Catch and effort data on Soviet tuna purse seine fisheries in the Indian Ocean based on daily radio reports database

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Abstract

General description of YugNIRO database on Soviet tuna purse seine fisheries in the Indian Ocean is presented. Principal sources of the information for database were daily radio reports on operations and on catch composition of purse seiners. Vessel types, temporal schedule of its activities, total catch and data quality, database structure is described. This paper is a supplement for a fine-scale (1-degree/month) catch statistics and activities dataset, presented to IOTC Secretariat.

Introduction

Soviet purse seine fisheries for Indian Ocean tuna were started in 1963[1] but large-scale commercial operations began in 1985. Despite quite good system of fisheries statistics and data reporting which were developed within the Ministry of Fisheries of the USSR and despite availability of high resolution data for tuna purse seine operations in the Indian Ocean this data were not available for regional fisheries management organizations (IPTP and later IOTC) for a long time. This paper is a description and a supplement for a fine-scale (1-degree/month) dataset for Soviet purse seine vessels which was extracted from the database, created in YugNIRO and based on daily radioreports (RR) from purse seiners operated in the Indian Ocean from September 1985 (onset of Soviet large-scale purse seine fishing operations[2]) till January 1995 (end of the functioning the RR data reporting system).

Materials and methods:

Daily radio reports database (DB) is compiled from the obligatory daily reports of the vessels fishing in the area from 1983 until the mid-1990-ies. Daily RR were manually keyed into database within several days after receiving or from paper archives. Each RR contains data on the vessel identification number, position (usually position at 18.00, local time), fishing operations (number of sets, number of positive sets, total catch and catch by species in metric tons (t)) and type of activity, i.e.: fishing, searching, breakdown, running to/from ports, transshipment at sea, etc. These data allow to calculate fishing effort in

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[1] Stopped in late 1965.
[2] Small-scale exploratory purse seine fishing was carried out in 1983 in the western Indian Ocean and in 1984-early 1985 in the eastern Indian Ocean. High resolution data for this period are unavailable.

fishing days, days at sea, sets, positive sets and calculate days at ports during one cruise, start and end of the cruise.

Catch figures and species composition of catch are based on vessel' captains estimates. Since the RR, which formed the basis of the DB, did not include information on sets by school type, it was not possible to stratify these data by school types.

However, such analysis is possible using observers' data described by Romanov (2002) and applying seasonal ratio of sets on different school types estimated from observer's data. Data collected by observers includes more precise data on catch composition and bycatch are stored in the separate database which is described in Romanov (2002).

Daily information is available for the period from September 1985 to January 1995. By estimates of the authors, the catch reporting rate (in terms of catch volume) varied by **96-99%** during 1985-1991, decreasing to **71%** in 1992 (Romanov, 2002).

DB consists of 11092 records for 18 vessels of three types/size classes (Table 1), for 5105 sets, 3216 positive sets, and 72211 t of total catch.

Table 1.

Types of vessels operated in the Soviet/Russian purse seine tuna fisheries in the Indian Ocean in 1983-1995

Head vessel	Vessel type	GRT	LOA	CC (m^3) (range)	HP	kW
Tibiya	SST	1800	55.5	736	2275	1670
Rodina	BST	2634	85.1	1000-1300	5200	3820
Kauri	BSTS	2100	79.8	1951	4957	3645

Database structure is presented in the Appendix.

Data were aggregated by month by 1-degree latitude × longitude squares. Fishing effort was calculated in fishing days, days at sea and in sets without separation by school types. Information on types of schools which were targeted by the purse seiners were not presented in the RR. This database and this paper does not take into account reflagging of some Soviet (from 1992 – Russian) vessels to Liberian flag and the vessels' nationality is defined here by the location of their shipowners.

Results

List of vessels and periods of its operation is presented in the Table 2.

Annual catch composition by species and by types of vessels is presented in the Table 3.

Spatial distribution of the fishing effort (fishing days) and catch (t) by seasons for the whole period of operations is presented at the Fig. 1, 2.

Fine-scale aggregated catch and effort data are presented as DBF files to Secretariat of the IOTC and could be available for stock assessment analysis under requests which comply IOTC data confidentiality requirements.

References

Romanov E. V., 2002. Bycatch in the tuna purse-seine fisheries of the western Indian Ocean. Fish. Bull. Vol. 100, No 1, p. 90-105.

Table 2

List of Soviet/Russian tuna purse seiners, which included in the RR DB and periods of their operations

Year	Vessel name	Vessel type	GRT	Month											
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1985	Tiora	BST	2634									×	×		
	Rodina	BST	2634											×	×
	Tridakna	BST	2634									×	×	×	
	Midiya	SST	1800											×	×
	Strombus	SST	1800												×
1986	Tiora	BST	2634	×	×	×	×	×							
	Ivan Borzov	BST	2634										×	×	×
	Rodina	BST	2634		×	×	×	×	×	×		×	×	×	×
	Evgenij Preobrazhenskij	BST	2634									×	×	×
	Tridakna	BST	2634	×	×	×	×	×	×		×	×	×	×	×
	Melongella	SST	1800									×	×	×
	Strombus	SST	1800	×								×	×	×	×
	Turbinella	SST	1800									×	×	×	×
	Marginella	SST	1800									×	×	×	×
1987	Tiora	BST	2634		×	×	×	×							
	Ivan Borzov	BST	2634	×	×		×	×	×	×	×		×	×	×
	Rodina	BST	2634	×	×		×	×	×	×	×		×	×	×
	Evgenij Preobrazhenskij	BST	2634	×	×	×		×	×	×	×	×	×	×	×
	Tridakna	BST	2634	×		×	×	×	×	×		×	×	×	×
	Strombus	SST	1800	×											
	Turbinella	SST	1800	×	×	×									
	Marginella	SST	1800	×	×										

Year	Vessel name	Vessel type	GRT	Month											
				Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1988	Tiora	BST	2634									×	×	×	×
	Ivan Borzov	BST	2634	×	×		×	×	×	×	×		×	×	×
	Rodina	BST	2634	×											
	Evgenij Preobrazhenskij	BST	2634	×	×	×	×	×	×	×	×		×	×	×
	Tridakna	BST	2634	×		×	×	×	×	×		×			×
1989	Tiora	BST	2634	×	×	×	×	×		×	×	×	×	×	
	Ivan Borzov	BST	2634	×	×		×	×	×	×		×	×	×	×
	Evgenij Preobrazhenskij	BST	2634	×	×		×	×	×	×	×				
	Tridakna	BST	2634	×	×	×			×	×	×	×		×	×
1990	Uzhgorsk	BST	2634		×	×	×	×						×	×
	Goryachegorsk	BST	2634		×	×	×	×							
	Uvarovsk	BST	2634		×	×	×	×						×	×
	Tiora	BST	2634	×	×	×	×	×	×	×	×	×	×		
	Ivan Borzov	BST	2634		×	×	×	×		×	×	×	×	×	
	Rodina	BST	2634		×	×	×	×		×	×	×	×	×	
	Trokhus	BST	2634		×	×	×	×							
	Tridakna	BST	2634	×	×	×		×	×	×	×	×			×
	Zemlyansk	BST	2634			×	×	×							×
1991	Uzhgorsk	BST	2634	×	×										
	Goryachegorsk	BST	2634	×	×	×	×								
	Uvarovsk	BST	2634	×	×	×	×								
	Tiora	BST	2634	×	×	×	×	×		×	×	×	×	×	
	Ivan Borzov	BST	2634					×	×	×	×	×	×		
	Rodina	BST	2634		×	×	×	×		×	×	×	×	×	
	Evgenij Preobrazhenskij	BST	2634									×	×	×	
	Tridakna	BST	2634	×	×	×	×						×	×	×
	Zemlyansk	BST	2634	×	×	×	×								
	Tivela	BSTS	2100								×	×	×	×	
	Pinna	BSTS	2100											×	×
	Kauri	BSTS	2100								×	×	×	×	×

Year	Vessel name	Vessel type	GRT	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1992	Tiora	BST	2634	×	×	×	×	×							
	Ivan Borzov	BST	2634	×	×	×	×	×	×					×	×
	Rodina	BST	2634	×	×	×	×	×							
	Evgenij Preobrazhenskij	BST	2634		×	×	×								
	Tridakna	BST	2634		×	×	×	×							
	Tivela	BSTS	2100	×	×	×	×	×	×	×	×	×	×	×	×
	Pinna	BSTS	2100	×	×	×	×	×	×	×	×		×	×	×
	Kauri	BSTS	2100		×	×	×	×	×		×	×	×	×	×
1993	Tiora	BST	2634									×	×	×	×
	Ivan Borzov	BST	2634	×	×	×	×	×	×			×	×	×	×
	Rodina	BST	2634			×	×	×			×	×	×	×	×
	Evgenij Preobrazhenskij	BST	2634		×	×	×	×	×	×	×	×	×	×	×
	Tivela	BSTS	2100	×	×	×	×	×		×	×	×	×	×	×
	Pinna	BSTS	2100	×	×	×	×	×				×	×	×	
	Kauri	BSTS	2100	×	×	×	×		×	×	×	×			×
1994	Tiora	BST	2634	×	×	×	×	×			×	×	×	×	
	Ivan Borzov	BST	2634				×	×	×		×	×	×	×	
	Rodina	BST	2634				×	×	×		×	×	×	×	
	Evgenij Preobrazhenskij	BST	2634	×	×	×	×	×			×	×	×	×	
	Tridakna	BST	2634								×	×	×	×	
	Tivela	BSTS	2100	×	×	×	×	×				×	×	×	×
	Pinna	BSTS	2100	×	×	×	×	×				×	×	×	×
	Kauri	BSTS	2100	×	×	×	×	×				×	×	×	×
1995	Tivela	BSTS	2100	×	No RR data reporting										
	Pinna	BSTS	2100	×	No RR data reporting										

Table 3

**Annual catch (t) and effort data for Soviet/Russian tuna purse seiners, which
included in the RR DB by types of vessels**

Year	Vessel type	Number of vessels	Days fished	Days at sea	Total catch	YFT	SKJ	BET	ALB	FRZ	TUN
1985	BST	3	125	140	1195	473	702	0	0	0	20
	BSTS	0	0	0	0	0	0	0	0	0	0
	SST	2	52	58	325	202	123	0	0	0	0
	Total	**5**	**177**	**198**	**1520**	**675**	**825**	**0**	**0**	**0**	**20**
1986	BST	5	667	767	4459	2418	1730	179	37	61	34
	BSTS	0	0	0	0	0	0	0	0	0	0
	SST	4	202	292	539	371	163	3	0	0	2
	Total	**9**	**869**	**1059**	**4998**	**2789**	**1893**	**182**	**37**	**61**	**36**
1987	BST	5	901	1085	7652	3144	4389	4	4	96	15
	BSTS	0	0	0	0	0	0	0	0	0	0
	SST	3	95	130	410	293	111	0	0	2	4
	Total	**8**	**996**	**1215**	**8062**	**3437**	**4500**	**4**	**4**	**98**	**19**
1988	BST	5	629	771	7009	4039	2629	279	1	11	50
	BSTS	0	0	0	0	0	0	0	0	0	0
	SST	0	0	0	0	0	0	0	0	0	0
	Total	**5**	**629**	**771**	**7009**	**4039**	**2629**	**279**	**1**	**11**	**50**
1989	BST	4	679	855	5281	2988	2118	103	0	9	63
	BSTS	0	0	0	0	0	0	0	0	0	0
	SST	0	0	0	0	0	0	0	0	0	0
	Total	**4**	**679**	**855**	**5281**	**2988**	**2118**	**103**	**0**	**9**	**63**
1990	BST	9	1103	1325	6769	2428	3932	223	2	21	163
	BSTS	0	0	0	0	0	0	0	0	0	0
	SST	0	0	0	0	0	0	0	0	0	0
	Total	**9**	**1103**	**1325**	**6769**	**2428**	**3932**	**223**	**2**	**21**	**163**
1991	BST	9	849	1024	6321	2139	3950	196	0	16	20
	BSTS	3	200	227	2606	920	1629	51	0	6	0
	SST	0	0	0	0	0	0	0	0	0	0
	Total	**12**	**1049**	**1251**	**8927**	**3059**	**5579**	**247**	**0**	**22**	**20**
1992	BST	5	388	501	3057	867	1987	152	0	4	47
	BSTS	3	543	680	8066	2834	4969	145	40	17	61
	SST	0	0	0	0	0	0	0	0	0	0
	Total	**8**	**931**	**1181**	**11123**	**3701**	**6956**	**297**	**40**	**21**	**108**
1993	BST	4	582	729	3385	794	1505	82	37	1	966
	BSTS	3	475	564	6325	2992	2696	448	0	12	177
	SST	0	0	0	0	0	0	0	0	0	0
	Total	**7**	**1057**	**1293**	**9710**	**3786**	**4201**	**530**	**37**	**13**	**1143**
1994	BST	5	528	739	2603	1375	718	136	3	2	369
	BSTS	3	555	677	6209	2943	3021	134	0	8	103
	SST	0	0	0	0	0	0	0	0	0	0
	Total	**8**	**1083**	**1416**	**8812**	**4318**	**3739**	**270**	**3**	**10**	**472**
1995	BST	0	0	0	0	0	0	0	0	0	0
	BSTS	2	6	6	0	0	0	0	0	0	0
	SST	0	0	0	0	0	0	0	0	0	0
	Total	**2**	**6**	**6**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Grand total		**77**	**8579**	**10570**	**72211**	**31220**	**36372**	**2135**	**124**	**266**	**2094**

Appendix

Structure of the YugNIRO RR database for Soviet tuna purse seine fisheries in the Indian Ocean

Structure for table: E:\DATA\CS\RR\IND\CS_E.DBF
Number of data records: 11092
Date of last update: 10.09.2000
Code Page: 866

| Field	Field Name	Type	Width	Description
1	NO_SHIP	Character	4	Vessel' board number
2	CALL_LAT	Character	5	Radio call sign
3	DATA	Date	8	Date of operation
4	LAT	Character	6	Noon latitude
5	LONG	Character	7	Noon longitude
6	NO_SETS	Numeric	1	Number of sets for reporting period (24 h)
7	R_SETS	Numeric	1	Number of positive sets for reporting period (24 h)
8	CATCH	Numeric	3	Total catch for reporting period (24 h).
9	YFT	Numeric	3	Catch of yellowfin for reporting period (24 h).
10	SKJ	Numeric	3	Catch of skipjack for reporting period (24 h).
11	BET	Numeric	3	Catch of bigeye for reporting period (24 h).
12	ALB	Numeric	3	Catch of albacore for reporting period (24 h).
13	FRZ	Numeric	3	Catch of mackerel and bullet tunas for reporting period (24 h).
14	KAW	Numeric	3	Catch of kawakawa for reporting period (24 h).
15	LTA	Numeric	3	Catch of longtail tuna for reporting period (24 h).
16	TUN	Numeric	3	Catch of non-identified tunas for reporting period (24 h).
17	ACTION	Character	15	Activity of vessel
18	AREA	Character	3	Area (high-seas or EEZ)
19	DATA_REP	Character	1	Quality of data reporting (T-good, F-bad)
** Total **			79	
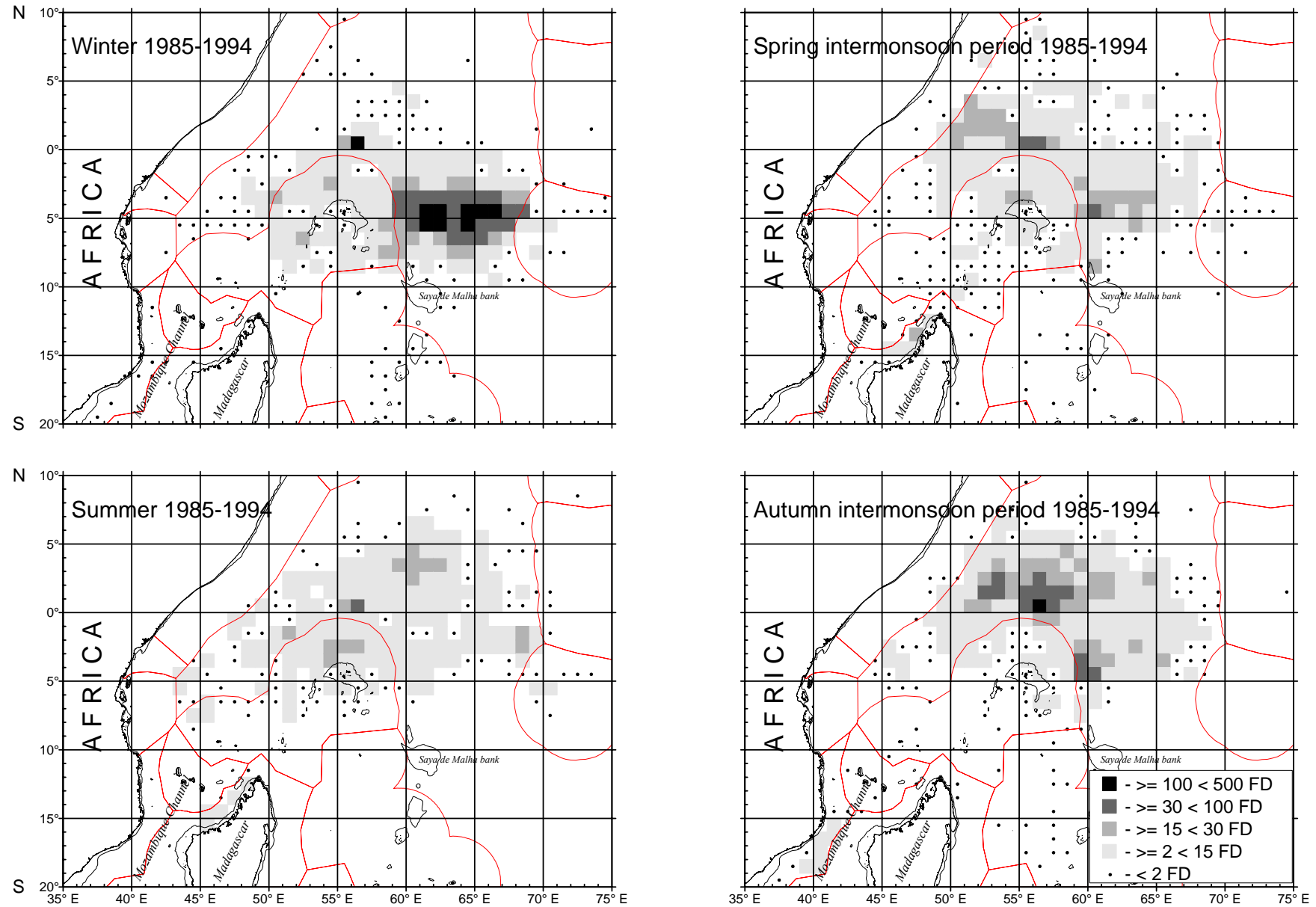
Fig. 1. Seasonal fishing effort (fishing days - FD) of Soviet/Russian/Liberian purse seine fleet in 1985-1994.
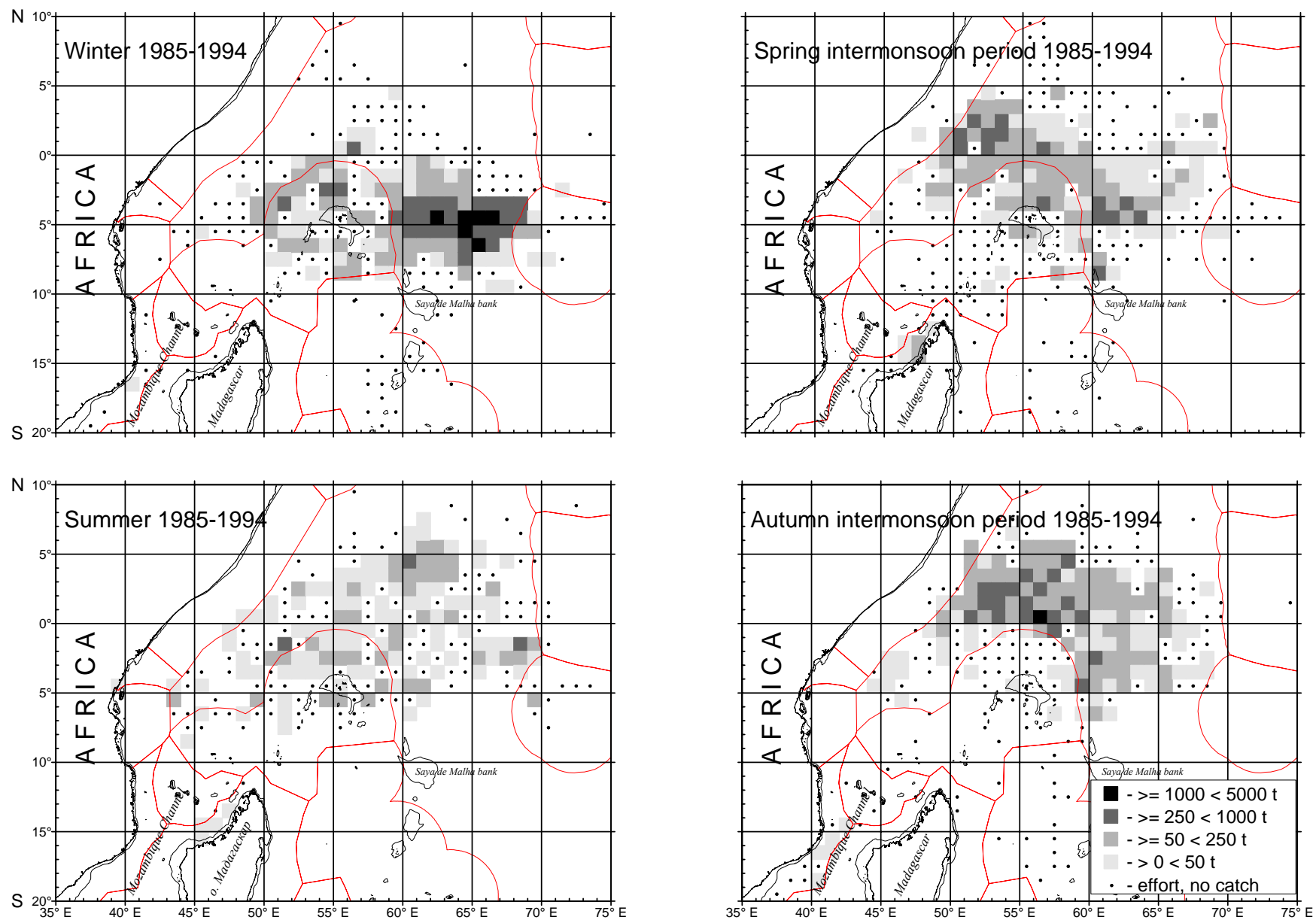
Fig. 2. Seasonal catch (metric tons - t) of Soviet/Russian/Liberian purse seine fleet in 1985-1994.