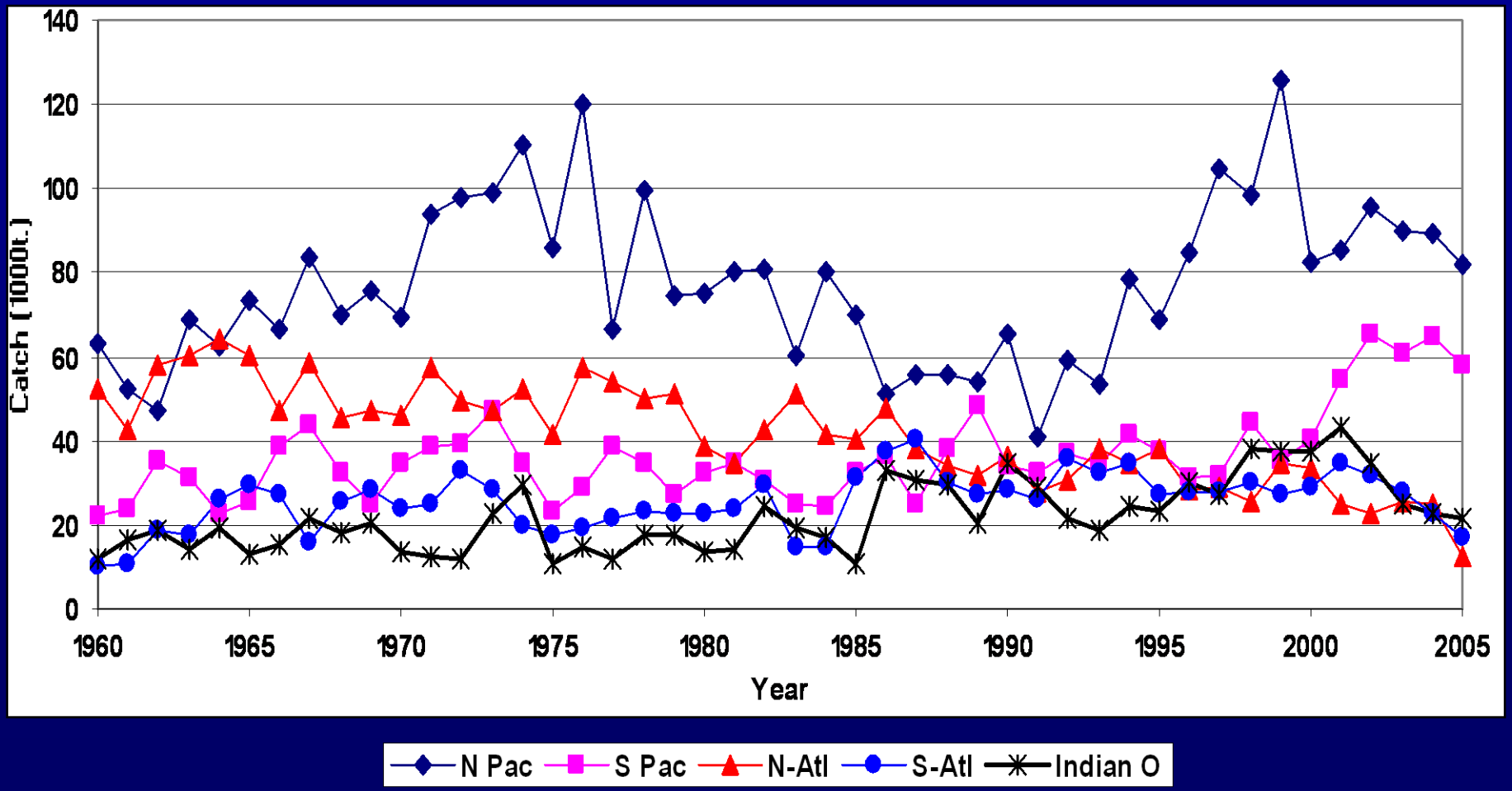
An overview of albacore tuna in the Indian Ocean: biology , fisheries and stock status

By Alain Fonteneau, IRD Tropical Tuna scientist

ALB: the only tuna species showing world wide flat catches trends
IO ALB catches have been always among the lowest compared to other oceans..
-the ALB Indian Ocean recent catches showing a decreasing trend

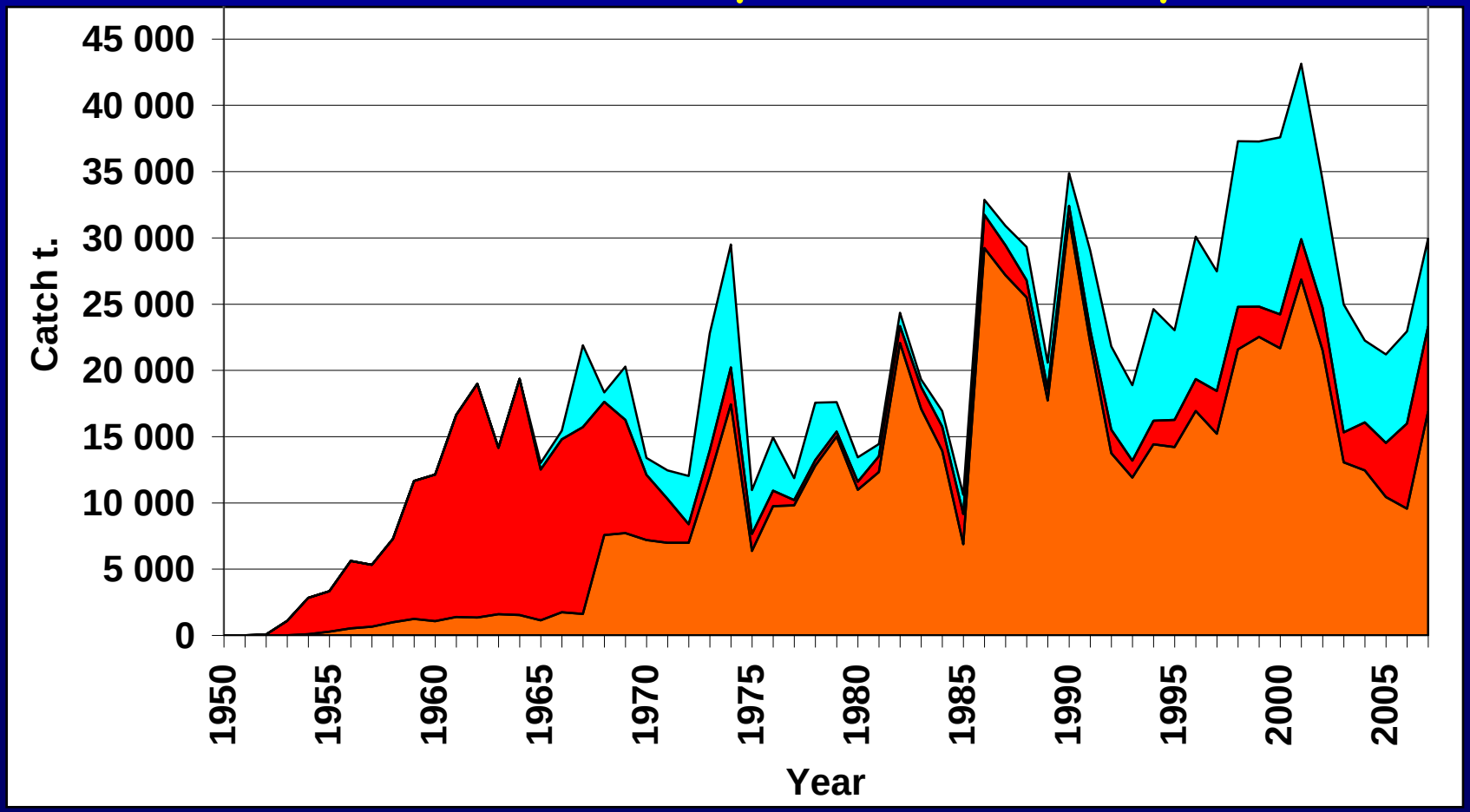


Average ALB catches by 5° squares in the various Oceans & ALB stocks

Ocean	Nb 5° squares fished with ALB	Average catch (1000t)	Average catch /5°square
Pacific N	142	77	0,54
Pacific S	182	36	0,20
Atlantic N	107	41	0,38
Atlantic S	107	26	0,24
Indian	143	22	0,15

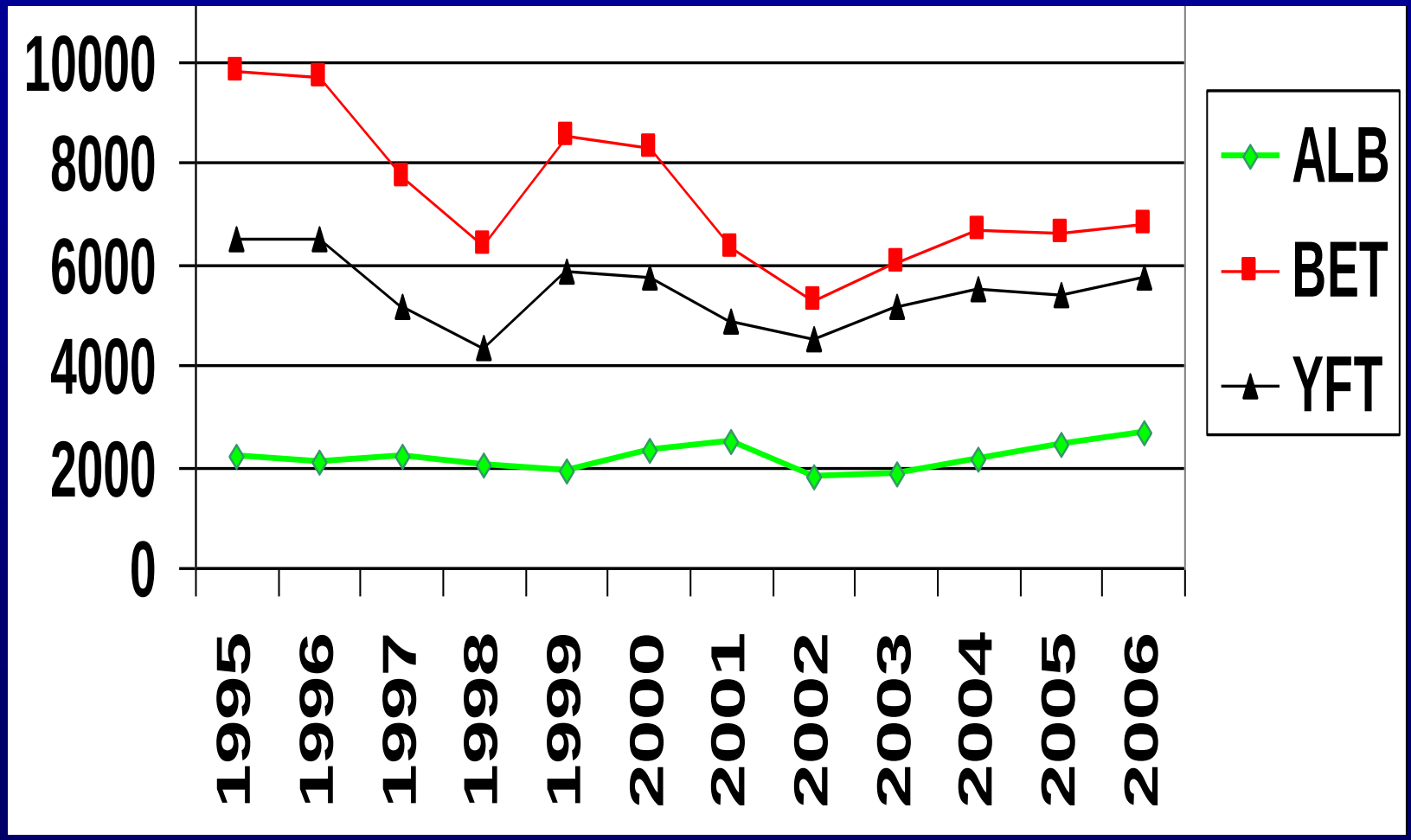
Indian Ocean ALB: the lowest ALB catches by 5° Squares…

ALB Catches by country in the IO: Historical fishery dominated by Taiwan

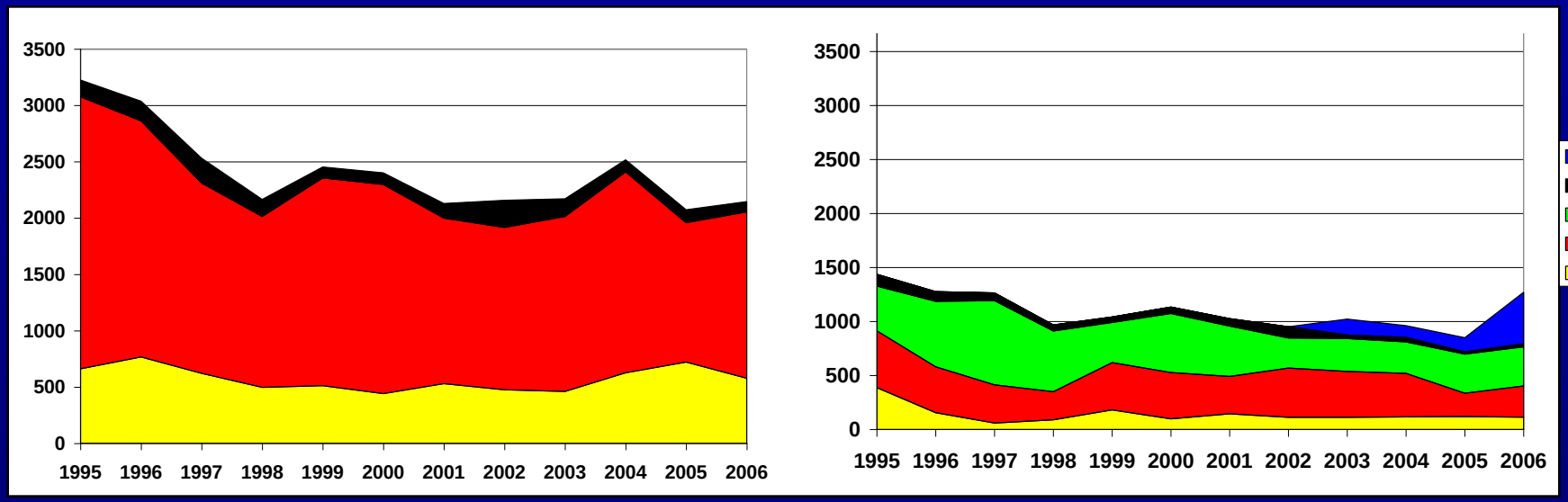


And by Japan (from time to time) , very few countries being active in the fishery (ALB is not YFT)

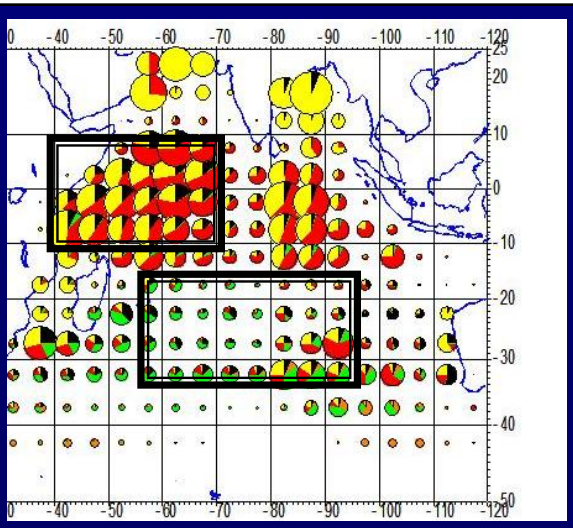
Albacore caught by longliners:
ALB are small tunas, average weight of only 15kg, always sold at a quite low values /kg

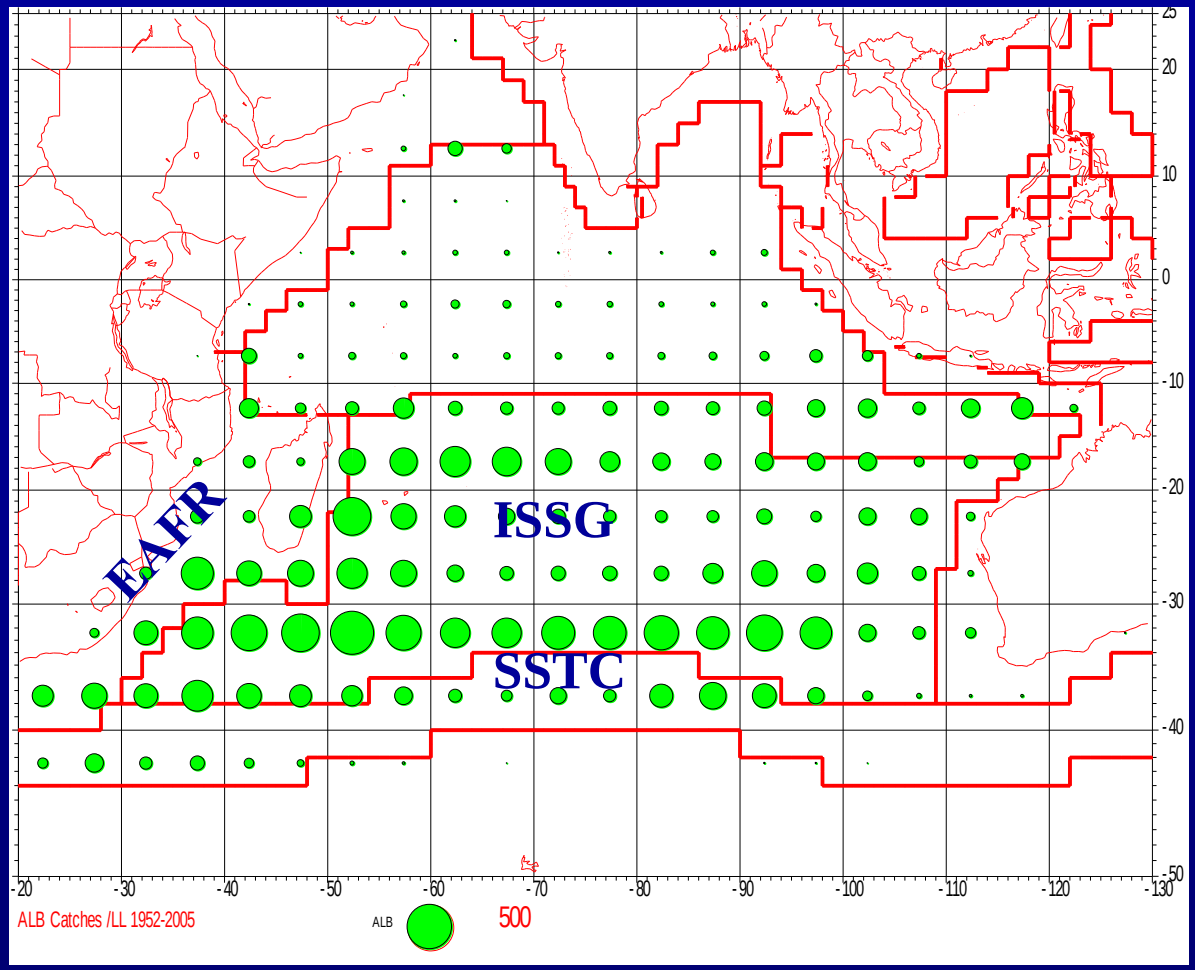


Targeting ALB in the gyre: not a highly profitable fishing pattern for Taiwanese LL!!??



Yearly CPUE by species, in US dollar, of Taiwanese LL fishing in the Western equatorial IO and in the middle of the South IO gyre





Average ALB LL catches 1984-2000:

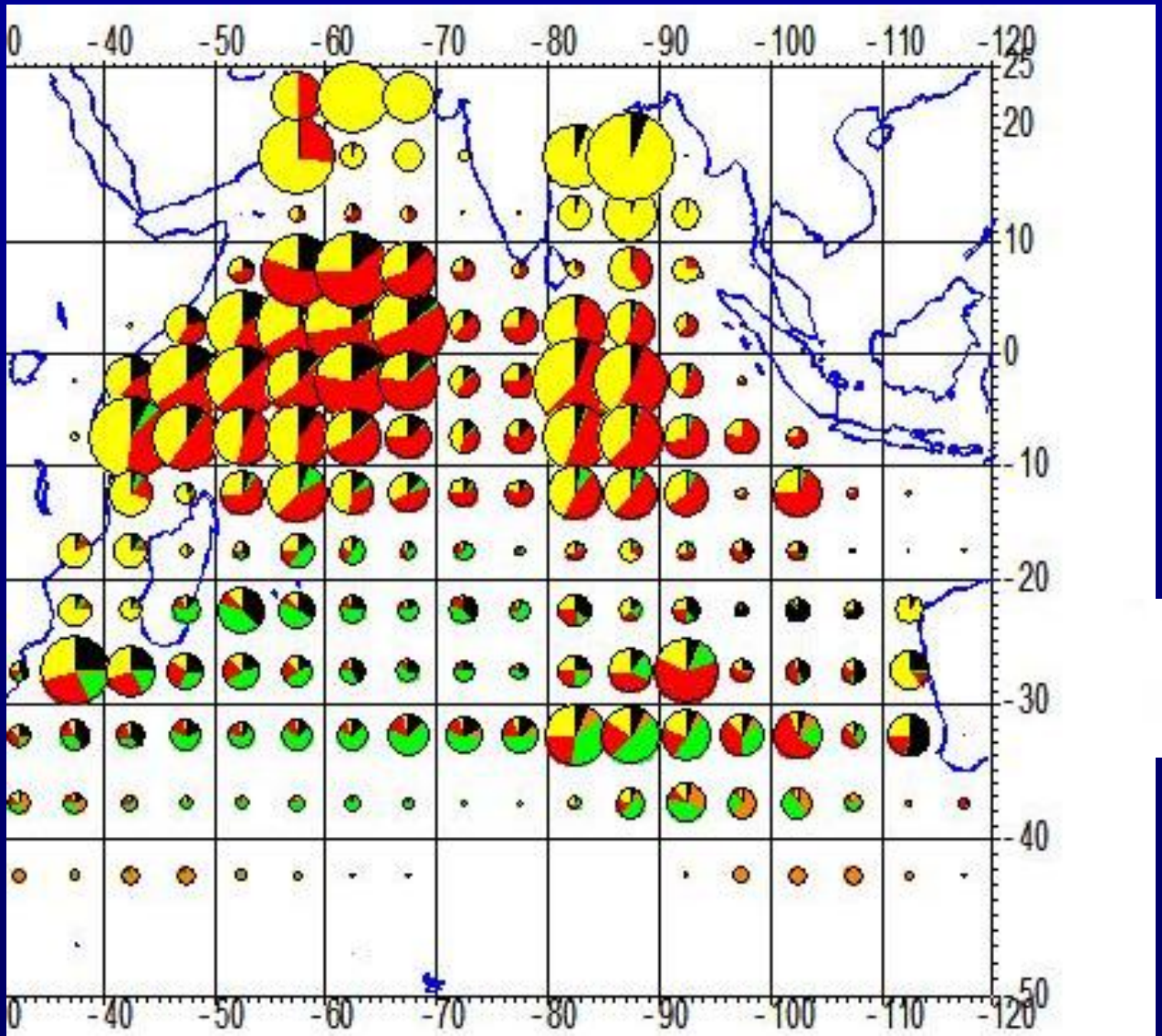
Albacore is a temperate tuna, mainly inhabiting 3 ecosystems:

ISSG: ***Indian Ocean South Subtropical Gyre***

SSTC : ***South Subtropical Convergence***

EAFR : ***East Africa coastal***

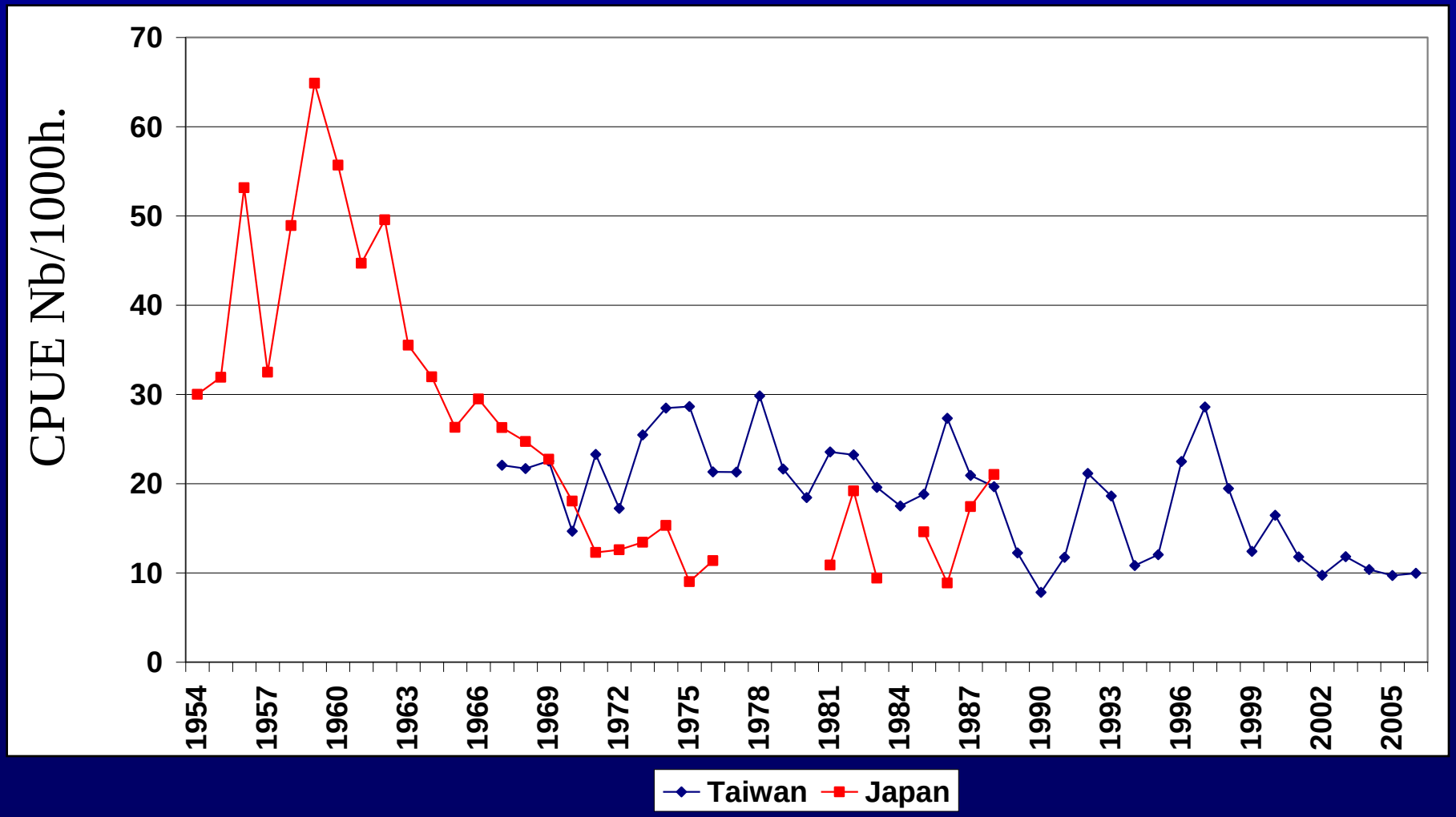
ALB LL fisheries:
centered in the gyre & with low diversity



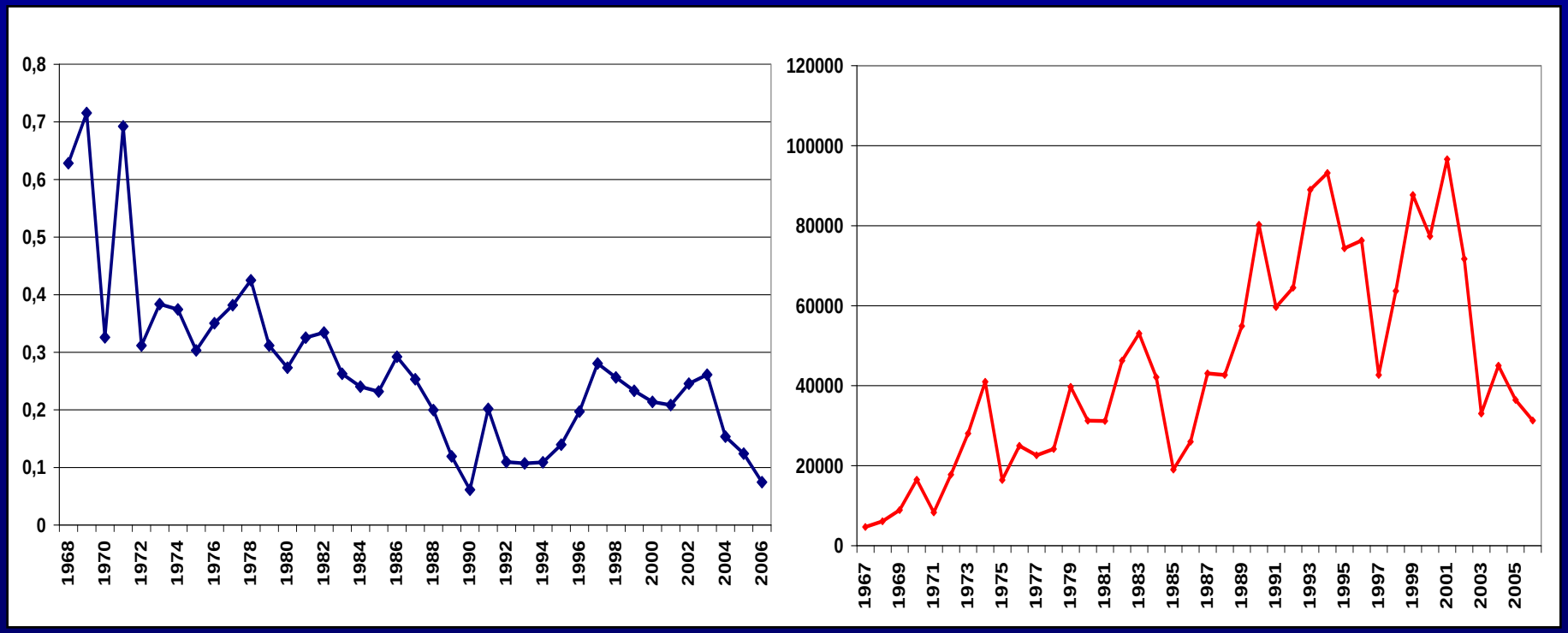
LL catches / species
2001-2005

Indian Ocean ALB:

typically a stock showing a « Myer's syndrom » : an excessive early cpue decline, under low stable catches (ALB CPUEs in the core of the gyre area)

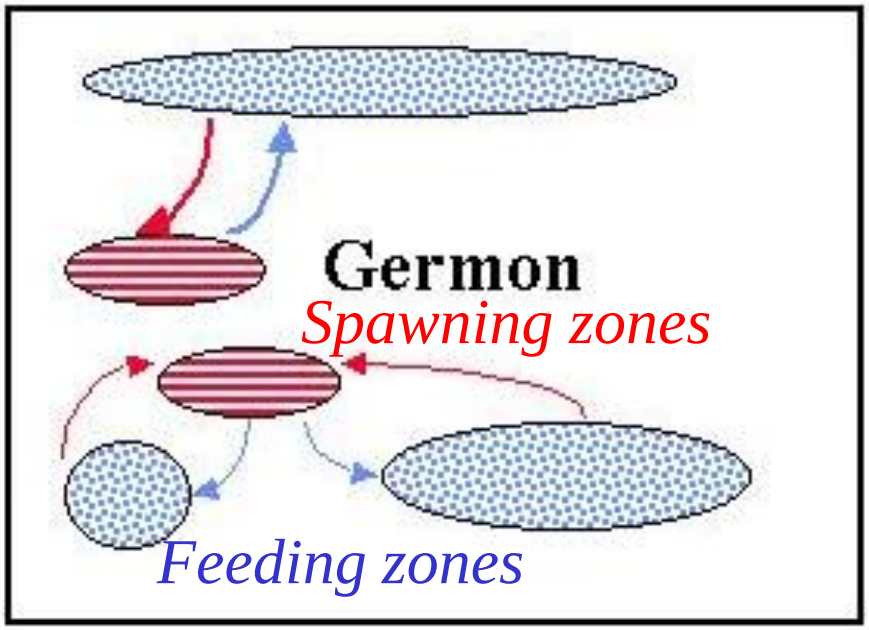


CPUEs and total Taiwanese LL Effort in the Longhurst gyre



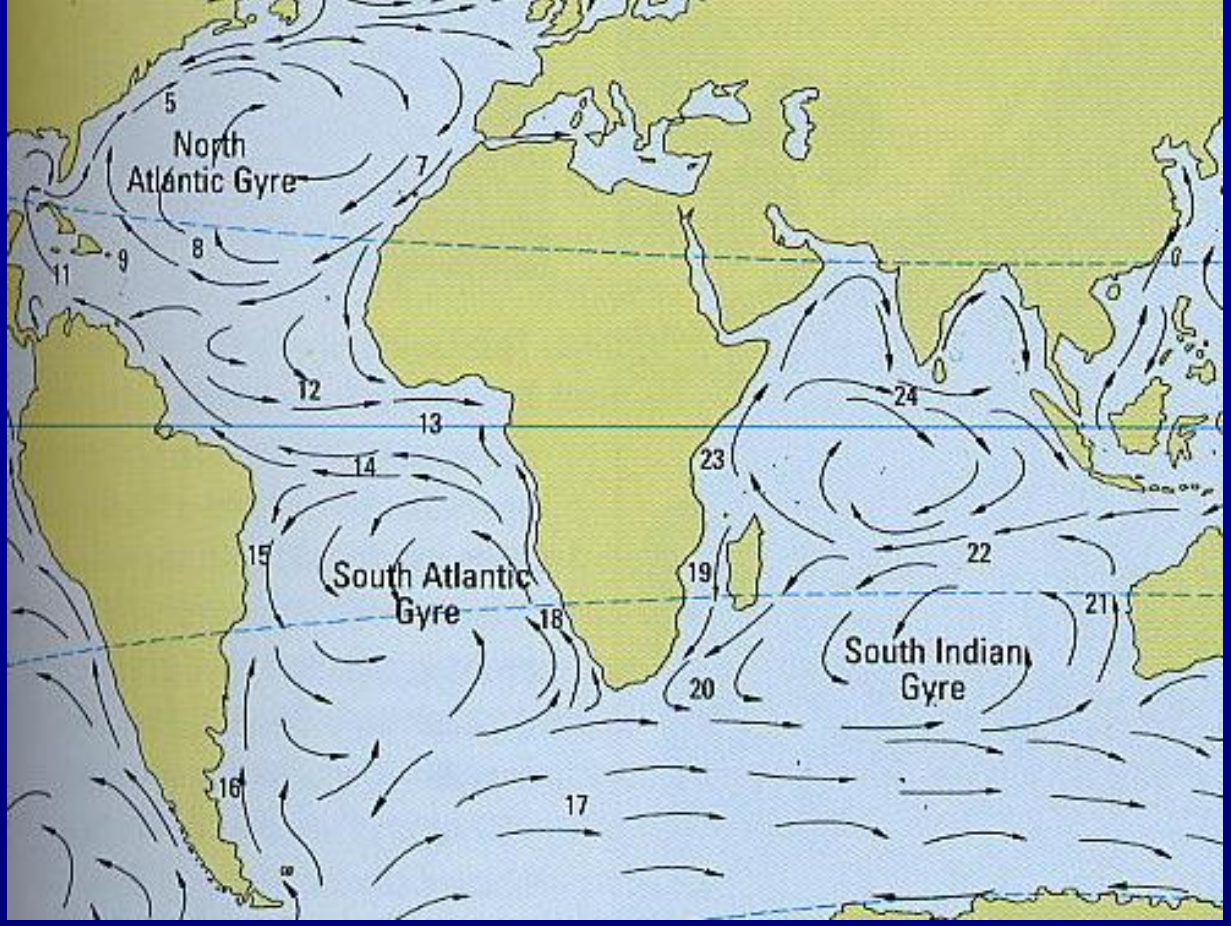
Declining CPUEs especially since 2004, and major decline of effort since 2003

A decline of CPUE probably in relation with a vanishing fleet and a less efficient surviving fleet

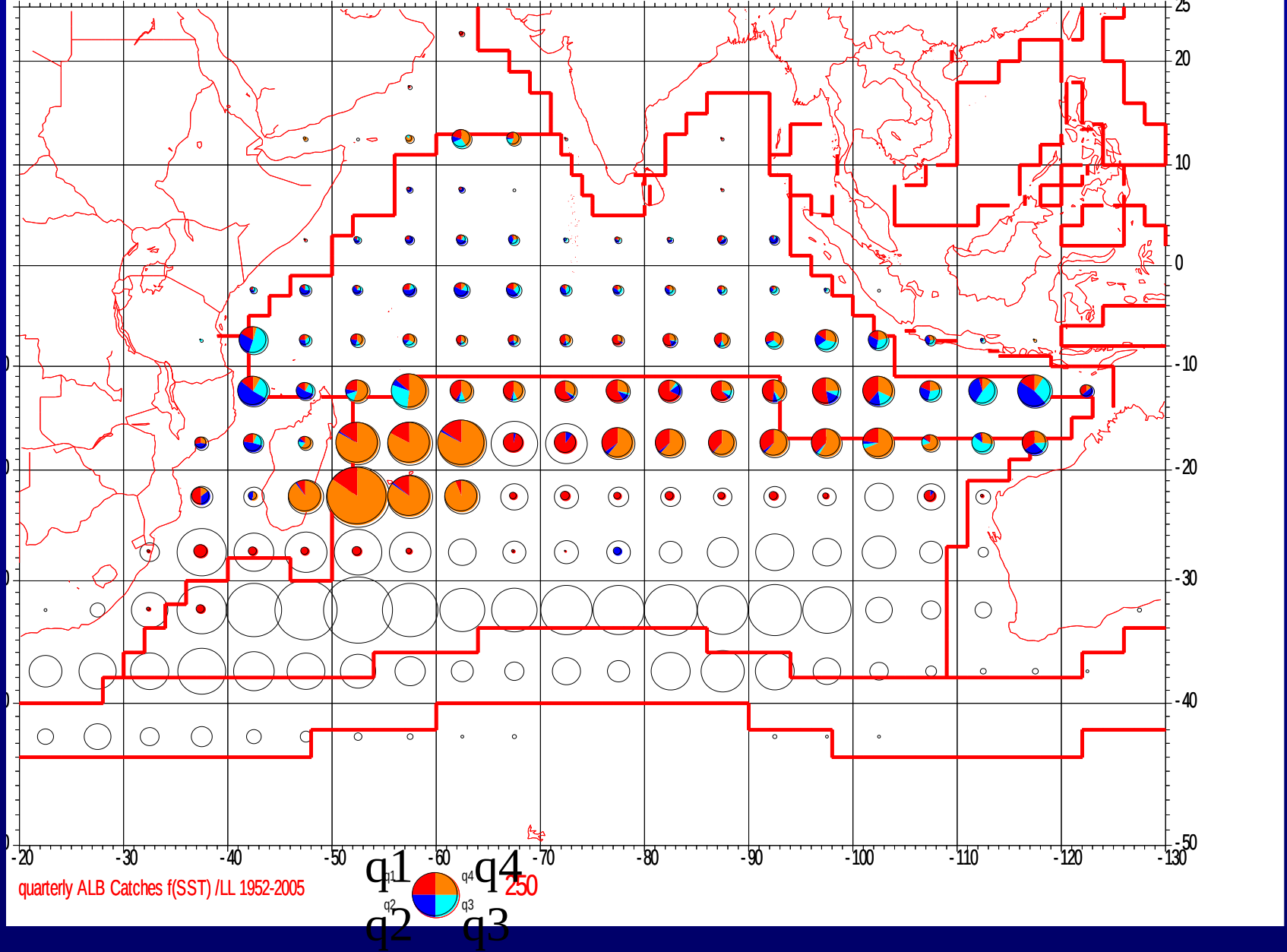


- World wide Albacore is a **typical temperate tuna**, a typical case of highly migratory species (as BFT and SBT), probably doing yearly extensive migrations: feeding & spawning migrations, & probably showing behavior

-Its seasonal **movement patterns are quite easily rebuilt simply based on the analysis of time and area catch and cpue data (by sizes)**, especially when taking into account the environmental parameters, such as SST and availability of food;

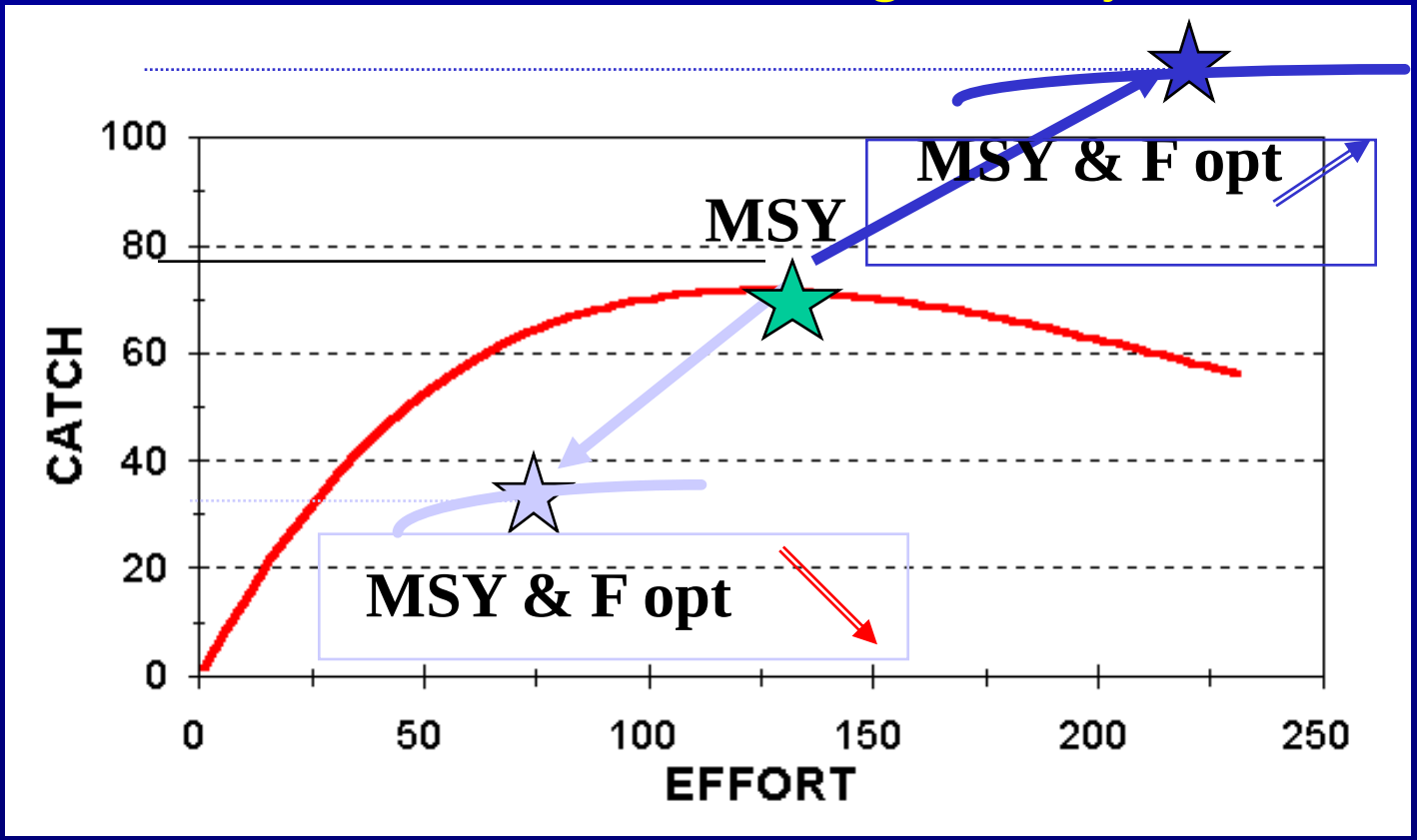


-ALB is the only and typical tuna species targetted in the gyres
-Albacore migrations tend to follow surface currents around gyres
- like all other tunas, ALB spawn in warm waters (SST>25°C)



Catches in cold and quarterly in warm waters (>25°C):
Clearly showing well identified spawning and feeding strata

Albacore: MSY are often variable, being driven by environment cycles?



#Albacore tuna stocks seems to show a variable productivity , being « prisoners » in temperate ecosystems, and driven by variability of these ecosystems (success of spawning and recruitment, food and competitors at all ages, size of the favourable habitat).

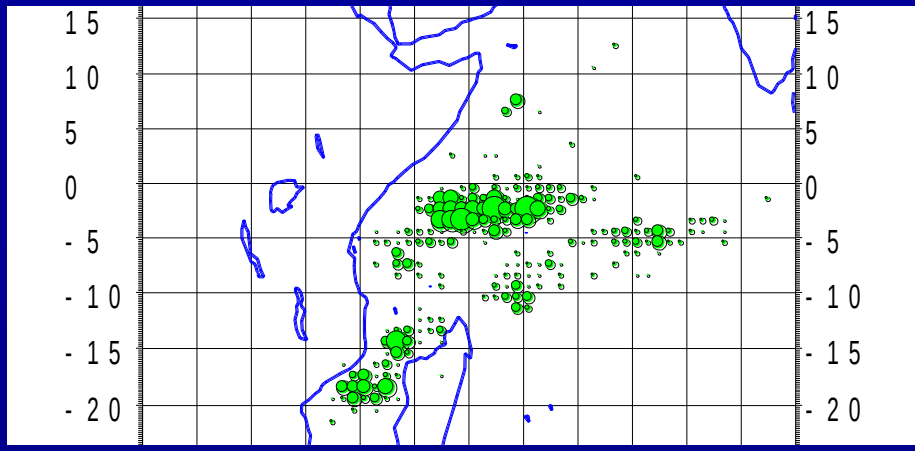
When MSY of other tuna species & stocks seem to be much more stable, having a much wider habitat and spawning zone.

This natural variability of ALB stock should be studied by IOTC scientists

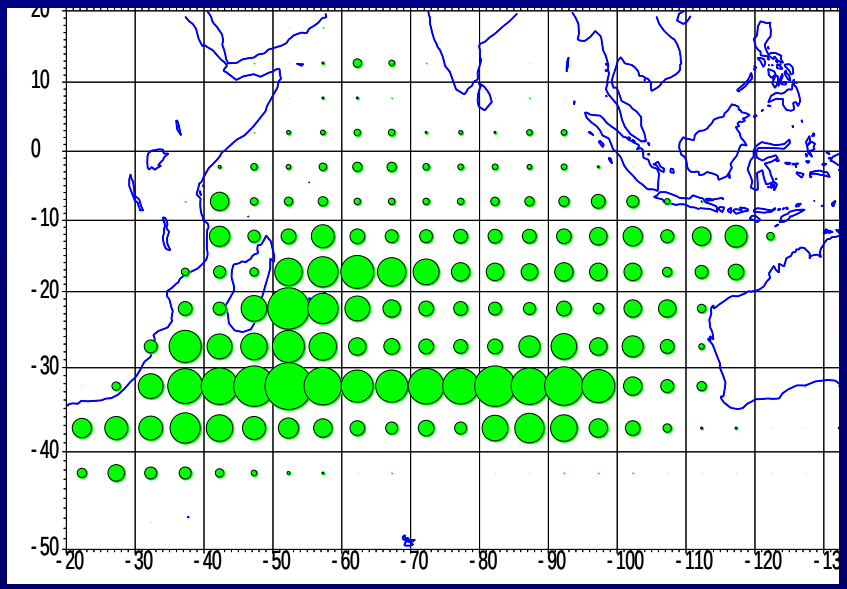
3 typical ALB fisheries active in the IO:

- Longline (major)
- Drift nets (gone since 1992)
- Purse seine

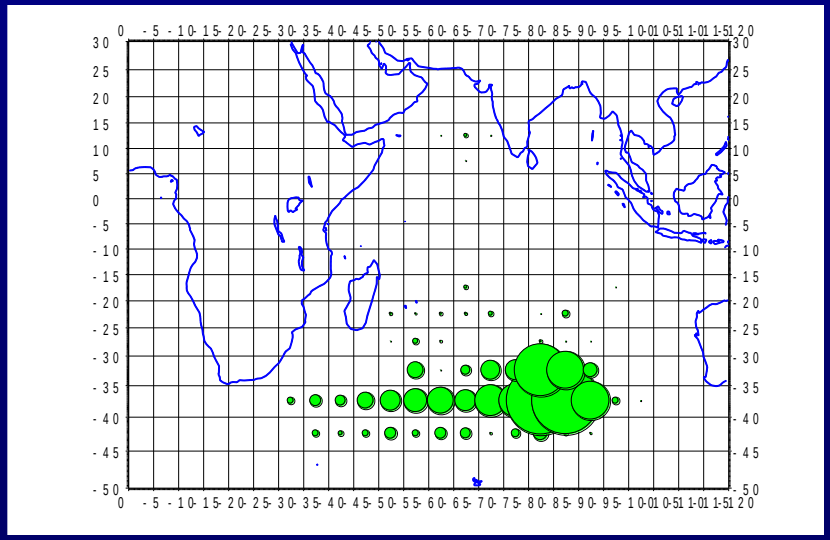
#The only ocean without pole and line vessels (SAF fishery?)



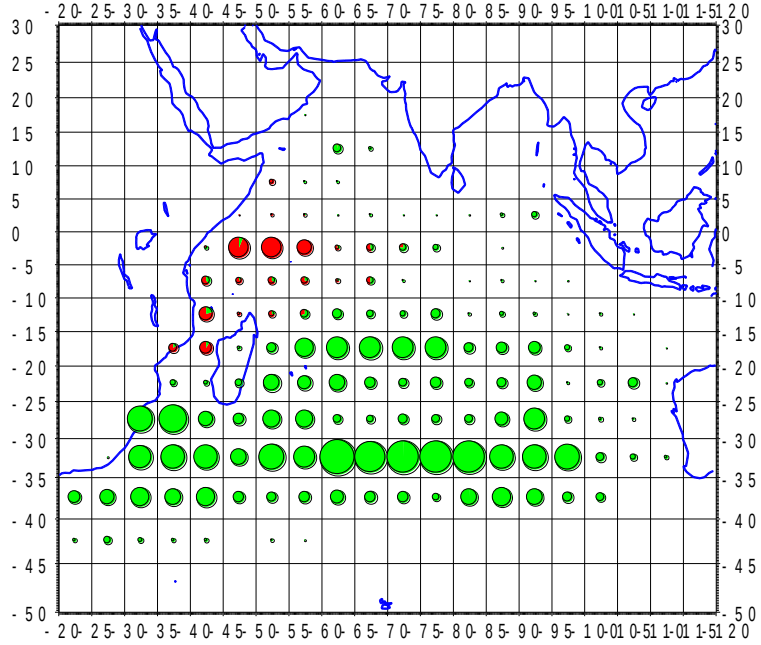
Recent catches by PS



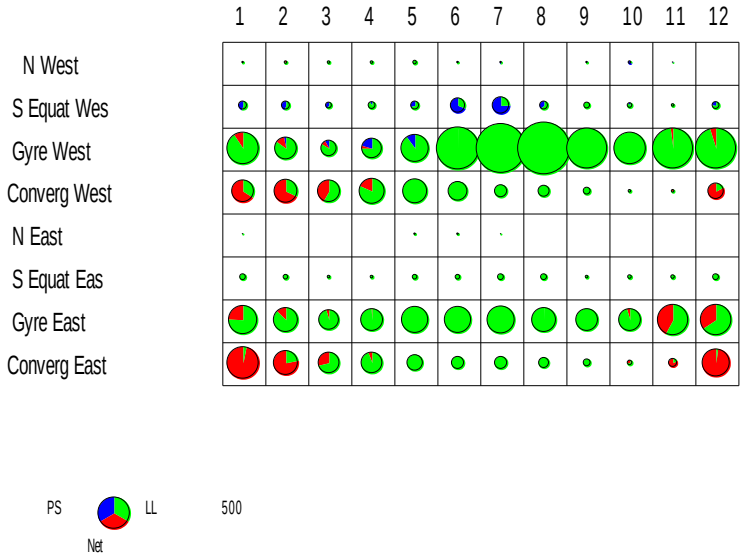
Longline catches



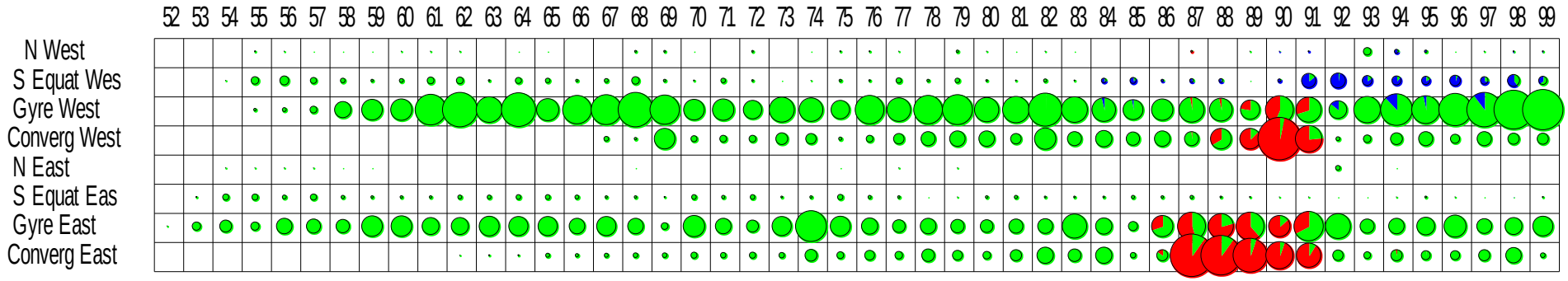
Historical catches by drift nets



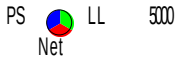
ALB catches 1990-2000

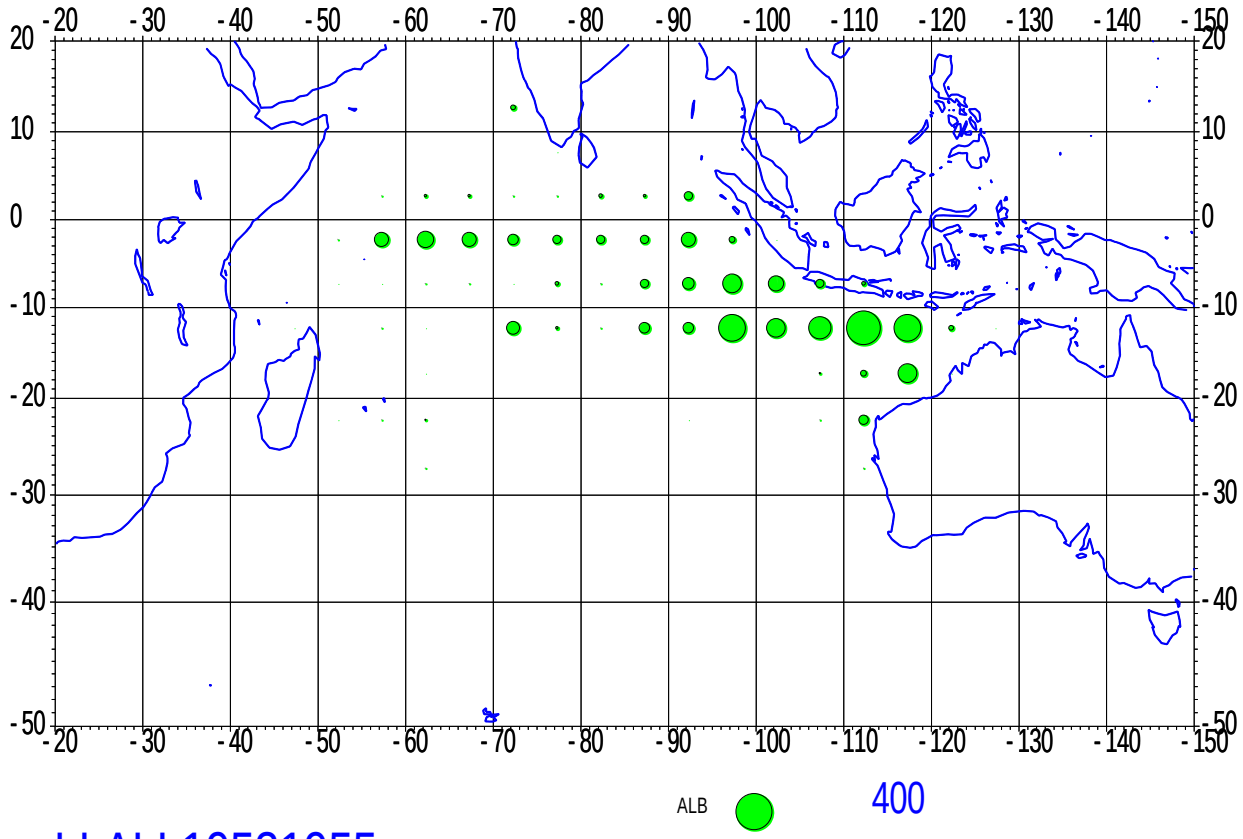


Catches by gear, monthly /area



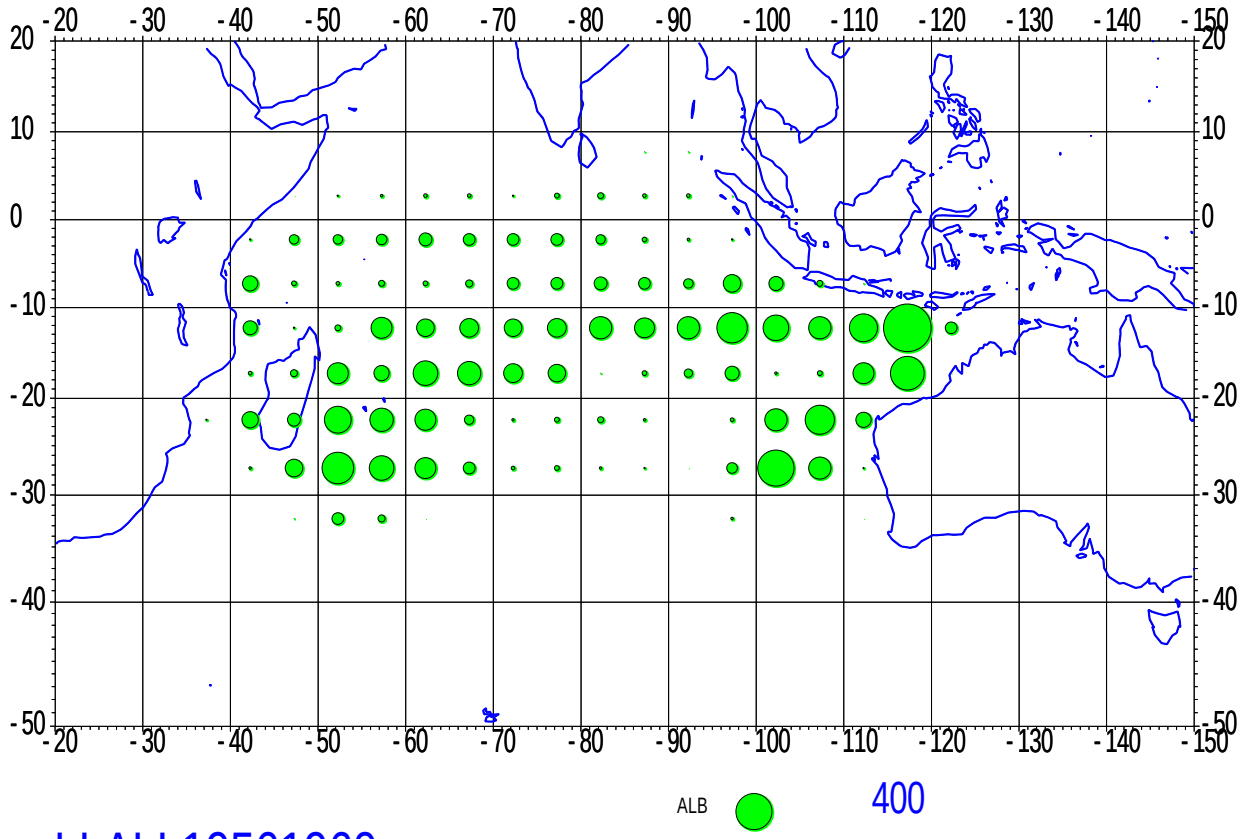
Total ALB catches / areas & gear



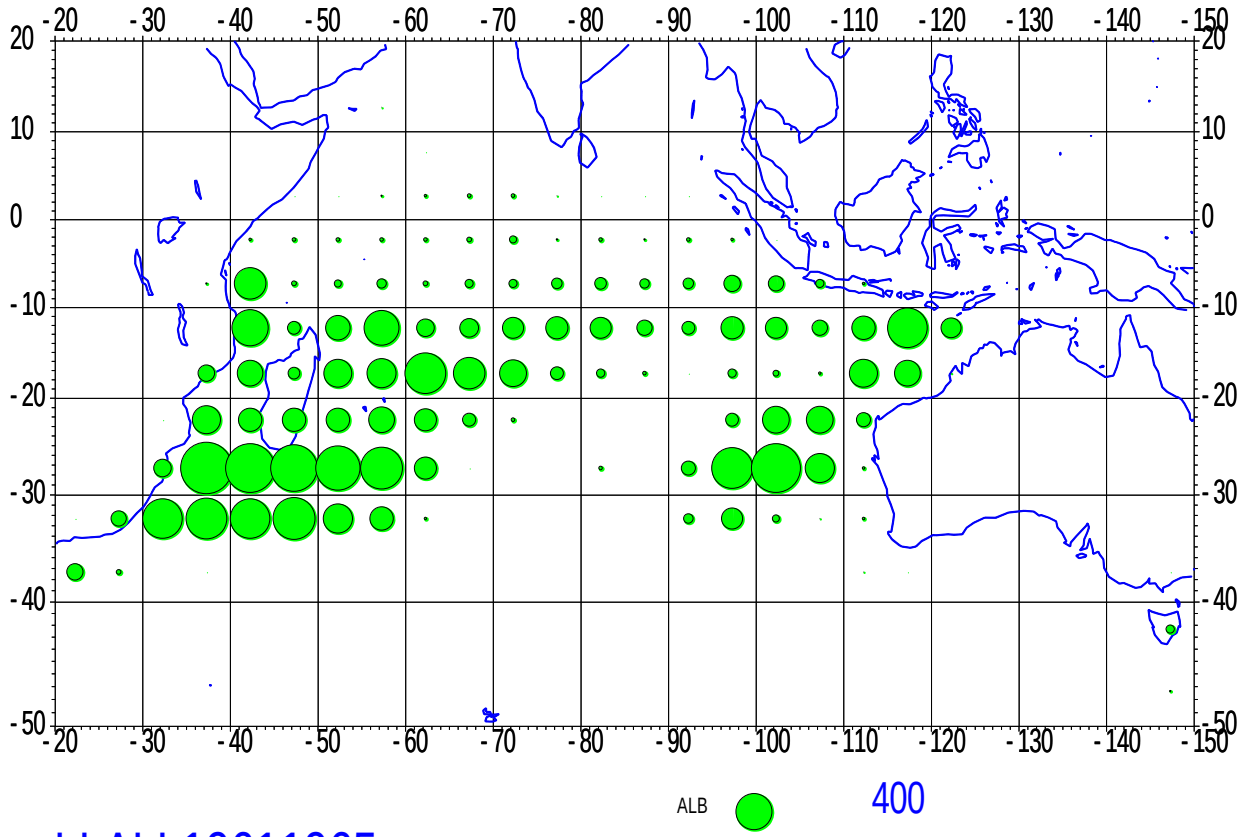


LLALL19531955

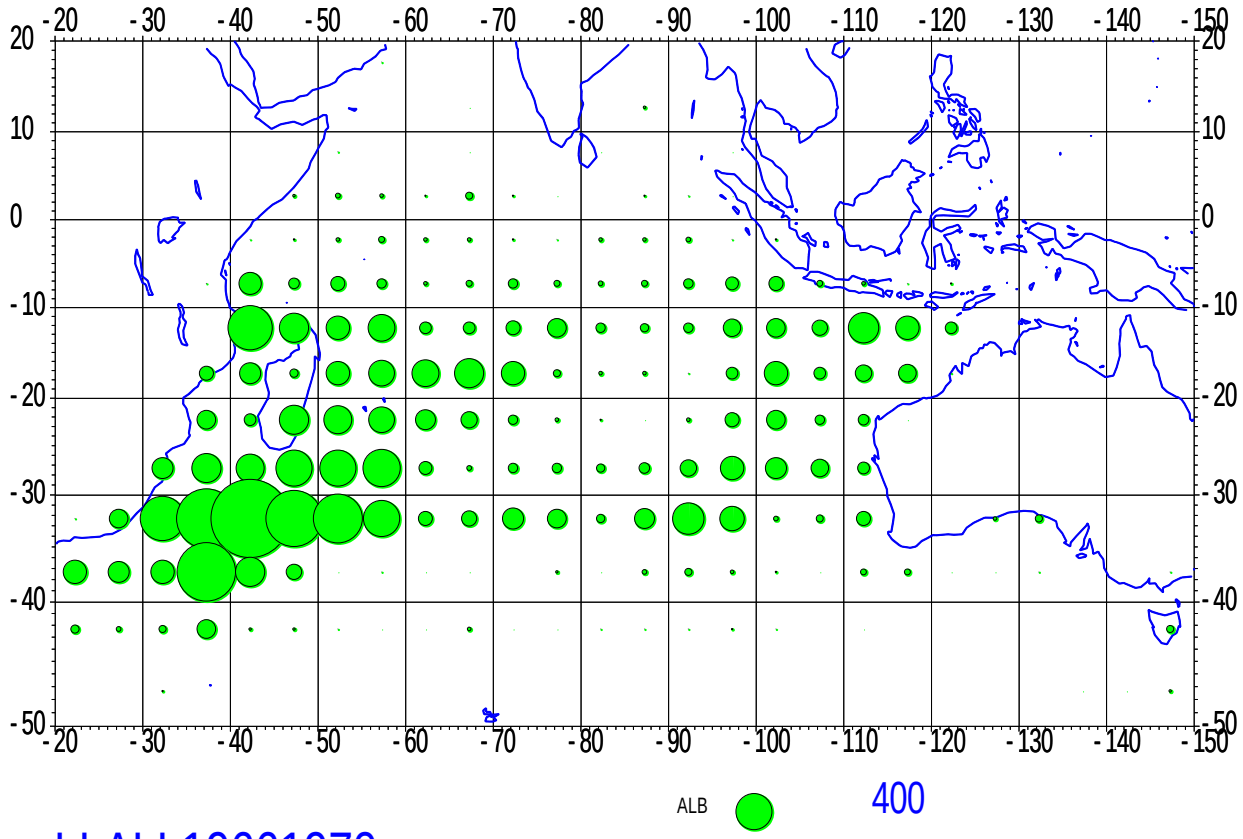
Albacore catches by longline fleets, by 5 years periods



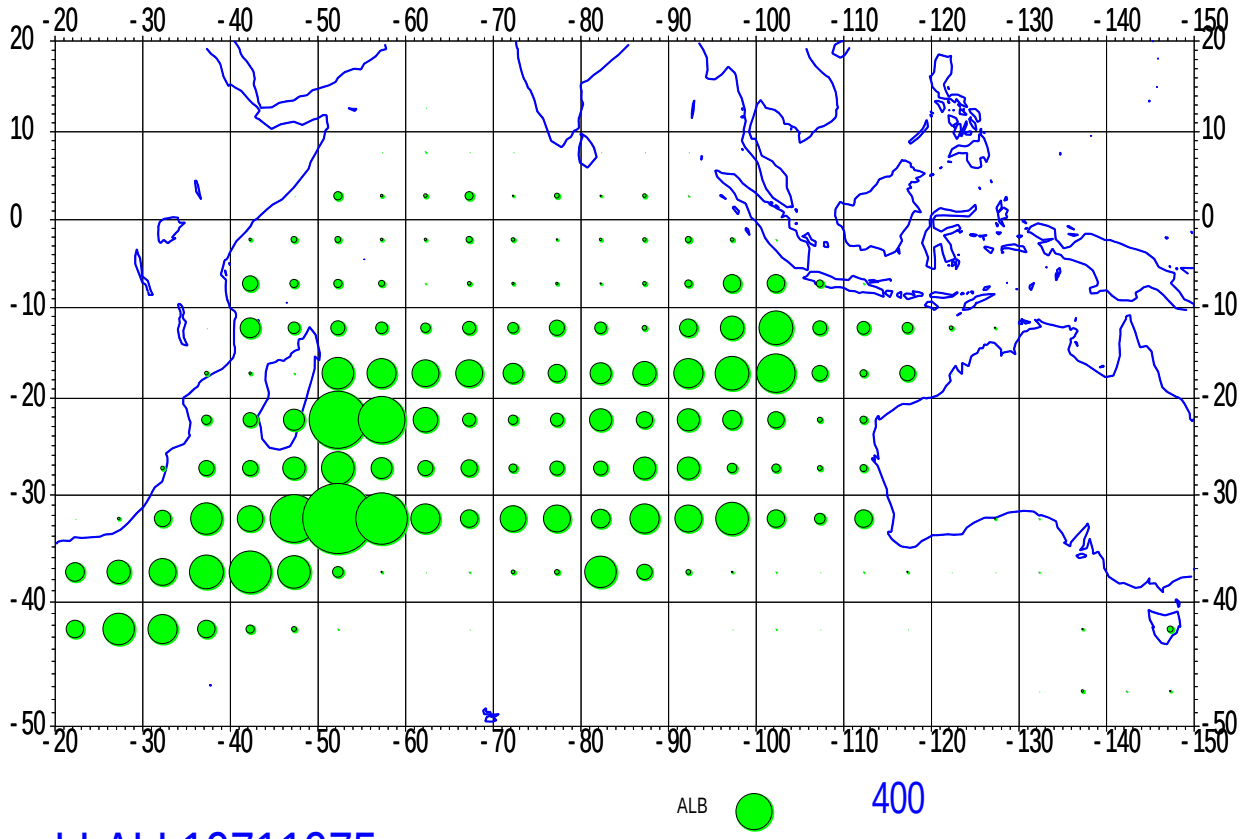
LLALL19561960



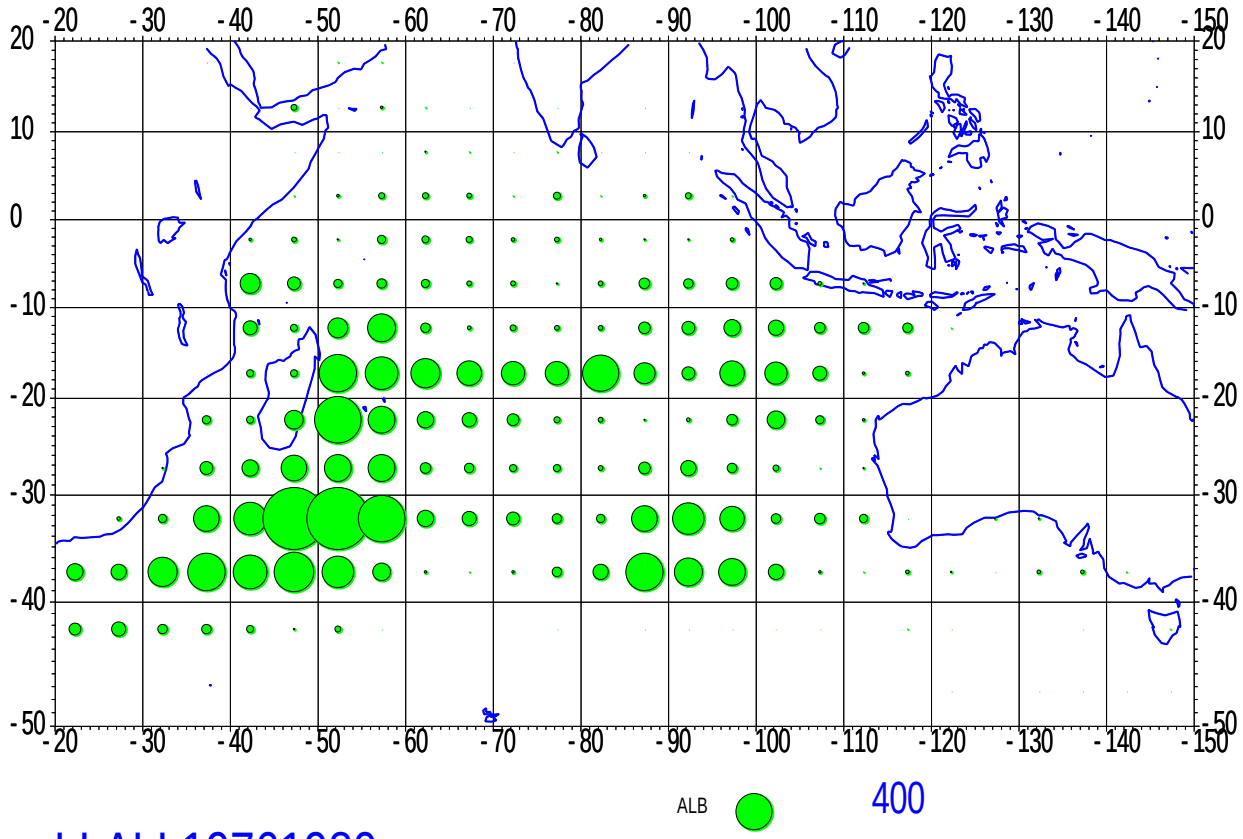
LLALL19611965



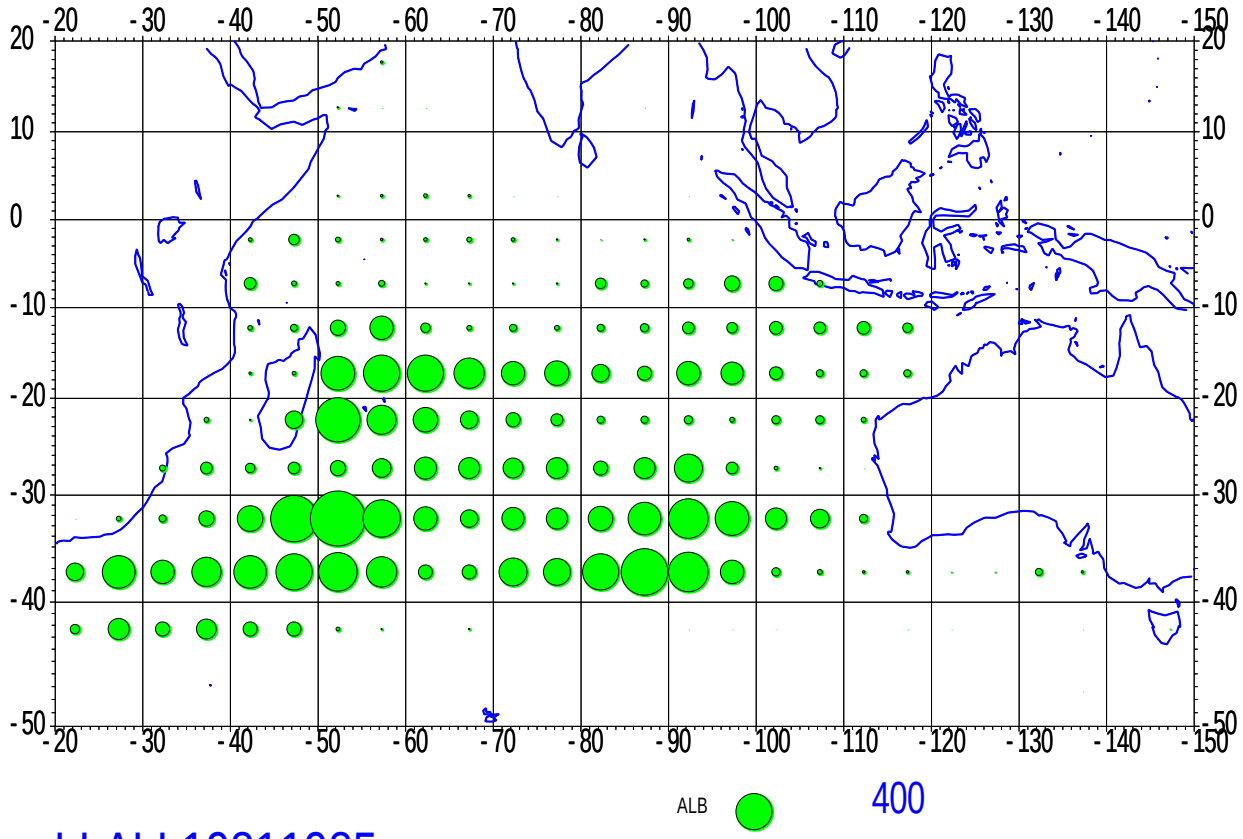
LLALL19661970



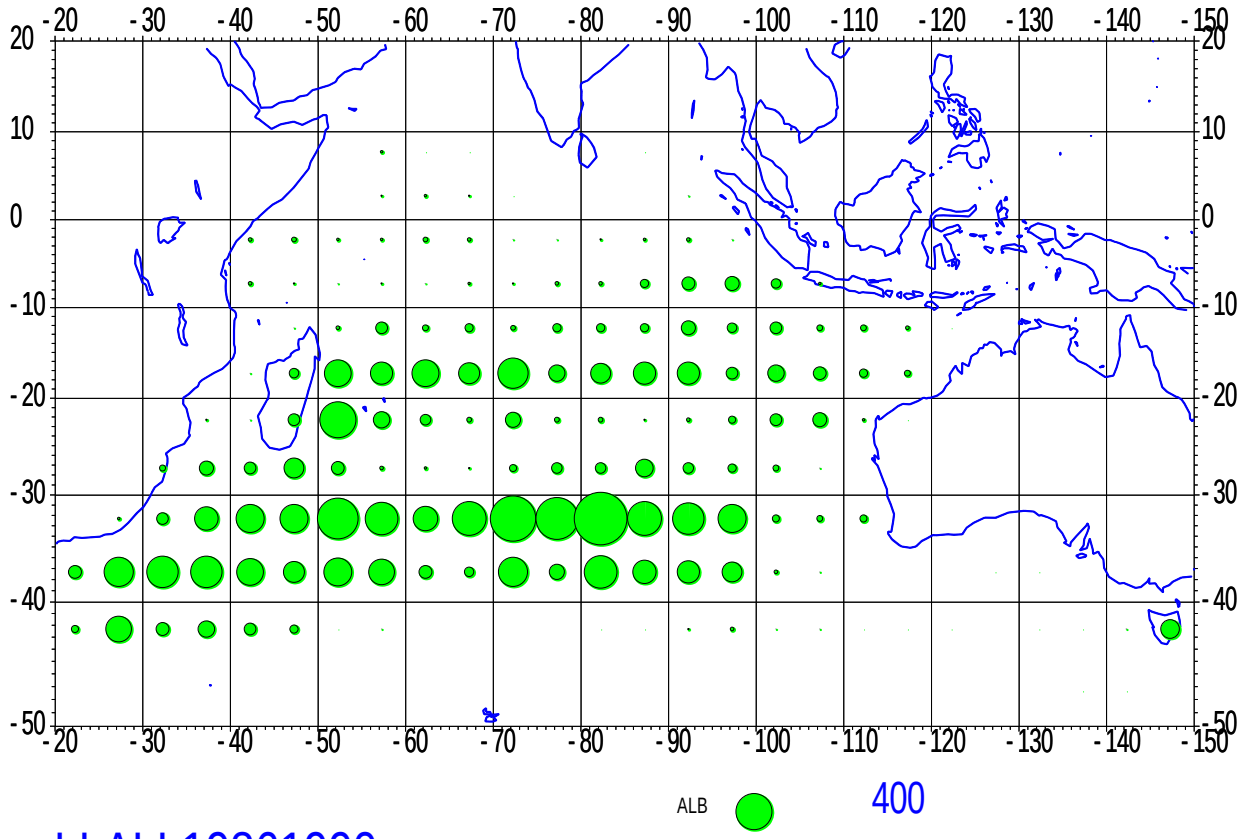
LLALL19711975



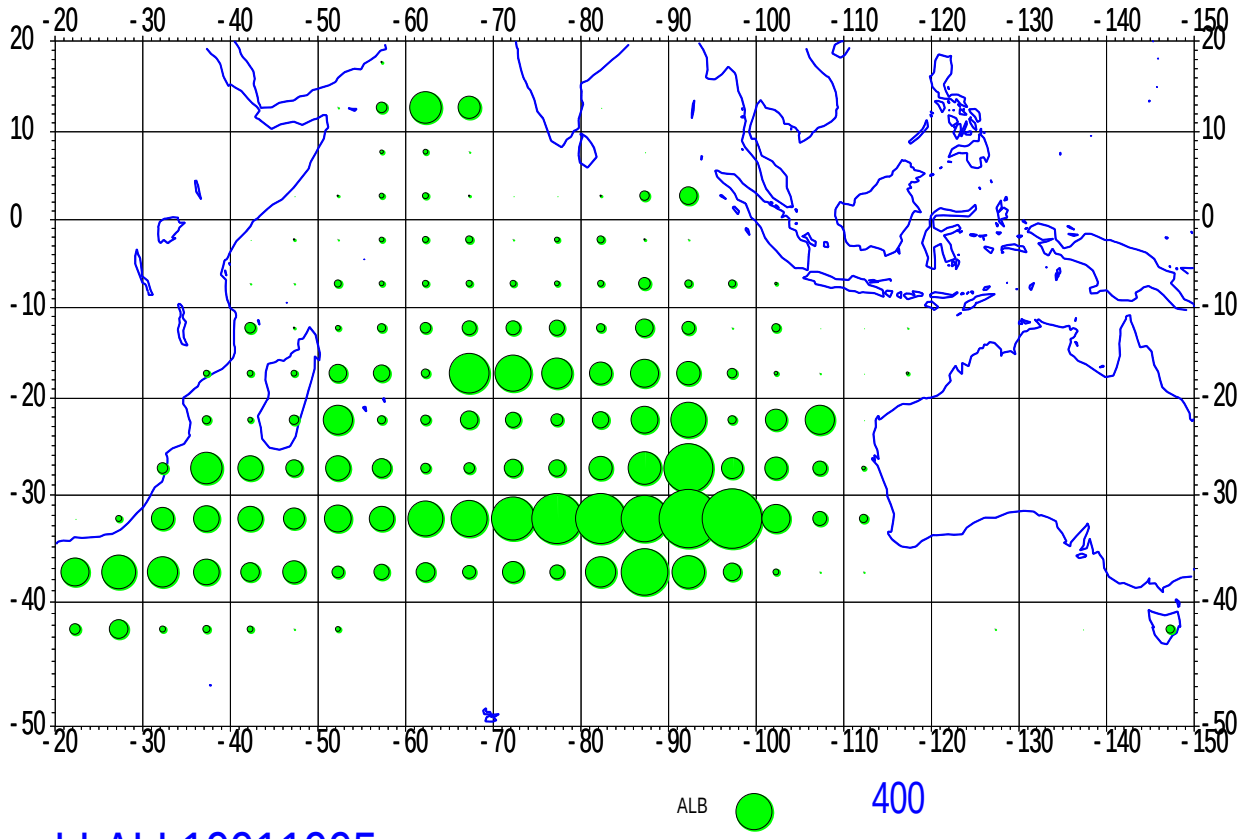
LLALL19761980



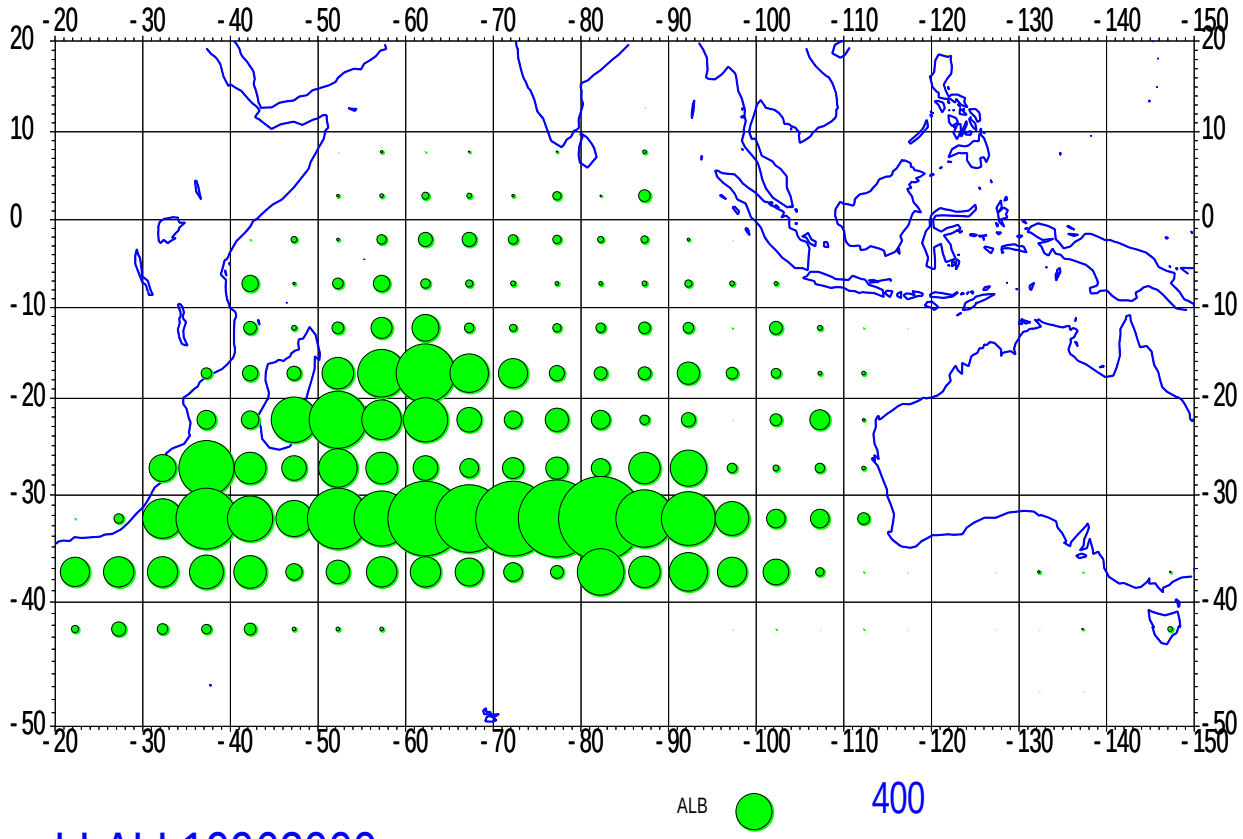
LLALL19811985



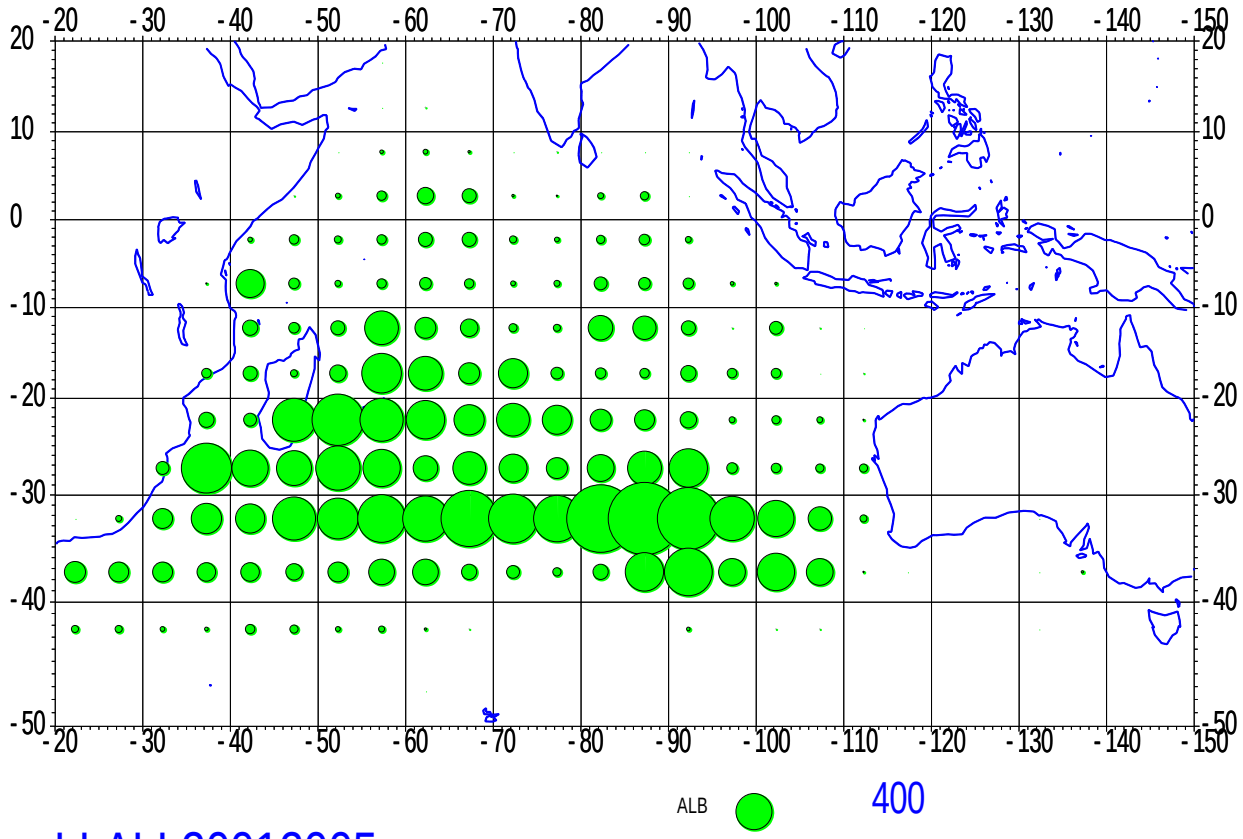
LLALL19861990



LLALL19911995

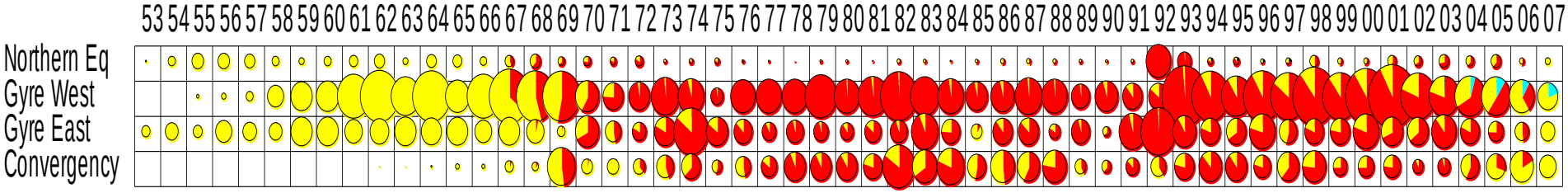


LLALL19962000



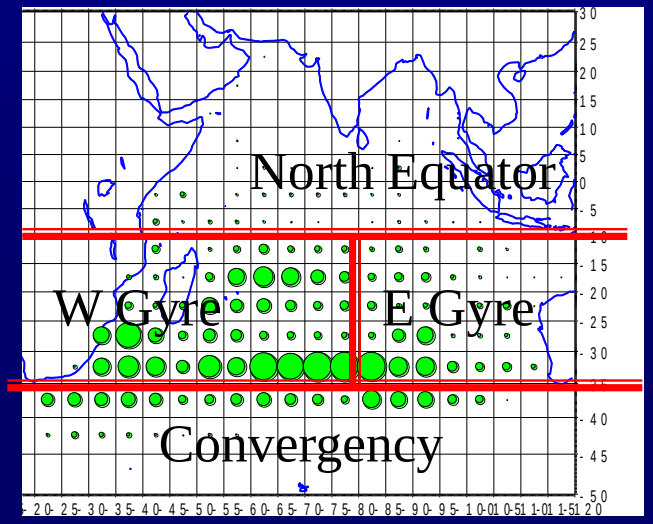
LLALL20012005

Yearly ALB catches by country and areas

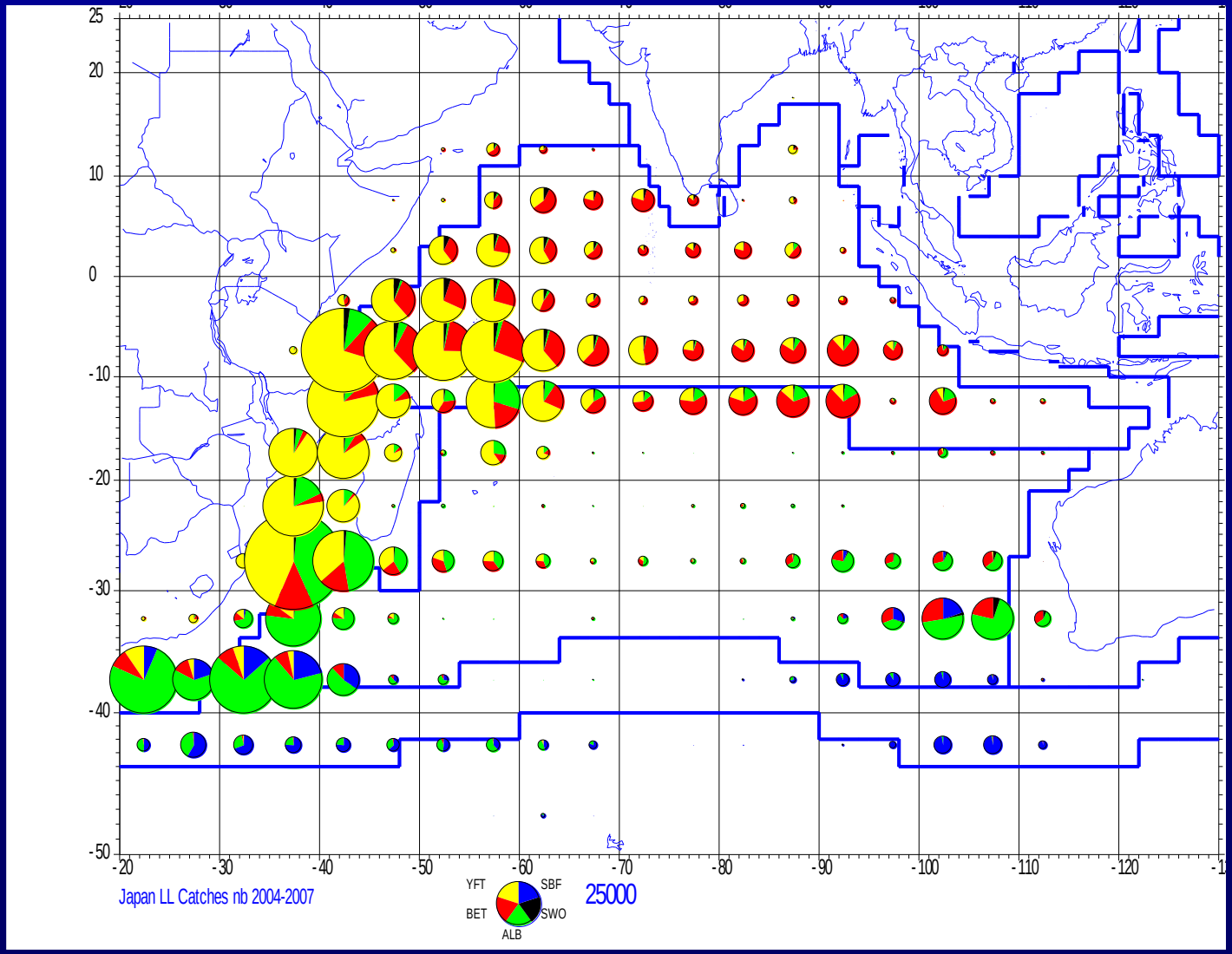


 # Albacore fisheries have been dominated by Japan until the late sixties; they were since 1970 and untill 2004 widely dominated by Taiwan, its LL fisheries targeting mainly ALB ; since 2005, Japan has been again the dominant country catching ALB (as a by catch of its SBT fisheries)

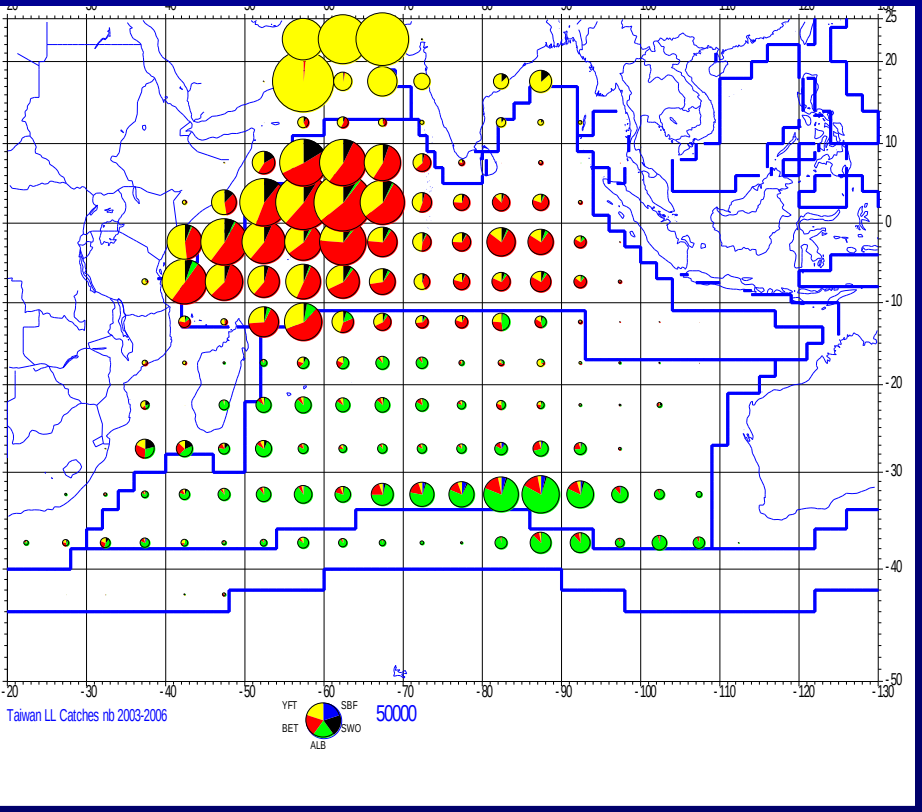
 # The major ALB fishing zones have been quite stable over time, namely the south IO gyres, and the subtropical convergency, minimal catches being taken in Equatorial areas



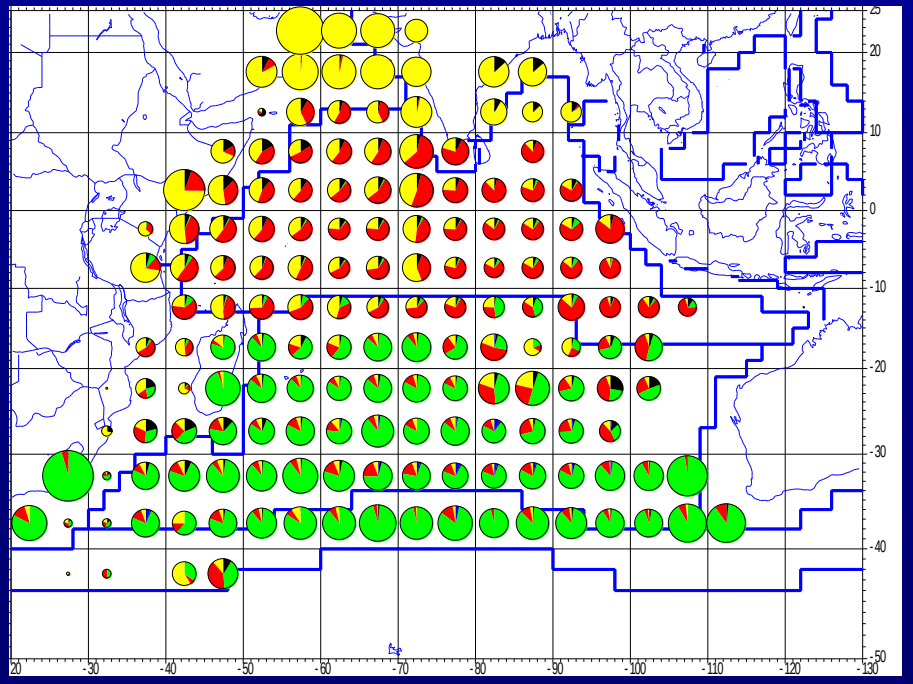
Recent fishing zones by Japanese LL 2004-2007: Significant ALB catches, but most often taken as a bycatch of the YFT or SBT fisheries, not as a pure target species (in the gyre)



Taiwan LL catches during the 2003-2006 period
Most activities targetting equatorial tropical tunas
(YFT/BET & SWO)

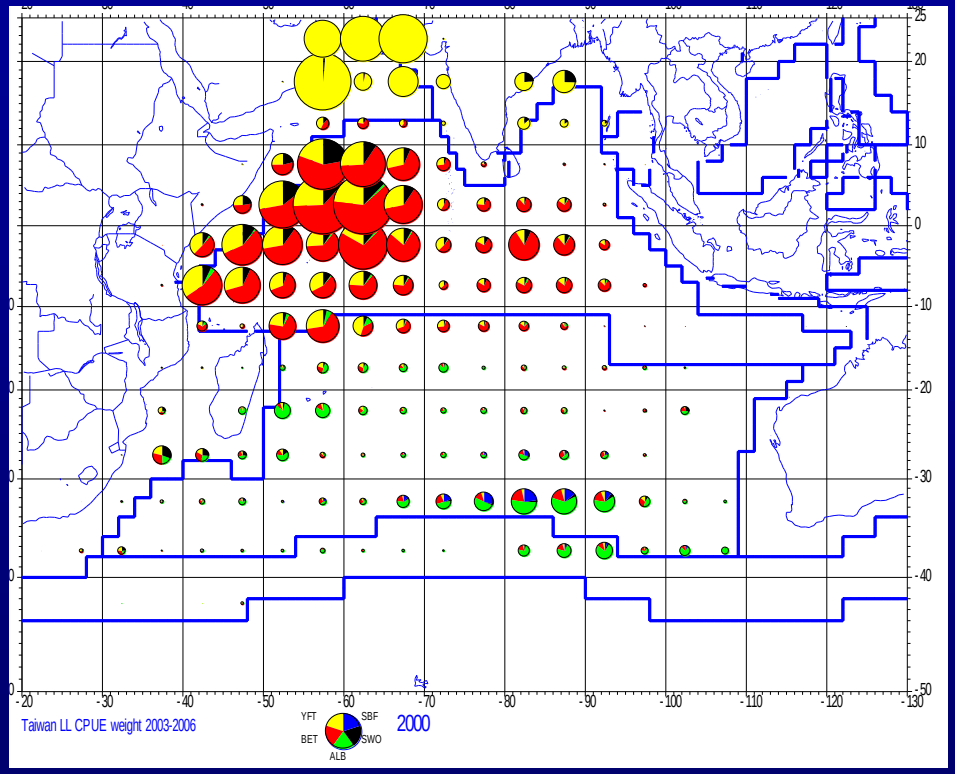


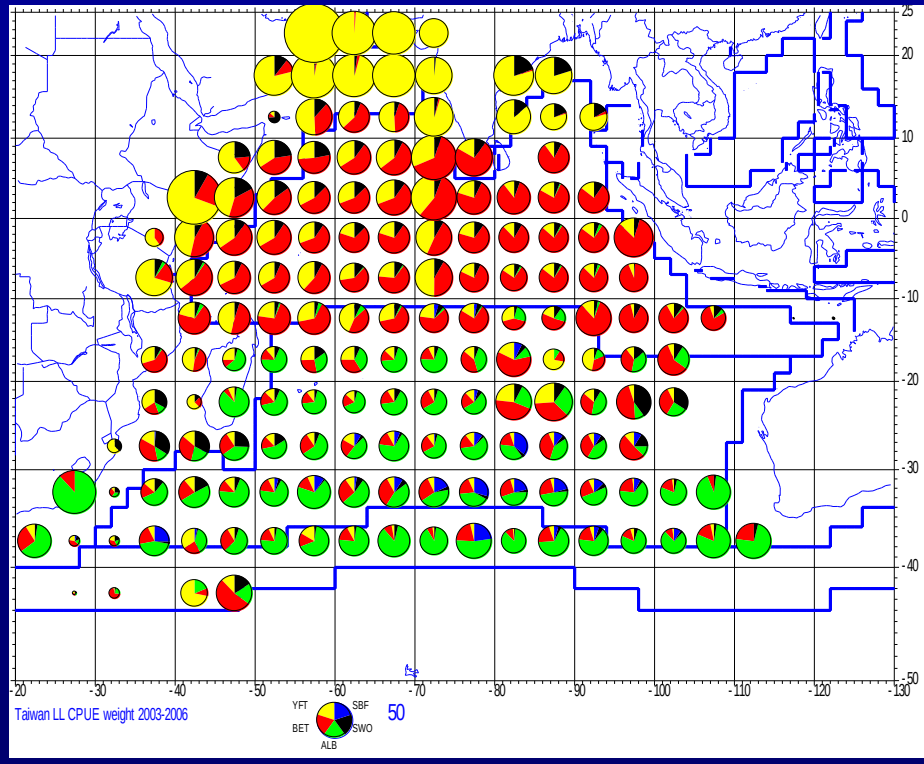
Catches in numbers



CPUEs in numbers

Same Taiwan 2003-2006 fishery: Catches and CPUEs in weight

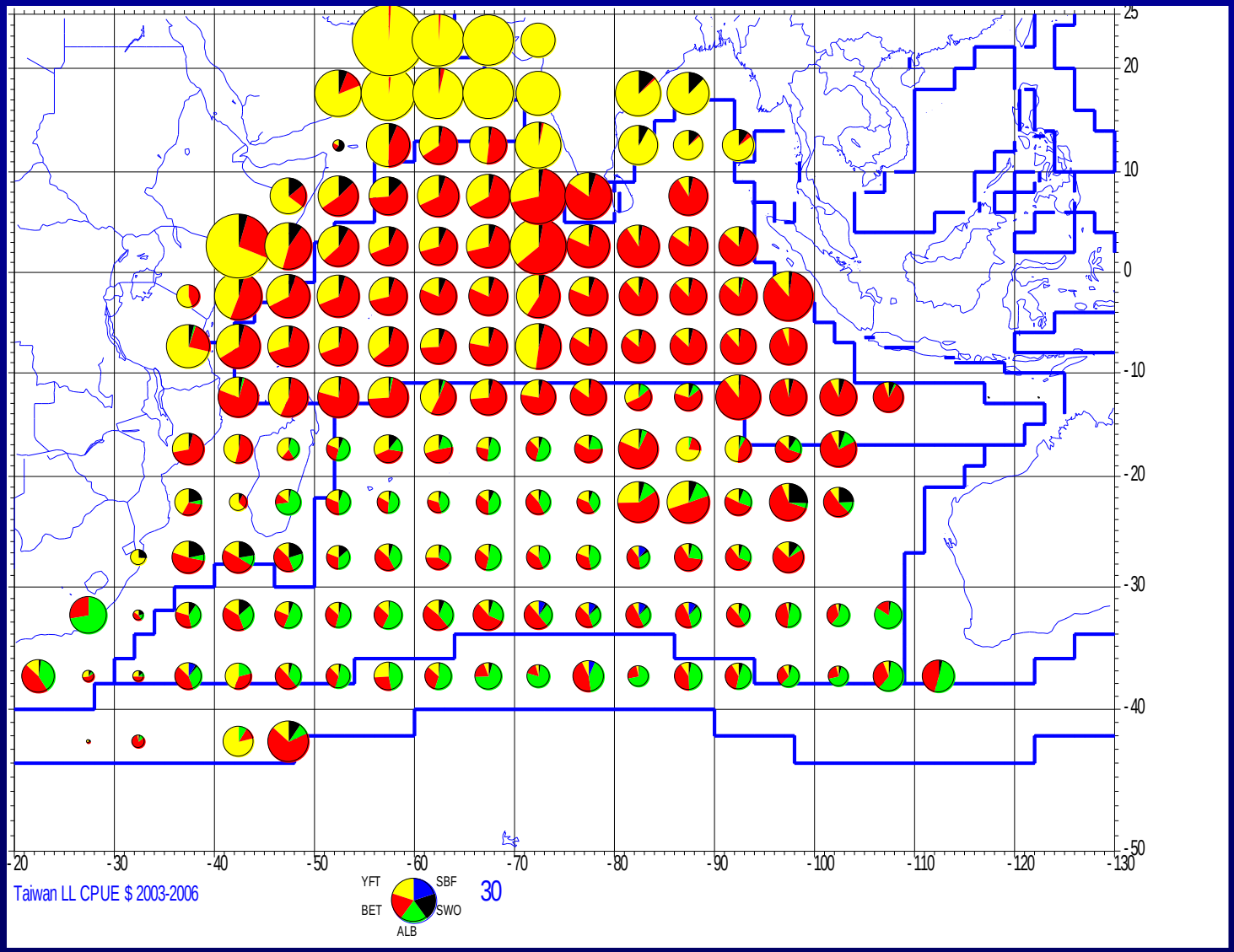


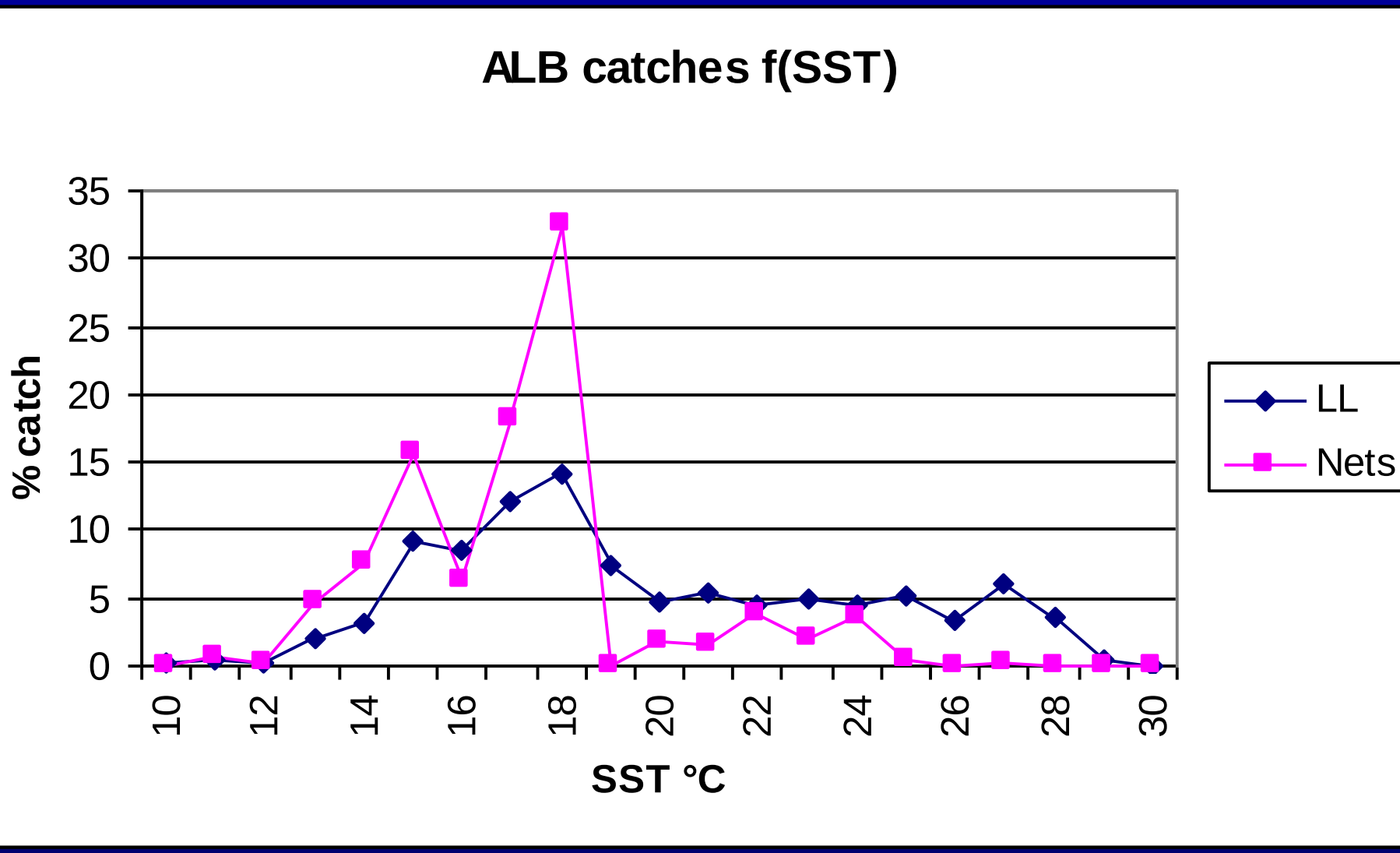


Catches in weight

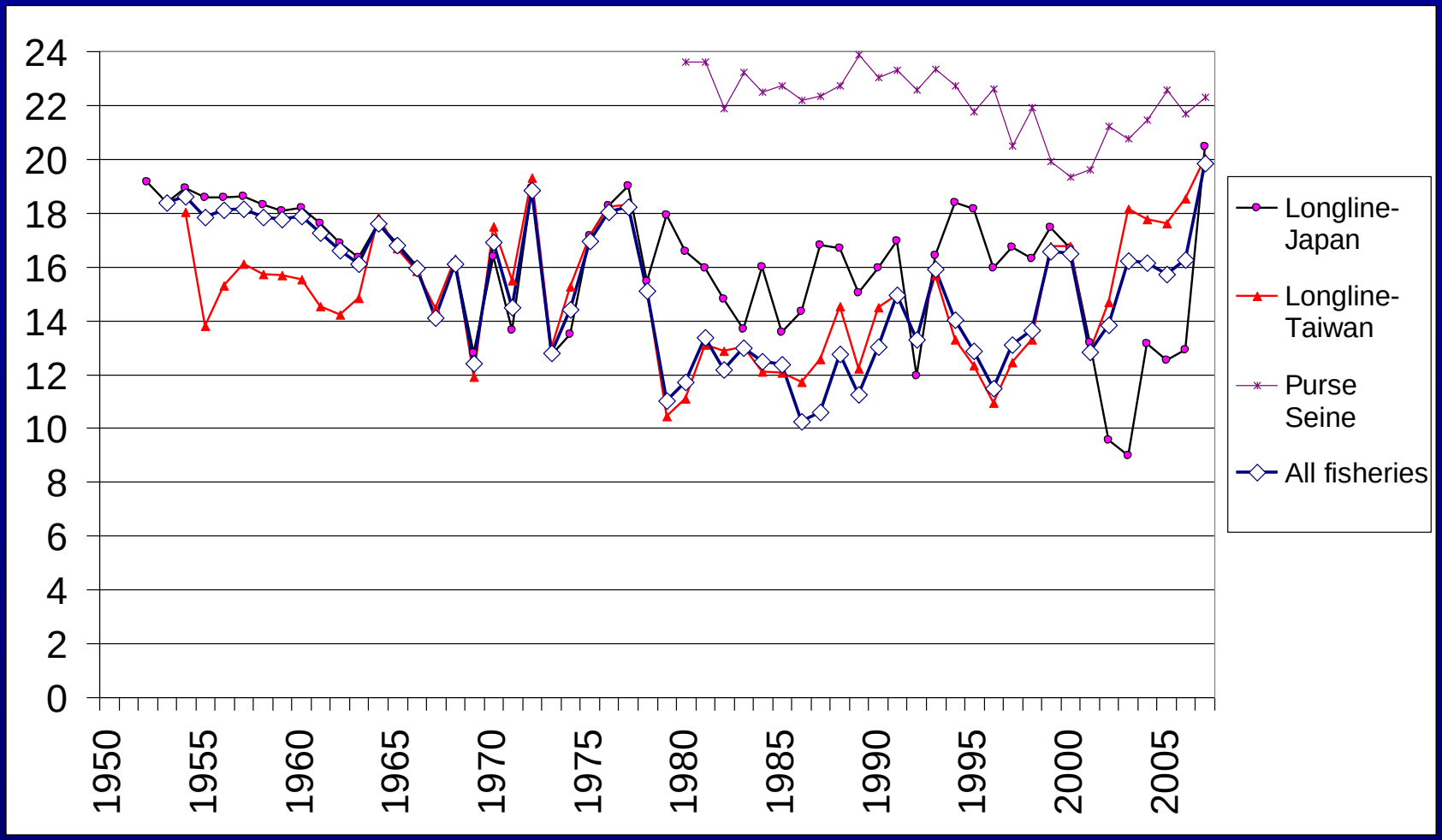
CPUE in tons/1000 hooks

Same Taiwan 2003-2006 fishery: CPUEs in US $:
A very low apparent profitability of LL fisheries targeting ALB in the gyre

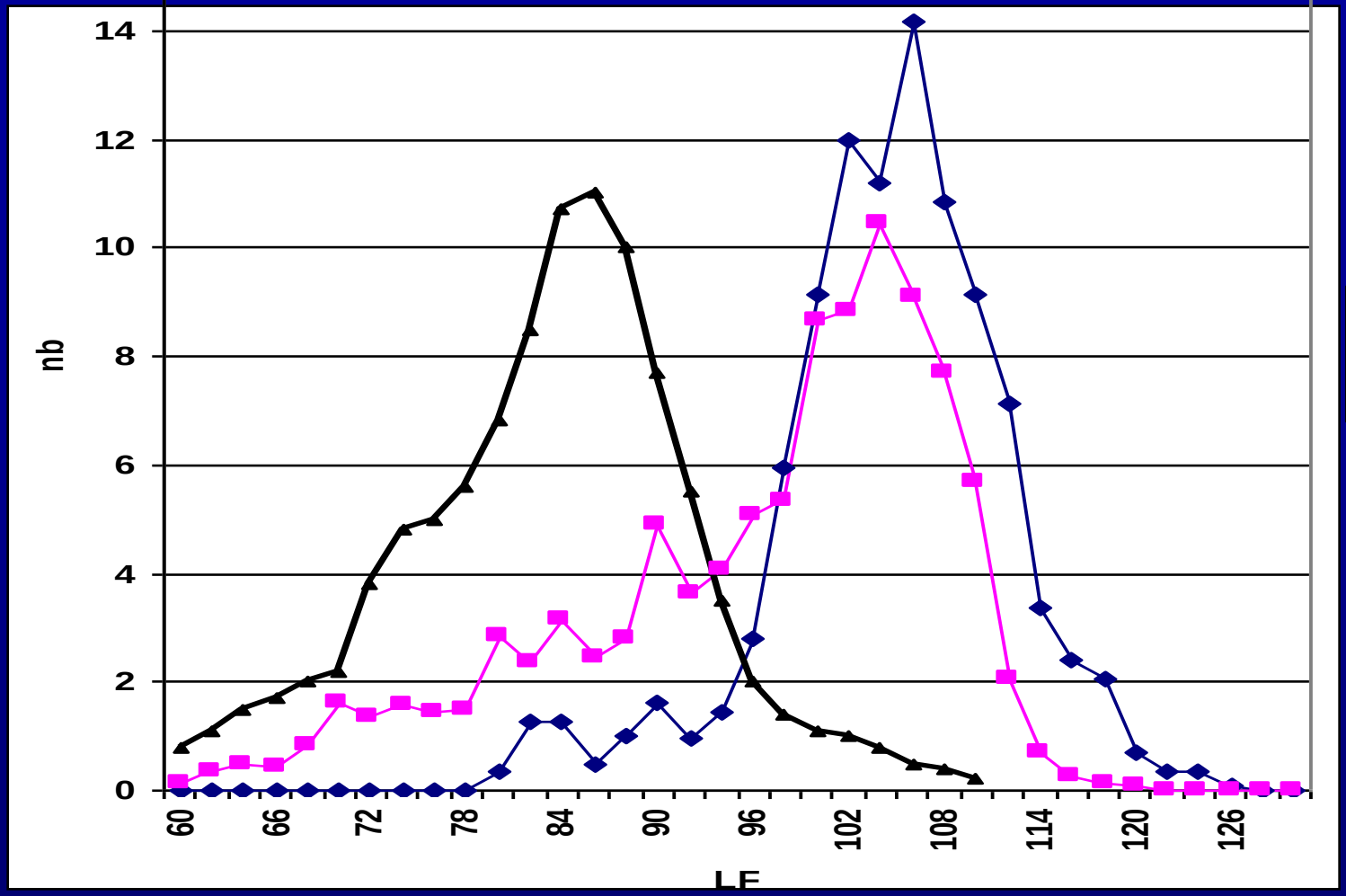




- The historical drift net fishery (targetting juvenile ALB?) was fishing in the cold waters of the subtropical convergency
- LL fisheries are fishing in a wide range of SST: 14°C et 28°C



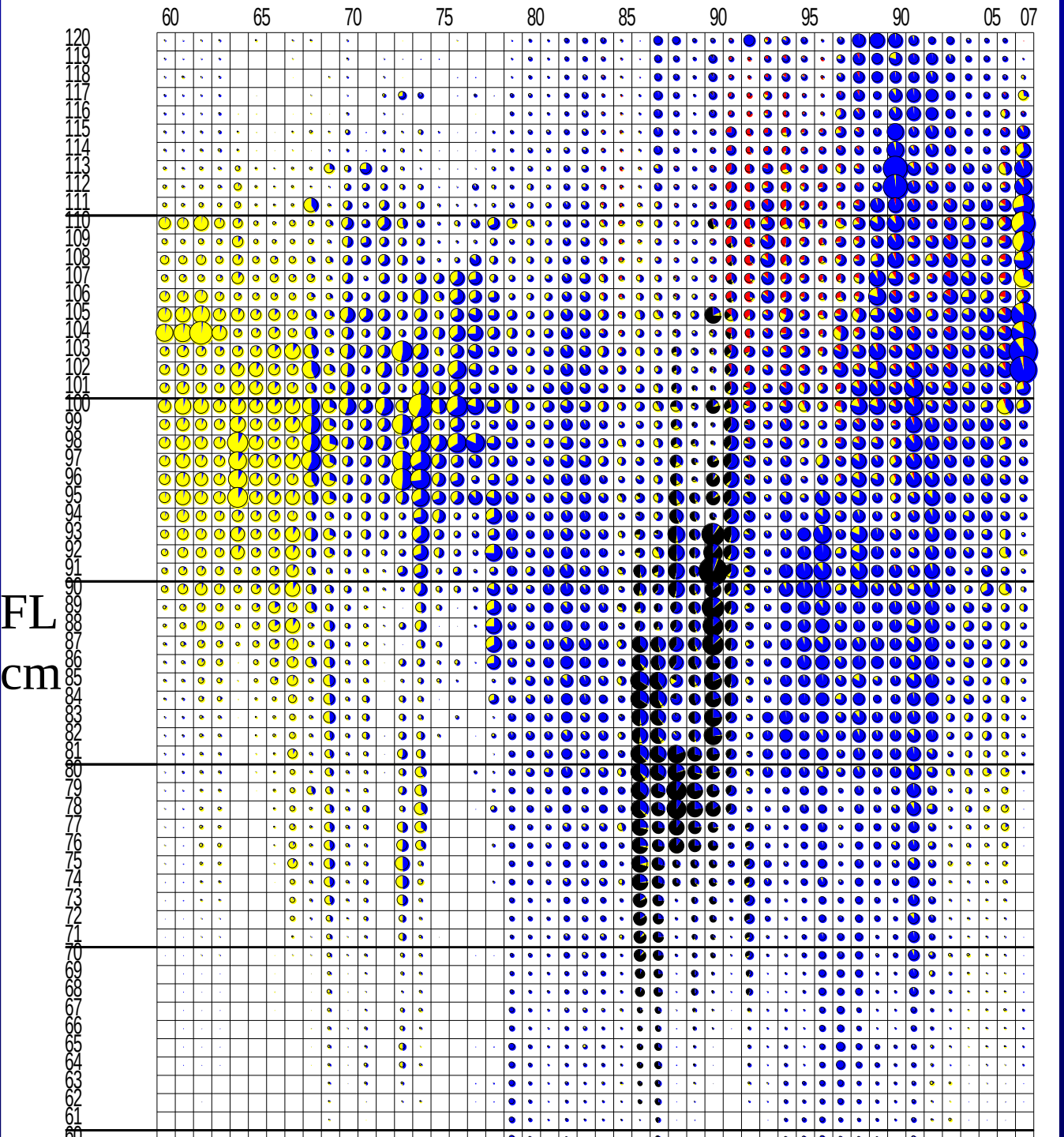
Average weight of ALB caught by the IO fisheries:
Stable and relatively large weight, in the absence of surface fisheries targetting juvenile ALB (fishes <5kg, as the major surface fisheries active in the Bay of Biscaye, SAF, and North Pacific)



Size taken:

LL and PS fisheries are taking the same sizes of ALB; (smaller fishes being also taken by longliners)

The SAF pole and line is catching in SE Atlantic smaller fishes (average 80cm), but at a reasonable average size: 10kg


60
65
70
75
80
85
90
95
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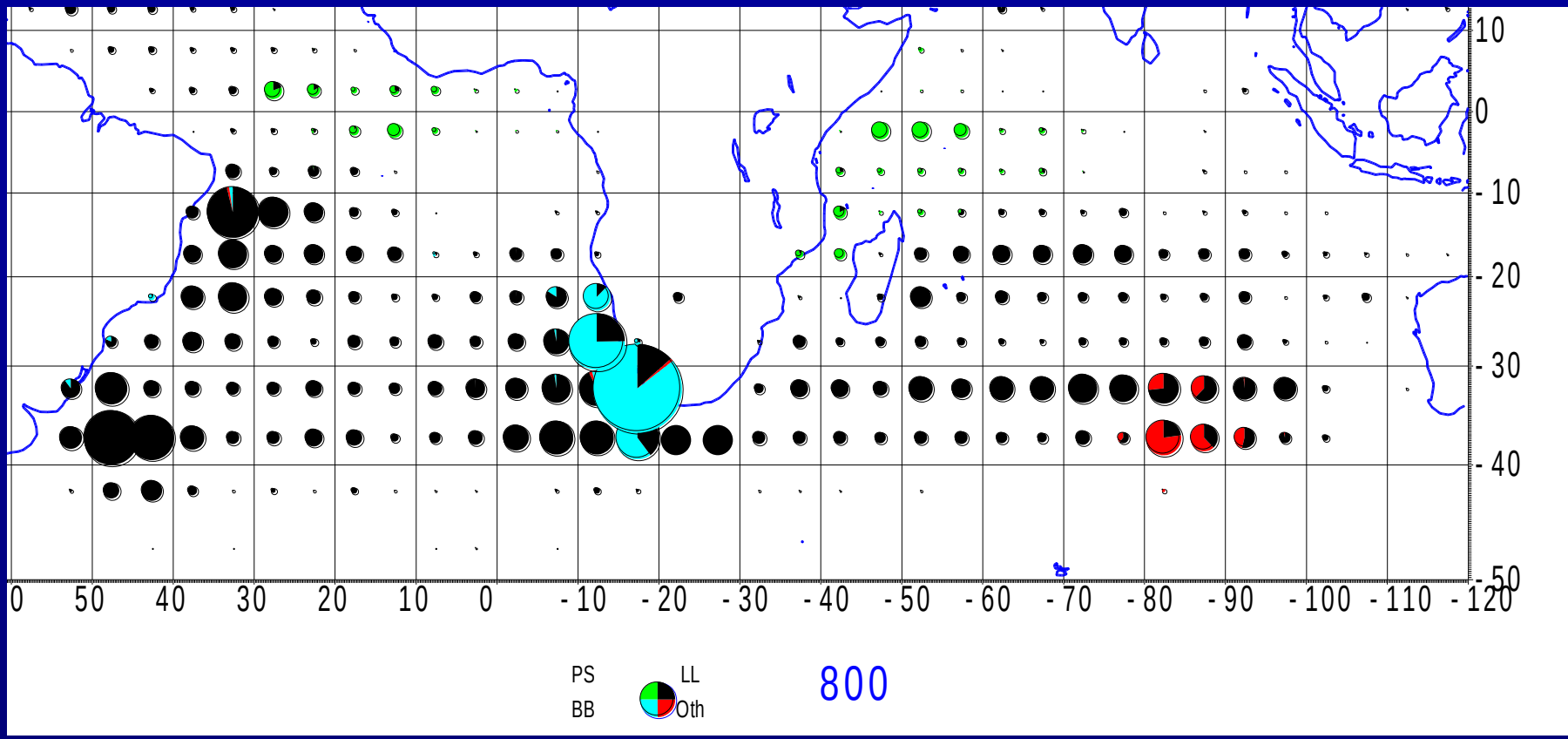
05
07
FL
cm
32 kg
23 kg
16 kg
11 kg
7 kg
4 kg
PS
LL Taiwan
Gill
LL Japan
ALB Yearly catch at size,
By gear



ALB catches by gear 1985-2000 (blue: P&L, black: LL)

-the hypothesis that the P&L SAF fishery is exploiting ALB from IO and Atlantic stocks has been widely accepted by various experts

- It is clear that there is no environmental frontier for adult or juvenile ALB between the IO and Atlantic oceans

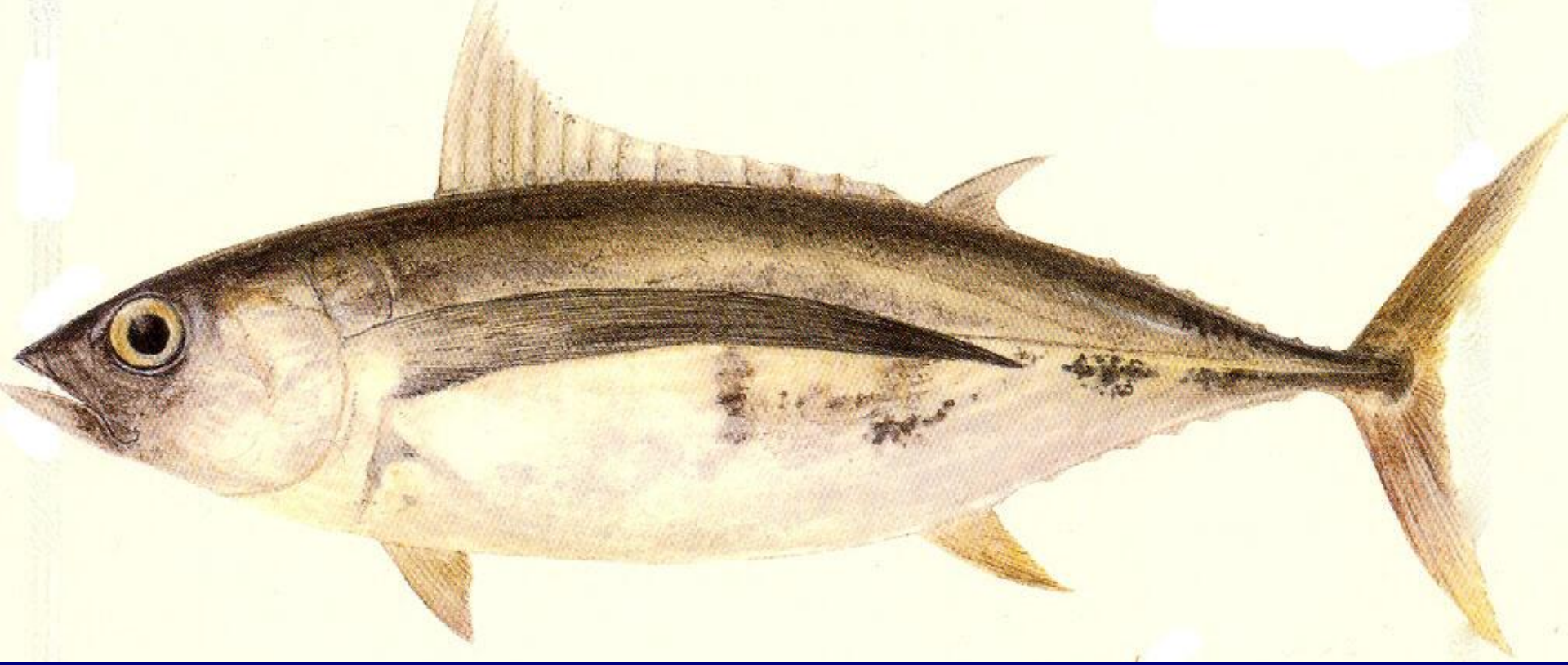
Conclusion

- Comprehensive size data recently released by Taiwan are very interesting: they would need further analytical studies
- Many pending scientific questions on ALB would need a more active research: ALB is still a species that has been abandonned de facto by the IOTC
- First priority: develop a comprehensive analysis of catch/cpue at size by time and area in order to estimate movement pattern
- Genetic/biochemistry studies conducted in the South Atlantic and in the Indian Ocean should easily allow to better evaluate potential mixing betwen Atlantic and IO ALB (juvenile & adults)
- Tagging of SAF small ALB in SAF waters would be highly interesting and easily done to identify the link between these young ALB and the IO fisheries
- Strong need to coordonate better the Atlantic and IO researches on ALB: ICCAT/IOTC

No need to recommend management measures: ALB is not SBT, as ALB stock is well protected:

- By its habitat: wide, deep, windy, far from landing port and very southern
- By the still cryptic habitat of juvenile ALB???
- By the fact that ALB CPUEs in weight and $ are never very high: ALB is not SBT
- By the low profitability of LL ALB fisheries: there is very little economical incentive to increase fishing effort targetting ALB in the IO, far from ports.

- Present ALB catch at size are + or – optimal in the present fisheries
- Present ALB catches/fished areas are still low compared to other oceans
- Simply a need to carefully monitor the catch trends and sizes taken and to develop a more active research on the stock



Thank you!