

Nearshore patterns of dissolved nitrogen availability

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Methods:

Monthly water samples were collected for nutrient analysis using GoFlow bottles at 1 m and 5 m depth, <50 m from the offshore edge of five kelp forests near Santa Barbara, CA, USA. Seawater for dissolved nitrogen concentration measurement was drained directly into acid-washed syringes, filtered through 0.2 μm polycarbonate membranes into plastic (HDPE) vials, and stored on ice in a dark cooler (up to 3 h). Upon return to the laboratory samples were stored at -20°C until analysis (90 d maximum).

Ammonium and combined nitrate+nitrite (NO_x) concentrations were determined analyzed by the UCSB Marine Science Institute's Analytical Laboratory using flow injection techniques (<http://msi.ucsb.edu/services/analytical-lab/seawater-nutrients-fia>). Total dissolved nitrogen (referred to here as dissolved fixed nitrogen or DFN) was determined by flow injection measurement of nitrate concentrations following persulfate digestion (Valderrama 1981). Urea concentrations were measured colorimetrically (Goeyens et al. 1998). Following reaction, samples and standards were placed in the dark at 21°C for 72 h and absorbance measured at $\lambda=520$ nm with a GENSYS 30 spectrophotometer (Thermo Scientific, MA, USA) equipped with a 10-cm path length quartz cuvette (Starna Cells Inc., CA, USA). All values for urea concentration are reported in terms of N, concentrations of the molecule are half as urea contains two N atoms.