

## ***Interactive comment on “Manufactured solutions and the numerical verification of isothermal, nonlinear, three-dimensional Stokes ice-sheet models” by W. Leng et al.***

**O. Gagliardini (Editor)**

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Dear authors,

We have now two reviews and a comment for your paper. In summary, I see three majors criticisms regarding your paper:

- you state that Sargent and Fastook paper contains errors, that are corrected in your paper, but you don't clearly show where are these errors in Sargent and Fastook, which is at the end not very useful for the reader.
- you perform convergence test of your Stokes solver using this new analytical solution,

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but you should go deeper in the analysis of these results (which number are theoretically expected for the rate of convergence for pressure and velocity? Are you above or below these rates?...)

- your paper is clearly not free of errors: both reviewers found some and I found also some (e.g.: Eq. (47) is obviously not correct).

An other point not addressed by the reviewers: the interest of proposing an analytical solution is to give all the necessary equations so that it can be use to test other Stokes solvers. Compensatory terms must be given in Appendix, and an easy-to-use source code (C or f90) should be proposed as accompanying material. I tested your C code and found some issue with it (Nan value returned at some point belonging in the domain, for example (0,0,0)). Your code would be also more readable if for example you introduce a variable for pi in the formula.

I would suggest at this stage to respond point by point to all comments, and to submit a revised version, which might be resend to reviewers.

Regards

Olivier Gagliardini

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Interactive comment on The Cryosphere Discuss., 6, 2689, 2012.

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