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Geoscientific
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Discussions

Interactive comment on "Automated continuous verification and validation for numerical simulation" *by* P. E. Farrell et al.

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The work describes the model validation and verification technique implemented in Imperial College Ocean Model. The novel feature of this technique is its automaticity allowing the code performance to be verified continuously with the code development. The importance of this work is crucial for the successful model development especially in case when dozen of scientists simultaneously modify the code. The latter is commonly the case. Despite I share the authors overall opinion I was not convinced in it by reading the manuscript. Therefore I can recommend this manuscript for publishing after the major revision only.

1. The model validation and verification is a common part in almost any GCM manual. As an example one can take (widely applied to the real world problems) Modular Ocean Model (MOM 4.1) user guide with its bunch of test cases (page 369). The MITgcm

model is similar continuously tested (even in automated fashion). I think I saw a similar topics in almost every GSM user guide but I have (might be my fault) never heard of someone writing a paper about it. Still, a chapter with the overview over existing models and their strategy in model validation and verification is definitely missing.

2. If we assume that the ocean/atmosphere gcm has been successfully validated and verified we still cannot guarantee that the real world application will be properly simulated as the typical motion scales are not always resolved. This means that if we take two different models which work perfectly for the test cases we still get different ocean/atmosphere states and both of them might be far from reality. Recent model intercomparison projects as AMIP/CMIP, DYNAMO, CORE etc. open the light on the model spread when applied to the real world problems. This might be slightly out of topic for this work but I would still suggest addressing the problem of proper parametrization and tuning for a particular setup. This would put a clear separation line between validation/verification and application.

3. On page 1588/15 (introduction) the authors write about recent progress in the computational hardware. On page 1590/20 the reference to Adrion et al. is of the year 1982. I would suggest that some recent works should be included additionally.

4. Chapter 3, especially part 3.4 of it (test cases) is not transparently written. As this is the major achievement (implementation of automated framework into the model) of this work I would suggest including some schematic representation of the total algorithm instead of providing the XML script. However this is up to the authors.

5. Chapter 4 (fluid dynamics test cases). I would go through the current gcms user guides and look what they do. Why do you provide these examples if one can easily find them in wikipedia?Are they commonly used by others? Execution of which set of examples gives the clearest view on the model performance?

6. Concerning conclusions I think that the message of continuous testing did penetrate the numerical modelling community. The results of geoscientific models however

should be always trusted carefully as it is seen in the existing intercomparison projects. Again there is a huge difference between getting the Munk gyre working and providing the operational setup for the climate simulation.

Interactive comment on Geosci. Model Dev. Discuss., 3, 1587, 2010.