Geosci. Model Dev. Discuss., 1, S80–S84, 2008
www.geosci-model-dev-discuss.net/1/S80/2008/

Geoscientific
Model Development
Discussions

Interactive comment on "Historical reconstruction of the Aral Sea shrinking by a full 3-D wetting and drying model ECOSMO" *by* I. Alekseeva and C. Schrum

Anonymous Referee #3

Received and published: 21 October 2008

Report on "Historical reconstruction of the Aral Sea shrinking by a full 3-d wetting and drying model ECOSMO"

by

I. Alekseeva and C. Schrum

The problem they address is well described and it is a very important one. The method used is a state of the art 3D ocean model with further improvements to adapt it to the specific requirements for the Aral Sea. My first opinion was that to investigate the shrinking of the Aral Sea with a 3D ocean model would be a good approach. However,

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

after reading the full paper I am not so sure.

Here are my major remarks:

1. Why do we need a full 3D model to reconstruct the Aral Sea shrinking? Potentially a 3D model may be useful to investigate the flow and the redistribution of for instance fresh water in the Aral Sea, but they only show 1 plot with 2D distribution of ICE (Fig 10) and I am not even convinced that they need this if the focus is on sea surface area. With all the uncertainties, that are well discussed, simpler budget type models may have sufficed?

2. They have many free parameters (for instance the thresholds in the wetting and drying scheme + tuning factors on the forcing) that are used to tune the model to get a "best guess" solution. How is this done? Maybe some kind of Least Squares approach involving a Cost function. They will need a Cost function to define 'best'. Please clarify. Even with this clarification, one may ask: Could they have achieved a better fit with a much simpler model? With parameters tuned through such a procedure one may also question whether the model will have any predictive skills? See the very interesting discussion in: Thieler,R.E. and Pilkey, O.H. and Young,R.S. and Bush,D.M. and Chai,F., The Use of Mathematical Models to Predict Beach Behavior for U.S. Coastal Engineering: A Critical Review, Journal of Coastal Research, 16, 2000, PAGES = 48–70.

3. The language needs improvements. There is a general lack of the article 'the'. Some sentences are strange. Some figures and figure captions need to be improved.

Answers to specific questions:

1) Does the paper address relevant scientific questions within the scope of GMD? Answer: Yes.

2) Does the paper present novel concepts, ideas, tools, or data? Answer: The basic model is well established, but the adaptation to the Aral Sea is new.

3) Are substantial conclusions reached? Answer: Yes, but they could have been

GMDD

1, S80–S84, 2008

reached with a simpler model.

4) Are the scientific methods and assumptions valid and clearly outlined? Answer: In general yes, but the tuning method is not specified.

5) Are the results sufficient to support the interpretations and conclusions? Answer: In general: Yes.

6) Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)? Answer: I think this will be difficult, but this is a generic problem with such complex 3D studies.

7) Do the authors give proper credit to related work and clearly indicate their own new/original contribution? Answer: Yes, as far as I know.

8) Does the title clearly reflect the contents of the paper? Answer: Yes.

9) Does the abstract provide a concise and complete summary? Answer: Yes.

10) Is the overall presentation well structured and clear? Answer: Some improvements may still be required, see below.

11) Is the language fluent and precise? Answer: Some improvements is required, see below.

12) Are mathematical formulae, symbols, abbreviations, and units correctly defined and used? Answer: Yes.

13) Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated? Answer: At least clarify the tuning method.

14) Are the number and quality of references appropriate? Answer: Yes.

15) Is the amount and quality of supplementary material appropriate? Answer: I did not find any.

Specific comments:

GMDD

1, S80–S84, 2008

Interactive Comment

On the data used: I find this discussed in Section 2.2, 2.4, Section 3 and 4, and they are used for different purposes. Maybe this should be clarified one place rather than spread out?

One example on the language: On page 246 lines 20-25: "... to describe local process in the Aral ..." > ... to describe the local processes in the Aral ... (General lack of 'the')

Some sentences also need to be re-written like the sentence on page 247 starting with "However," on line 4.

Further down they state that the model is described in Sect. 1. Should be Sect. 2.

On line 21 page 247: "is describes" > is described

On line 247: "Section 5 is Conclusion". Please give a full sentence and if you use Sect. above, use Sect. also here.

On line 10 page 249: Please rewrite the sentence starting: "Therefore"

On line 25 page 251: "All wet cell" > All wet cells and take the part "even if .." to the end of the full sentence.

On line 26 page 251: Insert a comma after "wet".

On page 253 they discuss waggling and threshold: I would have thought that a large range would give problems with the conservation of mass? Please, explain.

On page 255 line 5: Please complete the sentence starting " For instance,.." (or make it the 'tail of the sentence before).

On page 255 line 12: "lows" > laws ?

On page 256 line 28: "were" should be deleted ?

On page 264 line 11: "in different by thermal conditions years." I found this tail of the sentence 'strange'

GMDD

1, S80–S84, 2008

Interactive Comment

In page 269 line 15: The paper by Oey et al. is published in Ocean Dynamics.

Caption of Fig. 1 is given in keyword style. Please rewrite.

Caption of Fig. 3: What does the sentence "Final choice ..." mean?

Caption of Fig. 5: Rewrite the sentence "Averaged over the Aral Sea monthly ..." The text on the horizontal axis is both "Time(month)" and "months"?

Caption of Fig. 10: "extend" $>$ extent

Caption of Fig. 11: Is the last sentence "The time axis labels .." necessary?

Interactive comment on Geosci. Model Dev. Discuss., 1, 243, 2008.