

AGENDA

VERTIGO Workshop October 1-4, 2006

J. Erik Jonsson Woods Hole Center of the National Academy of Sciences, 314 Quissett Avenue, Woods Hole, and the last morning in room 509 in the Clark Building on Woods Hole Oceanographic Institution Quissett Campus

VERTIGO primary goal is to understand-

What controls transport on sinking particles between surface and deep ocean?

Two hypotheses flux and attenuation is controlled by -

1. processes related to surface community structure
2. processes in the mesopelagic

How well have can we answer our primary goal?

Key questions/processes/issues to discuss include-

(not in any order)

1. what can we say about relative rates of sinking vs. C consumption, which ultimately must impact remineralization length scale differences at ALOHA vs. K2?
2. What do we know about surface community structure, and how does this impact both e-ratio and attenuation length scales?
3. What is role of ballast? & differences CaCO₃ vs. bSi? in controlling what reaches deep ocean on sinking particles? and can we indirectly or directly constrain sinking rates (fn ballast? temp?)
4. K2 appears to be the tail end of a diatom bloom- is this true? Evidence for spatial vs. temporal variability? Ecosystem w/large diatoms shallow & picoplankton below- why? What limits production?
5. what can we say about C demand in the mesopelagic? If we decrease flux, what is response time/scale of heterotrophs? i.e. how tightly would we expect surface, mesopelagic and deep ocean fluxes? What can we say about mesopelagic bacterial community- attached/free living?
6. what role does lateral transport at K2 play for trace metal flux? Other components? Is dust or biogenic material the major carrier for trace metal (Fe and others) flux? And what are the attenuation length scales for TM vs. POC and macronutrients?
7. How can we parameterize differences in flux attenuation at both sites in model(s)? how does differences in attenuation length scales impact deep sea concentrations and upwelling of macro and micro nutrients, and hence productivity?
8. are fecal pellets primary vector for sinking particle/material? And what is various extent of local detrital, carnivory at depth vs. migratory feeding/processing by zooplankton? Evidence for repackaging by zooplankton at depth? And how do we assess role of zooplankton ontogenetic migration/life cycle stages on C flux attenuation
9. how do we reconcile constancy of elemental ratios of trap material (e.g. C:N) with idea of preferential remineralization of N and/or P, vs. multi component flux model each with different elemental ratios and attenuation length scales?
10. how well do we know the rates of particle formation, recycling and net export? i.e. residence times and what this can tell us?
11. how well have our new tools performed/enabled us to understand key processes in the twilight zone? NBSTs? SVT? O₂ respirometers? IRS/O₂ experiments? Optical sediment trap?
12. & more?

AGENDA-

Sunday Oct. 1, 2006

9:15 a.m. Pick up at Nautilus Motor Inn shuttle bus to meeting

9:30 Buffet Breakfast at NAS

10:00-11:30

Welcome/introductions/logistics

Review VERTIGO GOALS-

What controls transport on sinking particles between surface and deep ocean?

1. processes related to surface community structure

2. processes in mesopelagic

What we have learned

Presentations- 2 Nature papers- what we know/don't now regarding-

Fluxes of C between sites & vs. depth- Buesseler

Heterotrophic processes in the mesopelagic- Steinberg

11:30-12: break

12-1

Processes in the surface layer-

a. who/what's there

Nutrients/CTD site reviews/shallow particle source funnels- Buesseler

Surface phytoplankton communities- microscope studies- Silver

Surface phyto communities- HPLC- Bidigare

Picoplankton- Jiao/George

1-2 Lunch

2- 3:30

Processes in the surface layer-

b. Rates

Primary and new production & size fractionated- Elskens (slides from Boyd)

Bacterial production in upper 150m- van Mooy

Zoo in upper 150m- Steinberg

Export production- Th based- Buesseler

Nutrient drawdown ratios/budgets- Lamborg/Buesseler

3:30-4 break

4-5

Wrap up- What we know about processes in surface/upper layers

5:30 shuttle bus back to hotel

Monday Oct. 2, 2006

8:15 a.m. Pick up at Nautilus Motor Inn

8:30 Buffet Breakfast at NAS

Processes in the mesopelagic

9-10:30

a. Sinking & suspended particles- what's there, characteristics, etc.

Gels/SVT- Trull

Suspended material/optical trap- Bishop

Sinking rates- theoretical approaches- Lam

Lateral sources of suspended TM- Lam/Lamborg

10:30-11:00 break

b. Heterotrophic processing in mesopelagic

Zooplankton- Steinberg

Zooplankton life stages- Kobari

Zooplankton fecal pellets- Wilson

Bacteria rates- Van Mooy

Microbial community composition- Casciotti

12:20-1:30 lunch

1:30-3:00

c. rates of remineralization

Ba studies- Dehairs

²³⁴Th excess signals- Buesseler

Flux ratios/remineralization length scales- Lamborg/Buesseler

Incubations- Lamborg

IRS/O₂ sensors, O₂ respiration, ETS- Boyd (Buesseler to present?)

N isotopes- Casciotti

3:00 – 3:30 break

3:30 – 5:00

Wrap up- what we know about mesopelagic processes

5:30 bus to hotel

Tuesday Oct. 3, 2006

8:15 a.m. Pick up at Nautilus Motor Inn

8:30 Buffet Breakfast at NAS

9:00 – 10:30

Data management beyond VERTIGO- Chandler

What gets to the bottom?

Particle source funnels- deep traps- Siegel (Ken to review)

K2- Honda

ALOHA- Karl (Buesseler to present 2004 record)

10:30-11:00 break

11:00 – 12:30

Models

VERTIGO- “particles take the bus” open discussion/conceptual model

Q-10/temp- Lamborg

3 component- Buesseler

Sinking rates- Trull

Others?

12:30 – 1:30 lunch

1:30 – 3:00

DSRII & other papers

Revisiting/finalize Buesseler et al. & Steinberg et al. Nature submittals

Data to be added/coming in future

3:00 – 3:30 break

3:30 – 5:00

Break-out groups- tbd

Dinner at National Academy of Sciences- New England Clam bake!

(There will be a shuttle to/from hotel between meeting and dinner.)

5:30-6:30 beer/wine

6:30- start of dinner service

9:00 return to hotel

Wednesday, Oct. 4, 2006

MOVE workshop TO WHOI Clark-509 (via WHOI shuttle from Woods Hole)

The WHOI shuttle leaves every 20 minutes starting at 8 am from Dyers Dock parking lot which is right next to the Coffee Obsession in Woods Hole. The stop is a 5 minute walk from the Nautilus. Take a right after coming down the Nautilus driveway and walk straight down into Woods Hole, passing the Bank, Pie in the Sky and Post Office on your left. You will see Coffee Obsession on the left on the next corner. The shuttle stops in the parking lot right next to the Coffee Obsession. It will take you to Clark where the shuttle leaves to go back to Woods Hole every 20 minutes, 11:50 a.m., 12:10 p.m., 12:50 p.m., etc. The shuttle driver will drop you off at the Nautilus driveway if you ask him.

8:30-9:00 Continental Breakfast

9:00 – 12:00

How well have we answered primary VERTIGO questions-

What controls transport on sinking particles between surface and deep ocean?

1. processes related to surface community structure
2. processes in mesopelagic

Remaining questions

Future studies/plans

Wrap up

End- approx. 12-1pm. Lunch on your own.
