



NOAA

Pacific Islands Fisheries
Science Center

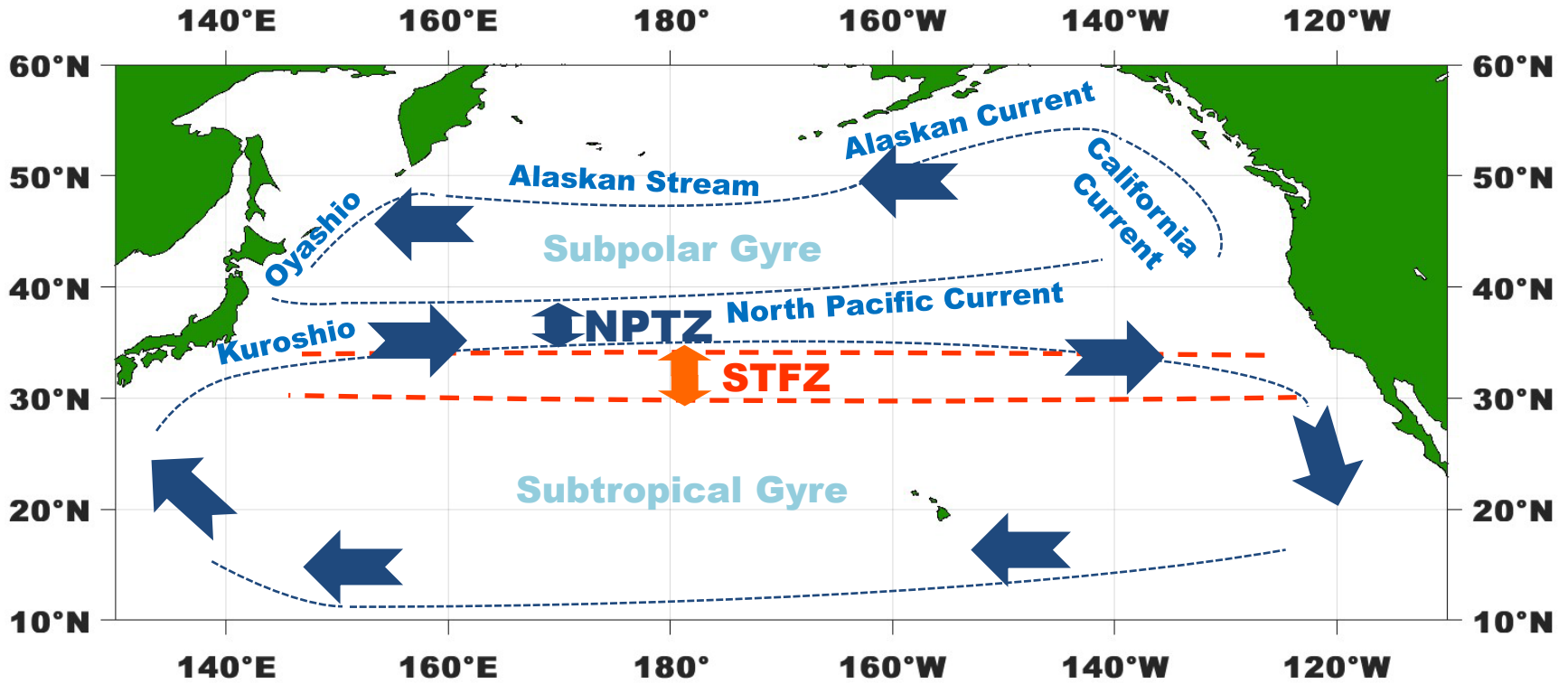
Spatiotemporal variability of micronekton at two central North Pacific Fronts

Réka Domokos

PICES 2022 annual meeting, Busan, South Korea

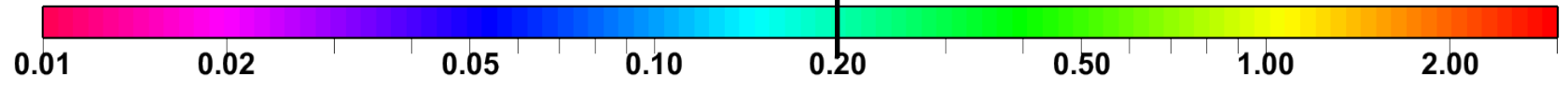
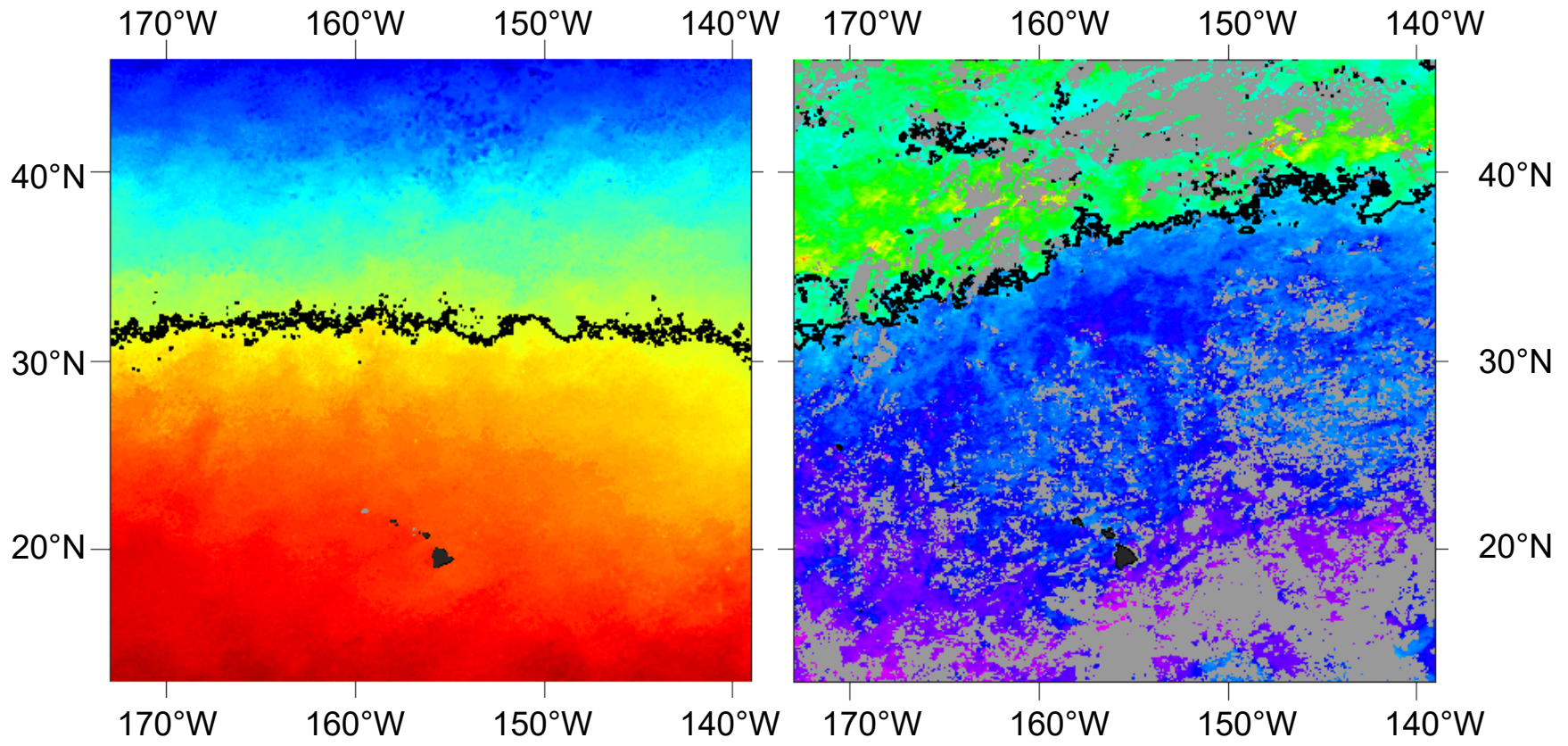
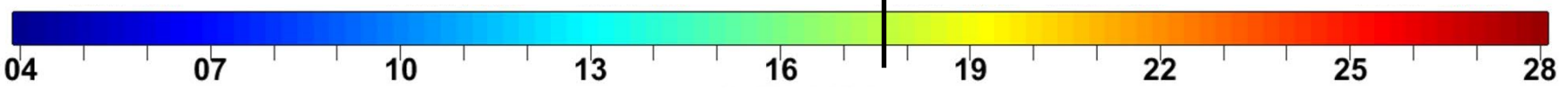
In revision (Deep Sea Research Part I.)

North Pacific Circulation



STF: 34.8 PSU surf. Salinity & 17.7°C SST

SST (°C)



Chl-a (mg m^{-3})

TZCF: 0.2 mg m^{-3} Chl-a

EXPERIMENTAL PRODUCT

avoid fishing between solid black 63.5°F and 65.5°F lines
to reduce turtle interactions

Sea Surface Temperature: 14Dec2007-16Dec2007

Ocean Currents: 05Dec2007-11Dec2007

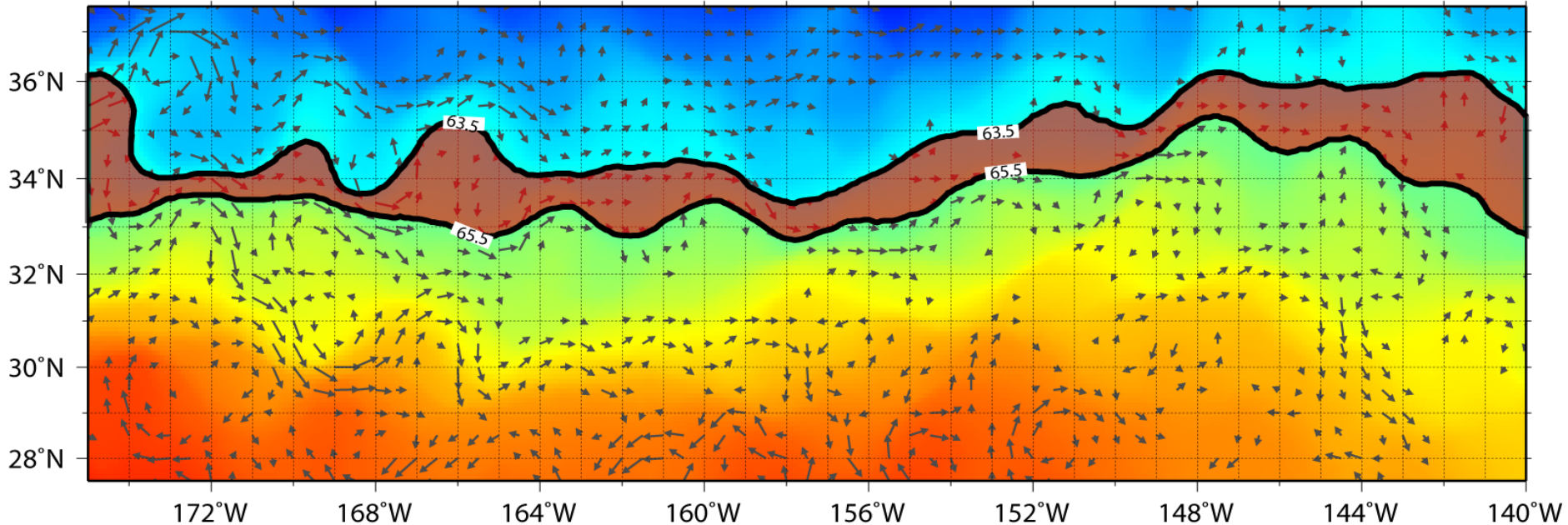
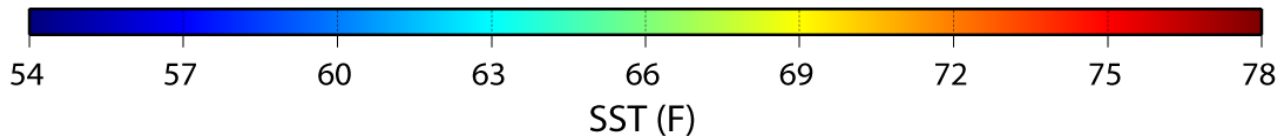


Image Created December 17, 2007 14:58PM HST by EAH. Next projected image date: December 18, 2007 04:00AM HST

→ 30 cm/sec



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<http://www.pifsc.noaa.gov/eod/turtlewatch.php>
contact: turtlewatch@noaa.gov

Data provided by Central Pacific CoastWatch node

TURTLEWATCH





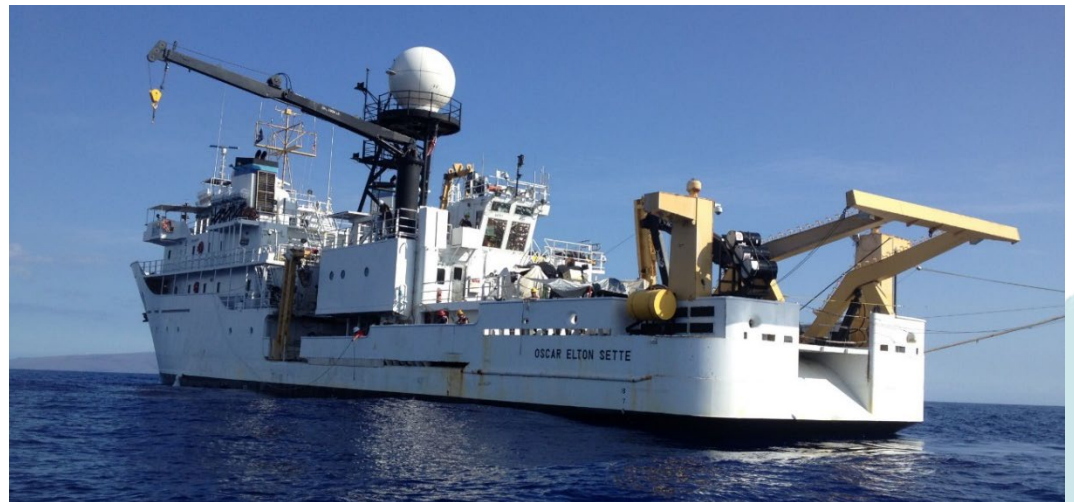
Objectives

- **Fill data gap on distribution on forage, micronekton, in the region**
- **How does the STF and/or TZCF affect micronekton distribution and composition?**

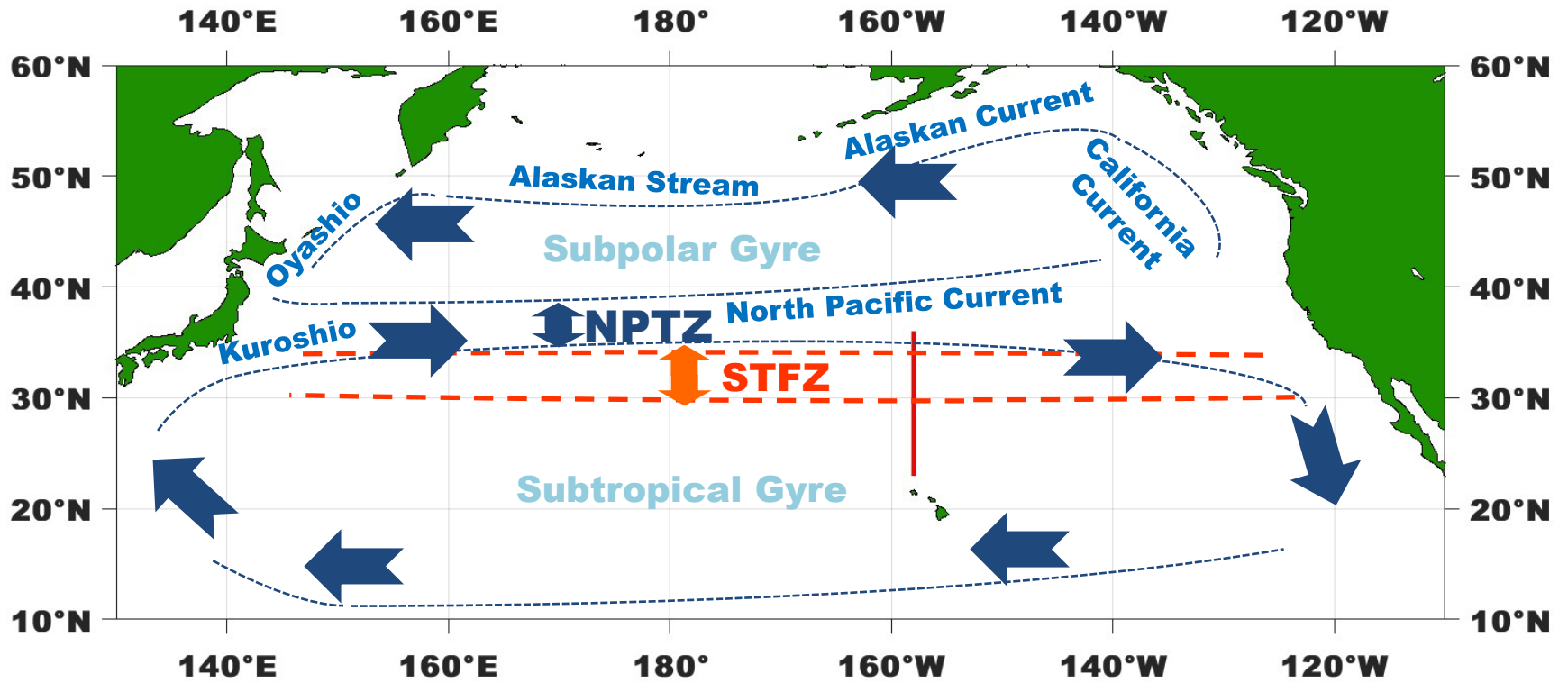


Methods

- ***In situ* observations (2009, 2011, 2015 Spring)**
 - **EK60 at 38kHz, 70kHz, and 120kHz**
 - **CTD casts**



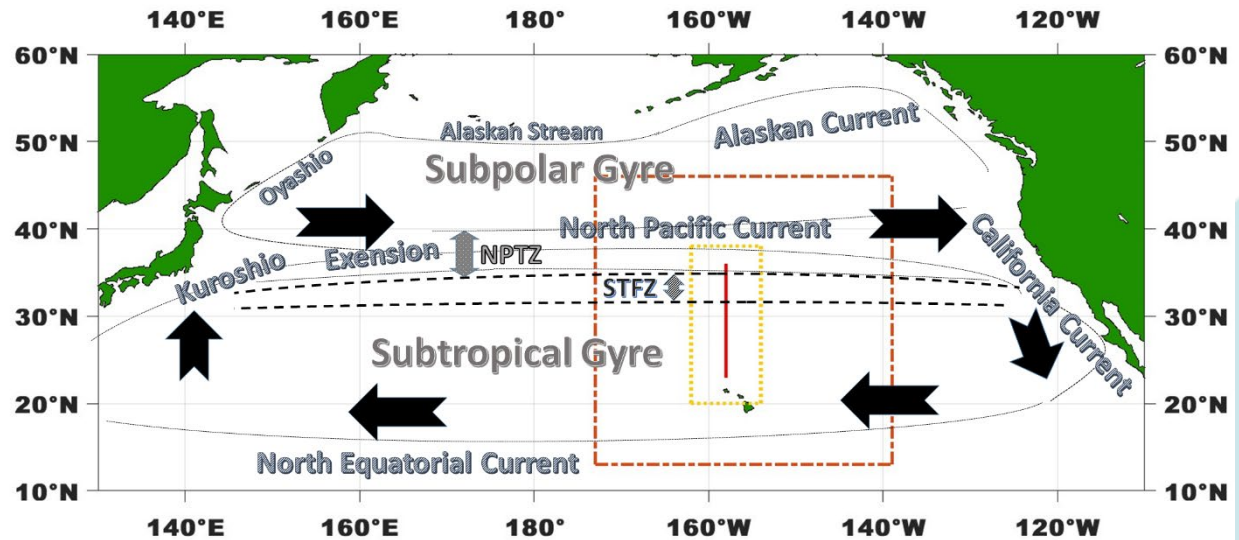
NOAA Ship *Oscar Elton Sette*





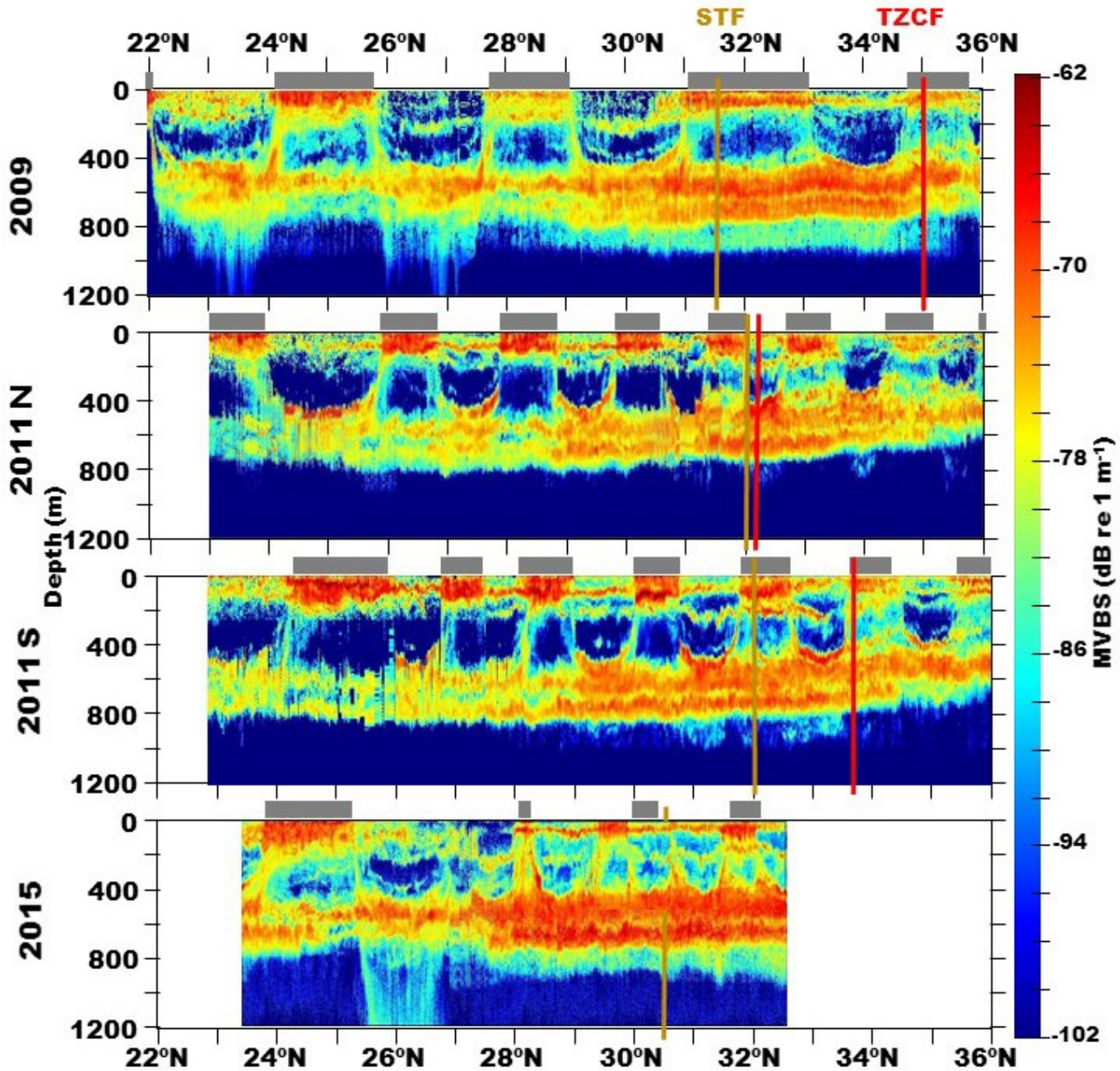
Methods

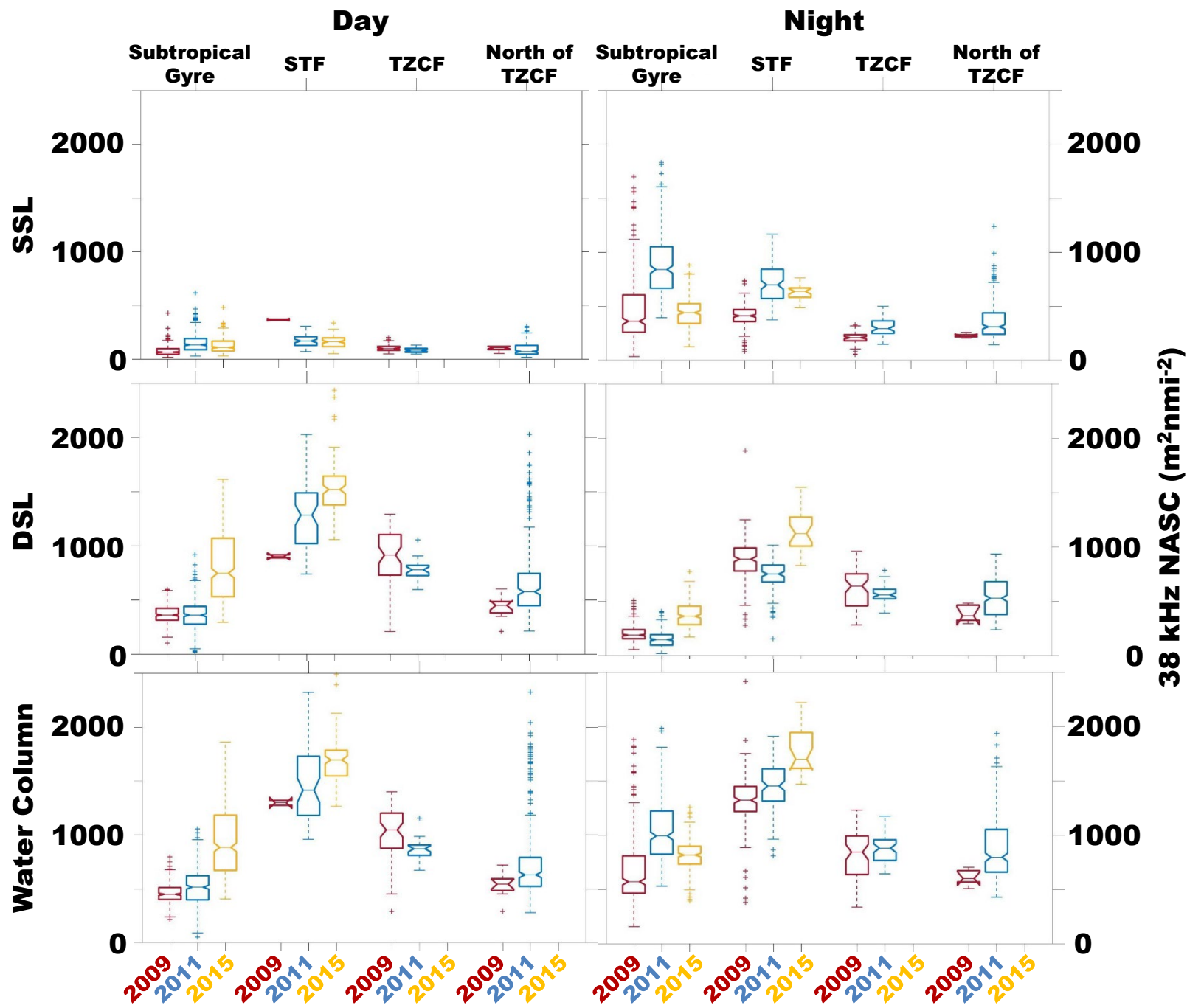
- ***In situ* observations (2009, 2011, 2015 Spring)**
 - EK60 at 38kHz, 70kHz, and 120kHz
 - CTD casts
- **Satellite data for qualitative assessment on larger scales**
- **Environmental indices for interannual & decadal scales**



STF = 34.8 PSU (17.7 °C SST)

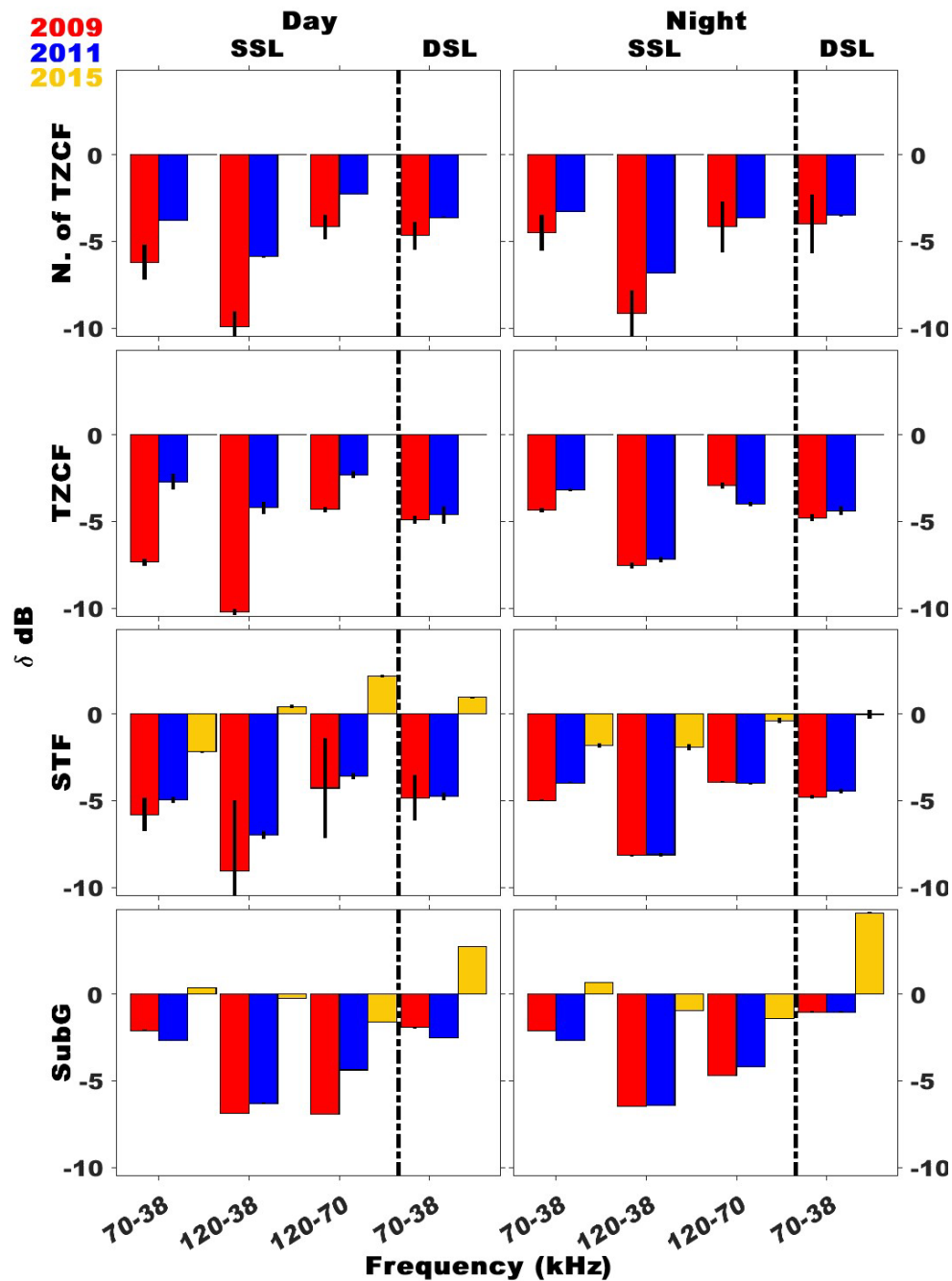
TZCF = 0.2 mg m⁻³





δ dB significantly lower north of STF than to south

δ dB significantly higher in 2015 than during the other two years



↓ **δ dB** ↑ **fish, siphonophores, cephalopods**
 ↑ **δ dB** ↑ **crustaceans, gelatinous (no gas inclusions)**

GAM and ANOVA

NASC ~ Dist_{STF} + Dist_{TZCF}

Significant negative relationship with Dist_{STF} except SSL

No relationship with Dist_{TZCF} except positive relationship with WC & DSL at 70 kHz

NASC ~ Temp + Chl-a + Oxy

Overall per layers:

-Significant pos relationship with temperature

-Significant neg relationship with Chl-a

-No relationship with Oxy

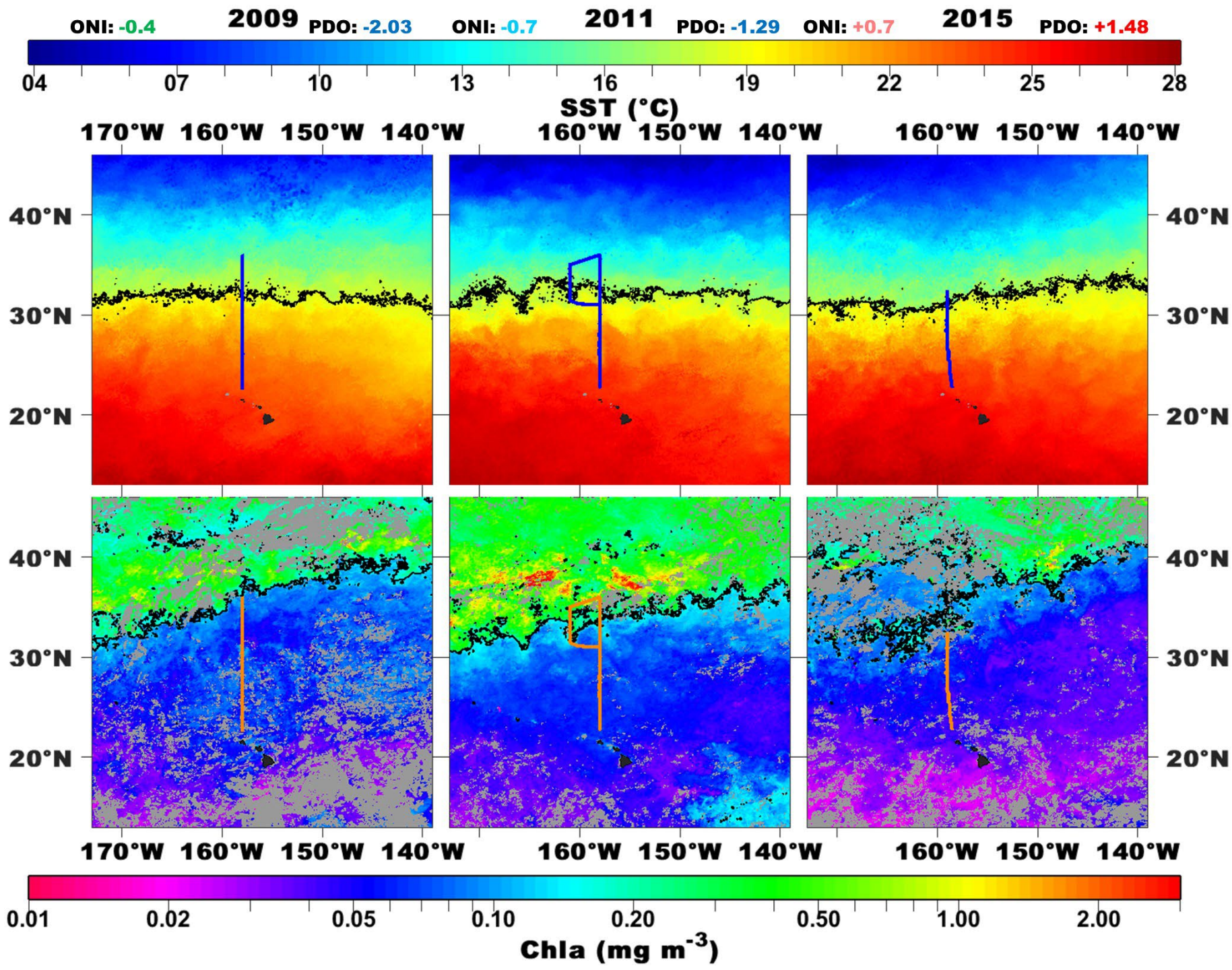
		WC			SSL			DSL		
		tTest	F	p	tTest	F	p	tTest	F	P
38 kHz	STF	-2.45	6.01	0.02	0.74	0.55	0.46	-6.13	37.53	0.00
	TZCF	0.39	0.16	0.69	1.11	1.24	0.27	-1.40	1.95	0.17
70 kHz	STF	-3.09	4.93	0.00	2.39	5.70	0.02	-5.55	30.77	0.00
	TZCF	5.29	0.57	0.00	1.55	2.41	0.12	4.11	16.91	0.00
120 kHz	STF	---	---	---	2.22	4.93	0.03	---	---	---
	TZCF	---	---	---	0.76	0.57	0.45	---	---	---

Overall per sea-surface:

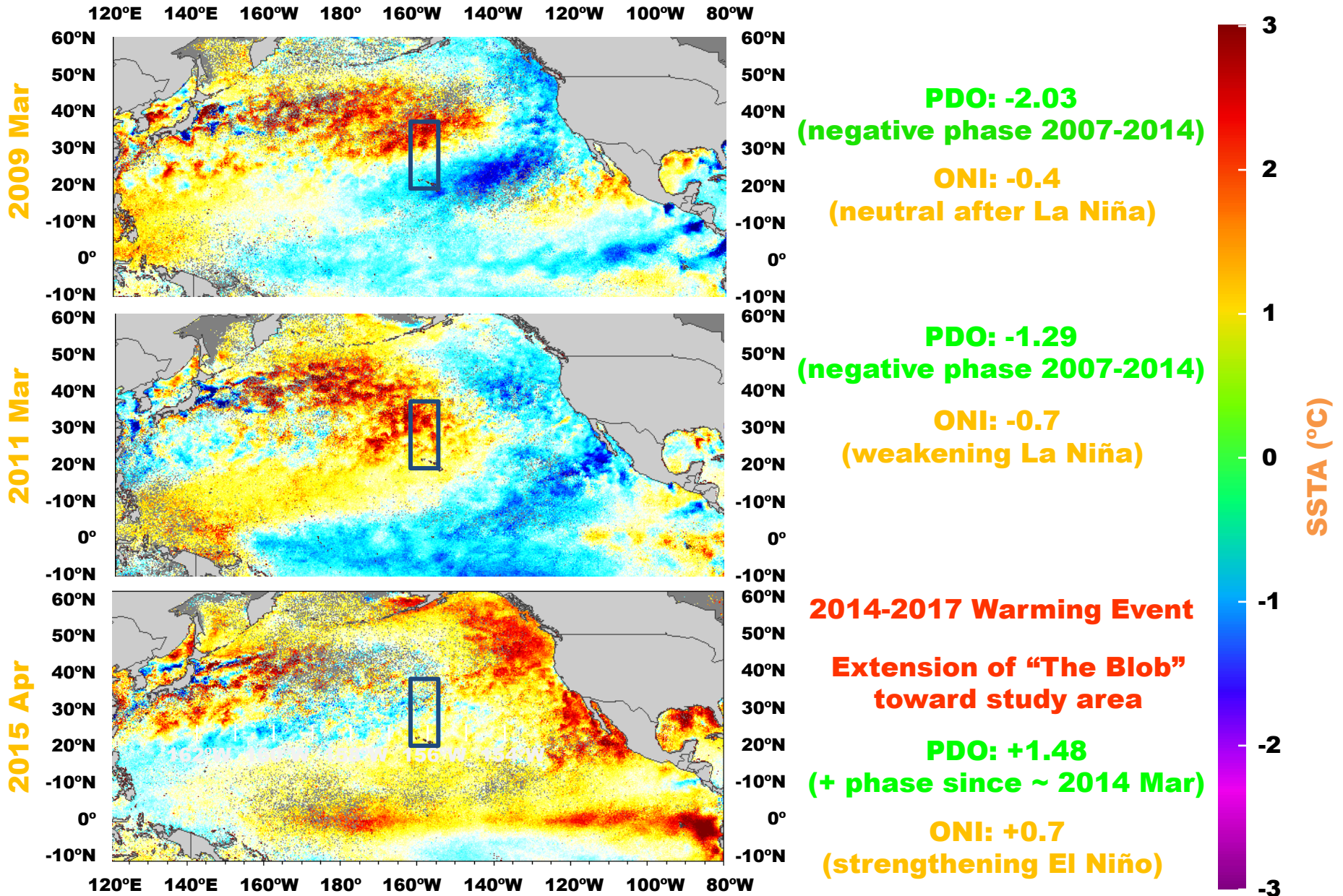
-Significant pos relationship with SST

-No relationship with surf. Chl-a

		Night WC			Day WC			Night SSL			Night DSL			Day DSL			
		tStsat	F	p	tStsat	F	p	tStsat	F	p	tStsat	F	p	tStsat	F	p	
layers	38 kHz	Temp	3.78	14.27	0.00	0.12	0.01	0.91	3.37	11.36	0.00	0.48	0.23	0.64	2.72	7.37	0.01
		Chl-a	-4.55	20.67	0.00	0.02	0.00	0.98	-4.24	17.96	0.00	-2.94	8.65	0.01	-2.83	7.98	0.01
		Oxy	-0.83	0.69	0.41	3.89	15.16	0.00	-1.04	1.09	0.31	-1.26	1.59	0.22	0.09	0.01	0.93
	70 kHz	Temp	2.76	7.63	0.01	2.58	6.67	0.02	3.49	12.15	0.00	1.20	1.45	0.01	4.90	23.98	0.00
		Chl-a	-3.11	9.65	0.00	-1.44	2.09	0.16	-3.84	14.74	0.00	-2.26	5.09	0.03	-4.32	18.64	0.00
		Oxy	-0.03	0.00	0.98	3.35	11.25	0.00	-0.76	0.57	0.46	-1.03	1.05	0.31	0.46	0.21	0.65
120 kHz	Temp							3.01	9.09	0.01							
	Chl-a							-3.29	10.85	0.00							
	Oxy							-0.51	0.26	0.61							
sea-surface	38 kHz	SST	3.23	10.42	0.00	-2.21	4.87	0.04	3.89	15.10	0.00	-1.26	1.59	0.22	-3.40	11.59	0.00
		Surf Chl-a	0.36	0.13	0.72	2.06	4.24	0.05	0.04	0.00	0.97	0.90	0.82	0.37	2.05	4.19	0.05
	70 kHz	SST	3.10	9.60	0.00	-0.69	0.47	0.50	3.10	9.60	0.00	-1.07	0.00	0.97	-1.07	1.14	0.29
		Surf Chl-a	0.03	0.00	0.97	3.76	14.12	0.00	0.03	0.00	0.97	3.64	0.13	0.73	3.64	13.27	0.00
	120 kHz	SST							3.43	11.77	0.00						
		Surf Chl-a							-0.68	0.47	0.50						



Monthly SSTA





Summary

- **STF has a significant effect on micronekton**
 - **NASC (proxy for relative biomass)**
 - **δ dB (proxy for composition)**
- **TZCF does not seem to play a significant role**
- **PDO phase seems to be important**
- **2014-2017 extreme warming likely the source of significantly higher relative biomass and change in composition during the 2015 relative to the 2009 and 2011 surveys**