

Interactive comment on “SELEN⁴ (SELEN version 4.0): a Fortran program for solving the gravitationally and topographically self-consistent Sea Level Equation in Glacial Isostatic Adjustment modeling” by Giorgio Spada and Daniele Melini

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I have been using SELEN for a couple of years now, and I want to thank Dr. Spada et al for making this useful SLE code open source. As mentioned in the abstract, this is the only open source SLE program (that I am aware of), which is surprising considering that other dynamic parts of the Earth system (i.e. ice sheet models, ocean models, atmosphere models) have many open source options. I hope that with the release of SELEN4, it will encourage other GIA modelling groups to follow suit.

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The new version of SELEN has several improvements that bring it in line with other 1D Earth structure GIA models, namely migrating shorelines and rotational effects. Migrating shorelines is probably the most essential new feature, as migration of the shoreline affects the total ocean volume for calculating sea level, and also will impact the GIA signal on areas with extensive continental shelves.

I've tested out SELEN4, and found it relatively trivial to get running. The included documentation is clear and helpful with the installation issues I initially had. SELEN 2.9 was really easy to get working and modify for my purposes, but there were a lot of post-processing elements that were included directly in the code that led to unnecessary overhead. I am happy to see that these post-processing options in SELEN4 are now separated from the main GIA calculation. I think the example post-processing examples can be easily modified for the general user who wants to include some modelling results in their studies.

Perhaps the biggest problem a user might face is if they want to add in their own ice load. Publicly available models (ICE-3G, ICE-5G and ICE-6G) are included in the distribution, but there is no tool to create your own. I have written code to create the pixel files from an ice load in an arbitrary projected coordinated system (<https://github.com/evangowan/selen/tree/master/pixel>), but I have not yet tested if it is compatible with SELEN 4. If the authors have code that can make the ice load input files, I encourage them to make it available.

Best Regards,

Evan J. Gowan

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