Geoscientific
Model Development
Discussions

Interactive comment on "The Marine Virtual Laboratory: enabling efficient ocean model configuration" *by* P. R. Oke et al.

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Reviewer Comment: The results section focuses on descriptions of test cases that don't rigorously contrast differences in model skill with respect to verification data (if there is any) that result from using WebMARVL generated configurations versus configurations customized by expert users.

Author Response: The model comparisons are presented in Figures 5-10. Some of these comparisons simply verify that WebMARVl-configured model runs and manually-configured model runs produce comparable, and credible results (Figures 5 and 8), while others include comparisons with observations (Figures 6, 7, 9 and 10). Recall, from the abstract, that it is the goal of the paper "to demonstrate that the WebMARVL-

configured model runs are credible - providing a good foundation for scientific research." We think that is achieved by the presented examples.

Reviewer Comment: The underlying technologies WebMARVL uses to access its databases, and the algorithms it uses for interpolation and remapping of fields, are not described.

Author Response: The revised paper includes a description of these elements of Web-MARVL. See the end of section 2.

Reviewer Comment: Section 3 presents several examples of WebMARVL use. These show that many users have successfully used the system to set up models, which is good, but do not rigorously demonstrate whether the automatically configured files are as good as, or per- haps better than, customized efforts.

Author Response: It is not our goal to demonstrate that WebMARVL-configured model runs out-performs manually-configured runs - models can always be tuned. Input data can be "massaged" – and manually-configured model runs can be refined and improved. We therefore expect that manually-configured model runs should out-perform WebMARVL-configured model runs. Indeed, this is the case in Figures 9 and 10. However, it is our goal to demonstrate that WebMARVL is an efficient tool for configuring a model – providing an advanced starting point for a novice or expert modeller to build on.

Reviewer Comment: With reference to section 3, example 3.1, and example 3.2, the reviewer challenges the suggestions that the WebMARVl-configured model runs agree "reasonably well" with observations – citing model-data differences of about 2 degrees in some places.

Author Response: The modelled and observed results are qualitatively similar. We agree that the point-wise comparisons show significant differences. But in a region that is dominated by mesoscale variability – with large-amplitude eddies – the degree

of point-wise disagreement between the modelled- and observed-fields is, in our experience, quite normal. Over most of the region high-lighted in this comparison (in Figure 6), the model-data differences are as reported.

Reviewer Comment: Example 3.3 makes a useful comparison to ADCP observations, but this is really an evaluation of the ROMS model. It is not an evaluation of the WebMARVL configuration of ROMS compared to a configuration made by other means.

Author Response: We agree with this comment. The agreement between the model and the observations is entirely attributed to the model (ROMS) and the data used to initialise it. The point of this comparison, is that the model was configured in just a few minutes – and then produces credible results.

Reviewer Comment: Everything that is said in section 3 could be said with examples 3.1 and 3.5.

Author Response: We agree that we could have limited this study to very few examples. However, by including many different examples, produced by many different users, we have tried to demonstrate that WebMARVL is suitable for a range of applications by users with a range of different experience.

Reviewer Comment: The Reviewer suggests showing examples of differences between the bathymetry and coastline of WebMARVL-configured and manually-configured runs.

Author Response: Such comparisons will only be instructive for the specific example shown. So we see little value in this. It is not our goal to assess – or comment on – the sensitivity of a model to these factors.

Reviewer Comment: Citing subtleties and sensitivities of model runs to details of model grids, coastline, interpolation schemes, the reviewer asks "what might be lost when this all-purpose code is used in place of codes created for specific models by expert user."

Author Response: This is a valid question. But it is well beyond the scope of this study.

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Reviewer Comment: Are satellite data sets included, and what is their provenance?

Author Response: No. Not yet.

Reviewer Comment: The available options are suited to local Australian applications, but GMDD is an international journal.

Author Comment: We recognize this. The release of MARVL used for this study used Australian Access Federation (AAF) to authenticate users. This restricts access to users from Australian research organisations. Work is underway to use eduGAIN, which will open up use to all international users.

Reviewer Comment: The Reviewer asks about data formats and whether MARVL needs local files, or can work with other protocols (e.g., OPeNDAP).

Author Response: WebMARVL uses a combination of local files and OPeNDAP. This is noted in the revised paper (see the end of section 2).

Reviewer Comment: The reviewer asks about the portability of the code.

Author Response: WebMARVL will soon be released as open-source code. The system is run on standard virtual machines, and requires no specialized hardware of software environment. Specifications are listed in the revised paper, stating that "... all calculations by WebMARVL are performed on a virtual machine, exploiting readily available open source software (e.g., GNU compilers, netcdf libraries and operators, gridgen)."

Reviewer Comment: Is the software that runs WebMARVL available, or only global access to an Australian hosted portal?

Author Response: Access to the WebMARVL portal is available. The source code is not yet released to researchers outside of the development team at CSIRO. An open source release is planned.

Reviewer Comment: the reviewer suggests an alternative to Figure 1, for representing

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the functionality of WebMARVL.

Author Response: The key elements of WebMARVL are the user decisions (left box), optional user-supplied model grids (top box), the underpinning data-sets (right boxes), options for deployment (bottom boxes), and data processing (central boxes). These could be arranged in many different ways. We are content with the current representation – and we think it gives a true and representative view of WebMARVL to the reader.

Reviewer Comment: Page 9749: "Neither configuration includes freshwater fluxes." Does this refer only to E minus P, or also include river inflows? There is no mention of river flows in the article.

Author Response: It includes all freshwater fluxes: P, E, and rivers.

Reviewer Comment: Page 9751 (line 19): Please clarify, does WebMARVL not produce tide boundary conditions, or just not for this example?

Author Response: WebMARVL does not produce tide boundary conditions. This is noted in the revised paper.

Reviewer Comment: it would be nice to see what is in the take away bundle for each target model so an expert user could see clearly what WebMARVAL does and does not deliver.

Author Response: Such an example is included in the reviewed paper. See the new section 4.