

Interactive comment on “ISSM-SESAW v1.0: mesh-based computation of gravitationally consistent sea level and geodetic signatures caused by cryosphere and climate driven mass change” by S. Adhikari et al.

Anonymous Referee #1

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This work presents a method for solving the Sea Level Equation, which is proposed as an alternative to the more traditional approaches based on the pseudo-spectral technique. At this stage, the method is limited to the case of an elastic Earth and does not account for the migration of shorelines.

Quite convincingly, the authors illustrate the details of the method and compare its efficiency with respect to previous studies. Some examples of applications are also given. Overall, the paper is well organized and written, the topic is perfectly fit for this journal and its science level is high.

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I have three major points, however, which require attention before the paper can be considered for publication.

1) The method is not new. In Tushingham and Peltier, 1991, a discretization scheme was used (which the authors called “finite elements method”) that essentially follows the same philosophy of the approach presented here (although the details of the implementation differ). There are traces of the same method spread in the works of Peltier and coauthors between the 80s and the 90s. I encourage the authors to discuss previous works so to put their own contribution into the right perspective.

2) The quantity “N”, defined at page 9773, is not the “perturbation to the geoid radius. . .”, and should be called “absolute sea-level change” instead. The reason is explained in e.g., Tamisiea (2011, GJI, doi: 10.1111/j.1365-246X.2011.05116.x).

3) At page 9787 the authors mention some tests that have been made to validate their solutions by comparison with Farrell and Clark (1976) and SELEN. But the results of these comparisons are not presented in this paper (at least, I am unable to find them). Since I think that these comparisons could add a value to the new method developed, I strongly encourage the authors to present and discuss them.

Interactive comment on Geosci. Model Dev. Discuss., 8, 9769, 2015.

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