

# **The Warm Event of 2014 off northern California: Observations from the Trinidad Head Line**

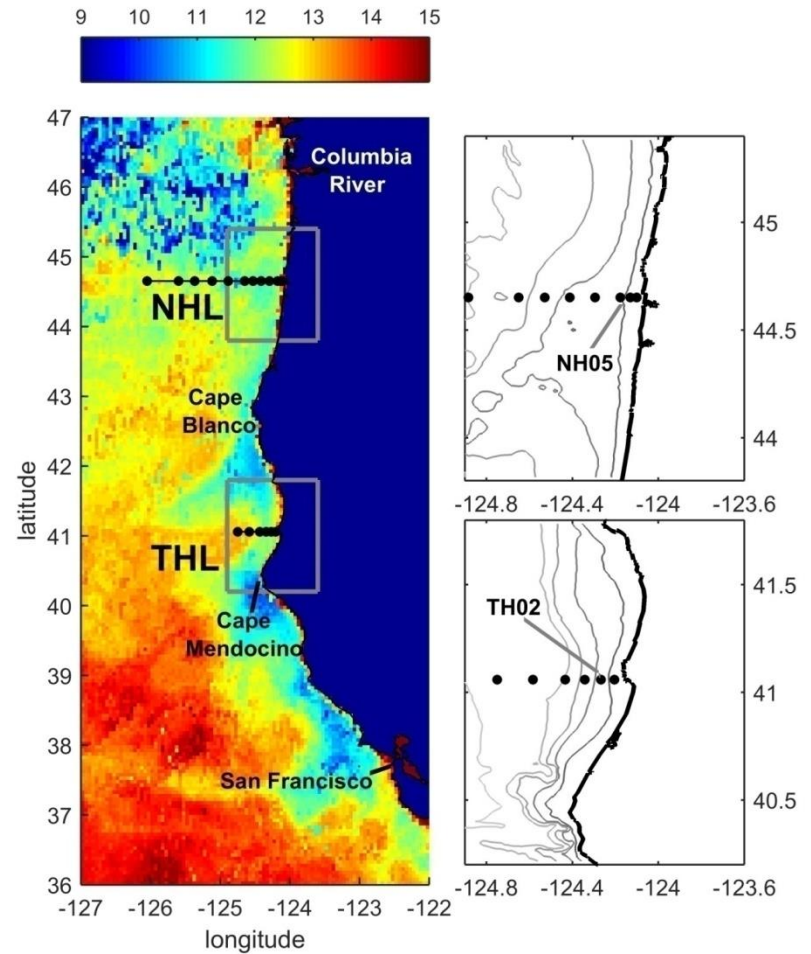
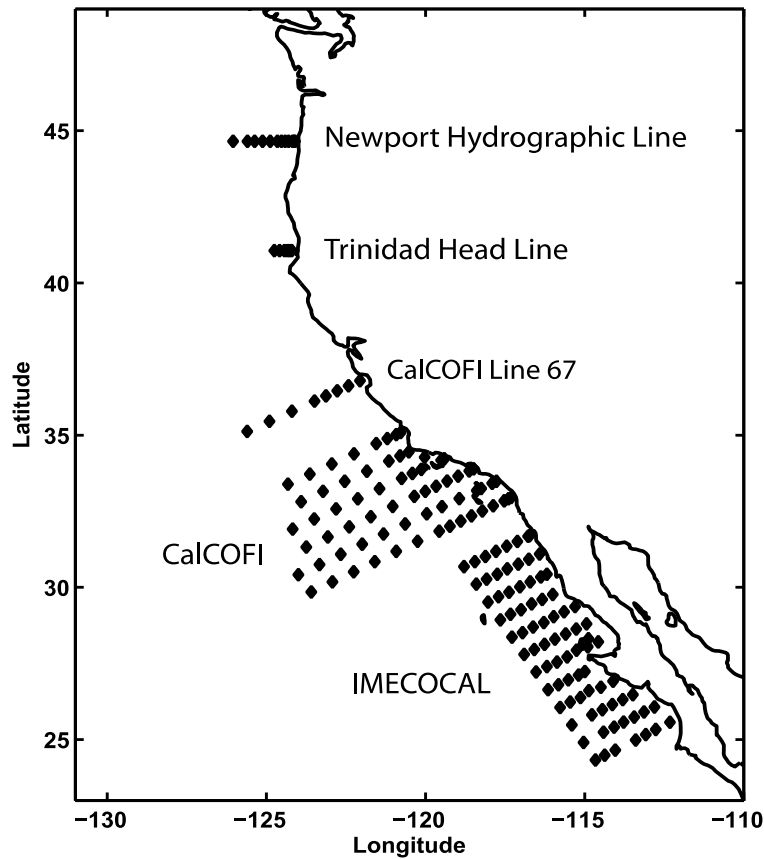
Eric P. Bjorkstedt<sup>1,2</sup>, Roxanne Robertson<sup>2</sup>, Bill Peterson<sup>3</sup>

<sup>1</sup>Southwest Fisheries Science Center

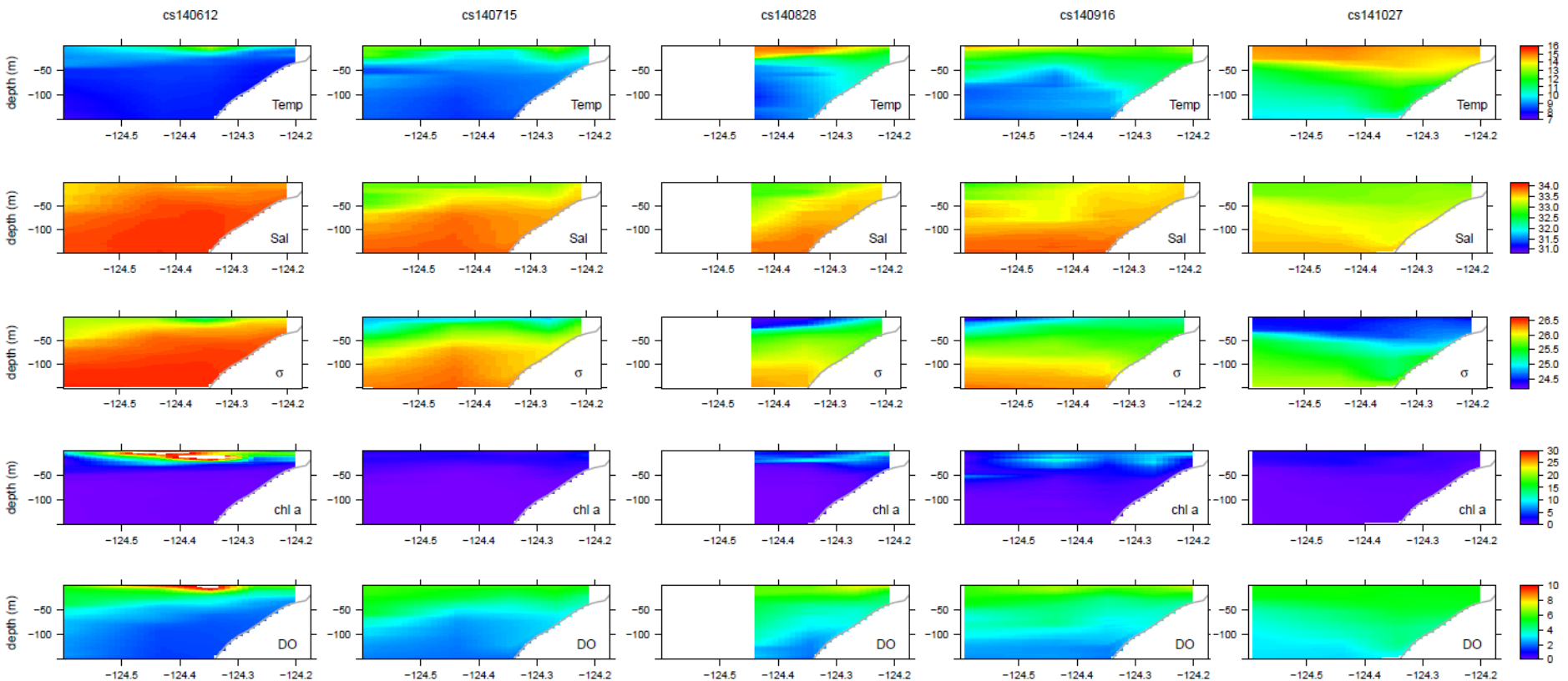
<sup>2</sup>Humboldt State University

<sup>3</sup>Northwest Fisheries Science Center

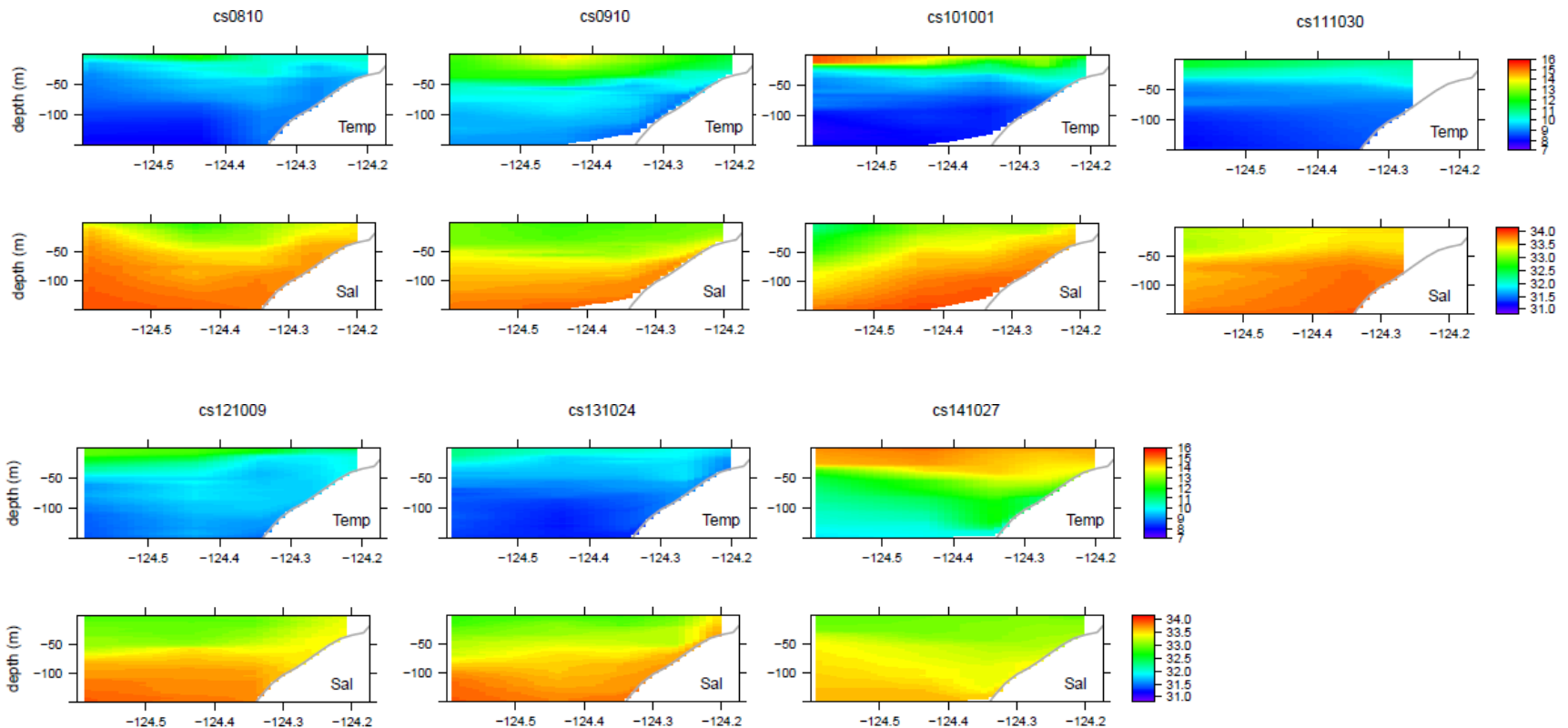
# Trinidad Head Line



# “Invasion of the Blob” (or, “Collapse of the Cool Coastal Corridor”)



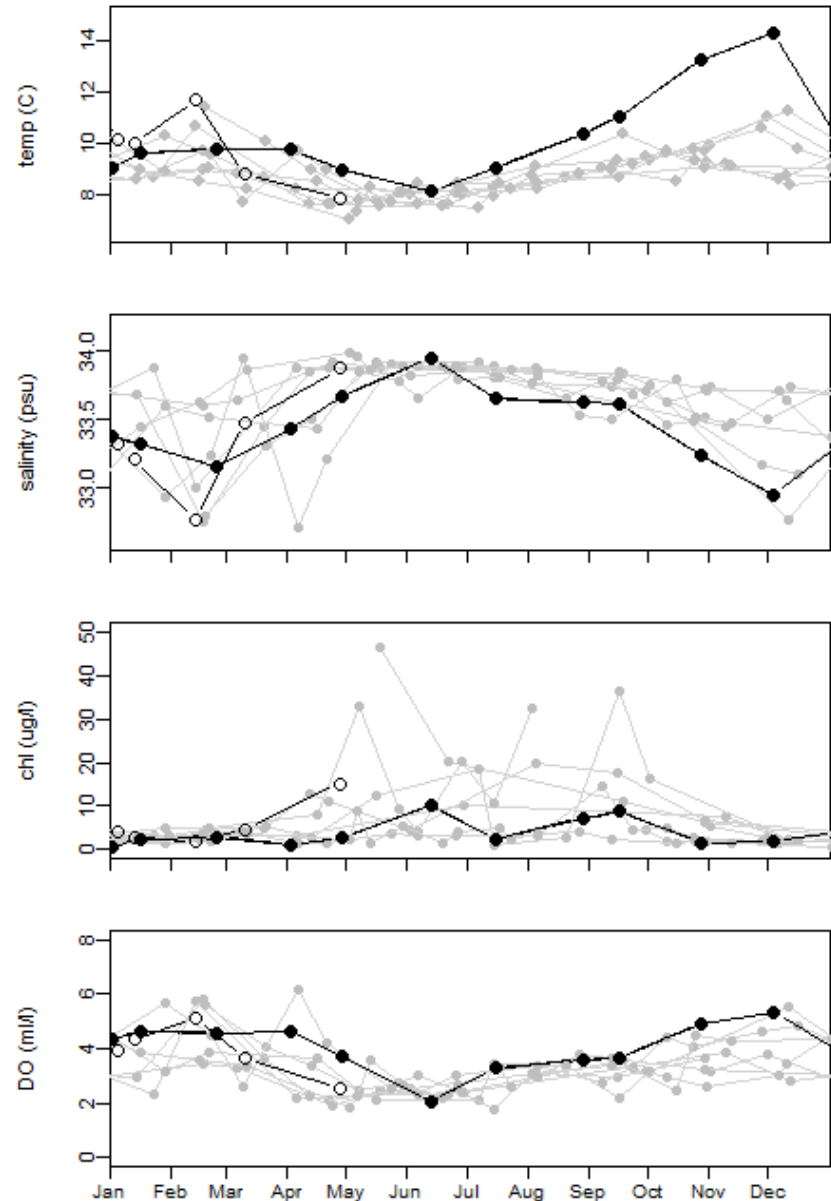
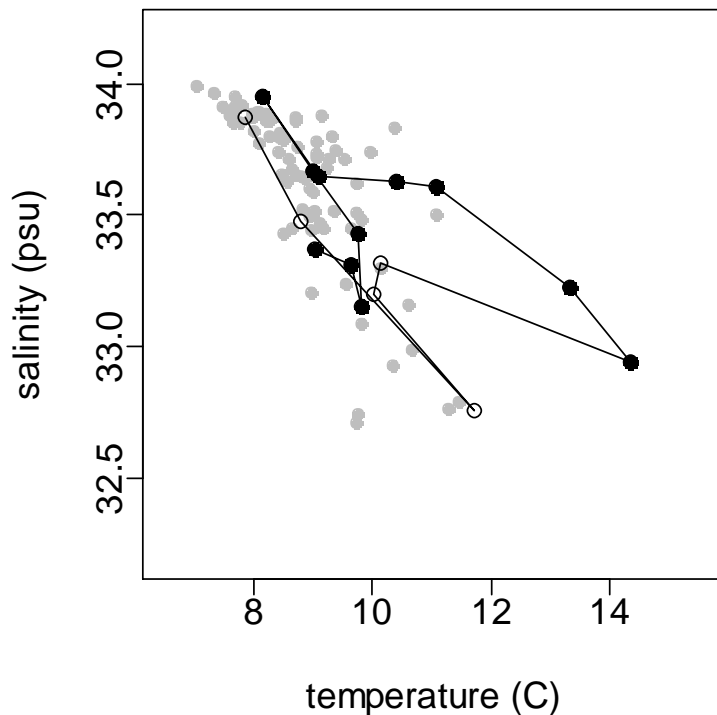
# Calculate the anomaly (15 pts.)



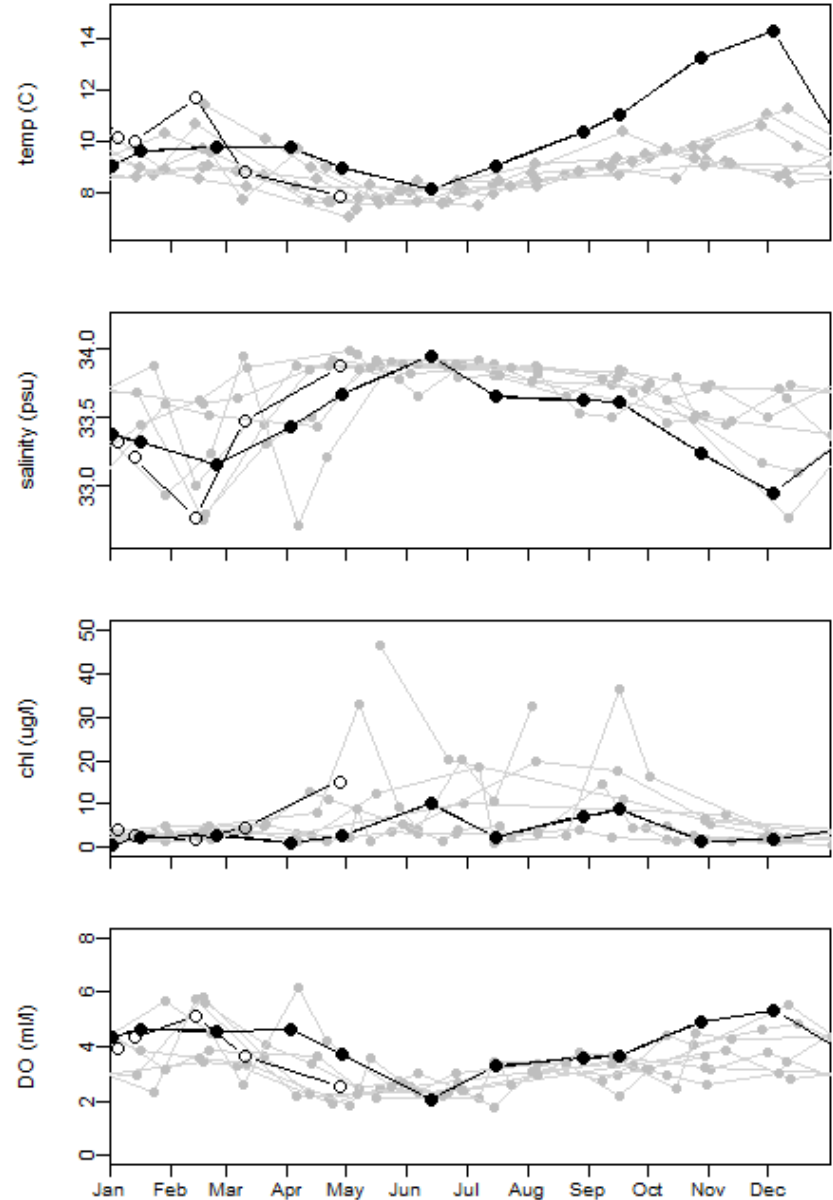
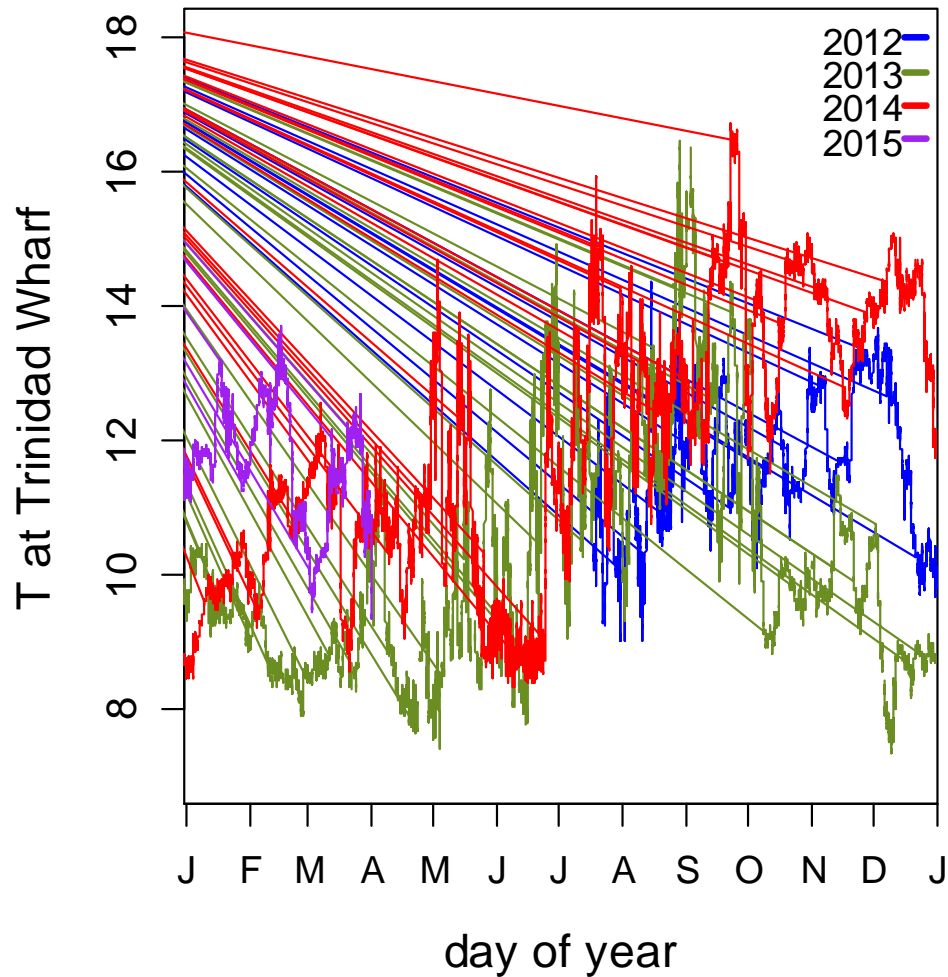
# Mid-shelf near bottom (60 m) water mass characteristics

Grey = 2008-2013; Black = 2014; Open = 2015

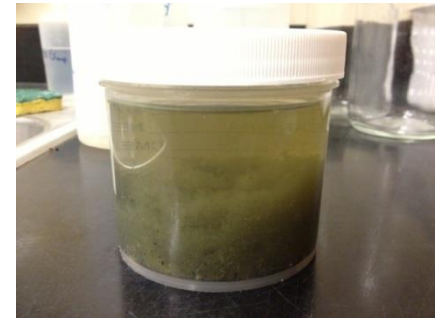
- Warmer than usual starting July 2014
- Blob waters present late fall-winter 2015
- Upwelling in early 2015



# Mid-shelf near bottom (60 m) water mass characteristics



# Copepod Community Analysis



# Copepod Community Analysis



SV 5 ml  
DIL 60ml  
17 spp

Stated 26 5/10/09  
Adjustments confirmed 4/10/09  
~ 1/10

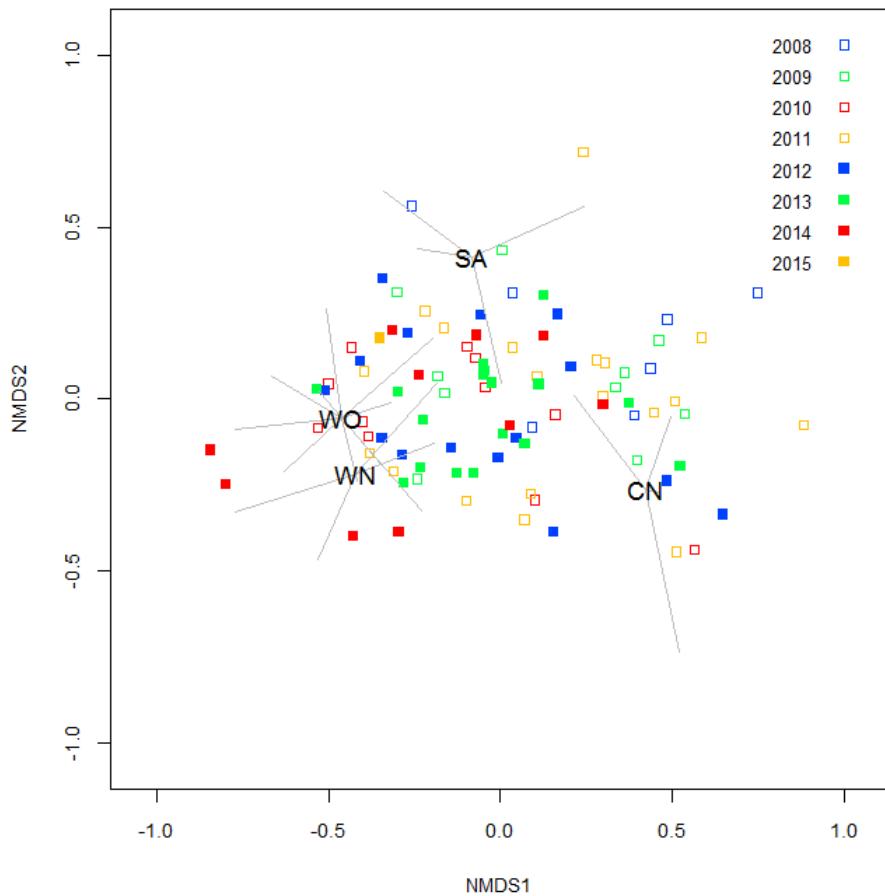
15 Jan 2009  
THOZ  
CS0901

• Ctenocalanus vanuxemi	2 IIII	CS 4	# 114	CS 7	# 111
• Clauso pergens	# 1		CS 4	# 11-1200	
• Clauso spp	# 1		# 1		# 1
• Microcalanus pusillus	# 1		CS 1		# 1
• Clauso arcuicornis	CS 11		CS 11		
• Paracalanus	CS 12		CS 12		
• Pseudocalanus	CS 12		CS 12		
• Microcalanus fennicanus	CS 1		CS 1		0
• Acartia tonsa	CS 1		CS 11		# 11 CS 11
• Metridia packardii	CS 1	CS 11	CS 1	CS 1	
• O. spinirostris					
• Oithona	132		145		
• Acartia dancus			CS 1		0
• Calocalanus of California			# 1		# 1
• Acartia hudsonica					# 1
• Oithona					
• Oncaea					
• Cyclops			1		1
• Cyclops	6		2		0
• Ostracod			1		1
• Bivalve veliger	1		1		1
• Chaetognath			1		1
• Pseudo	28 29	30 31 32 33 34	31 32 33	30	
	33 29	29 32 32 29	31 31	31	
• Scolecithicella minor					4: 1





# Copepod Community Analysis



SV 5 ml  
DIL 60ml  
17 spp

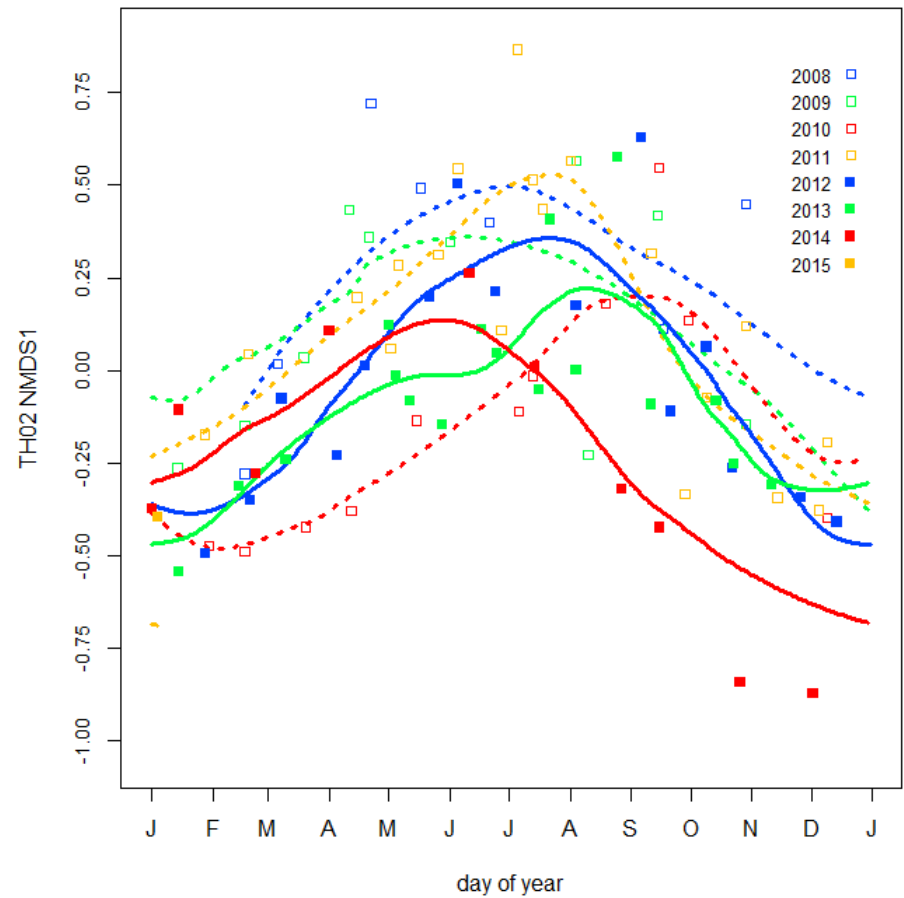
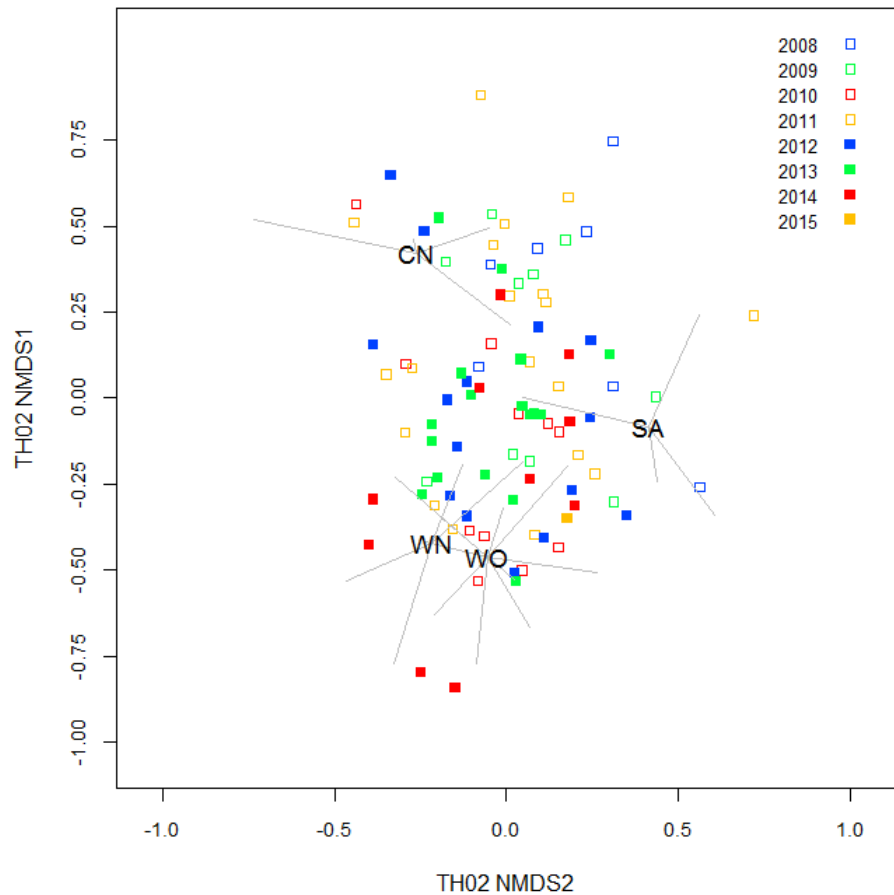
Stated 26 stations  
Adjusted compared 4/10/15  
~ 1/4

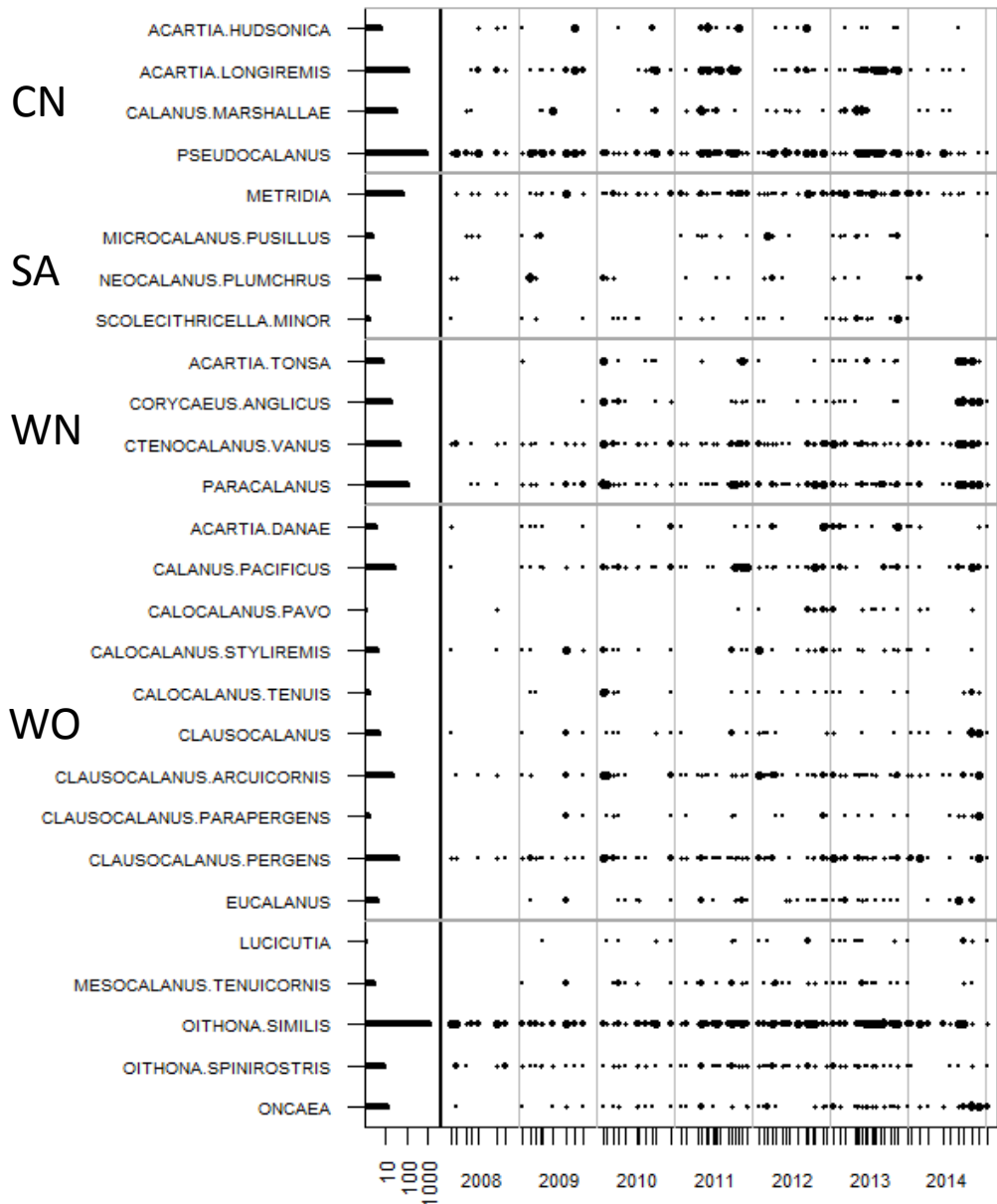
15 Jan 2009  
THOZ  
CS090

• Ctenocalanus vanuxemi	2/1111	CS 4	# 111	CS 7	# 111
• Clauso pergens	CS 8	CS 4	# 11-1200		
• Clauso spp	CS 1	CS 1	# 1		
• Microcalanus pusillus	CS 1	CS 1	# 1		
• Clauso arcticus	CS 11	CS 11	# 11		
• Paracalanus	CS 12	CS 12	# 12		
• Pseudocalanus	CS 1	CS 1	# 1		
• Microcalanus tenuicornis	CS 111	CS 111	# 111		
• Acartia tonsa	CS 1	CS 1	# 1	CS 11	# 11
• Metridia pacifica	CS 1	CS 1	# 1	CS 1	# 1
• O. spinirostris	111	111	# 111		
• Oithona	132	145	# 132		
• Acartia danda	CS 1	CS 1	# 1		
• Calocalanus of California	CS 1	CS 1	# 1		
• Acartia hudsonica	CS 1	CS 1	# 1		
• Oithona	CS 1	CS 1	# 1		
• Oncaea	CS 1	CS 1	# 1		
• Crab zoea	CS 1	CS 1	# 1		
• Cyclopoid	6	2	# 6		
• D. ostracod	1	1	# 1		
• Bivalve veliger	1	1	# 1		
• Chaetognath	1	1	# 1		
• Pseudo	28 27 30 31 33 24 31 32 30				
	33 29 32 32 29 31 31 31				
• Scolecithricella minor					4:1

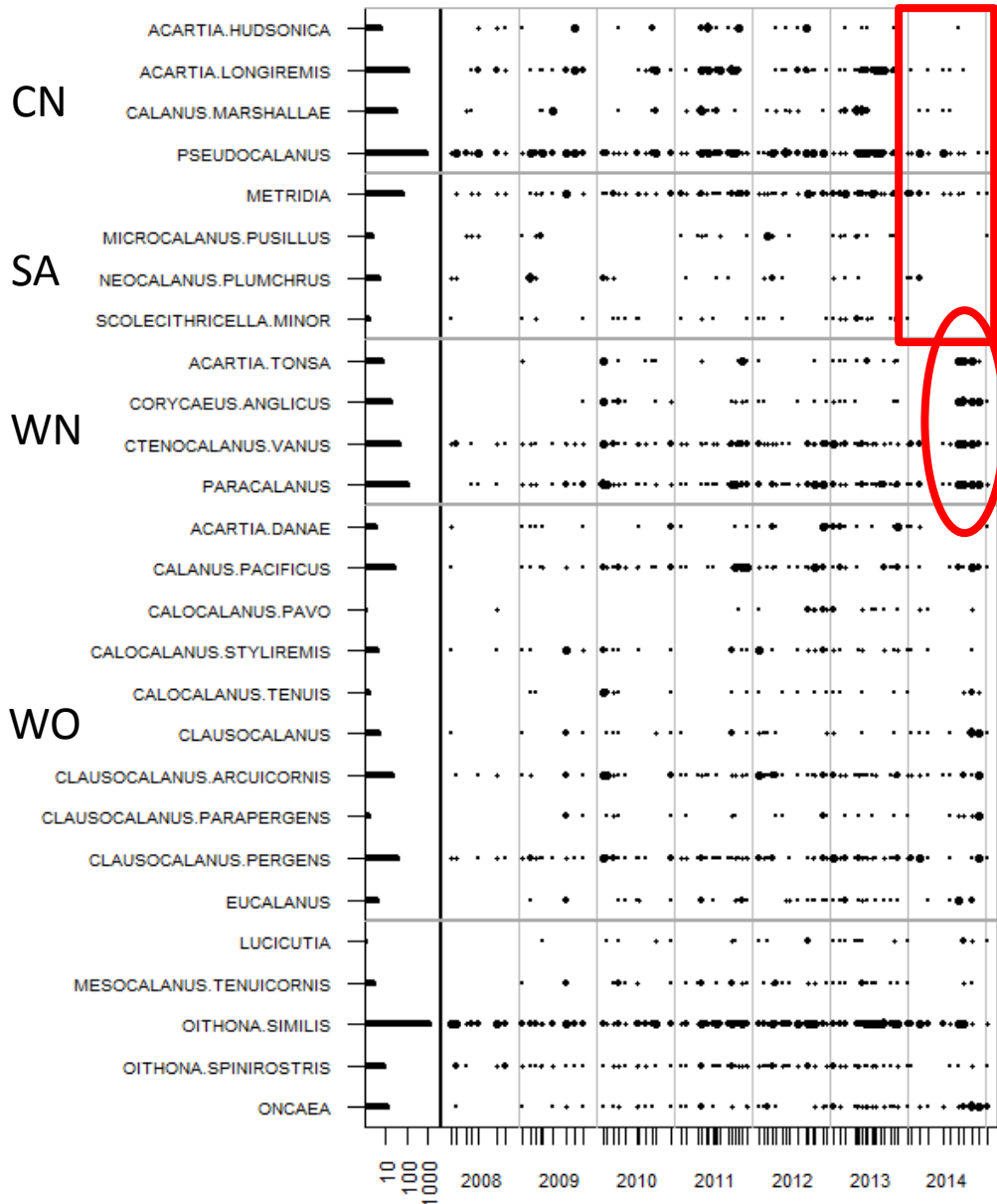


# Copepod Community Analysis

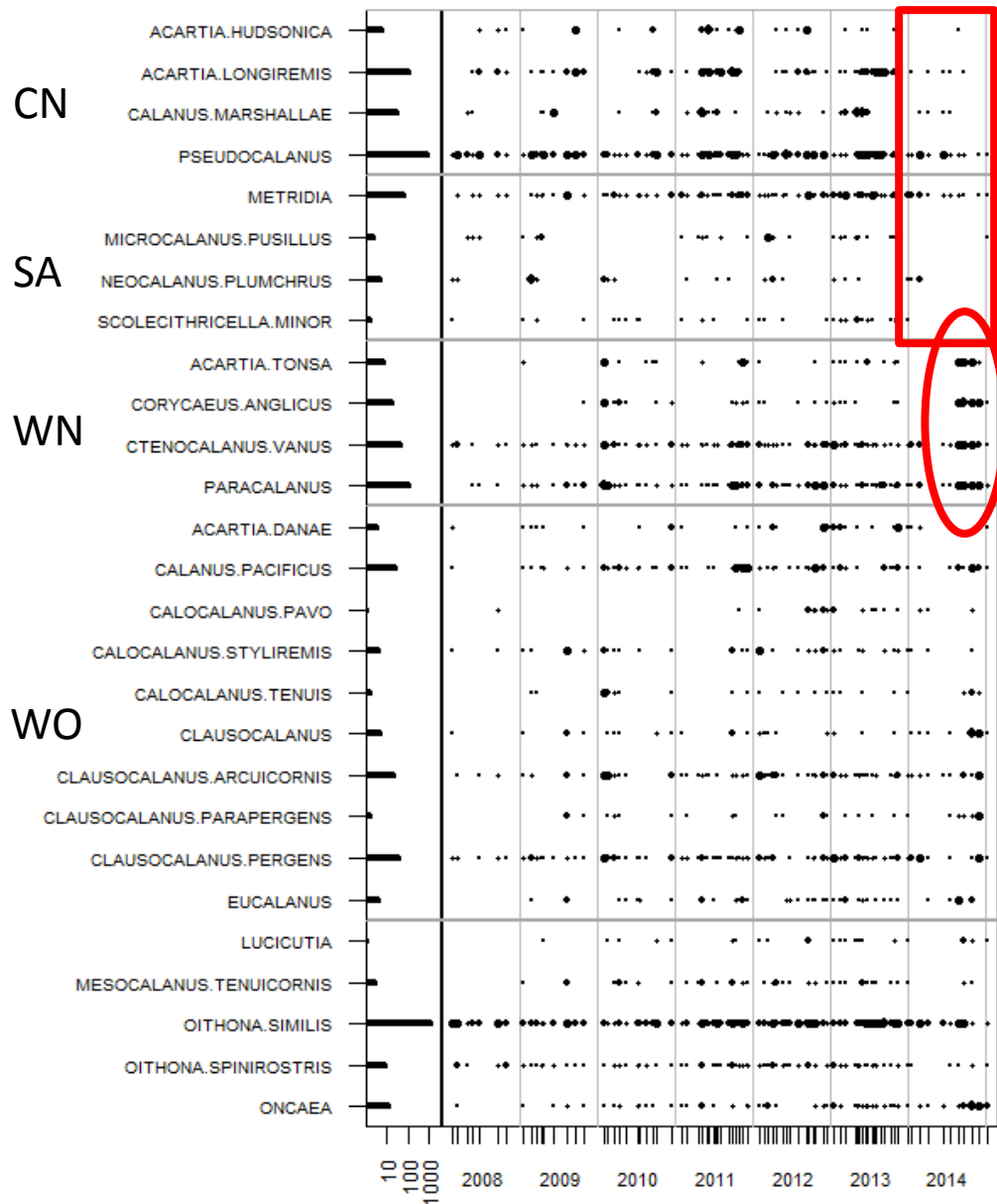




Shifts apparent in density of common species



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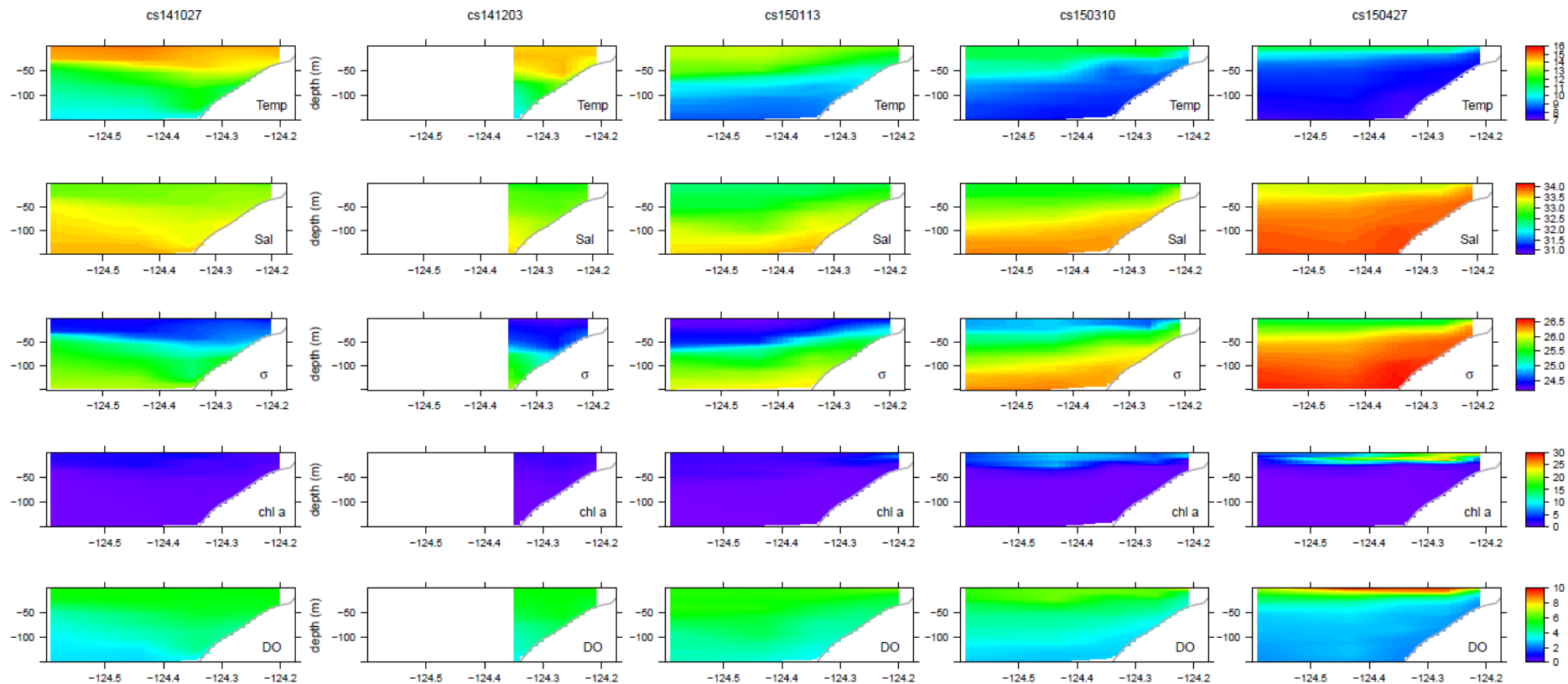


Shifts apparent in density of common species

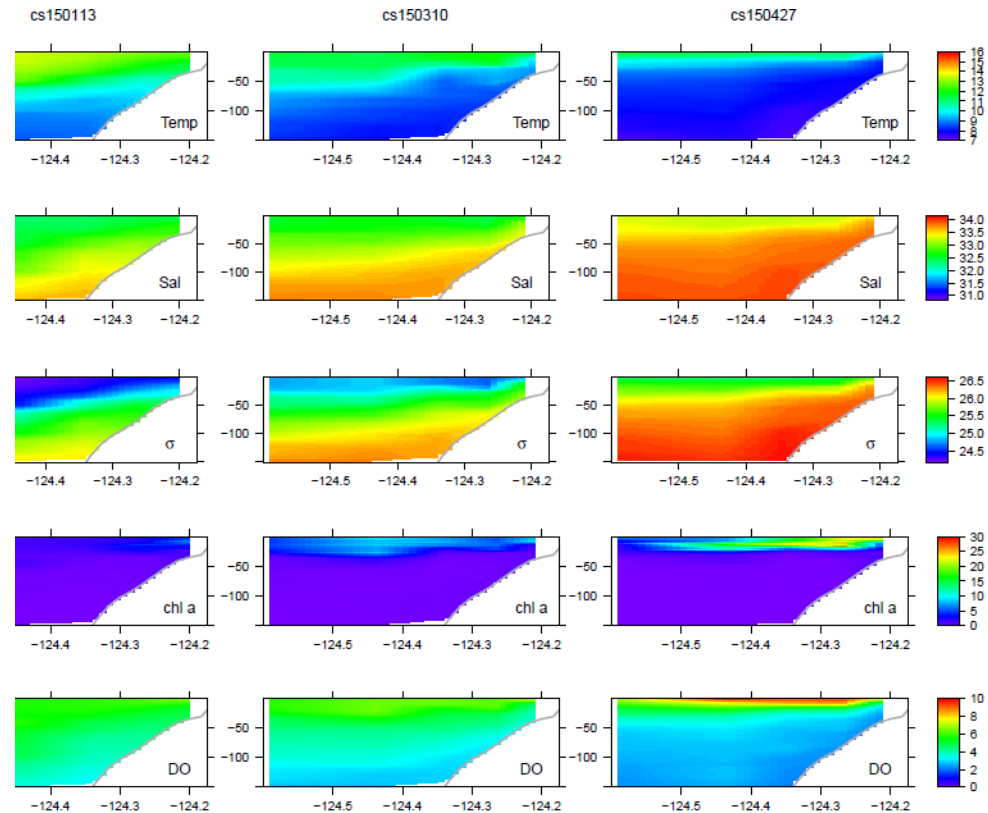
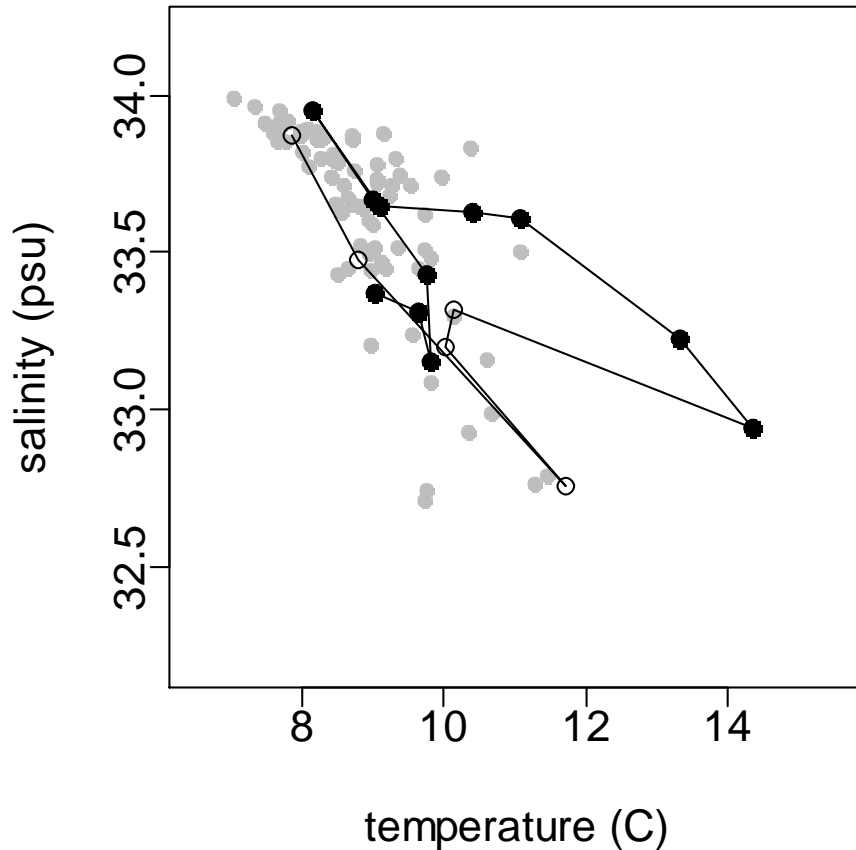
New copepod species observed at TH02, e.g.,  
*Clausocalanus farrani*  
*Clausocalanus furcatus*  
*Temora discaudata*  
*Subeucalanus subcrassus*

Analysis of bongo samples revealed a new euphausiid for THL—*Euphausia recurva*—in early 2015

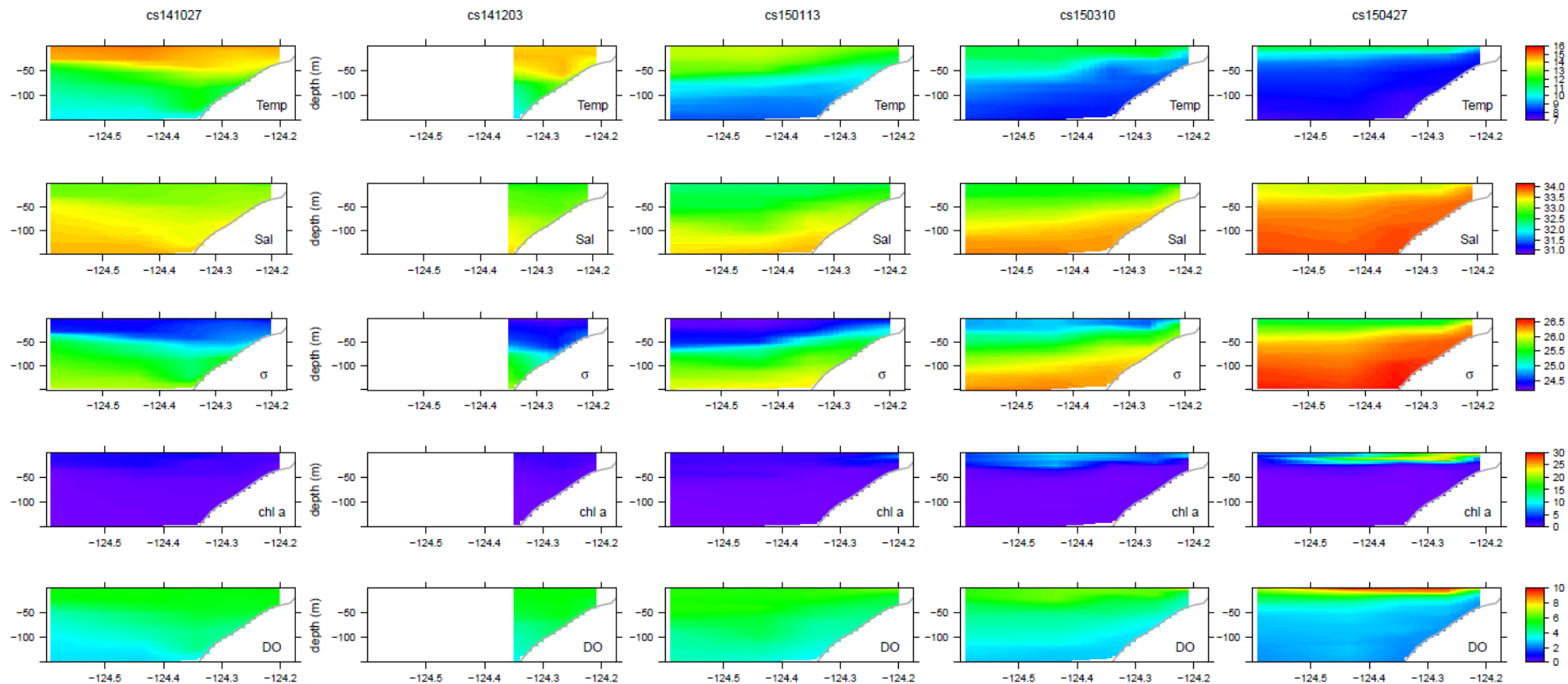
# Going into 2015: Upwelling...



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# Going into 2015: Upwelling...





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