Preliminary information on size and age composition data of Pacific saury for the development of age-structured model using Stock Synthesis

NPFC SSC-PS07 meeting

Data format of size and age composition

Format of submitting data

14 – 35 cm (bin = 1cm)

Member	Year	Month	Duration (Month, Early, Middle, Late, Date)	Latitude (°N)	Longitude (°E)	Mesh size of Grid	Catch amount (metric ton)	Total operation days for all vessels	Total net hauls for all vessels	Age-0	Age-1	Measurement length (FL, TL, KnL, BL)	<15	15≤	16≤	17≤	18≤	19≤	20≤	21≤	22≤	23≤
Russia	2000	8	Month	42.5	146.5	1.0	91.4	2		490,184	288,807	FL	0									
Russia	2000	8	Month	44.5	147.5	1.0	182	12		1,454,623	283,653	FL	0	0	0	132	794	927	662	32,534	80,341	96,806
Russia	2000	8	Month	44.5	146.5	1.0	36.7	7		354,649	10,427	FL	0	647	3,645	5,795	9,139	13,294	15,074	22,123	45,275	53,334
Russia	2000	8	Month	45.5	146.5	1.0	53.4	1		336,948	198,523	FL	0									
Russia	2000	8	Month	43.5	146.5	1.0	959	65		8,107,632	365,358	FL	0	256	31,377	64,825	63,913	61,938	114,772	207,776	439,831	662,720
Russia	2000	8	Month	43.5	147.5	1.0	781.2	37		5,413,607	967,430	FL	0	2,269	23,559	65,129	101,368	132,545	166,514	192,324	406,875	358,846
Russia	2000	9	Month	44.5	146.5	1.0	266.8	20		2,226,086	546,425	FL	0	0	7,803	564	4,036	12,418	21,127	65,348	73,464	137,037
Russia	2000	9	Month	44.5	145.5	1.0	80	1		516,869	304,530	FL	0									
Russia	2000	9	Month	42.5	146.5	1.0	73.4	10		556,384	144,612	FL	0	7,010	14,020	0	14,020	7,010	91,129	42,060	42,060	42,060
Russia	2000	9	Month	42.5	144.5	1.0	19.4	1		142,725	42,139	FL	0	0	0	0	1,170	2,925	4,680	5,935	7,860	12,124
Russia	2000	9	Month	41.5	143.5	1.0	23.9	2		163.314	54.280	FL	0	0	0	0	1.451	1.451	1.451	0	2.901	7.978

(*Center of grid*: Latitude (°N), Longitude (°E); *Effort*: Total operation days for all vessels, Total net hauls for all vessels; *Estimated catch by ages (N. Individuals)*: Age-0, Age-1)

- The unit of length data is measured as the **fork length (FL)** from Russia and Korea (others are Knob length, KnL);

Template for sharing data on PS size and catch.xlsx

Temporal coverage of size & age compositions data

This dataset is available from NPFC SSC-PS05
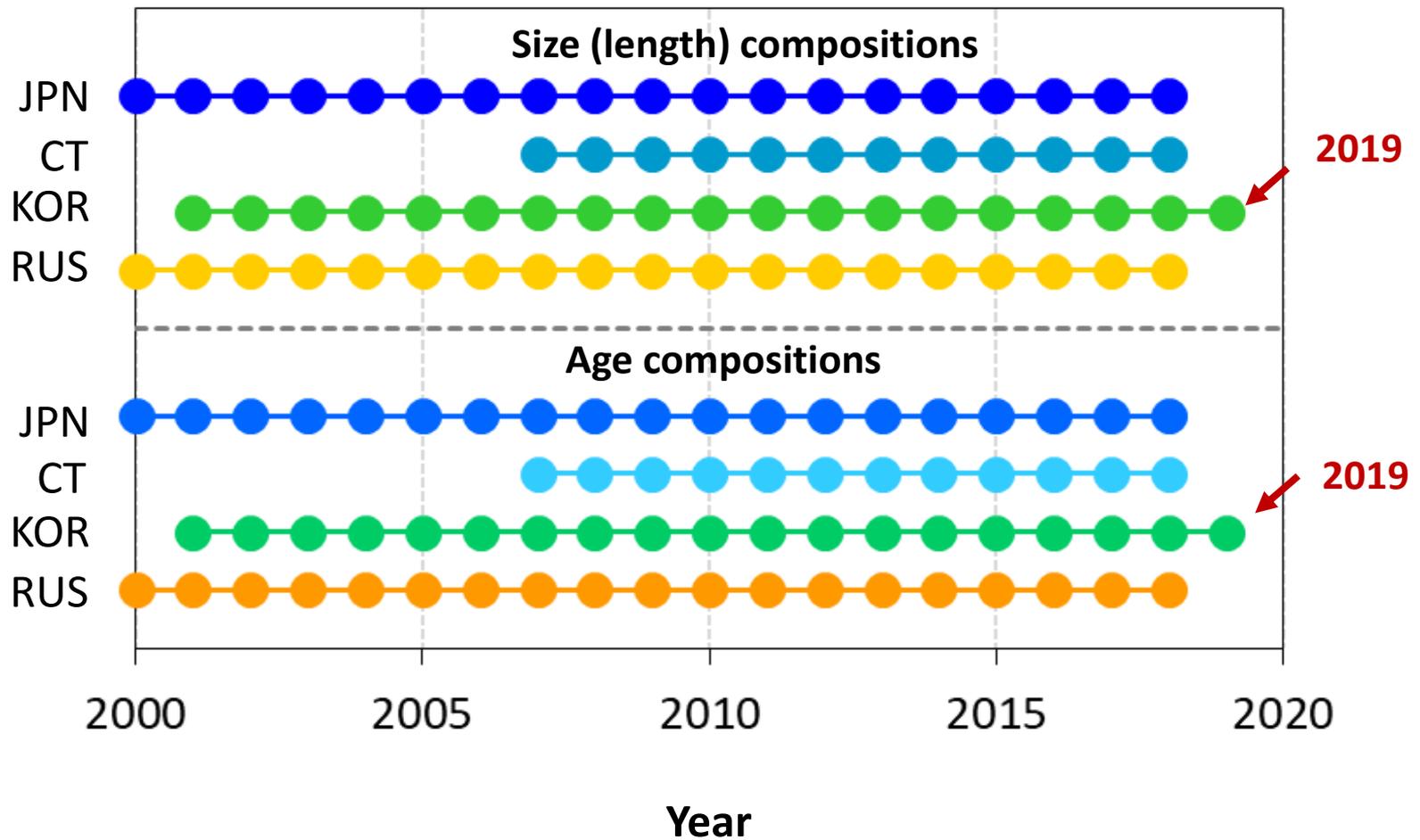

* Not available size and age composition data from China and Vanuatu in NPFC SSC-PS05

Aggregated size compositions by fleets

Combined all seasons
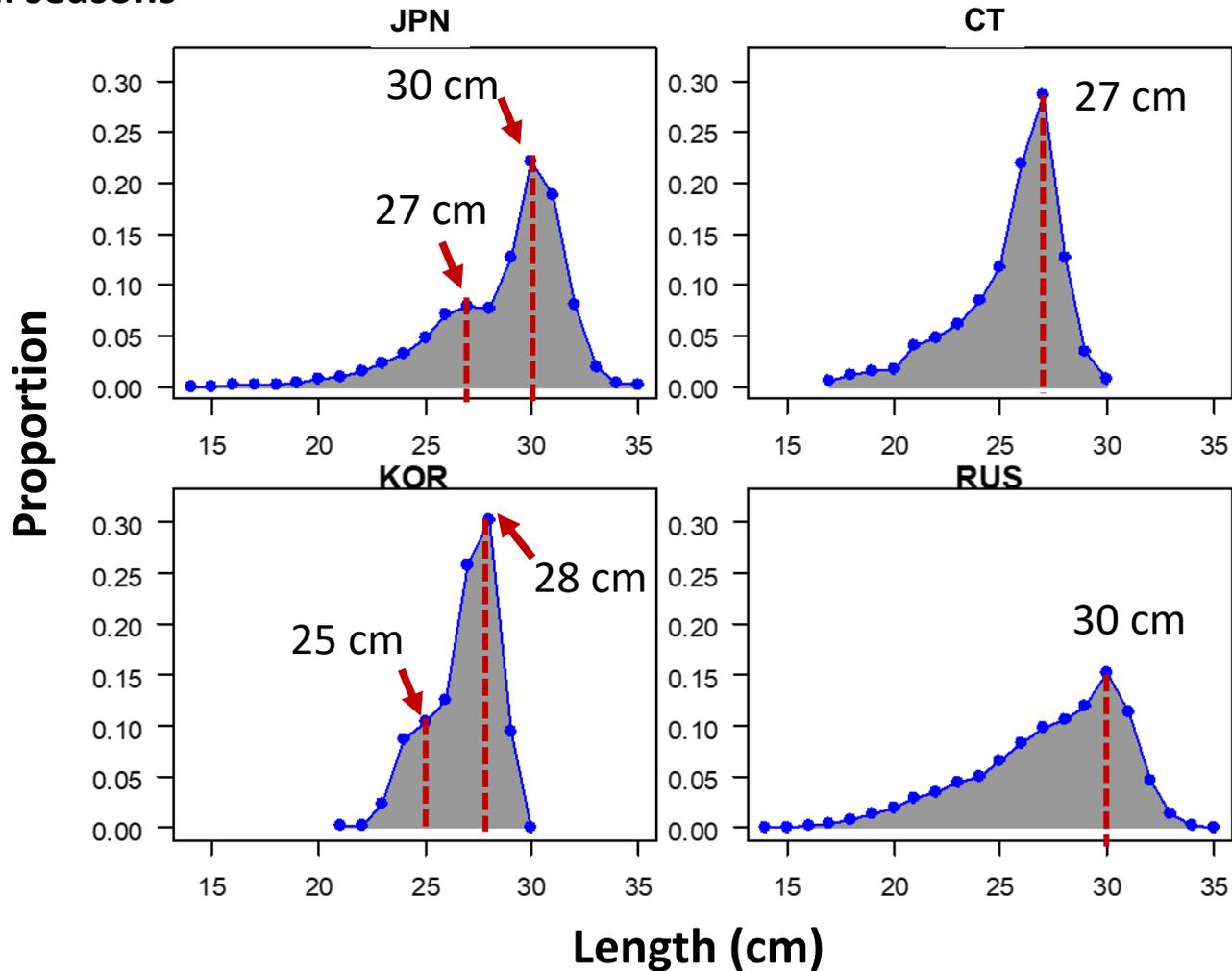
# Pairwise comparison of size compositions
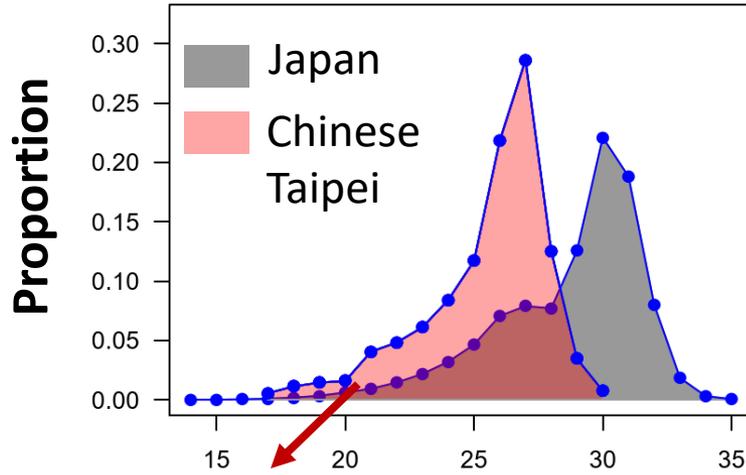
# Pairwise comparison of size compositions
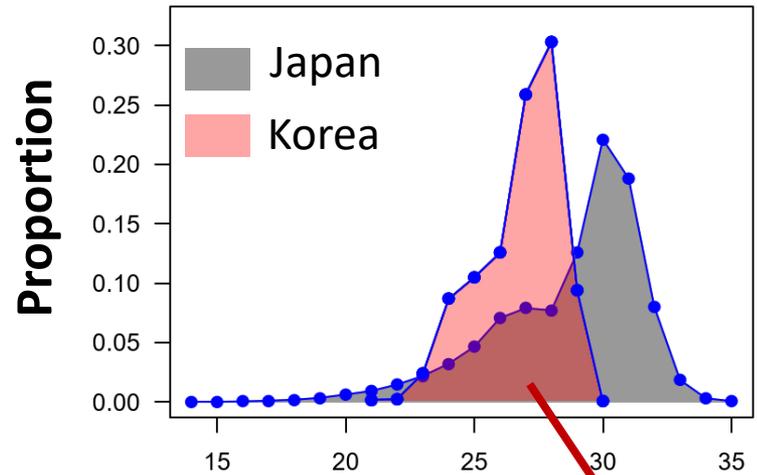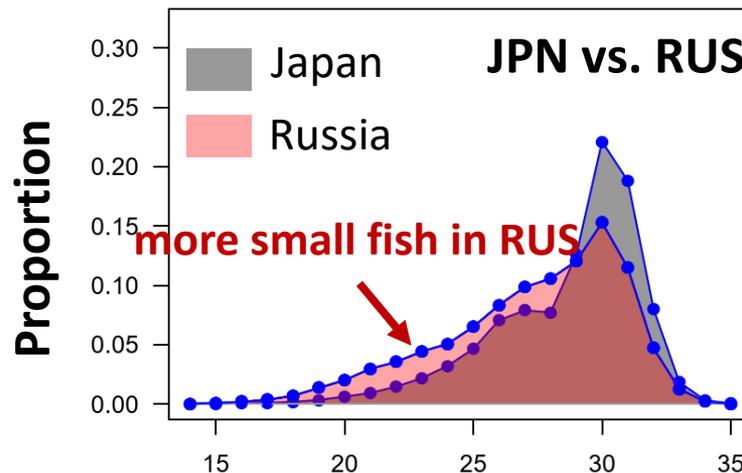
Pairwise comparison of yearly mean body length
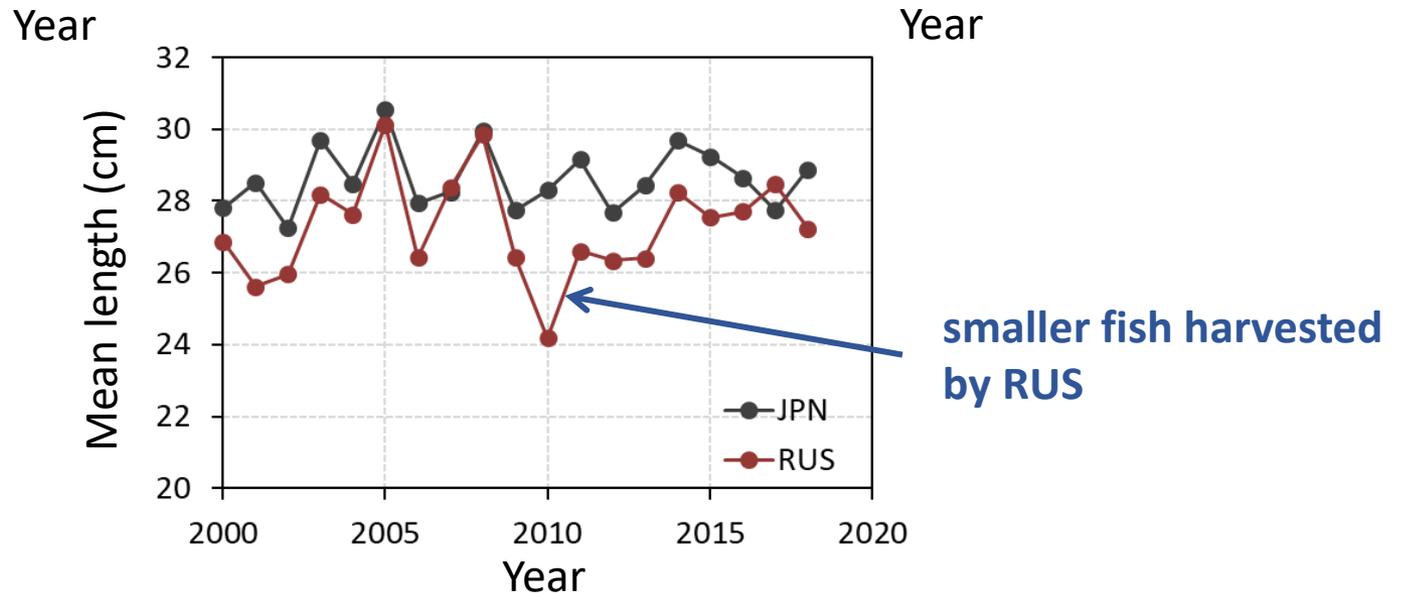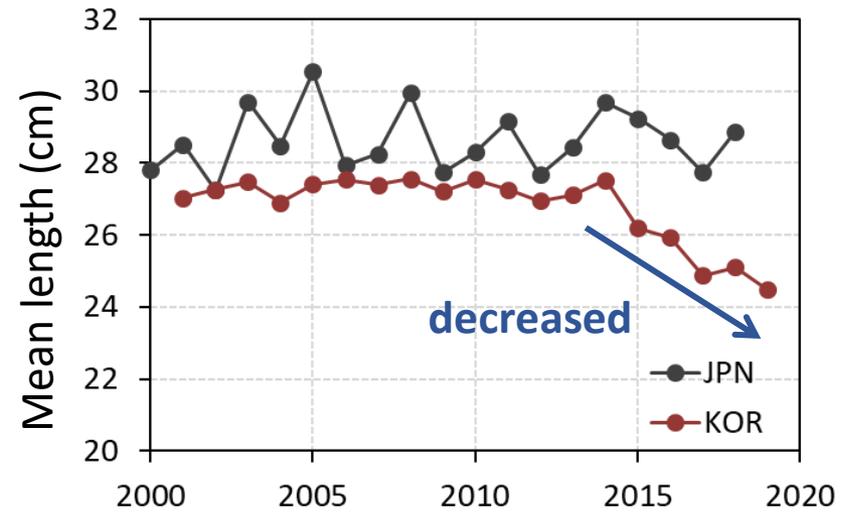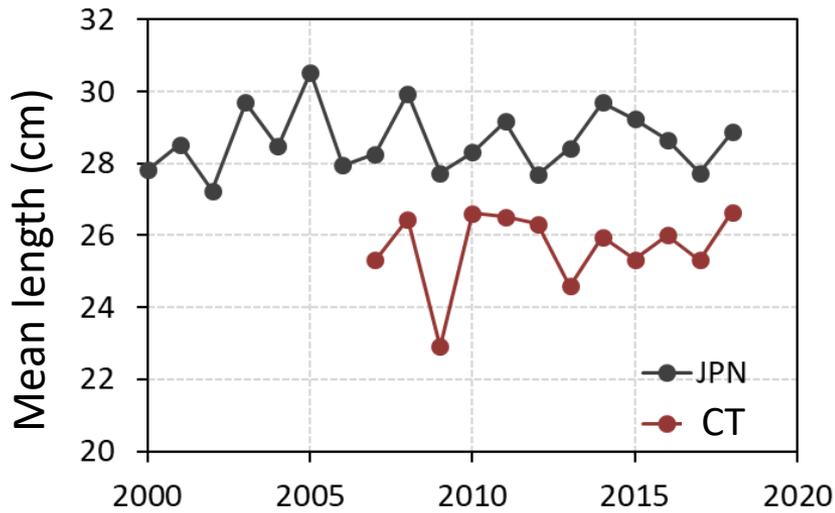
Pairwise comparison of yearly mean body length
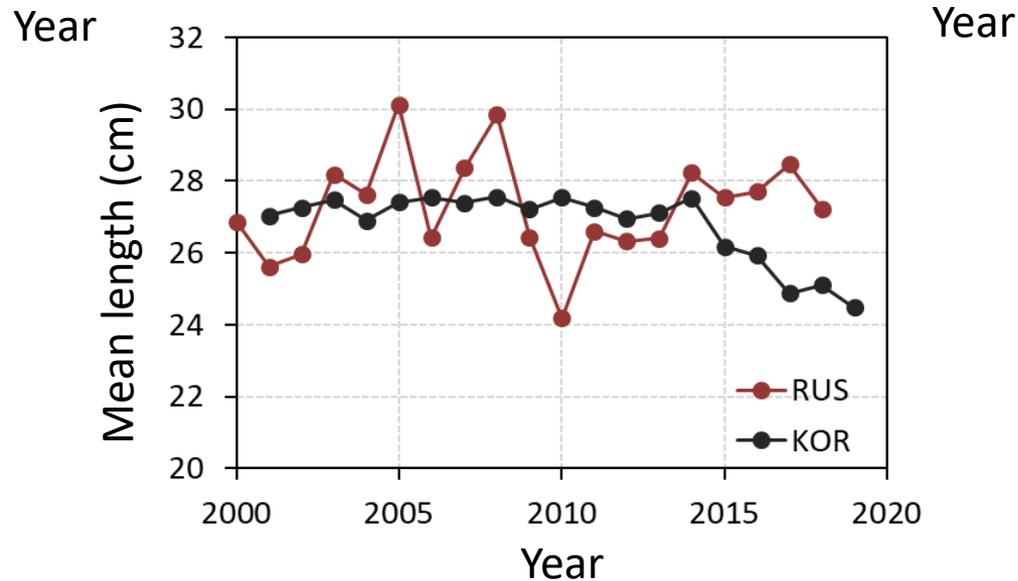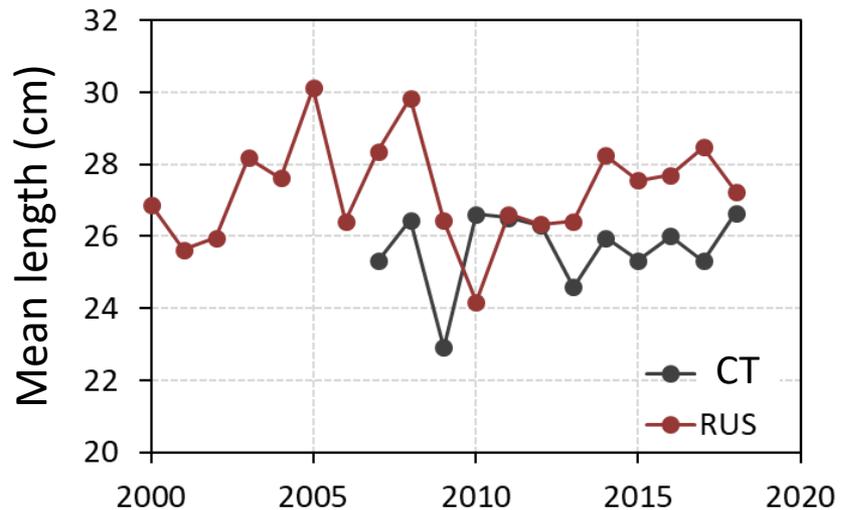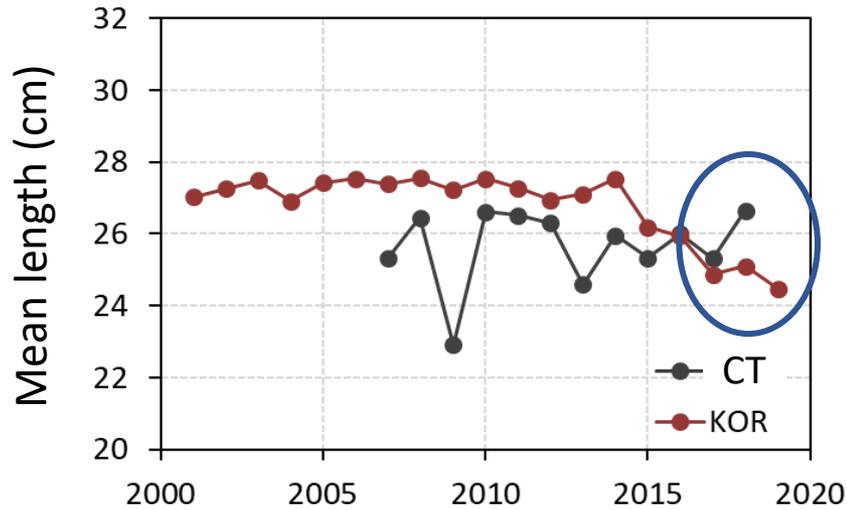
Seasonal changes of size compositions by fleets
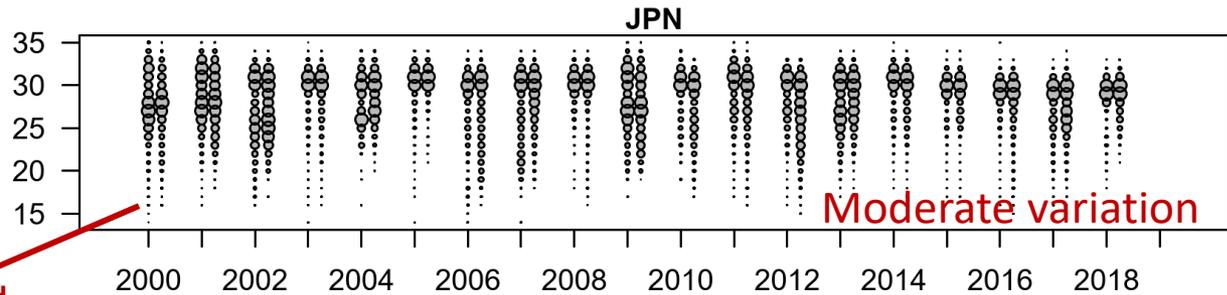
1st season: Jan – Mar
2nd season: Apr – Jun
3rd season: Jul – Sep
4th season: Oct – Dec
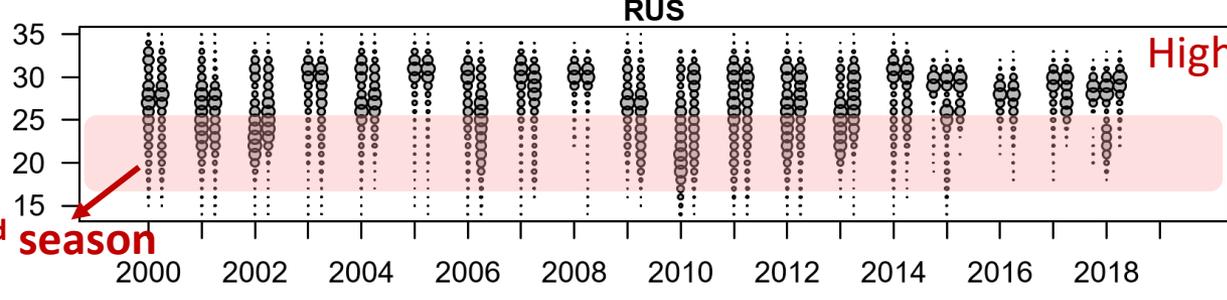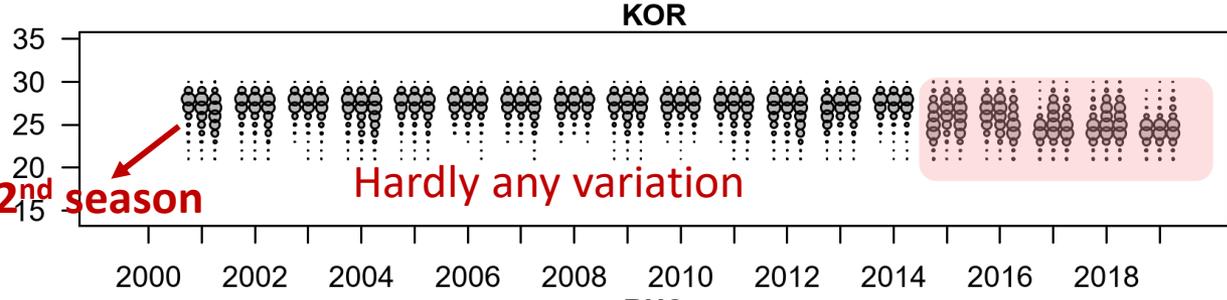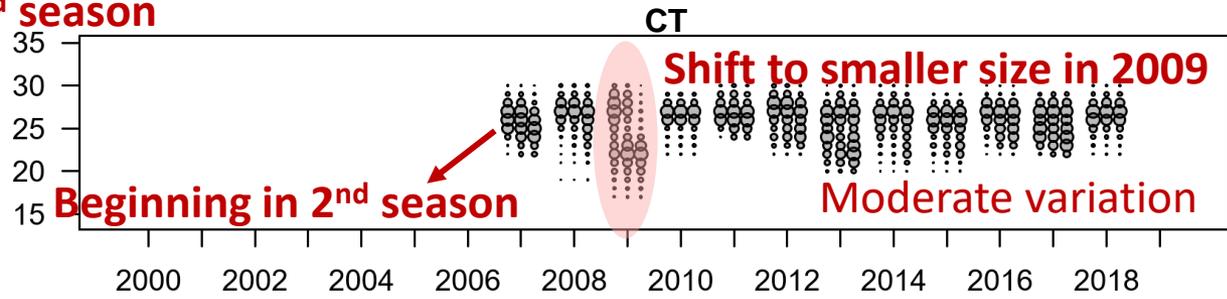
Data format of age-length key matrix

2 age-length key matrices from 2 seasons

			Size(cm)>=	20	21	22	23	24	25	26	27	28	29	30	31
1			Size(cm)<	21	22	23	24	25	26	27	28	29	30	31	32
3	May-Jul.-2000 ~ (Aggregate	Percentage of Age-1	0	0%	0%	0%	0%	1%	2%	20%	68%	96%	99%	100%	100%
4	Aug.-Dec.-2000 ~ (Aggregat	Percentage of Age-1	0	0%	0%	0%	0%	0%	0%	0%	1%	19%	75%	95%	99%
5	May-Jul.-2000	Percentage of Age-1	0	0%	0%	0%	0%	0%	0%	0%	0%	8%	86%	97%	98%
6	Aug.-Dec.-2000	Percentage of Age-1	0	0%	0%	0%	1%	2%	0%	1%	1%	2%	2%	42%	93%
7	May-Jul.-2001	Percentage of Age-1	0	0%	0%	0%	0%	0%	0%	0%	0%	57%	95%	100%	100%
8	Aug.-Dec.-2001	Percentage of Age-1	0	0%	0%	0%	0%	0%	0%	0%	1%	1%	4%	41%	88%
9	May-Jul.-2002	Percentage of Age-1	0	0%	0%	0%	0%	1%	0%	7%	25%	74%	95%	98%	100%
10	Aug.-Dec.-2002	Percentage of Age-1	0	0%	0%	0%	0%	0%	1%	1%	0%	2%	56%	88%	98%
11	May-Jul.-2003	Percentage of Age-1	0	0%	0%	0%	0%	0%	1%	2%	44%	98%	100%	100%	100%
12	Aug.-Dec.-2003	Percentage of Age-1	0	0%	0%	0%	0%	0%	0%	0%	1%	17%	80%	98%	100%
13	May-Jul.-2004	Percentage of Age-1	0	0%	0%	0%	0%	0%	1%	14%	53%	90%	98%	99%	99%
14	Aug.-Dec.-2004	Percentage of Age-1	0	0%	0%	0%	0%	2%	2%	1%	1%	15%	78%	98%	100%
15	May-Jul.-2005	Percentage of Age-1	0	0%	0%	0%	0%	0%	0%	1%	59%	98%	100%	100%	100%
16	Aug.-Dec.-2005	Percentage of Age-1	0	0%	0%	0%	0%	0%	0%	4%	0%	25%	88%	99%	100%
17	May-Jul.-2006	Percentage of Age-1	0	0%	0%	0%	0%	0%	1%	11%	71%	96%	99%	100%	100%
18	Aug.-Dec.-2006	Percentage of Age-1	0	0%	0%	0%	0%	0%	0%	0%	0%	43%	93%	99%	100%
19	May-Jul.-2007	Percentage of Age-1	0	0%	0%	0%	0%	10%	23%	54%	88%	96%	100%	100%	100%
20	Aug.-Dec.-2007	Percentage of Age-1	0	0%	0%	3%	0%	1%	0%	1%	5%	35%	86%	97%	99%
21	May-Jul.-2008	Percentage of Age-1	0	0%	0%	0%	3%	2%	67%	97%	99%	100%	100%	100%	100%
22	Aug.-Dec.-2008	Percentage of Age-1	0	0%	0%	0%	0%	0%	0%	0%	10%	40%	95%	99%	100%
23	May-Jul.-2009	Percentage of Age-1	0	0%	0%	0%	0%	0%	3%	7%	36%	91%	98%	100%	100%

Changed by year

Annual and monthly variation of otolith samples of Japan

Otolith samples:

Average: 5364 otoliths

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Sample size	4889	2532	8362	7624	8327	7531	5453	5787	3388	4736	5127	3683	5331	5444	5976	4393	4715	3777	4847

2000-2018_AL-Key(20191205)for NPFC.xlsx
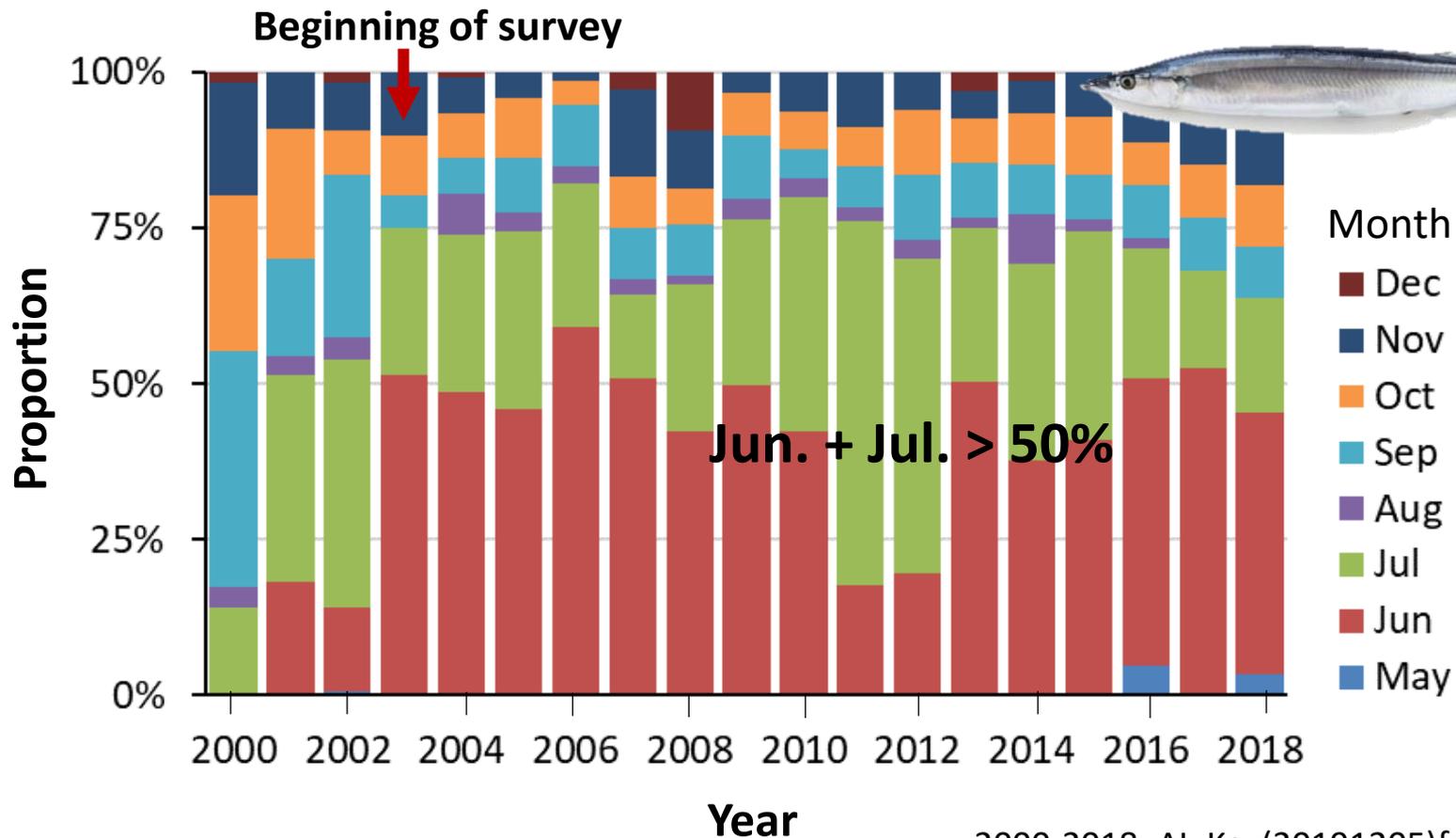
Spatial distribution of otolith samples
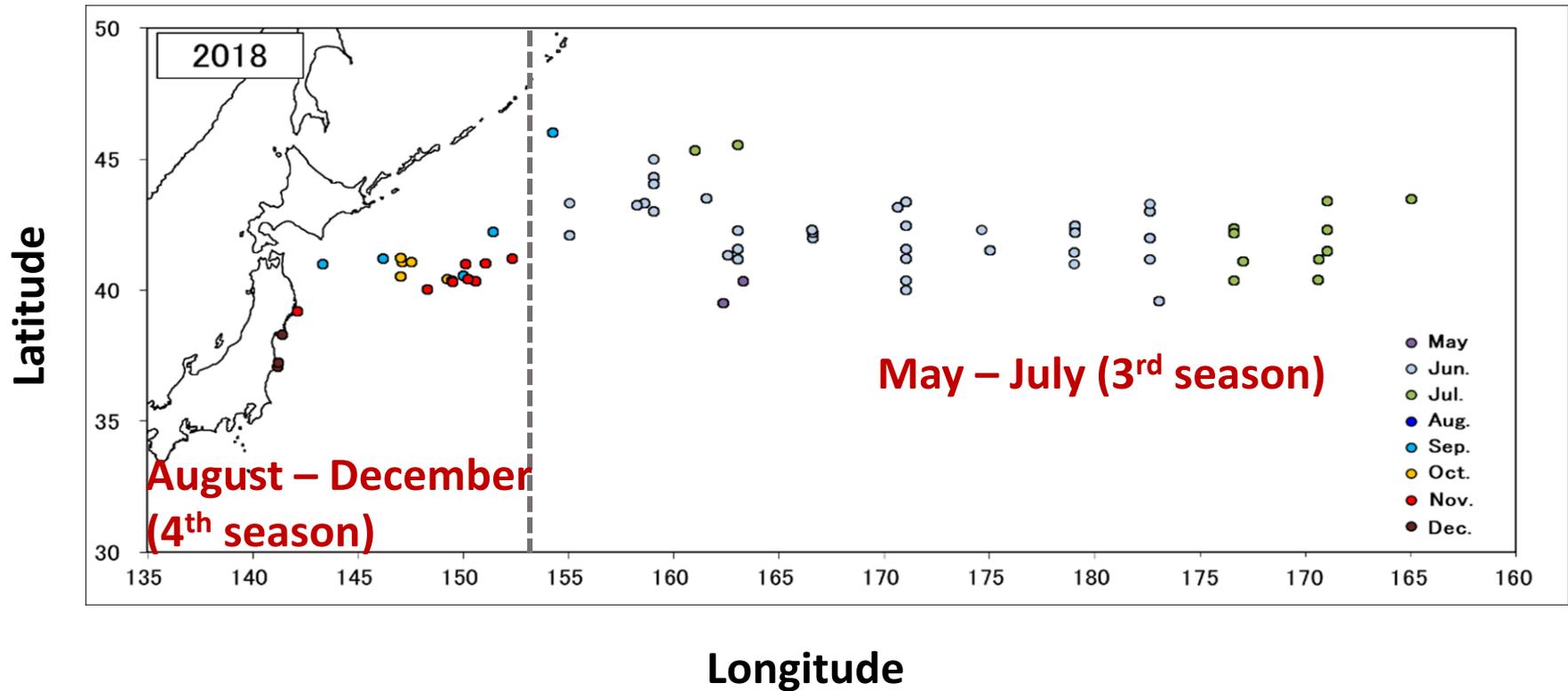
Aggregated seasonal age-length keys

2000 - 2018

May – July (3ʳᵈ season)

August – December (4ᵗʰ season)
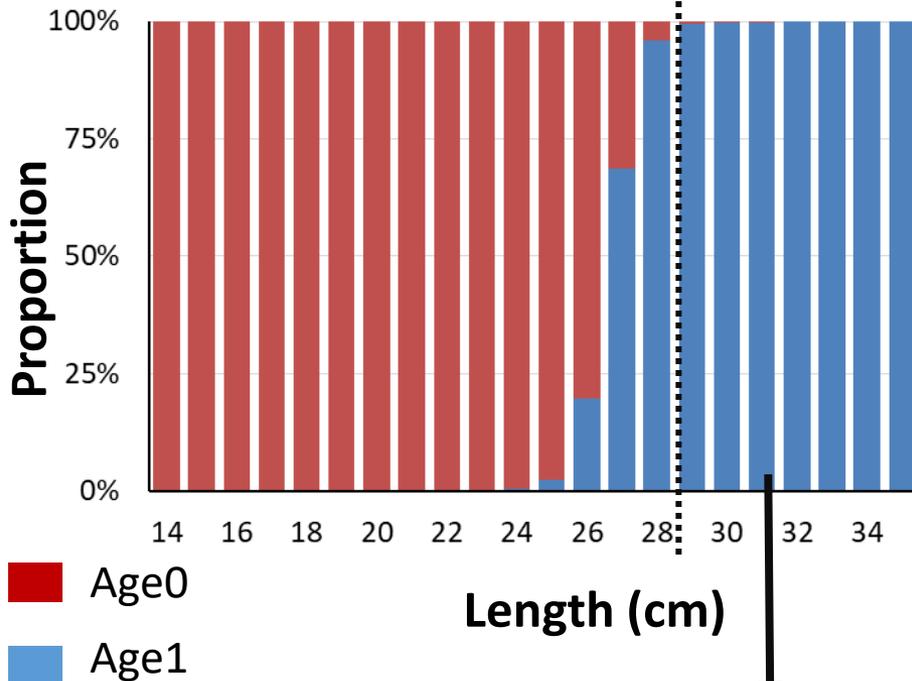
- Fish size is larger than **28** cm, the proportion of age 1 fish is almost 100%;
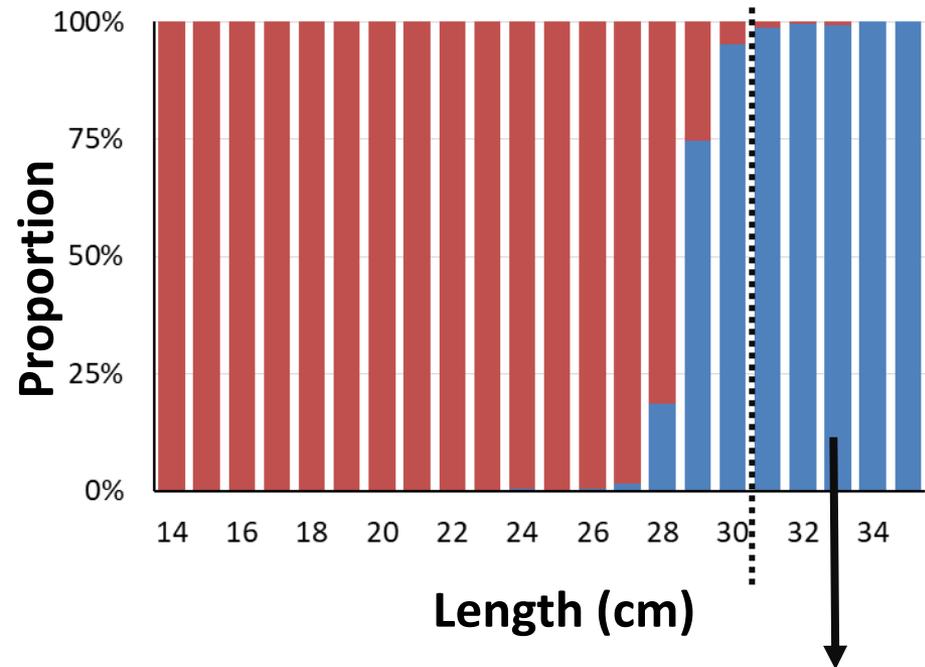
- Fish size is larger than **30** cm, the proportion of age 1 fish is almost 100%;

2000-2018_AL-Key(20191205)for NPFC.xlsx

Conditional age-at-length data for SS3
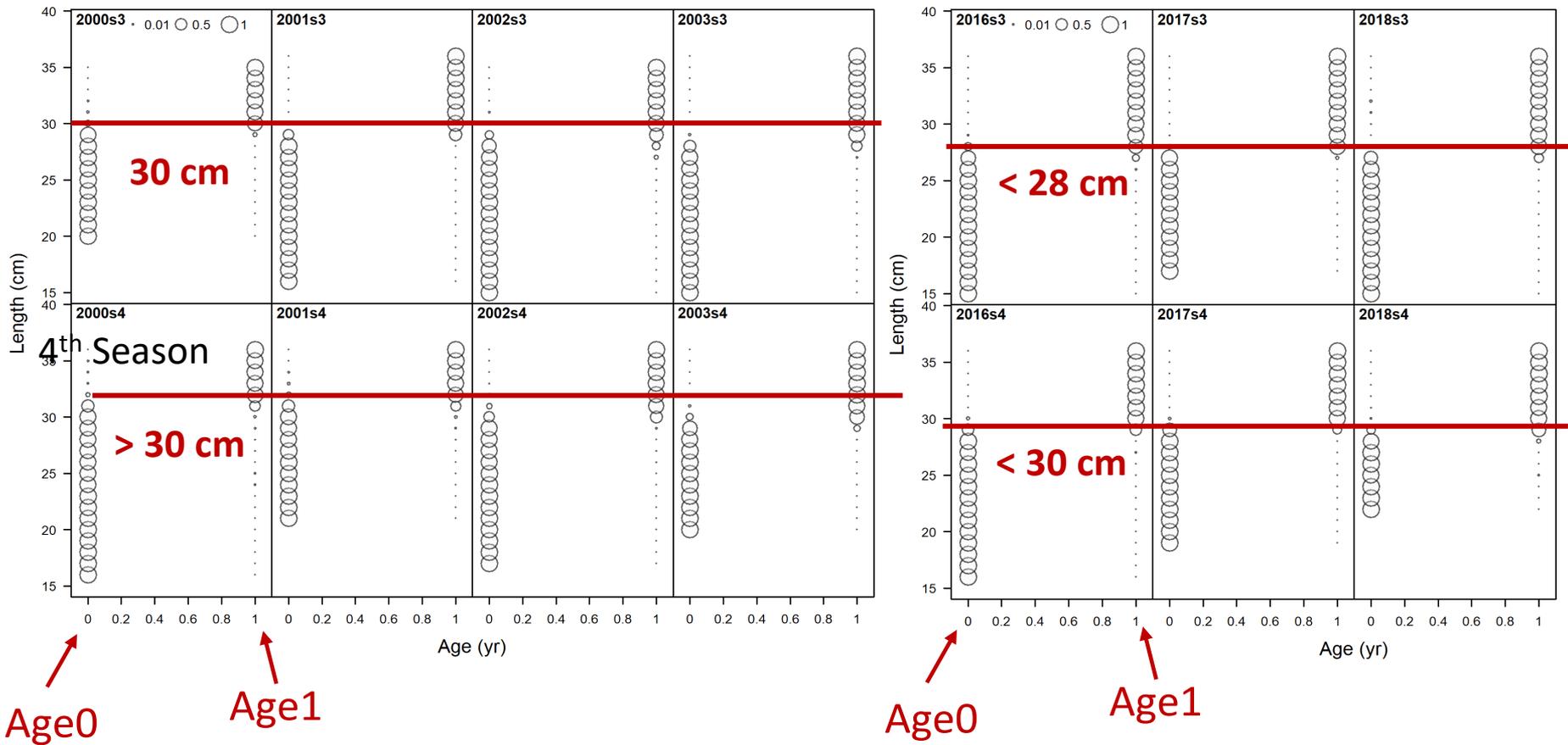
Aggregated age compositions by fleets
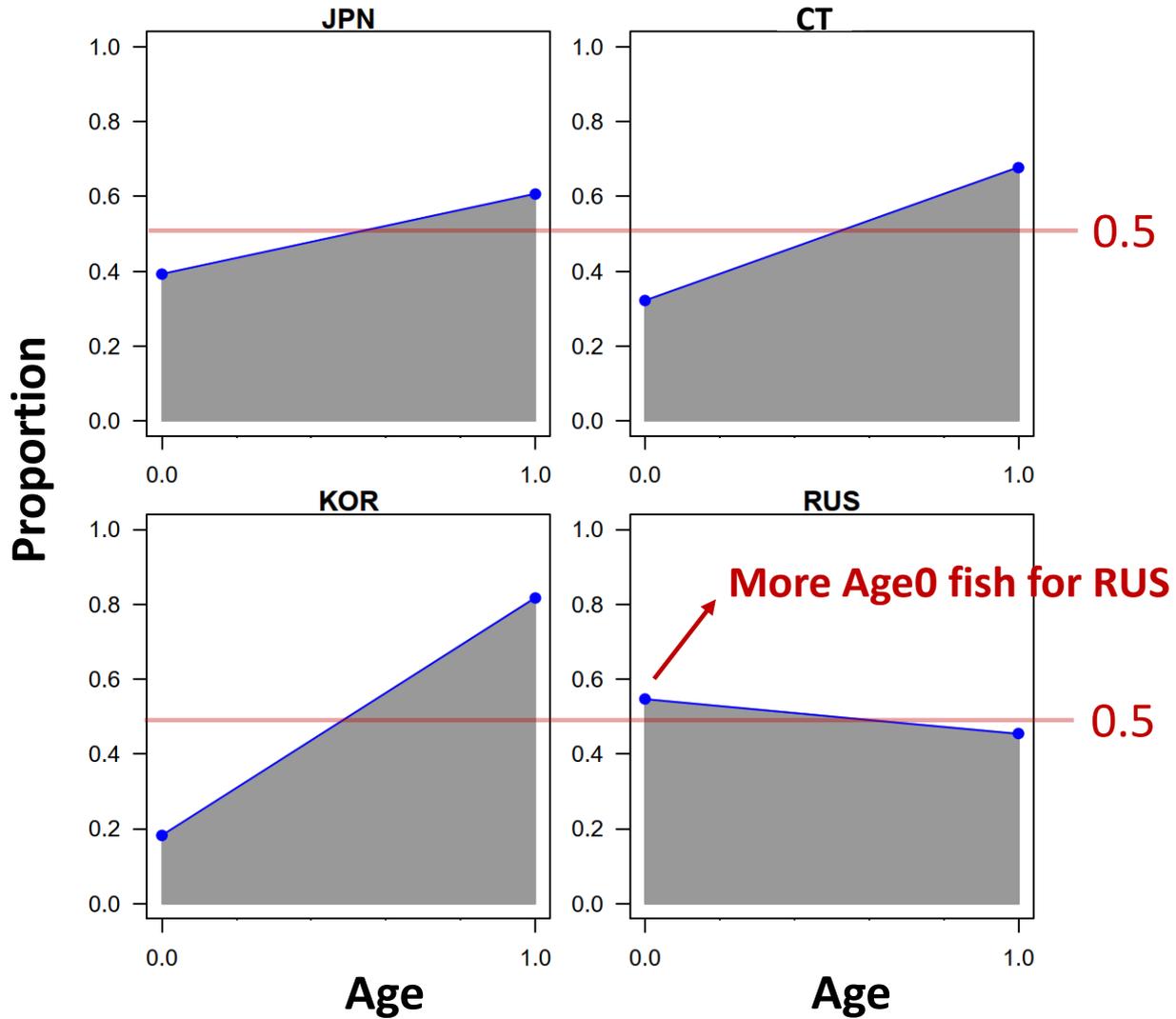
Seasonal variation of age compositions by fleets

1st season: Jan – Mar
2nd season: Apr – Jun
3rd season: Jul – Sep
4th season: Oct – Dec

JPN

Beginning in 3rd season

CT

Beginning in 2nd season   **shifting to Age0 fish in 2009**

Age

KOR

Beginning in 2nd season   **increasing the number of Age0 fish**

RUS

increasing the number of Age1 fish

Beginning in 3rd season

Year
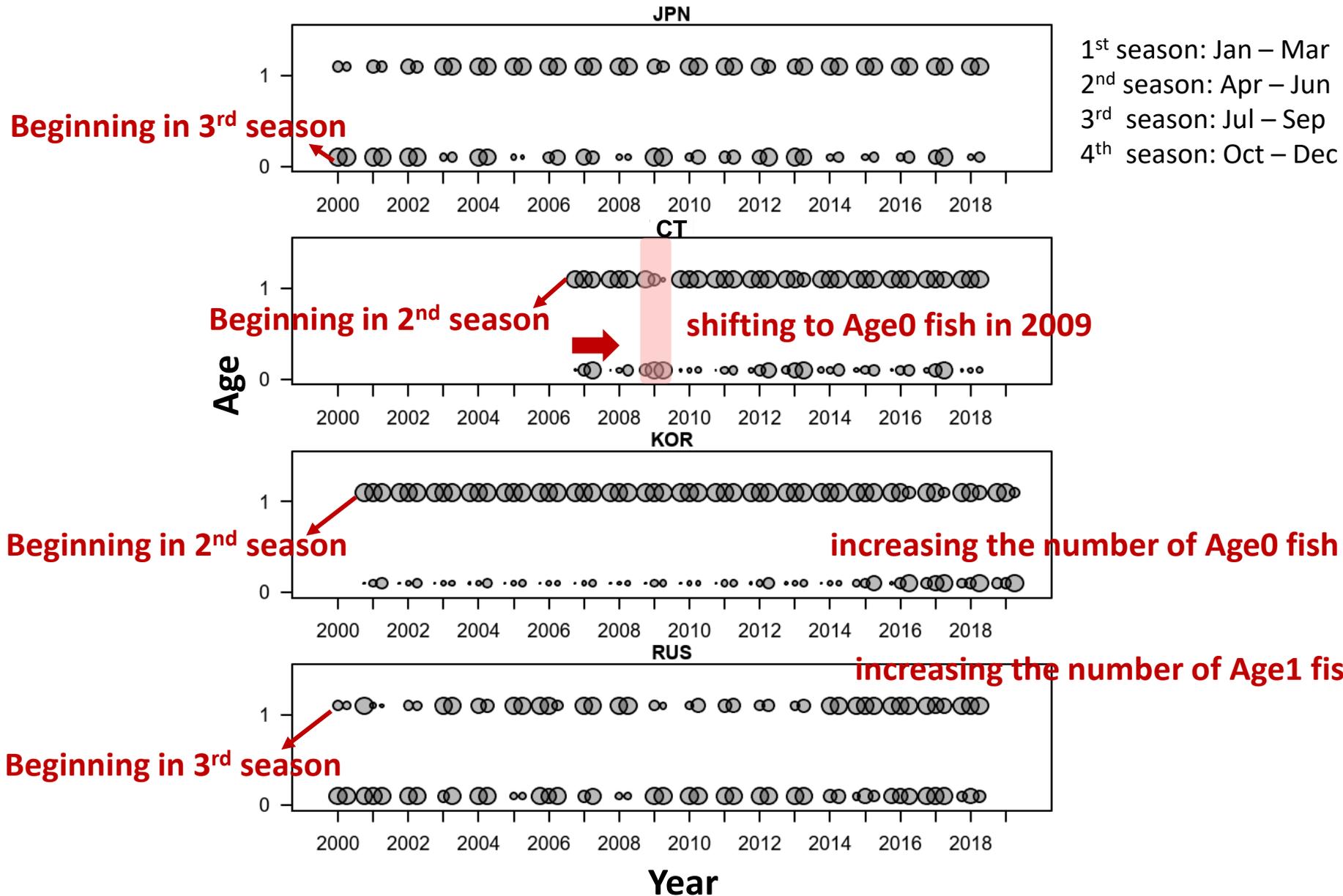
Summary

Member	Fishing ground	Fishing season	Size	Age
Japan, Russia	Costal area	3 – 4 seasons (Jul. – Dec.)	1. large range in size (15 – 35 cm) 2. large size (peak in 30 cm)	JPN: Age1 RUS: Age0
Chinese Taipei, Korea	High sea	2 – 4 seasons (May – Dec.)	1. small range in size (18 – 30 cm) 2. small size (peak in 25 – 28 cm)	CT: Age1 KOR: Age1

Discussions

1. Unit of the sample measurement, FL v.s. KnL;

2. Noted inconsistency of size compositions for each fleet;
   - Variability: moderate in JPN and CT; substantial in RUS; hardly any in KOR;
   - Pattern: shift to smaller fish in 2009 (CT); consistently shift to smaller fish after 2015 (KOR);

3. Noted substantial variation of age composition among fleets;
   - consistent pattern in Age1, varied in Age0 for JPN and CT;
   - shifting to Age1 for RUS, and to Age0 for KOR after 2015;

4. Potential treatments in SS3: time-varying selectivity or time-varying mortality or time-varying growth;

5. Availability of size and age compositions and age-length keys (conditional age-at-length) from other members;

6. Area stratifications of size and age compositions (areas-as-fleets approach: coastal fleets v.s. high sea fleets);