

Size composition longline

Exploratory data analysis of JPN data

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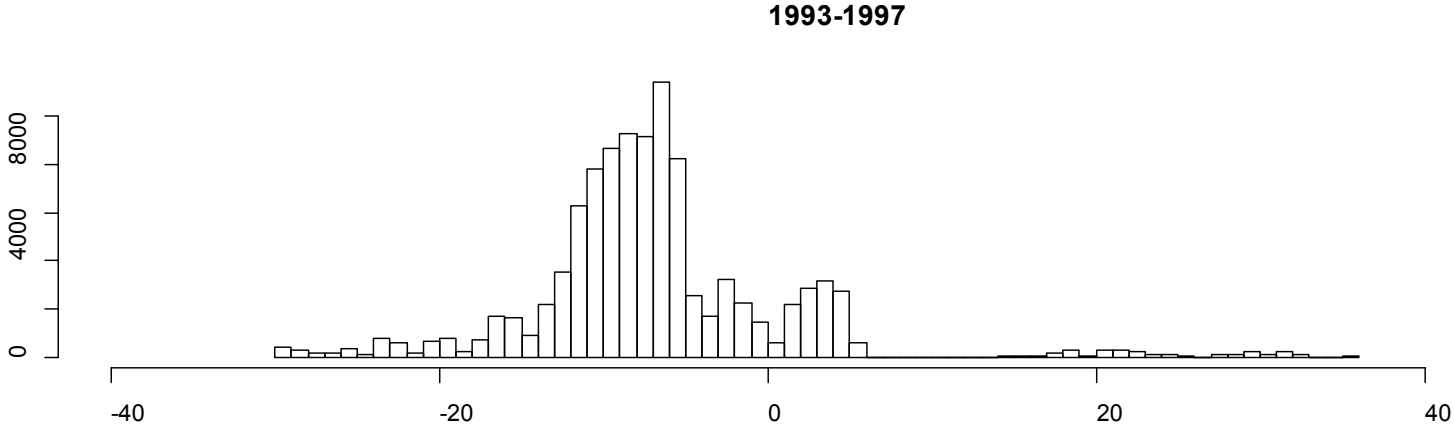
(data version: March 15 2018)

Background

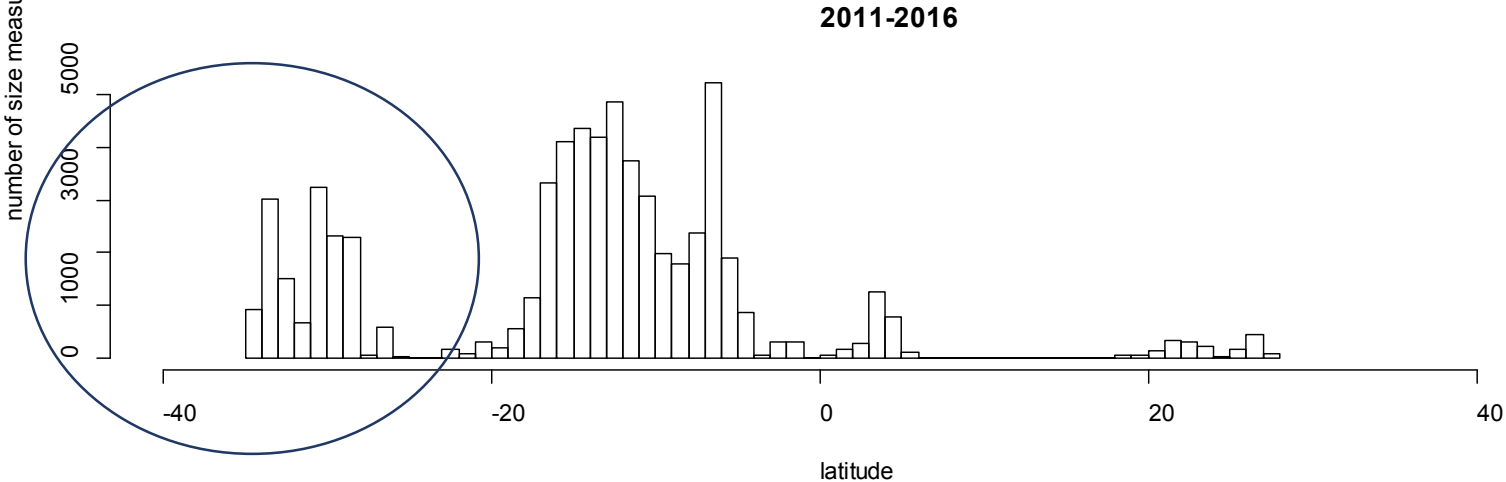
- Indices of relative abundance derived for longline CPUE data are the most important piece of information in the bigeye and yellowfin stock assessments
- Only data from the Japanese longline fleet are currently used to create these indices
- The stock assessment of YFT is fit to 5 indices of relative abundance, the main index is the longline index (LL_S), the other 4 indices are PS indices. BET is fit only to two indices, both from longline (JPN)
- In recent years the index for YFT tuna has been decreasing, while those from the PS fisheries have been stable
- Simultaneously, the length-frequency data is showing shifts towards larger sizes for YFT
- The characteristics, tactics, and spatial distribution of the fishery have been changing over time
- Analyses of operational-level longline data from the Japanese fleet have **identified potential changes in the longline gear configuration**, which may be reflecting changes in target that may affect the indices of relative abundance and **size-frequency of the catch**

How is the sampling for sizes on the JPN LL fleet over space?

Number of size (weight or length) measurements for **all species** combined by latitude and period

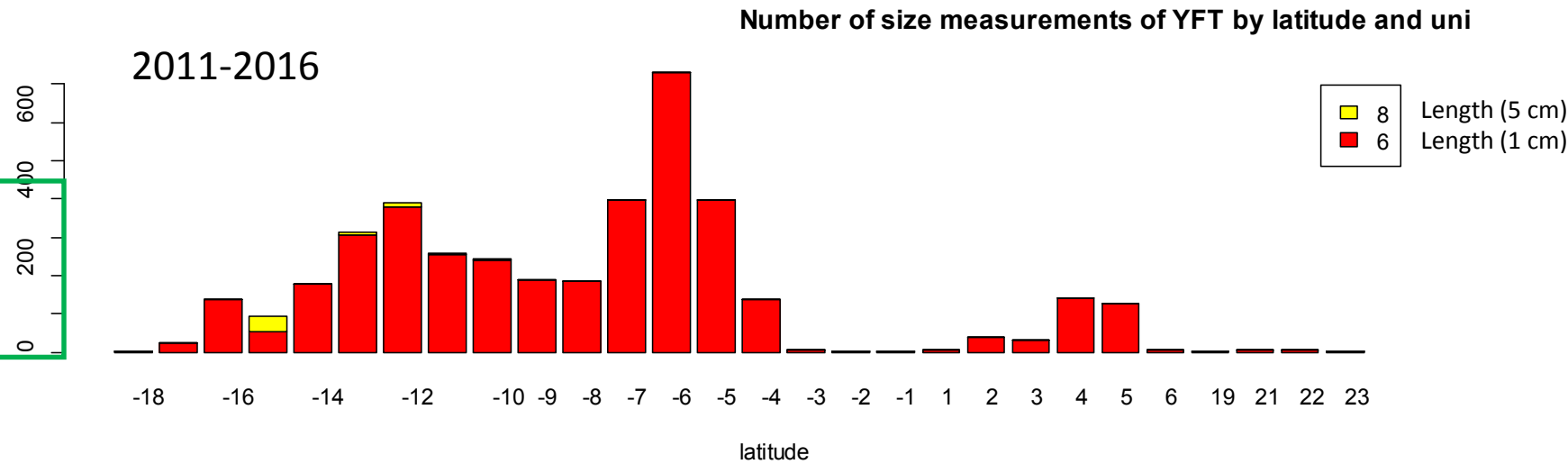
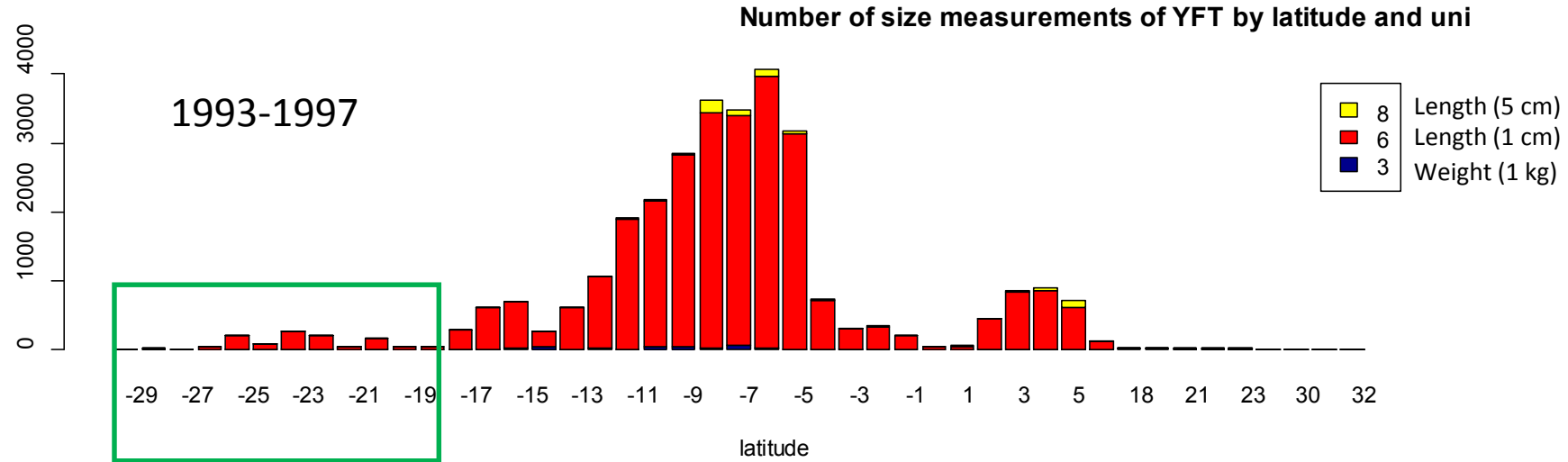


In recent years a burst of samples came from latitudes south of 20 S

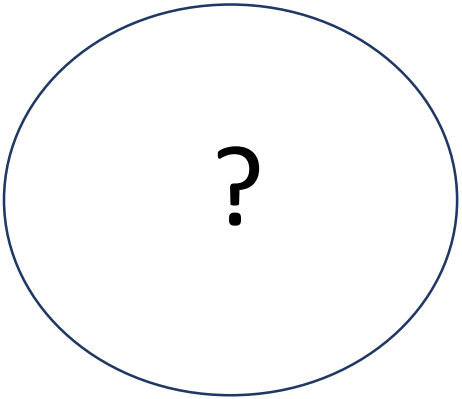


Most size measurements for YFT are in length in the 1 cm resolution

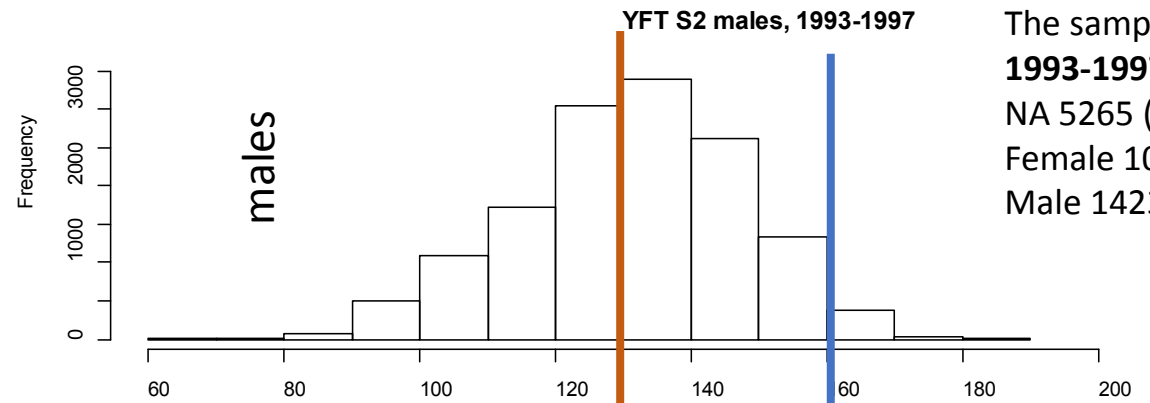
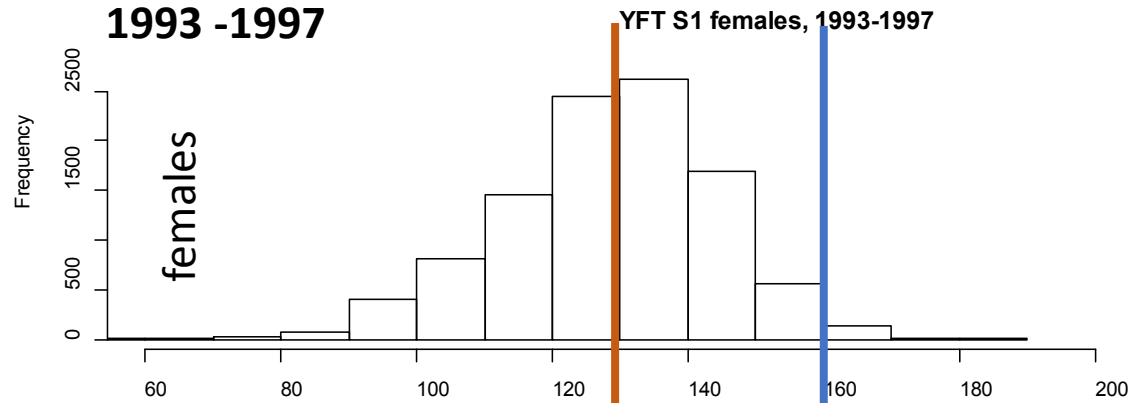
However, for yellowfin tuna, the sampling for size measurement actually contracted...



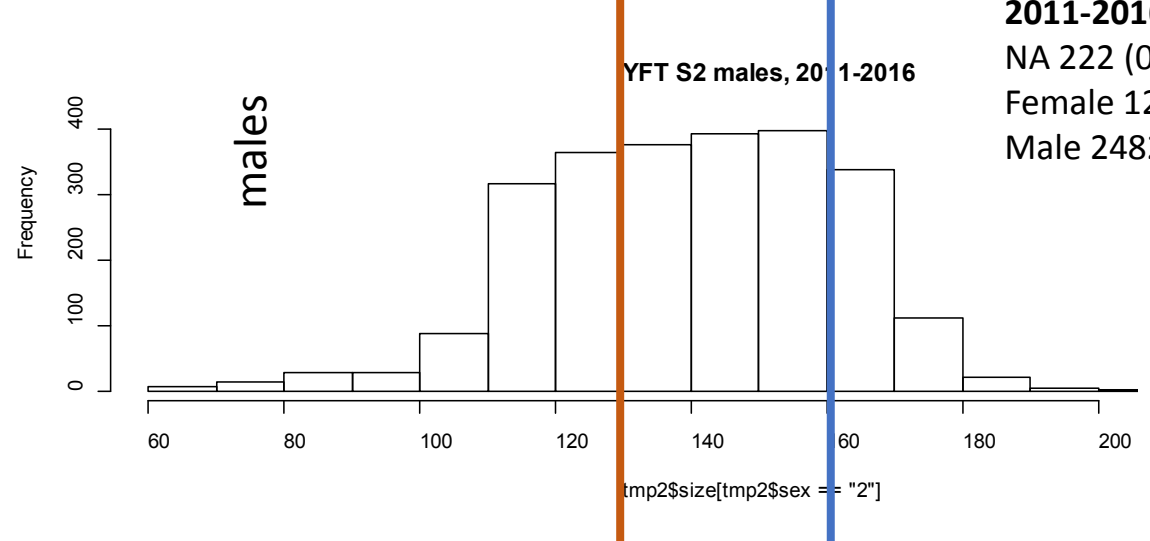
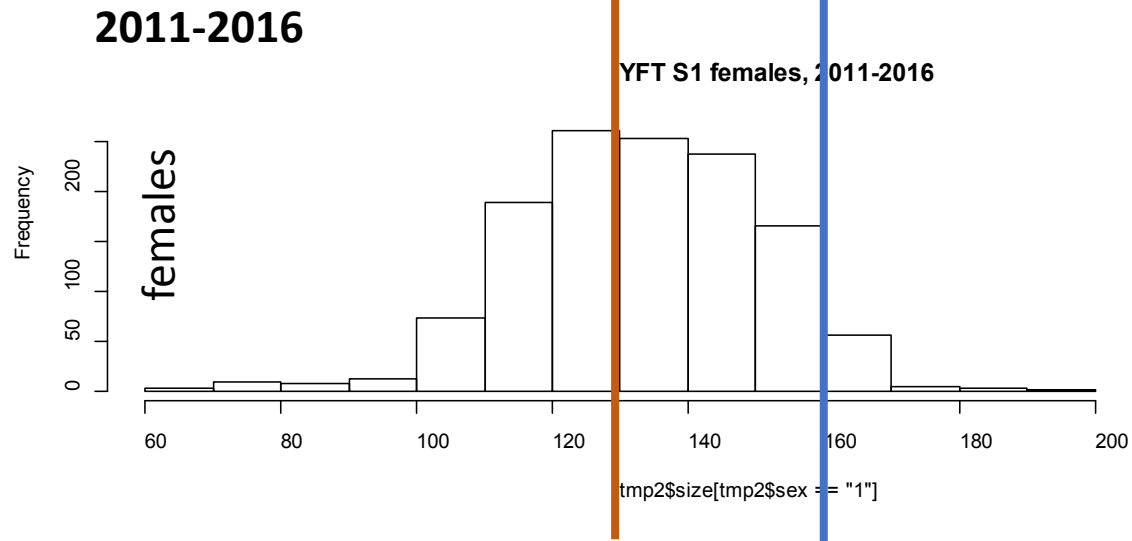
Are there no more catches on those latitudes?
Or no more sampling?



Overall size distribution for YFT by sex and period, raw samples



The sample sizes are
1993-1997:
NA 5265 (18%)
Female 10256 (35%)
Male 14233 (48%)



2011-2016:
NA 222 (0.06)
Female 1273 (32%)
Male 2482 (62%)

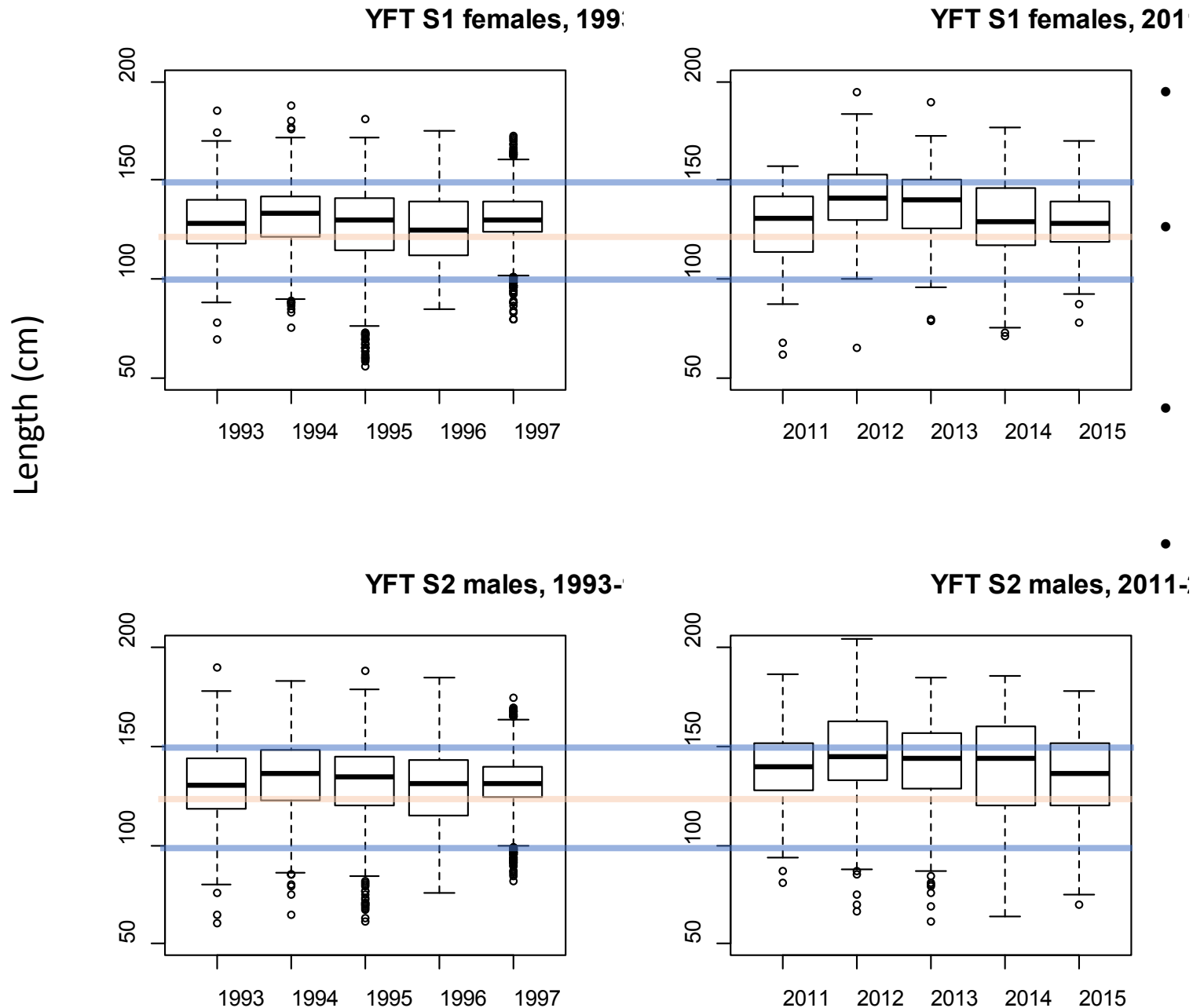
There seems to be a lot more large fish, specially large males, in recent years, why?

The total sample size is much smaller in recent year (12% of 1993-1997)

Box-plots of length distribution for females and males caught by JPN longliners

The sample sizes are
1993-1997:
 NA 5265 (18%)
 Female 10256 (35%)
 Male 14233 (48%)

2011-2016:
 NA 222 (0.06%)
 Female 1273 (32%)
 Male 2482 (62%)



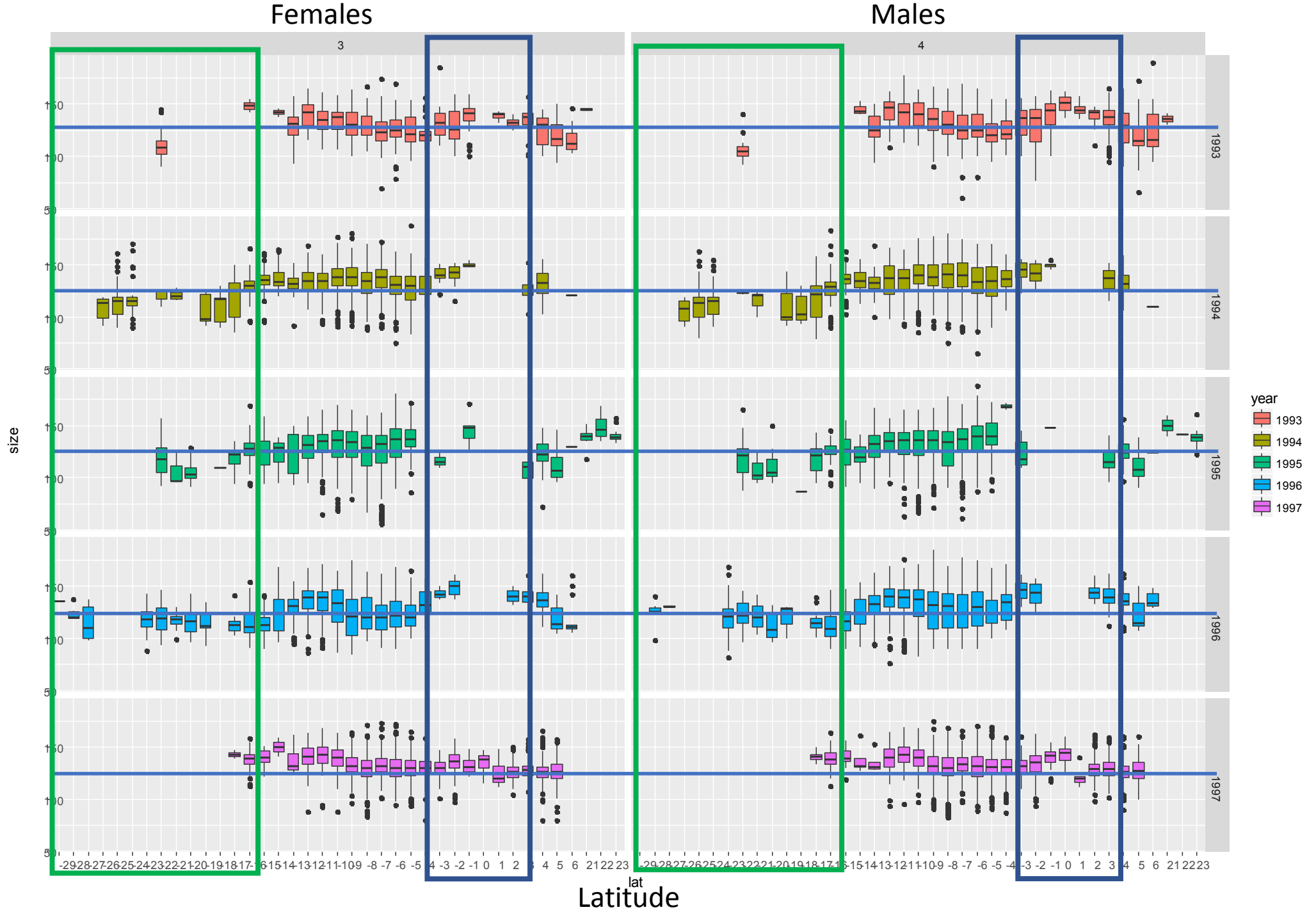
- Length-frequency distribution depend on sex
- The males have much larger median in the later time period than in the earlier one.
- The female size distribution is about the same in the two periods
- (Why? The females have larger natural mortality, maybe the males are having less fishing mortality in the larger sizes because of the decrease in effort by the longliners, and thus survive longer and keep growing larger)

1993-1997

125 cm

Largest sizes tended to be in the equator

Smallest tended to be South of 15S



2011-2015

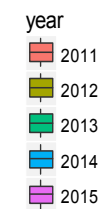
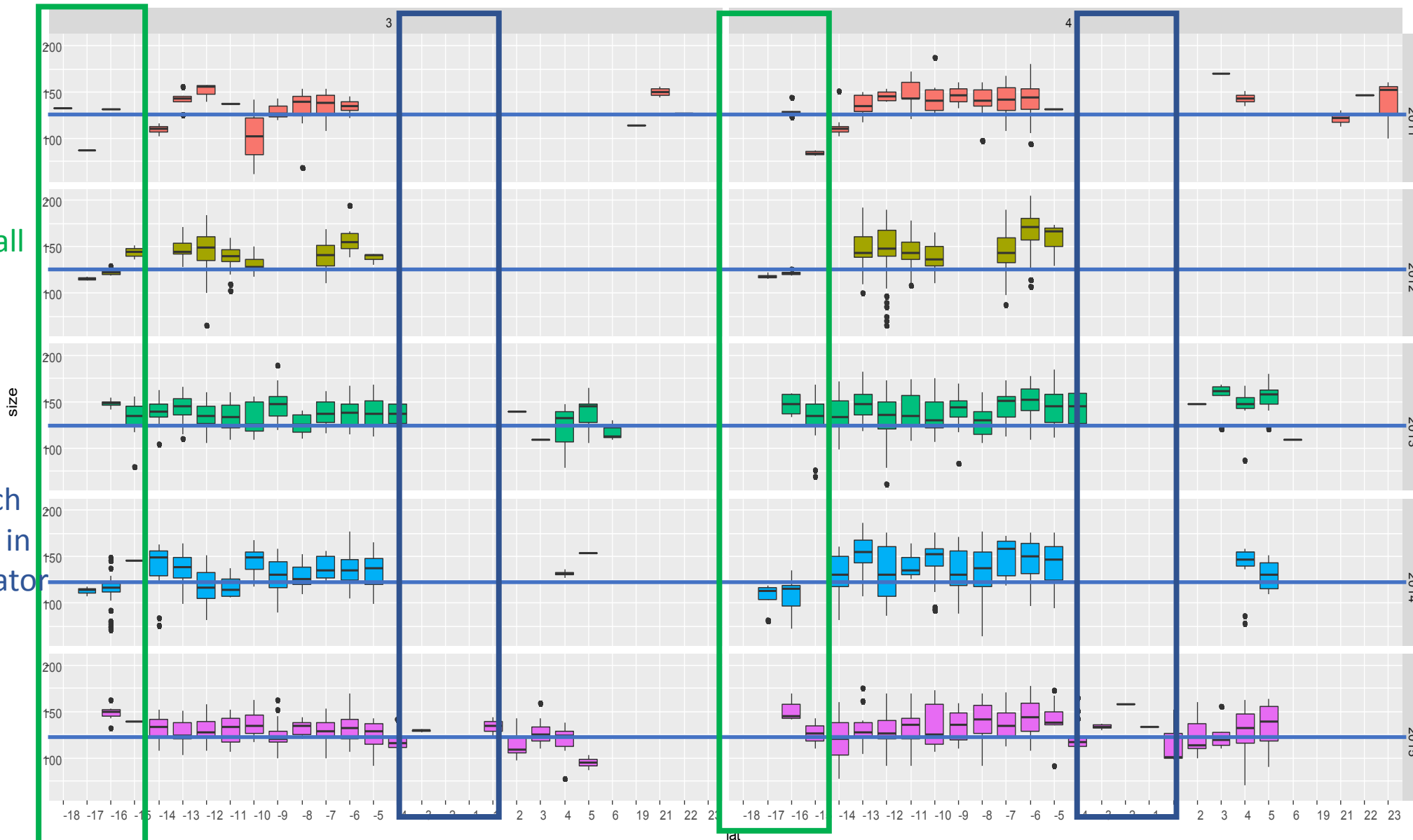
Females

Males

125 cm

Samples sizes south if 15S are very small

Not much samples in the equator either

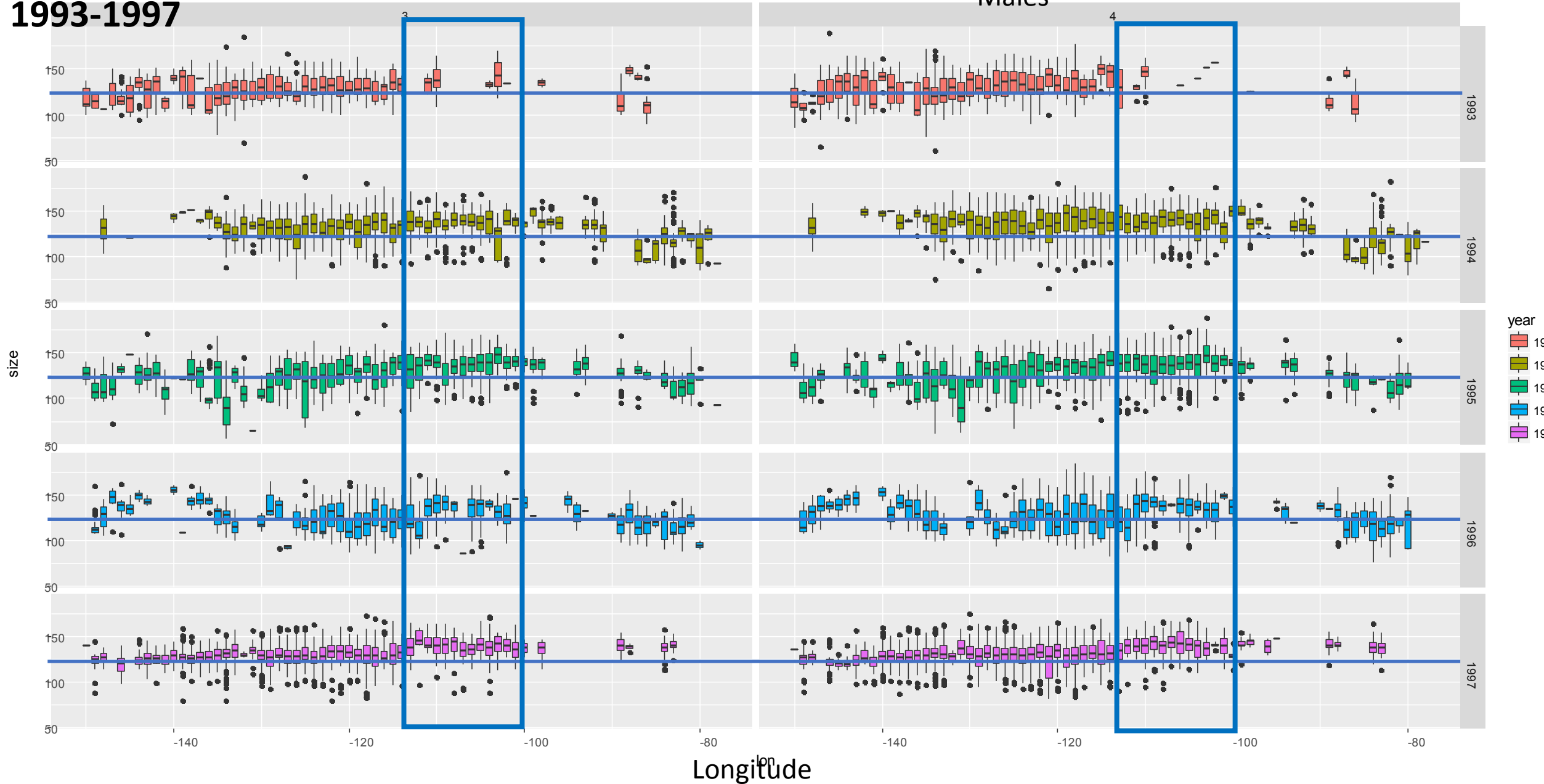


Latitude

1993-1997

Females

Males



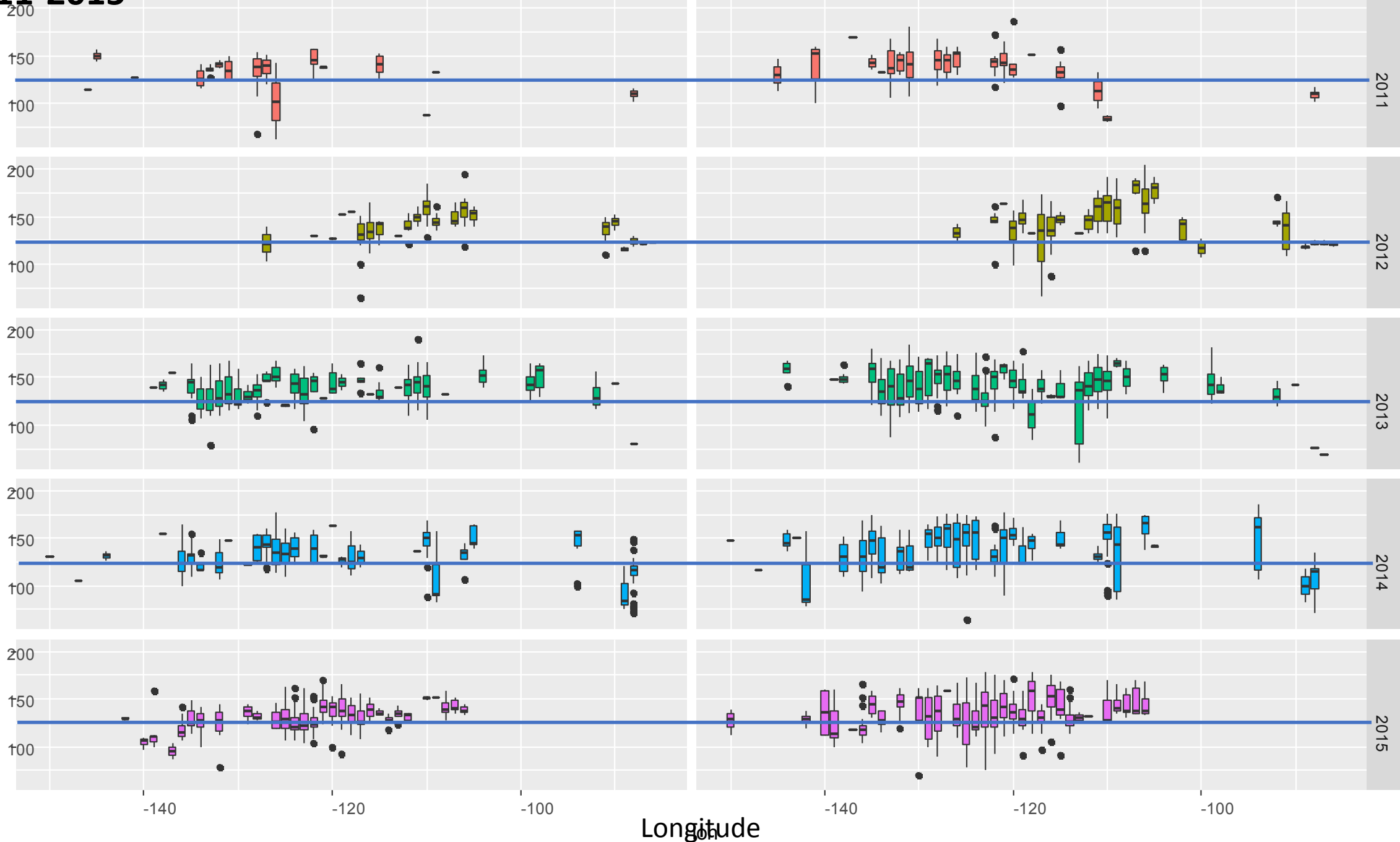
Variability within longitude is much larger than within latitude, but noticeable larger sizes between 100W and 120W, does this relate to gear configuration (e.g. length of FL)?

2011-2015

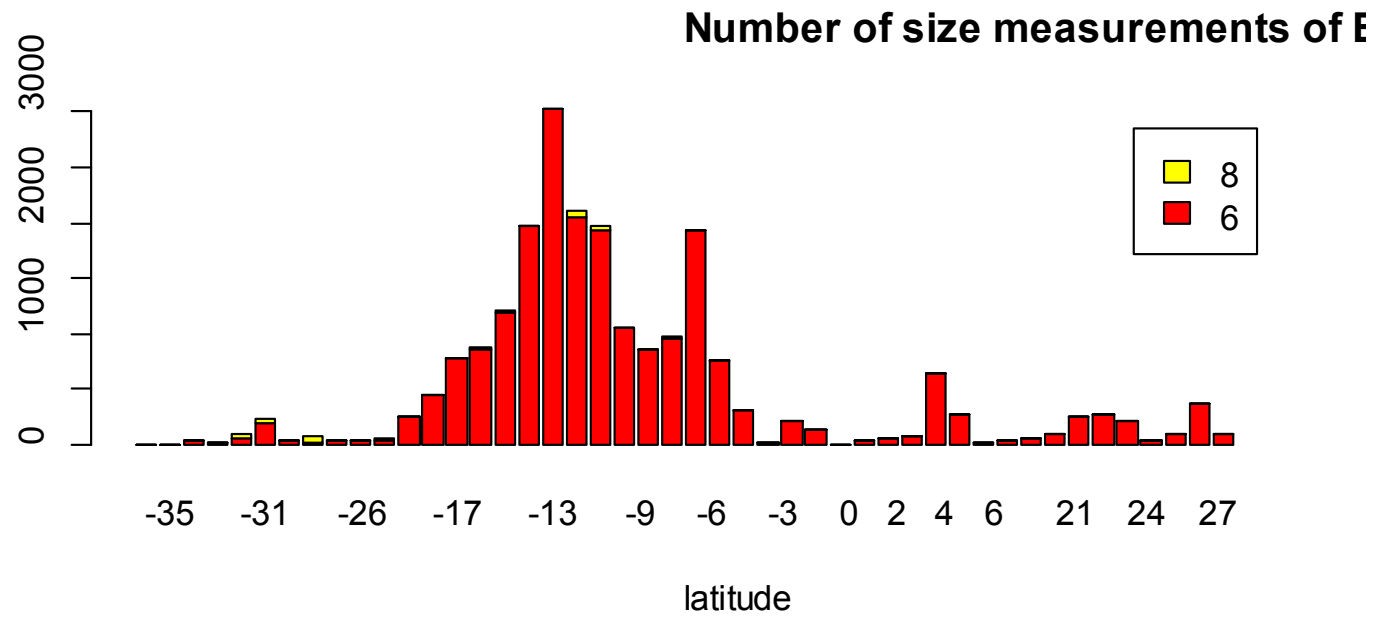
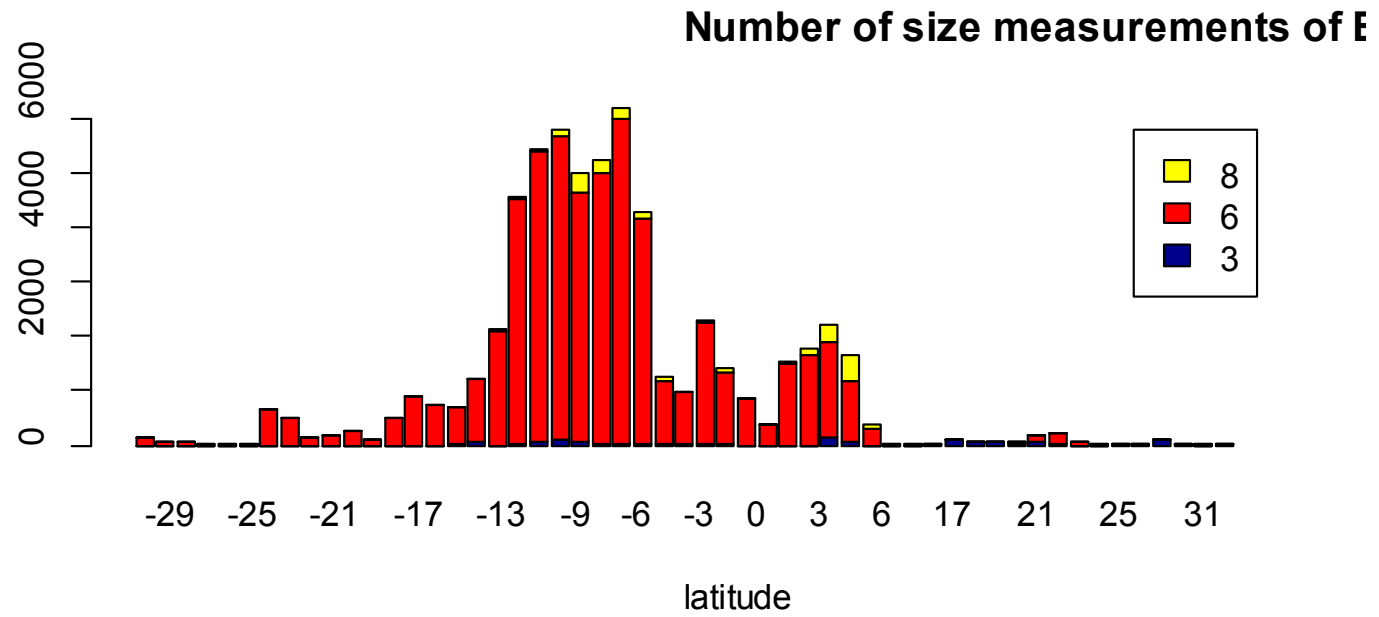
Females

Males⁴

size



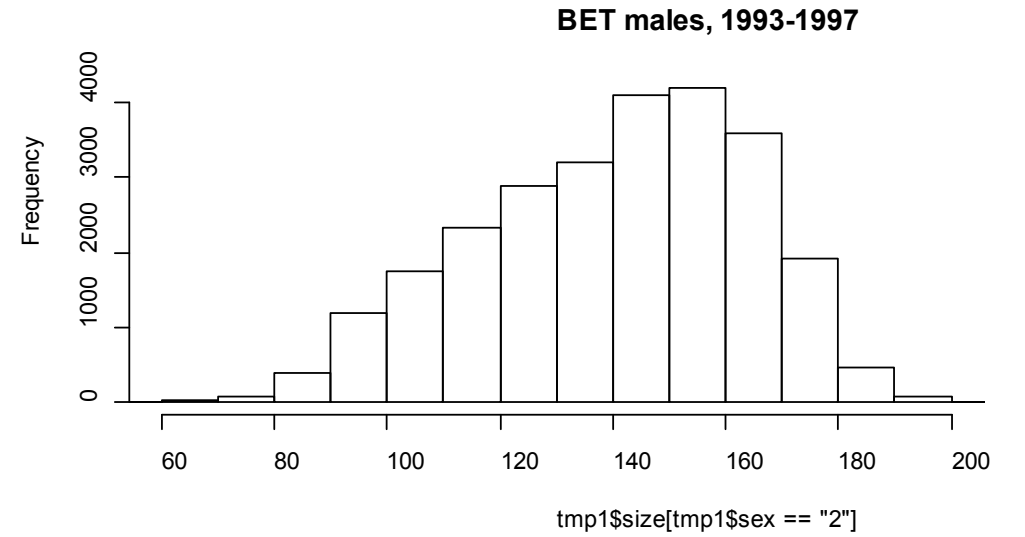
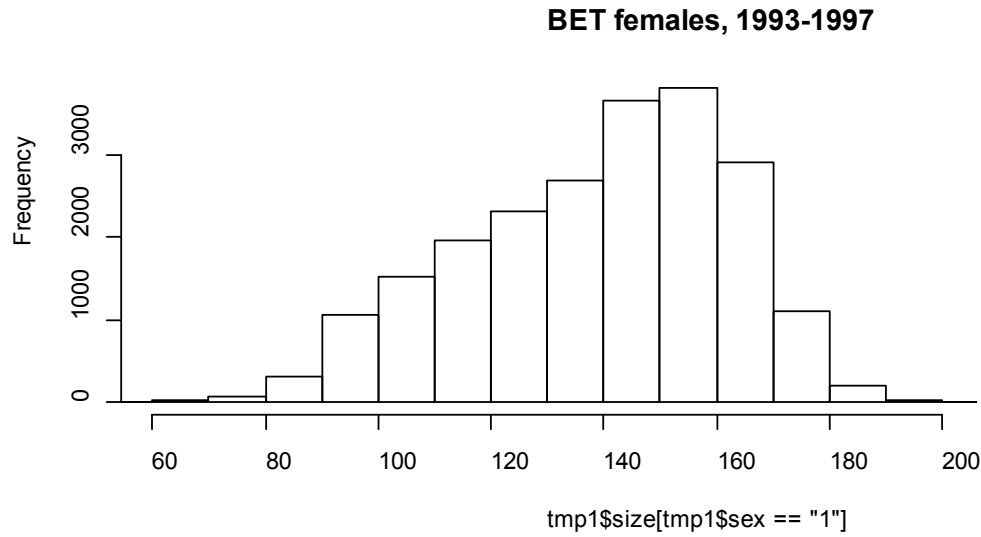
BET



1993-1997

NA 8471
0 475
Fem 21679
Male 26271

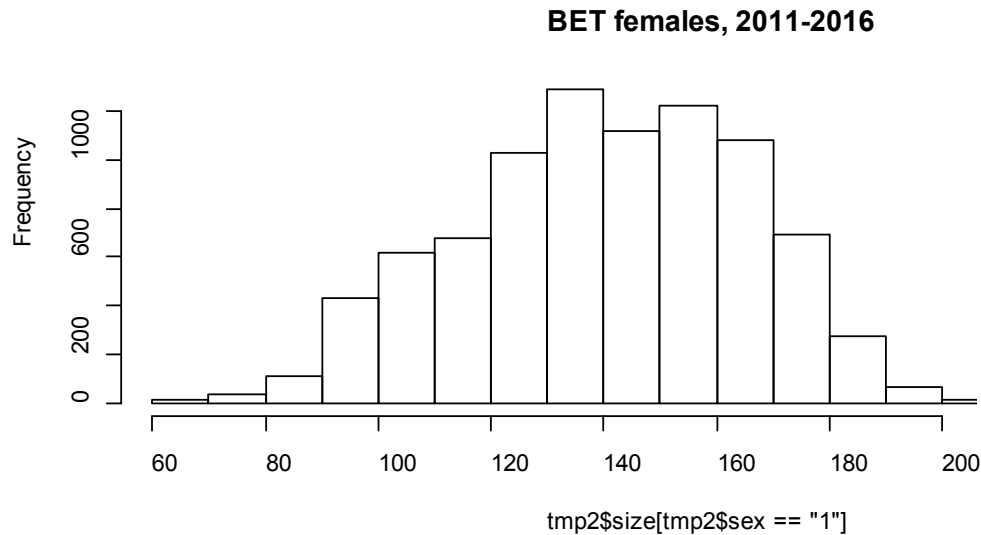
NA 15%
Fem 38%
Male 46%



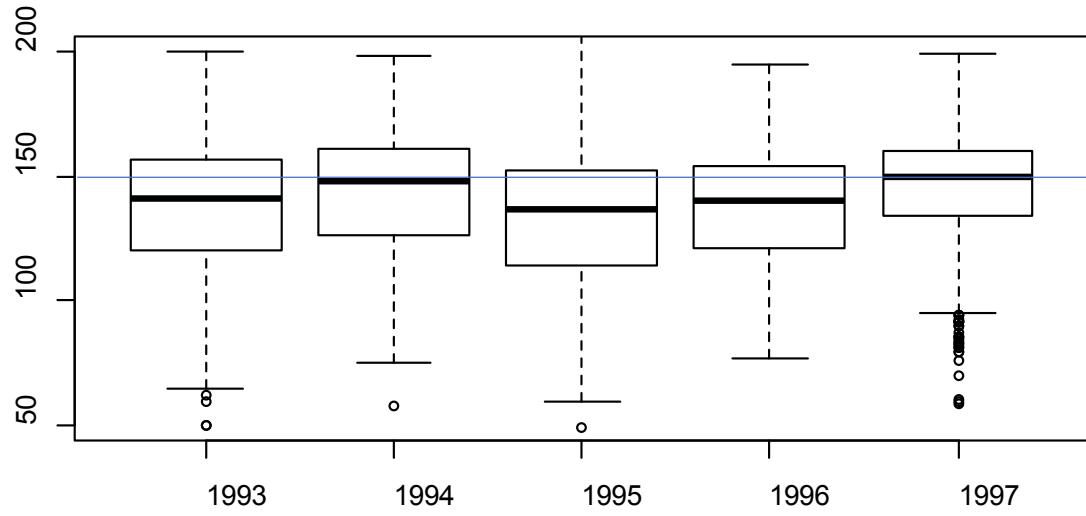
2011-2016

NA 0
0 1156
Fem 8696
Male 12025

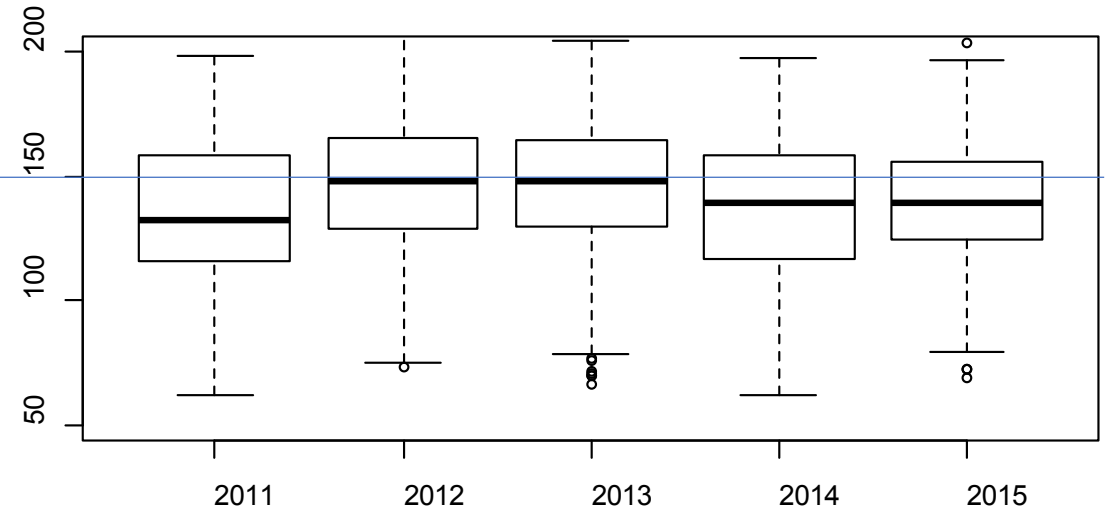
NA 0%
0 5%
Fem 40%
Male 55%



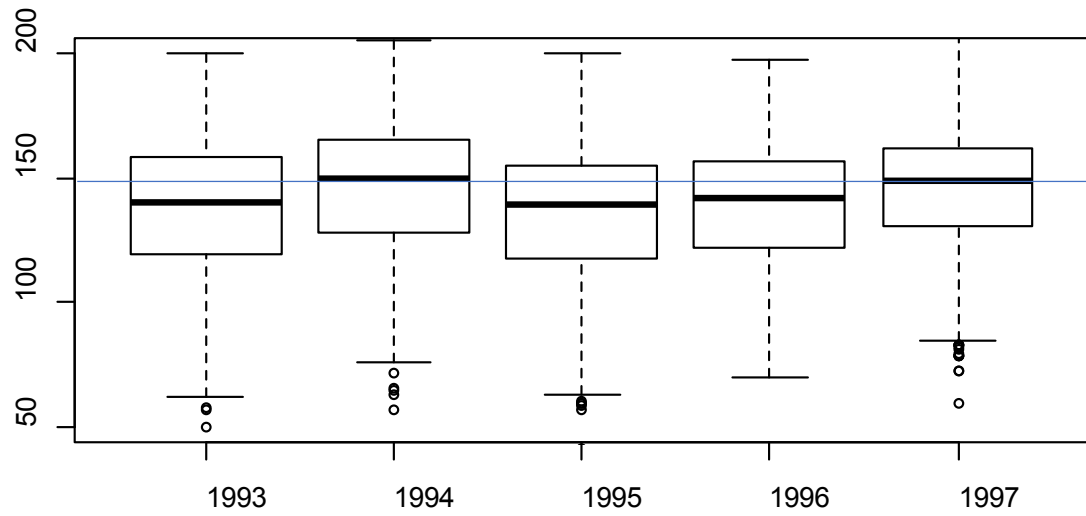
BET S1 females, 1993-1997



BET S1 females, 2011-2016



BET S2 males, 1993-1997



BET S2 males, 2011-2016

