Characterization of diversity and community structure of small planktonic copepods in the Kuroshio region off Japan using a metabarcoding approach

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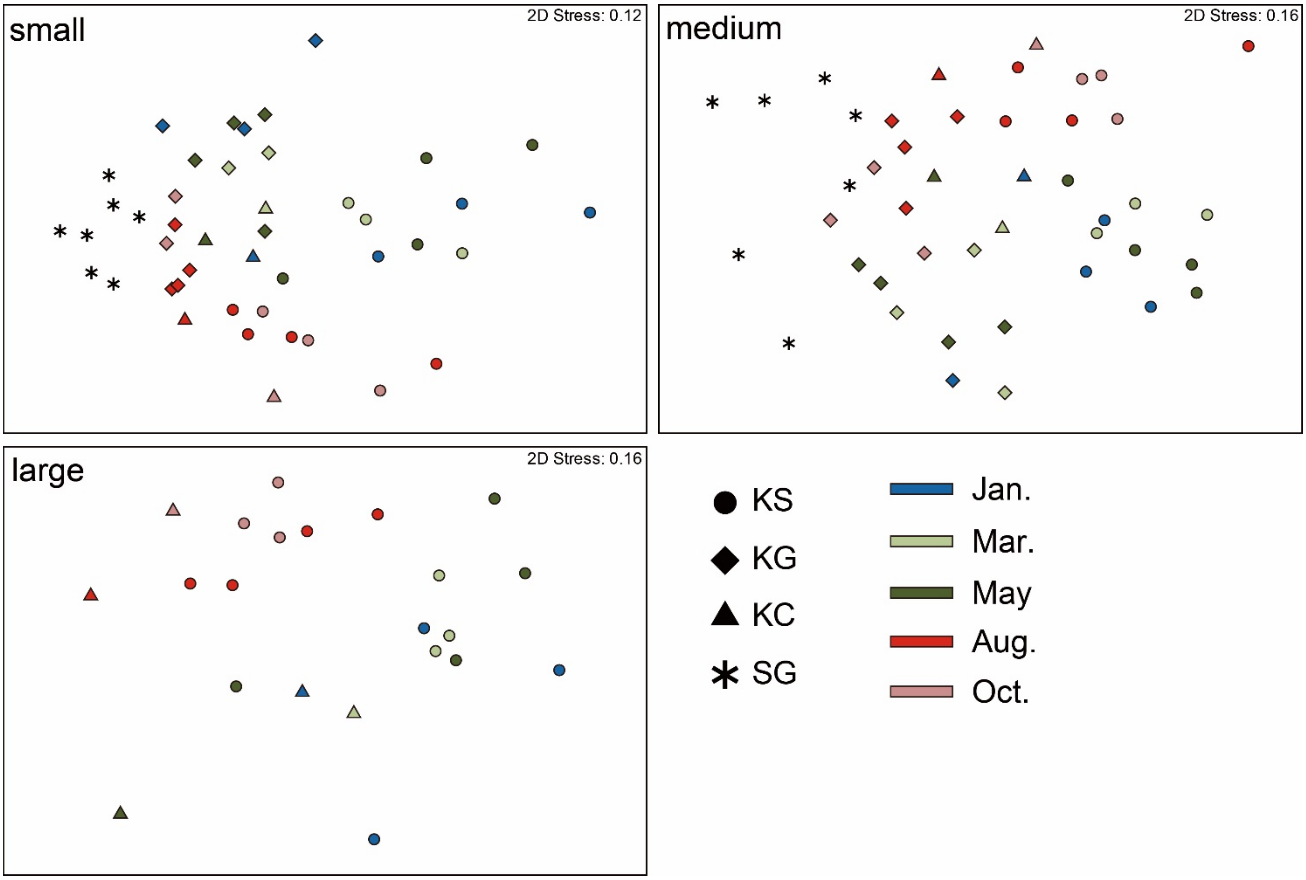

Fig. S1. Multidimensional scaling (MDS) analysis for presence/absence of copepod operational taxonomic units (OTUs) in each size category. KS: Kuroshio Slope, KG: Kuroshio Gyre, KC: Kuroshio Core, and SG: Subtropical Gyre.

Table S1. Location, date, and time information for samples. Observations using both CTD and plankton nets are listed. Location of the Kuroshio axis at 138°E is listed for each research cruise. The samples collected during the day are indicated by an asterisk in local time. Local time is the time of the deployment of plankton nets and is only presented for stations at which zooplankton samples were collected. KS: Kuroshio Slope, KG: Kuroshio Gyre, KC: Kuroshio Core, and SG: Subtropical Gyre.

Cruise	Region	Station	lat.	lon.	Date	Local time	Kuroshio axis (lat.)
Kuroshio (2013)							
SY-13-1	KS	C3400	34°00'N	138°00'E	17/1/2013	10:50*	33°30'N
	KG	C3000	30°00'N	138°00'E	23/1/2013		
SY-13-3	KS	C3400	34°00'N	138°00'E	7/3/2013		33°35'N
	KG	C3000	30°00'N	138°00'E	3/3/2013		
SY-13-5	KS	C3400	34°00'N	138°00'E	10/5/2013	14:50*	No data
	KG	C3100	31°00'N	138°00'E	13/5/2013	14:15*	
SY-13-8	KS	C3430	34°30'N	138°00'E	22/8/2013	1:56	32°05'N
	KG	C3000	30°00'N	138°00'E	28/8/2013	22:13	
SY-13-10	KS	C3400	34°00'N	138°00'E	28/10/2013	20:11	32°30'N
	KG	C3130	31°30'N	138°00'E	31/10/2013		
Kuroshio (2014)							
SY-14-1	KS	C3400	34°00'N	138°00'E	17/1/2014		32°45'N
	KG	C3000	30°00'N	138°00'E	23/1/2014		
SY-14-3	KS	C3400	34°00'N	138°00'E	28/2/2014	20:40	33°00'N
	KG	C3000	30°00'N	138°00'E	7/3/2014	20:29	
SY-14-5	KS	C3400	34°00'N	138°00'E	10/5/2014	0:21	33°10'N
	KG	C3000	30°00'N	138°00'E	16/5/2014	22:40	
SY-14-8	KS	C3400	34°00'N	138°00'E	26/8/2014	5:10	33°15'N
	KG	C3100	31°00'N	138°00'E	28/8/2014	21:07	
SY-14-10	KS	C3400	34°00'N	138°00'E	26/10/2014	19:06	33°00'N
	KG	C3000	30°00'N	138°00'E	29/10/2014	5:29	
Kuroshio (2015)							
SY-15-1	KS	C3400	34°00'N	138°00'E	27/1/2015	20:53	33°00'N
	KC	C3300	33°00'N	138°00'E	26/1/2015	0:38	
	KG	C3000	30°00'N	138°00'E	21/1/2015	22:42	
SY-15-3	KS	C3400	34°00'N	138°00'E	26/2/2015	19:29	32°20'N
	KC	C3220	32°20'N	138°00'E	28/2/2015	22:27	
	KG	C3030	30°30'N	138°00'E	3/3/2015	19:13	
SY-15-5	KS	C3400	34°00'N	138°00'E	14/5/2015	0:14	33°00'N
	KC	C3300	33°00'N	138°00'E	15/5/2015	23:50	
	KG	C3000	30°00'N	138°00'E	9/5/2015	22:53	
SY-15-8	KS	C3400	34°00'N	138°00'E	22/8/2015	21:15	32°00'N
	KC	C3200	32°00'N	138°00'E	25/8/2015	19:10	
	KG	C3000	30°00'N	138°00'E	25/8/2015	21:45	
SY-15-10	KS	C3400	34°00'N	138°00'E	24/10/2015	21:25	33°15'N
	KC	C3315	33°15'N	138°00'E	26/10/2015	23:04	
	KG	C3030	30°30'N	138°00'E	29/10/2015	0:24	

Kuroshio (2016)							
SY-16-1	KS	C3400	34º00'N	138º00'E	21/1/2016	19:55	33º00'N
	KG	C3130	31º30'N	138º00'E	28/1/2016	2:20	
SY-16-3	KS	C3345	33º45'N	138º00'E	2/3/2016	19:40	33º10'N
	KG	C3000	30º00'N	138º00'E	5/3/2016	20:20	
SY-16-5	KS	C3400	34º00'N	138º00'E	15/5/2016	22:31	32º45'N
	KG	C3000	30º00'N	138º00'E	11/5/2016	0:25	
SY-16-8	KS	C3400	34º00'N	138º00'E	31/8/2016	22:54	33º00'N
	KG	C3200	32º00'N	138º00'E	3/9/2016	2:46	
SY-16-10	KS	C3400	34º00'N	138º00'E	27/10/2016		33º00'N
	KG	C3000	30º00'N	138º00'E	30/10/2016		
Subtropical gyre							
KH-13-7	SG	St. 0	20º00'N	160º00'E	16/12/2013	10:51*	
KH-14-3	SG	St. 0	20º00'N	160º00'E	28/6/2014	3:24	
KH-16-7	SG	N02	23º00'N	141º00'E	10/12/2016	11:01*	
	SG	N04	23º00'N	127º00'E	13/12/2016	7:07*	
	SG	T15	25º59.5'N	126º26.8'E	18/12/2016	13:38*	
	SG	RM1	25º49.9'N	126º57.4'E	21/12/2016	18:58	
KH-17-4	SG	St.17	23º00'N	137º00'E	2/10/2017	0:26	

Table S2. Numbers of sequence reads during bioinformatics analysis.

	Reads per sample	Total reads
Raw reads	22,071-137,194	6,732,598
Initial quality-filtering	14,131-57,311	3,520,653
Selection of copepods	10,872-55,482	3,099,194
Standardization of reads before alignments	10,872	1,195,920
Further quality filtering	6,621-9,687	949,571
Standardization of reads before OTU clustering	6,621	728,310
Final reads for community and diversity analyses	6,589	724,790

Table S3. Top five operational taxonomic units (OTUs) contributing to similarity in each cluster group of medium and large sizes using similarity percentage (SIMPER) analysis. The cluster groups are presented in Figure 4A. KS: Kuroshio Slope, KG: Kuroshio Gyre, KC: Kuroshio Core, and SG: Subtropical Gyre.

Cluster group	OTUs	Blast-hit species	Contribution (%)
Cluster 1	OTU 3	*Subeucalanus subtenuis*	17.33
KS large (summer–autumn)	OTU 9	*Subeucalanus crassus*	14.94
	OTU 1	*Calanus sinicus*	7.45
	OTU 6	*Pleuromamma xiphias*	6.78
	OTU 30	*Pareucalanus attenuatus*	6.06
Cluster 2	OTU 6	*Pleuromamma xiphias*	17.97
KS large (winter–spring)	OTU 1	*Calanus sinicus*	15.21
	OTU 11	*Candacia bipinnata*	9.34
	OTU 12	*Paraeuchaeta russelli*	8.34
	OTU 5	*Neocalanus gracilis*	6.41
Cluster 3	OTU 1	*Calanus sinicus*	24.45
KS middle (winter–spring)	OTU 12	*Paraeuchaeta russelli*	7.72
	OTU 18	*Pleuromamma abdominalis*	7.24
	OTU 21	*Pleuromamma gracilis*	4.98
	OTU 3	*Subeucalanus subtenuis*	4.3
Cluster 5	OTU 3	*Subeucalanus subtenuis*	6.94
KS middle (summer–autumn)	OTU 1	*Calanus sinicus*	6.23
	OTU 20	*Subeucalanus pileatus*	6.11
	OTU 8	*Acrocalanus longicornis*	5.74
	OTU 9	*Subeucalanus crassus*	5.56
Cluster 6	OTU 3	*Subeucalanus subtenuis*	10.64
KG middle (summer–autumn)	OTU 2	*Cosmocalanus darwinii*	8.24
	OTU 5	*Neocalanus gracilis*	6.93
	OTU 15	*Pareucalanus* sp.	5.47
	OTU 32	Euchaetidae OTU	4.69
Cluster 7	OTU 2	*Cosmocalanus darwinii*	12.18
KG middle (winter–spring)	OTU 5	*Neocalanus gracilis*	10.82
	OTU 13	*Mesocalanus tenuicornis*	9.44
	OTU 18	*Pleuromamma abdominalis*	6.62
	OTU 33	*Euchaeta media*	5.24
Cluster 8	OTU 2	*Cosmocalanus darwinii*	11.97
SG middle	OTU 5	*Neocalanus gracilis*	10.78
	OTU 16	*Lucicutia flavicornis*	5.77
	OTU 7	*Delibus nudus*	5.52
	OTU 32	Euchaetidae OTU	5.34

Table S4. Average proportions of the sequence reads of major copepods in the small fraction of copepod community. KS: Kuroshio Slope, KG: Kuroshio Gyre, KC: Kuroshio Core, and SG: Subtropical Gyre.

	KS	**KG**	**KC**	**SG**
Major OTUs of medium-sized/large copepods	28.8	24.7	16.3	11.9
Major OTUs of small copepods	54.7	37.2	37.5	44.6
Non-major copepods	16.5	38.2	46.2	43.5