# Supplementary materials

## 1 - REWARE procedure

The REWARE procedure may be applied using Script 1. See main manuscript for details.

### Script 1

#!/bin/bash

#################################################################

# REWARE (REcovery of Water-column Acoustic REflectors)

# Sylvain et al. (2024)

# A simple method to fully leverage Sparker data

# Creates a copy of the data (shifted of 1 trace) and pastes it below the original record (without the last trace)

# INPUT (RAW DATA) and OUTPUT (REWARE) are SEG-Y files

# Submitted to Geophysical Journal International - Express Letters

#################################################################

SEGIN=”line.sgy” # input SEG-Y file

REWARE=”line\_REWARE-nomute.sgy” # output SEG-Y file

# Creating D1 (ntr corresponds to the last extracted trace)

ntr=`segyread tape=$SEG | segyclean | surange | awk '$1=="fldr" {print $3-1}'`

segyread tape=$SEG | segyclean | suwind key=fldr min=1 max=$ntr > 1.su

# Creating D2 (ntr corresponds to the last extracted trace)

ntr=`expr $ntr + 1`

segyread tape=$SEG | segyclean | suwind key=fldr min=2 max=$ntr > 2.su

# Merging D1 and D2

suvcat 1.su 2.su taplen=0 > tmp\_SD.su

# Extract the header from SU file and creating the new REWARE SEG-Y files

segyhdrs < tmp.su

segywrite tape=$REWARE hfile=header bfile=binary < tmp.su

## 2 - Mute picking

To make the surgical mute, we propose two options:

1. Import an interpreted horizon of the seafloor from raw data in a seismic interpretation software (e.g. Kingdom Suite ®) as a three-column text file (line number, trace number, two-way time) for the whole dataset and then extract the seafloor horizon for each line, as new text file (trace number, two-way time) using script 2.
2. The second option consists of using a picking tool of Seismic Un\*x using script 3

Both scripts (2 and 3) use the function *mkparfile*, which is part of Seismic Un\*x, and convert the input two-column text file into a Seismic Un\*x readable file for the water-column mute.

### Script 2 – Option 1 (using a seismic interpretation software)

#!/bin/bash

################################################################

# Creating mute file from text file (line, trace, time) extracted from IHS Kingdom Suite

# Sylvain et al. (2024)

################################################################

file=”seabed.dat” #seabed.dat is a three-column file (line, trace, time) for a whole survey

line=”line” # name or line number

# Extract the traces and times off seabed arrivals for a line

awk '$1=="$line " {print $2,$3}' $file > tmp\_mute\_KD.dat

# Make a .par file to use in Seismic Un\*x to mute the watercolumn

mkparfile < tmp\_mute\_KD.dat string1=xmute string2=tmute > mute.par

## Script 3 – Option 2 (using picker tool integrated into Seismic Un\*x)

#!/bin/bash

################################################################

# Creating mute file from text file (line, trace, time) extracted from HIS Kingdom Suite

# Sylvain et al. (2024)

################################################################

SEGIN=”line.sgy” # input SEG-Y file

# Plot the seismic profile in a new window call “Seafloor picking” and allows to save in mute.dat the trace and time selecting by right click

segyread tape=$SEGIN | segyclean | suximage mpicks=mute.dat perc=99

windowtitle=”Seafloor picking”

# Make a .par file to use in Seismic Un\*x to mute the watercolumn

mkparfile < mute.dat string1=xmute string2=tmute > mute.par

## 3 – REWARE procedure including a water column mute

Script 4 applies a mute to the water-column data on the REWARE version of the data.

## Script 4

#!/bin/bash

#################################################################

# REWARE (REcovery of Water-column Acoustic Reflectors)

# Sylvain et al. (2024)

# A simple method to fully leverage Sparker data

# Creates a copy of the data (shifted of 1 trace) and pastes it below the original record

# Includes a bandpass filter and adds a mute of the water-column.

# INPUT and OUTPUT are SEG-Y files

# Submitted to Geophysical Journal International - Express Letters

#################################################################

SEGIN=”line.sgy” # input SEG-Y file

REWARE=”line\_REWARE.sgy” # output SEG-Y file

Mute=”mute.par” # file that contains the water mute (from Script 2 or 3)

# Creating D1 (ntr corresponds to the last extracted trace)

ntr=`segyread tape=$SEG | segyclean | surange | awk '$1=="fldr" {print $3-1}'`

segyread tape=$SEG | segyclean | suwind key=fldr min=1 max=$ntr > 1.su

# Creating D2 (ntr corresponds to the last extracted trace)

ntr=`expr $ntr + 1`

segyread tape=$SEG | segyclean | suwind key=fldr min=2 max=$ntr > 2.su

# Merging D1 and D2

suvcat 1.su 2.su taplen=0 > tmp\_SD.su

# Muting the watercolumn

sumute < tmp.su key=tracr par=$mute > tmpmute.su

# Extract the header from SU file and creating the new REWARE SEG-Y files

segyhdrs < tmpmute.su

segywrite tape=$REWARE hfile=head\_EBCDIC bfile=binary < tmpmute.su