

## Marine Virtual Laboratory (MARVL) – Early Activity Milestone Report 2.0

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### **Deliverable 2:** WebMARVL-lite, version 1

Website that enables registered users to specify a time period; specify a region (bounding box); and select a source of surface and boundary forcing from a list of available datasets; and WebMARVL-lite will extract the requested sub-set of the data files on the native (original) grid and package these files for use.

**AC2.1:** WebMARVL-lite is live, and can be accessed and deployed by registered users.

**AC2.2:** Ability to automatically generate the input files needed to run a generic model for the Derwent Estuary using WebMARVL.

Version 1 of WebMARVL has been developed and tested. Two registered users (Farhan Rizwi and Mark Baird), who are not part of the MARVL development team, participated as independent “testers”, conducting a thorough test of WebMARVL on 26 March 2013. Both testers completed the MARVL test plan document that was previously approved by the NeCTAR Board. WebMARVL was tested on four different internet browsers (Internet Explorer, Firefox, Chrome, and Safari). Scanned copies of the completed test reports are included in this report in Appendix A and B. The testers reported that all tests passed, without exception. Testers also provided feedback on several aspects of WebMARVL (see test reports) that will be addressed in future versions of WebMARVL.

Both testers verified that WebMARVL is live, and could be accessed and deployed successfully (see Appendix A and B). This verification demonstrates completion of **Acceptance Criteria 2.1 (AC2.1)**. Access to WebMARVL is via a portal hosted in the NeCTAR cloud (Figure 1). Users must first authenticate with their own institution using the Australian Access Federation (AAF) service (Figure 2). For the purposes of this deliverable, the services were hosted on a physical server at CSIRO. But these will ultimately be hosted from a separate virtual machine, and transparently embedded within this portal (Figure 3). After logging in, users are directed to the MARVL homepage (Figure 4), from which they have the option to navigate to the “Model Control” page (Figure 5).

To test this deliverable, the testers were asked to use WebMARVL to automatically generate the input files needed to run a generic model for the Derwent Estuary (**Acceptance Criteria 2.2; AC2.2**). The model of the Derwent Estuary used here is the same as that used for Deliverable 1 of this project. This model is called the south-east Tasmania (SETAS) model, and was developed under a CSIRO-funded project called INFORMD, before MARVL began. The ocean model used to underpin the SETAS model is the Sparse Hydrodynamic Ocean Code (SHOC; Herzfeld 2009). A complete technical description the SETAS model configuration is given by Jones et al. (2012), along with results from a series of model runs, with and without data assimilation.

The Model Control page indicates the “Required Variables” needed for the chosen model, plus a list of available “Data Sources” (Figure 5). When the user selects the time period for which they wish to generate data, the available data sources are automatically restricted. The restricted time period is set by the time period for which data is available (Figure 5).

WebMARVL ensures that the user can only request a valid combination of input data (i.e., all requested data sources must be available for the specified time extent). If data are unavailable for the selected time period, then the Data Source is marked with a cross, indicating that it is unavailable for the current configuration (see Figure 6).

After all data sources have been selected for all required, the “Submit” button becomes enabled (Figure 7). The user can then either refine the selections, or click submit. After the user clicks submit, the data extract process begins. For this version of WebMARVL, the data extraction services were hosted on separate servers within the CSIRO. Ultimately, these services will be performed at TPAC. After the data extract processes are complete, the “Download” button is enabled (Figure 8), allowing the user to download the requested data files to their own archive.

For this version of WebMARVL, only four data sources were available for testing. These included two data sources for oceanic variables (OFAM2-1-NRT and OFAM2-1-AN) – both of which are output from the operational ocean forecast system at the Bureau of Meteorology (BoM; [www.bom.gov.au/oceanography/forecasts/](http://www.bom.gov.au/oceanography/forecasts/)); and two data source for atmospheric variables (ACCESS-A and ACCESS-G) – based on operational weather forecasts at the BoM. Ultimately, the available data will include several additional oceanic and atmospheric data sets.

The testers were provided with a script and checklist to complete an end-to-end process of logging in, model selection, time period selection, input data source selection, initiation of the data extraction process, downloading the extracted data, verifying the downloaded archive, and logging out. Completion of this checklist, and return of the test plans (attached at the end of this report) demonstrates completion of the AC2.2 (see Appendix A and B). In addition to the required tests, both testers then took the next step, and ran the model using the automatically-extracted data. The model integrated successfully for both testers.

Both testers were knowledgeable about the model. Both provided useful feedback on the WebMARVL user interface that will be incorporated in the next milestone. Both testers reported that WebMARVL was intuitive and easy to use after a very short instructional period. Overall impressions were reported as being very positive.

## References

- Jones, E. M., P. R. Oke, F. Rizwi, L. M. Murray, 2012: Assimilation of glider and mooring data into a coastal ocean model, *Ocean Modelling*, **47**, 1-13.
- Herzfeld, M., 2009: "Improving stability of regional numerical ocean models." *Ocean Dynamics*, **59**, 21-46.

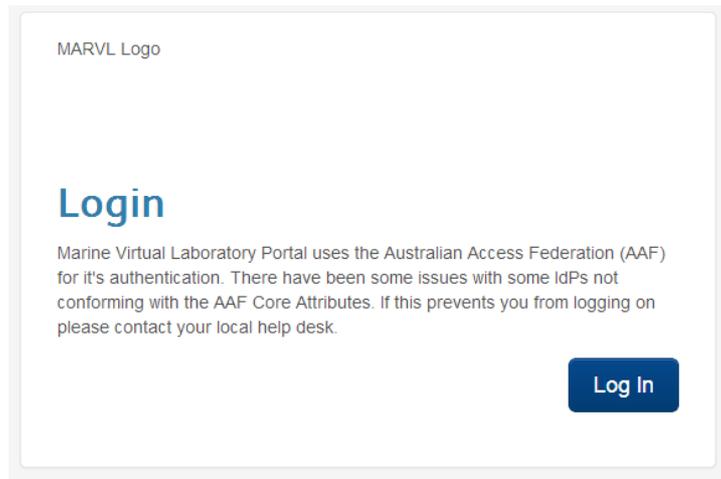


Figure 1: Screen shot of the Login page for WebMARVL.



Figure 2: Screen shot of the Australian Access Federation Login page.

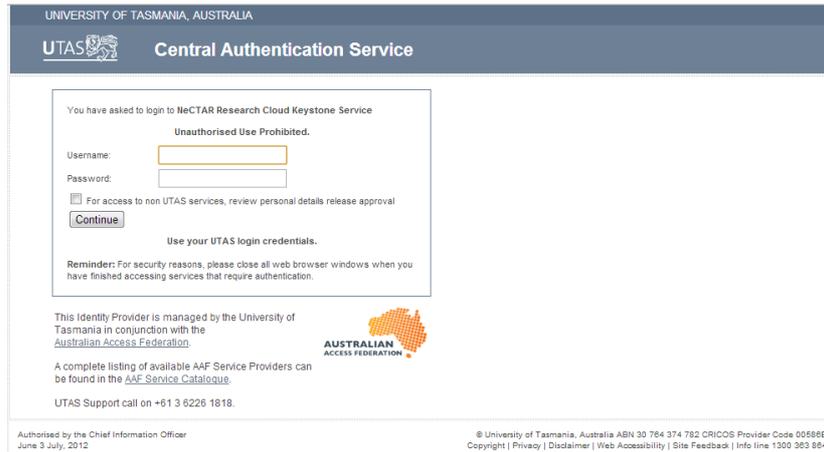


Figure 3: Screen shot of the AAF Username and Password Input screen (University of Tasmania).



Figure 4: Screen shot of the WebMARVL portal home page.

Marine Virtual Laboratory Portal

Logged in as: Mark Heppburn@csiro.au

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Model Control

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## Model Control

SHOC, Storm INFORMD model

Required Variables:

- Temp
- Eta
- Salt
- U,V
- Wind\_u,Wind\_v
- Mslp** ✓ (access-a-surface)

Data Sources:

- eta
- salt
- temp
- ACCESS-A-SURFACE (04/08/2010-28/03/2013)
- mslp**
- wind\_u,wind\_v
- ACCESS-B-SURFACE

Date Range: 12/07/2012-13/12/2012

Submit

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Figure 5: Screen shot of MARVL, demonstrating the configuration progress. The user can select the time period for which they require forcing fields using a slide bar (see bottom right of the figure), and available data sources for each variable are enabled. In this example, the user has selected the variable “mslp” (mean sea-level\_pressure) from the ACCESS-A database. After this has been selected, Mslp is ticked under the “Required Variables” list, showing the selected data source (access-a-surface).

Marine Virtual Laboratory Portal

Logged in as: Mark.Hepburn@csiro.au

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## Model Control

SHOC, Storm INFORMD model

Required Variables:

- Temp
- Eta
- Salt
- U,V
- Wind\_u,Wind\_v
- Mslp

Data Sources:

- ✘ OFAM2-1-AN (21/10/2012-19/03/2013)
- U,V
- eta
- salt
- temp
- ✘ OFAM2-1-NRT (25/10/2012-)

Date Range: 04/08/2010-29/03/2013

Submit

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Figure 6: Screen shot of WebMARVL showing the extraction properties interface. Note that there are six required variables (temperature; salinity; sea-level - listed as Eta; velocity - listed as U,V; wind - listed as Wind\_u,Wind\_v; and mean sea-level pressure). In this example, the user has selected a time-period for which forcing fields are unavailable. This unavailability is indicated to the user by the crosses next to the Data Sources (note the cross next to the titles OFAM2-1-AN and OFAM2-1-NRT).

Marine Virtual Laboratory Portal

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## Model Control

SHOC, Storm INFORMD model

Required Variables:

- Temp ✓ (ofam2-1-an)
- Eta ✓ (ofam2-1-an)
- Salt ✓ (ofam2-1-an)
- U,V ✓ (ofam2-1-an)
- Wind\_u,Wind\_v ✓ (access-a-surface)
- Mslp ✓ (access-a-surface)

Data Sources:

- eta
- salt
- temp
- ✗ OFAM2-1-NRT (25/10/2012-24/03/2013)
- u,v
- eta
- salt

Date Range: 24/10/2012-17/12/2012

Submit

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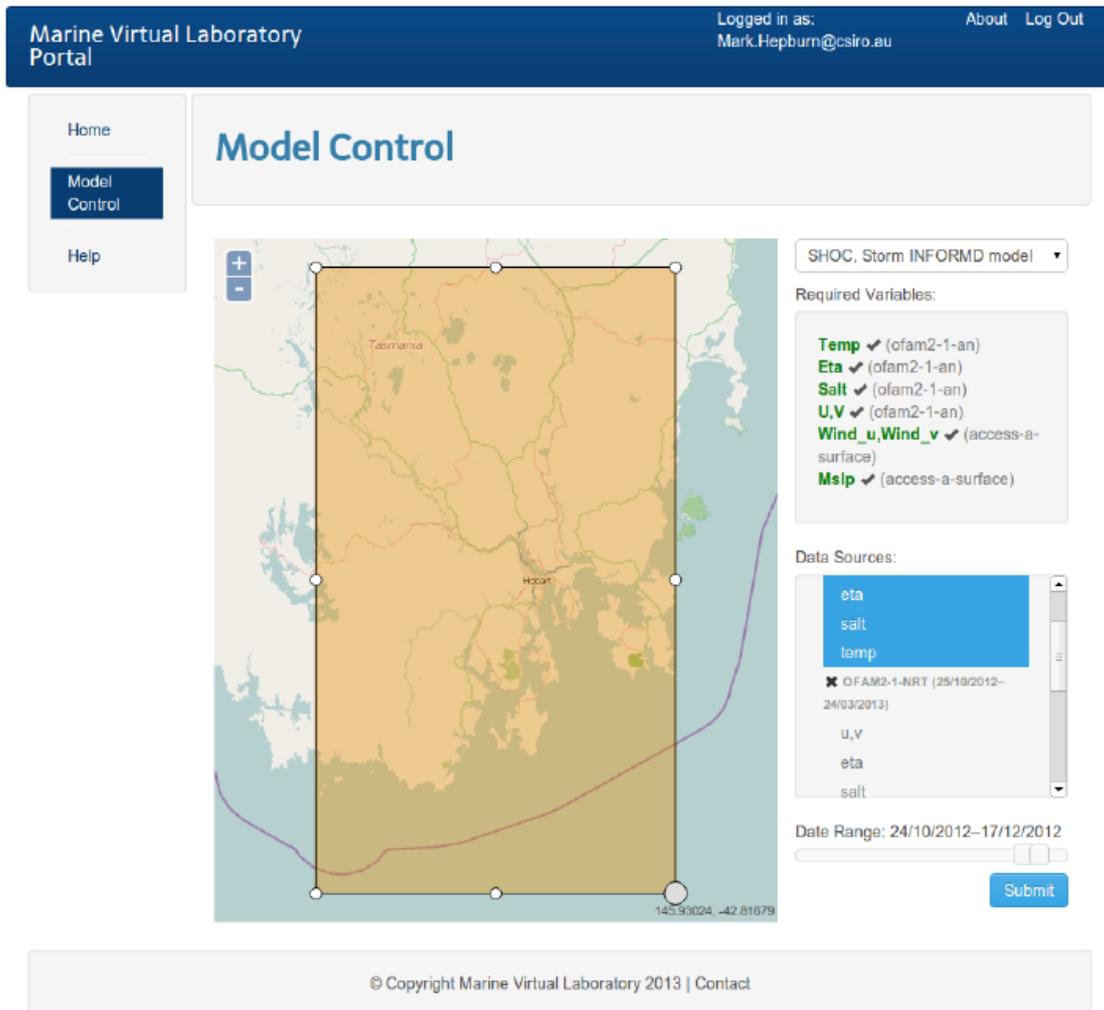


Figure 7: Screen short of WebMARVL for an example where the time-period has been selected, and the data sources have been selected for all required variables, and the data extraction request is ready to be submitted. Note that all variables have now been selected, and the “Submit” button has been enabled (see the bottom right of the figure). The ofam2-1-nrt data source is still out of range and unavailable, but this data source has not been chosen for this configuration.

Marine Virtual Laboratory Portal

Logged in as: Mark.Hepburn@csiro.au

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## Model Control

SHOC, Storm INFORMD model

Required Variables:

- Temp ✓ (ofam2-1-an)
- Eta ✓ (ofam2-1-an)
- Salt ✓ (ofam2-1-an)
- U,V ✓ (ofam2-1-an)
- Wind\_u,Wind\_v ✓ (access-a-surface)
- Mslp ✓ (access-a-surface)

Data Sources:

- eta
- salt
- temp
- ✘ OFAM2-1-NRT (25/10/2012-24/03/2013)
- u,v
- eta
- salt

Date Range: 24/10/2012-17/12/2012

Download

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Figure 8: As for Figure 7, except showing that the “Download” button has been enabled (see the bottom right of the figure). The download button is only enabled after the data extraction is complete