

The ONMS-PISCO Oceanographic Mooring Array is being applied in several key ways:

Informing the interpretation of ecological monitoring of marine protected areas (MPAs).

As described in the Carr et al. (2010) publication, “Knowledge through partnerships: Integrating marine protected area monitoring and ocean observing systems,” we are using the data generated from the ONMS-PISCO Oceanographic Mooring Array to compare oceanographic conditions inside and outside the Central Coast MLPA MPAs and interpret the ecological patterns identified by our MPA monitoring programs. These efforts constitute one of the first MPA monitoring studies to incorporate knowledge of relative oceanographic conditions both inside and outside the recently established MPAs, as well as across an entire MPA network. Recent funding awarded to PISCO for a two year continuation of this program emphasized the importance of maintaining a long-term oceanographic monitoring system for this very purpose.

Large-scale ocean-climate monitoring. The ONMS-PISCO Oceanographic Mooring Array is a critical component to larger-scale ocean-climate monitoring efforts (e.g., CeNCOOS) because it extends the reach of these observations to the nearshore environment and ecosystems. These data are critical for identifying the nearshore manifestation of climate change along our coasts and linking those changes to the ecological responses identified by the MPA monitoring program. This linkage is described more thoroughly in the Carr et al. manuscript mentioned above as well as in the MPA Monitoring booklet recently published by PISCO and the MBNMS Foundation: Carr, M.H., D. Malone, S. Lonhart and H. Selbie. 2010. Monitoring MPAs by SCUBA in waters off Central California.

Data Sharing and Access. The datasets for the oceanographic moorings are currently all up-to-date through Fall 2010. More recent datasets will be uploaded as they become available (there is generally a 3-5 month delay, due to mooring turnaround time). The PISCO-ONMS Oceanographic datasets are available online through several different sources:

1. NMSP West Coast Observations Data Access: <http://portal.ncddc.noaa.gov/wco/>
2. PISCO Data Access:
<http://osu.piscoweb.org/DataCatalogAccess/DataCatalogAccess.html>
The PISCO online data access webpage recently underwent a major redesign and overhaul to make finding and sorting through our extensive data catalogue easier.
3. Central and Northern California Ocean Observing System (CeNCOOS):
<http://www.cencoos.org/>
We are currently working with CeNCOOS to implement data sharing between the PISCO data server and the CeNCOOS online public data portal.

Peer-reviewed publications. The following published products utilize ONMS-PISCO Oceanographic Mooring Array data, either by including data directly, or by using the data to design mooring arrays:

- Woodson, C. B., et al. 2011. Observations of internal wave packets propagating along-shelf in northern Monterey Bay. *Geophysical Research Letters*. Vol 38, L01605, doi:10.1029/2010GL045453.
- Ryan JP, N Clinton, R Kudela, MA McManus, C Rusham, and CB Woodson. 2010. Recurrent patterns of surface slicks in a coastal upwelling shadow. *Journal of Geophysical Research - Oceans*. Vol 115, C12070, doi: 10.1029/2010JC0063.
- Carr MH, CB Woodson, OM Cheriton, D Malone, MA McManus, and PT Raimondi. 2010. Knowledge through partnerships: integrating marine protected area monitoring and ocean observing systems. *Frontiers in Ecology and the Environment*. doi: 10.1890/090096.
- Galindo HM, AS Pfeiffer-Herbert, MA McManus, Y Chao, F Chai, SR Palumbi. 2010. Seascape genetics along a steep cline: Using genetic patterns to test predictions of marine larval dispersal. *Molecular Ecology*. Vol 19(17): 3489-3835.
- Cheriton OM, MA McManus, JV Steinbeck, MT Stacey, JM Sullivan. 2010. Towed vehicle observations of across-shelf thin layer structure and a low-salinity intrusion in northern Monterey Bay, CA. *Continental Shelf Research Special Issue: The Ecology and Oceanography of Thin Plankton Layers*. Sullivan JM, MA McManus and PL Donaghay (Eds). Vol 30(1): 39-49.
- Ryan JP, MA McManus, JM Sullivan. 2010. Interacting physical, chemical and biological forcing of phytoplankton thin-layer variability in Monterey Bay, California. *Continental Shelf Research Special Issue: The Ecology and Oceanography of Thin Plankton Layers*. Sullivan JM, MA McManus and PL Donaghay (Eds). Vol 30(1): 7-16.
- Sullivan JM, MA McManus, OM Cheriton, KJ Benoit-Bird, L Goodman, Z Wang, JP Ryan, M Stacey, DV Holliday, C Greenlaw, MA Moline, M McFarland. 2010. Layered Organization in the Coastal Ocean: An introduction to thin layers and the LOCO project. *Continental Shelf Research Special Issue: The Ecology and Oceanography of Thin Plankton Layers*. Sullivan JM, MA McManus and PL Donaghay (Eds). Vol 30(1): 1-6.
- Cheriton OM, MA McManus, MT Stacey, JV Steinbeck, and JP Ryan. 2009. Physical and biological controls on the maintenance and dissipation of a thin phytoplankton layer. *Marine Ecology Progress Series*. Vol 378: 55-69.
- Steinbeck JV, MT Stacey, MA McManus, OM Cheriton and JP Ryan. 2009. Observations of turbulent mixing in a phytoplankton thin layer: Implications for formation,

maintenance, and breakdown. *Limnology and Oceanography*. Vol 54(4): 1353-1368.

- Woodson CB, L Washburn, JA Barth, DJ Hoover, AR Kirincich, MA McManus, JP Ryan, J Tyburczy. 2009. The northern Monterey Bay upwelling shadow front: Observations of a coastally- and surface-trapped buoyant plume. *Journal of Geophysical Research*. Vol 114, C12013, doi:10.1029/2009JC005623.
- McManus MA, RM Kudela, MV Silver, GF Steward, JM Sullivan and PL Donaghay. 2008. Cryptic blooms: Are thin layers the missing connection? *Estuaries and Coasts*. Vol 31: 396-401.
- Ryan JP, MA McManus, JD Paduan and FP Chavez. 2008. Phytoplankton thin layers within coastal upwelling system fronts. *Marine Ecology Progress Series*. Vol 354: 21-34.
- Barth JA, BA Menge, J Lubchenco, F Chan, JM Bane, AR Kirincich, MA McManus, KJ Nielson, SD Pierce and L Washburn. 2007. Delayed upwelling alters coastal ocean ecosystems in the northern California current. *Proceedings of the National Academy of Sciences*. Vol 104(10): 3719-3724.
- Pfeiffer-Herbert AS, MA McManus, P Raimondi, Y Chao, and F Chai. 2007. Dispersal of barnacle larvae along the central California coast: a modeling study. *Limnology and Oceanography*. Vol. 52: 1559-1569.
- Cheriton OM, MA McManus, DV Holliday, CF Greenlaw, PL Donaghay and T Cowles. 2007. Effects of mesoscale physical processes on thin zooplankton layers at four sites along the West Coast of the U.S. *Estuaries and Coasts*. Vol 30(4): 1-16.
- Woodson CB, DI Eerkes-Medrano, A Flores-Morales, M Foley, S Henkel, M Hessing-Lewis, D Jacinto, L Needles, M Nishizaki, J O'Leary, CE Ostrander, M Pespeni, K Schwager, JA Tyburczy, KA Weersing, A Kirincich, J Barth, M A McManus, and L Washburn. 2007. Diurnal upwelling driven by sea breezes in northern Monterey Bay: A local mechanism for larval delivery to the intertidal? *Continental Shelf Research*. Vol 27: 2289-2302.
- Storlazzi CD, MA McManus, JB Logan and BE McLaughlin. 2006. Cross-shore velocity shear, eddies and heterogeneity in water column properties over fringing coral reefs: West Maui, Hawaii. *Continental Shelf Research*. Vol 26(3): 401-421.
- Pfeiffer-Hoyt AS, and MA McManus. 2005. Modeling the effects of environmental variability on *Balanus glandula* larval development. *Journal of Plankton Research*. Vol 27: 1211-1228.
- Drake PT, MA McManus and CD Storlazzi. 2005. Local wind forcing of the Monterey Bay area inner shelf. *Continental Shelf Research*. Vol 25: 397-417.

McManus MA, OM Cheriton, PT Drake, DV Holliday, CD Storlazzi, PL Donaghay and CE Greenlaw. 2005. The effects of physical processes on the structure and transport of thin zooplankton layers in the coastal ocean. *Marine Ecology Progress Series*. Vol 301: 199-215.

Manuscripts submitted (not yet accepted or published):

Cheriton OM, MA McManus, EE McPhee-Shaw, J Sevadjian, and D Carroll. Submitted. Oceanographic conditions affecting Marine Protected Areas inside Carmel Bay, a small embayment on the Central California Coast. *Continental Shelf Research*.

Woodson CB, MA McManus, J Tyburczy, JA Barth, L Washburn, PT Raimondi, BA Menge, and SR Palumbi. *Submitted*. Persistent fronts determine biological hotspots along the Eastern Pacific. *PNAS*.

Suanda SH, JA Barth, and CB Woodson. *Submitted*. Diurnal Heat Balance for the northern Monterey Bay Inner Shelf. *Journal of Geophysical Research – Oceans*.