

Temporal patterns of yellowfin and skipjack tuna associated with anchored and drifting FADs

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Species, Areas and Spatial scales

YFT



SKJ



YFT



SKJ



YFT



BET



YFT



SKJ

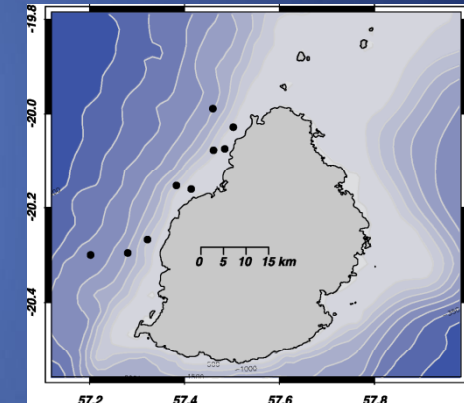
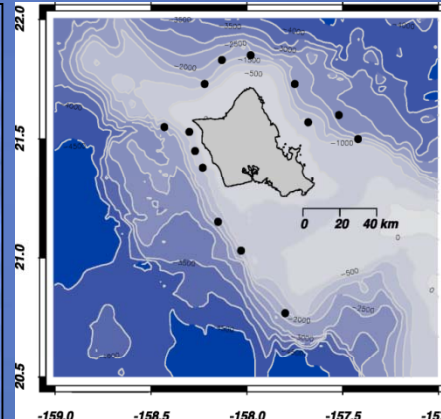
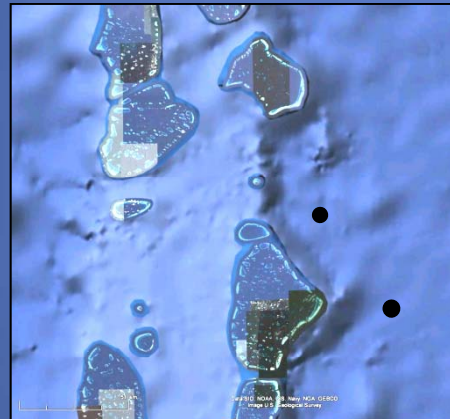
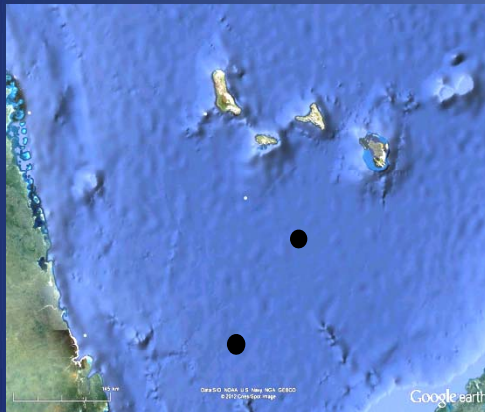


Moz. Cha. (~ 1 Month)

Maldives (~ 1 Month)

Hawaii (3 yrs)

Mauritius (2 mths)



INDPT FAD

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$50 < T < 100$

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$3.3 < T < 17.5$

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$1.1 < T < 8.0$

Mean Speed
= 1 BL/s



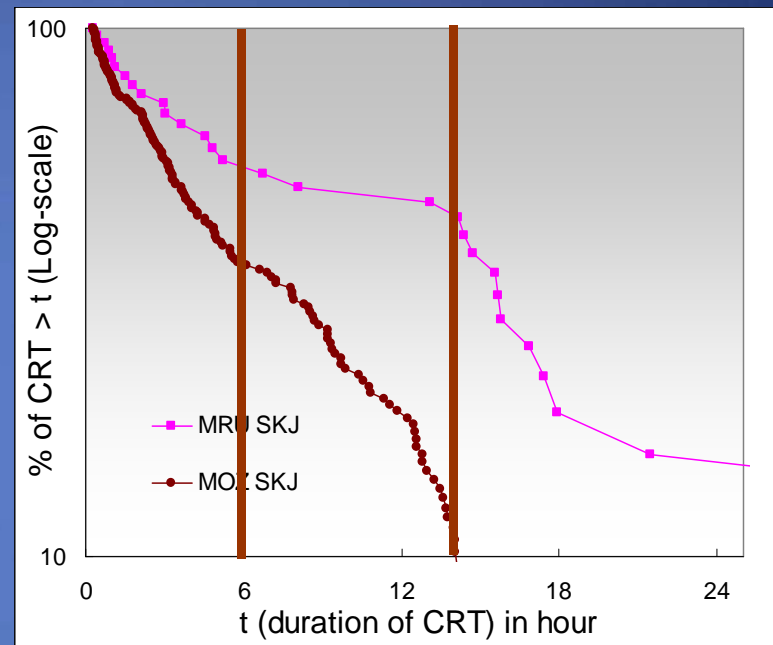
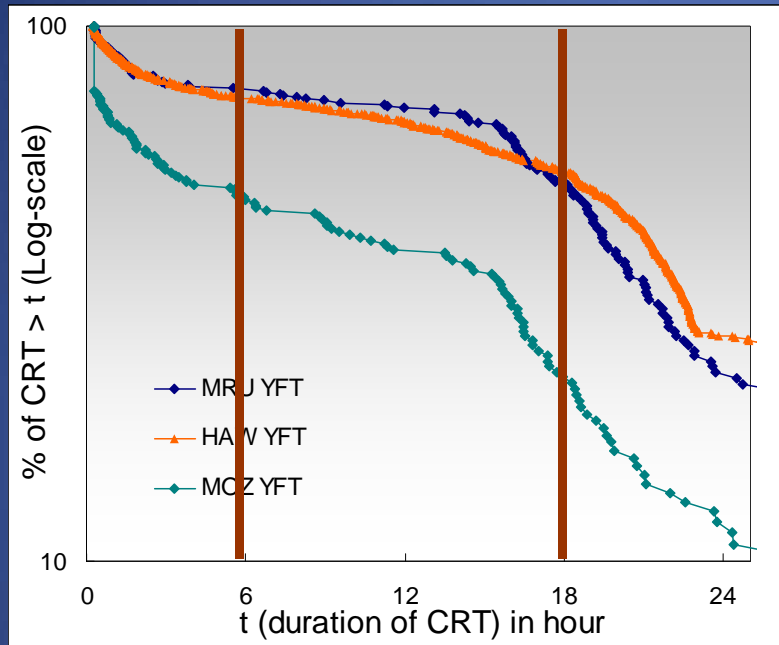
$T = \frac{\text{neighboring FAD distance}}{\text{Fish speed}}$

OBJECTIVE

Understanding the association of fish to FADs in the light of their diel patterns

- Do fish show diel pattern in their visits to FADs?
- Can external triggers explain this pattern?
- Could we infer a pattern of residence times (CRT) ?

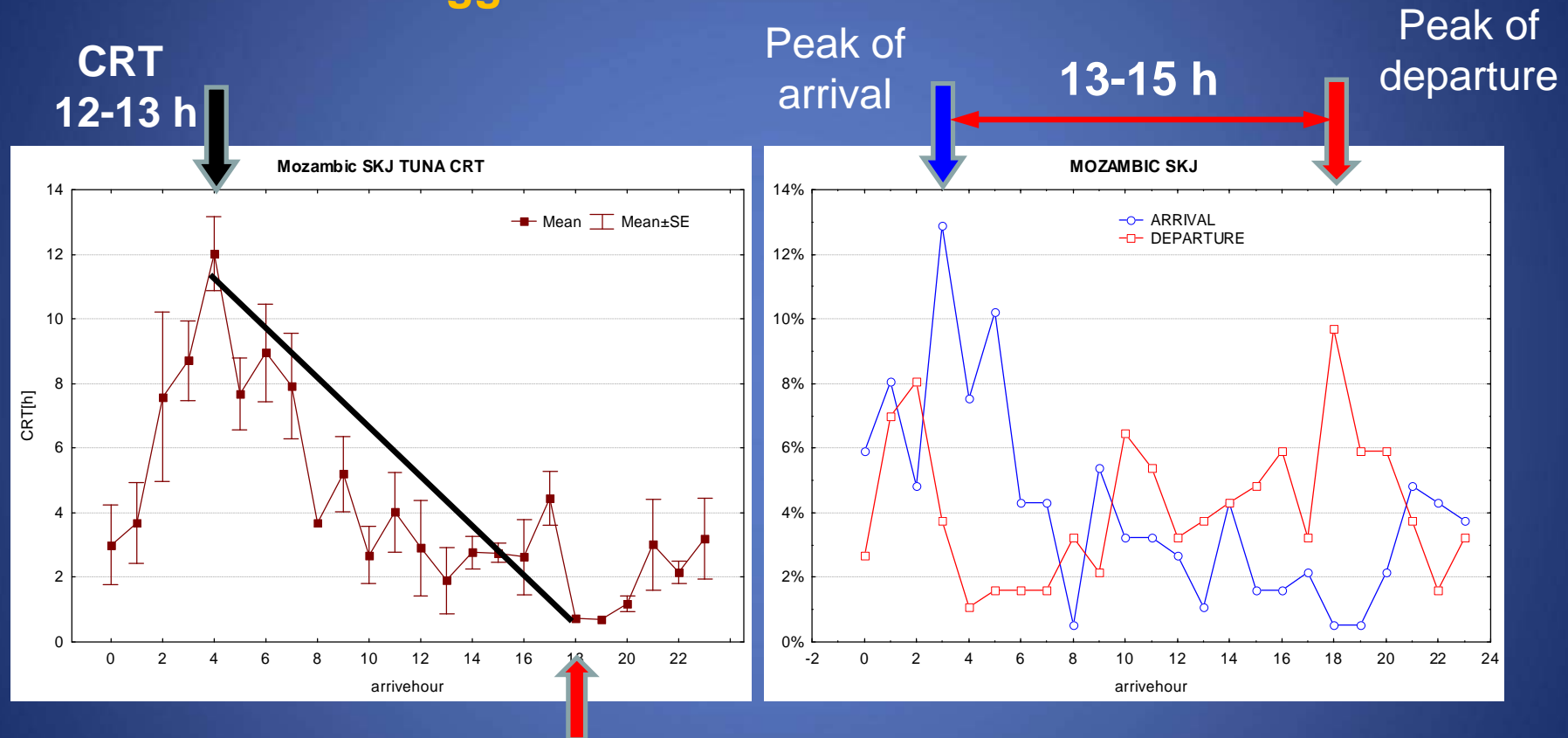
Survival curve of CRT at day scale: an estimate of the probability of fish to leave a FAD



- Fish species displayed short and long stays in different proportion and duration
- Long-term residence with a low probability to leave FAD (plateau of the survival curve) between ~ 6h and 18h depending on species and areas.
How could we explain this plateau?

Duration of CRT relative to the hour of the day and Diel patterns of arrivals and departures

SKJ MOZAMBIC CHANNEL 11 Tagged Fish and 186 CRT PERIODS



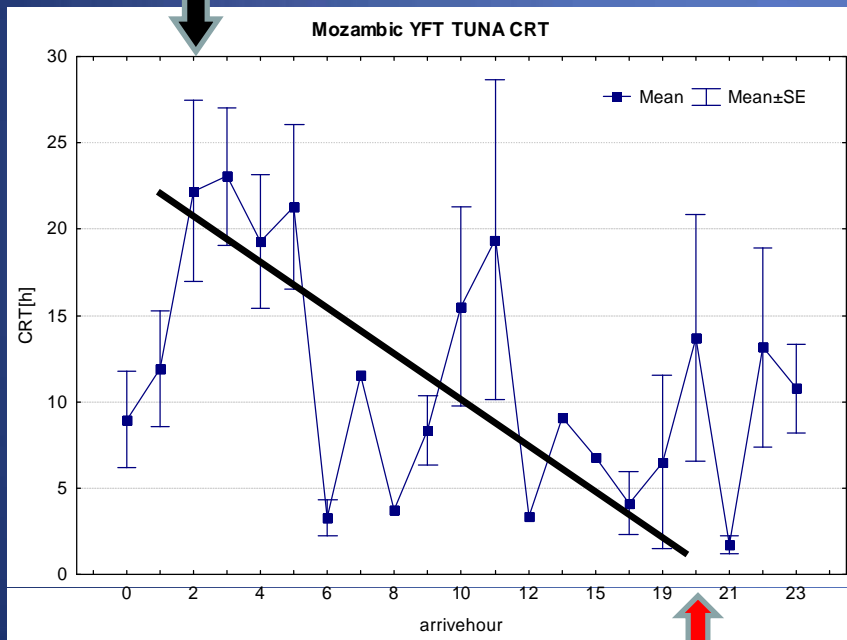
Cases following the regression correspond of fish which the probability to leave the FAD could depend on the interval of time between arrival and peak of departure more than on the time stayed at FAD

FOR SKJ in Moz. Channel: ~ 20% of cases

Duration of CRT relative to the hour of the day and Diel patterns of arrivals and departures

YFT MOZAMBIC CHANNEL 12 Tagged Fish and 143 CRT periods

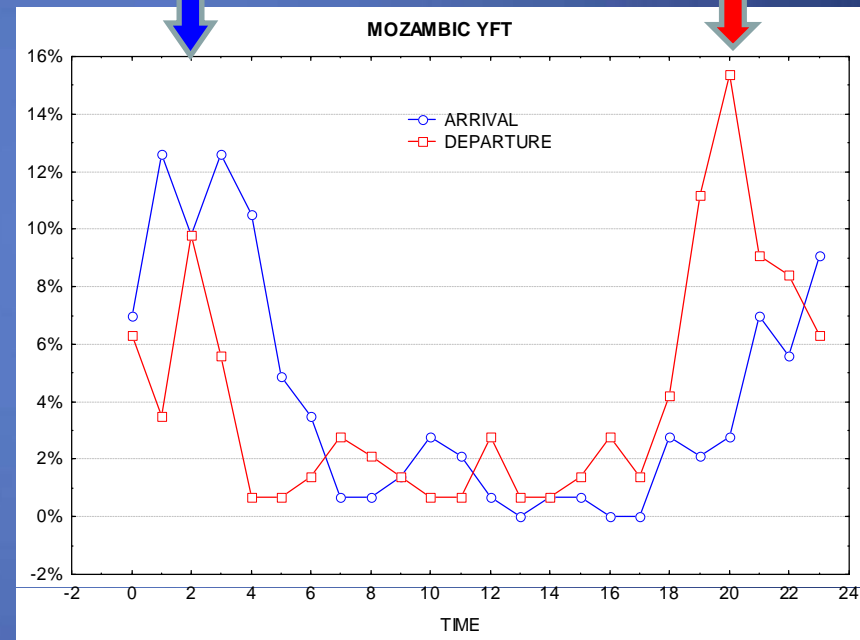
CRT
18-20 h



Peak of
arrival

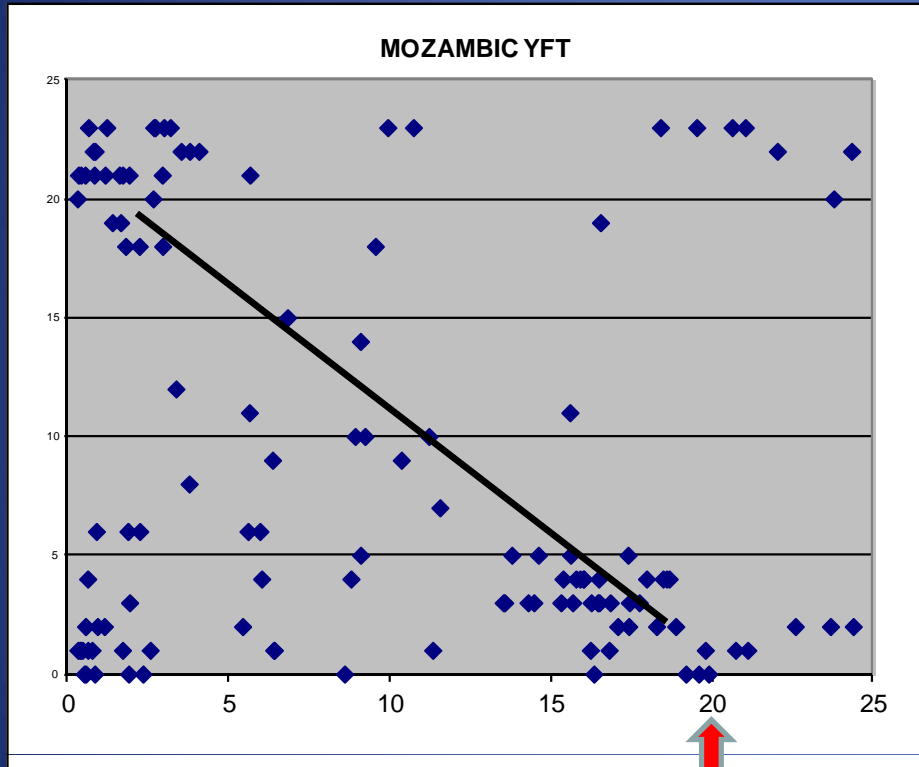
18-20 h

Peak of
departure

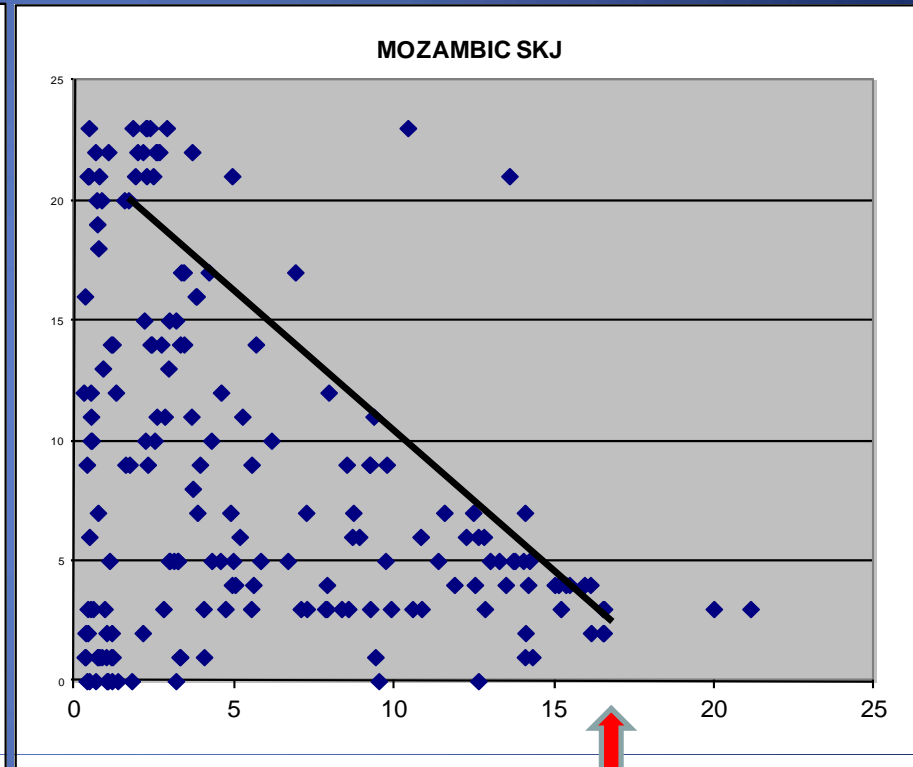


~ 20% duration of CRT tend to be related to the peak of departure

Duration of CRT relative to the hour of the day



Time of the
peak of
departure

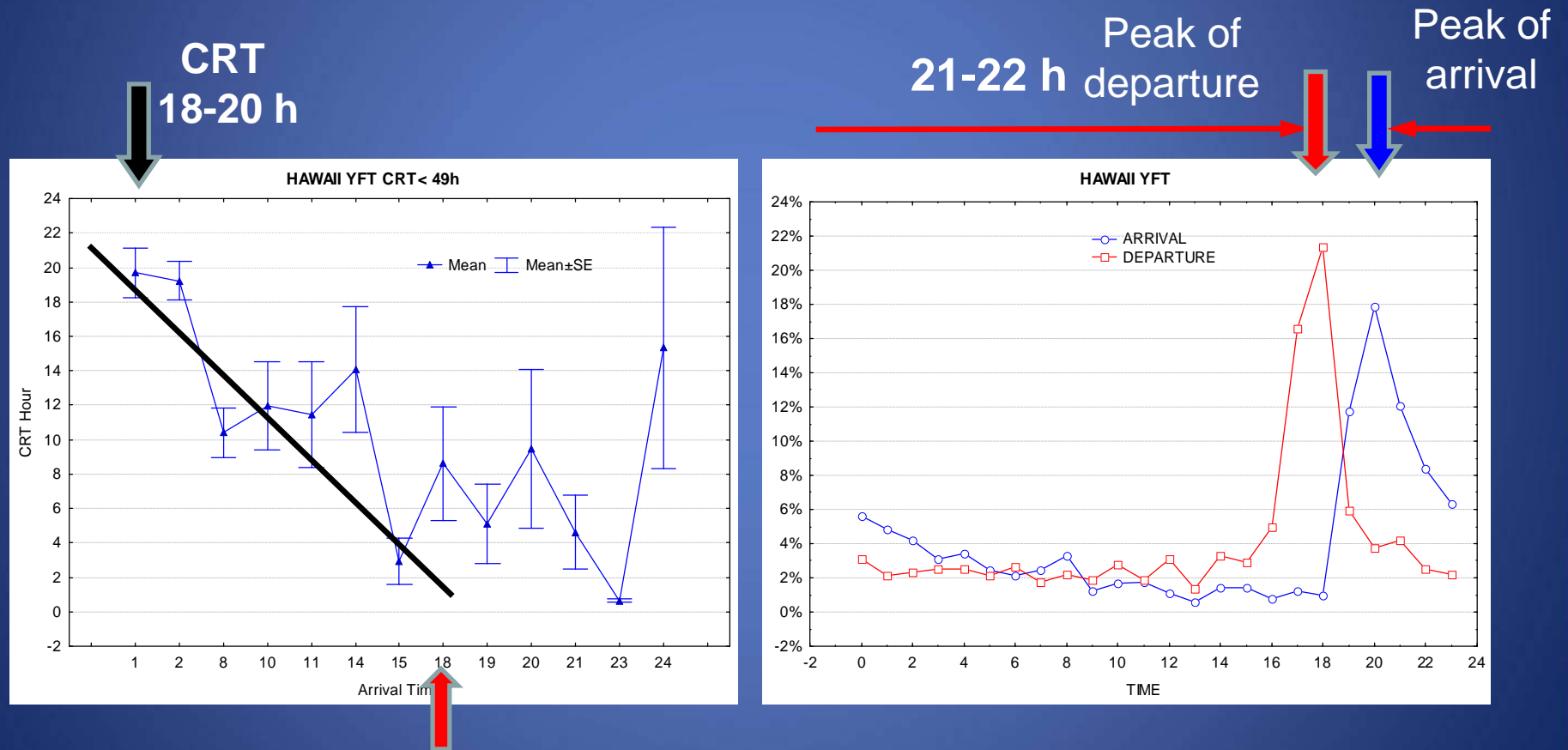


Time of the
peak of
departure

Duration of CRT relative to the hour of the day and Diel patterns of arrivals and departures

YFT HAWAII

120 Tagged Fish and 905 CRT periods

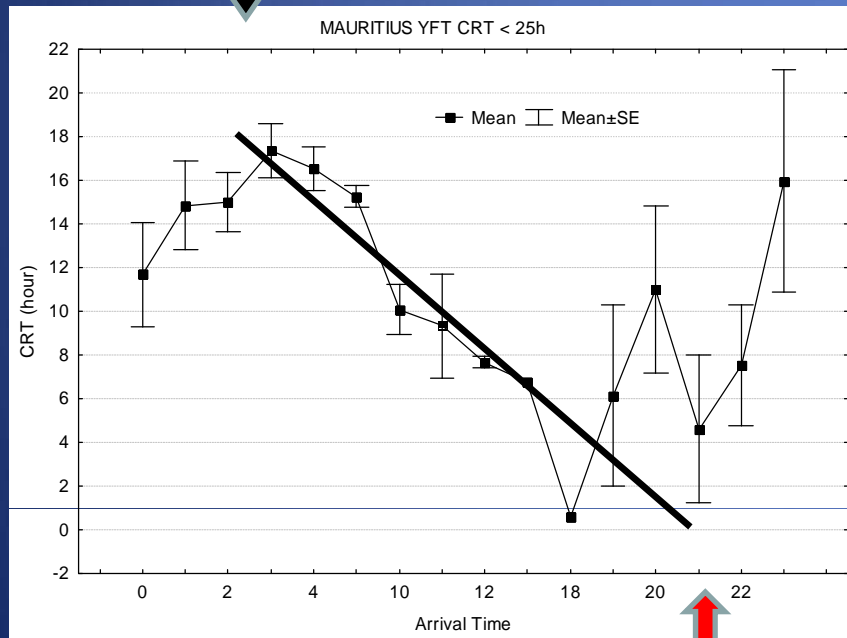


~ 10% Duration of CRT tend to be related to the peak of departure

Duration of CRT relative to the hour of the day and Diel patterns of arrivals and departures

YFT MAURITIUS
26 Tagged Fish and 183 CRT periods

CRT
17-18 h



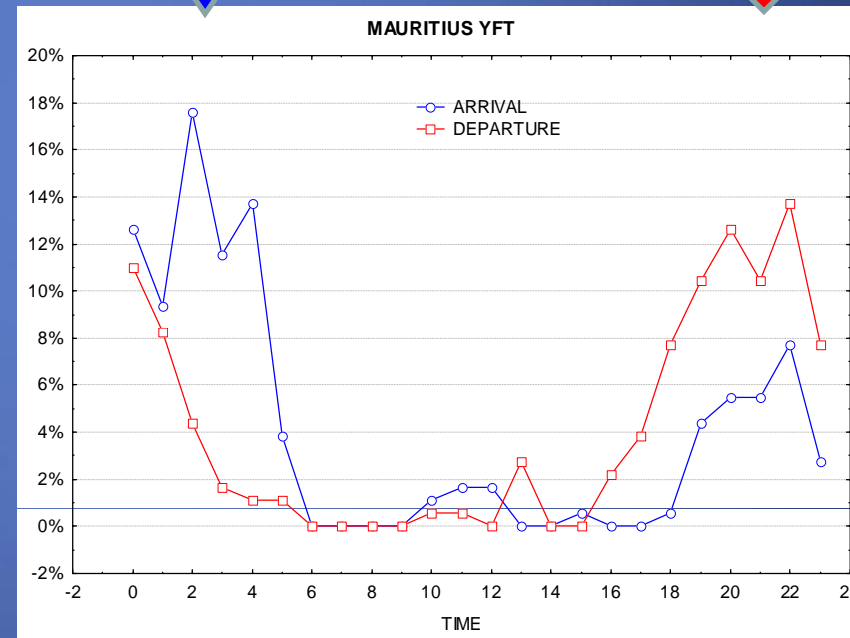
Peak of
arrival



18-19 h



Peak of
departure

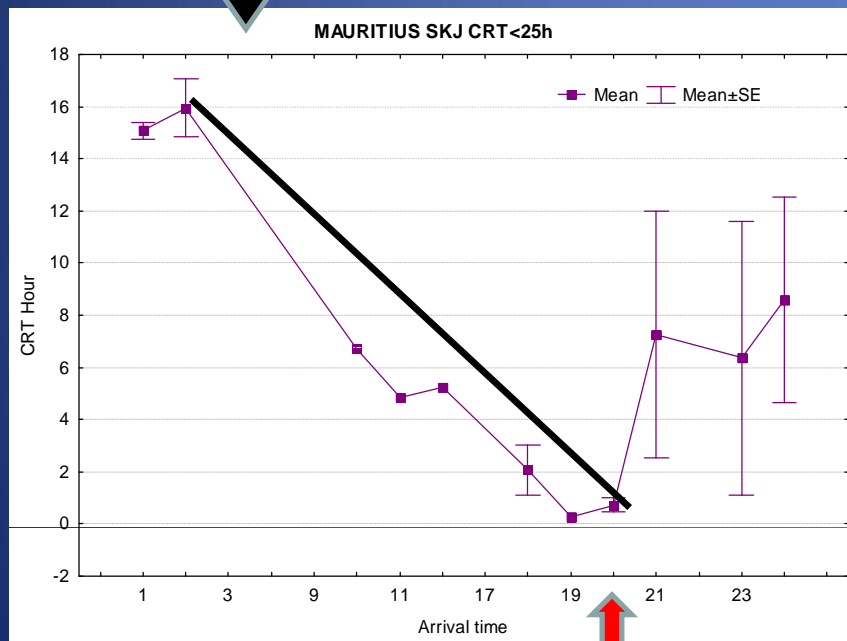


~ 20% Duration of CRT tend to be related to the peak of departure

Duration of CRT relative to the hour of the day and Diel patterns of arrivals and departures

SKJ MAURITIUS 19 Tagged Fish 32 CRT periods

CRT
15-17 h



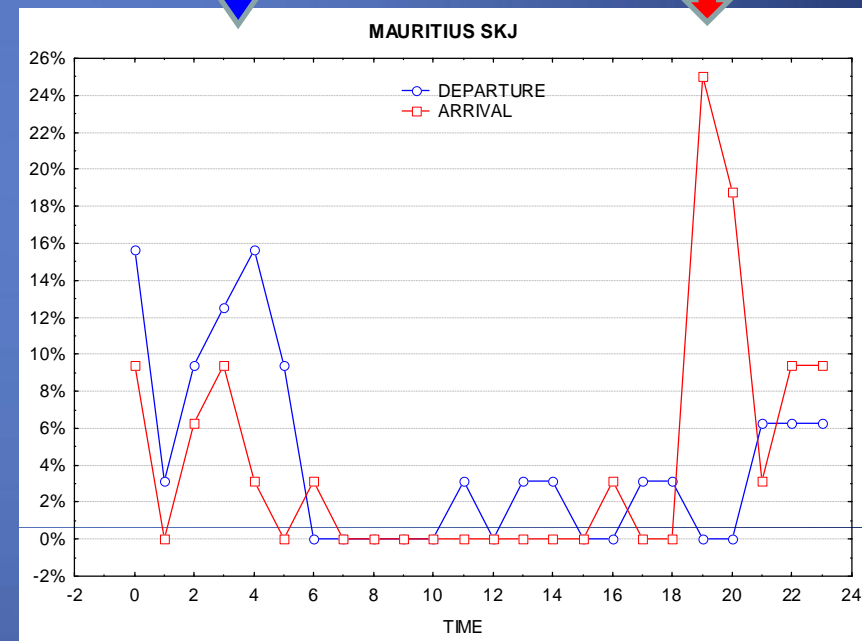
Peak of
arrival



15-17 h



Peak of
departure



~ 30% Duration of CRT tend to be related to the peak of departure

Diel patterns of arrivals and departures and residence times

- Departure of fish occurred mostly around dusk
 - ➡ Same external trigger (light) ruling the time departure in the different areas and for different species
- Interval of residence time with a low probability to leave FAD (plateau of the survival curve) could be due to:
 - ➡ - to a strong strength of a FAD to retain fish (see MPH),
- but following this analysis could also be due to an external trigger fixing the moment to leave the FAD?
- Arrivals of fish occurred before dawn for tunas in Mauritius and in Mozambic channel while in Hawaii, arrivals of fish occurred after dusk 2 hours after the peak of departure
 - ➡ Assume the effect of a specific releasing factor governing the time of arrival.

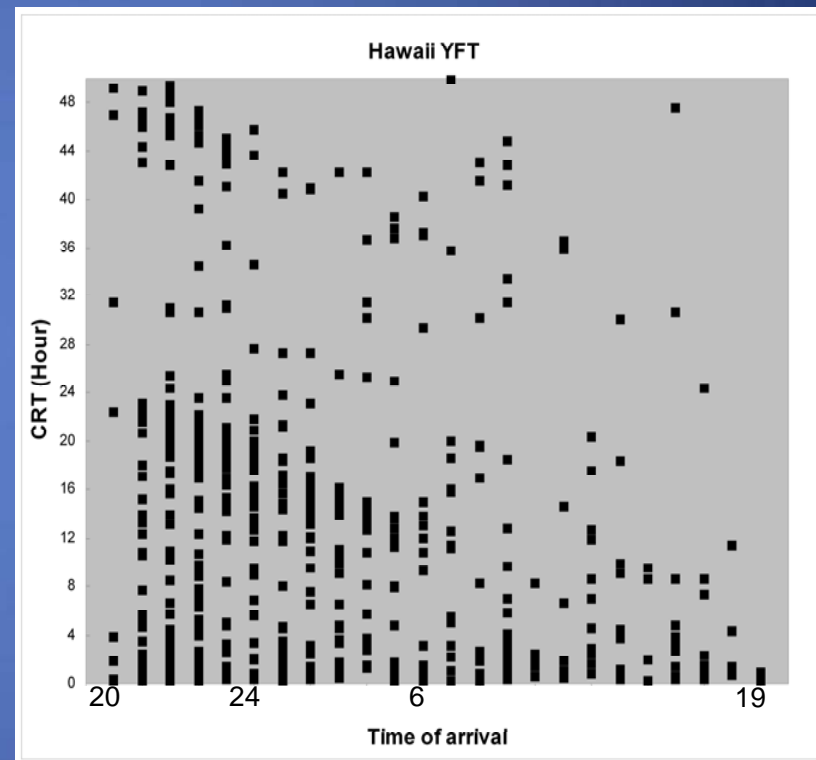
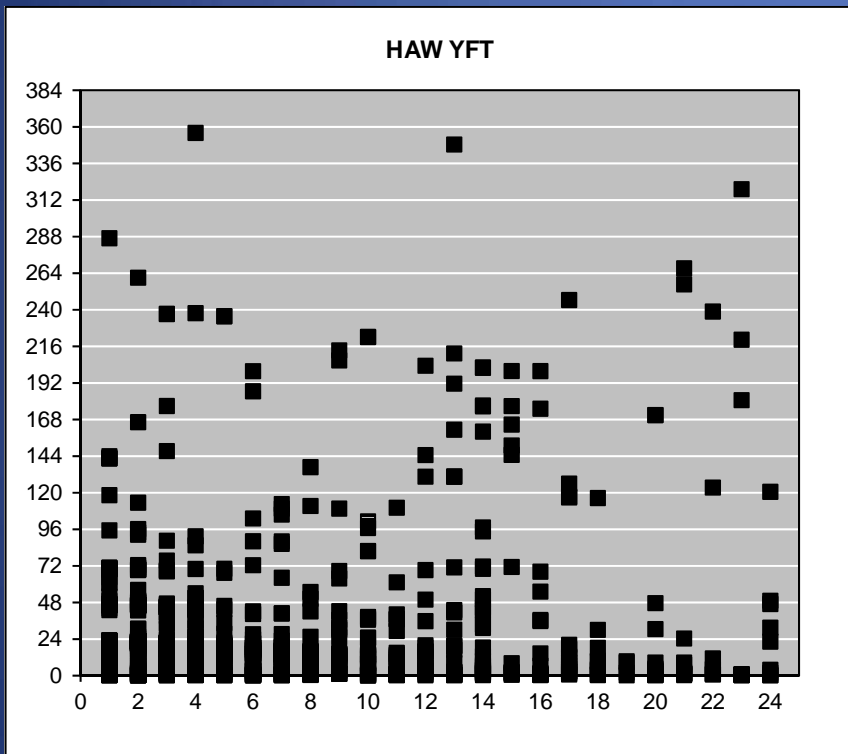
Conclusion

- Different tuna species can show similar temporal patterns
- General scenario implying external trigger and releasing factors could explain the regular patterns of residence time at FADs (anchored or drift FADs)
- Possible existence of a meeting time due to intra et inter specific interactions in addition to a meeting point



Thank you...





Study of tuna species and a small pelagic fish in inter-tropical area

