


Comisión Interamericana del Atún Tropical
Inter-American Tropical Tuna Commission

CIAT
IATTC

# REVIEW OF ISSUES WITH THE LONGLINE-DERIVED INDEX OF ABUNDANCE FOR YELLOWFIN TUNA

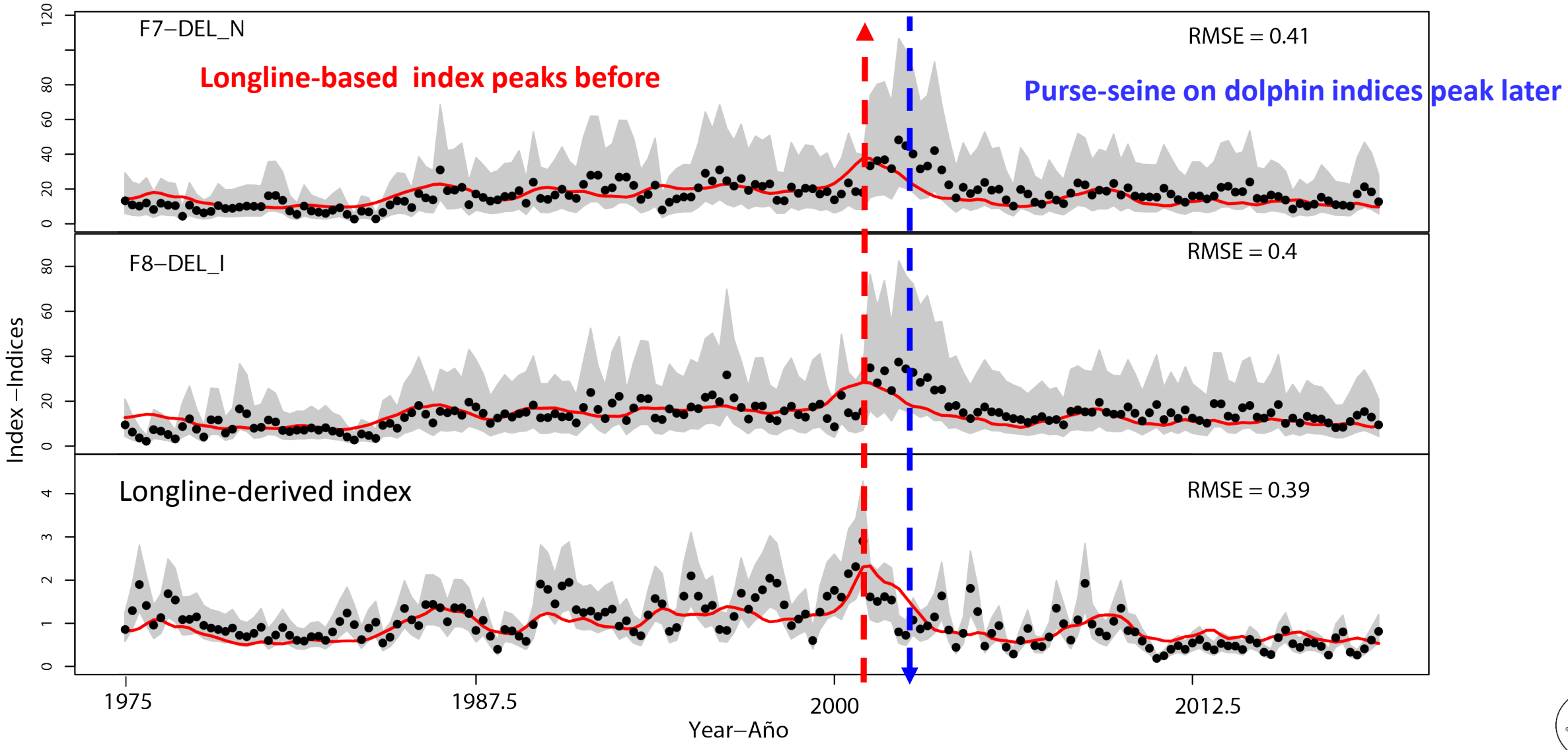
Carolina V. Minte-Vera, Haikun Xu, Mark N. Maunder, and Alexandre Aires-da-Silva

10th Meeting of the Scientific Advisory Committee San Diego, California USA, 13-17 May 2019

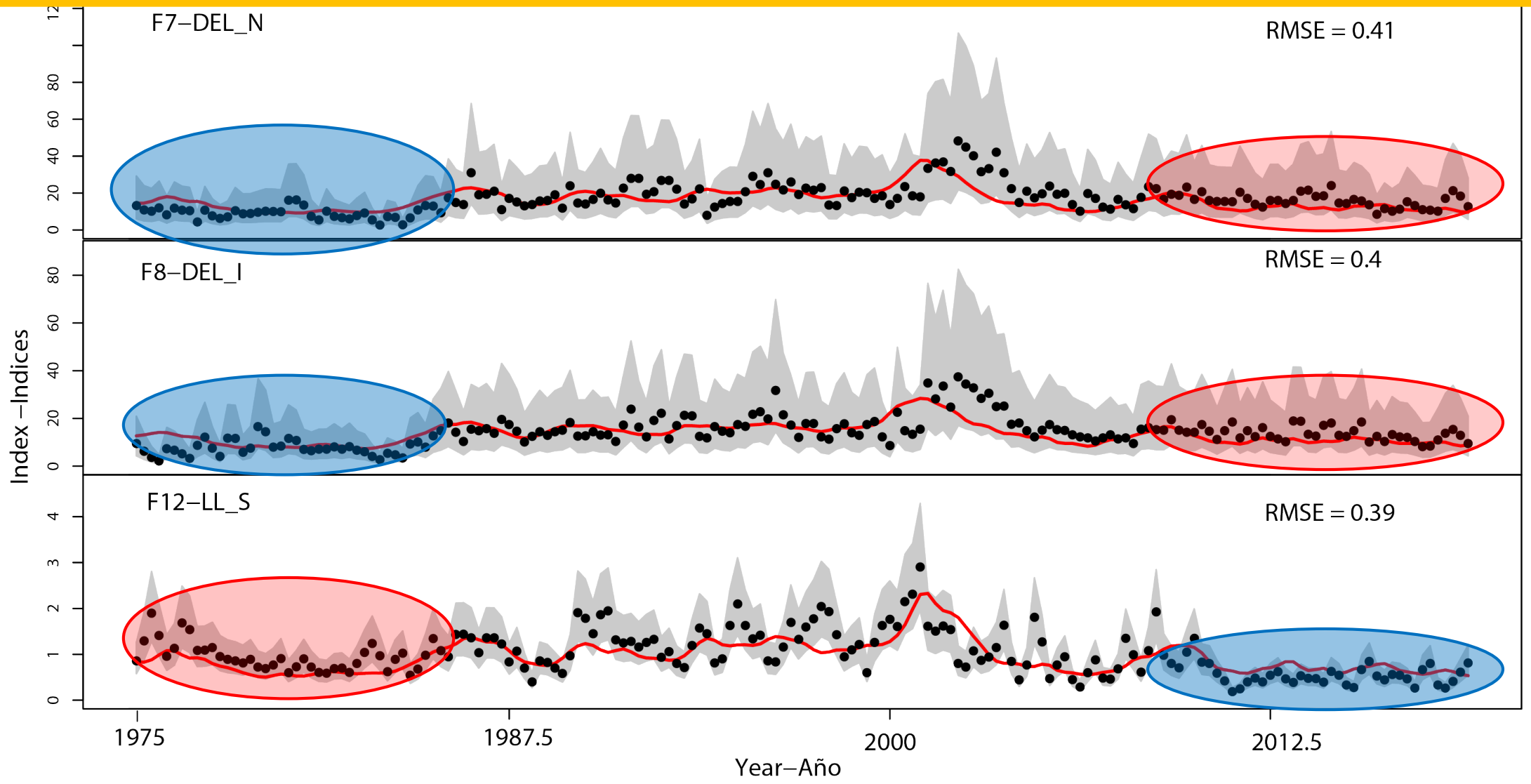
# Background

- Data from Japan
- Standardization
- Main index of abundance
- Issues highlighted with the 2018 BET assessment
- YFT assessment was thought robust
- Five indices of abundance and length composition data
- In 2019 assessment results driven by the longline-derived index of abundance
- Longline workshop – many lessons learnt

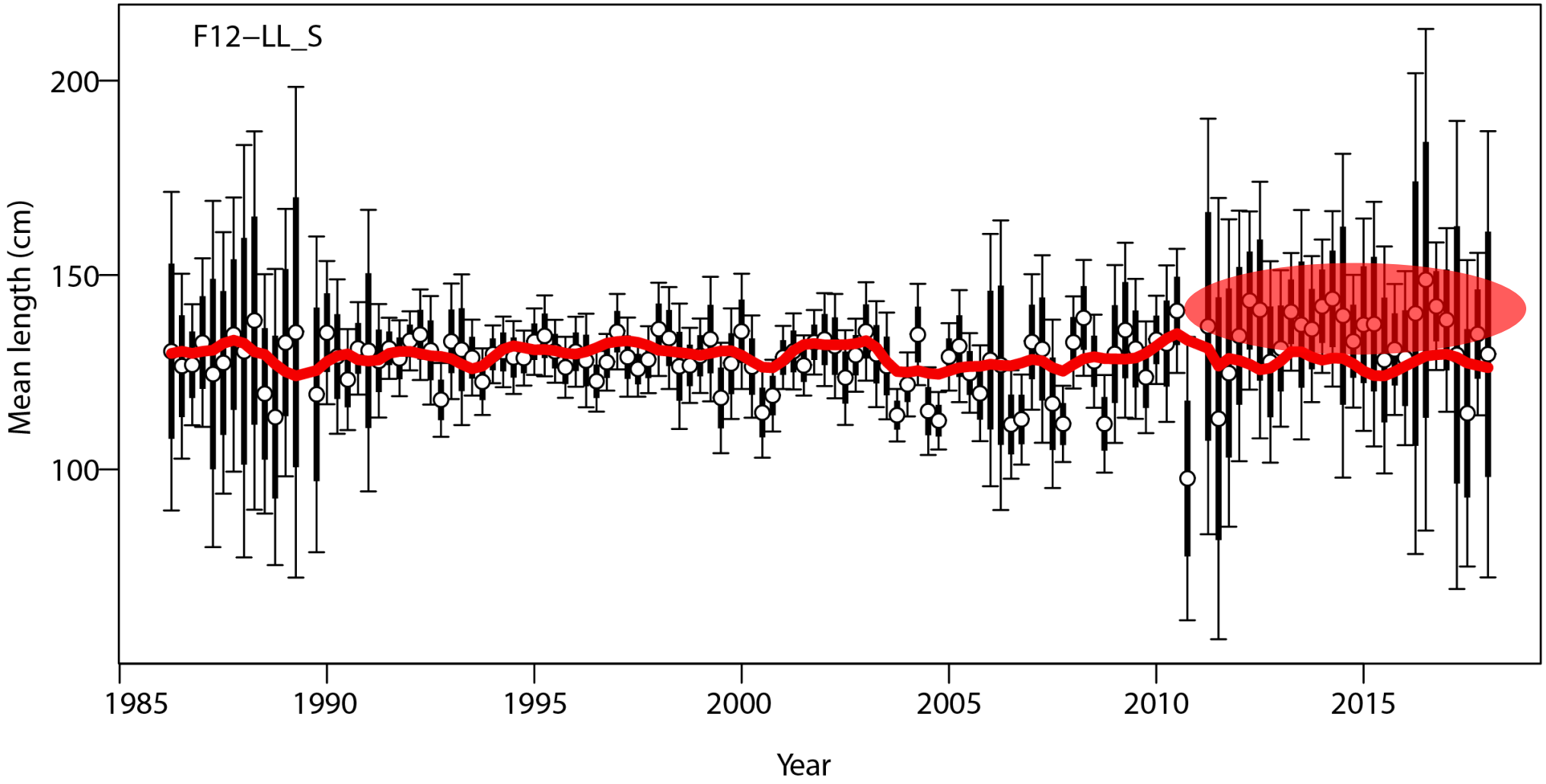
# Issue 1: inconsistencies among indices



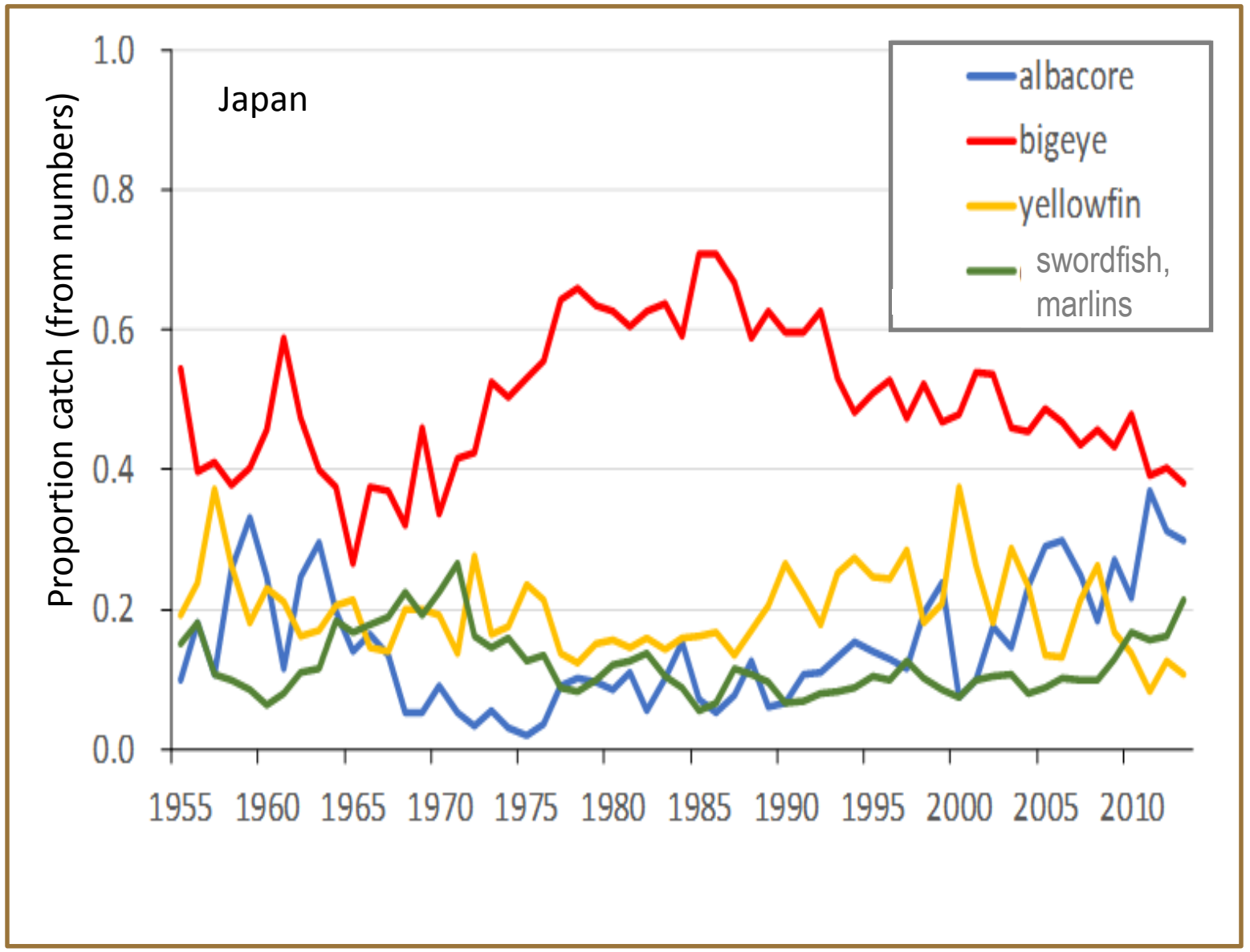
# Issue 1: Inconsistencies among indices



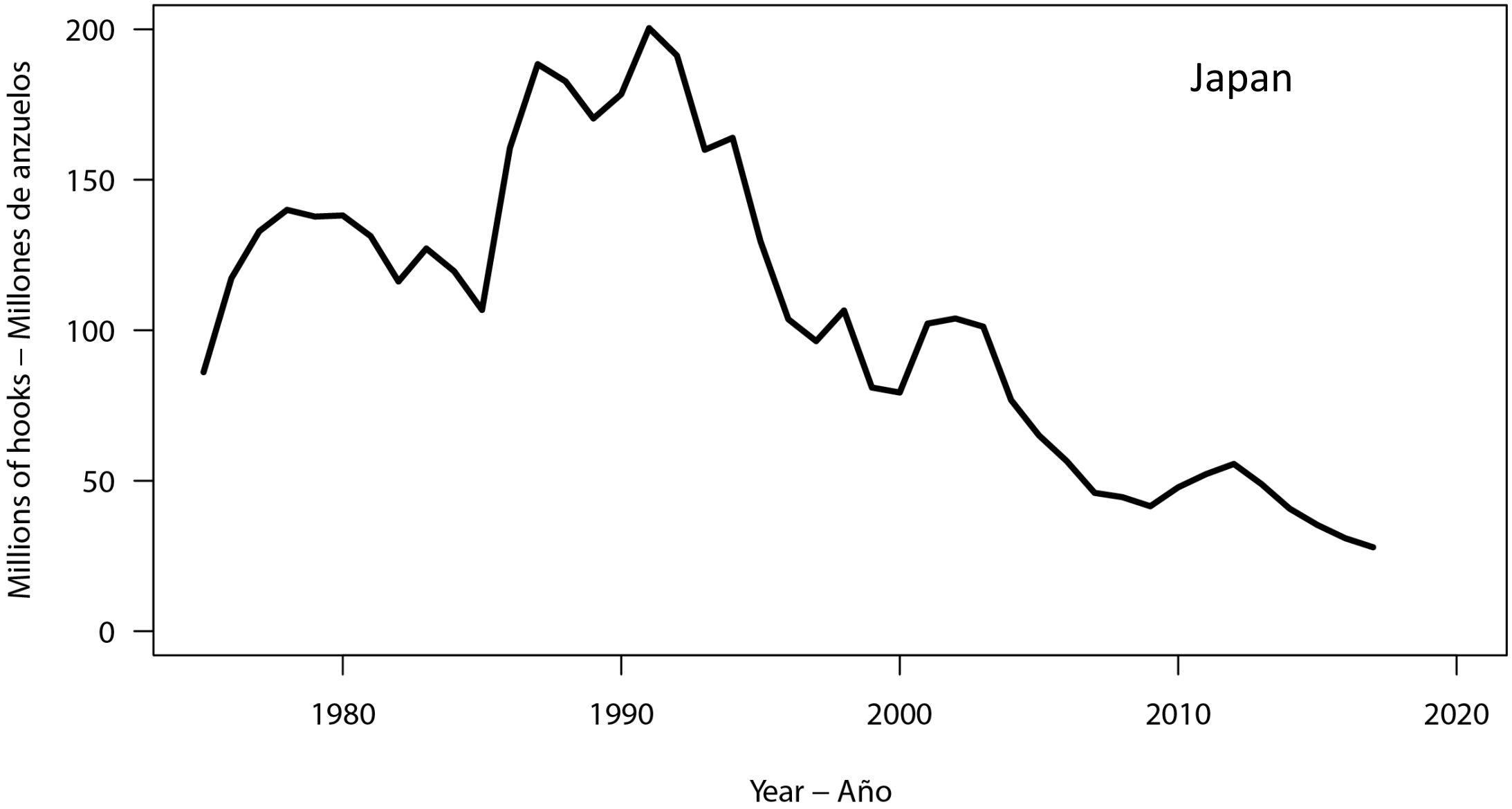
# Issue 2: Change in longline length composition



# Issue 3: potential change in target

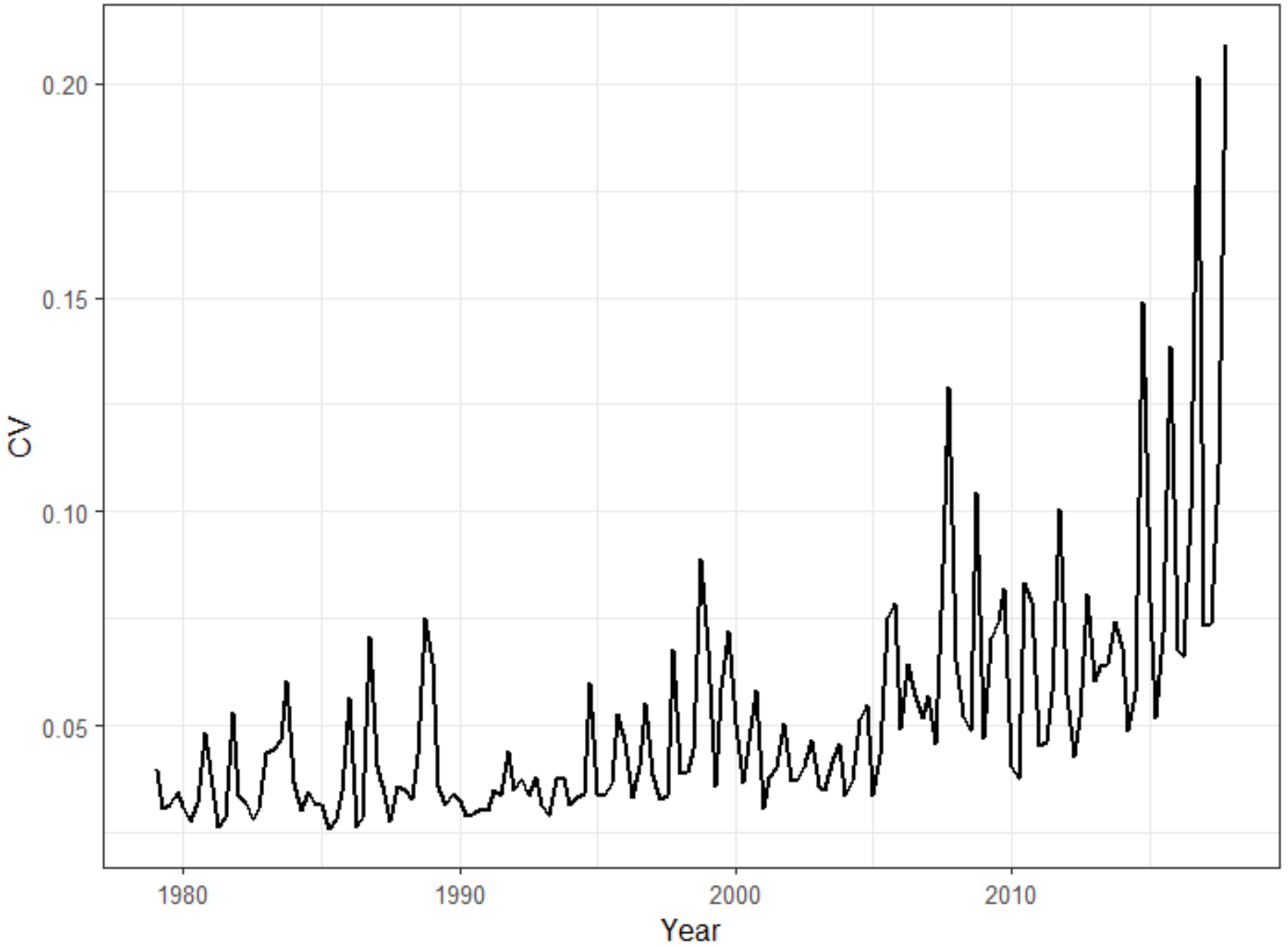


# Issue 4: Decrease of effort over time



# Issue 5: CV of the index is increasing

Coefficient of variation

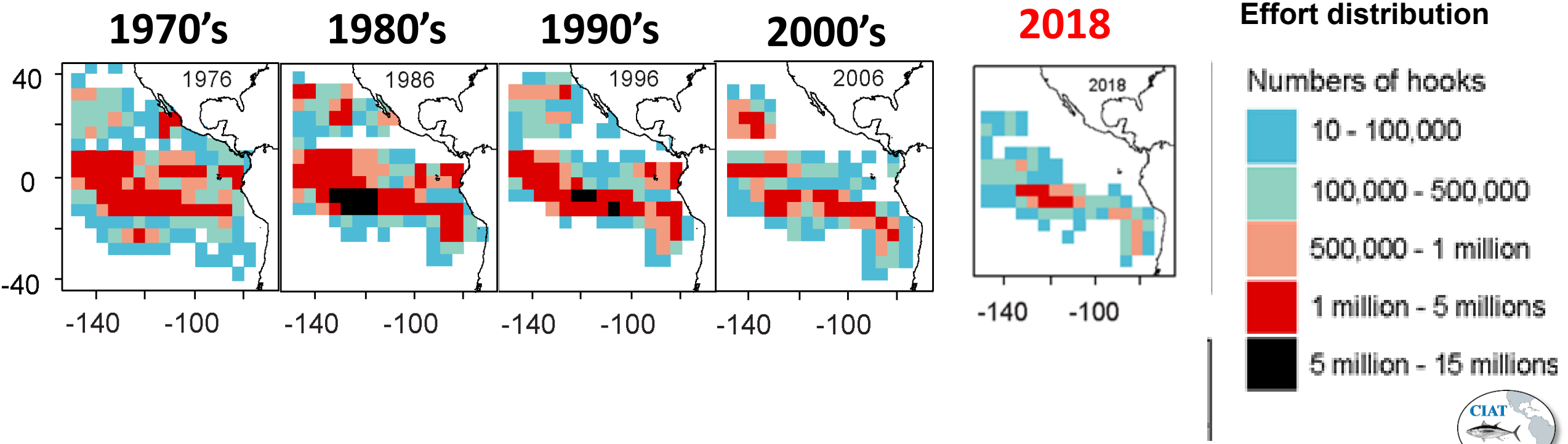



Japan
unpublished
results
WSLL-01

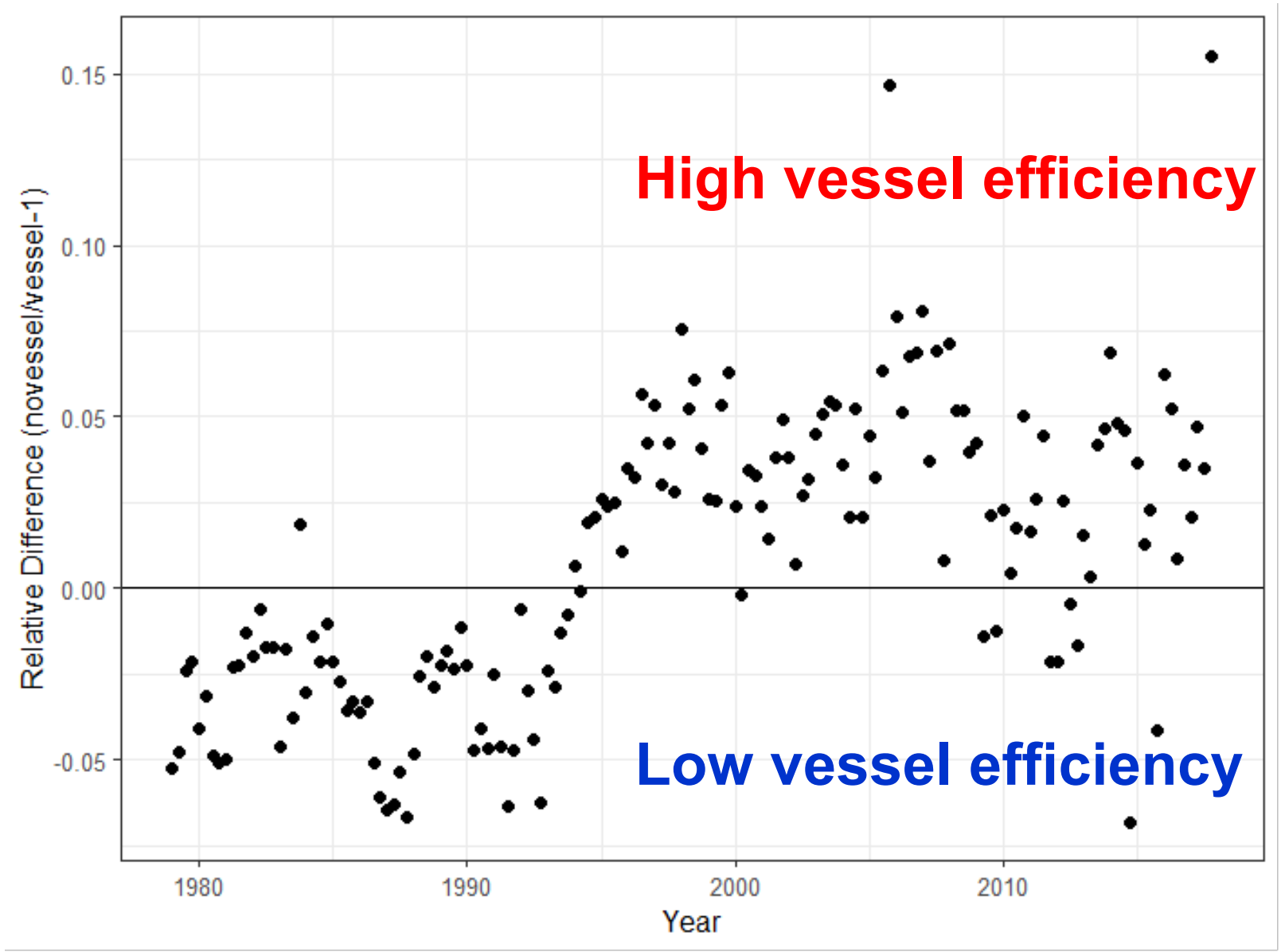
for bigeye tuna
Area 1:
150°W - 110°W
10° S – 10°N

# Issue 6: contraction of spatial range

The area of operation of the Japanese fleet is contracting



# Issue 7: temporal changes in catchability




Japan
Unpublished results
WSLL-01
for bigeye tuna

# Summary of the issues

1. Inconsistency of the dolphin associate indices with the longline one
2. Change in the length frequency
3. Potential changes in targeting
4. Reduced effort (reduced sample size)
5. Increased the variance in the estimate in the most recent time-period
6. The spatial coverage has been reducing over time
7. Temporal changes in catchability (“vessel effects”)
8. **Catchability related to the environment**

# Conclusion

- Several issues were identified with the longline-derived index of abundance over the years
- None taken into account the current indices, nor is reflected in the weighting in the stock assessment models.
- New tools recently available: spatiotemporal models
- In the last year: access to operational level data from main longline fleets
- Considerable work has been done to understand the issues and possible solutions for constructing longline-derived indices (WSLL-01)
- Workplan to construct indices for benchmark assessments

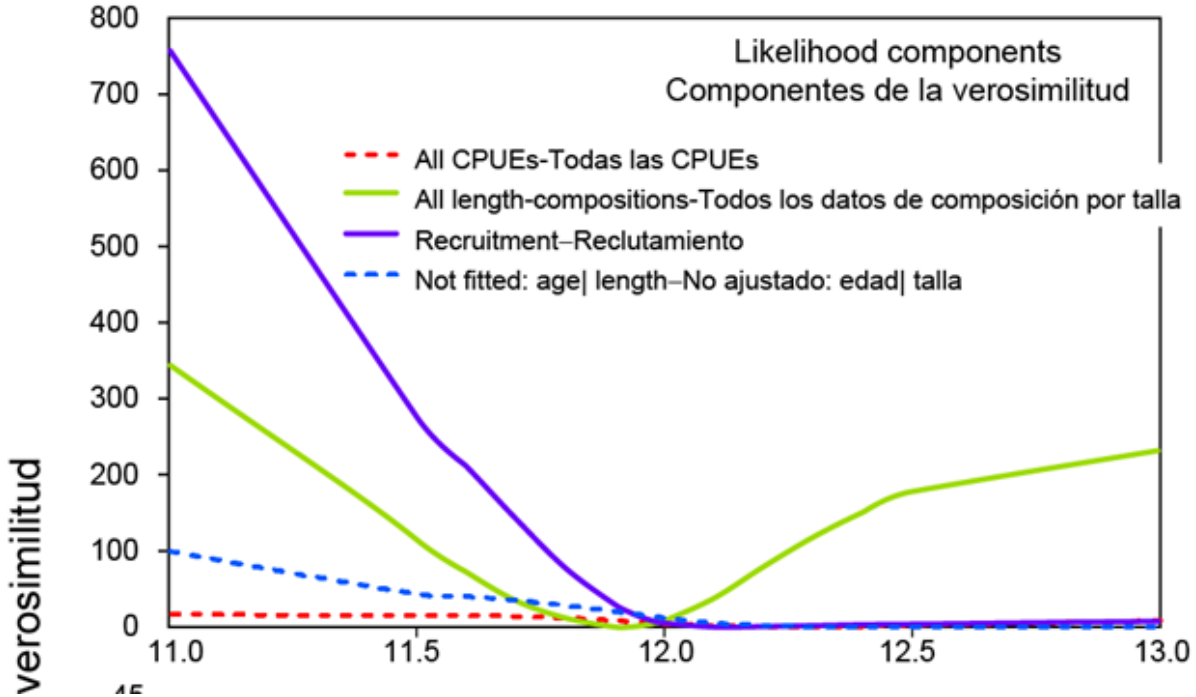
CIAT

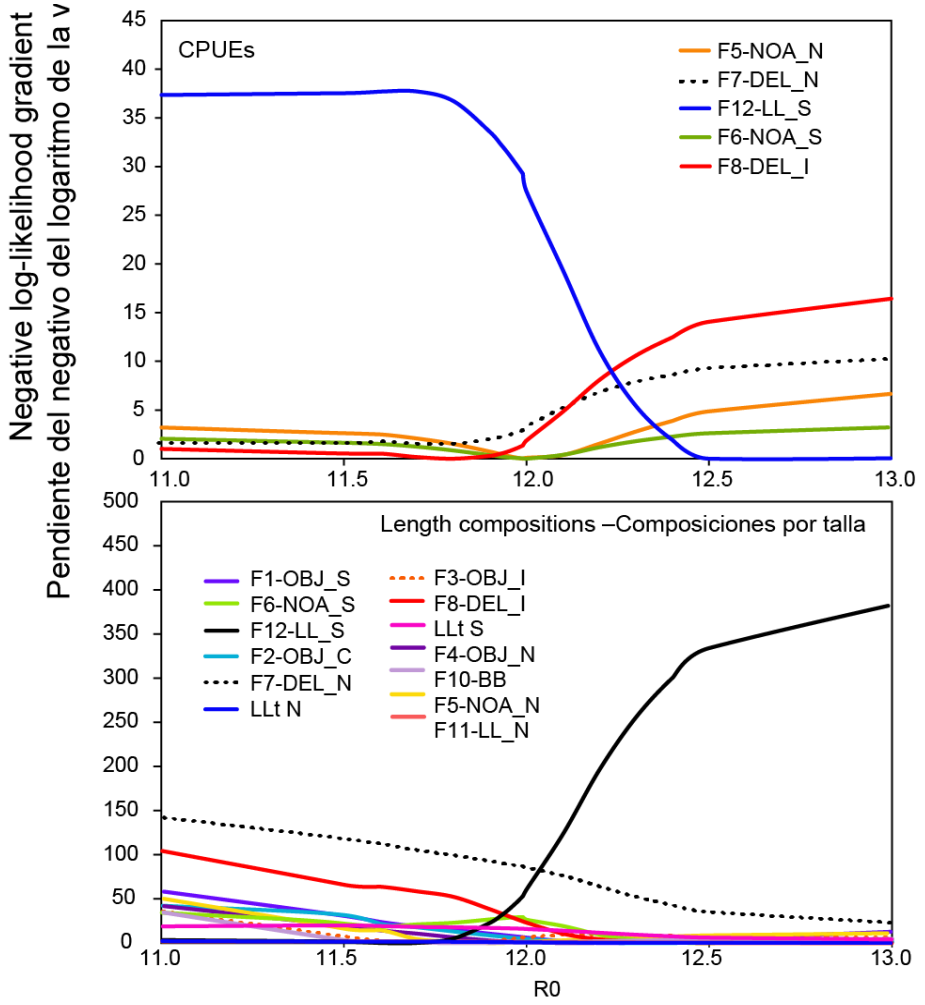
IATTC

# Thank you!

# Extra-slides

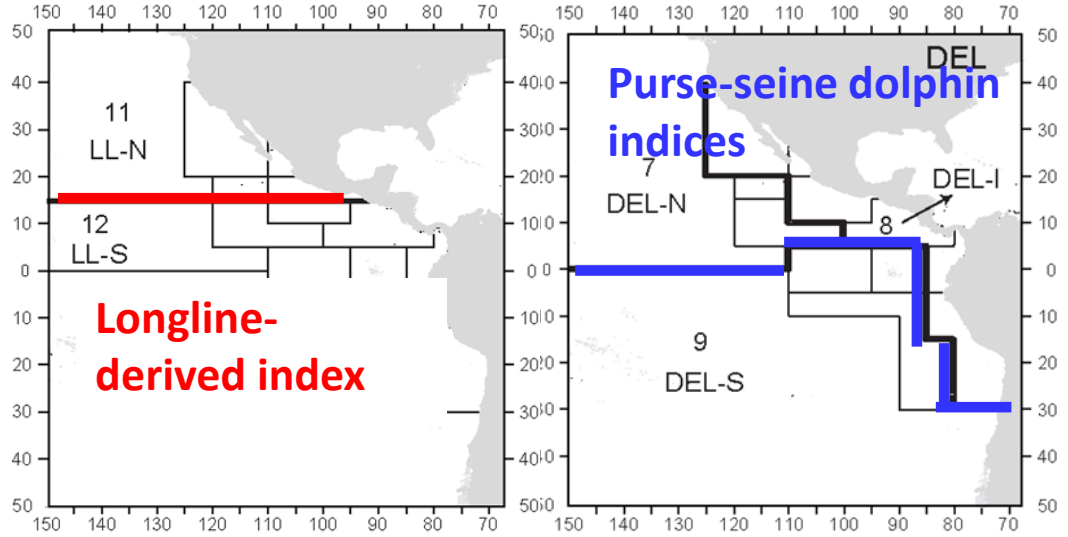
# Likelihood profile on the scaling parameters

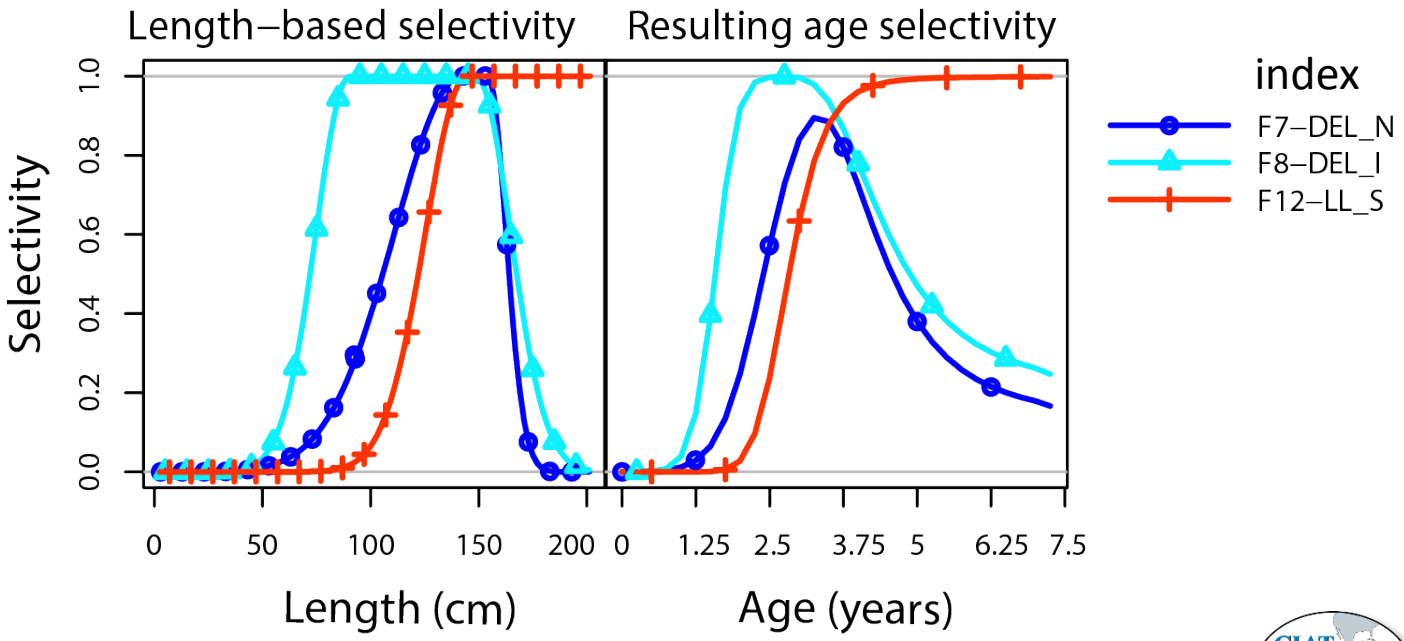


# Issue 1: Index inconsistencies

- Overlap in area of the longline-based index and purse-seine based indices
- Overlap in selectivity



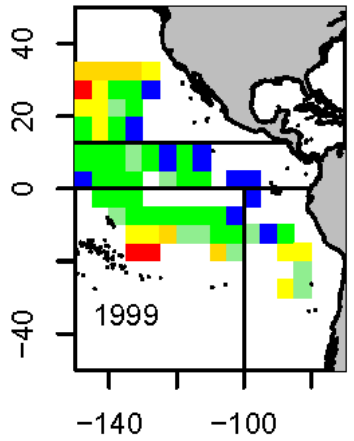



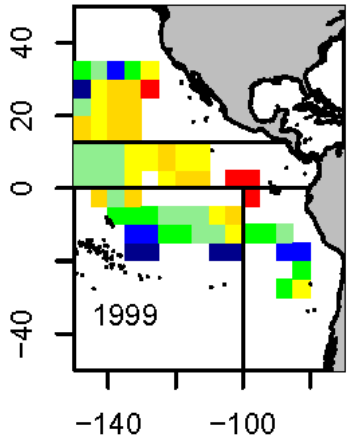
# Issue 3: potential changes in target

Albacore catch ratio

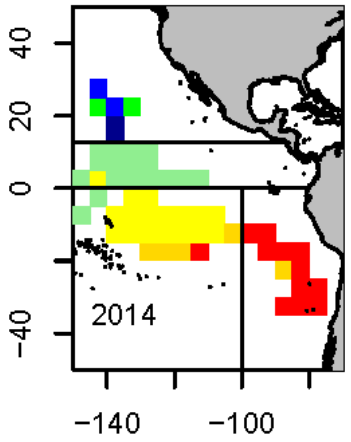
Bigeye catch ratio

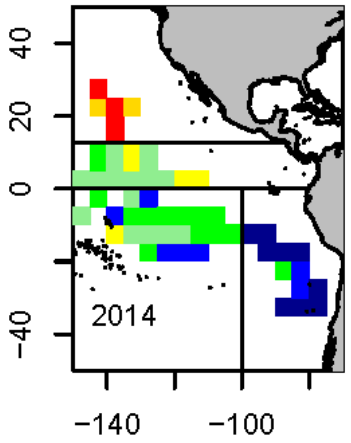
End of 1990's




Early 2010's




**Highest**

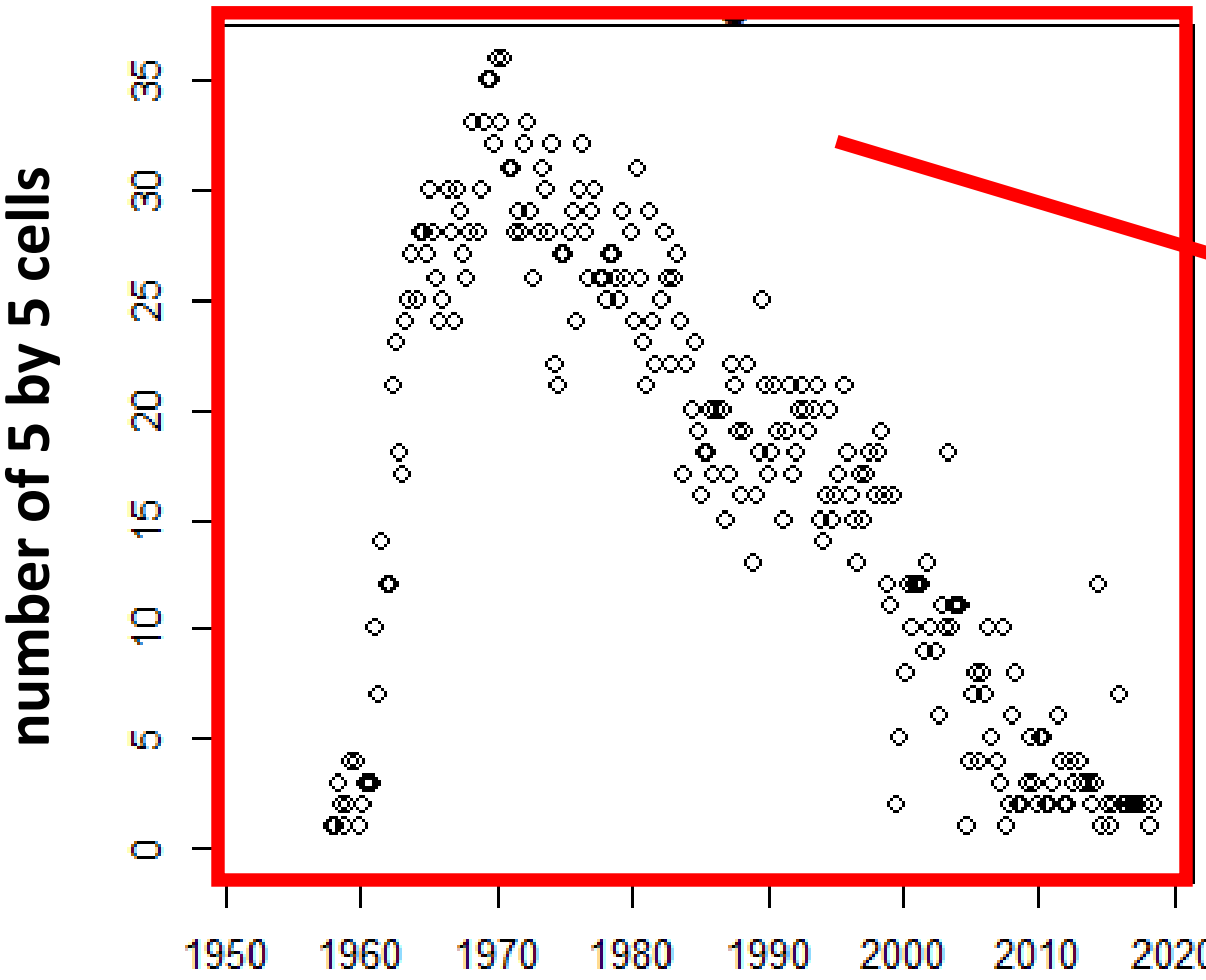
**High**

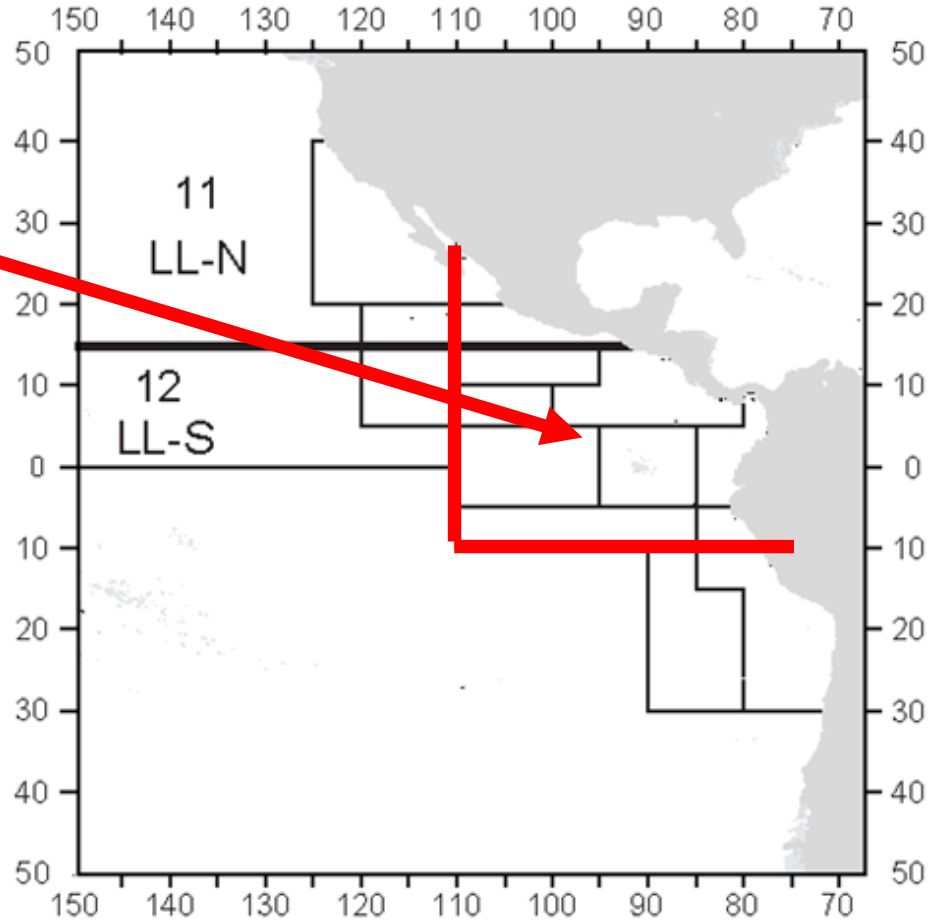
**Medium**

**Low**

**Lowest**

# Issue 4: Decrease in effort: number of 5 by 5 cells

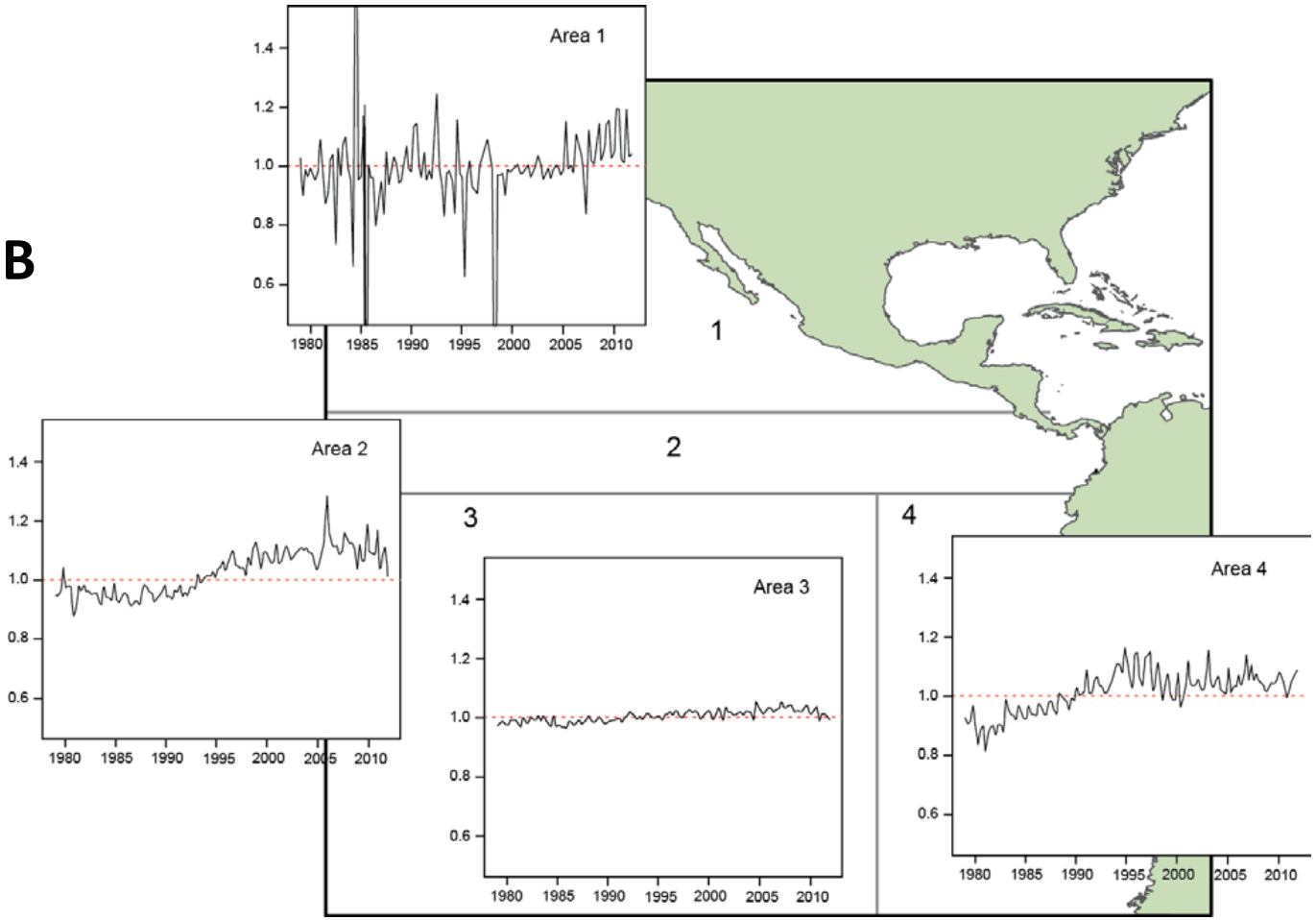


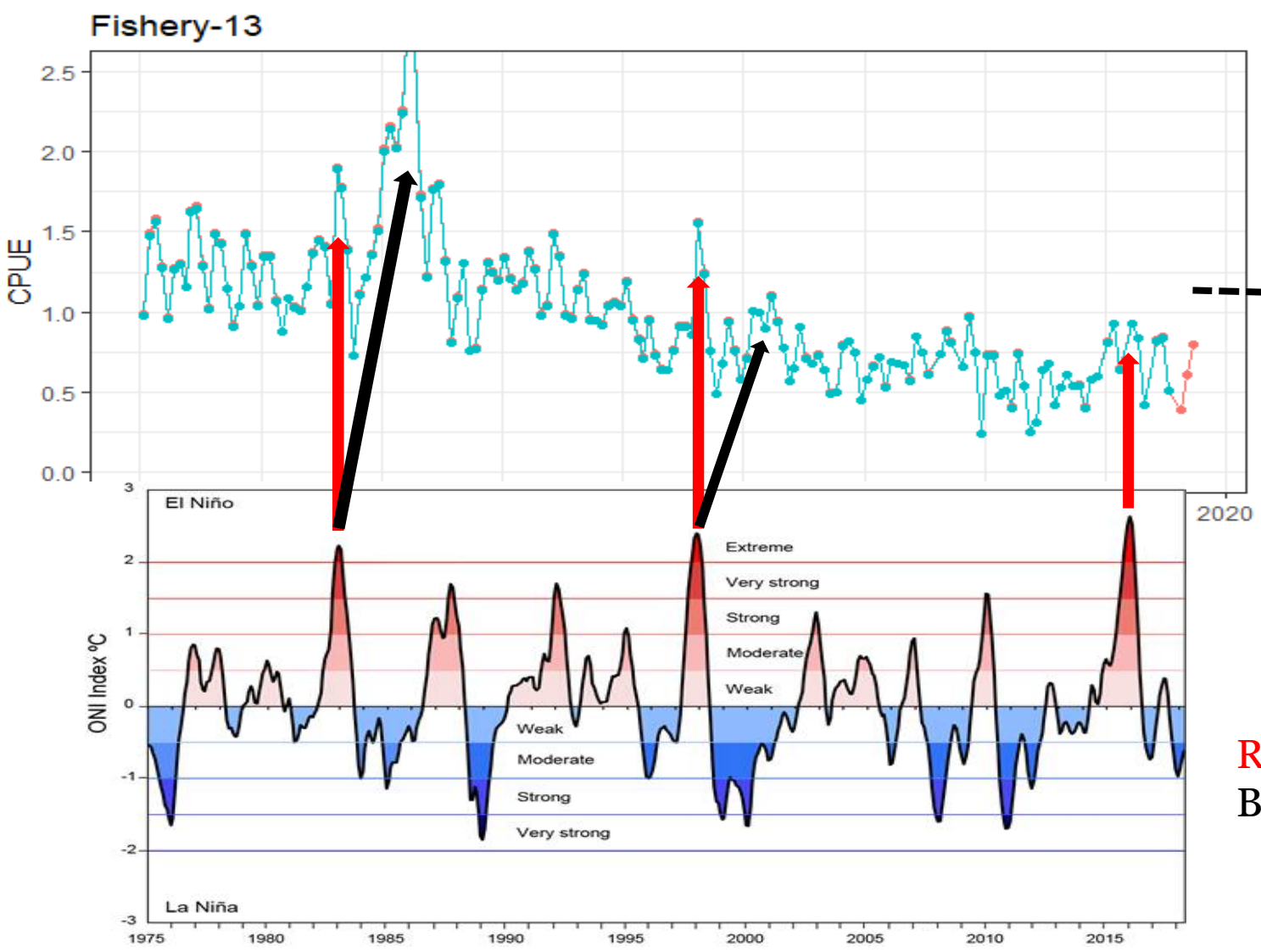
# Issue 7: Temporal change in catchability

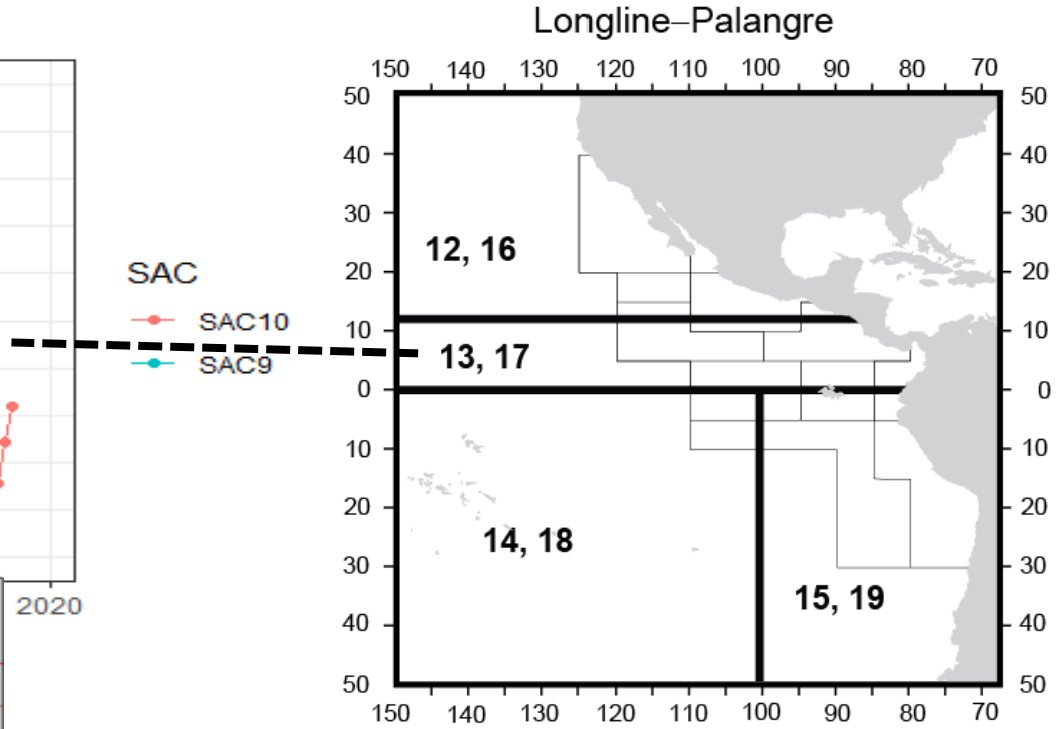
"vessel effects"

Lennert-Cody et al, 2012, **SAC-04-05B**



# Influence of the environment on the index of abundance



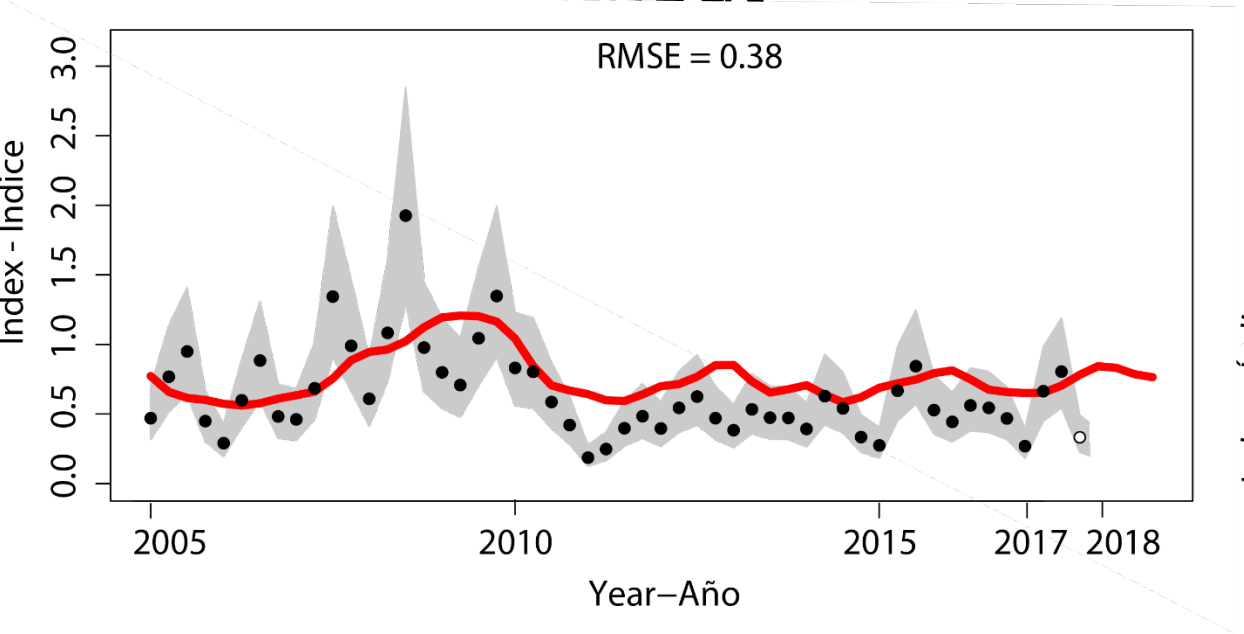

Red: immediate influence

Black: delayed influence through recruitment

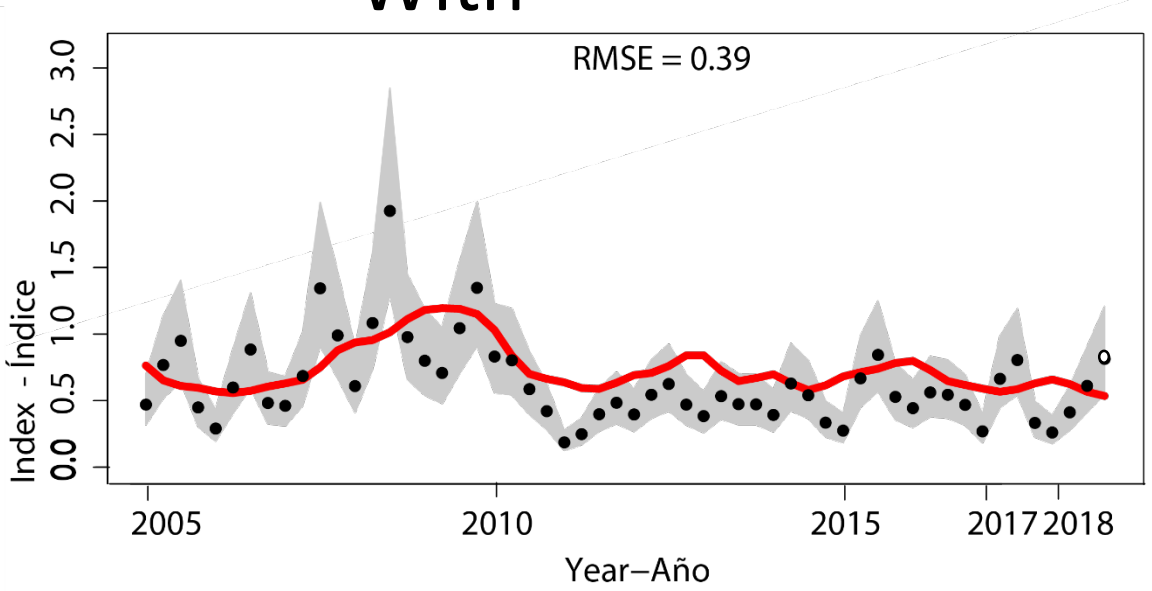
# Sensitivity of to the main index of abundance

**New data:** Update data for last quarter of 2017, new data for quarters 1-3 of 2019

Without




With




Fitted value for the index (from the assessment model)

Observed index and assumed precision

Incomplete data – not used

# Discussion

- In 2018 the bigeye tuna assessment model was found to have deficiencies that prevented its use to base any management advice
- The urgency in addressing those deficiencies was brought to light mainly by the inclusion of a new year of data from the abundance indices
- The only abundance indices for the bigeye tuna model, as well as the main abundance index for the yellowfin tuna assessment are derived from the standardized longline catch per unit effort from the Japanese longline fleet.
- Work is in progress to improve the longline-derived indices of abundance (see WSLL-01)
- The yellowfin tuna assessment model was thought to be robust to any problem with the longline-derived index of abundance due to the fit to four other indices derived from purse-seine data, the high weight given to the length-composition data, and the “depletion-like” proprieties of the model
- The update assessment of 2019 that the yellowfin tuna model is also sensitive to the inclusion of a new year of the main index of abundance, as it should be. Other information in the model does not carry the same signal about abundance.
- Collaborative work is in progress to not only improve the longline derived index, but also deepen our understanding of it, so improved assumptions can be made when using it in the stock assessments
- Work is in progress to improve the purse-seine derived indices (e.g. Xu et al 2019)