Supplementary Information

Table 1| Species list and the max length, depth below sea level, and the abundance.

Group	Species	Max length (cm)	Depth below sea level (m)	1983-2002 abundance (%)	2003-2019 abundance (%)
Fish	*Muraenesox cinereus*	220	300	2.59	3.47
Fish	*Ilisha elongate*	60	5	1.00	0.87
Fish	*Engraulis japonicus*	18	200	7.89	8.30
Fish	*Sardine*	21	25	1.20	1.48
Fish	*Clupea pallasi*	46	238	0.00	0.23
Fish	*Epinephelus aeneus*	120	110	0.47	0.96
Fish	*Pagrus major*	100	105	1.17	1.54
Fish	*Decapterus maruadsi*	30	20	10.54	5.79
Fish	*Pennahia argentata*	40	40	0.00	1.13
Fish	*Nibea albiflora*	43.5	50	0.00	0.79
Fish	*Miichthys miiuy*	70	58	0.00	0.49
Fish	*Larimichthys crocea*	80	60	1.21	0.77
Fish	*Larimichthys polyactis*	40	120	2.15	3.44
Fish	*Collichthys niveatus*	15	40	0.00	2.58
Fish	*Branchiostegus japonicus*	46	165	0.00	0.47
Fish	*Ammodytes personatus*	15	172	0.00	1.45
Fish	*Trichiurus lepturus*	234	225	19.27	11.46
Fish	*Nemipterus virgatus*	35	26	3.52	3.38
Fish	*Sphyraena obtusata*	55	15	0.92	1.42
Fish	*Pneumatophorus japonicus*	64	125	7.02	4.74
Fish	*Scomberomorus niphonius*	113	100	0.00	4.20
Fish	*Thunnus albacores*	239	50	0.00	0.64
Fish	*Pampus chinensis*	40	10	3.65	3.57
Fish	*Thamnaconus septentrionalis*	23	85	8.45	1.86
Fish	*Trachurus japonicus*	50	163	0.00	0.64
Fish	*Mugil cephalus*	100	10	0.00	1.05
Crust	*Acetes chinensis*	NA	NA	8.22	5.56
Crust	*Penaeus orientalis*	NA	NA	1.25	1.40
Crust	*Trachypenaeus curvirostris*	NA	NA	3.72	3.21

Crust	*Mantis shrimp*	NA	NA	0.00	2.85
Crust	*Portunus trituberculatus*	NA	NA	3.56	4.27
Crust	*Callinectes sapidus*	NA	NA	0.48	0.75
Crust	*Charybdis japonica*	NA	NA	0.00	0.54
Shellfish	*Shellfish*	NA	NA	8.25	6.25
Cepha	*Sepiidae*	NA	NA	0.00	1.39
Cepha	*squid*	NA	NA	0.00	3.74
Cepha	*Octopus vulgaris*	NA	NA	0.00	1.22
Jellyfish	*Rhopil emaesculentum*	NA	NA	3.45	2.11

Table 2| Species richness, mass, and the temporal trends of different periods in different provinces

Year	Region	Latitude (N)	Richness (sp.)		Catches (million tons)	
			Mean (SD)	Temporal trends	Mean (SD)	Temporal trends(10^{-4})
1983-2002	China	3°30 -43°26′	20.70 (0.08)	0.16^{**}	4.27 (2.22)	35.91^{***}
	FuJian	23°30 -28°20	17.50 (0.10)	0.31^{***}	0.56 (0.27)	4.46^{***}
	GuangDong	20°13′-25°31′	18.70 (0.14)	0.35^{***}	0.80 (0.37)	6.09^{***}
	GuangXi	22°13′-23°32′	18.35 (0.10)	0.21^{**}	0.27 (0.20)	3.22^{***}
	HaiNan	3°30 -20°07	21.13 (0.08)	$0.05^{n.s.}$	0.19 (0.10)	2.24^{***}
	HeBei	36°01 -42°37	14.40 (0.08)	$-0.02^{n.s.}$	0.07 (0.03)	0.37^{***}
	JiangSu	30°45′-35°20′	15.90 (0.06)	0.16^{***}	0.25 (0.12)	1.67^{***}
	LiaoNing	38°43′-43°26′	17.65 (0.08)	0.15^{**}	0.34 (0.18)	2.77^{***}
	ShanDong	34°22 -38°23	17.75 (0.09)	0.27^{***}	0.80 (0.57)	8.83^{***}
	ShangHai	30°40′-31°53′	12.60 (0.08)	$-0.05^{n.s.}$	0.08 (0.04)	-0.62^{***}
	TianJin	38°33 -40°15	11.75 (0.14)	-0.41^{***}	0.01 (0.01)	-0.09^{***}
	ZheJiang	27°02 -31°11	18.65 (0.15)	0.38^{***}	0.92 (0.42)	6.76^{***}
2003-2019	China	3°30 -43°26′	37.94 (0.01)	$0.02^{n.s.}$	9.94 (0.98)	-14.56^{***}
	FuJian	23°30 -28°20	37.82 (0.03)	$0.04^{n.s.}$	1.46 (0.10)	$0.38^{n.s.}$
	GuangDong	20°13′-25°31′	37.94 (0.01)	$0.02^{n.s.}$	1.32 (0.10)	-1.22^{**}
	GuangXi	22°13′-23°32′	32.82 (0.05)	-0.14^{**}	0.57 (0.07)	-1.05^{***}
	HaiNan	3°30 -20°07	37.88 (0.02)	$0.03^{n.s.}$	0.91 (0.16)	2.23^{**}
	HeBei	36°01 -42°37	25.94 (0.10)	$0.06^{n.s.}$	0.19 (0.02)	$-0.16^{n.s.}$
	JiangSu	30°45′-35°20′	35.35 (0.06)	$-0.06^{n.s.}$	0.49 (0.04)	-0.47^{*}
	LiaoNing	38°43′-43°26′	36.18 (0.05)	-0.12^{**}	0.78 (0.26)	-4.64^{***}
	ShanDong	34°22 -38°23	33.18 (0.15)	-0.56^{***}	1.81 (0.42)	-7.99^{***}
	ShangHai	30°40′-31°53′	18.00 (0.14)	$0.23^{n.s.}$	0.04 (0.05)	-0.69^{**}
	TianJin	38°33 -40°15	16.41 (0.10)	-0.32^{***}	0.03 (0.01)	$0.08^{n.s.}$
	ZheJiang	27°02 -31°11	37.65 (0.03)	0.09^{***}	2.34 (0.18)	$-0.36^{n.s.}$

Fig. 1

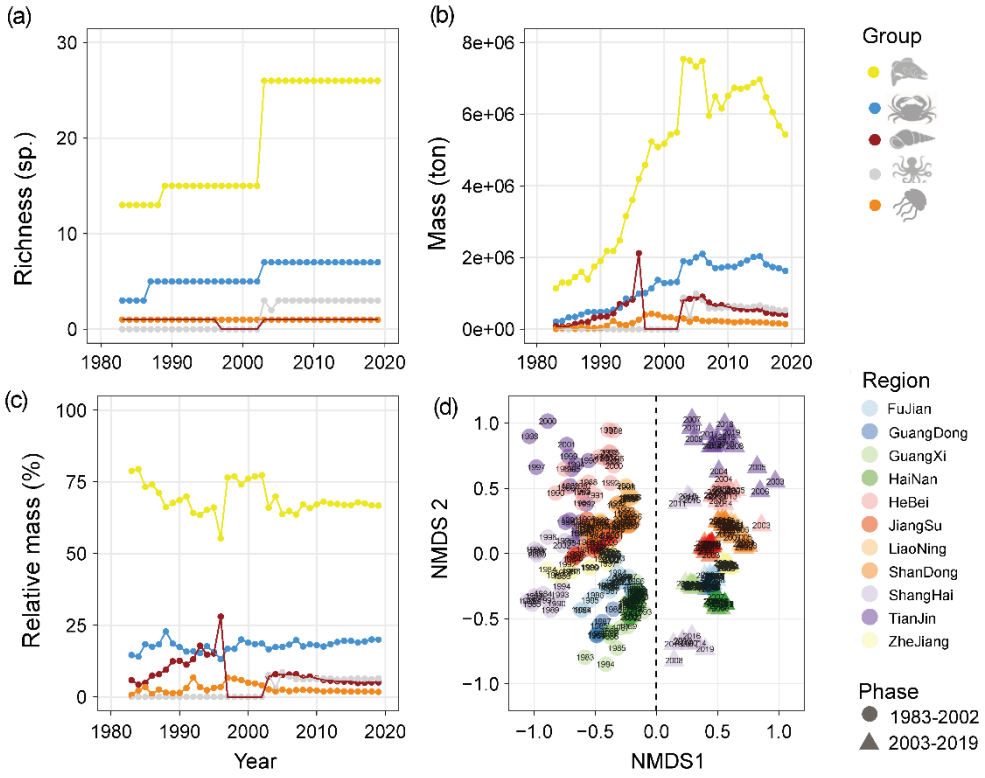


Fig. 1| Changes in structure and composition of marine catch from 1983-2019. Shown are (a) species richness, (b) mass, (c) relative mass, and (d) trajectories of marine catch from 1983-2019. Each color represents a group in (a-c), and each point represents the score of each province in NMDS of a given year in (d).

Fig. 2

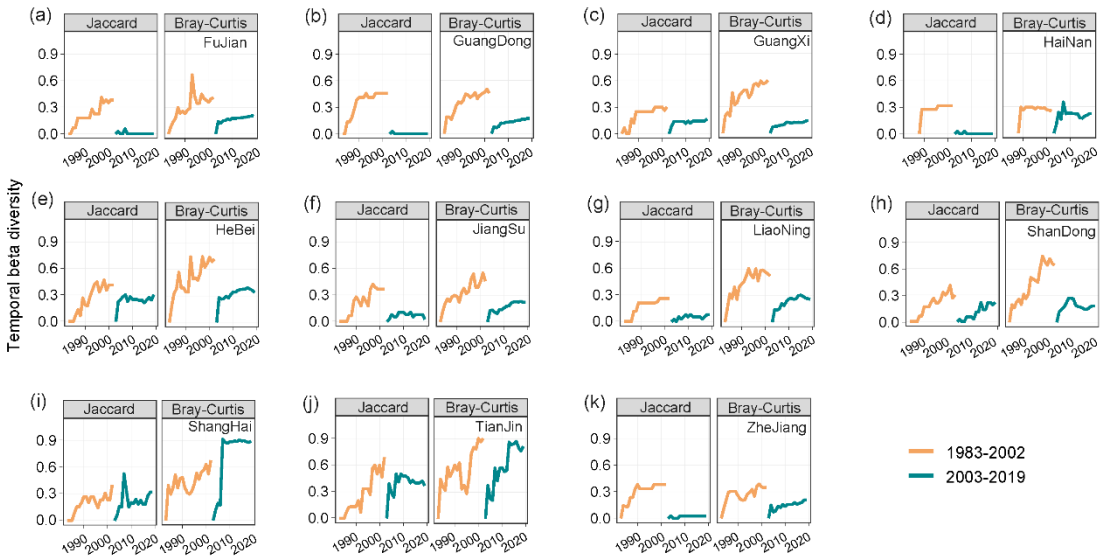


Fig. 2| Changes in temporal beta diversity in each province. Shown are incidence-based (Jaccard) dissimilarity and abundance-based (Bray-Curtis) dissimilarity relative to the initial year (i.e. 1983 and 2003 respectively) over two periods (1983-2002 and 2003-2019), orange lines indicated the period during 1983-2002 and green lines indicated the period during 2003-2019.

Fig. 3

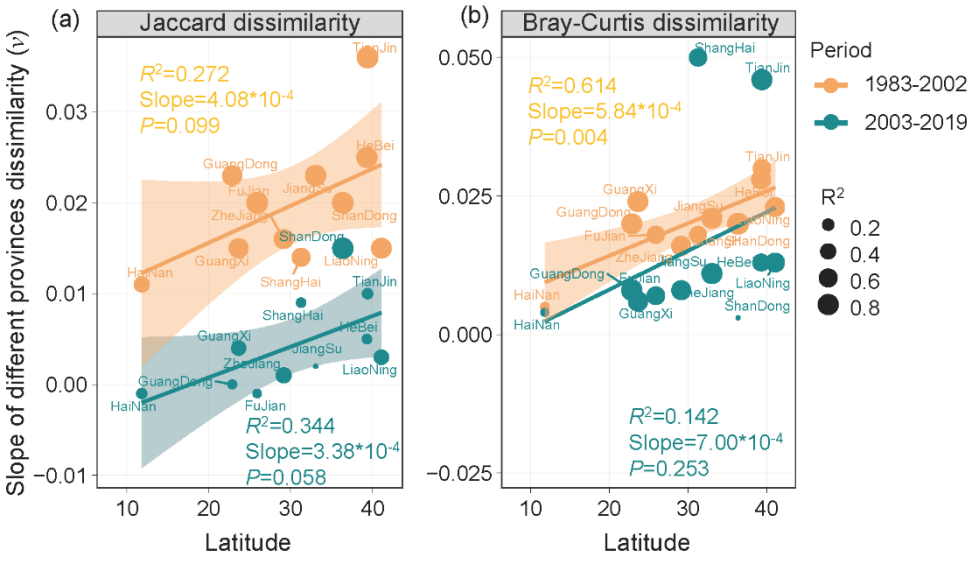


Fig. 3| Slope of dissimilarity in relation to latitude. Shown are overall trends (OLS regression) of (a) Jaccard dissimilarity during 1983-2002 (R^2=0.272, P=0.099) and 2003-2019 (R^2=0.344, P=0.058), and (d, e) Bray-Curtis dissimilarity during 1983-2002 (R^2=0.614, P=0.004) and 2003-2019 (R^2=0.142, P=0.253) in relation to latitude. Each point represents the pairwise dissimilarity between two provinces in each year. Error bar indicates standard error (S.E., n=11). Shaded areas represent 95% confidence intervals.

Fig. 4

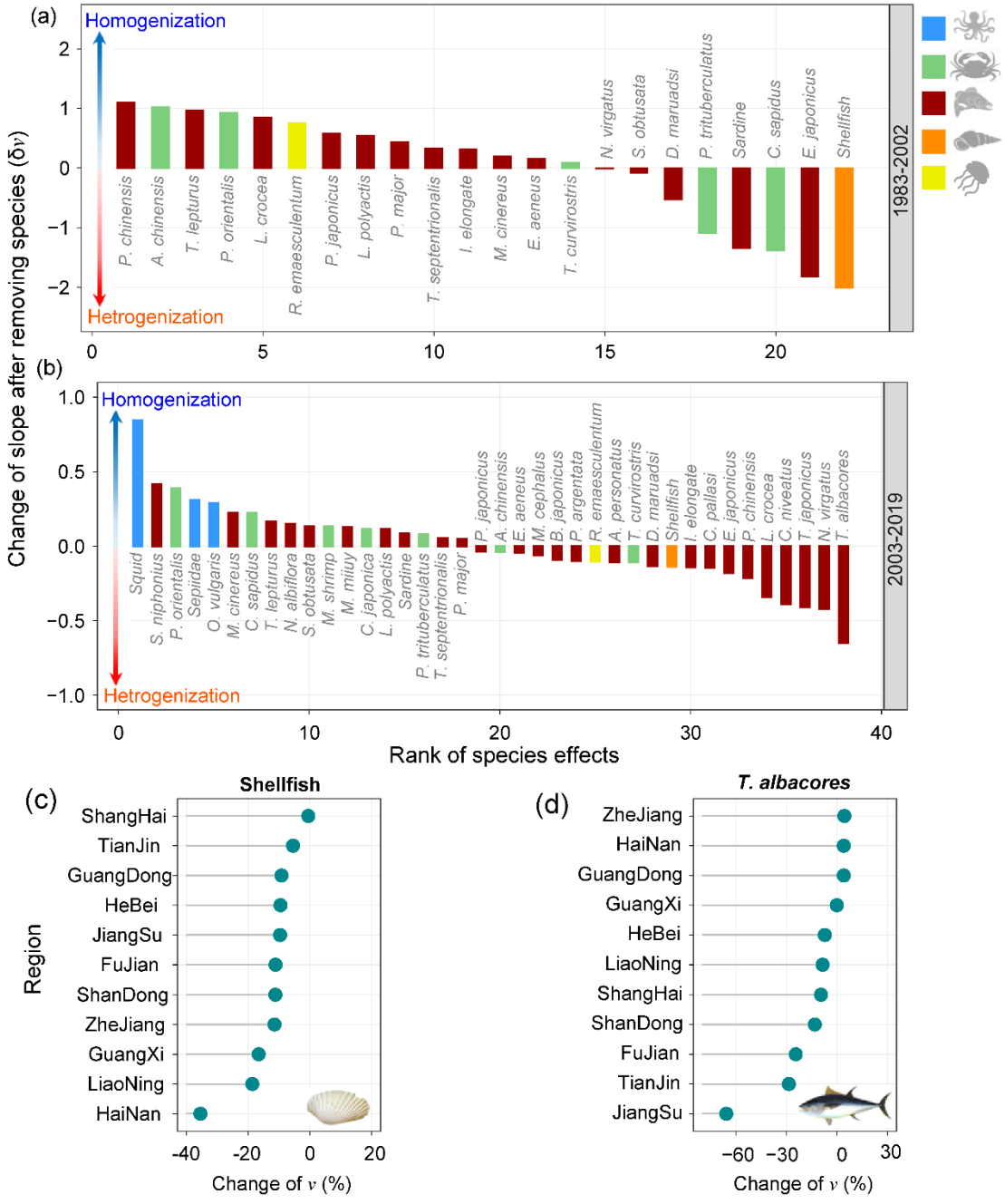


Fig. 4 |Contribution of species to community β diversity change. Shown are the slope change of total Jaccard beta diversity against time in (a) 1983-2002 and (b) 2002-2019, after each species (starting with the one with the least contribution to heterogenization) was omitted in order, and (c-d) the slope change of each province beta diversity after the species contributed most to assemblage was omitted. The x-

axis indicates the rank number of omitted species. *** $P<0.001$; ** $P<0.01$;* $P<0.05$; n.s.: not significant ($P>0.05$).

Fig. 5

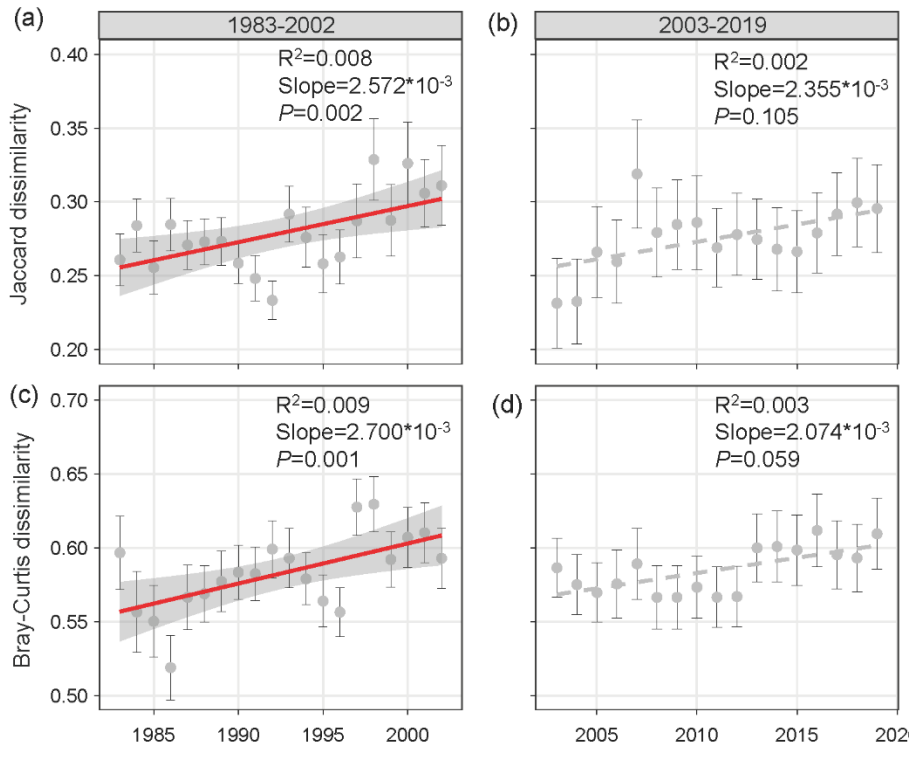


Fig. 5| Changes in spatial beta diversity (pairwise dissimilarity) in relation to time. Shown are overall trends (OLS regression) of (a, b) Jaccard dissimilarity during 1983-2002 (R^2= 0.008, P=0.002) and 2003-2019 (R^2=0.002, P=0.105), and (c, d) Bray-Curtis dissimilarity during 1983-2002 (R^2=009, P=0.001) and 2003-2019 (R^2=0.003, P=0.059). Each gray point represents the average value of each province pair in each year, and the error bar indicates standard error (S.E., n=45 before 1987, n=55 after 1987). Shaded areas represent 95% confidence intervals. *** P<0.001; ** P<0.01; *P<0.05; n.s.: not significant (P>0.05).

Fig. 6

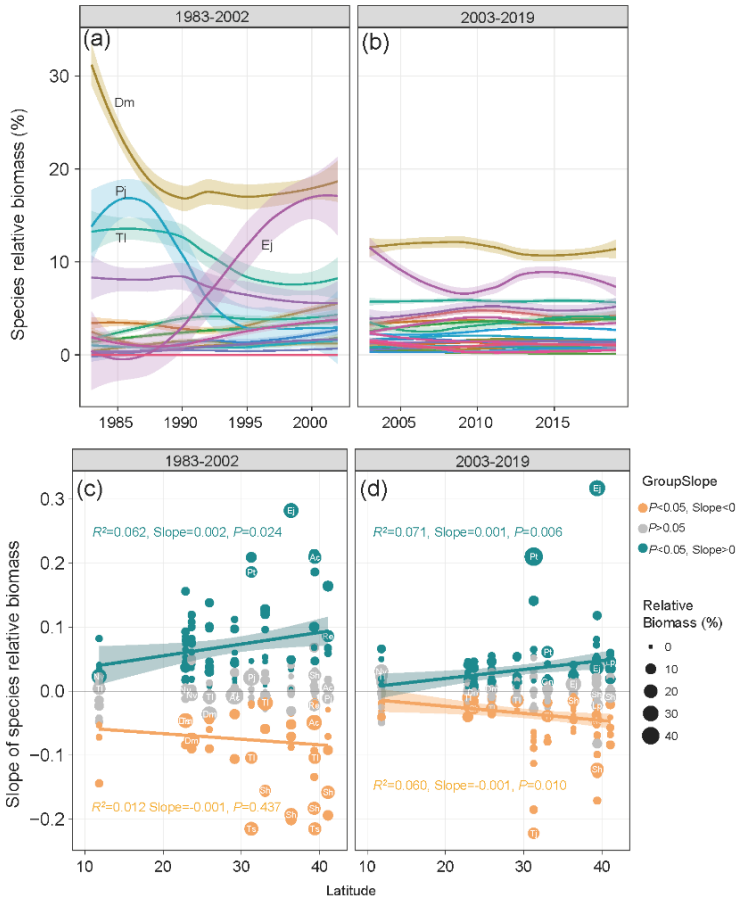
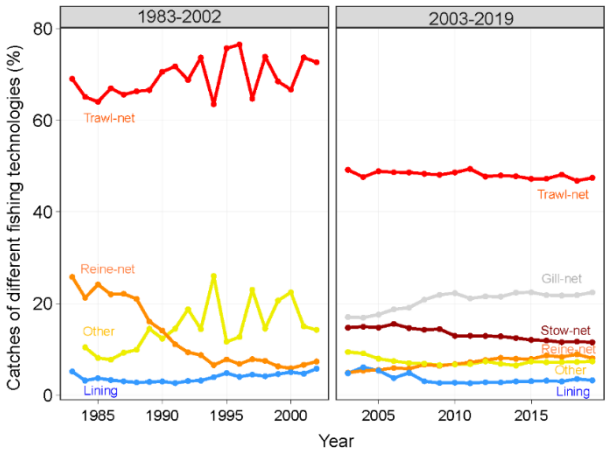


Fig. 6| Changes of species relative biomass over two periods. Shown are (a-b) the change of the fish relative biomass over the year, and (c-d) the slope of fish relative biomass in relation to the latitude of different provinces. Each line in (a-b) and each point in (c-d) represents a species, the green and the orange points represent the positive and negative slope with the P <0.05, and the gray points represent the P <0.05. Shaded areas represent 95% confidence intervals.

63 **Fig. 7**



64

65 **Fig. 7| Change of marine catche by different fishing technologies.** Shown are the

66 proportion of the total catch by different fishing technologies from 1983-2002 and 2003-2019.

67 Each color represents a different fishing technology.