

BEST/BSIERP model decision points
November 16, 2009 Conference call
12:30AM Seattle time, 11:30 AM Alaska time

Attendants: Georgina Gibson, Kerim Aydin, Kate Hedstrom, Ivonne Ortiz, Nick Bond, Al Hermann, Elizabeth Moffitt, Lisa Pfeiffer, Will Satterthwaite, Francis Wiese Not attending: Enrique Curchitser, Michael Dalton, Andre Punt, Alan Haynie, Gordon Kruse, Franz Mueter, Marc Mangel, Jim Ianelli.
Rapporteur: Ivonne Ortiz

SUMMARY: THIS IS A CONTINUATION OF THE DISCUSSION ON DECISION POINTS HELD NOVEMBER 10.
MAIN ITEMS DISCUSSED: TIMELINE FOR VERTICAL MODEL RUNS IN THE NEXT 6 MONTHS AND FACE –TO –FACE MEETING.

THE TIMELINE FOR THE VERTICAL MODEL WILL DEPEND ON RESULTS OF SIMULATIONS WITH MODIFIED FLOW AT UNIMAK PASS WHICH ATTEMPTS TO LOWER ESTIMATED TEMPERATURES. THIS SIMULATION IS BEING PERFORMED ON THE BERING GRID ONLY. THE RESULTS FOR THIS SIMULATION ARE EXPECTED TO BE AVAILABLE BY THE END OF THE WEEK.

SHOULD THIS SIMULATION IMPROVE TEMPERATURES, THEN KATE WILL START RUNNING ROMS 1970-2005 FOR NEP5 WITH PHYSICS ONLY. FROM THIS, BOUNDARY CONDITIONS WILL BE EXTRACTED FOR BERING GRID, THE BERING GRID WILL BE VALIDATED AND THEN PASSED ON TO GEORGINA TO RUN THE NPZ. IF TEMPERATURES ARE STILL TOO HIGH, A DECISION HAS TO BE MADE WHETHER OR NOT TO EXPLORE FURTHER SOLUTIONS TO THE TEMPERATURE BIAS OR WHETHER TO MOVE FORWARD WITH THE HINDCAST AND CHARACTERIZE THE OFFSETS. THIS DECISION WILL DEPEND ON THE TIME FRAMES NEEDED FOR ALL THE OTHER MODELS TO MEET THE 6 MONTHS DEADLINES IN CONJUNCTION WITH ROMS. IN ANY CASE, THE DELIVERY OF THE NEP5 OUTPUT WILL BE IN THE ORDER OF ONE YEAR EVERY COUPLE OF DAYS (APPROXIMATELY 1.5 MONTHS FOR THE 1970-2005 HINDCAST).

INITIAL PROPOSED DATES FOR 2-DAY IN PERSON MEETING ARE DECEMBER 10-11 IN SEATTLE, BUT A DOODLE POLL WILL BE SENT OUT TO SCHEDULE AS SOON AS POSSIBLE, WITH TRAVEL EXPENSES COVERED BY NPRB.

To do list

- Al will send results of simulation with modified Unimak Pass
- Discuss simulation results over e-mail by end of week, early next week and set schedule for finalized NEP5 (physics only) hindcast, 1970 onwards

Detailed notes

Meeting goals: i) Continue discussion on decisions points started November 10, ii) discuss need for face to face meeting. No other issues were brought up for discussion by attendants.

Schedule for production runs

Francis: The first of the 4 decision points was to *agree on schedule to start production runs*. We should work out a schedule for the next 6 months *and start by having a schedule for the fully coupled vertical model*

Kerim: Doable for the FEAST equations, however we should start on the lower end because we [the upper levels] depend on the stability on the lower levels.

Francis: Let's start then between Nick and Al –hand-off between IPCC and Bering Sea ROMS and what needs to be done

Nick: I'm fairly certain that I have everything for the Canadian [climate] model, I've been standing on the sidelines while everybody else is working on their own portions. I don't think getting the climate input ready will be very time-consuming, maybe a couple of weeks worth of work. Al, is that what you think?

Al: that is correct in terms of preparing the files, but in terms of whether the model will blow up it's a different matter.

Nick: Correct –getting the data ready for ROMS will not be a big issue

Al: one of the issues [discussed previously] was the runoff and it seems all new pieces are available. It is for the future projections (which is what we are talking about here in terms of production runs), that we have to ensure the model works adequately.

Nick: *is this what you are talking about? Future runs?*

Kerim: the hindcast and forecast really need to run smoothly together for the model to work for the upper trophic levels

Francis: you need to ensure that the model runs in both hindcast and forecast, so even if we talk about production runs we mean the full hindcast and then forecast. You don't want to run 10 hindcasts and then find out that the forcing [forecast] doesn't work with them [hindcast].

Nick: hindcasts of IPCC models don't get the timing right, so we'll get observed physics but not observed biology. I think there is going to be a disconnect no matter what.

Francis: I don't think I fully understand. If the hindcast goes to 2005...

Kate: We are bound by what data [SODA] is available

Francis: *so why would you not start forcing 2005 onwards?*

Nick: What the IPCC models have in the early 2000's is not the same as what has happened.

Francis: Can you take off the first 5 years [of IPCC forecasts] and start in 2005?

Nick: yes, but the next 5 years (2005-2010) will not replicate the data we will have available.

Kerim: The hindcast [run with data] and forecast [run with predicted climate] don't need to match, it just needs to be a smooth transition, so we may get away with a spin-up period.

Al: Maybe get best conditions for 2000 [not 2005] and then have spin up.

Are we losing all data collected in 2000's then?

Kerim: No, that data would be used to calibrate the model. We're not really doing now-casting, we don't have [SODA] data for 2006-2010. Kate, *what is the SODA cutoff?*

Kate: sometime mid 2006

Kerim: so we do have that gap [2006-2010] and we didn't realize that until last June [at the vertical modelers workshop]

Al: it is not like the data is not used. The data can still be used to tune the hindcast

Francis: so you can run the model and see how far off the prediction is from the 2005-2010 data use that to have an idea of how off some of these predictions will be. It seems the key issue of this jump between hind and forecast mode –*is there a simple size version of the model we can use before using the highly detailed model?*

Nick: to have all production runs in 2000 means they will be entirely separate from the retrospective ones. So it wouldn't be a jump, rather another starting year and there would be no expectation on matching the first few years, although hopefully statistics on key physical factors would be available to see if we are getting the variability right.

Kate: Hindcast and forecast are two different runs

Liz: so the point of running the forecast starting in 2000 is to have the overlap between hindcast and forecast?

Al: yes, 2000 is when IPCC simulations start

Georgina: it would be nice to have those 5 years of overlap [2000-05] to contrast one series [hindcast] to the other [forecast].

Francis: *does such strategy work?*

Kerim: I think so, on that particular point

Francis: 2 things: Nick, you would start in 2000 and work with Al to ensure the model doesn't explode. *Would you run that test just for the link [so ~2000-2005, 2010] or would you like to run it for 50 years?*

Nick: initially just for 3-5 years to ensure we can go through seasonal cycles and then do runs with the whole vertical model. For proof of concept a few years should work.

Al: these models run slow enough you can look at the output as it is being calculated so you can see if the run has a problem – no need to wait it out.

Francis: *so the hand-off can be achieved in about a couple of months?*

Georgina: *are you talking about the Bering Sea grid or the NEP5 grid?* Nick has been working on the NEP5 grid

Nick: there has been validation of the physical output.

Are these test runs and the long ones with the Bering Sea grid?

Francis: we had already made this decision for the Bering Sea grid. Specifically that the 50 year hindcast would be run for NEP5 and from there boundary conditions would be extracted for the Bering grid; Likewise for the forecast.

Is this what Al will be working on? And considering the computational effort, should we consider that both hindcast and forecast work with the Bering Sea grid.

Nick: forecast was always planned for the NEP5 and that has been leveraged in other projects.

Francis: for the physics part there is NEP5, from NEP5 output we need to extract the Bering grid to drive biology

K: *Al, what you tested on was on the Bering or NEP5 grid?*

Al: Bering grid

Francis: we have NEP5 hindcast. *Do we have a Bering Sea grid hindcast?*

Kate: the 50 year hindcast is currently running for NEP5.

Georgina: can we extract the Bering grid from that and use that to drive the hindcast?

Nick: yes

Starting year of hindcast

Francis: *how far back do we go? One suggestion was to go back to 1976 and start after shift.*

Kate: –best to start in 1970 to get the regime shift

Francis: *what is the schedule to finish the 50year run for NEP5*

Kate: if I were running actively now, 4 days per year

Georgina: *physics or biology too?*

Kate: biology too.

Francis: *don't you run physics alone first?*

Kate: no

Francis: So if we want to ensure we have the full 1970-2005

Kate: you can use SODA and run it on your own

Al: Kerim sketched some of this. It may be you can increase the time step significantly if you run NPZ offline. The main reason for tides is to get tidal mixing, if you are getting that from ROMS then that gives you the physical output you need to run the biology

Georgina: *any idea what that time step increment would be?*

Al: 5 times increased performance. Currently we have a timestep of 400 seconds [~7 minutes].

Francis: We don't need too many details, I just want to understand better. *Do we have to have the ROMS hindcast in hand before we couple it with anything?*

Kerim: we already coupled it

Georgina: we can either do our own hindcast on the Bering grid or we can extract pieces we need from hindcast that as already been run from the NEP5.

Francis: that presupposes that we have both options available

Georgina: if we're doing an independent Bering Sea hindcast, we can use SODA boundary conditions, then the simulation is completely independent from NEP5.

Francis: we have not been working on that assumption: the assumption was that we would run NEP5, validate, then extract for Bering grid, use and validate.

Al: correct, the original assumption was to run the full NEP5 for hindcast and extract the Bering grid. But if we are running short on time, then we need to go with SODA.

Francis: *how long until NEP5 finishes the 50 years run?*

Kate: we need to run with NEMURO and it takes one month –start in 1970?

Francis: starting in 1970:

Kate: I can get pieces as you need them, give you the initial years first, because you will not need them all at the same time.

Francis: so if we want all for the next 6 months we still need timeline. Kate, if you have the opportunity of *running NEP5 since 1970, how long would it take to run up to 2005?*

Georgina; *if you are just running this physics –can you not use the smaller grid also?*

Kate: but then it wouldn't be any different from you using SODA

Al: that is true, the improvement is it would have the biology,

Georgina; *so we would only gain the boundary conditions?*

Francis: what do you get from the outputs in each case?

Kate: if you run physics offline then you save detailed files, otherwise you save averages.

Al: you can store daily averages from physical runs which includes tidal mixing, and use it to run the biological model using a larger time step than was allowed in a physical run. It wouldn't go as high as daily time step., but the internal timesteps could be half an hour or so.

Francis: *so how long would those runs take?*

Kate: physics only [NEP5] I can start giving you 1970 in a day or two, then next year in a couple extra days and so on.

Georgina: *with NEP5?*

Nick: should run with smaller grid [Bering grid]

Georgina: the advantage of NEP5 is we get the boundary conditions for the Bering grid

Francis: *what is the compared timeline of running NEP5 physics vs Bering grid directly?* Seems running NEP5 and then extracting the Bering grid is more accurate.

Kate: timewise, the difference is by a factor of 3: I can give you three years every couple days if I do the Bering grid only

Francis: *so we will go from NEP5 physics only, 1970 onwards and get one hindcast year every couple of days?*

Kate: correct

Francis: so for Georgina to get a full extraction for the Bering grid it would take about a month a half [technically 50 days]

Ivonne: but you still need validation for the Bering grid

Al: right, but validation goes on all the time

Francis: correct, *but then how does it proceed?*

Kate: at the meeting we thought it was best just to characterize the offsets, except for maybe correcting at the passes, but if you start correcting then you start all over again with validation.

Francis: so it seems like we will go with the 30 yr simulation for NEP5 physics only the we extract the Bering Sea grid and it goes to AL to validate physics, whogives OK to Gerogina so she can do the biology with the NPZ. We will characterize offsets and then decide whether we need to invest another month to deal with temperature.

Kate: if we are going to deal with temperature we need to deal with it now before running it

Francis: Then this needs to be decided now

Al: I am about to start a run with modified Unimak Pass and that should help our decision making.

Francis: so we will wait for that. The meeting is running out of time, these are very interesting discussions. This takes many hours but decisions and terms need to be laid out on the table for everybody to understand. As a result, I would like to propose a 2 day meeting in person.

Ivonne: we can move forward on this particular decision point [the hindcast run] using the results of Al's runs and we could reach a decision via e-mail or conference call without waiting for the face-to-face meeting

Francis: I agree

Georgina and Al: that makes sense

Al: I expect to have the output of the run later this week and will discuss technical points with Kate

Francis: if within a week or so you can send us what the decision would be based on regarding the physics, and then Kate can provide an estimate of time, that would be great because then we could get going on that. There might be other issues we can deal with over e-mail prior to meeting in person.

Next meeting would be in Seattle, maybe dec 7-12? How about end of 7-12?

Kerim: Jim would maybe stay longer that week in Anchorage for the Council meeting.

Ivonne will send out doodle poll with proposed date as Dec 10-11, but will include alternate dates going up to the next month.

END OF MEETING