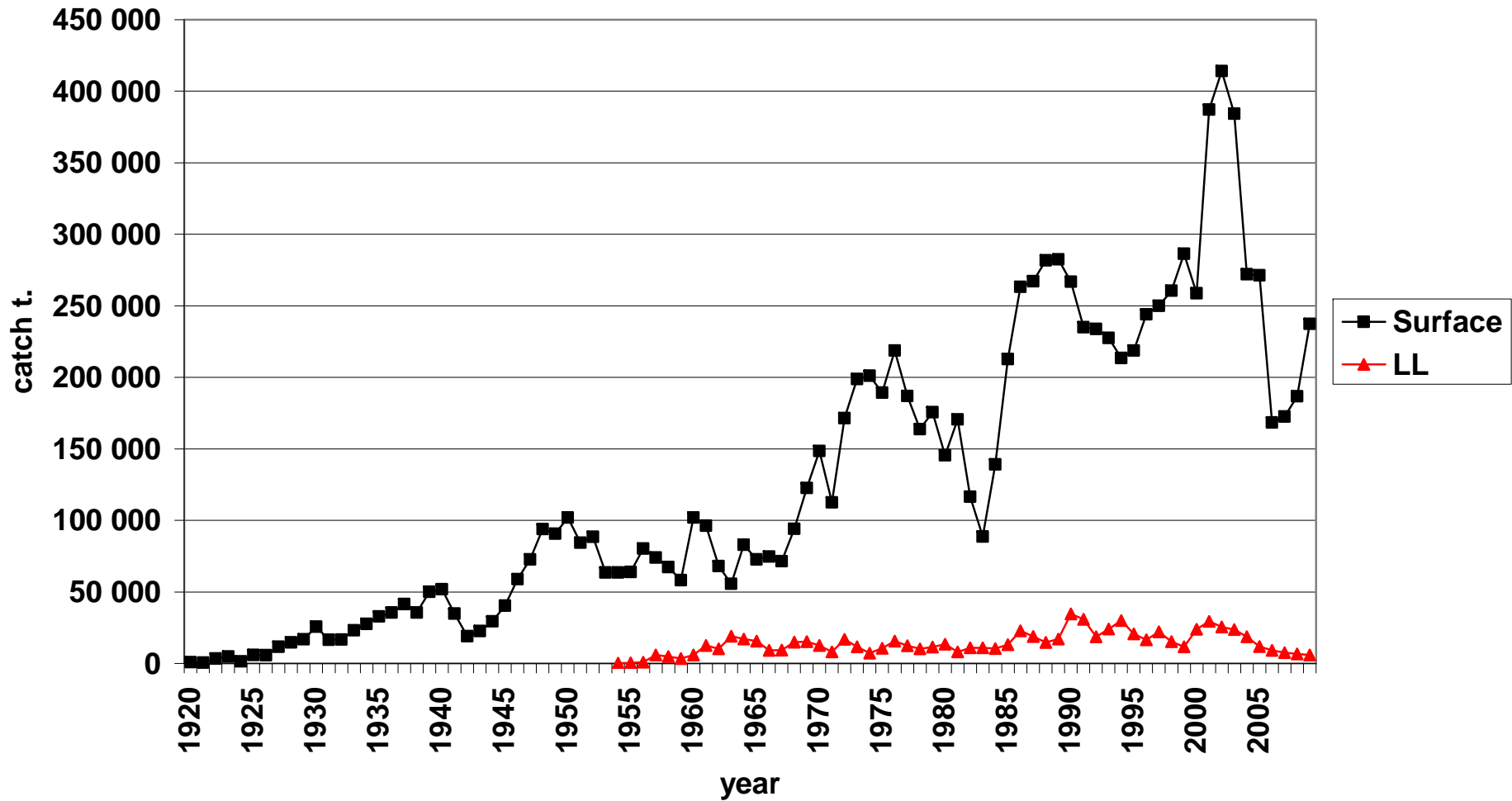


# Tunas Yield per recruit and MSY of longline fisheries, case of yellowfin stock in the Eastern Pacific Ocean

by Alain Fonteneau and Javier Ariz

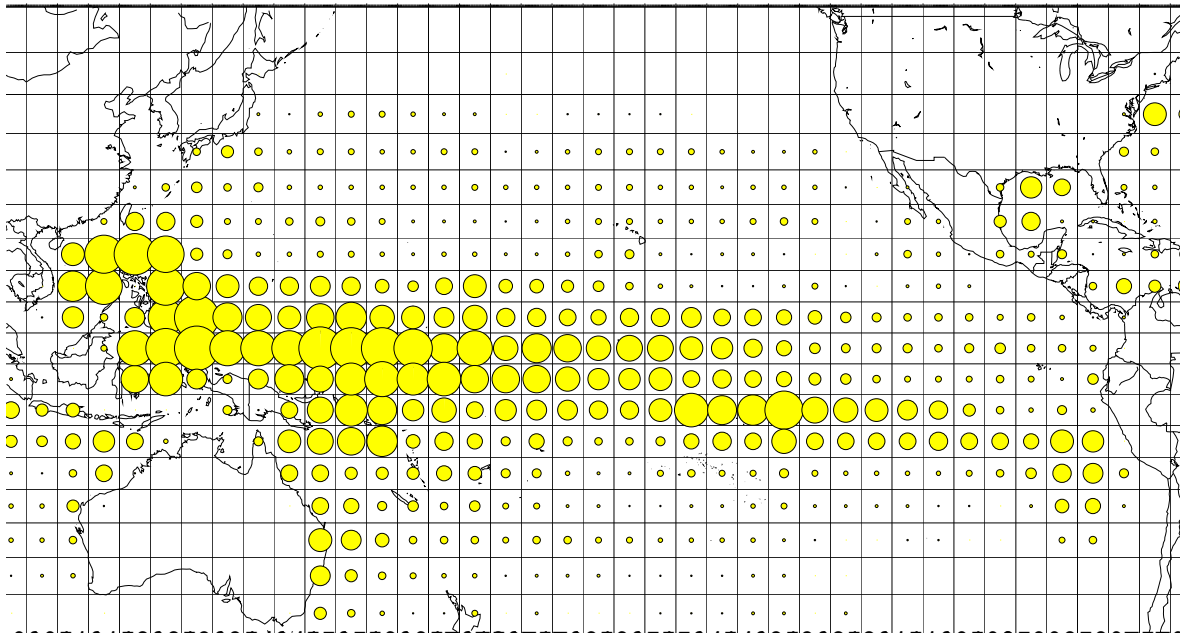
- The goal of this paper is to examine and to discuss if  $MSY > 400,000$  tons could be obtained by longline fisheries in the EPO,
- As it has been written by the IATTC in all its recent stock assessment reports...
- Or if this ideal  $MSY$  should never be envisaged by scientists and managers, being totally unrealistic.



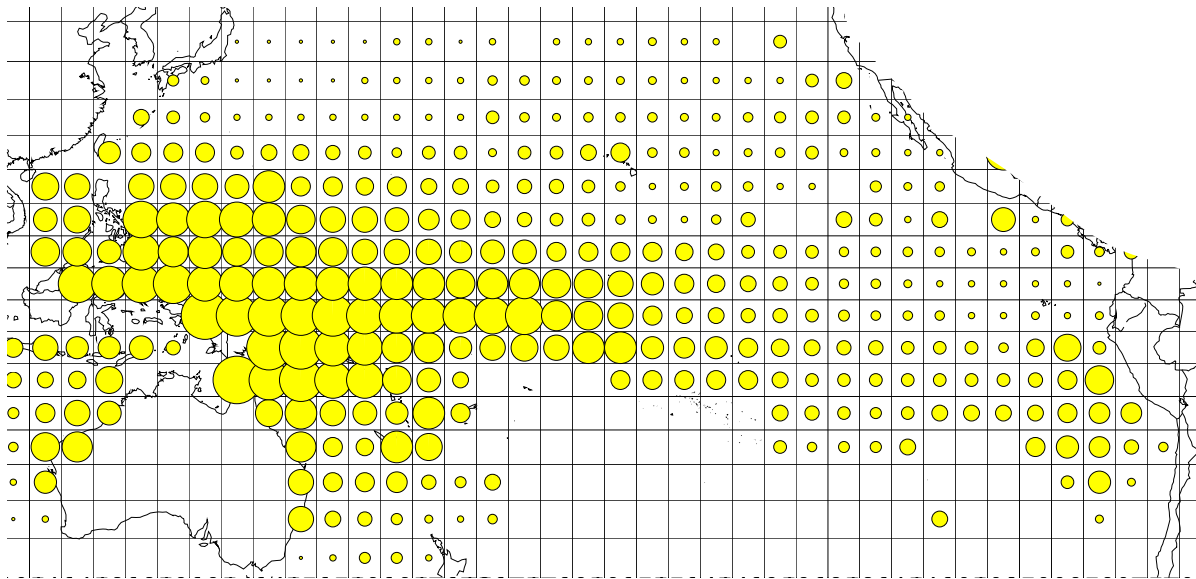


Yearly catches of YFT in the EPO by surface gears and by longliners

***YFT total catches in the EPO have been always very low.....***

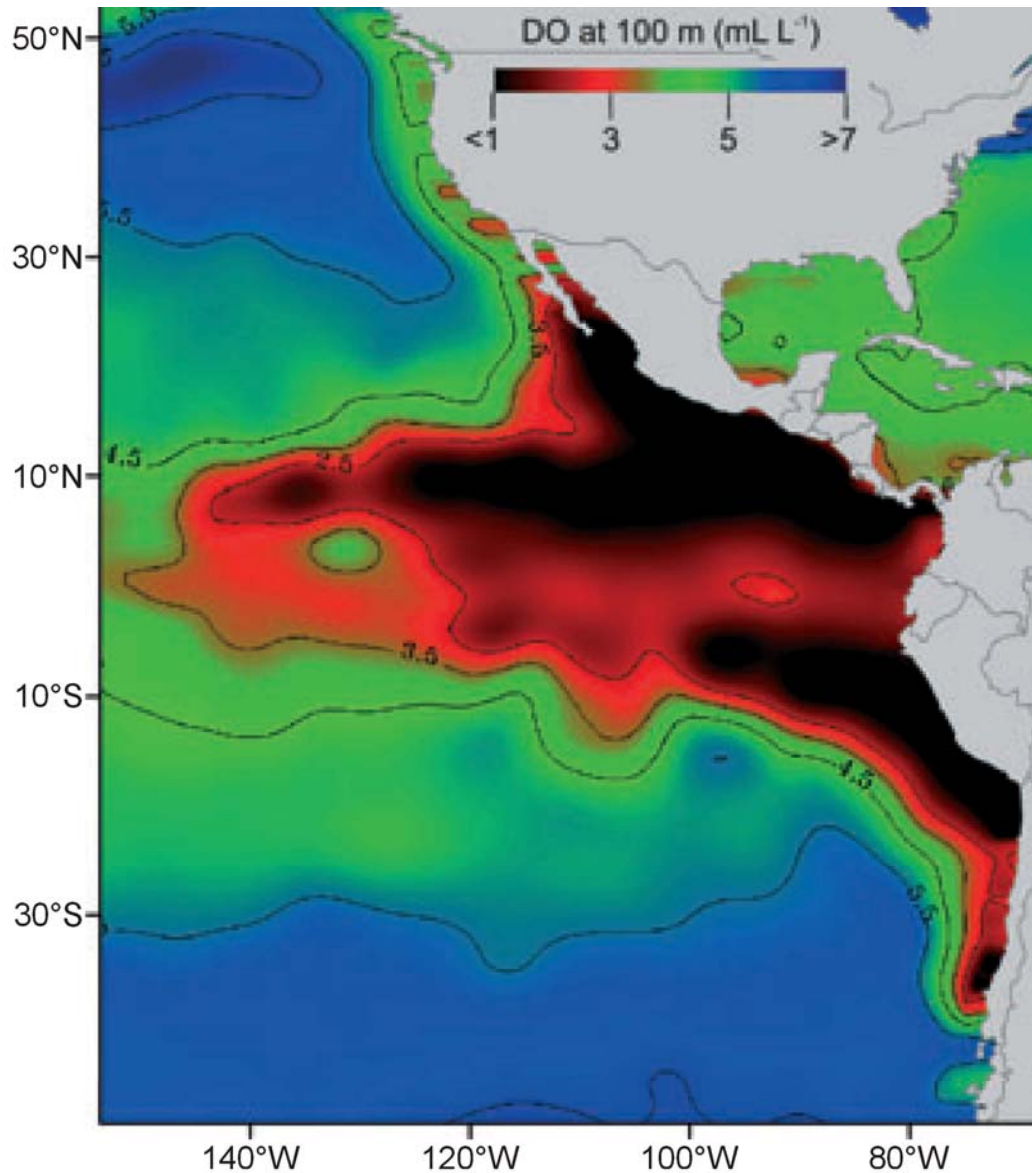


Average catches of YFT  
In the EPO



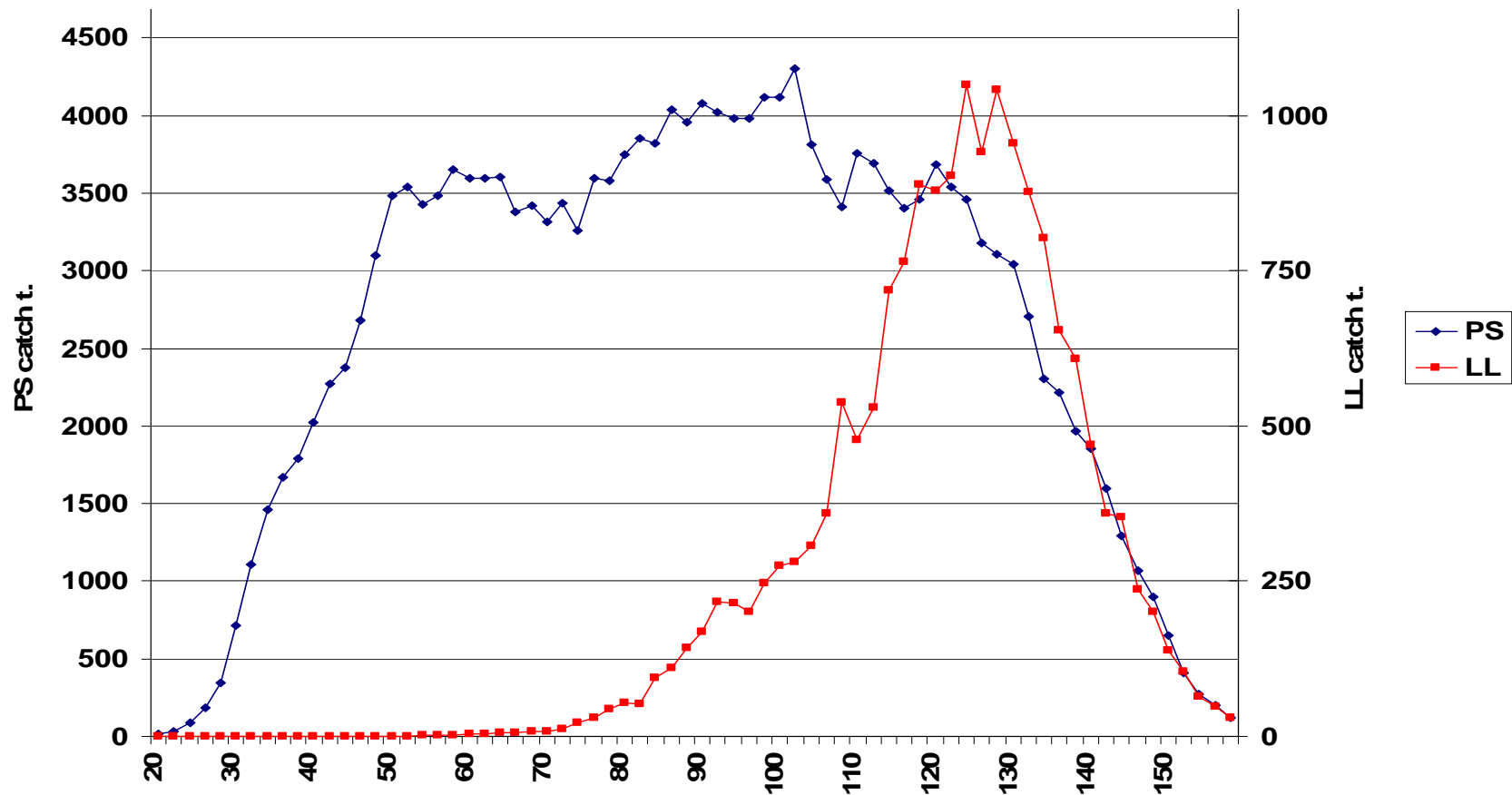
Average LL CPUE of YFT  
In the EPO

Both types of maps showing that the EPO has never been an eldorado for YFT fishing,  
The WCPO being much better...



*Very low rates of oxygen observed  
At the fishing depth of most LL  
A compressed habitat not suitable  
for longliners, especially the  
Eastern basin*

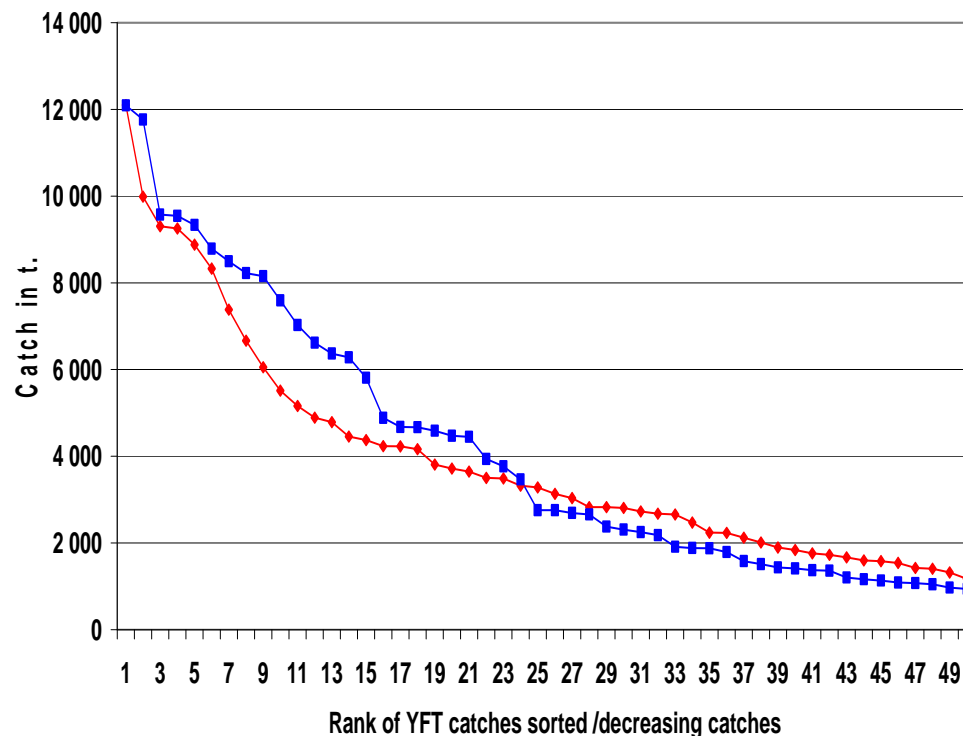
(taken from Prince et al 2010) Average levels of dissolved oxygen at 100 meters (a depth typical of the YFT longline fisheries) in the EPO (Data from Levitu atlas)



**Average catch at size of yellowfin, in weight per 2 cm classes of fork length, taken by purse seine and by longline fisheries (IATTC data, period 1961-2006)**

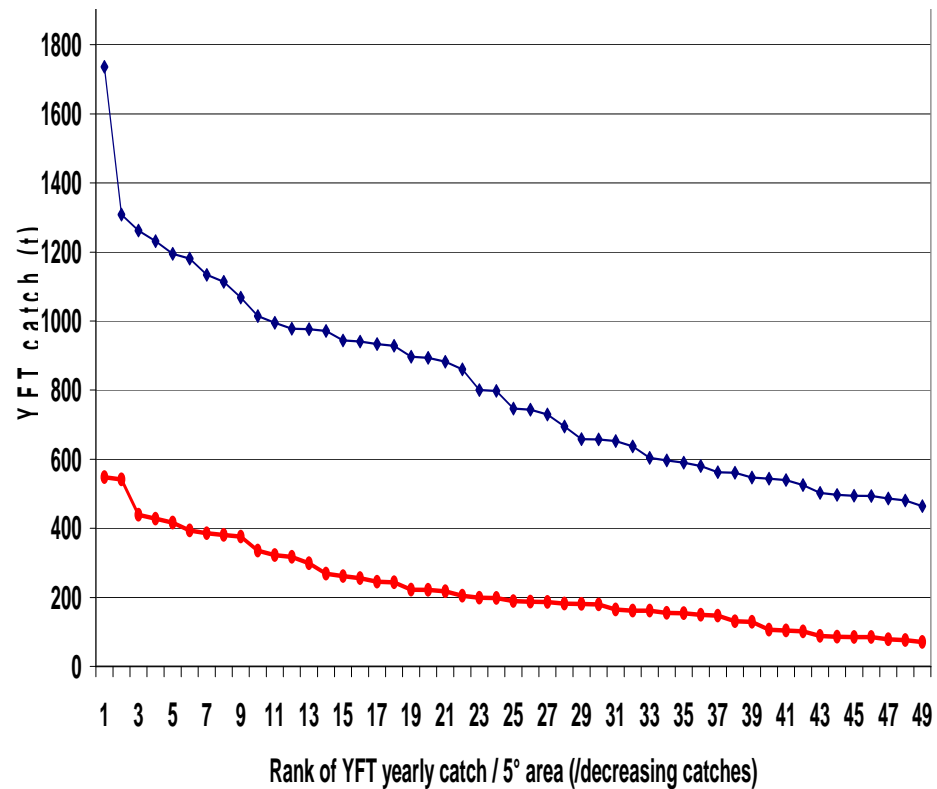
*LL catching large YFT, then with a good yield per recruit*

*But PS fisheries catching the entire range of sizes: small YFT taken on FADs and free schools producing a poor YR, medium & large taken on dolphin schools... also producing a good YR*



—♦— EPO Av catch = 3945t. —■— WPO average catch = 4121t.

Average catches of YFT taken by the combined fisheries, by 5° squares sorted by decreasing catches (only the 50 best 5° squares shown)



—♦— WPO Av Catch=802 t —♦— EPO Av Catch=223 t

Average catches of YFT taken by longliners, by 5° squares sorted by decreasing catches (only the 50 best 5° squares shown)

Average catches of YFT by 5° squares in the 50 best areas was nearly identical for the combined gears in the Eastern and Western Pacific oceans: an average catch of 3900 t. in the EPO vs 4100 tons in the west. On the opposite, the average catches by longliners in the 50 best 5° squares areas was much higher in the Western than in the Eastern Pacific: 800 t vs 220t.

An MSY of 407000t. by longliners in the EPO?

- The EPO is a quite small fishing zone compared to the WPO: only 150 5° Squares producing some YFT
- As a consequence the theoretical 407.000t MSY should have to be taken in these 150 squares: i.e. with an average « world record catch of 2800 tons » of YFT /5° square.
- Such average YFT catch would be 3.5 larger than the present average YFT catches by LL in the WCPO in the best 50 5° squares!!
- Such level of extremely high potential catches by longliners is of course totally unrealistic in the EPO

# Conclusion

- The real potential *MSY* that could be obtained by longliners on the EPO YFT stock is probably **very low**, simply because this resource is not significantly available to longliners.
- In such a basic context, the sustainable maximal catches by longline fleets are probably in a range of about 10 times lower than the theoretical *MSY* presently estimated by the IATTC report.
- Then it is misleading to provide to the SA reports these "miracle *MSY*" potentially obtained by longliners
- Realistic estimates of *MSY* by longliners should never be based on estimated yield per recruit multiplied by numbers of recruits,
- But they should be conditioned by the very low availability of the EPO yellowfin stock tuna to this fishing gear, due to its low rates of oxygen at the traditional fishing depth of longliners.