CONTENTS

1 In brief 1
2 User manual 3
3 List of references 21
4 Development notes 23
5 How to contribute 25
6 License 27
7 Credits 31
Index 33
HydrOffice is a research development environment for ocean mapping. It provides a collection of hydro-packages, each of them dealing with a specific issue of the field. The main goal is to speed up both algorithms testing and research-to-operation (R2O).

HydrOffice Stormfix is a collection of tools to reduce artifacts in acoustic backscatter data (see List of references).
The common workflow is to first detect the corrupted pings (Detect artifacts tab), then reduce them (Reduce artifacts tab).

### 2.1 Detect artifacts

You can access the tools in this tab after having loaded some data (Inputs/Outputs tab).

#### 2.1.1 Inputs/Outputs

This tab is used to define the input binary data, by selecting files in Kongsberg formats (.all and .wcd), the control files, and to set the location for outputs (e.g., fix files).

To access these functionalities, you need to select the Detect artifacts tab on top of the application, then the Inputs/Outputs sub-tab at the lower-left corner.

**Note:** Currently supported Kongsberg sonars: EM 122, EM 302, EM 710, ME70 BO, EM 2040, and EM 2040C.

### Data Inputs

In Data inputs:

- Drag-and-drop input binary files (.all or .wcd) in the Input files field. (The “+” browse button may also be used.)
- Drag-and-drop control files (.ctrl) in the Control files field. (The “+” browse button may also be used.)
- The References field is currently unused.
- The directory and filename of loaded data will populate the respective field of Data inputs.
- With the addition of a input binary file, the Track WCD MAD sub-tab on the bottom of the interface will become available (Fig. 2.1).
- When both a binary file and a control file are loaded, the Just check sub-tab on the bottom of the interface will become available (Fig. 2.1).
- The Clear data button may be used to remove all data inputs.
- The Info button provides a link to the present section of the manual.
- Additional functionalities are available by right-clicking on the loaded binary files (Fig. 2.2) and control files (Fig. 2.3). See Context Menu.
Fig. 2.1: The Inputs/Output sub-tab in the Detect Artifact tab.
Fig. 2.2: Context menu accessible by right-clicking on a binary input file.

2.1. Detect artifacts
Fig. 2.3: Context menu accessible by right-clicking on a control input file.
**Context Menu**

With binary files, the context menu provides access to actions to:

- Remove binary files.
- Create a new, empty Control File.
- Make exploratory plots of the raw data content (Fig. 2.9).

When selected control files, the context menu provides access to the *Control File Viewer/Editor*.

![Fig. 2.4: Water Column Data values retrieved from the raw binary data.](image)

**Data Outputs**

In data outputs:

- The default output folder location is listed; however, this may be modified via drag-and-drop (or browse to) a user-specified output folder. To return to the default output folder location, click *Use default.*
• The ensuing functions will open the output folder automatically upon execution; however, if needed, the specified output folder may be accessed by clicking the **Open folder** button.

• The **Info** button provides a link to the present section of the manual.

### 2.1.2 Just Check

This tool just checks the Control files against the binary files, then it creates the resulting Fix files.

### 2.1.3 WCD Track

This tool detects pings with artifacts.

**How To Use?**

In **Parameters** (Fig. 2.5):

- Switch the knobs to use median- or mean-based tracking, to visualize and/or to save plots intermediate steps of the monitoring algorithm.
- Select the number of horizontal bands to monitor along the water column.
- Set the number of initial samples (in pings) before starting to flag pings.
- Set the range factor that is multiplied by the moving MAD/standard deviation to decide if a section votes to flag a ping.
- Choice the number of sections in a band that have to positively vote in order to flag a ping.

**How Does It Work?**

See *List of references*.

### 2.2 Reduce artifacts

You can access the tools in this tab after having loaded some data (**Inputs/Outputs** tab).
Fig. 2.5: The WCD Track sub-tab in the Detect Artifact tab.

2.2. Reduce artifacts


2.2.1 Inputs/Outputs

This tab is used to define the input binary data, by selecting files in Kongsberg formats (.all and .wcd), the fix files, and to set the location for outputs.

To access these functionalities, you need to select the **Reduce artifacts** tab on top of the application, then the **Inputs/Outputs** sub-tab at the lower-left corner.

**Note:** Currently supported Kongsberg sonars: **EM 122, EM 302, EM 710, ME70 BO, EM 2040, and EM 2040C**.

**Data Inputs**

In **Data inputs**:

- Drag-and-drop input binary files (.all or .wcd) in the **Input files** field. (The “+” browse button may also be used.)
- Drag-and-drop fix files (.sfix) in the **Fix files** field. (The “+” browse button may also be used.)
- The **References** field is currently unused.
- The directory and filename of loaded data will populate in the respective field of **Data inputs**.
- When both a binary file and a fix file are loaded, the **Remove flagged pings** sub-tab and the **Randomize snippets in flagged pings** sub-tab on the bottom of the interface will become available (Fig. 2.6).
- The **Clear data** button may be used to remove all data inputs.
- The **Info** button provides a link to the present manual.
- Additional functionalities are available by right-clicking on the loaded binary files (Fig. 2.7) and fix files (Fig. 2.8). See **Context Menu**.

**Context Menu**

With binary files, the context menu provides exploratory plots of the raw data content (Fig. 2.9).

With control files, the context menu provides access to the **Fix File Viewer/Editor**.

**Data Outputs**

In **Data outputs**:

- The default output **Folder** location is listed; however, this may be modified via drag-and-drop (or browse to) a user-specified output folder. To return to the default output folder location, click **Use default**.
- The ensuing functions will open the output folder automatically upon execution; however, if needed, the specified output folder may be accessed by clicking the **Open folder** button.
- The **Info** button provides a link to the present manual.

2.2.2 Remove Flagged Pings

This tool simply creates a copy of the binary files without the flagged pings.
Fig. 2.6: The Inputs/Output sub-tab in the Reduce Artifact tab.
Fig. 2.7: Context menu accessible by right-clicking on a binary input file.
Fig. 2.8: Context menu accessible by right-clicking on a fix input file.
Fig. 2.9: Roll values retrieved from the raw binary data.
2.2.3 Randomize Flagged Pings

This tool reduces the effect of artifacts in the flagged pings.

How To Use?

In Parameters (Fig. 2.10):

- Select the number of maximum gap in pings that you allow for randomize the flagged pings. If greater, the pings are removed.

Fig. 2.10: The Randomize Flagged Pings sub-tab in the Reduce Artifact tab.
How Does It Work?

See *List of references*.

## 2.3 Info tab

The Info Tab contains numerous helpful links and utilities:

- The HydrOffice’s *Oceano website* (*StormFix* is part of the Oceano project).
- Online and Offline Documentation.
- License Information.
- Authors List.
- The HydrOffice Main Page.
- The Center for Coastal and Ocean Mapping/Joint Hydrographic Center (CCOM/JHC) Main Page.
- The University of New Hampshire (UNH) Main Page.

## 2.4 Editors

### 2.4.1 Control File Viewer/Editor

The Control File Viewer/Editor provides functionalities to visualize, edit and validate Control files (.ctrl).

A *Control file* (Fig. 2.12) is used to customize the detection of corrupted pings.

Each row of a Control file must start with:

- ‘#’ for a single-line comment.
- ‘+’ for adding pings to the list of the flagged ones.
- ‘-‘ for removing pings from being analyzed for flagging.

It is possible to identify a single ping (e.g., ‘+ 1234’) or a range of pings (e.g., ‘+ 1234 1240’).

### 2.4.2 Fix File Viewer/Editor

The Fix File Viewer/Editor provides functionalities to visualize, edit and validate Fix files (.sfix).

A *Fix file* (Fig. 2.13) is used to customize the reduction of corrupted pings.

Each row of a Fix file must start with:

- ‘#’ for a single-line comment.
Fig. 2.11: The Info tab.
Fig. 2.12: An example of Control file.
Fig. 2.13: An example of Fix file.
• ‘@’ for flagged pings.

It is possible to identify a single ping (e.g., ‘@ 1234’) or a range of pings (e.g., ‘@ 1234 1240’).
DEVELOPMENT NOTES

N/A
CHAPTER
FIVE

HOW TO CONTRIBUTE

Every open source project lives from the generous help by contributors that sacrifice their time and this is no different. To make participation as pleasant as possible, this project adheres to the Code of Conduct by the Python Software Foundation.

Here are a few hints and rules to get you started:

- Add yourself to the AUTHORS.txt file in an alphabetical fashion. Every contribution is valuable and shall be credited.
- If your change is noteworthy, add an entry to the changelog.
- No contribution is too small; please submit as many fixes for typos and grammar bloopers as you can!
- Don’t ever break backward compatibility.
- Always add tests and docs for your code. This is a hard rule; patches with missing tests or documentation won’t be merged. If a feature is not tested or documented, it does not exist.
- Obey PEP 8 and PEP 257.
- Write good commit messages.
- Ideally, collapse your commits, i.e. make your pull requests just one commit.

Note: If you have something great but aren’t sure whether it adheres – or even can adhere – to the rules above: please submit a pull request anyway! In the best case, we can mold it into something, in the worst case the pull request gets politely closed. There’s absolutely nothing to fear.

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Oceano is a project developed by the UNH’s Center for Coastal and Ocean Mapping.

For bugs and feature requests: hydroffice.oceano@ccom.unh.edu

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Symbols

.all, 3, 10
.wcd, 3, 10

A
acoustic backscatter, 1
artifacts, 1
artifacts, detect, 8
artifacts, reduce, 10, 15

C
control file, 3, 10, 16

D
data
  - browsing, 3, 10
  - clear, 3, 10
  - folder, 7, 10
  - data inputs, 3, 10
  - data outputs, 7, 10
  - drag-and-drop, 3, 10

F
fix file, 3, 10, 16