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Preliminary analysis of fishing activities of Purse Seiners fishing in the Western Indian Ocean over the period January to June 2009.

by

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Abstract

The goal of this paper is to analyze the catches and CPUE of the Purse seine fleet active in the western Indian Ocean during the first 6 months of 2009 and to compare these results with the same parameters observed during the same period of previous years. The paper also analyses the fishing zones during the first six months of 2009, given the increasing pressure by Somalian piracy.

The analyses show that one major anomaly observed in the 2009 fishery is the significant shift eastward of exploited zones. Activities on the coast of Africa and in the area NW of the Seychelles were significantly reduced in 2009. The latter is considered as an area where large yellowfin are caught in great quantities each year during the 1st quarter (spawning strata). Fishing effort and yellowfin catches were very low in this stratum in 2009.

Another important point worth noting is the significant increase in set made on FAD's associated school, which subsequently lead to a significant increase in the catches of small (< 10kg) bigeye and yellowfin tuna often in association with these floating objects.

1. Introduction

As all stock assessment work done by IOTC as well as by other tuna RFOs seldom use the most recent fishery data, it is always interesting, by definition, to incorporate in the discussion of the Stock Assessment results such data concerning the present fishing year. This is especially the case in the assessment of Indian Ocean Tropical Tunas where the purse seine activities (effort, catches by species and sizes) can easily be followed based on the analysis of their landings in Port Victoria, Seychelles, as these catches correspond to a great proportion of their activities. Furthermore, this question of follow up of the purse seine activities is of increase importance in the present context of the purse seine fishery due to the major changes in this fishery given the current security concern (Somalian pirates).

2. Materials and methods

The statistics compiled in this report are information gathered from the mandatory purse seine logbooks system for all vessels licensed to operate in the Seychelles exclusive economic Zone. Due to excellent cooperation with vessels owners, the statistic cover activities conducted throughout the Indian Ocean. The data cover most of the purse seiners active in the Western Indian Ocean during the period 2000 to 2009; however for some analysis the aggregated historical data (1984-1999) has also been used for comparison purposes. The logbook species composition has been corrected using port sampling data and the logbook data has also been raised to its corresponding landing data. These data (logbooks and species-size sampling) allow the estimation of the catch at size landed by the purse seine fishery.

Three categories of yellowfin and bigeye tuna have been considered in this analysis; YFT1; <10kg, YFT2; between 10-30kg and YFT3; >30kg.
BET1; <10kg, BET2; between 10-30kg and BET3; >30kg.

All catch statistics of the purse seine fleet have been stratified in these analysis under two main types of schools, FADs associated and Free swimming schools, as the species composition and sizes caught in these 2 fishing modes are widely different.

3. Results

3.1. Vessels active

The number of vessels active during the first semester of 2009 has decreased by 13% when compared to the same period of the previous year (figure 1). An average of 40 purse seiners was active per month in 2009 compared to an average of 46 vessels active per month in 2008. This decline is due to the departure of several vessels (French, Spanish as well as Seychelles registered) moving toward the Atlantic Ocean, an area where the purse seine CPUE trends was considered to be quite good in 2009.

3.2. Nominal effort

The total number of fishing days reported by purse seiners in the Indian Ocean during the first six months of the year has been decreasing since 2007. A 16% decrease was recorded in 2009 compared to the same period in 2008 (figure 2). This decline being due to 2 additive factors: (1) the decreasing number of purse seiners and
(2) the reduced activity of this fleet during the first semester of the year 2009 due to the extension of the operating range of Somalian Pirate.

3.3. Nominal catches

The total nominal catches recorded by purse seiners during the period under review (January to June 2009) is estimated at 111,886 Mt. This represents a small decrease of only 9% (10,479 Mt) over the catches reported for the same period of the previous year.

3.4. Species composition

Readers should note that logbook declarations have been corrected using actual species composition data collected via port sampling.

Analysis of species composition revealed significant change in the nominal catches of all three major species targeted by the purse seine fishery in the Indian Ocean throughout the period under study (figure 3).

The reported nominal catch of yellowfin tuna decreased by 43%, from 64,146 Mt in 2008 to 36,468 Mt in 2009. This is the lowest reported catch of yellowfin tuna during the first semester of the year since 1987.

On the other hand the nominal catches of skipjack tuna increased by 33% from 45,622 Mt during the first semester of 2008 to 60,450Mt in 2009.

The nominal catches of bigeye tuna increased by 31% reaching a total of 14,629Mt, the highest bigeye catches reported since the record catch of 15,103 Mt was reported during the El Niño year of 1998.

3.5. Nominal catch rate

The corresponding nominal catch rate expressed in terms of catch per fishing day is shown in figure 4. The figure revealed that despite the security issue, the overall CPUE has been on the increase since 2007, reaching an average of 19.27 Mt/fishing days in 2009

Similarly the nominal catch rate of skipjack tuna increased from 6.64Mt/ fishing day in 2008 to an average of 10.41 Mt/ fishing day in 2009. The nominal catch rate of bigeye tuna reached a record of 2.52 Mt/ fishing day, whilst that of yellowfin tuna decreased from 9.33 Mt/fishing day in 2008 to 6.28 Mt/fishing day in 2009.

3.6. School type

During the first semester of 2009, a significant increase of 53% was recorded in sets made on FAD's associated schools whilst a major decrease of 59% was recorded in sets made on free swimming schools (figure 5).

Nominal catches on FAD's associated schools increased by 67% whilst those on free swimming schools decreased by 58 %, (figure 6). The total catches (31,229 Mt) on free swimming school are the lowest recorded for that period of the year since 1987. Hence 72% of the total catches were from FAD's associated schools making this by far the highest proportion of catches on FAD's associated schools and the lowest proportion of catches on free swimming schools recorded for the first semester of the year since the beginning of the fishery.

The corresponding species composition shows a decrease of 60%, 54% and 47% in yellowfin, skipjack and bigeye tuna nominal catches on free schools respectively (figure 8) and an increase of 34%, 68% and 138% in yellowfin, skipjack and bigeye tuna catches on FADs associated schools respectively (figure 9).

The catches of Yellowfin (21,356 Mt) on free school is the lowest since the beginning of the fishery and that of skipjack (6,145 Mt) the lowest since 1991, whilst the catches of bigeye tuna (11,190 Mt) on FAD's associated school is the highest since 1998.

The nominal catch rate of 5.38 Mt/fishing day on free school is the lowest recorded since the beginning of the fishery (figure 7). Figure 10 shows that catch rate for all 3 major tropical tuna species on free school has decreased during the first semester of 2009 when compared to the same period in 2008. Meanwhile catch rates for all 3 species on FAD's associated schools has increased with a record of 1.93 Mt/ fishing day reported for bigeye tuna (figure 11).

3.7. Catches by size categories

The total nominal catches of large yellowfin (>30kg) have been on the decreased since the record catch of such size class in 2004 (100,960 Mt). During the first six months of 2009 only 21,095 Mt of such large yellowfin (YFT3) were caught, similar to what was reported in the year 2000 (figure 12). The nominal catches of yellowfin (YFT2 of 10-30kg) have also decreased (-79%) in 2009, whilst yellowfin (<10kg) has increased significantly (106%).

The total nominal catches of small bigeye (<10kg) has increased significantly from an average of 4,761 Mt over the period 2000 – 2008 to 11,667Mt in 2009, of which 95% was caught on FAD's associated school (figure 13).
Catches of large bigeye tuna (> 30kg) drop by about 3,500 Mt during the period under review in 2009 when compared to the same period of 2008.

3.8. Fishing ground exploited

Figures 14 to 16 and maps 1 to 15 show fishing zones exploited and corresponding catches reported by the purse seine fishery during recent years and for the first 6 months of 2009. These figures and maps show that the one major anomaly observed in the 2009 fishery was the low fishing activity and very low catches in the NW Seychelles area (see figure 14 and 15). Contrary to previous years when large yellowfin were caught in great quantities during the 1st quarter in this area, fishing effort and yellowfin catches were very low in this strata in 2009 (Maps 1 – 3). This area around the Seychelles has been identified (Karpinski and Hallier 1988; Stéquert et al. 2001 **in Fonteneau *et al*, 2008**) as a typical spawning strata for adult yellowfin during the first quarter of the year (Fonteneau *et al*, 2008).

It would appear that this major change in the 2009 fishing zones was mainly due to the increasing pressure of Somalian pirates and not to a deliberate change in the fishing strategies of fishermen or to an environmental anomaly as in 1998 when all the purse seine fleets moved to the Eastern Indian Ocean.

4. Discussion

There is no doubt that there has been a dramatic change in fishing pattern in the purse seine fishery during the beginning of 2009, when their reduced fishing zones probably had a significant negative impact on their catches of large yellowfin. On the contrary, although the fishing zones for FAD's have also been slightly different from the ones observed during recent years, their level of productivity has been quite good or very good (for example in the Mozambique Channel). However, the majority of the FAD associated catches tends to be reported during the last semester of each year and predominantly in the area off Somalia (map 4). It is therefore at this point of time impossible to evaluate the 2009 total catches on FADs. It is worth nothing that the recent introduction of armed personnel onboard purse seiners may result in the area of the Somalia coast becoming again accessible to the fleet during the last semester of the year. It will be necessary to analyze the 2009 data in great details in order to evaluate the exact causes of the severe 2009 decline of adult yellowfin catches and the CPUE. This CPUE decline may be mainly driven by Somalian pirates and the shrinkage of the yellowfin fishing zone, as well as the consequence of a low adult biomass of the yellowfin stock, for instance following the very large catches of the 2002-2005 period. However given the changes in both fishing zones and fishing mode it is difficult to identify the exact cause.

Likewise at this point it is not possible to evaluate the 2009 catches of juvenile bigeye tuna (<10kg). However it is worth noting that this may call for concern given that the recommendation of the IOTC Scientific Commission 2008 was that fishing effort should not increase further from the 2004 levels (IOTC-2008-SC).

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5. References

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Fonteneau A., Lucas V,, Tewkai E., Delgado A., Demarcq H. 2008., **Mesoscale exploitation of a major tuna concentrationin the Indian Ocean.** Aquatic Living Resources. **Vol-21**, 109–121.

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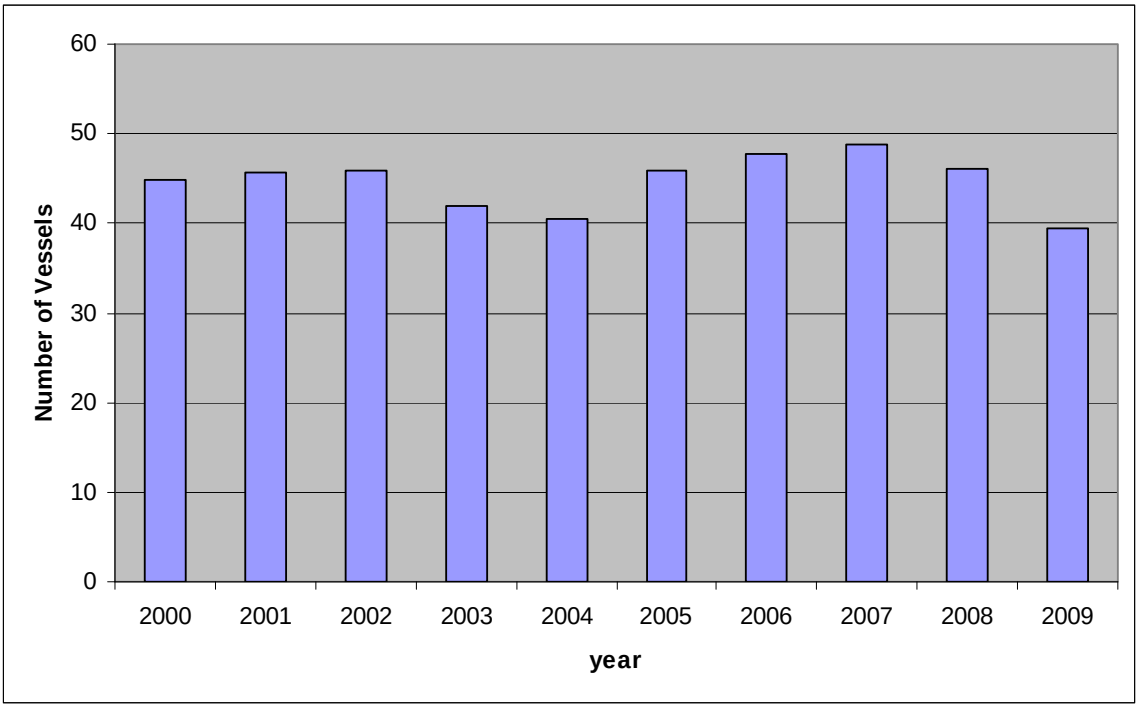

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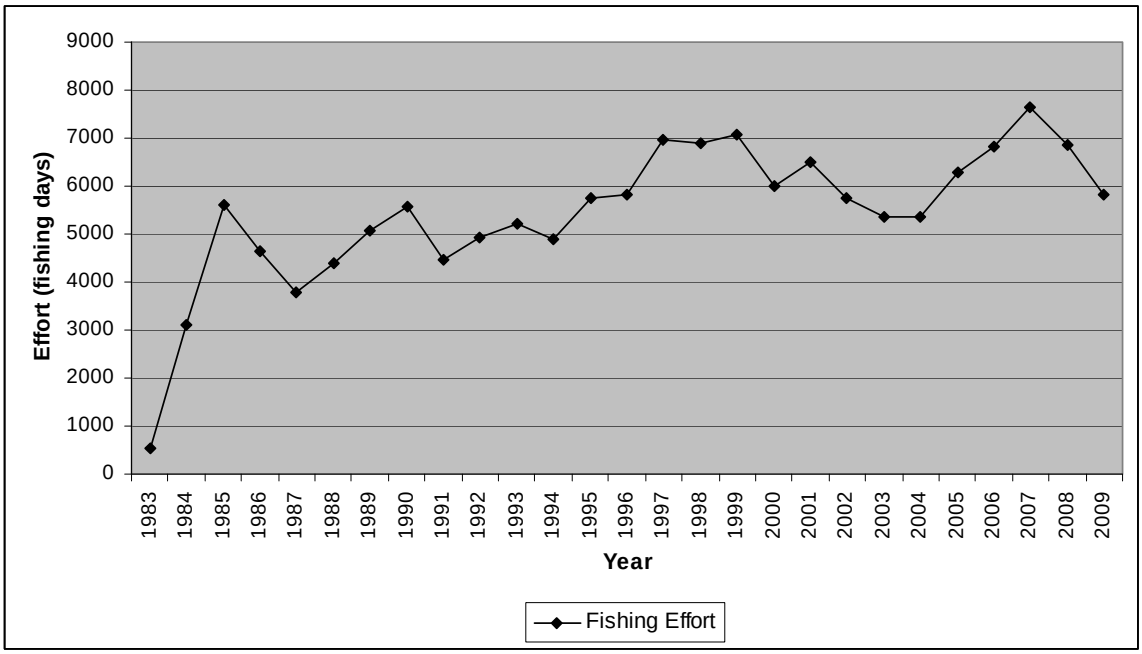

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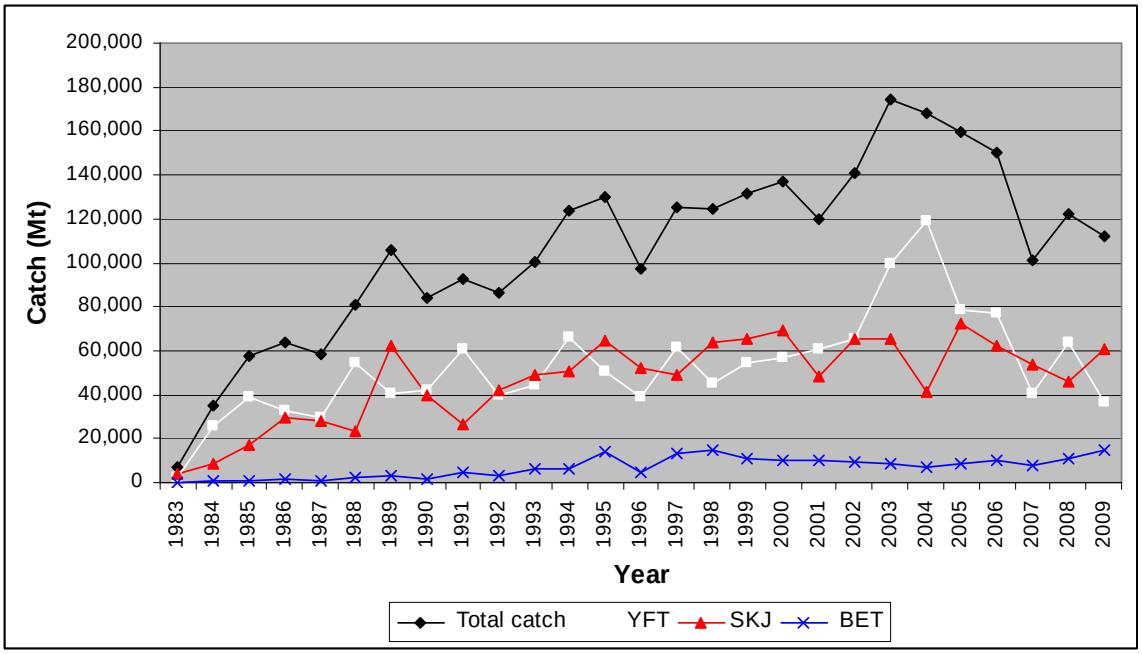

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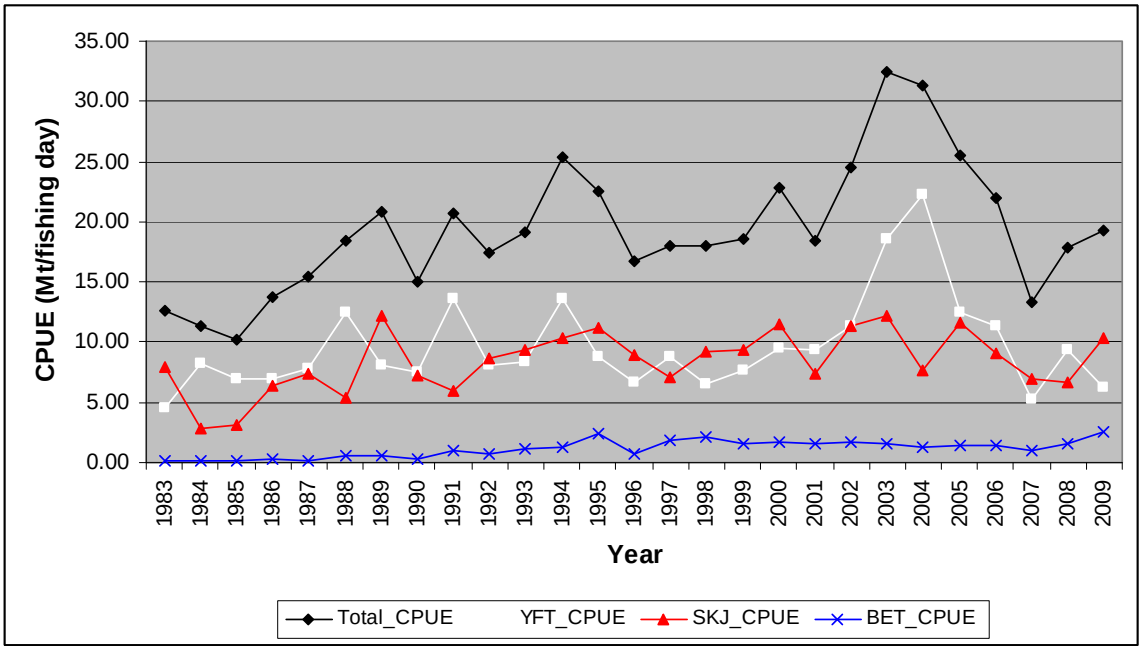

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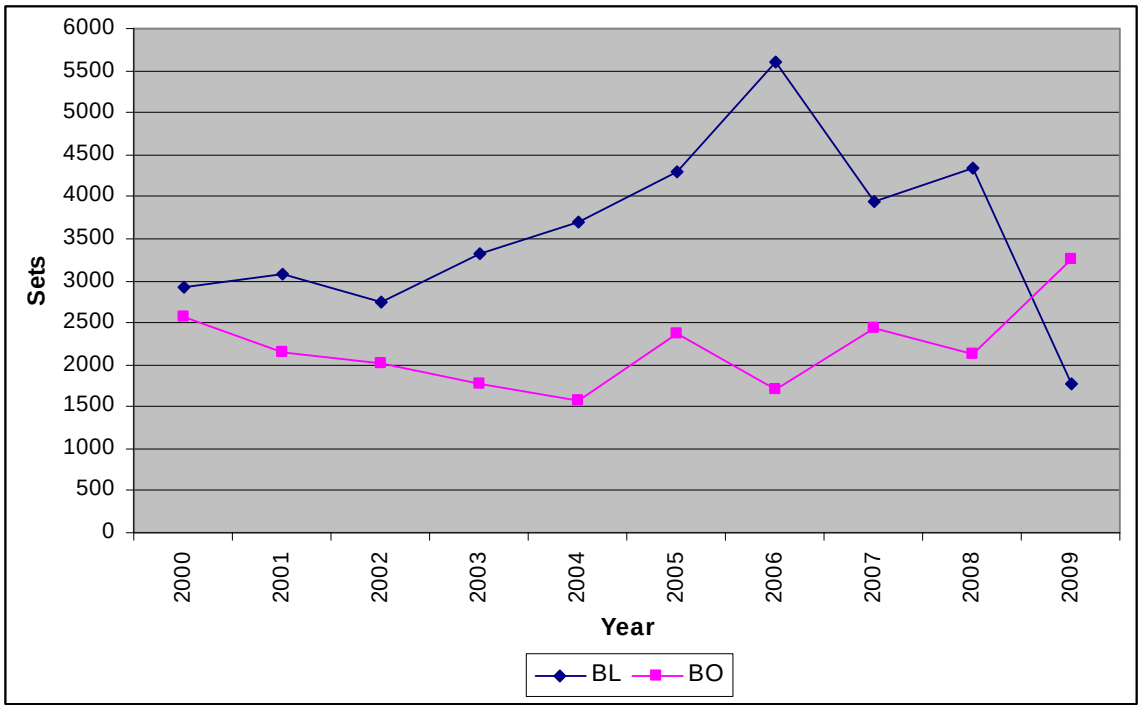

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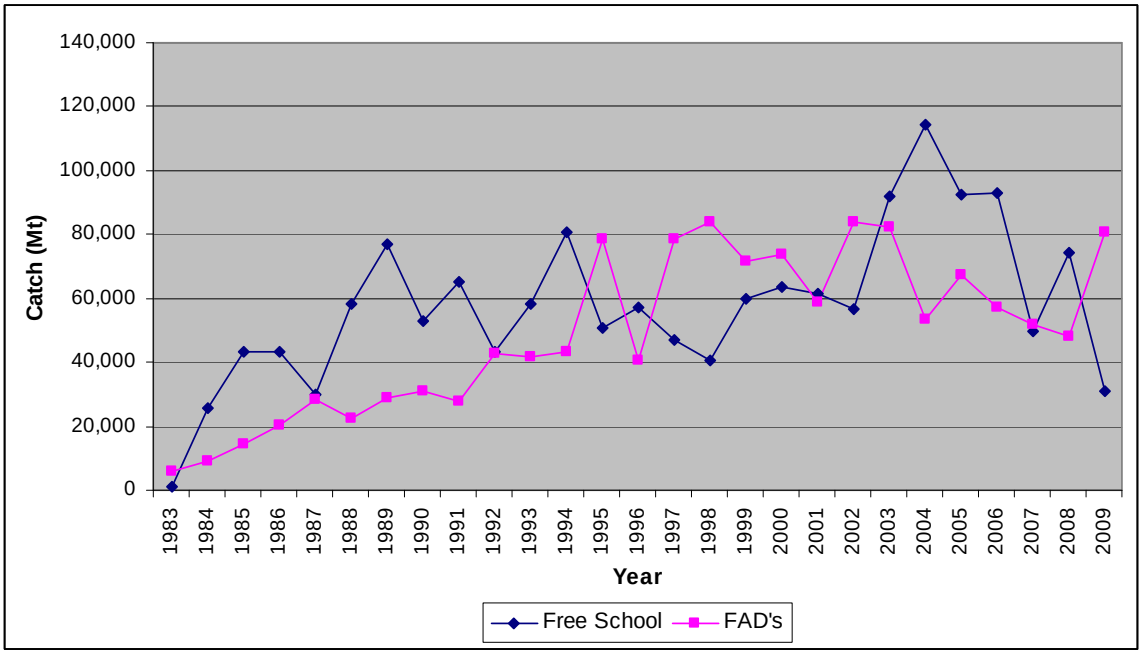

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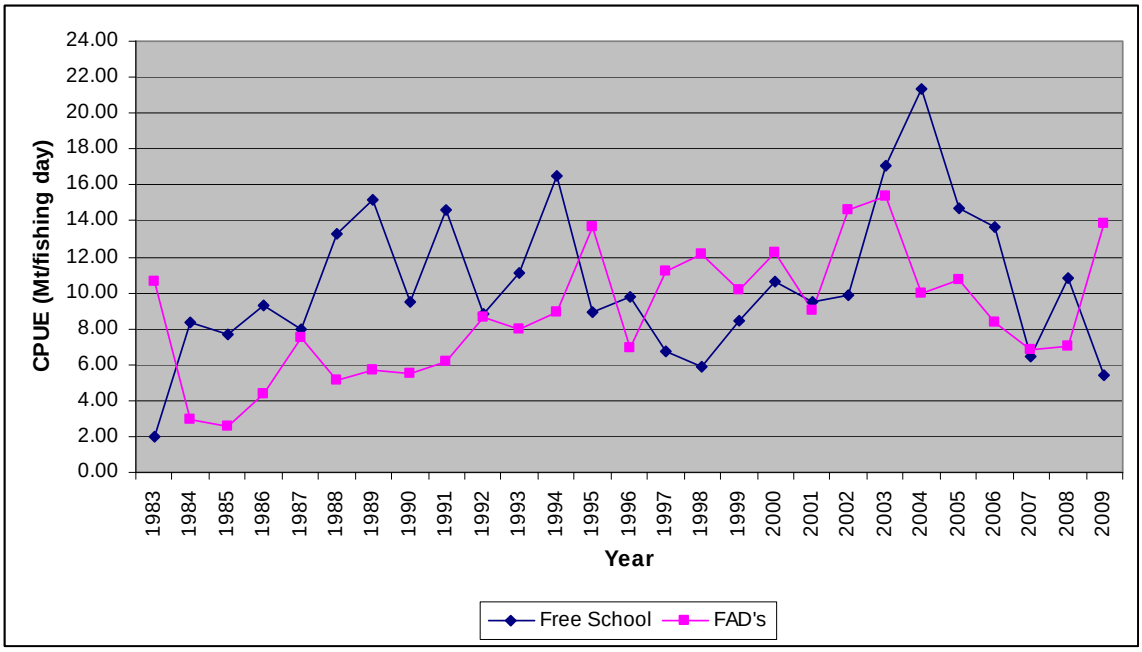

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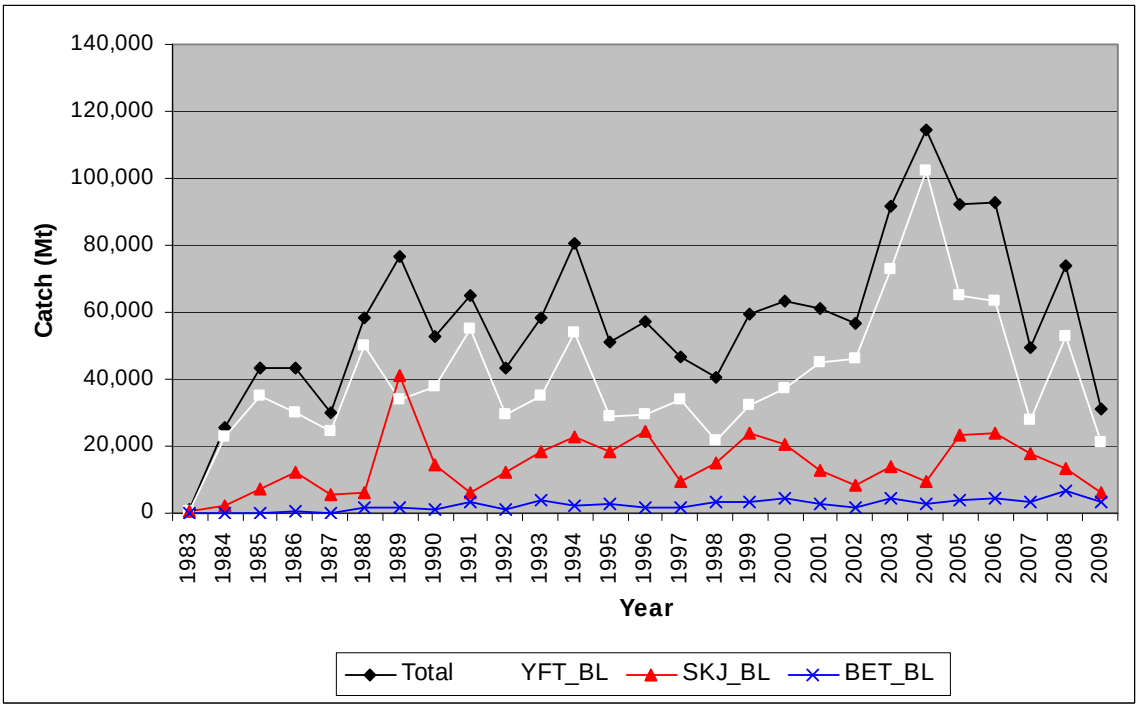

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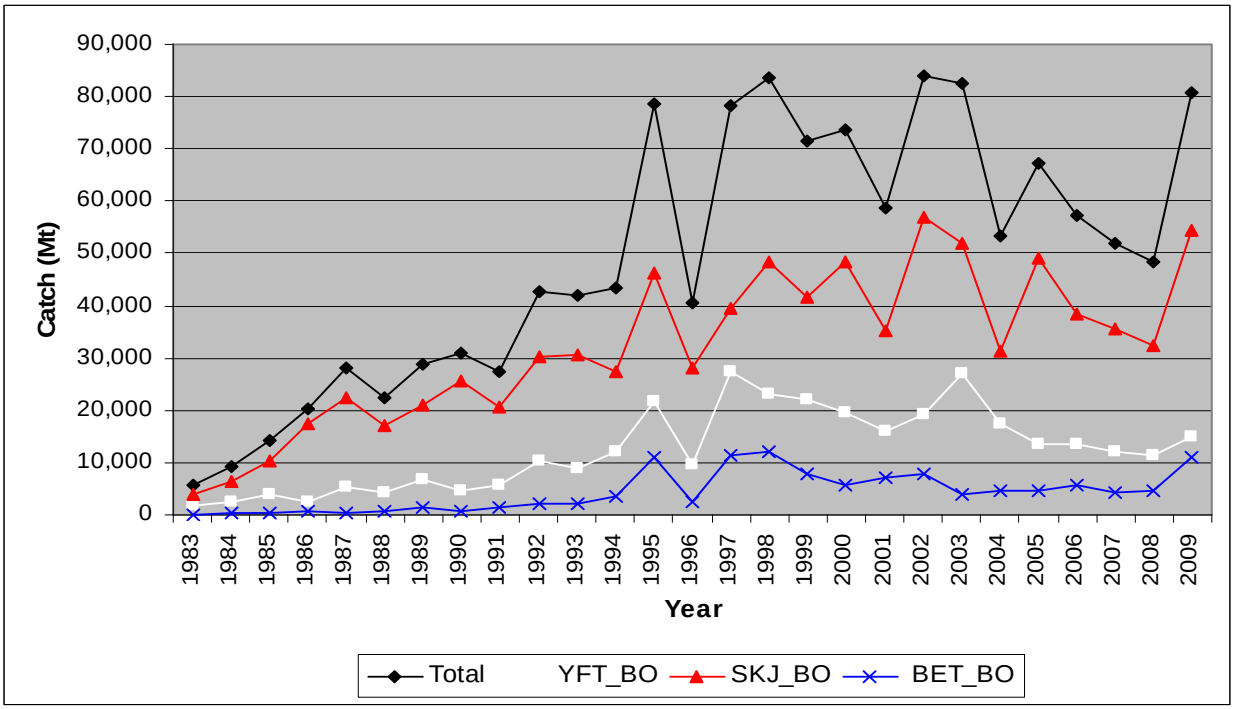

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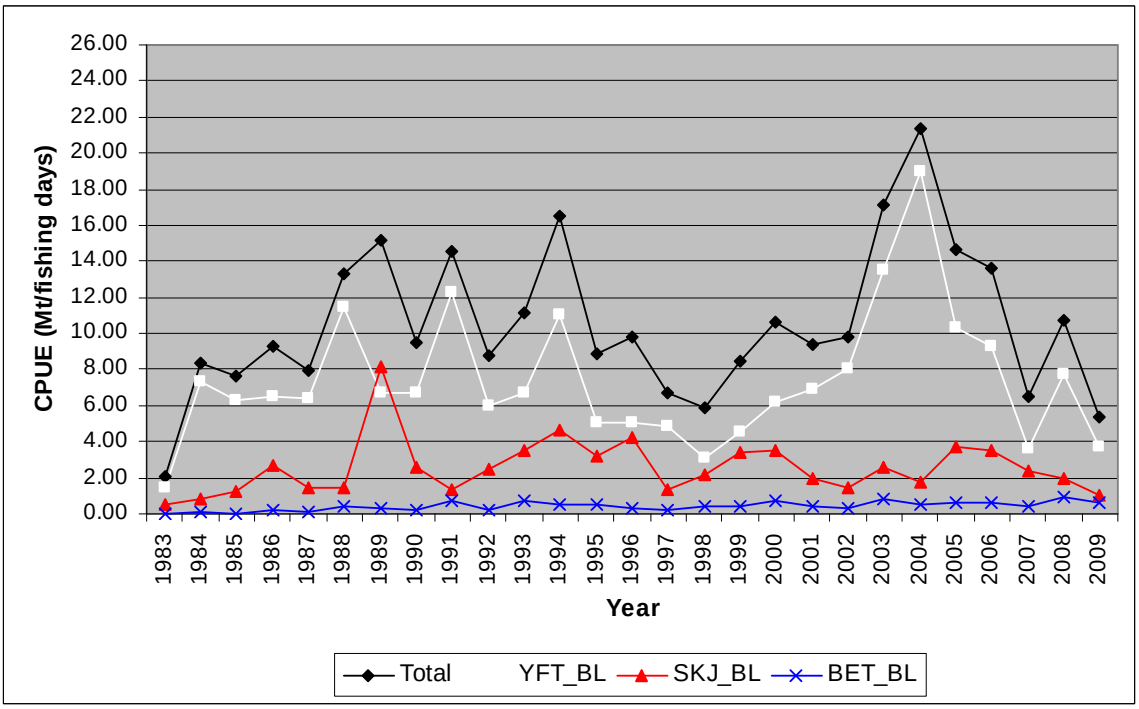

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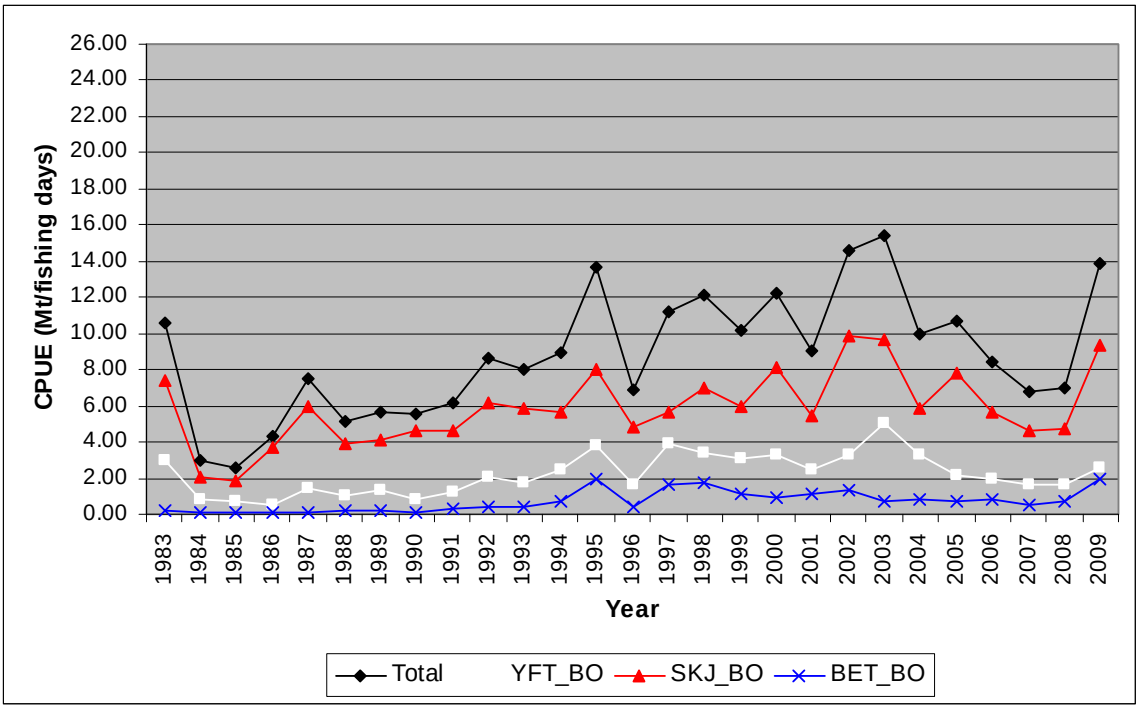

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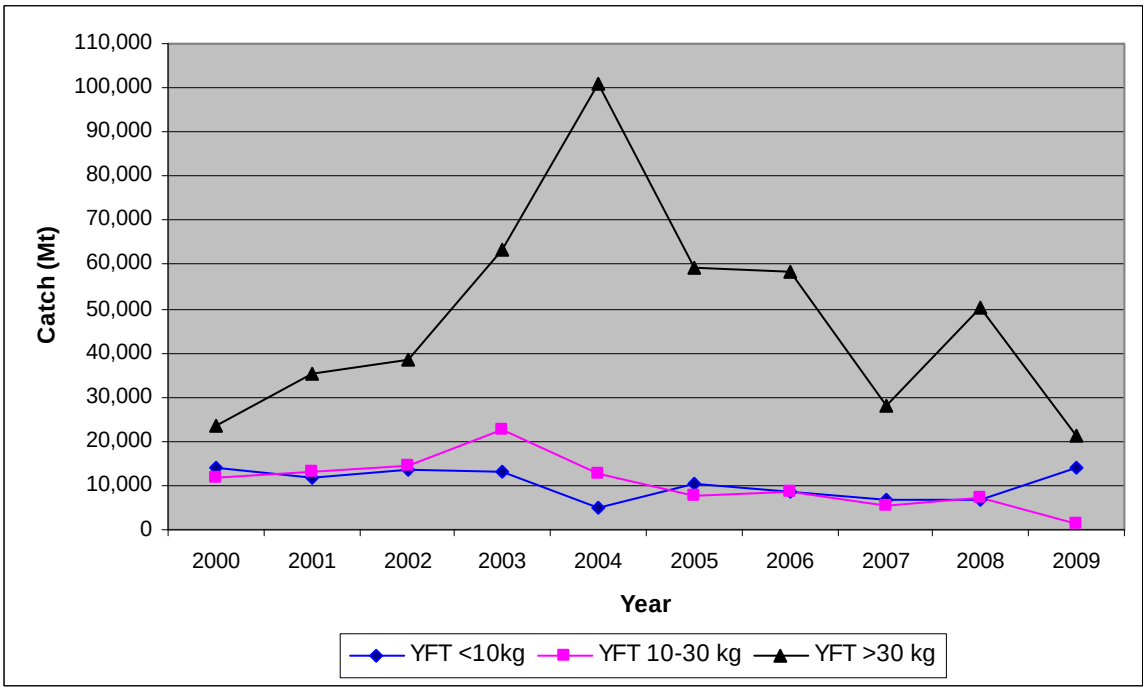

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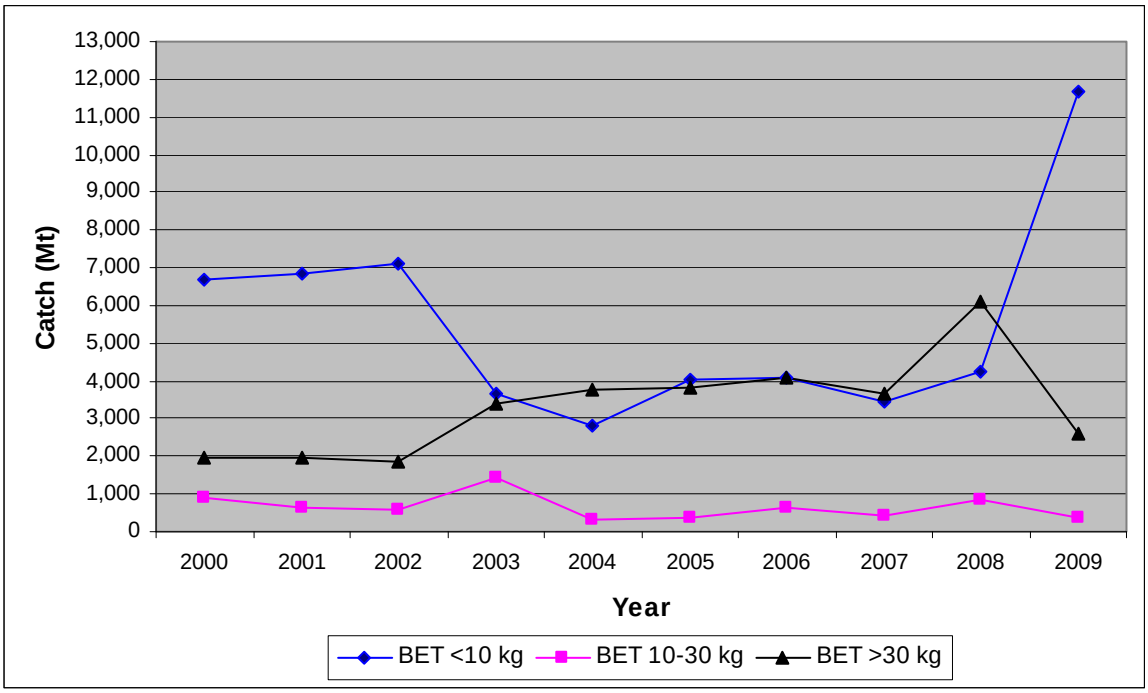

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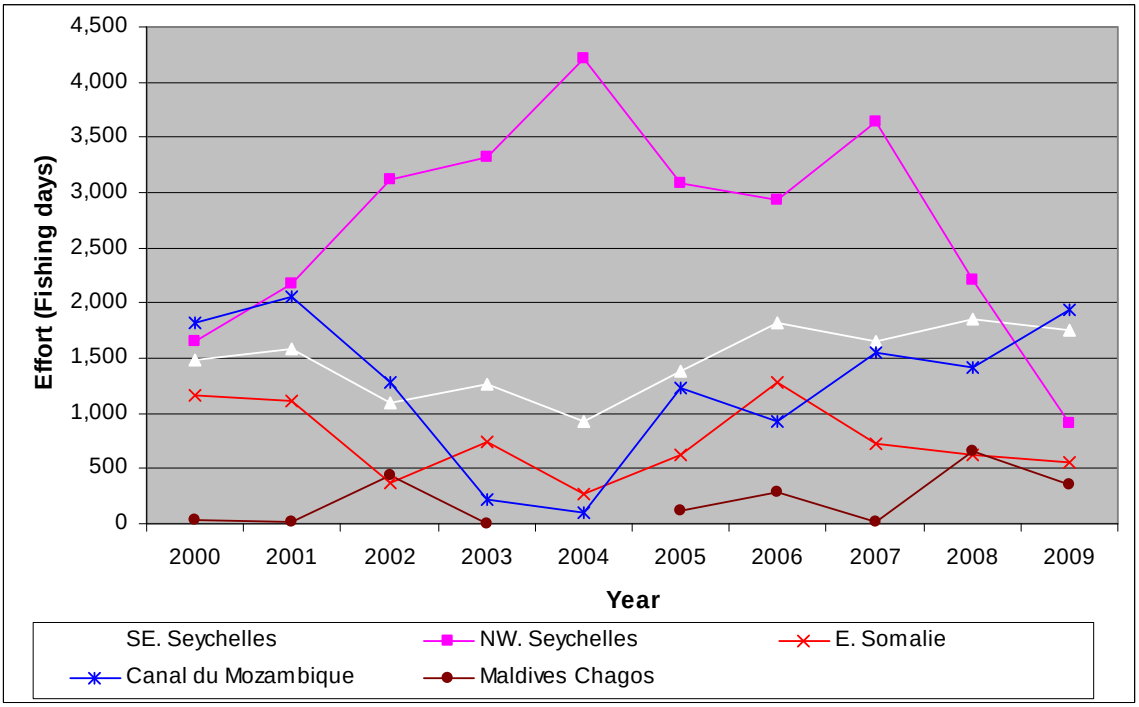

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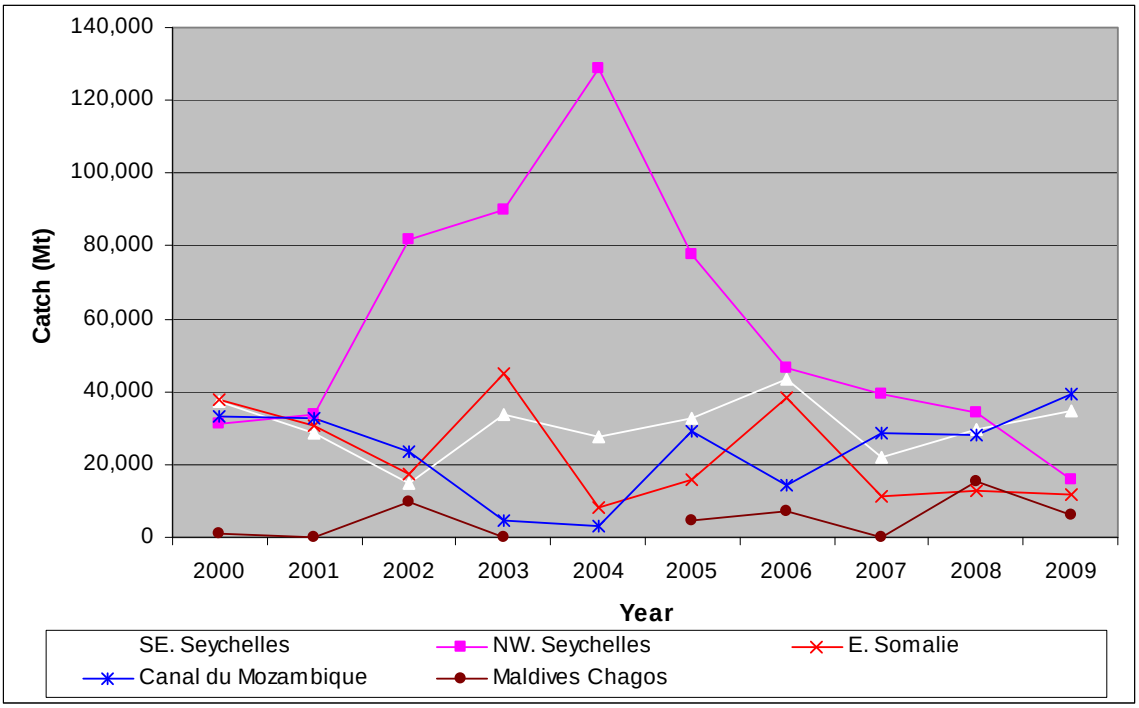

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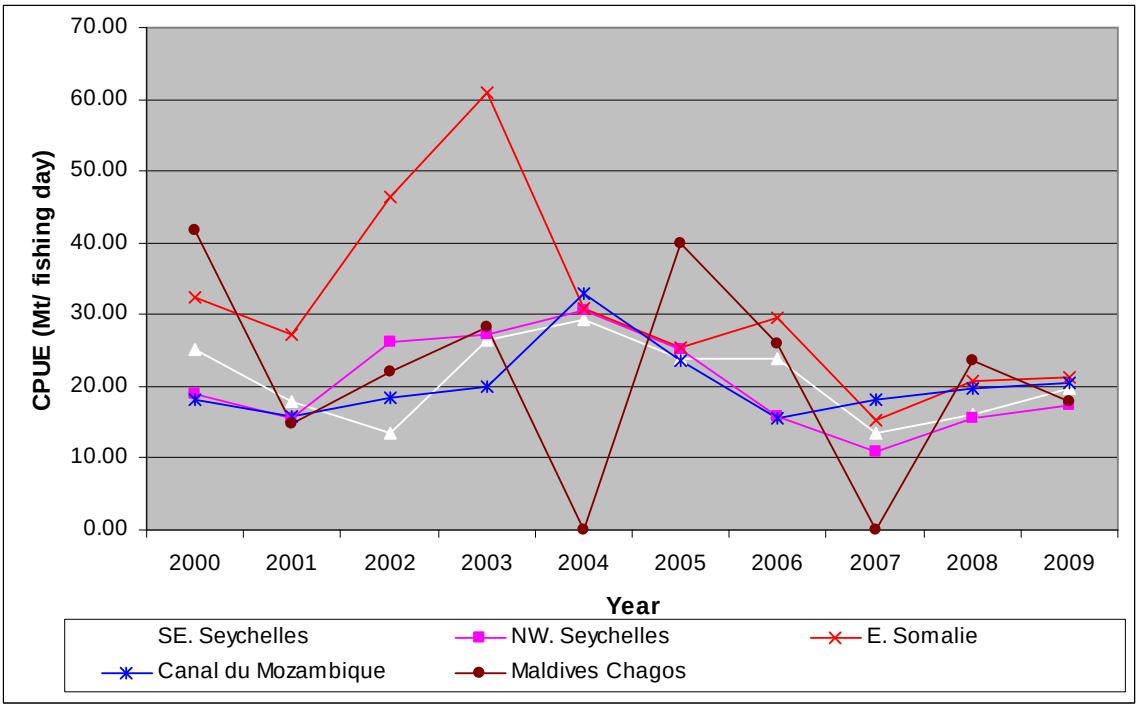

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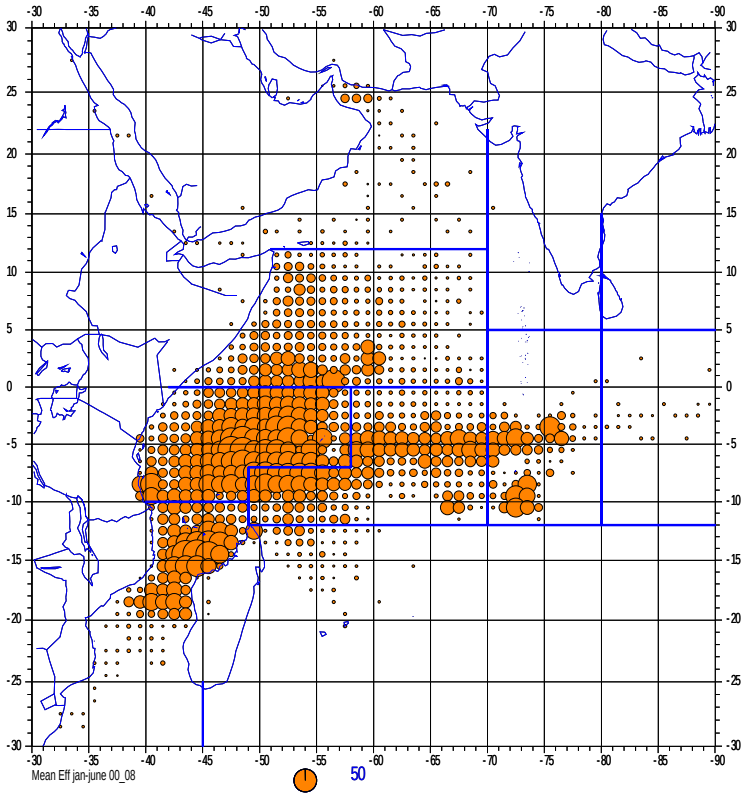

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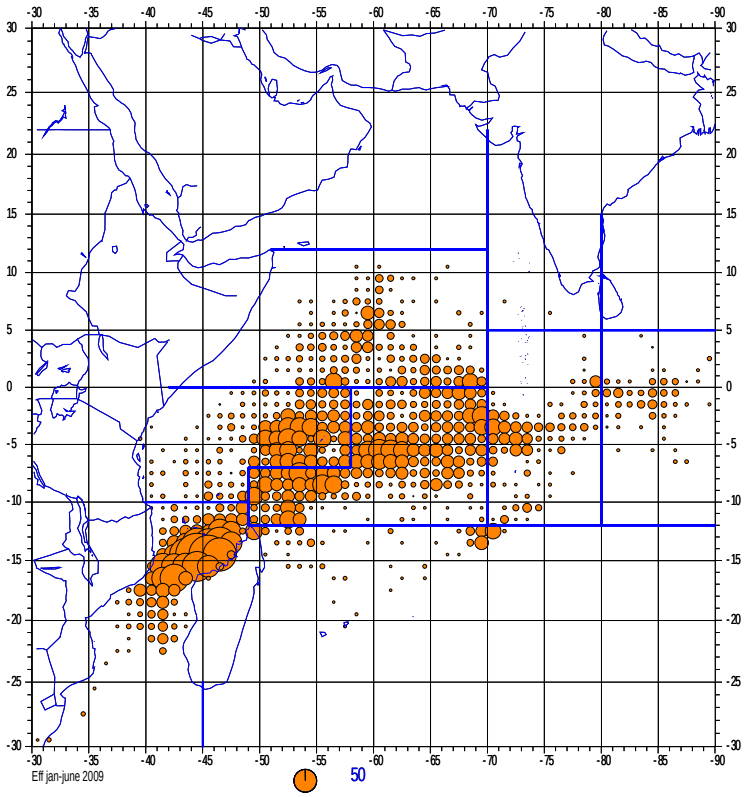

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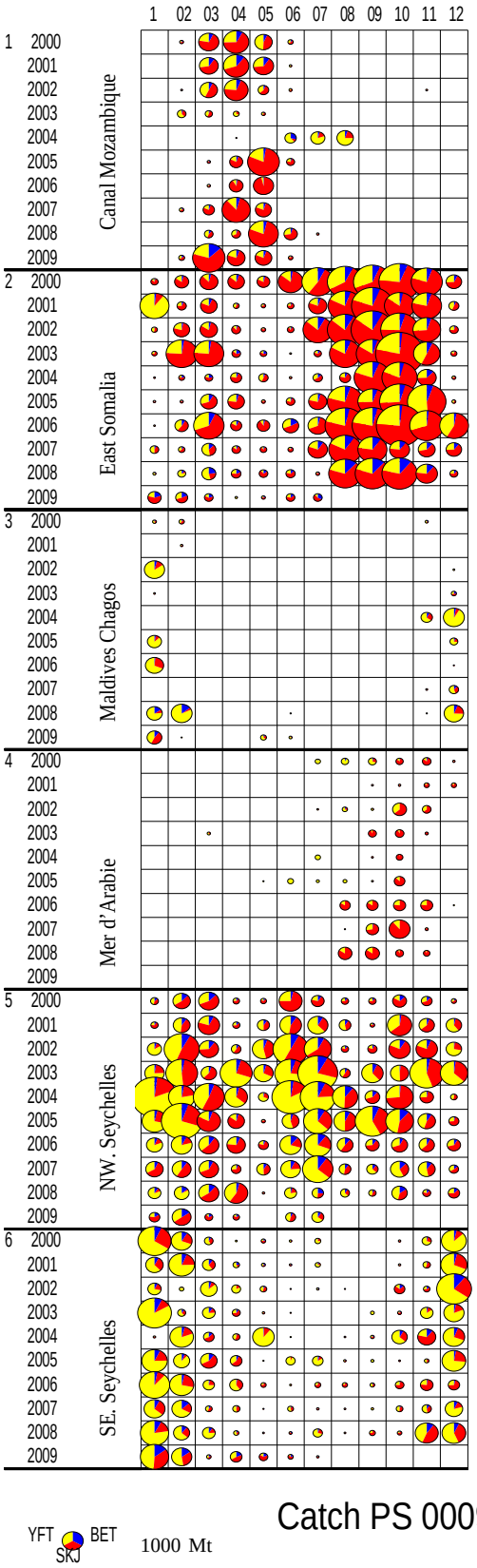

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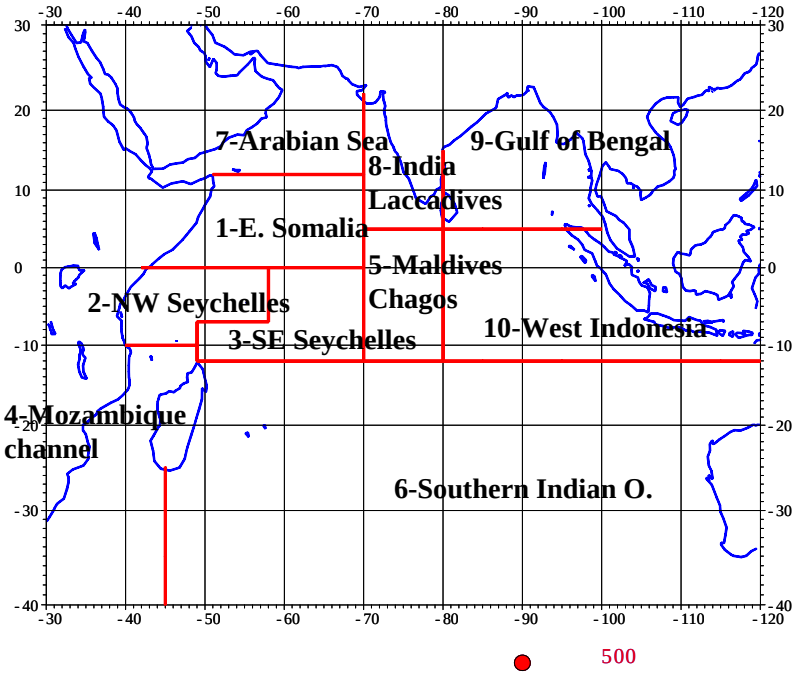

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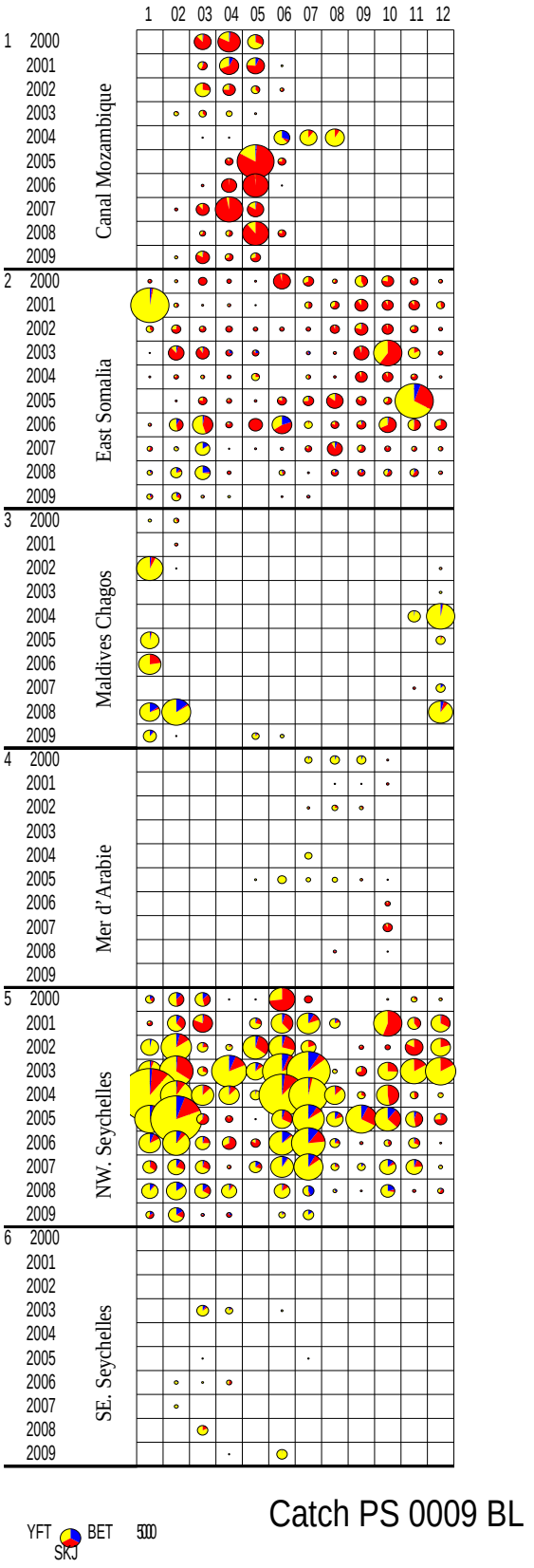

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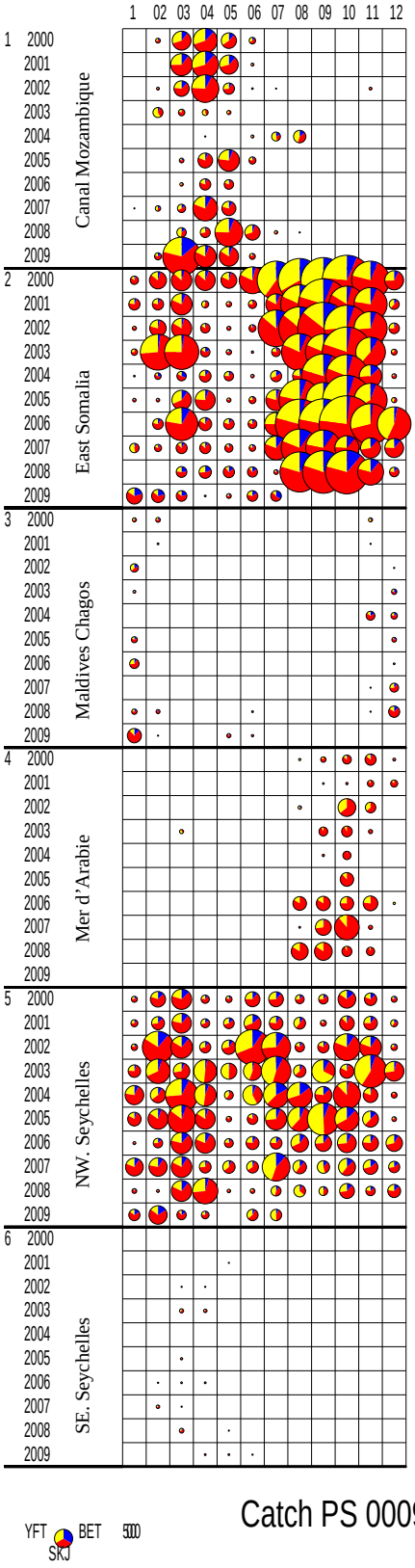

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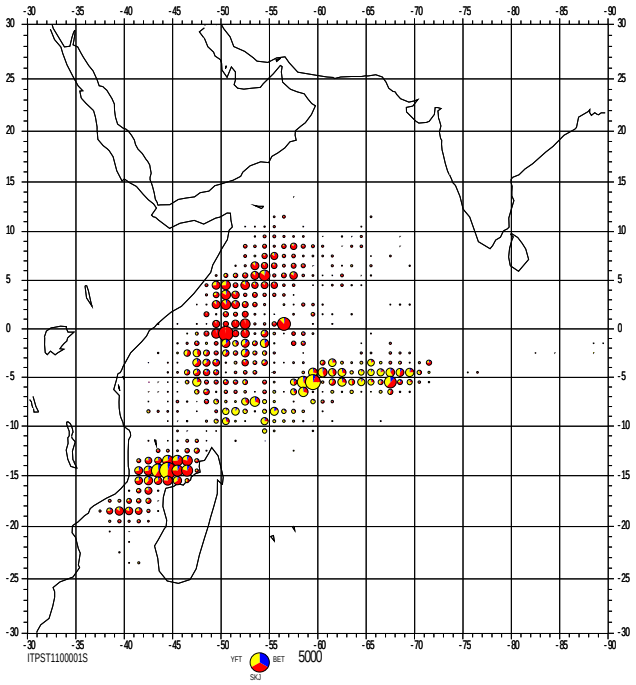

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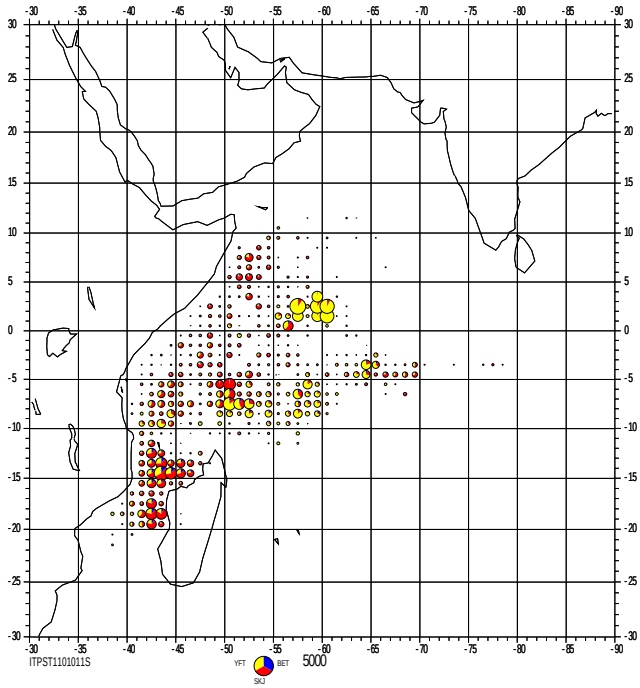

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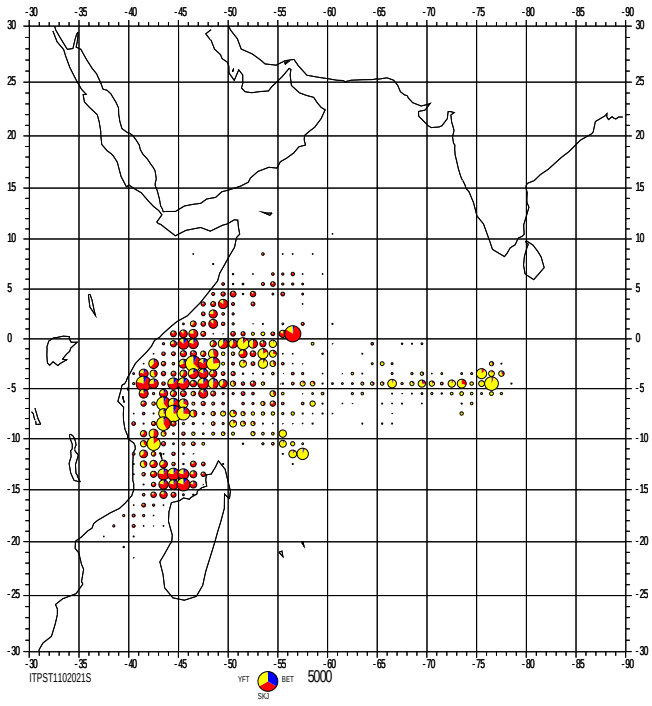

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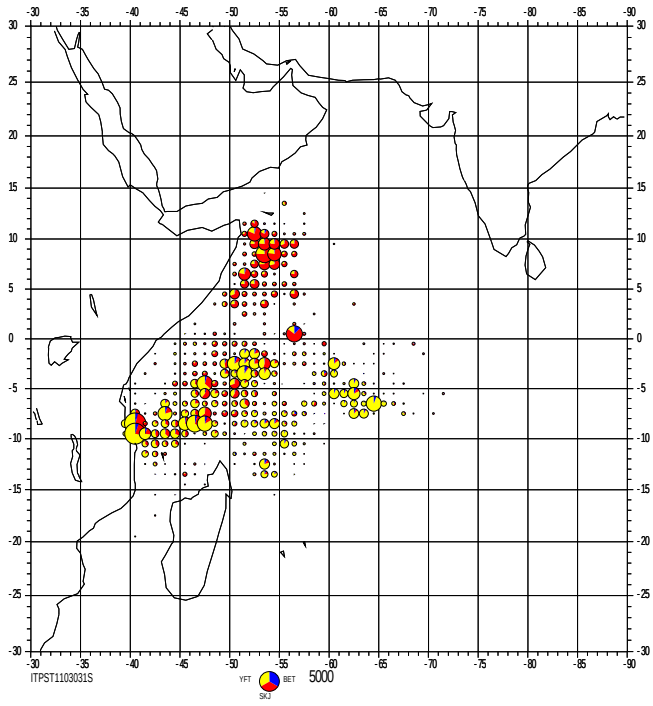

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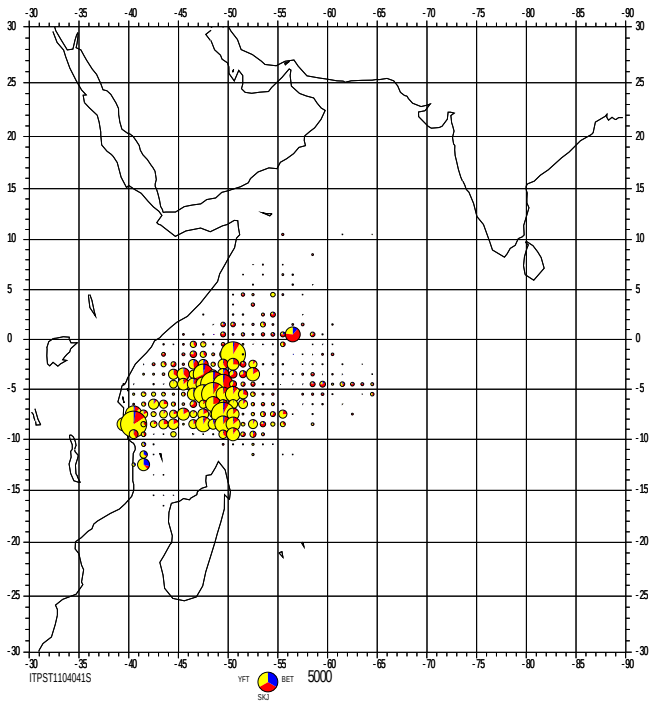

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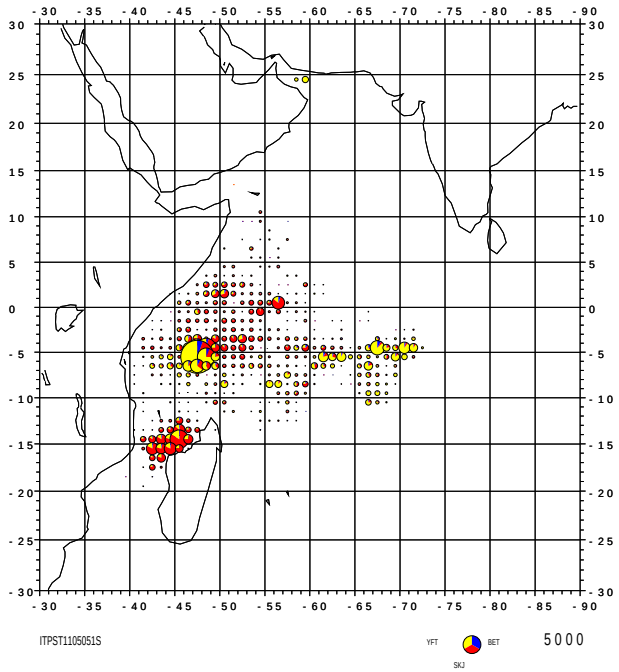

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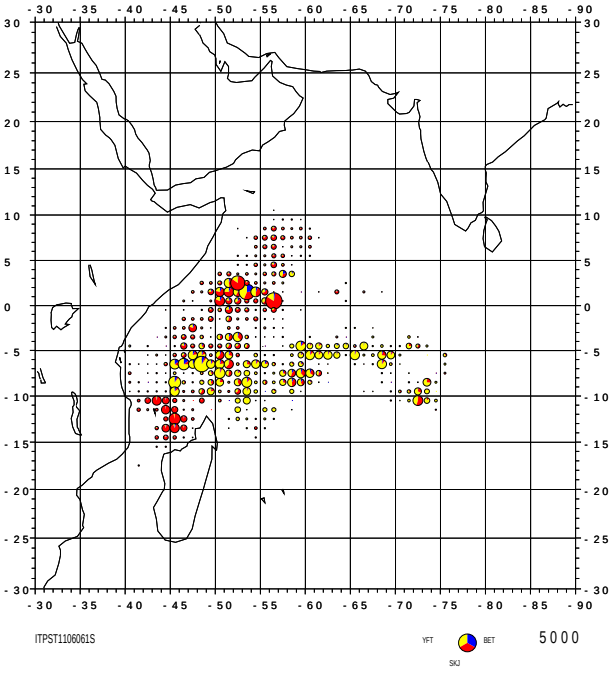

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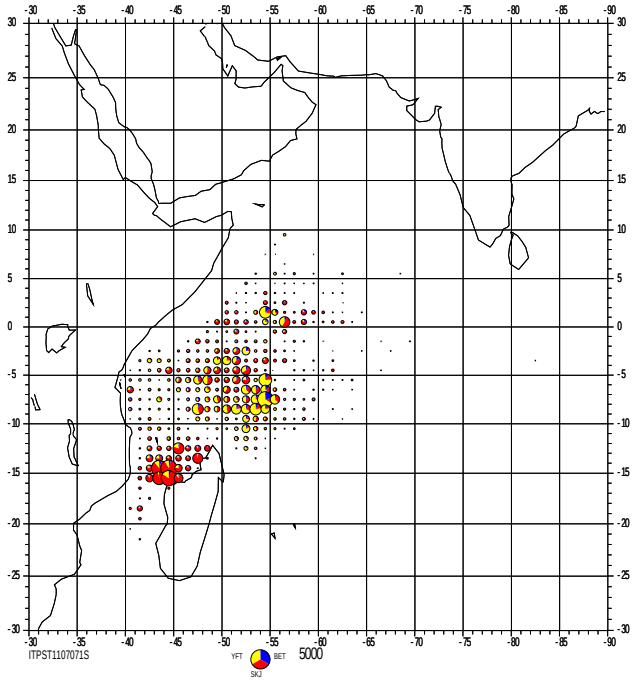

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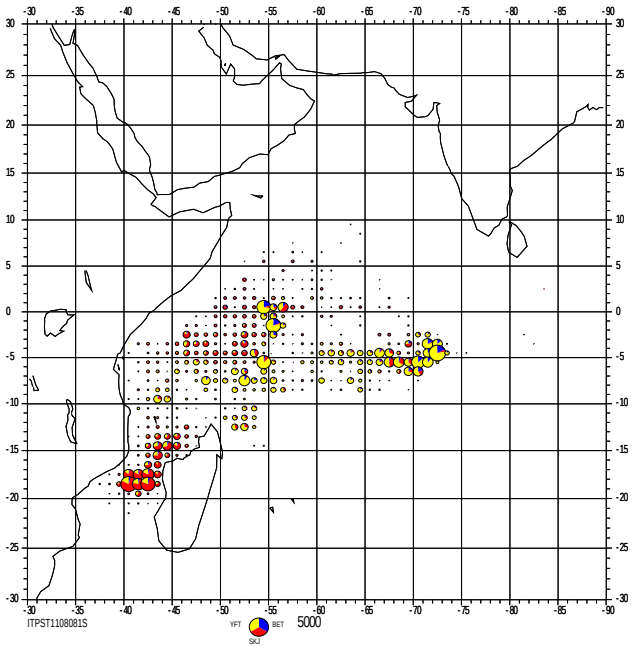

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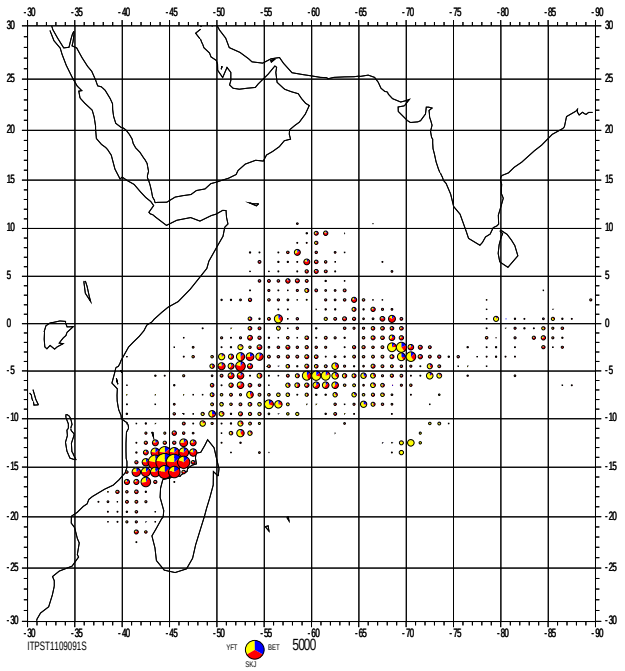

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