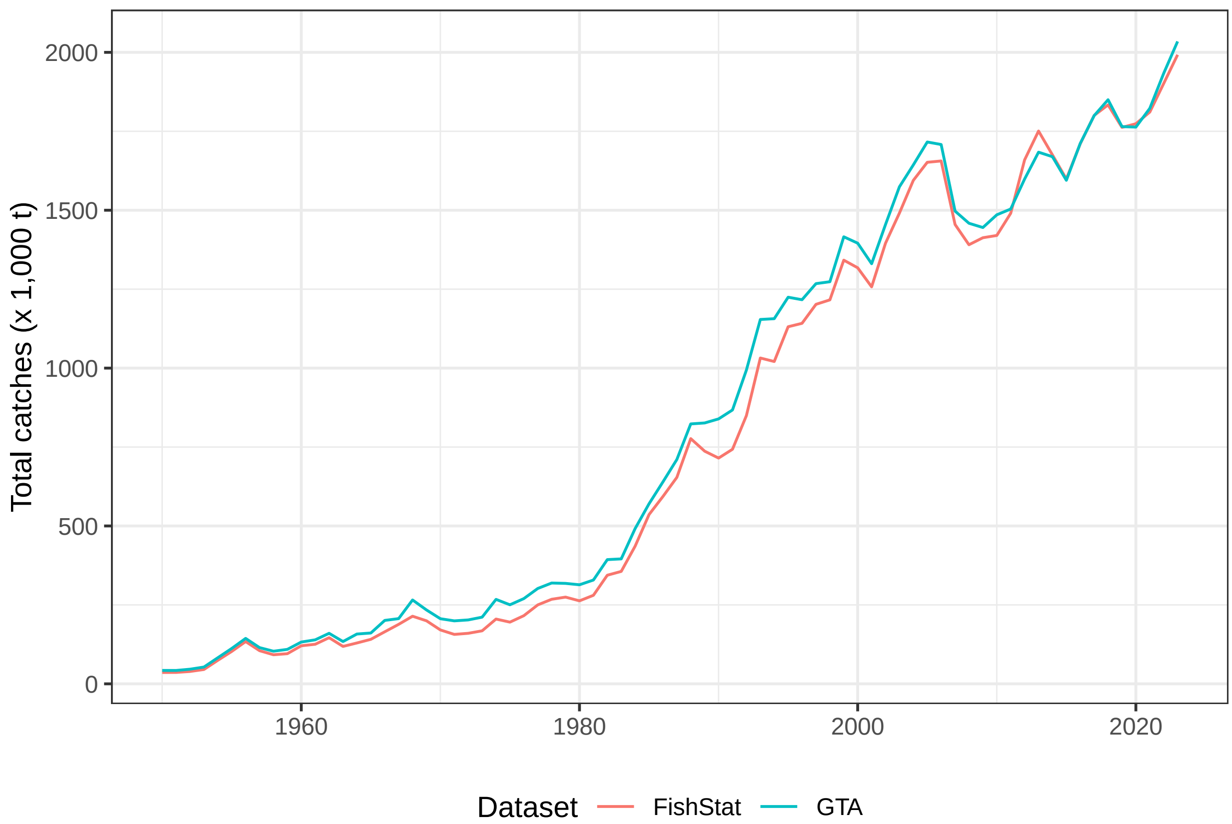


Figure 3: Comparison of the annual time series of catch (t) of tuna and tuna-like species in the Indian Ocean between for FishStat and GTA datasets for the period 1950-2023

nitude is greater in GTA, both datasets reproduce nearly identical interannual trends, suggesting that they are largely driven by the same underlying dynamics.

To better understand the origin of these differences, the analysis is further disaggregated by species in the following section, in order to determine whether the observed discrepancies are evenly distributed across taxa or concentrated in specific groups.

Species-level analysis

Table VI: Comparison of total catch (t) by species between the Global Tuna Atlas and Fishstat database for a set of selected taxa

Loss / Gain	Per species	Values dataset 1 (FS)	Values dataset 2 (GTA)	Difference (in %)	Difference in value
Gain					
	Frigate tuna	1,379,089	2,598,842	88.45	1,219,753
	Yellowfin tuna	14,853,943	15,720,603	5.83	866,661
	Skipjack tuna	16,966,329	17,394,926	2.53	428,597
	Albacore	1,623,943	1,897,446	16.84	273,503
	Bullet tuna	321,562	592,809	84.35	271,247
	Narrow-barred Spanish mackerel	4,981,372	5,193,418	4.26	212,046
	Swordfish	1,045,941	1,173,298	12.18	127,357
	Longtail tuna	3,975,399	4,078,920	2.60	103,521
	Others	2,084,928	2,455,731	17.78	370,803
Loss					
	Kawakawa	4,288,368	3,856,577	-10.07	-431,791
	Blue shark	641,860	343,154	-46.54	-298,706
	Thresher sharks nei	113,173	7,746	-93.16	-105,427
	Bigeye tuna	4,728,067	4,686,290	-0.88	-41,777
	Streaked seerfish	14,857	10,511	-29.25	-4,346
	Indo-Pacific king mackerel	1,524,961	1,520,887	-0.27	-4,074

At the species level, discrepancies between GTA and FishStat are not evenly distributed. When focusing on the 16 IOTC “primary species” (Indian Ocean Tuna Commission (IOTC) 2013), most show comparable or slightly higher total catches in GTA compared to FishStat. This group includes the main tuna species (yellowfin, skipjack, albacore, bigeye), as well as swordfish, marlin, and mackerel species, which together account for the majority of catches in the Indian Ocean. Among them, only kawakawa (-10.1%) and, to a lesser extent, bigeye tuna (-0.9%) exhibit slightly lower totals in GTA, while albacore shows a more notable increase (+16.8%). yellowfin and skipjack tunas, together with swordfish, display close agreement between datasets, with slightly higher catches in GTA, further confirming the strong consistency observed for the main target species in the Indian Ocean. In contrast, the largest discrepancies are observed for non-priority taxa such as blue shark (-46.5%) and thresher sharks nei (-93.2%), which likely reflect differences in the treatment of bycatch or taxonomic aggregation. These patterns suggest that while the reporting of primary target species is well harmonized between GTA and FishStat, secondary or bycatch groups remain less consistent and more sensitive to methodological or structural differences between datasets.

Notably, some of the discrepancies highlighted previously at the global scale are almost entirely explained by the IOTC region. For instance, the case of Kawakawa largely accounts for the global deficit observed for this species, as the Indian Ocean is the only basin for which complete data are available.

Additional discrepancies can also be explained by differences in taxonomic aggregation between the two datasets. For instance, in FishStat, Frigate and Bullet tunas were for many years reported jointly under the combined category FRZ (Frigate and Bullet tunas). When these categories are summed (frigate tuna + bullet tuna + FRZ), the resulting total exceeds that of GTA (approximately 3.3 million tonnes in FishStat), suggesting that the apparent difference for these species is largely due to coding rather than reporting discrepancies. This example illustrates the complementarity of the two datasets: users interested in species-level analyses may prefer GTA, while broader assessments encompassing aggregated categories may find FishStat more suitable.

Focus on major tuna and tuna-like species

To facilitate a clearer comparison of temporal trends across countries and ocean basins, the analysis now focuses on the major tuna and tuna-like species - albacore, bigeye, skipjack, yellowfin, and swordfish. These species are among the most consistently reported across all oceans and constitute the core taxa of the Global Tuna Atlas. Focusing on this subset allows a more detailed examination of inter-dataset consistency, both spatially and temporally, while minimizing noise from irregularly documented species.

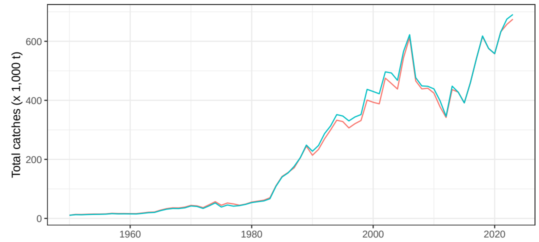
Table VII: Total captures (t) for each dataset and relative differences, for datasets filtered on major species

FishStat	GTA	Difference	Difference (in %)
39,218,223	40,872,564	1,654,341	4.22

Precision and temporal dynamics

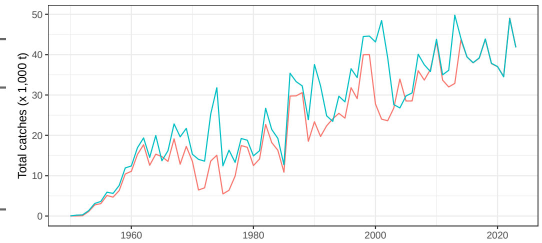
A) skipjack

Loss / Gain	Per Area	Values dataset 1 (FS)	Values dataset 2 (GTA)	Difference (in %)	Difference in value
Gain					
	Eastern Indian Ocean	4,873,711	5,050,520	3.63	176,809
	Western Indian Ocean	12,092,618	12,344,406	2.08	251,788



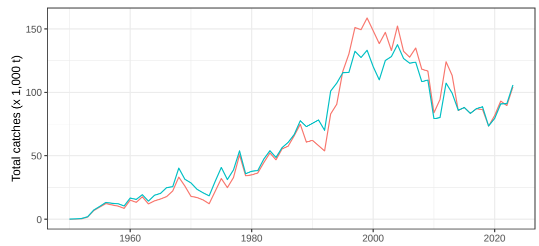
B) Albacore

Loss / Gain	Per Area	Values dataset 1 (FS)	Values dataset 2 (GTA)	Difference (in %)	Difference in value
Gain					
	Eastern Indian Ocean	638,312	820,697	28.57	182,385
	Western Indian Ocean	985,631	1,076,749	9.24	91,118



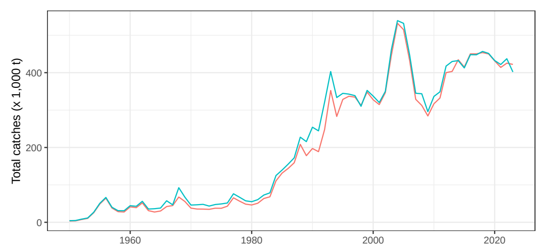
C) bigeye

Loss / Gain	Per Area	Values dataset 1 (FS)	Values dataset 2 (GTA)	Difference (in %)	Difference in value
Gain					
	Western Indian Ocean	2,987,192	3,093,946	3.57	106,755
Loss					
	Eastern Indian Ocean	1,740,875	1,592,344	-8.53	-148,531



D) yellowfin

Loss / Gain	Per Area	Values dataset 1 (FS)	Values dataset 2 (GTA)	Difference (in %)	Difference in value
Gain					
	Eastern Indian Ocean	3,269,729	3,702,455	13.23	432,726
	Western Indian Ocean	11,584,213	12,018,148	3.75	433,935



E) swordfish

Loss / Gain	Per Area	Values dataset 1 (FS)	Values dataset 2 (GTA)	Difference (in %)	Difference in value
Gain					
	Eastern Indian Ocean	377,985	482,037	27.53	104,052
	Western Indian Ocean	667,957	691,261	3.49	23,305

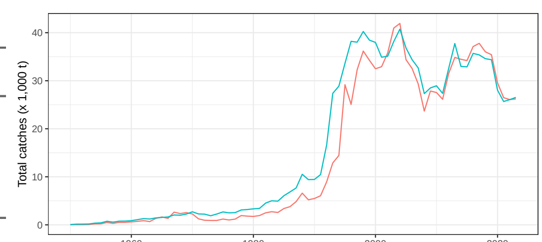


Figure 4: Evolutions of values for the dimension year and differences by ocean for 5 major species between FS (red) and GTA (Blue)

Pronounced discrepancies are observed for albacore and bigeye tuna, particularly in the western Indian Ocean, where GTA reports systematically higher values (see Figure: 4). For bigeye tuna, these differences are especially pronounced at the ocean-basin level, suggesting that variations may stem from differences in data integration or national submissions rather than from temporal inconsistency.

For yellowfin and skipjack tuna, the two datasets display almost identical trajectories over time, indicating a strong coherence in the reporting of the dominant commercial species. In contrast, swordfish shows moderate discrepancies, mostly during the 1990s and early 2000s, which may correspond to periods of partial data revision or differing treatment of gear-specific catches.

Overall, while the general trends remain comparable across datasets, the magnitude and timing of reported catches for Albacore and bigeye highlight potential inconsistencies in how these species are aggregated or reported by ocean basin.

Focus on bigeye tuna

To better understand the origin of the discrepancies observed at the aggregate level, we focus on bigeye tuna, an illustrative example where the direction of the differences between GTA and FishStat reverses between ocean areas. While not the species with the largest discrepancies, it provides a relevant case study to explore patterns that could similarly be examined for other species.

For bigeye tuna, the largest discrepancies occur in the Eastern Indian Ocean, where GTA reports substantially higher total catches than FishStat for several decades (Figure: 5). The fleet breakdown in appendix (Table XV) shows that these differences are mainly associated with catches attributed to Indonesia, which are markedly lower in FishStat. This difference is mainly associated with the Eastern Indian Ocean which shows significantly high differences in percentage Table VIII). While part of this divergence could stem from the way catches are grouped (for example, through the use of the NEI category in GTA), such reclassification alone cannot explain the overall difference, since it would not affect total basin-level values.

In contrast, in the Western Indian Ocean, the two time series show a much closer alignment, with consistent magnitudes and parallel temporal patterns across most years. However, when comparing the two basins, the situation appears more complex: the dataset that reports higher values changes depending on the ocean, and in the Eastern basin, the interannual dynamics also diverge markedly, especially after the early 2000s.

As discussed previously, the case of Indonesia remains the most significant: its lower totals in GTA likely reflect historical revisions to Indian Ocean catch data that have been integrated into GTA but are not yet reflected in FishStat.

Table VIII: Major differences break down by fishing_fleet_label between FS (Dataset 1) and GTA (Dataset 2) datasets, for bigeye tuna catches in Eastern Indian Ocean

Loss / Gain	Per fishing fleet	Values dataset 1 (FS)	Values dataset 2 (GTA)	Difference (in %)	Difference in value
Gain					
	Other nei	49,399	193,575	291.86	144,176
	Taiwan Province of China	269,273	325,559	20.90	56,286
	Republic of Korea	69,094	74,134	7.29	5,039
	China	21,532	22,134	2.79	601
	United Republic of Tanzania	180	696	285.76	515
	Others	98,163	98,216	0.05	53

Table VIII: Major differences break down by fishing_fleet_label between FS (Dataset 1) and GTA (Dataset 2) datasets, for bigeye tuna catches in Eastern Indian Ocean

Loss / Gain	Per fishing fleet	Values dataset 1 (FS)	Values dataset 2 (GTA)	Difference (in %)	Difference in value
Loss					
	Indonesia	841,626	488,922	-41.91	-352,704
	Japan	354,899	352,132	-0.78	-2,767
	Italy	323	5	-98.36	-318
	Thailand	1,498	1,328	-11.33	-170
	Seychelles	6,827	6,757	-1.03	-70
	Others	27,964	27,911	-0.19	-53

To better assess the alignment between datasets, a new comparison was performed excluding the Indonesian data, as the associated differences are well understood and explained by historical reporting revisions. These discrepancies are expected to disappear in the next FishStat update; excluding them therefore allows a clearer examination of the remaining differences between the two datasets.

Focus on bigeye tuna without Indonesia data

When excluding the Indonesian data from the bigeye tuna series, the overall alignment between GTA and FishStat substantially improves, confirming that the observed discrepancy was largely driven by this fleet. Nevertheless, noticeable differences persist in the Western Indian Ocean, suggesting that additional factors, such as spatial aggregation or reporting updates, may still play a role. (Figure: 6)

The following results also suggest a progressive convergence between the two datasets in recent years. For several major tuna and tuna-like species -such as albacore, bigeye, and to some extent skipjack -the (see Figure: 4)) values reported by FishStat and GTA become nearly identical after 2014, indicating that both datasets may increasingly rely on similar or shared data sources.

To verify whether this convergence is systematic or species-specific, the following section focuses on the most recent years of the time series. By comparing the post-2014 period across all major tuna species, we aim to determine whether the observed alignment reflects a broader harmonization of data flows or remains limited to certain taxa or ocean basins.

Post-2014 alignment of major species

We restrict the analysis to data from 2014 onwards, since this is where the two series visually converge for all major species. On top of that, for all species the differences are lower from this year (See appendix: Figure: 8)

Many similarities are observed between 2014 and 2020. We now investigate, for the species-year combinations with small discrepancies, whether differences still remain at the fishing_fleet_label level.

Country-specific behaviour for Indian Ocean

Although yellowfin tuna and swordfish do not appear to show a clear convergence between FishStat and GTA in the most recent years, a closer examination reveals that for many countries, the reported values are in fact very similar, sometimes even identical, as they are for the other species (see Figure: 7). The apparent divergence at the global level therefore likely results from a limited number of countries that do not consistently report all species, thereby influencing the aggregated trends.

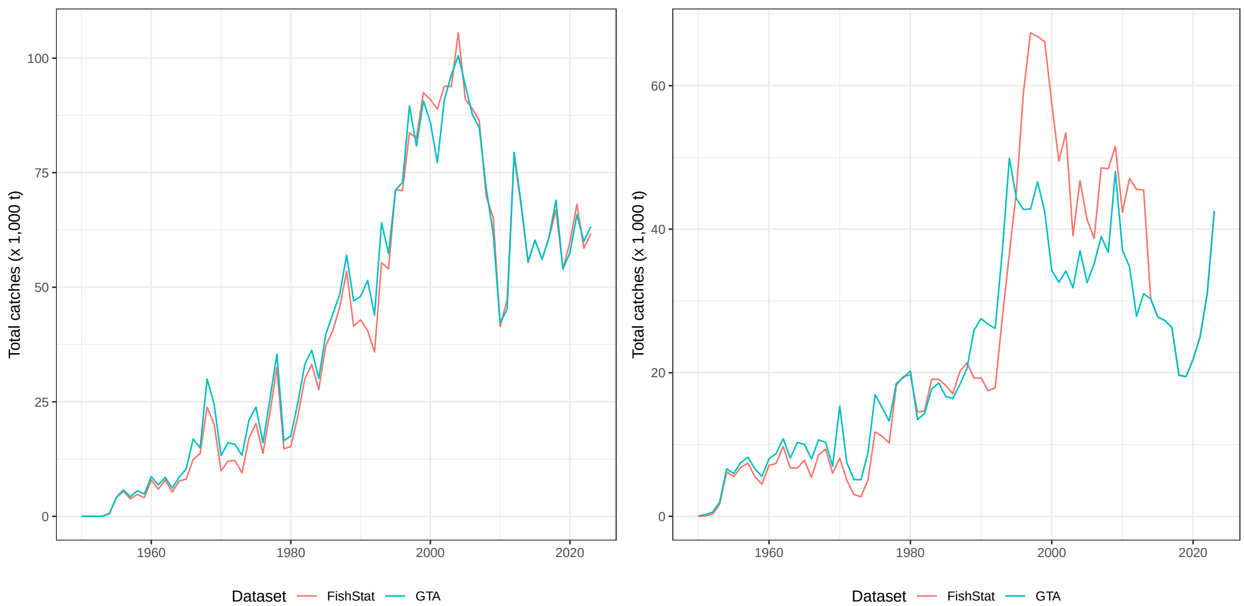


Figure 5: Comparison of Western and Eastern Indian Ocean for bigeye tuna catches

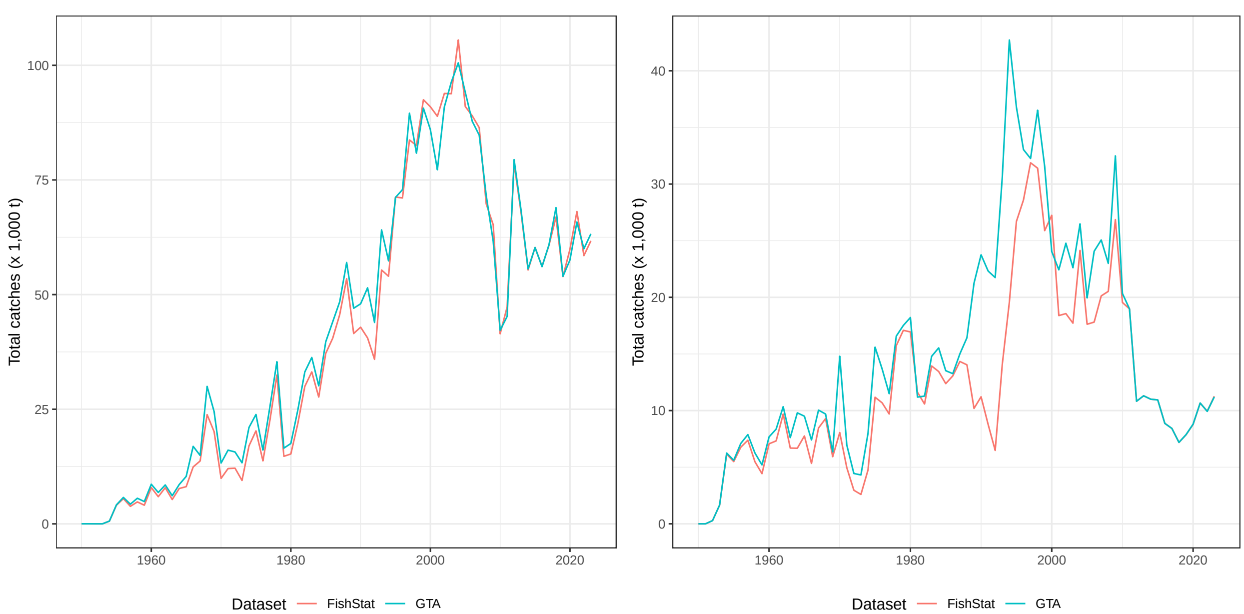


Figure 6: Comparison of Western and Eastern Indian Ocean for bigeye tuna catches, without Indonesian data

Figure 7: Country-specific differences in reported catches (GTA vs FishStat, 2012-2023)

At the country level, three broad patterns can be distinguished.

1. Countries with stable agreement: for several reporting States (e.g. Republic of Korea, Mauritius, or Madagascar), the correspondence between the two datasets remains strong and constant over time.
2. Countries with persistent differences: some countries, such as South Africa or Jordan, show systematic deviations between datasets, suggesting enduring discrepancies in reporting, conversion, or aggregation practices.
3. Countries with variable alignment: in a few cases (e.g. France, Spain, Great Britain), the relationship between datasets changes from year to year, showing periods of agreement followed by sharp divergences. These alternating patterns are the most challenging to interpret, as they may result from changes in data structuring, aggregation rules, estimation procedures, or even shifts in the data source used by one of the systems.

Overall, this analysis confirms that while convergence between GTA and FishStat is evident for many country-species combinations, differences remain and are not uniformly distributed. Understanding whether these variations stem from harmonization updates, national resubmissions, or methodological differences in data integration will require a detailed comparison of the underlying reporting flows.

Verification example: identical strata

To conclude, a final verification was carried out on a single year-species pair to confirm whether identical values between datasets correspond to complete equivalence across all dimensions. We selected albacore in 2015, a representative case where total catches are identical in FishStat and GTA.

For this year and species, the data are fully identical between FishStat and GTA, differing only by rounding errors (appendix: Table XVI). This confirms that in certain strata, both datasets rely on exactly the same source data and transformations, reinforcing the assumption of partial convergence observed in the most recent years.

Synthesis and discussion

Historical analyses have already highlighted persistent inconsistencies between FAO and RFMO tuna statistics. Garibaldi and Kebe (Garibaldi & Kebe 2005) were the first to document discrepancies between FAO and ICCAT tuna catch statistics in the Mediterranean. These differences were later confirmed at a broader scale by Justel-Rubio et al. (Justel-Rubio et al. 2016), who compared FAO and tuna RFMO datasets globally and showed that such inconsistencies persisted across regions and species despite ongoing harmonization efforts.

Although the overall difference between FAO and RFMO datasets was estimated at around 5% globally, differences exceeding 10% were found for several species or ocean areas. The main causes identified included variations in spatial delineation, flag attribution, the reporting of artisanal fisheries to FAO only, and the inclusion or omission of farming and chartered catches. These findings mirror the patterns observed in the present study, where discrepancies between FishStat and the Global Tuna Atlas are generally small in aggregate but can reach higher levels when broken down by specific taxa or basins. Together, these analyses reinforce that such divergences largely stem from structural and procedural differences in reporting and harmonization, rather than from contradictory underlying data.

It is important to note that the FAO FishStat dataset does not represent a fully independent source from the RFMOs. A substantial part of the data originates from the same regional reporting systems (IOTC, ICCAT, WCPFC, IATTC, CCSBT), complemented by national submissions and FAO adjustments to fill gaps or ensure consistency. The opposite is also true: in some cases, RFMO statistics may directly draw on FishStat estimates for non-reporting members. Moreover, discrepancies can occur when FAO incorporates recent national data or includes catches not yet reflected in RFMO datasets, such as those from non-tuna fisheries reported under broader categories. Consequently, differences between GTA (based directly on RFMO data) and FishStat may not reflect conflicting information sources but rather different stages of data harmonization.

The FAO performs additional aggregation, validation, and estimation steps that may correct for late reporting or fill missing values, leading to slightly higher totals in some cases. This aligns with findings by Heidrich et al. (2023) ((Heidrich et al. 2023)), who demonstrated that IOTC data under-represent total pelagic catches by about 30 %, suggesting that part of the discrepancies observed between GTA and FishStat could stem from incomplete reporting at the RFMO level.

Interestingly, this pattern appears to vary by taxonomic group: for major species, the GTA values are mainly higher than those in FishStat, reflecting the fact that RFMOs like IOTC tend to maintain more up-to-date and comprehensive statistics for their primary target stocks. Conversely, secondary taxa and bycatch groups are often higher in FishStat, possibly due to FAO-level adjustments or reconstructions compensating for the limited coverage of these species in RFMO datasets. This may also reflect the inclusion of catches from non-tuna fisheries reported under broader categories.

Overall, discrepancies between FishStat and RFMO-based products such as the GTA have tended to decrease since 2014, following FAO's efforts to enhance alignment with RFMO data. However, historical differences persist, as countries seldom revise older submissions when updating their national reports to tRFMO. Residual mismatches are also partly explained by differences in species or fleet mappings between FAO and RFMO classification systems, and by the use of approximate or overlapping spatial areas that are not handled in a consistent way across datasets.

In addition, the conceptual distinction between nominal landing in FishStat and nominal catches in GTA may introduce minor biases when comparing aggregated totals, as the two variables are not strictly equivalent. This inconsistency cannot be fully resolved at present, but it highlights the need for continued clarification and harmonization of definitions and reporting practices across global tuna datasets.

Acknowledgments

This work has received funding from the European Union's Horizon Europe research and innovation programme under the Blue-Cloud 2026 project (Grant agreement No 101094227).

Bibliography

Agnew DJ, Pearce J, Pramod G, Peatman T, Watson R, Beddington JR, Pitcher TJ (2009) Estimating the worldwide extent of illegal fishing. *PLoS ONE*. doi:10.1371/journal.pone.0004570

Clarke SC, McAllister MK, Milner-Gulland EJ, Kirkwood GP, Michielsens CGJ, Agnew DJ, Pikitch EK, Nakano H, Shivji MS (2006) Global estimates of shark catches using trade records from commercial markets. *Ecology Letters*. doi:10.1111/j.1461-0248.2006.00968.x

FAO (2025) Global capture production.

FAO Coordinating Working Party on Fishery Statistics (CWP) (2024b) Catch and landings - CWP handbook of fishery statistical standards.

FAO Coordinating Working Party on Fishery Statistics (CWP) (2024a) CWP global code list - catch concepts (cl_catch_concepts.csv).

FAO-FIRMS (2025) Global tuna atlas - global nominal catches (1950-2023).

Garibaldi L, Kebe P (2005) Discrepancies between the FAO and ICCAT databases for tuna catches in the mediterranean. *Collect Vol Sci Pap ICCAT*

Heidrich KN, Meeuwig JJ, Zeller D (2023) Reconstructing past fisheries catches for large pelagic species in the indian ocean. *Frontiers in Marine Science* **10**:1177872. doi:10.3389/fmars.2023.1177872

Indian Ocean Tuna Commission (IOTC) (2013) Resolution 13/03 on the recording of catch and effort data by fishing vessels in the IOTC area of competence.

Justel-Rubio A, Garibaldi L, Hampton J, Maunder M (2016) A comparative study of annual tuna catches from two different sources: FAO global capture database vs tuna RFMOs statistical databases (2000–2014). Technical Report, ISSF Technical Report 2016-15. International Seafood Sustainability Foundation (ISSF), Washington, D.C., USA

Pauly D, Zeller D (2016) Catch reconstructions reveal that global marine fisheries catches are higher than reported and declining. *Nature communications*. doi:10.1038/ncomms10244

Yimin Ye MB Manuel Barange (2017) FAO's statistical databases and the sustainability of fisheries and aquaculture: Comments on pauly and zeller (2017). *Marine Policy*. doi:10.1016/j.marpol.2017.03.013

List of Figures

List of Tables

Appendix

Table IX: Extract of the Global Tuna Atlas dataset, with redundant temporal columns (year, month, quarter) omitted

source_authority	fishing_fleet	time_start	time_end	geographic_identifier	gear_type	species	fishing_mode	measurement	measurement_type	measurement_unit	measurement_processing_level	measurement_value
IOTC	ARE	1950-01-01	1950-12-31	IOTC_WEST	07.9	COM	UNK	catch	NL	t	unknown	603.47595
IOTC	ARE	1950-01-01	1950-12-31	IOTC_WEST	07.9	LOT	UNK	catch	NL	t	unknown	517.27118
IOTC	ARE	1950-01-01	1950-12-31	IOTC_WEST	09.5	COM	UNK	catch	NL	t	unknown	96.52405
IOTC	ARE	1950-01-01	1950-12-31	IOTC_WEST	09.5	LOT	UNK	catch	NL	t	unknown	82.72882
IOTC	ARE	1951-01-01	1951-12-31	IOTC_WEST	07.9	COM	UNK	catch	NL	t	unknown	603.47595
IOTC	ARE	1951-01-01	1951-12-31	IOTC_WEST	07.9	LOT	UNK	catch	NL	t	unknown	517.27118

Table X: First lines of the FS dataset

COUNTRY.UN_CODE	SPECIES.ALPHA_3_CODE	AREA.CODE	MEASURE	PERIOD	VALUE	STATUS
36	FPE	57	Q_tlw	2013	12	A
36	FPE	57	Q_tlw	2014	8	A
36	FPE	57	Q_tlw	2015	14	A
36	FPE	57	Q_tlw	2016	12	A
36	FPE	57	Q_tlw	2017	0	A
36	FPE	57	Q_tlw	2018	0	A

Table XII: Geographic correspondence between GTA management areas and FishStat (FAO) subregions

Ocean Basin	GTA Regions	FishStat Subregions	Comments
Atlantic Ocean	AT-NW, AT-NE, AT-SE, AT-SW	Atlantic Northwest, Northeast, Western Central, Eastern Central, Southwest, Southeast	FS subdivides the Atlantic more finely into six FAO areas, while GTA aggregates them into four broader RFMO regions.
Indian Ocean	IOTC_WEST, IOTC_EAST	Indian Ocean, Western; Indian Ocean, Eastern	Correspondence between GTA and FAO for both subregions.
Pacific Ocean	EPO, WCPO, WCPFC	Pacific Northwest, Northeast, Western Central, Eastern Central, Southwest, Southeast	FS distinguishes six FAO areas, whereas GTA uses three broad RFMO zones (EPO, WCPO, WCPFC) covering overlapping sectors.
Mediterranean & Black Sea	MD	Mediterranean and Black Sea	Correspondence between GTA and FAO.
Southern Ocean (Antarctic)	—	Atlantic Antarctic; Indian Ocean Antarctic; Pacific Antarctic	No direct equivalent in GTA. In FS, these zones contain marginal species (e.g. *Porbeagle*, *Rays*, *Mantas nei*). In GTA, only *Southern Bluefin Tuna (SBF)* may overlap under CCSBT, but reported at basin level (Indian or Atlantic).

Table XIV: Number of dimensions for each dataset filtered on FAO areas 51 and 57, after mapping of fishing_fleet for FS

	FishStat	GTA	Difference
Number of fishing_fleet_label	61	51	-10
Number of species_name	89	32	-57
Number of year	74	74	0

Table XI: Species retained for the comparative analysis between FishStatJ and the Global Tuna Atlas (n = 32)

species_name	species
Black marlin	BLM
Blue marlin	BUM
Narrow-barred Spanish mackerel	COM
Frigate tuna	FRI
Indo-Pacific king mackerel	GUT
Kawakawa	KAW
Longtail tuna	LOT
Striped marlin	MLS
Indo-Pacific sailfish	SFA
Albacore	ALB
Skipjack tuna	SKJ
Yellowfin tuna	YFT
Bullet tuna	BLT
Bigeye tuna	BET
Shortfin mako	SMA
Swordfish	SWO
Wahoo	WAH
Blue shark	BSH
Silky shark	FAL
Oceanic whitetip shark	OCS
Porbeagle	POR
Shortbill spearfish	SSP
Smooth hammerhead	SPZ
Great hammerhead	SPK
Bigeye thresher	BTH
Longfin mako	LMA
Scalloped hammerhead	SPL
Thresher sharks nei	THR
Streaked seerfish	STS
Giant manta	RMB
Pelagic thresher	PTH
Devil fish	RMM

Table XIII: Mapping from FishStat to GTA fishing_fleet_label

FSJ	NC
British Indian Ocean Ter	United Kingdom
US Virgin Islands	United States of America
Montenegro	Serbia and Montenegro [former]
Sudan (former)	Sudan
French Guiana	France
Tokelau	New Zealand
Greenland	Denmark
Northern Mariana Is.	United States of America
Guam	United States of America
Congo, Dem. Rep. of the	Congo
Guadeloupe	France
Martinique	France
American Samoa	United States of America
New Caledonia	France
Réunion	France
Congo	Congo, Republic of
Fiji	Fiji, Republic of
Falkland Islands (Malvinas)	Falkland Is.(Malvinas)
Micronesia (Federated States of)	Micronesia,Fed.States of
Iran (Islamic Republic of)	Iran (Islamic Rep. of)
Republic of Korea	Korea, Republic of
Other NEI	Other nei
Palestine	Palestine, Occupied Tr.
Ascension, Saint Helena and Tristan da Cunha	Saint Helena
Saint Pierre and Miquelon	France
Union of Soviet Socialist Republics [former]	Un. Sov. Soc. Rep.
Turks and Caicos Islands	Turks and Caicos Is.
Türkiye	Turkey
United Republic of Tanzania	Tanzania, United Rep. of
Saint Vincent and the Grenadines	Saint Vincent/Grenadines
Venezuela (Bolivarian Republic of)	Venezuela, Boliv Rep of
British Virgin Islands	NA
Wallis and Futuna Islands	Wallis and Futuna Is.
Yugoslavia SFR [former]	Yugoslavia SFR
Congo	Congo, Republic of
German Democratic Republic	NA
United Kingdom of Great Britain and Northern Ireland	United Kingdom
United States Virgin Islands	United States of America
Democratic Republic of the Congo	Congo, Republic of
Serbia and Montenegro [former]	Serbia and Montenegro
Mayotte	France
British Indian Ocean Territory [former]	UK (territories)
United Republic of Tanzania, Zanzibar	Tanzania, United Rep. of
Ethiopia PDR [former]	NA
Sudan [former]	Sudan
China, Hong Kong SAR	China
Northern Mariana Islands	United States of America
French Polynesia	France
Bahamas	Bahamas
Slovenia (EU)	NA
Singapore	NA

Table XV: Major differences break down by fishing_fleet_label between FS and GTA datasets, filtered on species/oceans commons pairs

Dimension	Loss / Gain	Precision	Values dataset 1	Values dataset 2	Difference (in %)	Difference in value
fishing-fleet-label						
	Gain					
		Other nei	243,754	411,570	68.85	167,815
		Taiwan Province of China	1,124,412	1,194,862	6.27	70,450
		Republic of Korea	410,148	445,017	8.50	34,869
		Japan	749,530	779,016	3.93	29,485
		Spain	400,580	402,647	0.52	2,067
		Mozambique	4,592	6,173	34.42	1,581
		China	110,443	111,289	0.77	846
		Maldives	34,340	35,070	2.13	731
		South Africa	3,901	4,142	6.19	241
		Mauritius	28,953	29,158	0.71	205
		Others	641,864	642,097	0.04	233
fishing-fleet-label						
	Loss					
		Indonesia	841,626	488,922	-41.91	-352,704
		Italy	8,135	3,045	-62.57	-5,090
		United Republic of Tanzania	10,038	7,456	-25.73	-2,583
		Iran (Islamic Republic of)	33,843	31,784	-6.08	-2,059
		India	33,167	32,960	-0.62	-207
		Thailand	14,847	14,686	-1.09	-162
		Australia	4,344	4,327	-0.40	-18
		Madagascar	2,215	2,212	-0.15	-3
		Vanuatu	339	338	-0.34	-1
		Philippines	19,333	19,333	0.00	-1
		Others	7,640	7,640	0.00	0

Table XVI: Major differences break down by fishing_fleet_label between FishStat and GTA for albacore tuna data catches for year 2015

Dimension	Loss / Gain	Precision	Values dataset 1	Values dataset 2	Difference (in %)	Difference in value
fishing-fleet-label						
	Gain					
		China	1,843	1,843	0.01	0
fishing-fleet-label						
	Loss					
		South Africa	13	12	-12.31	-2

Dimension	Loss / Gain	Precision	Values dataset 1	Values dataset 2	Difference (in %)	Difference in value
fishing-fleet-label						
	Gain					
		Japan	394,632	426,884	8.17	32,253
		Republic of Korea	341,054	370,883	8.75	29,829
		Other nei	194,355	217,995	12.16	23,640
		Taiwan Province of China	855,139	869,303	1.66	14,164
		Spain	396,205	398,271	0.52	2,066
		Mozambique	4,592	6,172	34.39	1,579
		Maldives	34,340	35,070	2.13	731
		China	88,911	89,155	0.28	245
		South Africa	3,901	4,142	6.19	241
		Seychelles	255,162	255,330	0.07	169
		Others	308,992	309,286	0.10	294
fishing-fleet-label						
	Loss					
		Italy	7,812	3,040	-61.09	-4,772
		United Republic of Tanzania	9,858	6,760	-31.43	-3,098
		Iran (Islamic Republic of)	33,747	31,688	-6.10	-2,059

Dimension	Loss / Gain	Precision	Values dataset 1	Values dataset 2	Difference (in %)	Difference in value
		India	19,955	19,781	-0.88	-175
		Kenya	1,834	1,810	-1.34	-25
		Madagascar	2,200	2,197	-0.17	-4
		Philippines	16,187	16,187	0.00	0

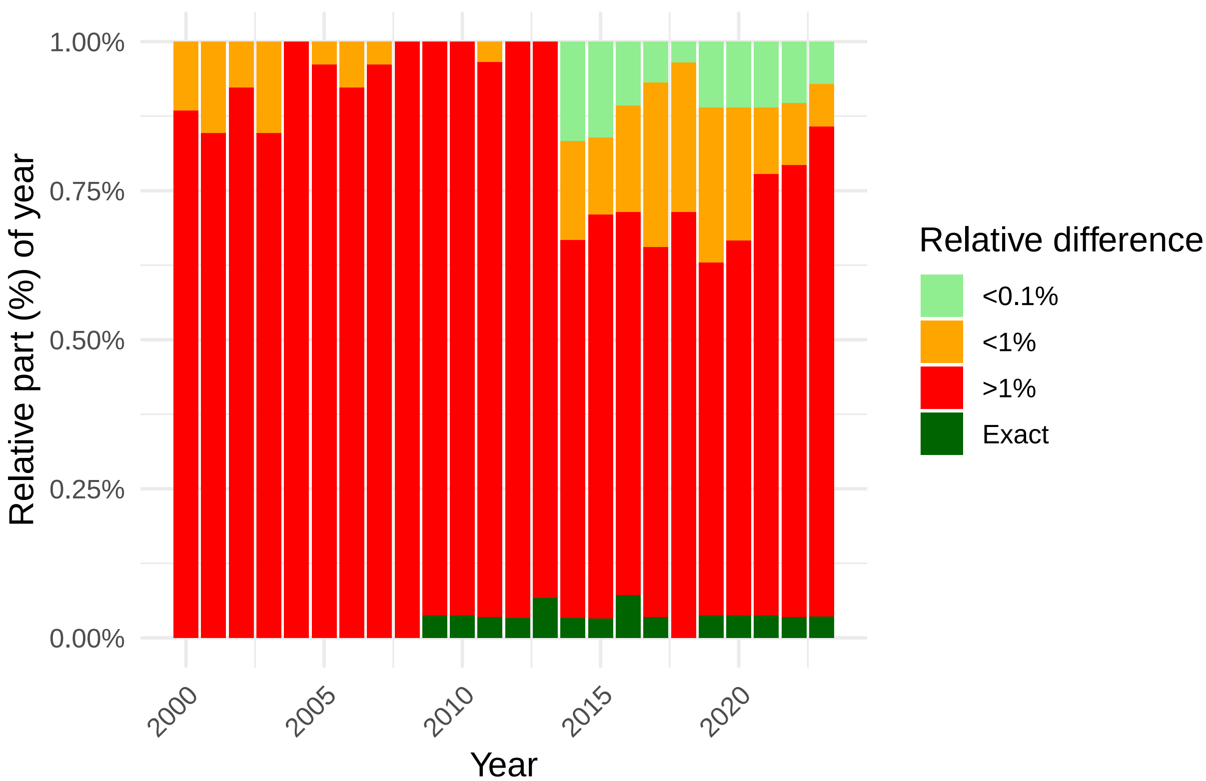


Figure 8: Comparison of species-to-species differences between GTA and FishStat datasets

Table XVIII: List of species codes, common names, and scientific names (IOTC focus).

Code	Common_name	Scientific_name
ALB	Albacore	Thunnus alalunga
BET	Bigeye tuna	Thunnus obesus
BLM	Black marlin	Istiompax indica
BLT	Bullet tuna	Auxis rochei
BUM	Blue marlin	Makaira nigricans
COM	Narrow-barred Spanish mackerel	Scomberomorus commerson
FRI	Frigate tuna	Auxis thazard
GUT	Indo-Pacific king mackerel	Scomberomorus guttatus
KAW	Kawakawa	Euthynnus affinis
LOT	Little tunny	Euthynnus alletteratus
MLS	Striped marlin	Kajikia audax
SBF	Southern bluefin tuna	Thunnus maccoyii
SFA	Indo-Pacific sailfish	Istiophorus platypterus
SKJ	Skipjack tuna	Katsuwonus pelamis
SWO	Swordfish	Xiphias gladius
YFT	Yellowfin tuna	Thunnus albacares