

**BSIERP SAB – Modeling conference call
November 3, 2009**

Attendants: Kerim Aydin, Al Hermann, Ivonne Ortiz, Georgina Gibson, Jim Ianelli, Andre Punt, Kate Hedstrom, Will Satterthwaite, Francis Wiese, Bill Wiseman, Mike Sigler, Mike Lomas, Phyllis Stabeno, Jeff Napp. Rapporteur: Ivonne Ortiz

Agenda:

1. Additions to agenda?
2. Set-up for SAB-modeler interaction (Wiese and Sigler):
Calls will be every first Tues of the month 9-10am AK time (next dates are Dec 1, Jan 5, Feb 5, Mar 2).
Calls will be agenda driven, with items being lead by modeler seeking input. Agenda items should be submitted to Francis by the Friday preceding the call. Modelers will send necessary documents for discussion to Francis for distribution ahead of time
3. Patch-dynamics model needs data on density of various prey species across space (Will Satterthwaite).
The behavioral foraging model rests upon calculations of encounter rates between upper trophic level predators and various species of prey, with these encounter rates varying across space. It seems like the best data source to use in the long term will be Kelly Benoit-Bird and Scott Heppell's work combining acoustic surveys (overall biomass of fish and krill) with trawls (species composition of this biomass). However, whereas work has begun with some of the acoustic data, the species composition data are not yet available.
I am looking for suggestions of the best data source to use in the near term to provide some reasonable species composition to overlay onto the densities from the acoustic surveys. Ideally this data would be seasonally appropriate (i.e., July-August, although extending into October for fur seals) and reflect the range depths that the species being modeled forage at (kittiwakes near-surface, murre and fur seals foraging at a range of depths from near-surface potentially down to ~200m maximal depth).
4. Georgina is looking for feedback on the daily primary and secondary production output from her model (see attached figure)
5. Al sent figures mooring data compared to NEP5 model estimates for location M2 for 1) temperature profile of water column through the year and climatological currents (shallow, 12m; deep, 60m).

To do list (see discussion for details)

- Mike Sigler will call Will to continue discussion on data for behavioral model
- Kerim & Ivonne will send Will seabird diet data
- Someone (Jeff/Mike L/Francis?) Check with Ed feasibility of measuring small and large phytoplankton this spring.
- Jeff: Coyle and Pinchuk paper; Smith and Vidal reference, for Georgina
- Phyllis will provide M4 data for Al by end of week
- Georgina will prepare production series for M4
- Al will try new freshwater file
- Kate? Will try new bathymetry algorithm which might solve excess flow at Unimak Pass
- Continue oceanography discussion offline
- next meeting December 1st

Detailed Discussion

Meeting started 9:05 AK time; 10:05 Seattle time.

Meeting proceeds with agenda items in order submitted. SAB – modelers conference calls will not be recorded by default unless requested in advance.

1) Additions to agenda

Figures sent by Al (see item 5).

2) Set up of SAB- modelers interaction

Mike [Sigler]: These meetings are meant to continue biologists – modelers interaction to help models be realistic. Morning sessions [of October BSIERP meeting] were very productive and this is a continuation of this dialogue. SAB will join the conference call once a month to answer questions/issues sent in advance. Short questions 10-20 minutes will be addressed directly, more lengthy discussions will probably require a separate conference call with interested parties only. Francis: Calls will be driven by modelers who will bring up questions for discussion. Information/ questions should be sent previous Friday so information can be distributed to all attendants in advance.

Dates set for future meetings are as follows (from e-mail sent Nov 2):
December 1, January 5, February 5, March 2

3) Data needs for behavioral model (Will Satterthwaite)

My understanding of the acoustics data is that at the end of each transect there sampling with trawl nets. All fish are lumped together and would rather have some depth information on that. Species composition data was not available yet, but an hour ago I talked to Sandy? and there may be some data available. Would only be waiting on some energetic content information.

If Mike [Sigler] or someone else knows the status of that data, I'd appreciate it.

Mike: What is the resolution of the data that you want? Space and depth? Do you want plankton information?

Will: Zooplankton info would be useful too, spatial resolution similar to 10km scale, in depth ideally some surface data and then probably just a single deep layer would work for murre. I have reviewed groundfish data but that is only bottom sampling.

Mike: the Patch dynamics has 20nm N-S transects similar to Benoit data but coarser.

Francis: Are you planning on just modeling data around the Pribis or do you want to do that on a broader scale? Initial idea was someone would do broader scale and then compare to fine resolution studies like the patch dynamics.

Mike: Kelly and Scott data collection–oceanography, seabird, fur seals was fine scale resolution with close together transects, so lot of information around Bogoslof and Pribilof. At the broad scale NOAA surveys are conducted, albeit stations are 20nm apart and there is no sampling where birds are. So the data going into each scale are very different.

Will: We will end up using whatever data resolution is available and perhaps the more detailed data

Mike: I suggest you [Will] focus on Kelly Benoit's data and then on the focus area (100km circle).

Mike: Jeff, can you describe Jul-Aug what zoop data is available?

Jeff: Single tow at end of day on groundfish charter boats. Tows are oblique so no separation in depth. Acoustics takes some tows to characterize backscatter. BASIS starts in Aug. In July there are just a few scattered tows taken during the groundfish surveys.

Mike: how about Healy and other cruises?

Jeff: Those cruises sample the 70m isobath –starting June through July there would be depth stratified tows along 70m isobath. Mike [Lomas], what about data collected around the Pribilofs?

Mike Lomas: We will have some, but it is hard to predict which stations.

Mike Sigler: doesn't Kelly do some zooplankton sampling too?

Francis: They do, but they don't do species composition –unclear details of sampling as none of the seabird group was present to clarify. What are you trying to get at?

Mike: Copepods

Jeff/Mike L: Spring data is available they were trying to have something arranged for summer. Sampling uses mesh 505µm.

Forum: Will; your prey fields for birds and mammals –you want surface and then everything below shallow. Yes

Jeff: Will, are you doing auklets as well? No

What plankton feeders are you modeling? Not sure any, I'm modeling murrelets, kittiwakes and fur seals

Maybe euphausiids from acoustics is enough

Least and crested auklets are dedicated species feeding in zooplankton and do feed on copepods but I don't think the other do.

Francis: not really- they mostly eat euphausiids and forage fish. Kerim do you have any other info on seabirds diet?

Kerim: Ask Ivonne

Ivonne: Vern Byrd would be best to answer this, but euphausiids and forage fish are primary prey, not much other zooplankton.

Francis: Use that as first approximation, other species data won't be as good anyway. Also, I think it would be easier to write down specific questions addressed by model and at what resolution. That way it would be easier to identify the data suitable to address those questions.

Mike has to leave –will talk to Will and sort things out in more detail. Call today later or tomorrow, Thanks

Francis: Will does that sound like a good plan –the questions? Sounds like people have different ideas on what data is available.

Kerim & Ivonne will send Will diet data for birdies.

Special issue on Pribilof Islands might have some data as well.

4) Feedback on daily primary and secondary production (Georgina)

Georgina: See Figure 1 on primary and secondary production estimates through the year. I am trying to get the correct timing as well as the overall magnitude. Figure shows current carbon production. The problem: carbon production is not enough for the fish. The model is not really producing carbon at the beginning of year; prior to May there is no primary production and hence no secondary prod. Should there be some low level production all the time?

Mike Lomas: there should be some low level production–on your scale about 60mgC, not zero but low. Is that enough for fish? -couldn't tell you. That is water column algae. Ice algae are large diatoms.

Georgina: Why small algae in water column?

Mike L: They seem to be the only ones to do OK at these very low light levels, we don't have a lot of info –talk was given last year at a meeting.

Francis: George, the threshold in your model?

Georgina: I'll have to revisit the light limitation function and adjust it to get low growth without triggering a bloom.

Isn't Temperature restriction also? Yes –will have to balance light and temperature.

Mike Lomas: What are the loss terms?

Georgina: They have a natural mortality and respiration loss term and one for degrading.

Mike Lomas: So as long as growth rate is in balance with all those it should be OK because growth would be less than 0.1? per day. Still growing but relatively static.

Other studies just looking at large phytoplankton, not small. Can we look at that this spring? In principle. Should be able to count that but I don't think they are. Will talk to Ed? and see if that is feasible.

Phyllis: I suggest you move primary production comparison to M4

Georgina: In 1D NPZ version I only have blips of ice and for M4 we have satellite data (so not from model for M2).

Phyllis: BEST cruises don't spend much time at M2 while M4 is thicker ice and light conditions are very different.

Al: Can use same 1D setup just different forcing file.

Q for Mike: There is a really big spike on production and then dropdown and then up again. How does this look overall? Good representation?

Mike L: total production is reasonable. However on summer cruises where you have large phytoplankton going to zooplankton production they are still maybe 20-40% of total. Total production looks OK in magnitude and timing, have seen that initial spike. Whether it is that sharp or part of a bloom is hard to know –we are trying to get at that to get a better temporal resolution. Zero in summer should be increased to 20-40%. And small zooplankton would come up as well.

Jeff: I'm thinking of the SE [Bering] close to M2 –peak of fall –is that 1st of Aug? Yes. Phyllis, is that early?

Phyllis: I've seen it that early, 1999 was stormy and generally when it is stormy it is that early. Typically non stormy years start in September. There are little tiny blips all the time 3-4 meters with storms. Summer M2 looks pretty good.

Jeff: I was comparing your data to paper by Rowe & XX??? Seems model values are higher –have you looked at that?

Georgina: Not, more recently I was looking at data from Auke Bay which had good temporal resolution

Jeff: Paper has table of midshelf and that might be helpful for you.

Georgina: Jeff, any idea on secondary production?

Jeff: Hard to measure, I'll look in the literature. The only 2 papers to compare are the Coyle and Pinchuk for growth based on global model for copepod production; uses temperature and copepod size for 2004 and [2nd paper] Smith and Vidal older paper, just for copepods. I'll try to come up with the references and send them.

Georgina: Should there be low level production through the year?

Jeff: Yes, small species will be growing but slowly through year.

Georgina: So if I get phytoplankton right, then small zooplankton would increase

Jeff: For microzooplakton –there is a burst of activity in Spring but still going on over summer, I don't think you see that zero of activity,

Kerim: secondary production in figure?

Georgina: Pink line microzooplankton, Red Pseudocalanus. Low level production through year –preventing zooplankton growth.

Kerim: Feedback with fish is very important because bloom might be masked by fish consumption, as opposed to having a fixed quadratic mortality.

Kerim: Jeff gave a lot of information in terms of fish loss of weight, so production needed for fish would be lower over winter.

Francis: will come back to this. What you're trying to match, general patterns is important, and those are more relevant than values at certain location/time.

Jim Ianelli: what about the temperature?

Phyllis: M2 doesn't have enough ice. So M2 turns out much warmer and that's why I'm suggesting M4

Al: I'm eager to do that but it's harder to get the data:

Phyllis: I'll have it by Thurs-Fri.

Francis: Is that all Georgina? For now, yes thanks everybody?

5) Mooring data compared to NEP5 model estimates for location M2 (sent by Al Hermann, see Figures 2-4)

Al: Still problems at M2. Presented this at Girdwood. Stratification looks good, temperature is too warm. One possible culprit –short wave radiation, but when you look at shortwave from Phyllis' mooring data and the model, they are pretty much identical. Looking at climatological currents, velocity at M2 it does indeed seem to be too much northwards flow relative to what Phyllis observed. For these figures I was looking at NEP5 rather than Bering so I don't know whether Bering will look the same.

George: Q to Kate: I just think there are differences between setups? –yes open boundary conditions. So condition could be different.?

In NEP5 it is driven by model, boundary condition from SODA and whatever wind forcing is applied.

Francis: how do you test how different they are? And what is driving the process?

Al: I'm trying to construct a heat budget at M2, advection is the tricky one. It is hard to compute the gradients. Hopefully we'll make it more specific.

Francis: if you find this makes a huge difference in the heat budget what is the process to adjust it? Is it possible, or do we live with it?

Al: if warm temperatures are because of northward flow then we have to look at Bering Straight, if so and it is the likely source of warm temps. Phyllis: don't think it is Bering Straight –too far. I think it is Unimak Pass, too wide (resolution problem). Too much water through Unimak, maybe a bit too deep.

Kate: maybe.

Phyllis: Unimak is 79% wind controlled so too much wind will quickly cause a large flux, it is just a guess.

Al: another place to look then.

Kate: we can try another bathymetry set –a different algorithm and maybe more realistic

Phyllis: I noticed the freshwater flow...

Al: freshwater flow is an artifact –run off north of AI not realistic. Found another runoff file by Trember? Different for the other assemblages, 2 degree resolution and this one is 1 degree and seems to not have that resolution.

Mike Lomas and Andre leaving.

Francis: Suggestion to move simulation to M4, look at Unimak Pass for temp issues and freshwater file. Should keep bigger picture and not just M2, overall production not driven by these points but we

should focus on general patterns. If overall is correct then overall pattern is OK. We can forget about point estimates.

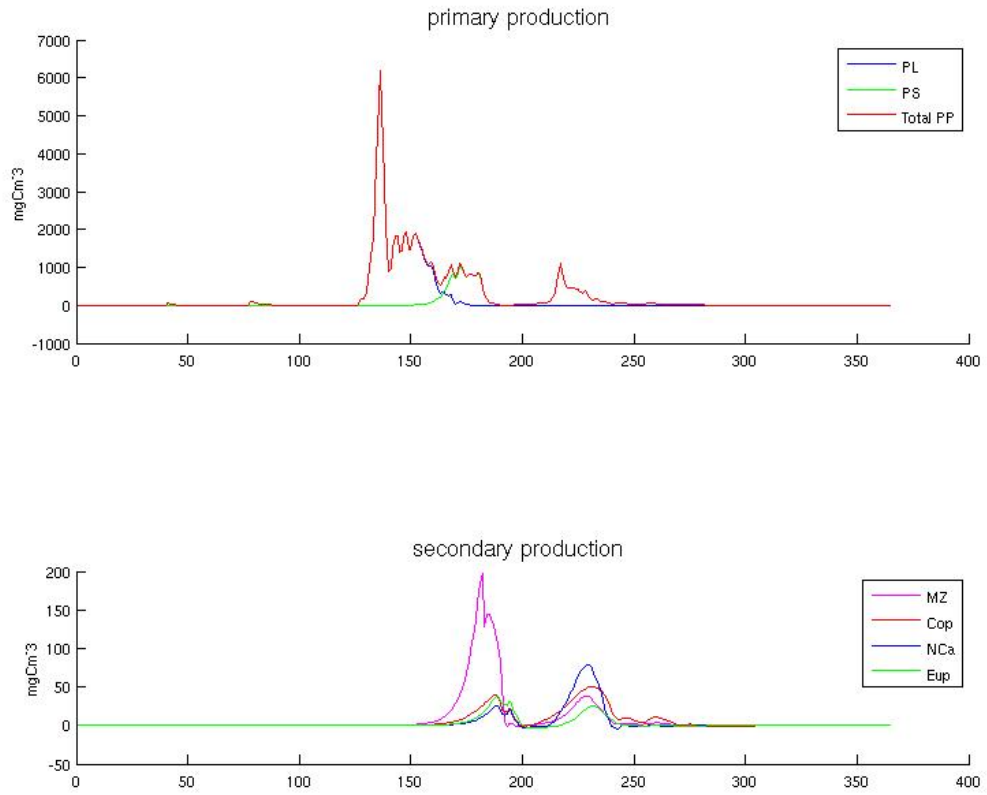
Al, Phyl: M2 has the longest time series, that's why we focus on that and then also it is the ice edge.

Francis: Lets continue discussion of oceanography offline too. The meeting was very useful and if you find some model behavior that will have implication for the rest of the group send e-mail to everybody

Next meeting December 1. Send questions/issues I advance, so thy get distributed.

End of meeting

Figure 1. Primary and secondary production figure sent by Georgina
PL is large phytoplankton, PS small phytoplankton; lower panel MZ is microzooplankton, Cop is *Pseudocalanus*, NCa *Neocalanus*, Eup euphausiids.



Figures 2-4. Data sent by Al Hermann shows mooring data compared to NEP5 model estimates for location M2.

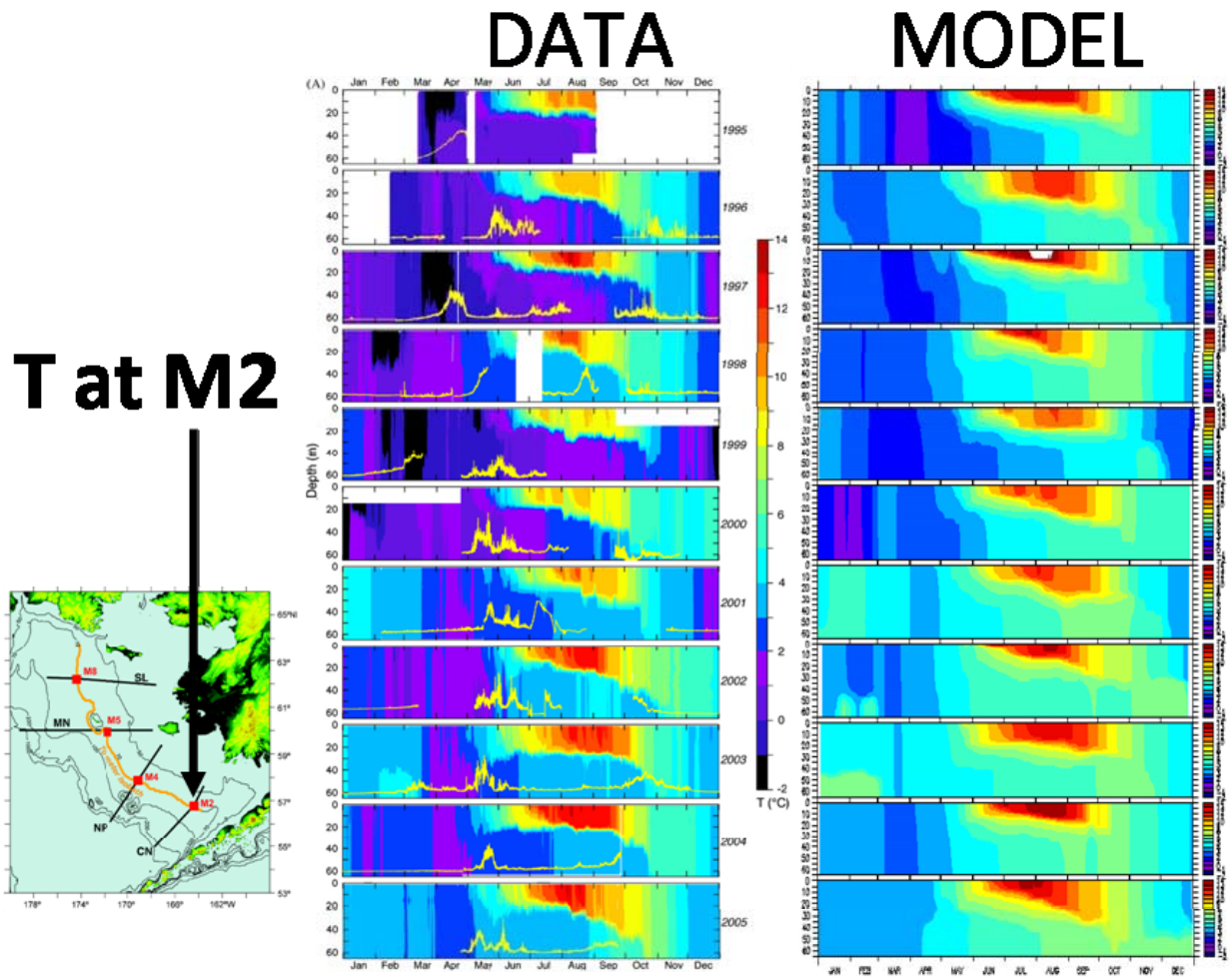


Figure 3.

MODEL T minus DATA T at M2 about 2 degrees warm, on average bias is more pronounced in summer

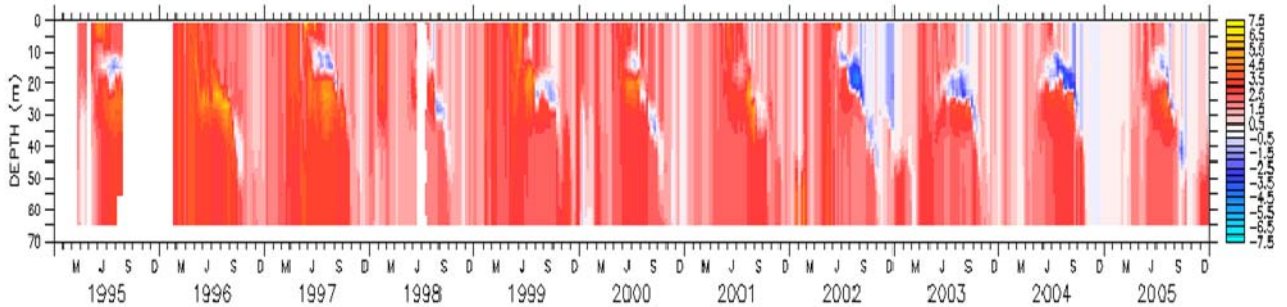


Figure 4.

Measured vs modeled climatological currents at M2 Model has a northward bias in summer

