paraMESH
User Support

Running MESH with ParaMESH

For Users with an Existing MESH Directory

September 11, 2009

Disclaimer

ParaMESH is an advanced parameter management software. The user should use ParaMESH to manage their parameter files during the optimization or run-time of any compatible model.

ParaMESH is not an independent model and cannot provide additional support for compatible models. Technical support for compatible models may be provided by independent and third-party model developers. ParaMESH will link to support and contact information for compatible models whenever it is possible; however, it cannot provide additional support information for model expansion packs which have not been released exclusively by the ParaMESH development team.

Additional software and ParaMESH support may be available online at: http://www.eng.uwaterloo.ca/~dprincz/.

ParaMESH has been developed by D. G. Princz and has been supported, in part, by Dr. E. D. Soulis at the University of Waterloo and B. Davison at the National Hydrology Research Centre (NHRC) of Environment Canada.

MESH is an independent software and is supported by the Hydrometeorology and Arctic Laboratory of Environment Canada. Additional software and MESH support may be available online at: http://halfront.wxe.sk.ec.gc.ca/html/documents/store/index.html.

Windows is a registered trademark of Microsoft Corporation.

Notes

The instructions of this document apply to the "Classic View" of all versions of ParaMESH 1.2 and above. The user should have a working knowledge of Windows® and some of its tasks, such as copying, pasting, and opening files.

The user should note that:

- **Stylized** words denote section references within this document;
- *Italicized* words denote buttons, checkboxes, and other form controls;
- **Emphasized** words denote program prompts, windows, and figures; and,
- `Teletype` words denote file names and programming code.

The instructions of this document apply to versions of ParaMESH 1.2 and above that have been configured for the MESH environment. The user should have a working knowledge of the MESH model and its required input files.

The terms "input files", "configuration files", and "parameter files" are synonymous in this text.

Revisions

This document was updated on September 11, 2009, for ParaMESH Version 1.2.1.0 and MESH 1.2.

This document was originally released on August 9, 2008, for ParaMESH Version 1.1.6.0 and MESH 1.0, sub-releases 1.0.c02 through 1.0.c06, and MESH 1.1, sub-releases 1.1.a01 through 1.1.a04.

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Running MESH with ParaMESH

This document will review the necessary steps to load an existing MESH directory and run the MESH model using ParaMESH. The user should have a certain familiarity with the MESH model, and an existing MESH directory should have already been created by the user.

ParaMESH (Version 1.2)

ParaMESH is an advanced parameter management software that has been configured for MESH. ParaMESH may be used to manage the following MESH input files:

- `MESH_input_run_options.ini`
- `MESH_input_soil_levels.txt`
- `MESH_parameters_CLASS.ini`
- `MESH_parameters_hydrology.ini`

The graphical user interface used in the "Classic View" of ParaMESH is illustrated in **Figure 1**. The circled numbers correspond to the five steps that will be reviewed in this document.

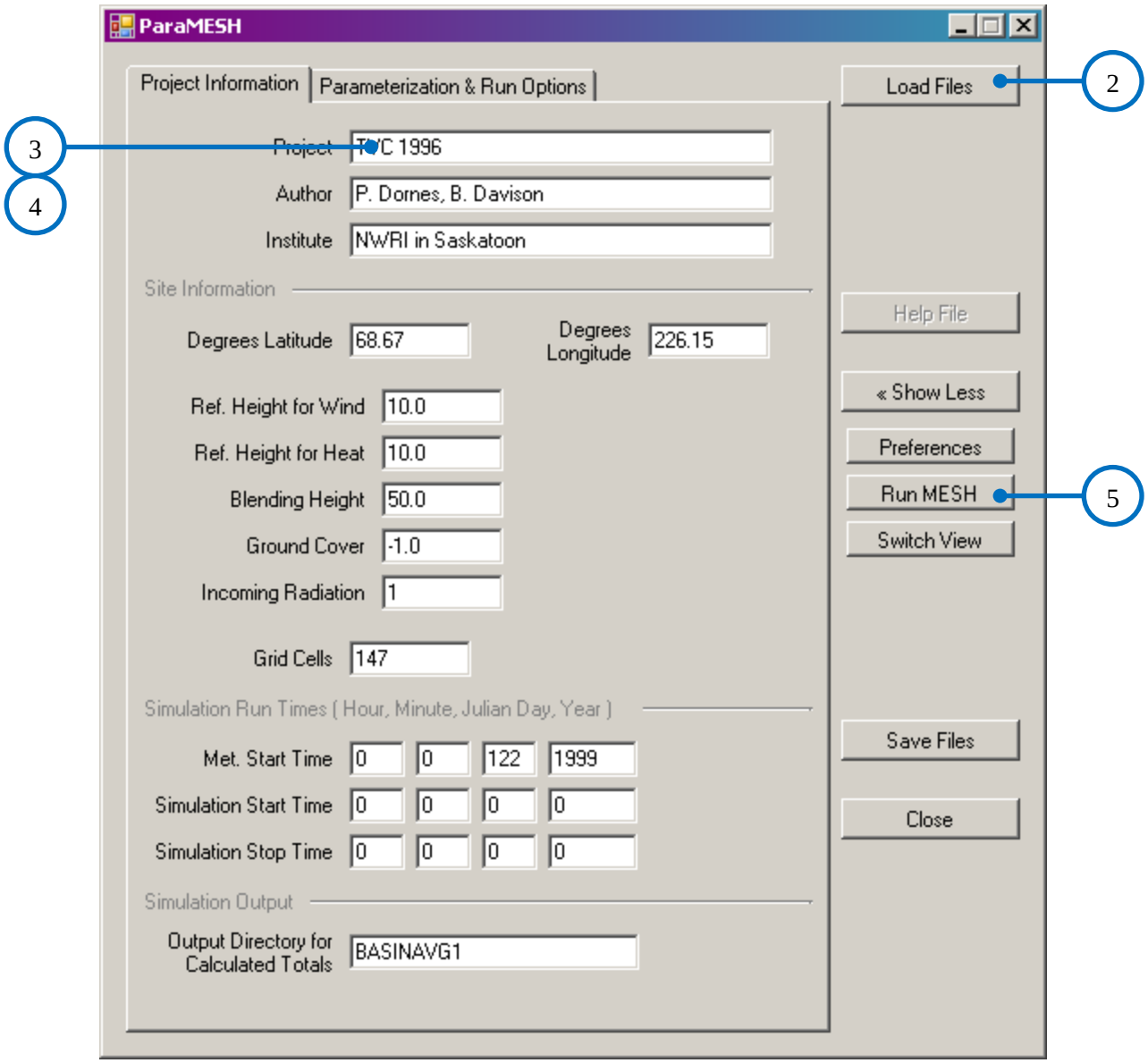

Figure 1 The graphical user interface used by the "Classic View" in ParaMESH. The circled numbers correspond to the five steps that will be reviewed in this document.

Step 1: Preparing the MESH directory for ParaMESH

Certain input files are required to run MESH, which may include:

- The MESH executable; i.e.: `mesh.ifort.exe`.
- `MESH_input_drainage_database.txt`; the drainage and topographical map file.
- `MESH_input_forcing.bin`; the binary-format meteorological forcing data—the name and format of this file may differ with newer versions of MESH.
- `MESH_input_reservoir.txt`; the reservoir information file.
- `MESH_input_run_options.ini`; the run options forcing file used to configure MESH.
- `MESH_input_soil_levels.txt`; the absolute and cumulative soil depths of the basin.
- `MESH_input_streamflow.txt`; the observed streamflow, used for comparative purposes.
- `MESH_parameters_CLASS.ini`; the CLASS-specific parameter file.
- `MESH_parameters_hydrology.ini`; the water flow and surface routing parameter file.

Note: Refer to the MESH documentation for a detailed list of required input files.

ParaMESH may be used to manage the following input files:

- `MESH_input_run_options.ini`
- `MESH_input_soil_levels.txt`
- `MESH_parameters_CLASS.ini`
- `MESH_parameters_hydrology.ini`

ParaMESH uses a batch file, called `mesh.bat`, to run the MESH model. Follow the subsequent procedure to create this file if it has not already been created in the MESH directory.

1. In Windows Explorer, browse to the MESH directory.
2. Create a new text file named "`mesh.bat`". Ensure that the "`.txt`" extension has been replaced by "`.bat`".
3. Open `mesh.bat` with a plain-text file editor (i.e.: Notepad).
4. Type the name of the MESH executable. Include quotation marks if the filename includes spaces and other non-alphanumeric characters (refer to **Figure 2**).
5. Save and close the file.

The batch file may contain the following text:

```
"mesh.ifort.exe"
pause
```

Figure 2 An example of the text in the `mesh.bat` file, used by ParaMESH to run the MESH model.

Note: Users may wish to include the command "`pause`" after calling the executable. This command will prevent the MESH console from closing once the simulation has ended. The user may also wish to modify the batch file to run more complicated simulation routines.

Step 2: Loading the input files with ParaMESH

The input files do not have to be re-created to run the MESH model. Follow the subsequent procedure to load the input files using ParaMESH.

1. Load ParaMESH.
2. Click the *Load Files* button (refer to **Circle 2** in **Figure 1**). The **Load Files** window will open.
3. Click [...] to browse to the MESH directory (refer to **Figure 3**).

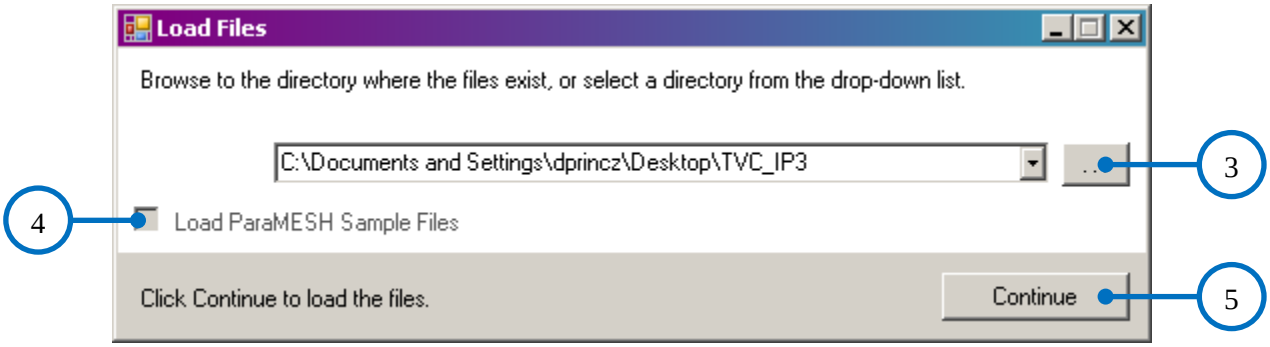

Figure 3 The **Load Files** window. The circled numbers correspond to the procedure in **Step 2: Loading the input files with ParaMESH**.

4. Browse to the MESH directory in the **Browse for Folder** window. Click *OK*.

   Do not check the *Load ParaMESH Sample Files* checkbox in the **Load Files** window. Checking this checkbox will load the sample files, if installed, and will risk overwriting any existing input files in the MESH directory.

5. Click *Continue*. The **Load Files** window will close. ParaMESH will load the input files.

Step 3: Verifying parameter values with ParaMESH

ParaMESH automatically verifies parameter values once they have been modified by the user. Follow the subsequent procedure to become familiar with the parameter verification process.

Note: Parameter verification is enabled by default, but may be disabled with the **User Preferences** window. Refer to the ParaMESH 'Quick Set' Instruction Manual for more information.

3.1: Parameter Warnings

1. Once the MESH directory has been loaded, select the text in the *Blending Height* field under the *Project Information* tab of the main ParaMESH window (refer to **Figure 1**).
2. Strike *Enter* (carriage return) on the keyboard to save the value. If parameter verification has been enabled, the **Parameter Verification** window will open.

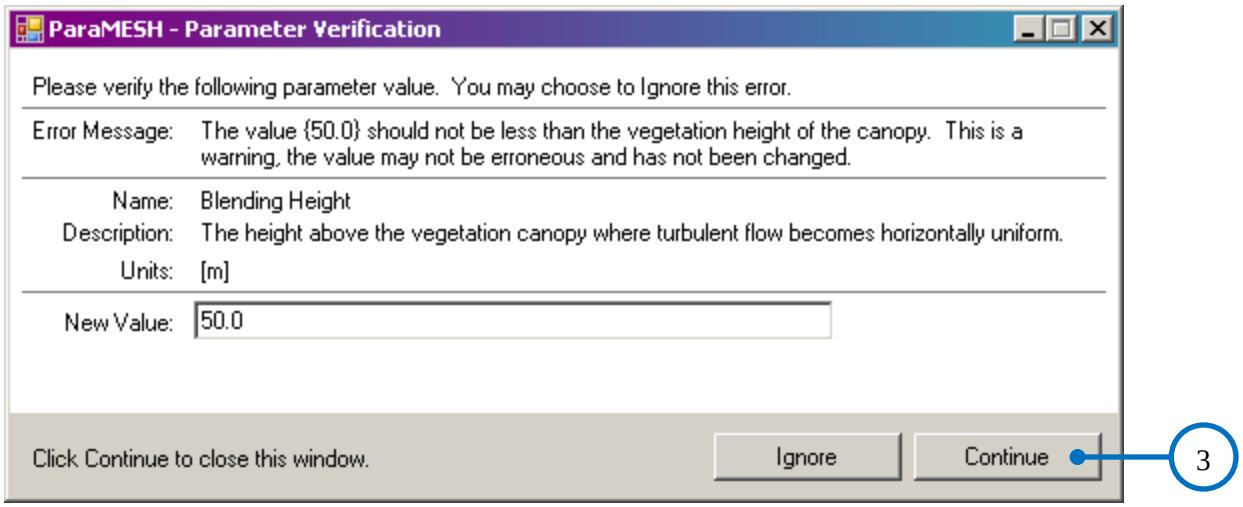

Figure 4 The **Parameter Verification** window prompting the user to acknowledge a warning. The circled number corresponds to the procedure in **Step 3.1: Verifying parameter values with ParaMESH (Parameter Warnings)**.

ParaMESH has discovered a warning related to the *Blending Height* parameter. An error message explains the warning. Helpful information, such as the description and units, if applicable, of the parameter are displayed.

Because ParaMESH has only found a warning associated with the parameter, the parameter value has not been changed. The user may choose to ignore the warning.

3. Click *Continue*. The **Parameter Verification** window will close. ParaMESH will save the parameter value.

3.2: Parameter Errors

1. Once the MESH directory has been loaded, select the text in the *Degrees Latitude* field under the *Project Information* tab of the main ParaMESH window (refer to **Figure 1**).
2. Append the letter "d" to the end of the value. Strike *Enter* (carriage return) on the keyboard to save the value. If parameter verification has been enabled, the **Parameter Verification** window will open.

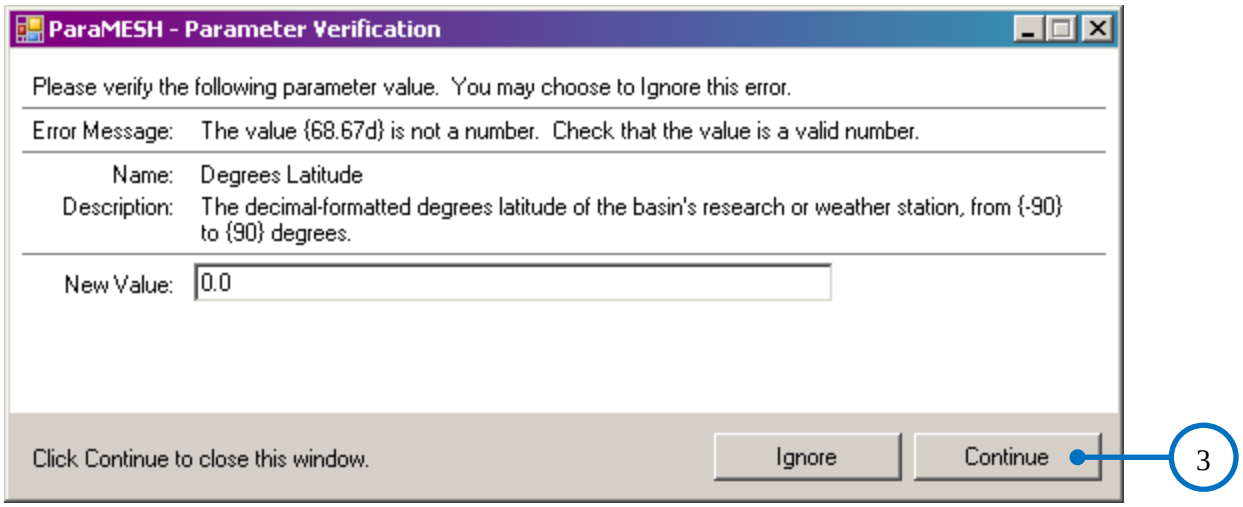

Figure 5 The **Parameter Verification** window prompting the user to acknowledge an error. The circled number corresponds to the procedure in **Step 3.2: Verifying parameter values with ParaMESH (Parameter Errors)**.

ParaMESH has discovered an error related to the *Degrees Latitude* parameter. An error message explains the error. Helpful information, such as the description, appropriate values, and units, if applicable, of the parameter are displayed. The user may choose to ignore the warning.

3. Enter "`0.0`" in the *New Value* field. The original value will be restored in **Step 4** of this tutorial.
4. Click *Continue*. The **Parameter Verification** window will close. ParaMESH will save the parameter value.

Note: The Parameter Verification window will continue to prompt the user until the parameter value has been corrected, or until the user has chosen to ignore the error. Ignoring the error will prevent ParaMESH from verifying the parameter until a new MESH directory has been loaded, or until the list of errors being ignored by ParaMESH has been reset in the **User Preferences** window. Refer to the ParaMESH 'Quick Set' Instruction Manual for more information.

Step 4: Restoring parameter values with ParaMESH

Parameters values may be restored using the parameter restore component of ParaMESH. Follow the subsequent procedure to become familiar with this process.

This procedure references the procedure reviewed in **Step 3**.

1. Once the modified *Degrees Latitude* value has been saved (refer to **Step 3.2**), right-click the parameter's field. A context menu will appear (refer to **Figure 5**).

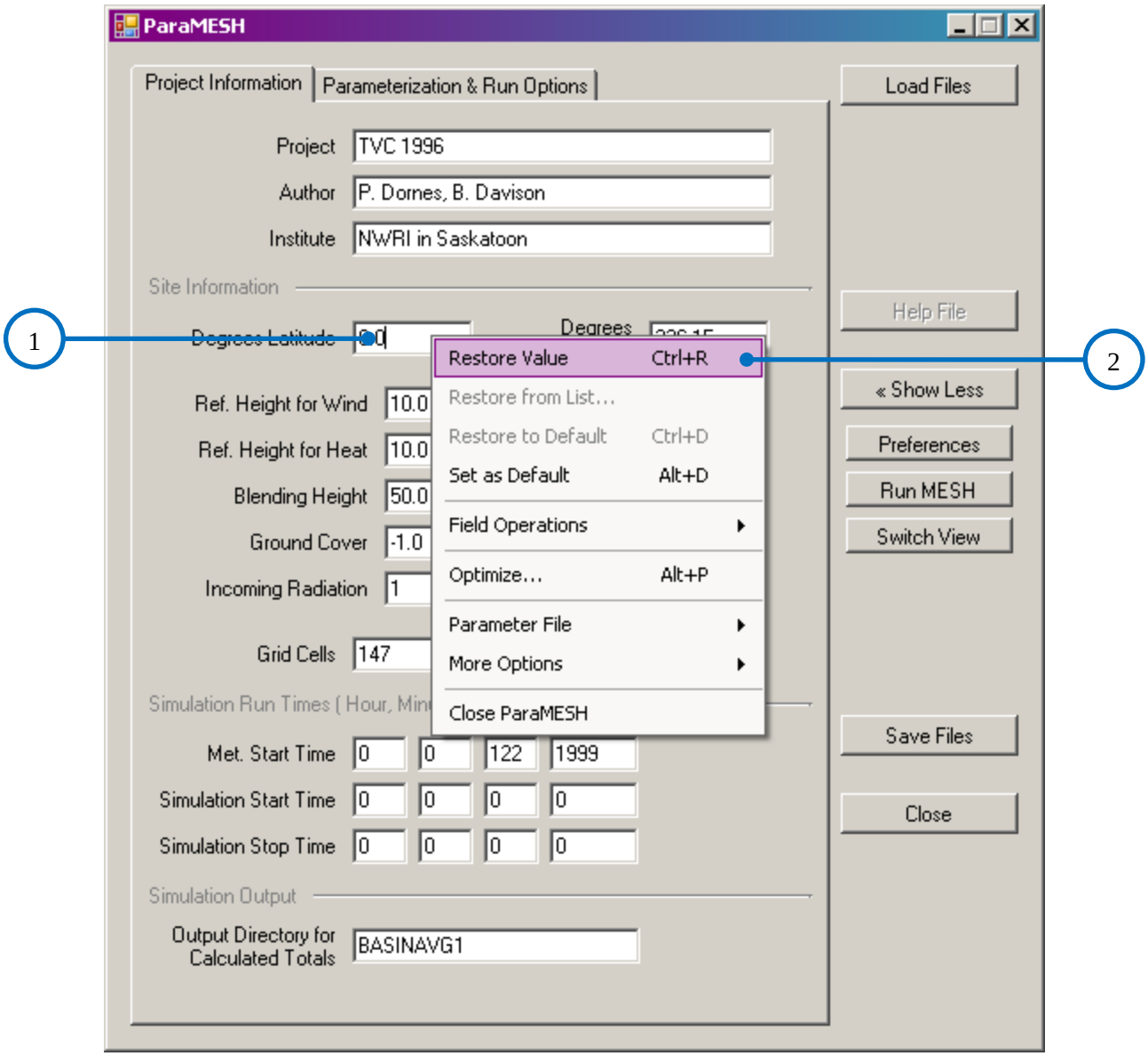

Figure 5 The parameter field context menu. The circled numbers correspond to the procedure in **Step 4: Restoring parameter values with ParaMESH**.

2. Click *Restore Value*. The previous parameter value will be restored.

   Note: A new window will appear if more than two values have been used for this parameter. Choose the value you wish to restore from the drop-down list and click *Continue*. ParaMESH will restore the parameter value.

Note: Previously used parameter values are not saved when a new MESH directory is loaded. A record of previously used parameter values can only be saved by saving the active session. ParaMESH will prompt the user to save the active session whenever a new MESH directory has been loaded, or whenever ParaMESH is being closed.

Step 5: Running the MESH executable with ParaMESH

ParaMESH may be used to run the MESH model. Follow the subsequent procedure to become familiar with this process.

Note: ParaMESH will not run the MESH executable if `mesh.bat` does not exist in the MESH directory (refer to **Step 1**).

1. Click the *Show More ››* button in the main ParaMESH window to show the *Run MESH* button.
2. Click the *Run MESH* button. ParaMESH will verify the parameter values. The **Parameter Verification** window will open if any erroneous values have been found (refer to **Step 3**). ParaMESH will save the parameter files and run `mesh.bat`. The MESH console will open.
3. ParaMESH will ask the user if the MESH directory should be opened. Click *Yes* to open the MESH directory or click *No* to do nothing.

Closing Remarks

Continue to parameterize MESH by following the procedures that have been reviewed in this document.

Save the directory's session whenever ParaMESH has been closed or a new MESH directory has been loaded to preserve a history of any changes that have been made to the input files.

Users may choose to save their preferences to prevent ParaMESH from asking repeated questions. Check the *Save this preference* checkbox in any ParaMESH prompt to save the preferred course of action. Critical prompts may not show the *Save this preference* checkbox. Individual preferences may be reset in the **User Preferences** window. Refer to the ParaMESH 'Quick Set' Instruction Manual for more information.