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Title

Coastal Ocean Observing System Elements for the Southern California Bight and Santa Monica

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Final report for CEQI-supported project

"Coastal Ocean Observing System Elements for the Southern California Bight and Santa Monica Bay"

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CEQI funds supported a nearly two year-long deployment of a state-of-the art interdisciplinary mooring in Santa Monica Bay. This support was crucial in maintaining the mooring for such a long period and also enabled us to add new sensors to the system, in particular a CO₂ sensor that measures the partial pressure of CO₂ in seawater and overlying air.

1) Highlights of this research include: a) Detailed documentation of an extraordinary strong upwelling event in Santa Monica Bay in March 2002 that lead to the largest phytoplankton bloom recorded by satellite since 1997 (Gruber et al., in prep.). This bloom likely caused also a strong proliferation of the harmful algae "Pseudonitschia spp", which we link to extensive domoic acid poisoning of mammals observed in May of 2002. b) We have combined observations from this upwelling event with our 3-D coupled physical-biogeochemical models of the area, to fully describe and investigate the 3-dimensional evolution of the event (Capet et al., 2004; Frenzel et al. (in prep.)) c) We also discovered a surprisingly strong diurnal cycle in all physical and chemical properties, whose origin (solar, tides, winds) we are still investigating. Leinweber et al. (in prep) show, for example, that substantial errors would be made when estimating the net exchange of CO₂ between the ocean and atmosphere in this coastal region, if this diurnal cycle was neglected.

2) Funding from CEQI was very instrumental in helping to establish a role for us and UCLA in undertaking coastal observations. Gruber was recently awarded a grant from NSF over about \$620,000 to continue making time-series observations at the mooring site in Santa Monica Bay and to continue operating a continuous partial pressure of CO₂ analyzer on the mooring. The coastal center of the Institute of the Environment of UCLA, which both McWilliams and Gruber are members of, has become a member of the Southern California Coastal Ocean Observing System (SCCOOS) consortium, which has been awarded nearly 10 million dollars from NOAA to establish a pilot observing system in the Southern California Bight. A significant fraction of this support will be given to UCLA, in part to continue our mooring operations. SCCOOS is also in the final stage of negotiations with the California Coastal Conservancy to establish coastal radar observations and supporting observations in Southern California to describe, in near real time, the coastal circulation. A substantial portion of this support is also allocated to UCLA for making observations and supporting our modeling activities. Therefore, funding from CEQI was instrumental in demonstrating our ability to undertake long-term coastal observations, which permitted us to build the basis for attracting substantial new funding.