Field Measurements – CCE LTER

Variables measured in CCE/CalCOFI. Measurements added to CalCOFI by CCE are shown in RED font. Biological stock and rate measurements made only on CCE Process cruises are not listed.

Variable	CalCOFI Time-Series Core/CCE-Augmented	CCE Process Cruises
Physical Environment		
Temperature, salinity, pressure	CTD profile, continuous surface	Yes, plus MVP
Temperature, salinity	CTD discrete, salinometer	Yes
Irradiance, daily PAR	CTD & ship MET, PAR sensors	Yes
Light transmission	Transmissometer, 660 nm (CTD)	Yes
Bio-optics – spectral	No	Yes
Upper ocean currents	Hydrography, gliders, & ADCP	Yes
Biogeochemistry – Elemental Stocks & Rates		
Dissolved oxygen, profile	Oxygen sensor, CTD	Yes
Dissolved oxygen, discrete	Microwinkler	No
Sea-surface pCO_2, underway	IR absorbance (MBARI, PMEL)	No
Sea-surface pH, underway	Electrode (Martz)	No
Total CO_2, discrete	Coulometry	No
Alkalinity, discrete	Gran titration	No
pH, discrete samples	Calculated	No
Nitrate, nitrite, phosphate, silicic acid	Autoanalyzer	Yes
Nitrate, continuous	ISUS sensor, CTD (Goericke)	No
Ammonium	Autoanalyzer	Yes
Dissolved iron	No	FeLume flow injection
Dissolved organics (DOC, DON)	High-temp oxidation (Aluwihare)	Yes
Suspended particulate C, N	Dry combustion (Aluwihare)	Yes
Suspended particulate P	No	No
Particulate biogenic Si	No	Colorometric
Primary production (particulate C)	^{14}C uptake – deck	*In situ*
Primary production (DOC)	^{14}C uptake – deck (Goericke)	*In situ*
Bacterial production	No	Yes
Export – particulate C, N, mass	No	Sediment trap, ^{234}Th
Export – particulate P	No	No
Export – particulate biogenic Si	No	Sediment trap
Mesozooplankton C, N, mass	Displacement volume	Size-fract C, N, DW
Biology - Population & Community Measurements		
Chlorophyll *a*	Fluorometer (CTD profiles, discrete)	Yes
Taxon-specific phyto-pigments	HPLC (Goericke)	Yes
Heterotrophic bacteria	Flow cytometry (Landry)	Yes
Pico-phytoplankton	Flow cytometry (Landry)	Yes
Nano- and microplankton	Epifluor-microscopy (Landry)	Yes
Mesozooplankton, sentinel species	Microscopy (Ohman)	Yes
Mesozooplankton, size composition	ZooScan (Ohman)	Yes
Mesozooplankton, size distributions	Laser OPC (Checkley)	Yes
Fish egg distributions	Nets and underway pumping	No
Ichthyoplankton (~400 species)	Microscopy	No
Krill & small pelagic fish	Acoustical survey (SWFSC, Koslow)	No
Seabird abundance, distribution	Visual survey (Sydeman)	No
Marine mammal census	Visual & acoustic survey (Hildebrand)	