Table X.1. Palmer LTER Core measurements made on cruises and at Palmer Station. The top row for each section (in boldface) identifies a major program component and a coordinator for each group of measurements.

Parameter	**Method**	**Instrumentation**	**Mode**[1]	**QA/QC**[2]	**Investigator**[3]	**Reference**[4]
Navigation					**Raytheon**	
Lat/Long	GPS	Vessel sensors	U			
Meteorology			U		**Raytheon**	
SAT, SLP, winds	Surface sensors	Vessels & WAP stations	U, V		**Raytheon**	
SAT, SLP, winds	Numerical analyses	NCEP/NCAR Reanalyses	V, S			Kalnay et al. 1996
Physical Oceanography					**Martinson**	
T and S	On hydrographic grid stations	CTD	V, P	I	Raytheon Martinson	
T&S bulk ocean properties	Numerical analysis of T/S data			I		Martinson and Iannuzzi, 1998, 2001
T profiles	Off station	XBT	U	I	Raytheon	
T profile time series	Optimal vertical fixed locations	Moorings	M, D	I		

Sea Ice					**Stammerjohn**	
Surface concentration	Remote sensing	Visible, Infrared & microwave sensors	S		Stammerjohn	
Predators					**Fraser**	
<u>Pelagic surveys</u> Environmental data Distribution and abundance of seabirds and marine mammals	Underway ship log Census	V	U U	NS D	Raytheon Fraser	Ribic et al. 2008 Ribic et al. 2008
<u>Adélie Demography</u> Adult breeding population Annual recruitment Winter survival	Census Mark-recapture Census, mark-recapture		D D D	R R R	Fraser Fraser Fraser	CCAMLR 2004 Fraser and Patterson 1997
<u>Adélie Breeding Success and Phenology</u> Breeding phenology	Census		U	R	Fraser	CCAMLR 2004

1:2 chick ratios Reproductive success Chick survival to crêche stage Chick fledging weights	Census Chicks fledged/pair Chicks fledged/colony Allometric measurements		D D D U	R R R D	Fraser Fraser Fraser Fraser	CCAMLR 2004 CCAMLR 2004 CCAMLR 2004 CCAMLR 2004, Chapman et al. 2008
<u>Adélie Foraging Ecology and Telemetry</u> Adult sex and condition Foraging trip duration Chick diet composition Prey population size-age structure Predator and prey stable carbon and nitrogen isotope ratios (new protocol; see Fig. 2.8)	Allometric measurements VHF transmitters Stomach lavage Stomach lavage Tissue analysis	Data loggers	D U D D D	D D D D D	Fraser Fraser Fraser Fraser Fraser	CCAMLR 2004 CCAMLR 2004, Fraser and Hofmann 2003 CCAMLR 2004, Fraser and Hofmann 2003 CCAMLR 2004, Fraser and Hofmann 2003 Gorman et al. In Press

Nutrients/Biogeochemistry			**D**		**Ducklow**	
NO2, NO3, PO4, Si(OH4)2, NH4	Colorimteric spectroscopy	Autoanalyzer	D	D,R	Ducklow	Knap et al. 1994
POC, PN	Gas chromatogra-phy	CHN Analyzer	D	D,R	Ducklow	Knap et al. 1994
Diss. Inorg. Carbon		Coulometry	D	D,R	Ducklow	Knap et al. 1994
Diss. Org. Carbon	High-temperature oxidation and infrared detection	Shimadzu TOC Analyzer	D	Ns,R	Ducklow	Knap et al. 1994
Dissolved Oxygen	Potentiometric titration	Langdon Titrator	D	D, R	Ducklow	Knap et al. 1994
pCO2	Equilibration & infrared detection		U,V	D	Sweeney	Knap et al. 1994
Alkalinity	Titration	Metrohm titrator	D	D,R	Ducklow	Knap et al. 1994
Sedimentation / export	McLane sediment trap Total mass Partic C,N,P	POC, PN, PP, DW	D	D, R	Ducklow	Knap et al. 1994

Pigments					**Schofield**	
Chlorophyll	Fluorometry		D,U,S			Holm-Hansen et al. 1965
Accessory pigments	HPLC		D			Kozlowski *et al.*, 1995
Primary Production					**Schofield**	
Light	Profiling Hyperspectral Ed, Lu	Satlantic Hyper-Pro	P,U,M,G		Schofield	Chang & Dickey 2004
In situ Apparent Optical Properties	Profiled absorption. Attenuation, backscatter	Wetlabs	P		Schofield	Schofield et al 2004 Boss et al 2007
Hyperspectral Absorption	Flow-through Breve-Buster	Spectrometer	U		Schofield	Kirkpatrick et al. 2003
NPP	$^{14}CO2$ Deck incubation	Liquid Scintillation	D	Ns	Schofield	Smith et al. 1988
New Production	$^{15}NO3$ Deck incubation	Mass spectroscopy	D	ns	Ducklow	Knap et al. 1994

Photosynthetic competence	Fast repetition-rate fluorometry	Satlantic FiRE	C,P		Schofield	Gorbunov et al. 1999
Zooplankton					**Steinberg**	
Krill adult abundance	2M Trawl (oblique)	2M Trawl (700 µm mesh)	C	ns	Steinberg	Quetin and Ross, 2003; Ross et al., 2008
Krill larval abundance	1M and 2M Trawl (oblique)	1M and 2M Trawl (335µm & 700 µm mesh, respectively)	C	ns	Steinberg	Quetin and Ross, 2003
Krill demographics	Length frequency Reproductive status Stage composition	1M and 2M Trawl	D	ns	Steinberg	Quetin and Ross, 2003
Other (than krill) macrozooplankton abundance	2M Trawl (oblique)	2M Trawl	C	ns	Steinberg	Ross et al., 2008
Mesozooplankton abundance	1M Trawl (oblique)	1M trawl	C	ns	Steinberg	Ross et al., 2008
Depth-stratified	1 M	1 M MOCNESS	C	ns	Steinberg	Wiebe et al. 1985;

zooplankton abundance	MOCNESS					Steinberg et al., in press a
Zooplankton chemical composition	Wet/dry weight, POC,PON analysis Lipid analysis	balance CHN analyzer Gas chromatograph	D D	D,R D,R	Steinberg	Madin et al., 2001 Hagan et al., 2001
Macro- and mesozooplankton grazing	Gut fluorescence	Turner designs fluorometer	D	D,R	Steinberg	Mackas and Bohrer, 1976; Pakhomov and Froneman, 2004
Microzooplankton grazing	Dilution technique	Turner designs fluorometer, HPLC	D	D,R	Steinberg	Landry and Hassett, 1982; Landry et al., 2002
Zooplankton fecal pellet flux	McLane sediment trap Preserved trap samples	Microscopy	D	Ns, R	Steinberg	Wilson et al., in press
Sediment trap swimmers	McLane sediment trap Preserved trap samples	Microscopy	D	Ns, R	Steinberg	Steinberg et al., 1998
Microbes			**D**		**Ducklow**	
Bacterial abundance	Preserved samples	Flow cytometer	D	D,R (Beads)	Ducklow	Knap et al. 1994

Bacterial production	3H-leucine, incubations	Liquid Scintillation	D,R	ns	Ducklow	Knap et al. 1994
Bacterial species composition	DNA samples	DGGE, LH-PCR, TRFLP	D	ns	Ducklow	Mosier et al. 2007 Mills et al. 2003
Community respiration	Light/dark bottle	Oxygen titrations	D	D,R	Ducklow	Knap et al. 1994
Notes:						
[1]Sampling Mode: U=continuous/underway; D=discrete samples; S=satellite; V=Vessel sensors; P=continuous/profiling; T=moored sediment trap; M=moored sensors; G=glider sensors. [2]D=known calibration standards analyzed with each batch of samples as defined in Protocol. ns=no authentic standard for calibration and QC; R= replication to assure precision. [3]Raytheon Polar Services is the current Antarctic Program logistics subcontractor (see Project Management). The subcontractor may change in 2010. [3]Knap et al. (1994) is the Joint Global Ocean Flux Study (JGOFS) Protocols, available at http://usjgofs.whoi.edu/protocols_rpt_19.html						

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