A new fishery indicator: the **« 3 BEST »**

The average 3 best monthly catches and CPUEs by 5°square s

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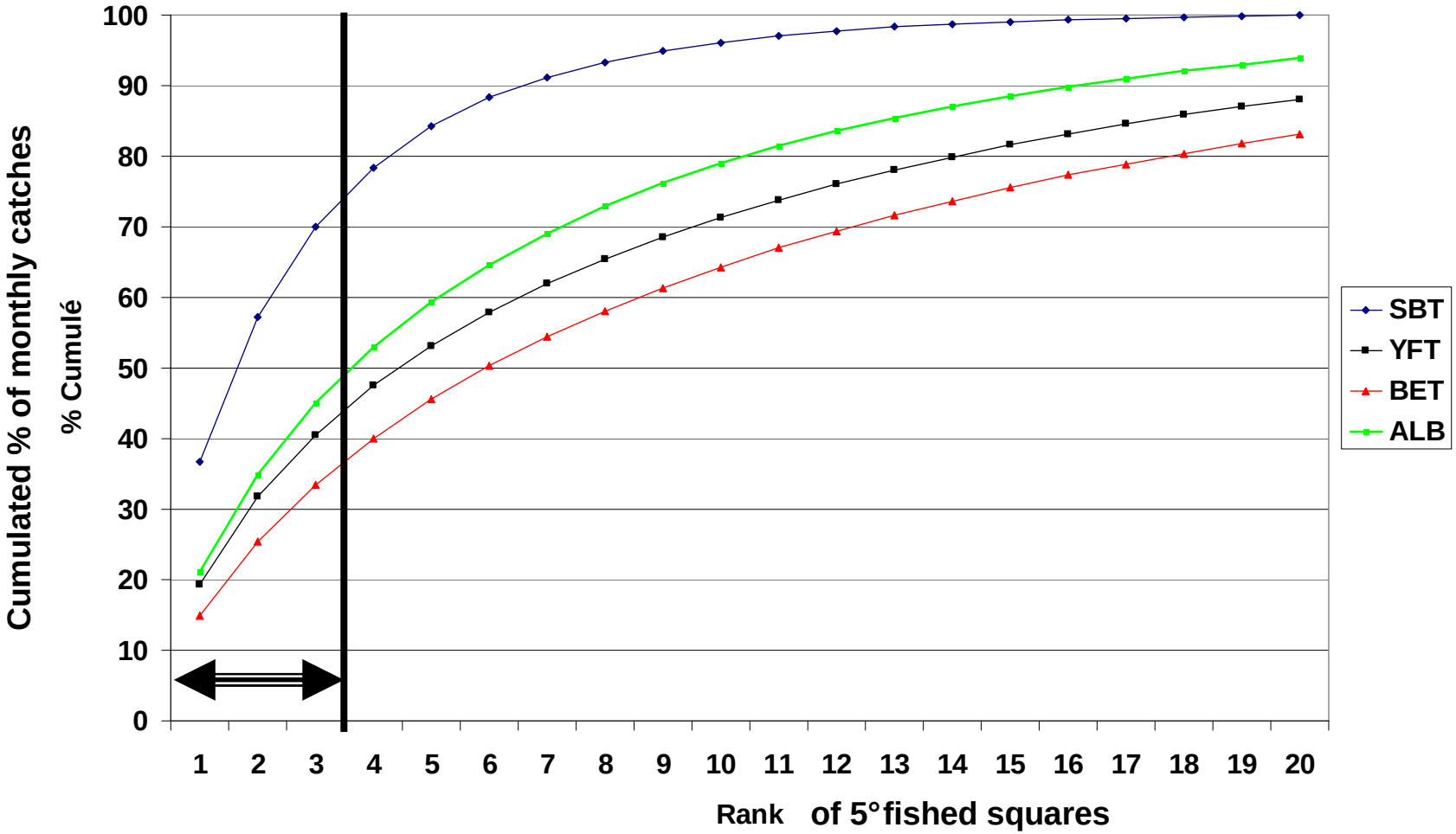
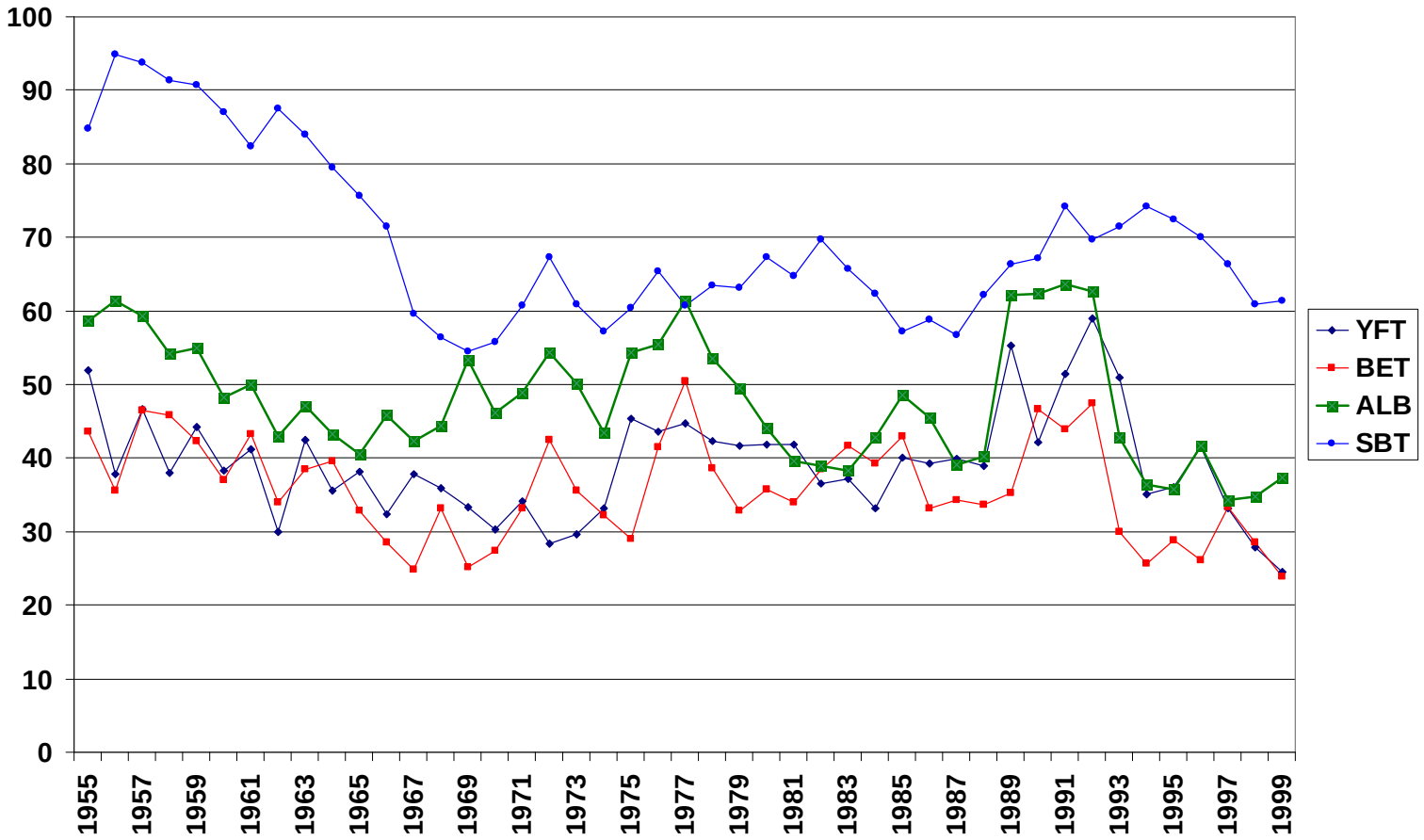
- **The average « 3Best » monthly catches are calculated on the estimated total catches by the combined longline fleets, monthly & by 5°squares since 1955**
- **The average « 3Best » monthly CPUEs are also calculated in numbers/weight of tunas taken by 1000 hooks, for Japanese and Taiwan longline fleets, monthly and by 5°squares, for all squares significantly fished by longliners (minimal effort taken: 20.000 hooks/month & square)**
- **The goal of these two indicators is to better understand the relationship between CPUEs (assumed to be representative of local densities) and total catches, that are the consequence of 3 combined parameters : (1) local biomass, (2) local fishing efforts and (3) fish availability to the gear deployed & its targeting.**
- **These results are clearly a potential source of interesting discussions, allowing a better understanding in the changes of stock status, in the understanding of national CPUEs, in the changes of fisheries behavior (by flag) and in the rates of tuna concentration in given strata (spawning or/and feeding strata)**



The analysis of the cumulative catches in the 20 « best 5° squares » fished monthly by longliners shows that a small numbers of heavily squares tend to produce a large % of the yearly catches

This pattern is:

- spectacular for SBT: the 3 best monthly squares producing >70% of yearly catches
- But also very strong for other species: the 3 best monthly squares producing during the 1955-2005 period 40% of YFT catches, 34% of BET catches, and 45% of ALB catches (These average rates being quite stable during the entire period, see the following figure)



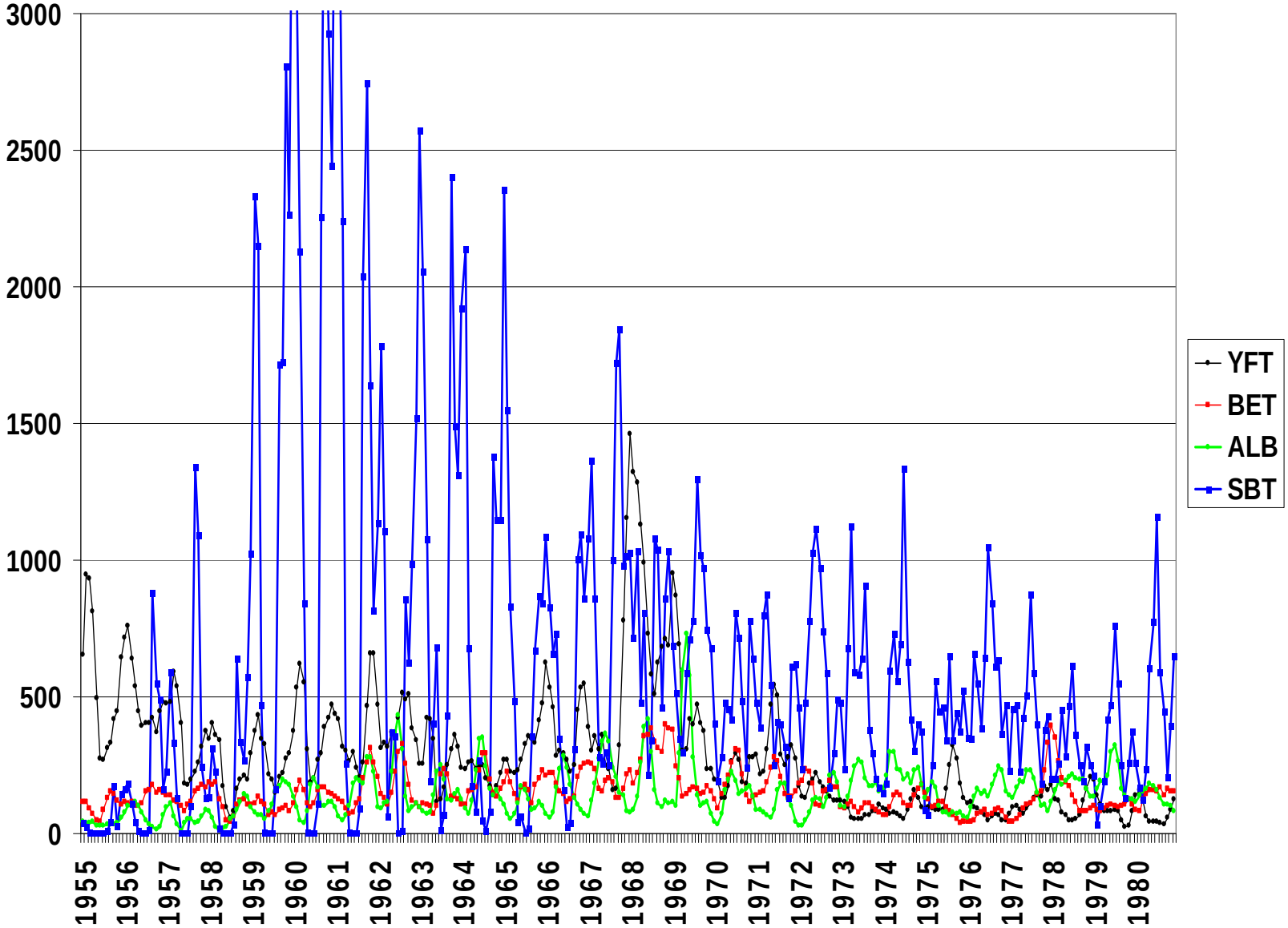
Average yearly percentage of the yearly catches caught by Indian Ocean Longliners in their 3Best 5°-month strata

Conclusion:

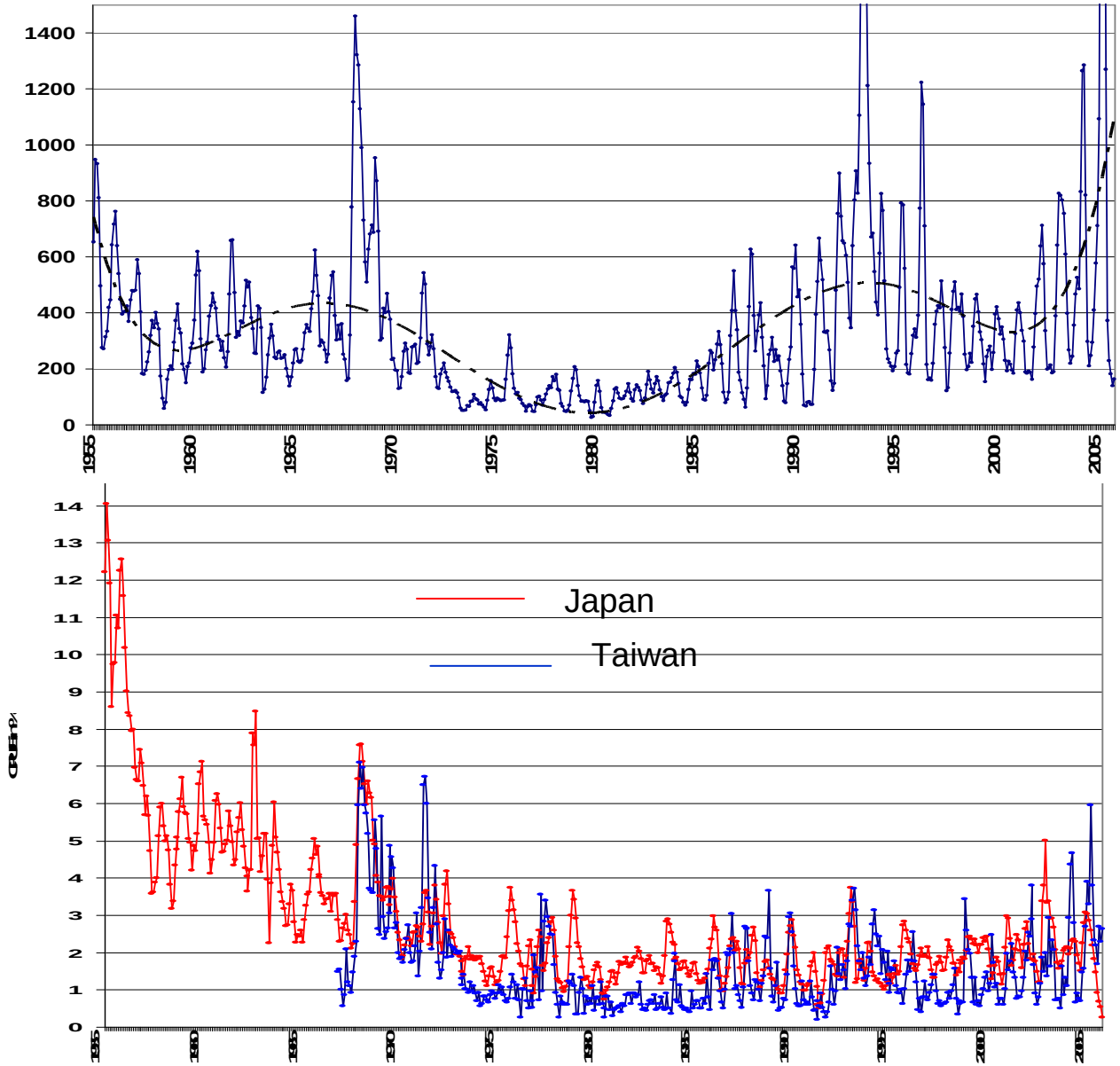
1- The contribution of these «3best» strata for total yearly catches is typical of each species, and relatively stable during the last 50 years

2- SBT is by far the species for which the monthly catches have been heavily concentrated in very small numbers of 5° squares: >60%, sometimes >80% in these « 3 Best » strata

3- ALB has been also widely caught in a very small number of strata (40 years between 1955 & 1993, during which more than 40% of ALB catches have been taken in the 3 best monthly-5°sq. strata)



The « 3Best » monthly catches by Indian Ocean longliners: showing patterns that are similar to the yearly averages, but highly spectacular for SBT, very high localized catches (high CPUEs+high efforts) in relation with the high vulnerability of its (low) biomass in its spawning and feeding strata

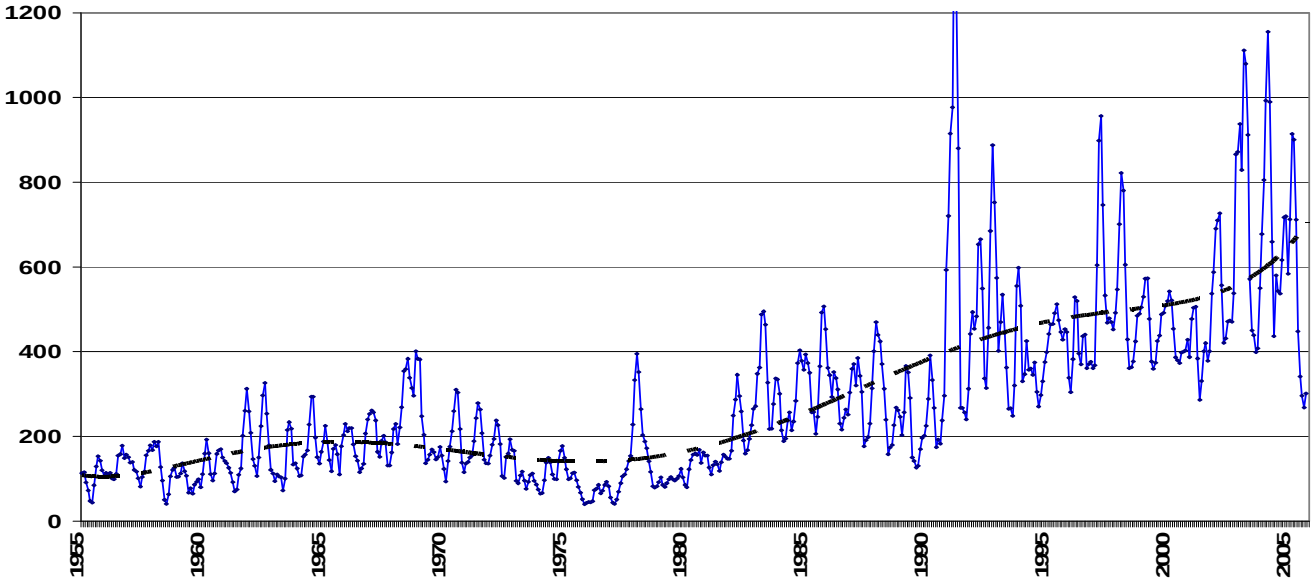


YELLOWFIN

3 Best Catches:
The max. best catches per 5°-month have been quite stable during the 50 years, increasing during the last 30 years, the highest catches being observed during the last 20 years, and not at all during the early years of very high CPUEs!

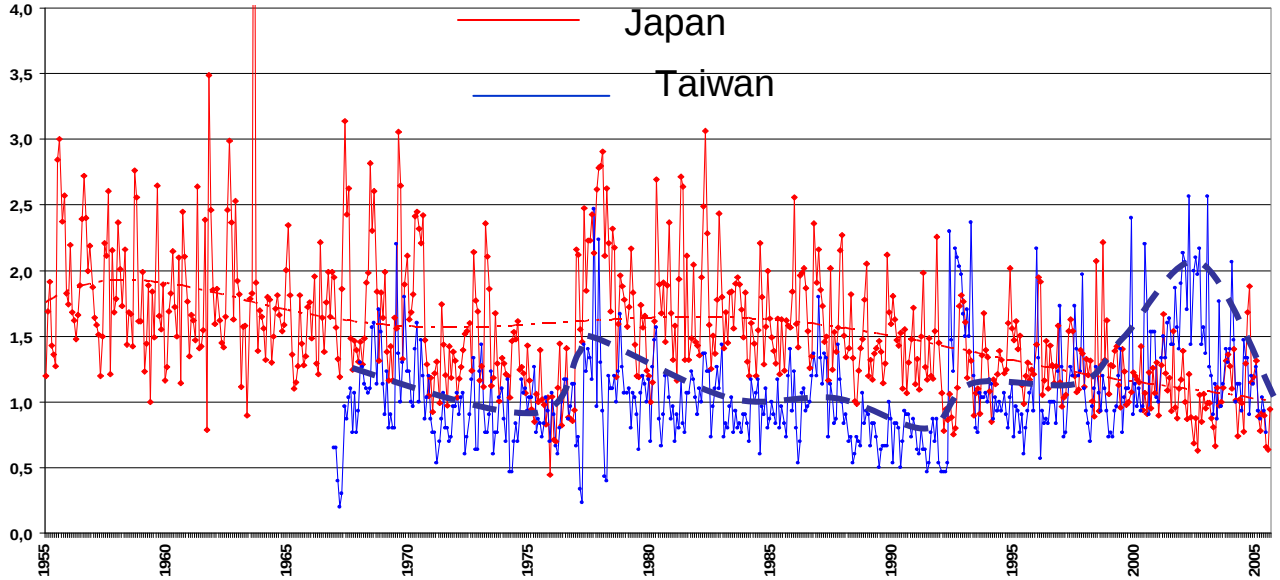
3 Best CPUE:
Major decline of the best CPUE during the initial period 1955-1980, a typical « Myers syndrom », followed by a period of quite stable max. CPUEs at about 2 fishes /100 hooks
Similar CPUE trends have been observed for Japan and Taiwan, but at different levels and showing different seasonal patterns

Indian Ocean YFT: average best monthly catches and best monthly CPUE in the 3 best 5°-month squares (pue: Japan and Taiwan, Catches: total of LL fleets)



BIGEYE

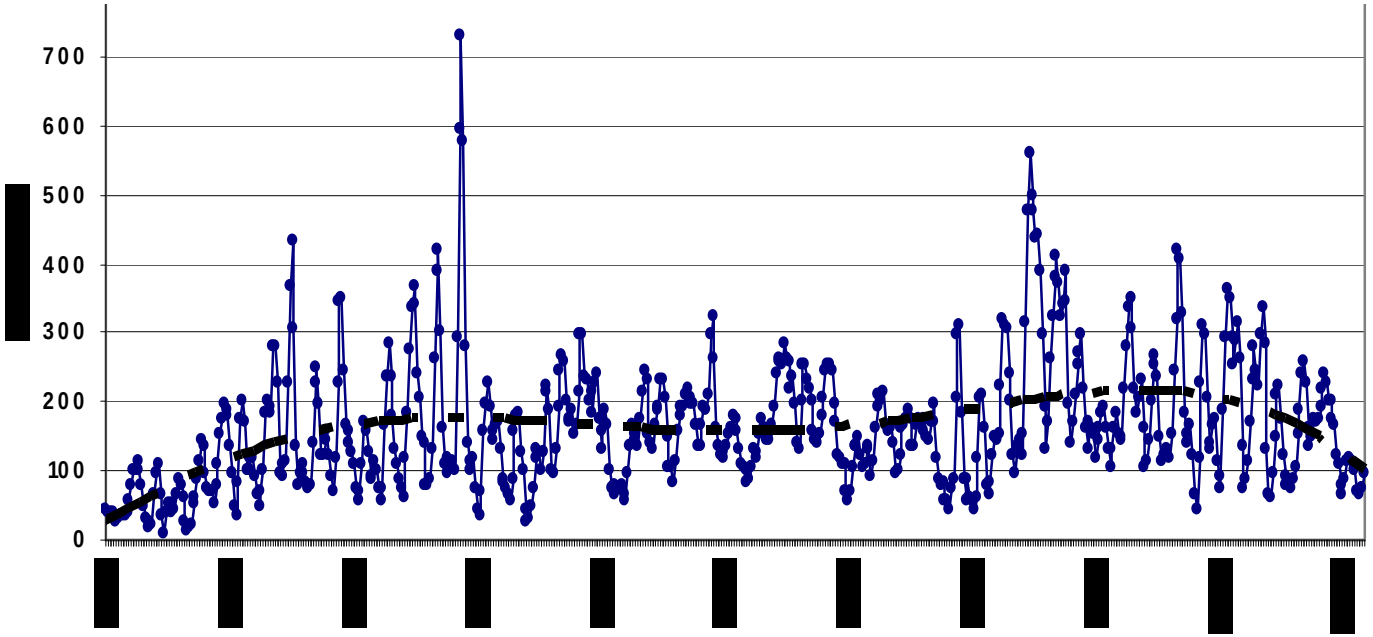
3 Best Catches:
The max. best catches per 5°-month have been quite low during the first 25 years, followed by a steady increase of max catches by 5°-month during the recent 25 years.



3 Best CPUE:
A first period 1955-1976 showing a slow decline of max CPUE, followed by a fast increase in 1977(deep longline), followed by a slow decline of these Max Jap CPUE.

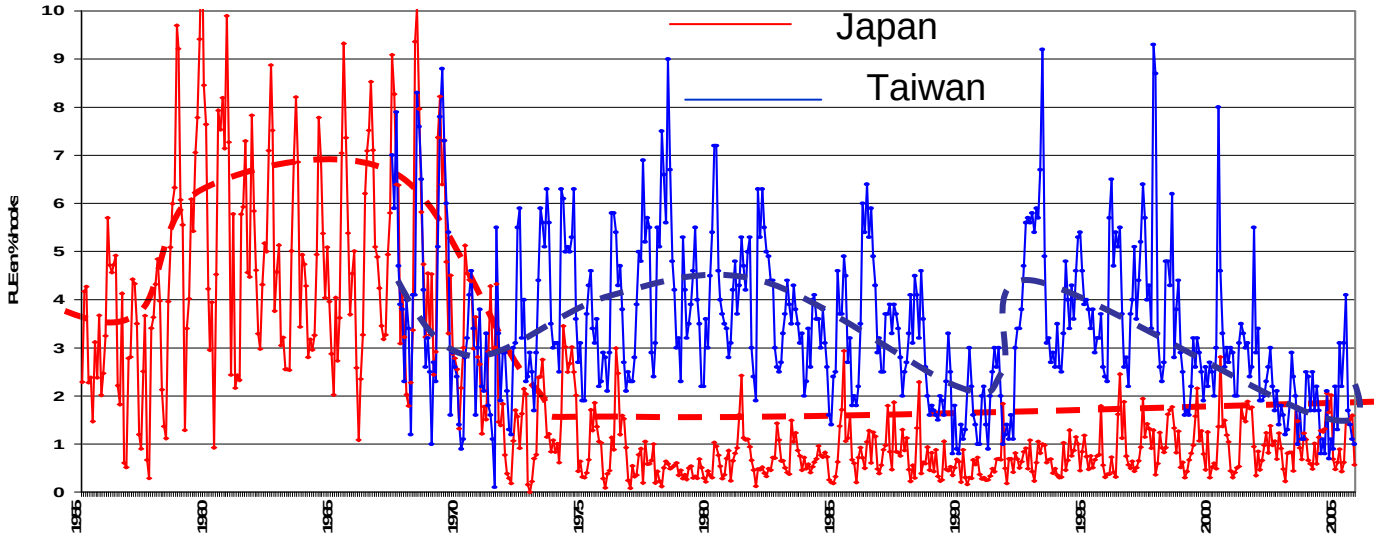
Taiwan MaxCPUE lower untill 1995, much higher than Japan since 1998

Indian Ocean BET: average best monthly catches and best monthly CPUE in the 3 best 5°-month squares (CPUE: Japan and Taiwan, Catches: tot al of LL fleets)



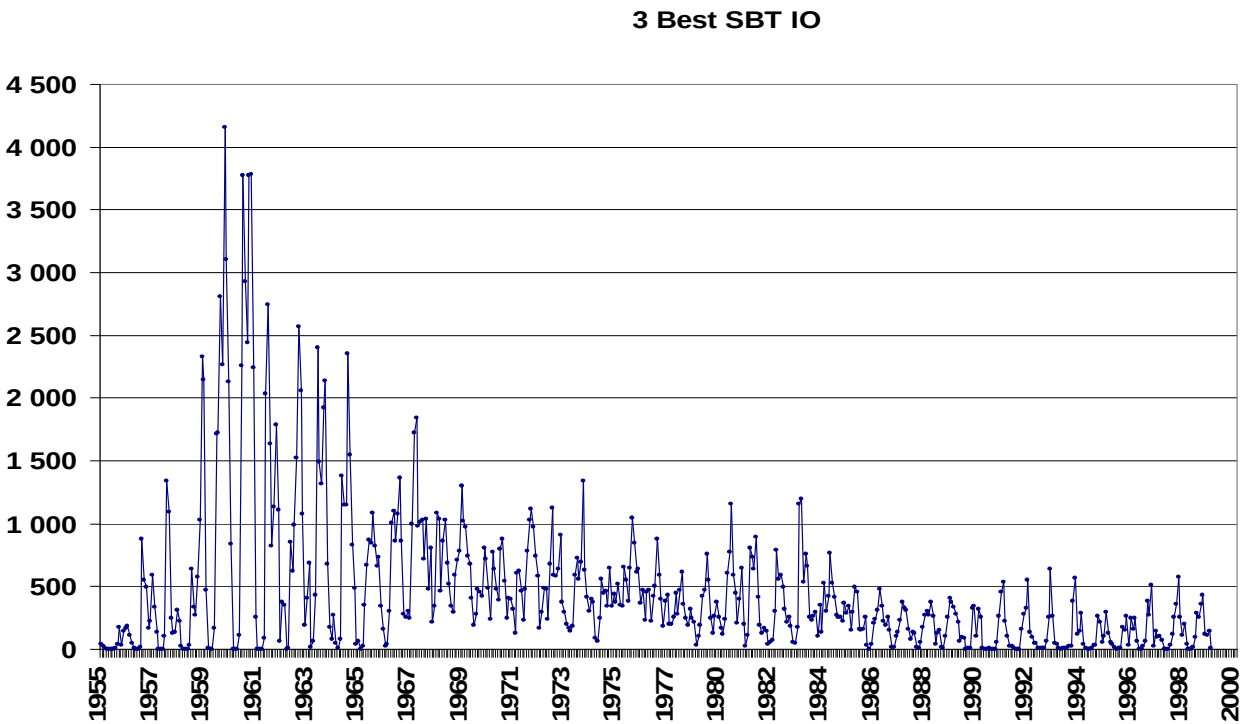
ALBACORE

3 Best Catches:
The max. best catches per 5°-month have been quite stable during the 50 years (average level of 165 t.)



3 Best CPUE:
High or very CPUE observed seasonally during the 15 years of the initial period, permanently followed by low Jap CPUEs (ALB never targeted by Japan LL), Taiwan max CPUE fluctuating at higher levels (2 stanza?)

Indian Ocean YFT: average best monthly catches and best monthly CPUE in the 3 best 5°-month squares (CPUE: Japan and Taiwan, Catches: total of LL fleets)



Southern bluefin

The max 3best catches by 5°-month have been during hist orical years (60ies) at the higest levels ever observed for a tuna species fished by longliners (>4000t/5°-month)

This 3 best indicator remain seasonally very high compared to all other tuna species, despite the very low level of recent SBT catches, probably in relation with the great vulnerability of this stock in its feeding strata.

Conclusion

- « 3Best » monthly/yearly 5°-Month strata is a new fishery indicator that can help to track changes in fisheries and resources
- These heavily fished strata are important as they produce a large part of total catches
- The « 3Best » total catches and 3 best CPUEs by fleet provide a different but interesting information