

From: Thomas C. Royer [mailto:royer@ccpo.odu.edu]
Sent: Monday, March 05, 2007 11:19 AM
To: Clarence Pautzke; Francis Wiese
Subject: Freshwater Model

Clarence and Francis,

I understand that the Climate Impacts on the Gulf of Alaska workshop last week in Juneau agreed that there is an inadequate understanding of fresh water forcing and how it affects the stratification of the surface layer at vertical scales of less than 10 meters and the to model the spatially explicit formation of fronts and eddies at horizontal scales of 1 km and time scales of days to weeks. As a step in trying to wrestle with the freshwater issue, I believe that we need to investigate on how to get the fresh water discharge model better “tuned” to more recent oceanographic data. The original model was tuned to hydrographic data at Seward prior to 1981 (Royer, 1982). We need to incorporate the more recent data into this model.

The first work should be to rewrite the computer code in a C+ language such as MATLAB. The code is now written in Quick Basic. Second, once it is running and verified with the existing model, modifications should be made. Comparisons with more modern hydrographic data should be made. Glacial ablation should be added using the latest glaciology information from Craig Lingle’s NASA (UAF/GI) study. Third, available river data should be incorporated. River input was not included in the original model. Fourth, freshwater discharge from British Columbia and the Columbia River (seasonally) should be added.

I believe that the rewriting of the computer code into C language can be done in a month. The tuning with new hydrographic data will take about 3 weeks. The inclusion of river discharges can be done in a couple of weeks. Finally the BC data and Columbia River discharges could be completed in another 3 weeks or so.

An undergraduate student here at ODU, Carl Pucci, could do these tasks this summer and we are proposing that he be supported to do this work. Chet Grosch and I are willing to supervise him. The cost of this student for 12 weeks of work @ \$11/hour would be \$5280 plus 9.23% fringe benefits and \$2420 indirect costs for a total of \$8187. I don’t know if any such funds might exist in NPRB for such work but I believe that this would help in the preparation of the RFP since one of those tasks would be to improve those “back of the envelope” calculations that I did in 1981. He will also provide documentation of the numerical model that will allow others to make intelligent changes in it (to counter the argument of Useless Arithmetic and its review by Carl Wunsch).

Regards,
Tom

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