Cruise Plan for R/V New Horizon Cruise of 8-25 July 2010

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Scientific Party:

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George Jackson (co-PI; Professor, TAMU)
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Jessica Forrest-Baldini (SRA, SIO, UCSD – with DC)
Steve Rabalais (SRA, LUMCON – with MD)
Rebecca Asch (GSR, SIO, UCSD – with DC)
William Jones (GSR, SIO, UCSD – with DC)
Matt Huelsenbeck (part-time SRA, SIO, UCSD – with DC)
Chelsea Didinger (paid REU UCSD undergrad student with DC)
Carl Wepking (WSU graduate student of Steve Bollens – with DC and MD)
Keith Shadle (Resident Marine Technician)
Robert Palomares (Electronics Technician)

Objective:

To investigate zooplankton as 'gatekeepers' of the vertical flux of particles out of the euphotic zone.

Location:

Monterey Bay, tentatively near MBARI buoy M1 (36.747°N,122.022°W; http://www.mbari.org/bog/roadmap/major_stations.htm)

General methods:

Deploy one, and at times two, SOLOPCs (autonomous, profiling floats that sense particles and plankton in the upper 100 m, http://checkley.ucsd.edu/documents/solopc_specs_12oct06.pdf) and sample nearby these using a CTD, with rosette of Niskin bottles and attached Underwater Video Profiler (UVP), bongo net with LOPC, and MOCNESS (1 m^2). Underway data will be acquired, including the ADCP and Simrad EK-60 scientific acoustic sounder.

Challenges:

1 – The two pervious SOLOPCs were lost during deployment from the R/V Knorr in the N Atlantic in spring 2008. Two new SOLOPCs have been made, at a total cost of ~ $180K. Deployment and recovery of these relatively fragile floats remains difficult. It will be essential that understanding and coordination exist between myself, other scientists, and, particularly, the ships crew and captain. Primary concerns are to keep the SOLOPCs away from the hull during both deployment and recovery and to ensure smooth release and recovery of the floats under all sea conditions. Deployment and recovery plans will be provided for review and discussion.

2 – The SOLOPCs will drift into waters with bottom depths too shallow for their operation. We will continually monitor their location (preferably by internet, if necessary by satellite phone). We will abort a mission when they encounter water shallower than their full dive depth (to be decided on station). We will then launch a new SOLOPC upstream of M1 and recover the aborted SOLOPC. This will take significant time, including for transit, recovery, and deployment. The currents will determine the float trajectory. Thus, the schedule below must be adaptive.

Activity Modules:

Sampling will occur largely in regard to SOLOPC location and drift. It may be convenient to classify activities into modules, as below. Times are approximate.

AM1 – Survey (bowtie with underway measurements, bongo-LOPC)

6-12h Starting at M1, steam a bowtie course, with periodic stations for bongo-LOPC casts (e.g., at outer points of bowtie); underway CTD, fluorometer, ADCP, and EK-60, combined with bongo-LOPC (w/ miniCTD), will provide context for later interpretation of data, and perhaps for planning

AM2 – SOLOPC recovery and redeployment

6h Deploy one SOLOPC 'upstream' of M1 and retrieve second SOLOPC (reverse order if necessary).

AM3 – Routine sampling (CTD, MOCNESS, surface net tow, bongo-LOPC) near SOLOPC

18h 1 – CTD with UVP and rosette to 200m or shallower; water analyzed for nutrients (frozen), chl a (extraction and fluorescence), POM (frozen), and microzooplankton (Lugols).
2 – MOCNESS (1 m^2 with ten 200 μm-mesh Nitex nets); surface to ~ 100m
3 – 0.75-m diameter surface plankton net tow to collect live zooplankton
4 – (optional) bongo-LOPC cast to ~ 100m

AM4 – Sampling for ammonium measurements using OPA (high-sensitivity method)

3h CTD to ~ 100m with bottles tripped to sample at fine scale in region of zooplankon

AM5 – CTD sampling for fecal pellet estimation

3h CTD to ~ 100m with bottles tripped to collect water for fecal pellet analysis; may be able to combine with AM4

AM6 – Intensive 24-h sampling

24h To be determined – likely every 3h CTD and possibly nets (MOCNESS and/or bongo-LOPC)

AM7 – Coordination with Zephyr

Ken Smith of MBARI plans to deploy two floating sediment traps on 21-22 July; details remain to be decided, but the traps will be deployed from MBARI's vessel Zephyr on 21 July and retrieved on 22 July.

Schedule (preliminary and adaptive):

July 6-7 (Tue-Wed)	Load
July 8 (Thurs)	
0800	Depart Nimitz Marine Facility for location in SB Bay
0900	At anchor in SD Bay, most likely near Shelter Island, to calibrate Simrad EK60; metal sphere to be hung a various places beneath transducers; may also wish to test CTD with UVP
1400	(time approximate) Depart SD Bay station for Monterey Bay
July 9 (Fri)	Transit
July 10 (Sat)	
1400	(time approximate) ETA Monterey Bay M1
	AM1 – regional survey
July 11 (Sun)	
0600	AM2 – deploy SOLOPC
0900	AM3 – routine sampling
July 12 (Mon)	
0300	finish AM3
0600	AM4 – CTD for ammonium
0900	AM5 – CTD for fecal pellets
1500	AM6 – Intensive sampling
July 13 (Tues)	finish AM6
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TBD	AM2 – deploy and retrieve SOLOPCs
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July 19 (Mon) (tentative)	Transfer scientist(s) to Moss Landing or Monterey Harbor
July 20 (Tues)	Rendezvous with Zephyr near M1
July 21 (Wed)	Rendezvous with Zephyr near M1
July 22 (Thurs) (tentative)	Pick up scientist(s) from Moss Landing or Monterey Harbor
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July 23 (Fri)	
1800	Depart Monterey Bay for San Diego
July 24 (Sat)	Transit
July 25 (Sun)	
1700	ETA Nimitz Marine Facility
July 26 (Mon)	Unload