

**Dynamics of Marine Ecosystems:
Biological-Physical Interactions in the Oceans (OCN 480/680)
Spring 2012**

Instructor:

Dr. Margaret Anne McManus
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Class Time:

Tuesday and Thursday from 12:00 -1:15 pm

Office Hours:

Tuesday and Thursday from 1:15 - 3:15 pm

Class Location:

MSB 307

Readings:

Dynamics of Marine Ecosystems: Biological-Physical Interactions in the Oceans. Mann KH and Lazier JRN. Blackwell Scientific Publications. (2nd or 3rd edition)

Journal Articles

Midterm Exam: February 21, 2010

In Class Presentations/Papers Due: April 24, April 26, 2010

Final Exam: May 1, 2010

Homework:

Please pay attention to the syllabus.

- (1) If we are going to have a lecture on a chapter, read the chapter before class.
- (2) If we are going to have a lecture on a journal article, read the journal article before class.
- (3) If you are going to present a journal article, please come to class prepared.

Class Schedule:

Date	Activity	Ch	Topic
Jan 10	Lecture	1	Introductions Overview of syllabus & project Reading assignments (undergrad = 1, graduate = 2) Chapter 1
Jan 12	Lecture	2	Chapter 2: Biology and Boundary Layers I Phytoplankton
Jan 17	Journal Article		Berdalet, E. and Estrada, M.: Effects of small-scale turbulence on the physiological functioning of marine algae, in: Algal Cultures, Analogues of Blooms and Applications, edited by: Subba Rao, D. V., Enfield, NH, USA, Science Publishers, Inc., 2005

Jan 19	Lecture & Journal Article	2	Chapter 2: Biology and Boundary Layers II Zooplankton Woodson CB, DR Webster, MJ Weissburg and J. Yen. 2005. Response of copepods to physical gradients associated with structure in the ocean. <i>Limnol. Oceanogr.</i> 50(5) 1552-1564.
Jan 24	Journal Articles		Huntley and Zhou. 2004. Influence of animals on turbulence in the sea. Vol. 273: 65–79, 2004 Kunze, E et al. Observations of biologically generated turbulence in a coastal inlet.
Jan 26	Lecture	3	Chapter 3: Vertical Structure of the Open Ocean: Biology of the Mixed Layer Cullen JJ and RW Eppley. 1981. Chlorophyll maximum layers of the Southern California Bight and possible mechanisms of their formation and maintenance. <i>Oceanologica Acta.</i> Vol 4(1) 23-32.
Jan 31	Journal Articles & Exercise		Sverdrup HU. 1953. On Conditions for the Vernal Blooming of Phytoplankton. <i>J. Cons. Perm. Int. Exp. Mer.</i> 18: 287-295. Behrenfeld, MJ.2010. Abandoning Sverdrup’s Critical Depth Hypothesis on phytoplankton blooms. <i>Ecology</i> , 91(4), 2010, pp. 977–989
Feb 2	Lecture	4	Chapter 4: Vertical Structure in Coastal Waters: Freshwater Run-off and Tidal Mixing
Feb 7	Journal Articles		Deksheniaks MM, PL Donaghay, JM Sullivan, JEB Rines, TR Osborn and MS Twardowski. 2001. Temporal and spatial occurrence of thin phytoplankton layers in relation to physical processes. <i>Marine Ecology Progress Series.</i> 223: 61-71 Sevadjian JC, MA McManus, G Pawlak. 2010. Effects of physical structure and processes on thin zooplankton layers in Mamala Bay, Hawaii. <i>Marine Ecology Progress Series.</i> 409:95-106.
Feb 9	Lecture	5	Chapter 5: Vertical Structure in Coastal Waters: Coastal Upwelling Regions
Feb 14	Journal Article		Graham WM and JL Largier. 2007. Upwelling shadows as nearshore retention sites: the example of northern Monterey Bay. <i>Continental Shelf Research.</i> Vol 17(5) 509-532.
Feb16	Lecture & Midterm Exam		Understanding the effects of a variable climate on planktonic populations

	Review		Midterm Exam review
Feb 21	MIDTERM		
Feb 28	Lecture	6	Chapter 6: Fronts in Coastal Waters Owen, R. W. (1981) Fronts and eddies in the sea: mechanisms, interactions and biological effects. In <i>The Analysis of Marine Ecosystems</i> (ed. A. R. Longhurst), pp 233. Academic press, London. 197-212
March 1	Journal Article		Pingree RD, PR Pugh, PM Holligan and GR Forster. 1975. Summer phytoplankton blooms and red tides along tidal fronts in the approaches to the English Channel. <i>Nature</i> Vol 258: 672-677.
Mar 6	Lecture	7	Chapter 7: Tides, Tidal Mixing and Internal Waves
Mar 8	Journal Article		Pineda J. 1999. Circulation and larval distribution in internal tidal bore warm fronts. <i>Limnology and Oceanogr.</i> 44(6): 1400-1414.
Mar 13	Journal Article		Sevadjian, J.S., M.A. McManus, K.J. Benoit-Bird, and K. Selph. submitted. Planktonic responses to episodic near-bottom water pulses in tropical waters. <i>Continental Shelf Research</i>
Mar 15	Lecture	8	Chapter 8: Ocean Basin Circulation: The Biology of Major Currents, Gyres, Rings and Eddies
Mar 20	Lecture		Owen, R. W. (1981) Fronts and eddies in the sea: mechanisms, interactions and biological effects. In <i>The Analysis of Marine Ecosystems</i> (ed. A. R. Longhurst), pp 233. Academic press, London. 212-228 Doty MS and M Oguri. 1956. The Island Mass Effect. <i>J. Cons. Int. Expl. Mer.</i> 22:33-37
Mar 22	Lecture		Eddy studies & Optics in Oceanography
Mar 27			Spring Break
Mar 29			Spring Break
Apr 3	Journal Article		Bidigare, Benitez-Nelson, Leonard, Quay, Parsons, Foley, Seki. 2003. Influence of a cyclonic eddy on microheterotroph biomass and carbon export in the lee of Hawaii. <i>GRL</i> , Vol 30(6) 1318.

			Seki MP, R Lumpkin, P Flament. 2002. Hawaii cyclonic eddies and blue marlin catches: The case study of the 1995 Hawaiian International Billfish Tournament. <i>Journal of Oceanography</i> . Vol 58. 739-745.
Apr 5	Lecture	9	Chapter 9: Variability in Ocean circulation: Its Biological Consequences
Apr 10	Journal Articles		Woodson CB and MA McManus. 2007. Foraging Behavior can Influence Dispersal of Marine Organisms. <i>Limnology and Oceanography</i> . 56(2): 2701-2709. Woodson CB, MA McManus, J Tyburczy, JA Barth, L Washburn, PT Raimondi, BA Menge, and SR Palumbi. in press. Persistent fronts determine biological hotspots along the Eastern Pacific. <i>Limnol. Oceanogr.</i>
Apr 12	Lecture & Acid Test Movie	10	The Oceans and Global Climate Change: Physical and Biological Aspect
Apr 17	Lecture		Recent changes at the bottom and top of the North Pacific subtropical ecosystem
Apr 19	Lecture & Exercise	11	Fisheries exercise. The social component. Questions for the future
Apr 24	Presentations		
Apr 26	Presentations		
May 1	Exam		Final Exam