

Methods and References – CCE LTER

Methods and References: Summary of methods used by CCE programs on CCE-augmented CalCOFI cruises. Methods used on the CCE Process Cruises are included in the methods reference list.

Variable	Method	Reference
CalCOFI Measurements (for detailed information: www.calcofi.org and www.swfsc.noaa.gov)		
Hydrographic properties, continuous	Seabird 911 plus sensors & 24 place 10L rosette	www.seabird.com
Salinity, bottle	Guildline model 8410 Portasal conductivity	UNESCO 1981
Dissolved oxygen, discrete	Automated modified-Winkler titration	Culbertson 1991
Nitrate, nitrite, phosphate, silicic acid	Autoanalyzer operated by SIO-ODF	Gordon et al. 1993
Chlorophyll <i>a</i>	Fluormetric analysis of acetone extracts	Strickland & Parsons 1972
Primary production	Noon to dusk on-deck ¹⁴ C uptake experiments	Steeman-Nielsen 1952
Mesozooplankton volume	Displacement volume of bongo tow sample	McGowan & Brown 1966; Ohman & Smith 1995
Fish egg distributions	Nets and underway pumping	Kramer et al. 1972; Checkley et. al. 2000
Ichthyoplankton (~400 species)	Microscopic analysis of bongo tow samples	Watson et al. 1988
CCE Measurements (for detailed information: www.cce.lternet.edu/data/methods)		
Nitrate, continuous	ISUS sensor, CTD-mounted	Johnson and Coletti 2002
Ammonium	Autoanalyzer operated by SIO-ODF	Gordon et al. 1993
Dissolved organic C & Total N	High temp oxidation (Shimadzu TOC-V)	Aluwihare et al. 2002
Particulate organic C, N	High temp combustion (Perkin Elmer 2400 EA)	Sharp 1974
Primary production (DOC)	¹⁴ C uptake – deck – activity in GF/F filtered SW	Mague et al. 1980
Taxon-specific phyto-pigments	Acetone extraction & HPLC analysis	Goericke & Repeta 1993
Heterotrophic bacteria	Stained samples on Altra flow cytometer	Monger & Landry 1993
Pico-phytoplankton	Stained samples on Altra flow cytometer	Monger & Landry 1993
Nano- and microplankton	Automated epifluoresence microscopy-image analysis	Taylor et. al. in prep.
Mesozooplankton, sentinel species	Microscope analysis of bongo-tow samples	Lavaniegos & Ohman 2007
Mesozooplankton, size composition	ZooScan analysis of vertical net samples	Gorsky et al. 2010
Mesozooplankton, size distribution	Laser OPC mounted in a bongo frame (0 to 210 m)	Herman et al. 2005
Krill & small pelagic fish	Multi-frequency acoustic survey (EK-60)	Demer et al. 1999
Mesopelagic fish	Oozeki fish trawl	Oozeki et al. 2004
Seabird abundance, distribution	Dawn to dusk visual survey	Tasker et al. 1984
Marine mammal census	Visual observers, acoustic buoys, towed hydrophone	Soldevilla et al. 2008