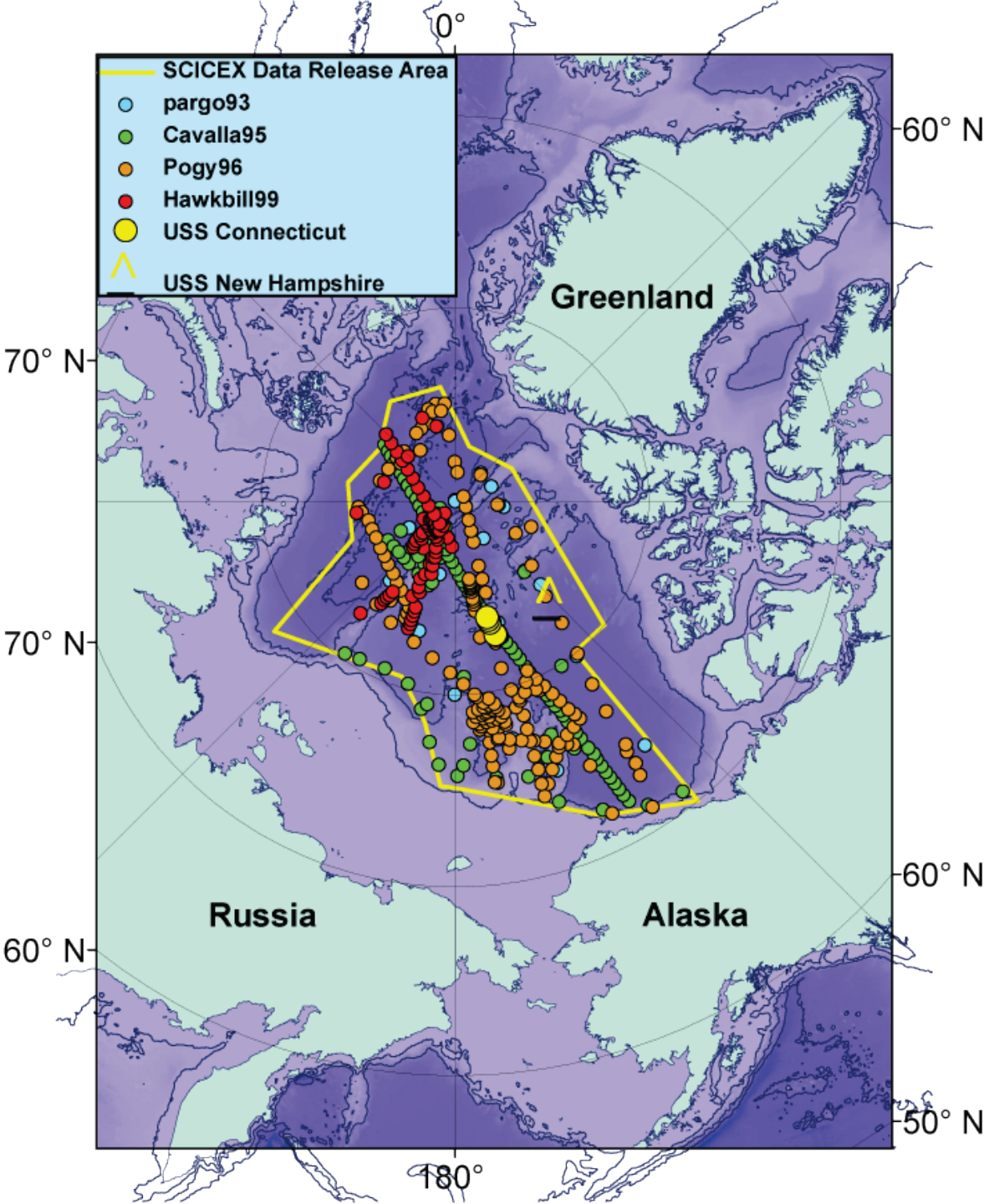
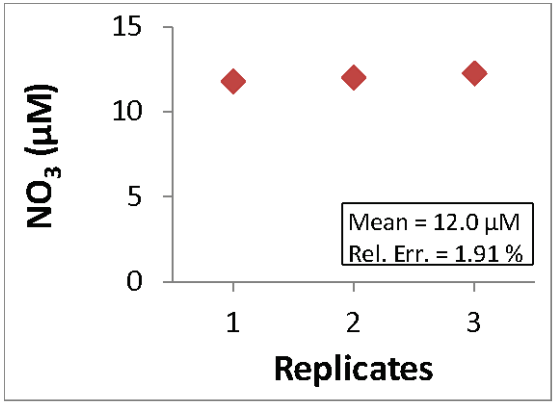
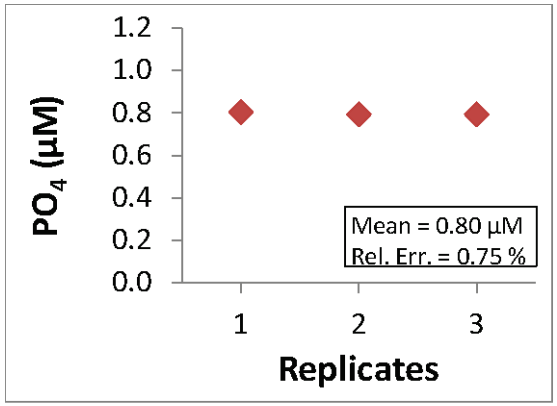
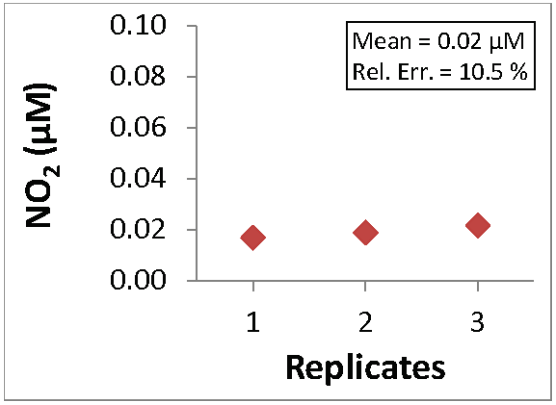
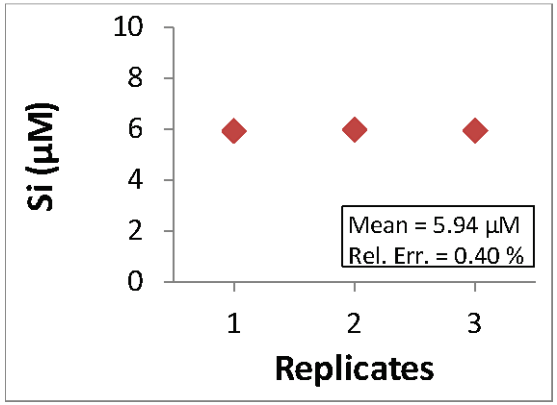

SCICEX Data Release Area
pargo93
Cavalla95
Pogy96
Hawkbill99
USS Connecticut
USS New Hampshire
Greenland
Russia
Alaska
0°
60° N
70° N
70° N
60° N
60° N
50° N
180°

Nutrients - Connecticut (Sea Wolf class; 219m)

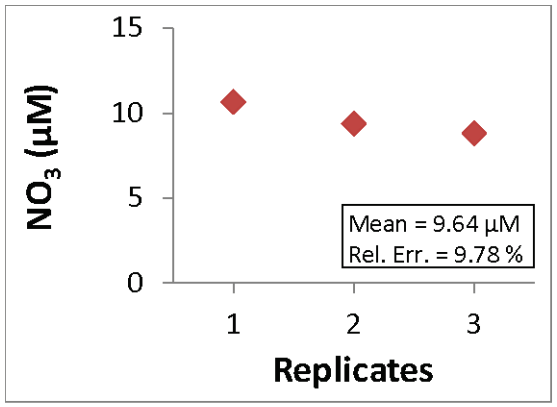


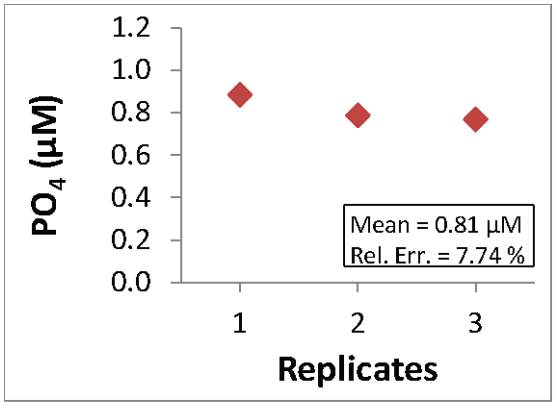


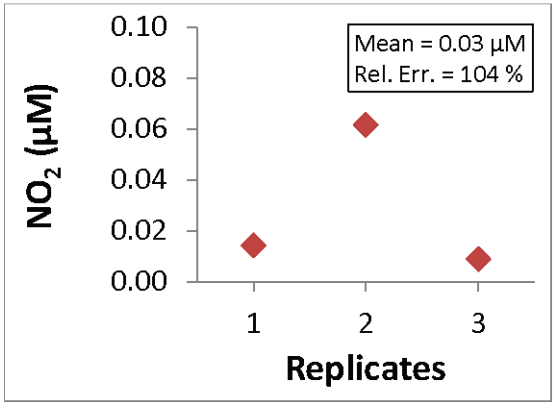


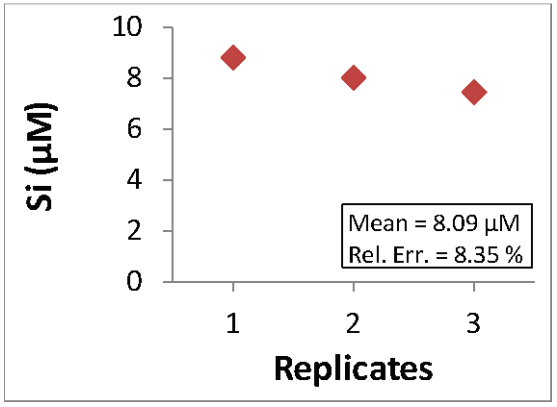


Nutrients – New Hampshire (Virginia class; 180m)

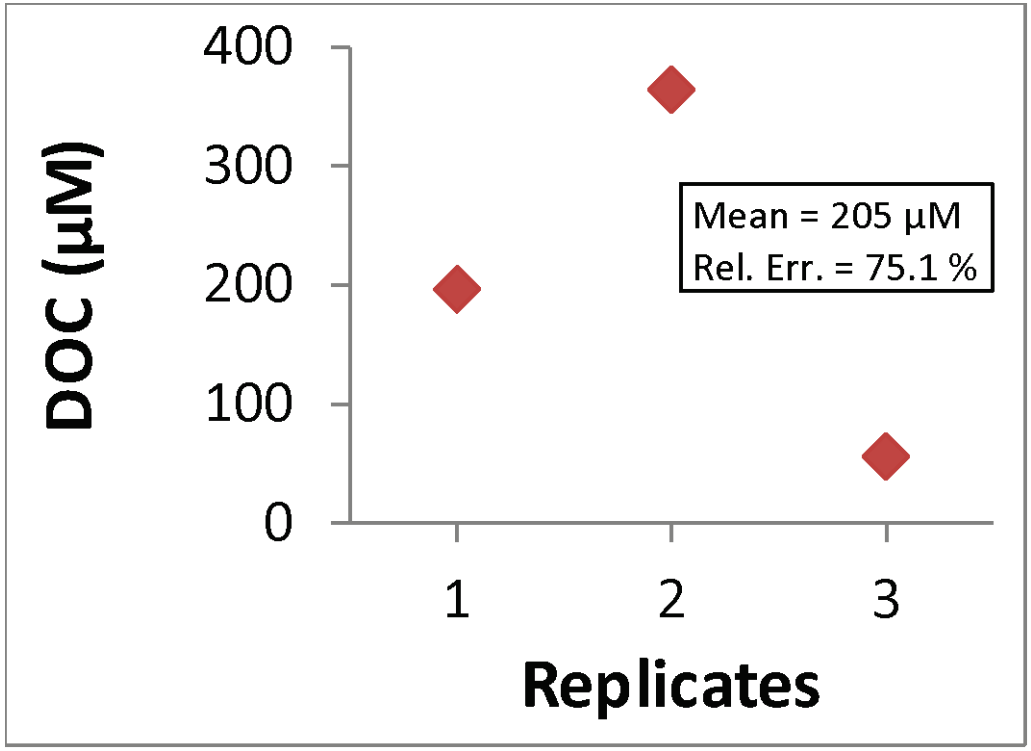




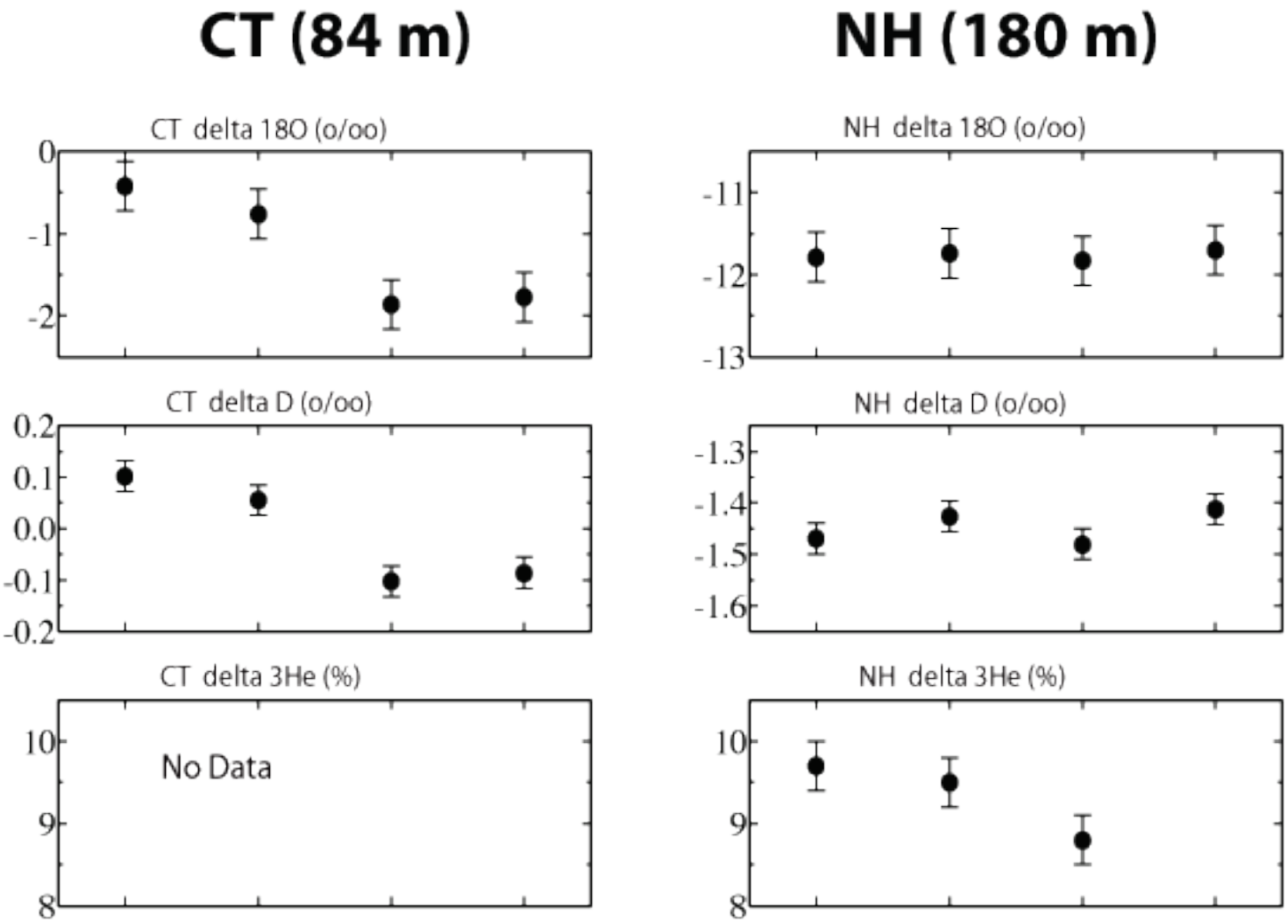




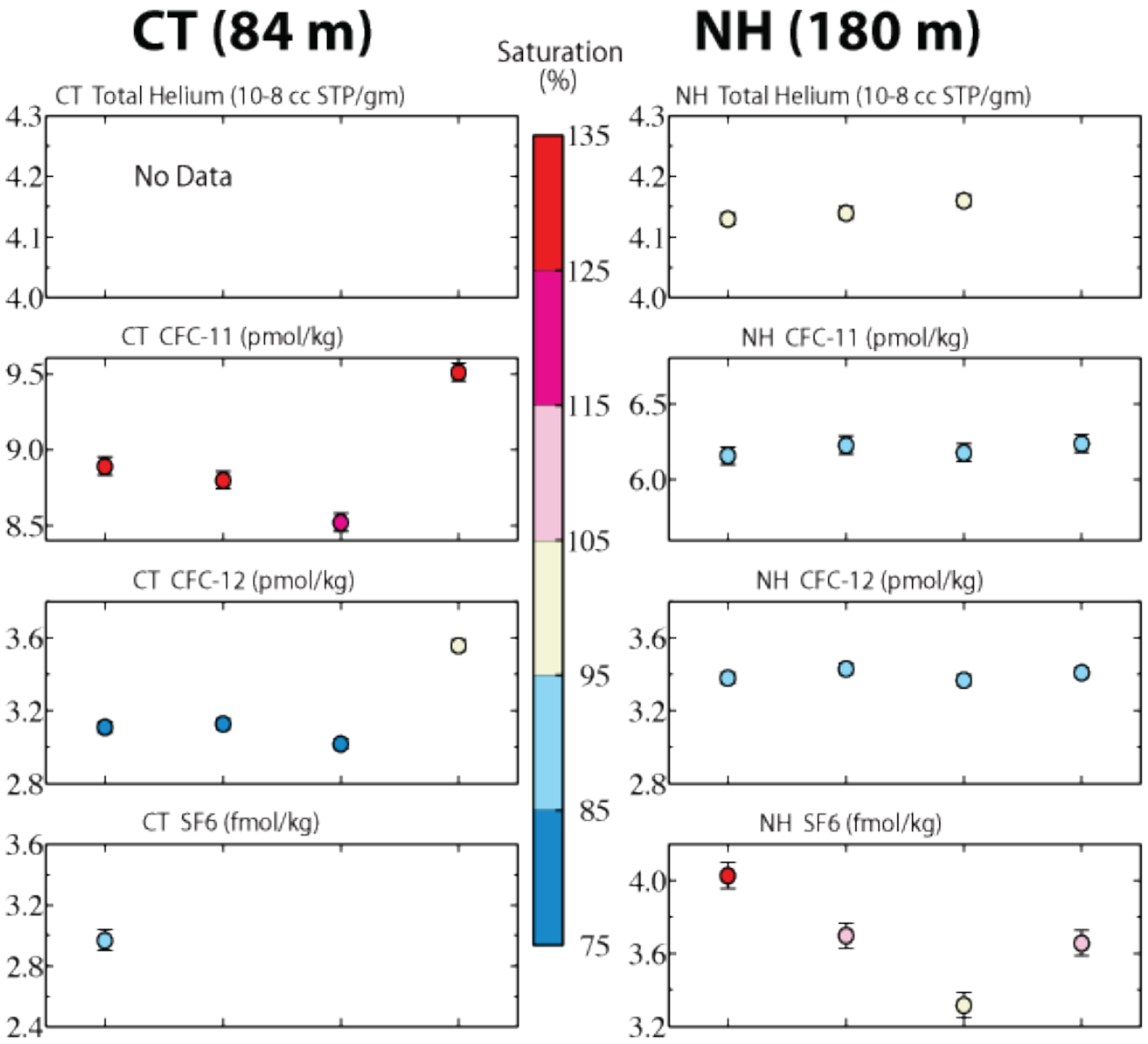
Dissolved Organic Carbon –Connecticut (219m)



Tracer data (1)



Tracer Data (2)



DISCRETE WATER SAMPLES

Salinity	Core water property; calibrate salinty sensor on CTD	200 ml	Rinse, fill, and cap a 200 ml glass bottle	Can be stored for shore-based measurement or measured on board with an Autosal	Room temperature
Oxygen	Water mass tracer; Biological production and recycling; calibrate O_2 sensor on CTD	120 ml	Rinse and fill 120 ml flask	Add reagents, follow Winkler titration procedures	Room temperature covered with water for up to one day prior to titration
Chl a, HPLC pigments	Phytoplankton levels and community composition; calibrate Chla fluorometer on CTD	500 ml (Chl a only) or 1–3 L for HPLC	Chl a—filter and place filter into 10 ml 90% acetone; HPLC samples—freeze filter	Chl a can be measured in an on-board fluorometer or stored for shore based measurement like HPLC	–20°C, must not thaw (–80° if possible for HPLC)
Flow cytometry	Microbial abundance	10 ml	Rinse and fill 15 ml tube	Add formalin and freeze	–20°C, must not thaw (–80° if possible)
Nutrients (PO_4, NO_3, SiO_2)	Water mass tracers; biological production and recycling	50 ml	Rinse, partially fill, and cap a 50 ml plastic tube; keep upright and ensure cap is tight	Quick freeze as soon as possible at –20°C	–20°C, must not thaw
^{18}O	Determine freshwater sources	100 ml	Rinse, fill, and cap 100 ml glassbottles	None	Room temperature
Alkalinity	CO_2 uptake, ocean acidification	250 ml	Rinse and fill 250 ml glass bottle with screw cap leaving a 2 ml headspace	None	Keep in dark at room temperature
SF_6, CFCs	Age information; calculation of anthropogenic CO_2 watermass tracer	1–2 L	Rinse and fill a 250–500 ml glass stoppered bottle, insert glass stopper, place the bottle in a jar and fill the jar with sample water	None	Refrigerated at a temperature of 0–2°C
Helium isotopes	Age information; watermass tracer	50 ml	Flush a 50 ml copper tube with the sample and crimp the ends of the tube with the water flowing; rinse the crimped ends with freshwater	None	Room temperature
Tritium	Age information; watermass tracer	500 ml	Fill a 500 ml bottle without rinsing and cap	None	Room temperature
^{129}I	Circulation time of Atlantic water	1 L	Rinse, fill, and cap a 1 L plasticbottle	None	Room temperature
Radium isotopes	Circulation of shelf water into the interior	130 L	Filter water through a cartiridge while the submarine is underway	Change cartiridge approx every three hours while submarine is underway	Room temperature

DISCRETE WATER SAMPLES

Calibration & Diss. & Part. Pools	Salinity	Core water property; calibrate salinty sensor on CTD	200 ml	Rinse, fill, and cap a 200 ml glass bottle	Can be stored for shore-based measurement or measured on board with an Autosal	Room temperature
	Oxygen	Water mass tracer; Biological production and recycling; calibrate O_2 sensor on CTD	120 ml	Rinse and fill 120 ml flask	Add reagents, follow Winkler titration procedures	Room temperature covered with water for up to one day prior to titration
	Chl a, HPLC pigments	Phytoplankton levels and community composition; calibrate Chla fluorometer on CTD	500 ml (Chl a only) or 1–3 L for HPLC	Chl a—filter and place filter into 10 ml 90% acetone; HPLC samples—freeze filter	Chl a can be measured in an on-board fluorometer or stored for shore based measurement like HPLC	–20°C, must not thaw (–80° if possible for HPLC)
Phyto & Bacteria	Flow cytometry	Microbial abundance	10 ml	Rinse and fill 15 ml tube	Add formalin and freeze	–20°C, must not thaw (–80° if possible)
Diss. & Part. Pools	Nutrients (PO_4, NO_3, SiO_2)	Water mass tracers; biological production and recycling	50 ml	Rinse, partially fill, and cap a 50 ml plastic tube; keep upright and ensure cap is tight	Quick freeze as soon as possible at –20°C	–20°C, must not thaw
Tracer	^{18}O	Determine freshwater sources	100 ml	Rinse, fill, and cap 100 ml glassbottles	None	Room temperature
Diss. & Part. Pools	Alkalinity	CO_2 uptake, ocean acidification	250 ml	Rinse and fill 250 ml glass bottle with screw cap leaving a 2 ml headspace	None	Keep in dark at room temperature
Tracer	SF_6, CFCs	Age information; calculation of anthropogenic CO_2 watermass tracer	1–2 L	Rinse and fill a 250–500 ml glass stoppered bottle, insert glass stopper, place the bottle in a jar and fill the jar with sample water	None	Refrigerated at a temperature of 0–2°C
Tracer	Helium isotopes	Age information; watermass tracer	50 ml	Flush a 50 ml copper tube with the sample and crimp the ends of the tube with the water flowing; rinse the crimped ends with freshwater	None	Room temperature
Tracer	Tritium	Age information; watermass tracer	500 ml	Fill a 500 ml bottle without rinsing and cap	None	Room temperature
Tracer	^{129}I	Circulation time of Atlantic water	1 L	Rinse, fill, and cap a 1 L plasticbottle	None	Room temperature
Tracer	Radium isotopes	Circulation of shelf water into the interior	130 L	Filter water through a cartiridge while the submarine is underway	Change cartiridge approx every three hours while submarine is underway	Room temperature

Calibration & Diss. & Part. Pools

Phyto & Bacteria

Diss. & Part. Pools

Tracer

Diss. & Part. Pools

Tracer

Tracer

Tracer

Tracer

Tracer

Tracer

DISCRETE WATER SAMPLES

Salinity	Core water property; calibrate salinty sensor on CTD	200 ml	Rinse, fill, and c glass bottle	ml	Can be stored for shore-based measurement or measured on board with an Autosal	Room temperature
Oxygen	Water mass tracer; Biological production and recycling; calibrate O sensor on CTD	120 ml	Rinse and fill 12	k	Add reagents, follow Winkler titration procedures	Room temperature covered with water for up to one day prior to titration
Chl a, HPLC pigments	Phytoplankton levels and community composition; calibrate Chla fluorometer on CTD	500 ml (Chl a only) or 1–3 L for HPLC	Chl a—filter an into 10 ml 90% HPLC samples-	ter lter	Chl a can be measured in an on-board fluorometer or stored for shore based measurement like HPLC	–20°C, must not thaw (–80° if possible for HPLC)
Flow cytometry	Microbial abundance	10 ml	Rinse and fill 15		Add formalin and freeze	–20°C, must not thaw (–80° if possible)
Nutrients (PO_4, NO_3, SiO_2)	Water mass tracers; biological production and recycling	50 ml	Rinse, partially a 50 ml plastic t upright and en	ap s tight	Quick freeze as soon as possible at –20°C	–20°C, must not thaw
^{18}O	Determine freshwater sources	100 ml	Rinse, fill, and c glassbottles	l	None	Room temperature
Alkalinity	CO_2 uptake, ocean acidification	250 ml	Rinse and fill 25 bottle with scre a 2 ml headspa	s aving	None	Keep in dark at room temperature
SF_6, CFCs	Age information; calculation of anthropogenic CO watermass tracer	1–2 L	Rinse and fill a glass stoppere glass stopper, in a jar and fill t sample water	ml nsert bottle h	None	Refrigerated at a temperature of 0–2°C
Helium isotopes	Age information; watermass tracer	50 ml	Flush a 50 ml c with the sampl the ends of the the water flowi crimped ends v	e np h the water	None	Room temperature
Tritium	Age information; watermass tracer	500 ml	Fill a 500 ml bo rinsing and cap	ut	None	Room temperature
^{129}I	Circulation time of Atlantic water	1 L	Rinse, fill, and c plasticbottle		None	Room temperature
Radium isotopes	Circulation of shelf water into the interior	130 L	Filter water thr cartiridge while is underway		Change cartiridge approx marine every three hours while	Room temperature

Sample Collection & Shipping

SAMPLE	PURPOSE	SIZE	COLLECTION PROCEDURE	ON BOARD PROCESSING	STORAGE REQUIREMENTS
UNDERWAY CONTINUOUS SAMPLING VIA SENSORS					
Temperature	Core water property	N/A	Hull-mounted CTD	None	N/A
Salinity	Core water property	N/A	Hull-mounted CTD	None	N/A
Oxygen	Water mass tracer; biological production and recycling	N/A	Hull-mounted CTD	None	N/A
Nitrate	Water mass tracer; biological production and recycling	N/A	Hull-mounted CTD	None	N/A
DOC	Water mass tracer	N/A	Hull-mounted CTD	None	N/A
Alkalinity, pH, pCO_2	CO_2 uptake, ocean acidification	N/A	Pumped stream from hull-mounted CTD	None	N/A
Chl a, variable fluorescence	Phytoplankton abundance, photosynthetic capacity	N/A	Pumped stream from hull-mounted CTD	None	N/A
Spectral radiometry, light scattering, and absorption	Chemical and biological properties (CDOM; overlying phytoplankton levels, particulate characterization)	N/A	Upward-looking sensors; pumped stream from hull-mounted CTD	None	N/A

Issues from initial SCICEX SAM

1. Better training procedures and materials
2. Earlier submittal & proper routing of MSDS sheets for HAZMAT
3. Better labeling and water handling
4. Sampling problems with organics & perhaps some tracers
5. Need to standardize shipboard storage and shipping & handling from Bremerton & Groton