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ADCP – Processing and Data Entry – QRevInt

QREVINT

QREVINT is used for the processing of moving boat ADCP gaugings.

Overview



The original program was called QRev and was developed by the USGS. Due to development conducted outside the USGS the name was changed from QRev to QRevInt, so as to represent the international support and development.

The software supplied by the different manufactures of ADCPs have limited automated quality assessment features. Software from different manufacturers use different algorithms for various aspects of the data processing and discharge computation.

QRevINT automates filtering and quality checking of the collected data and provides feedback to the user of potential quality issues with the measurement.

The general design of QRevINT was guided by the following criteria:

1. Process SonTek and TRDI data.
2. Use consistent algorithms.
3. Use the best available data (interpolate only what is missing or invalid).
4. Provide a logical workflow.
5. Automate data quality assessment and provide useful feedback.
6. Provide manual overrides for all automated filters.
7. Use windows with tables and graphs designed to evaluate specific problems.
8. Provide uncertainty information to the user.
9. Use a GUI and layout that is tablet friendly.

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Transferring data

Create a folder in the site gauging folder with standard naming convention

Hydrology Sites/*site name*/Gaugings/Sontek/*Gauging number_TIDEDA date_Site code*

Download files and copy .riv files (M9) or .rsqmb files (RS5), CompassCal, and SystemTest folders across.

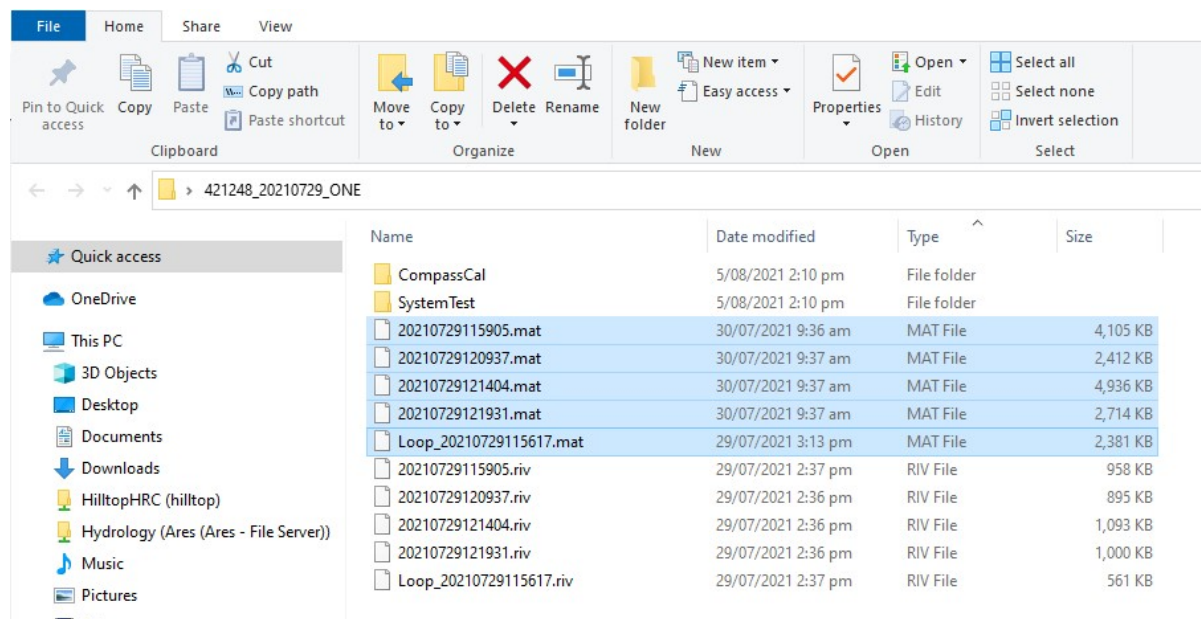
Create Matlab files

QRev opens matlab files. The M9 and RS5 are different in how they produce these files.



M9 – Open gauging files in RiverSurveyorLive. Matlab files will be automatically generated when you exit RiversurveyorLive

RS5 – Open gauging file in RSQ software and export as Matlab file.

The file structure should look something like this.



Processing transects

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Run the latest version of QRevINT

\Hydrology Sites\General Site Information\Gaugings\USGS QREV

Open the individual transects.mat files and QRev will pick up the moving bed test, compass cal and system test from the folders

Note: With the M9 the CompassCal and System test folders are held on the device you used, so if you downloaded your gaugings directly from the M9 to a different device you'll have to manually copy them across.

All processing tasks can and should be undertaken in QRevINT

QRevINT has a very good navigable help file which is located in:

\Hydrology Sites\General Site Information\Gaugings\USGS
QREV\QRevInt_XXX\Help\QRev_Users.pdf

A brief description is given here. If you require clarification, refer to the user manual.

The object of the exercise is to get green tabs along the top, which in theory should lower your gauging error.

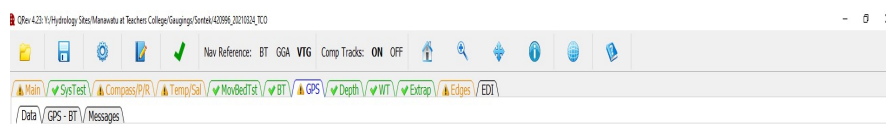
Green – Passed internal quality checks

Orange – Has failed some checks and you should have a look

Red – Failed checks and may effect the resulting discharge

Blue – User has made a change from original settings

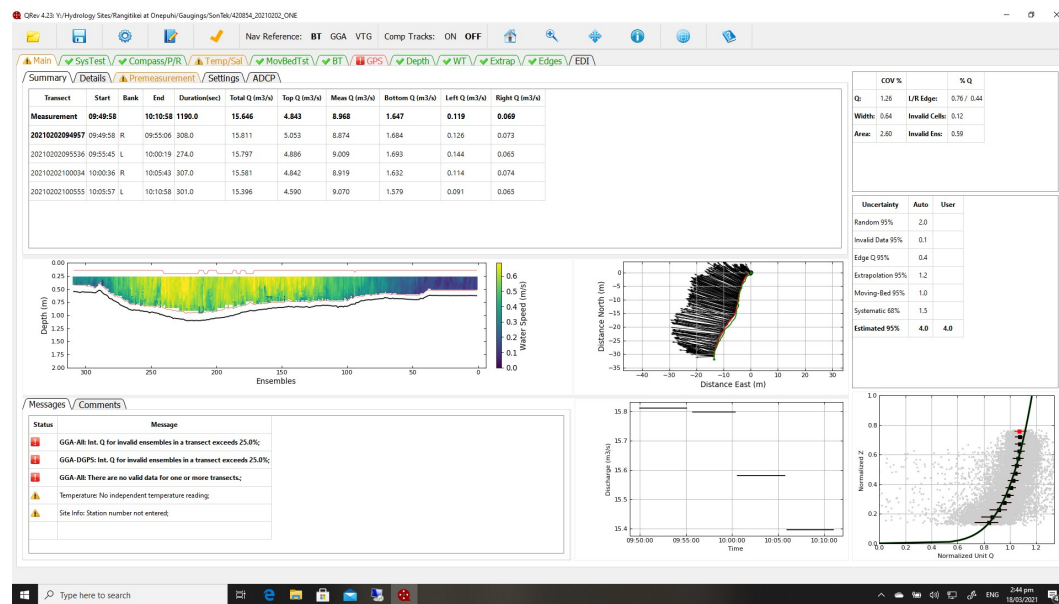
Its not immediately obvious what parameters can be edited. You have to click in the values to see what can be changed.



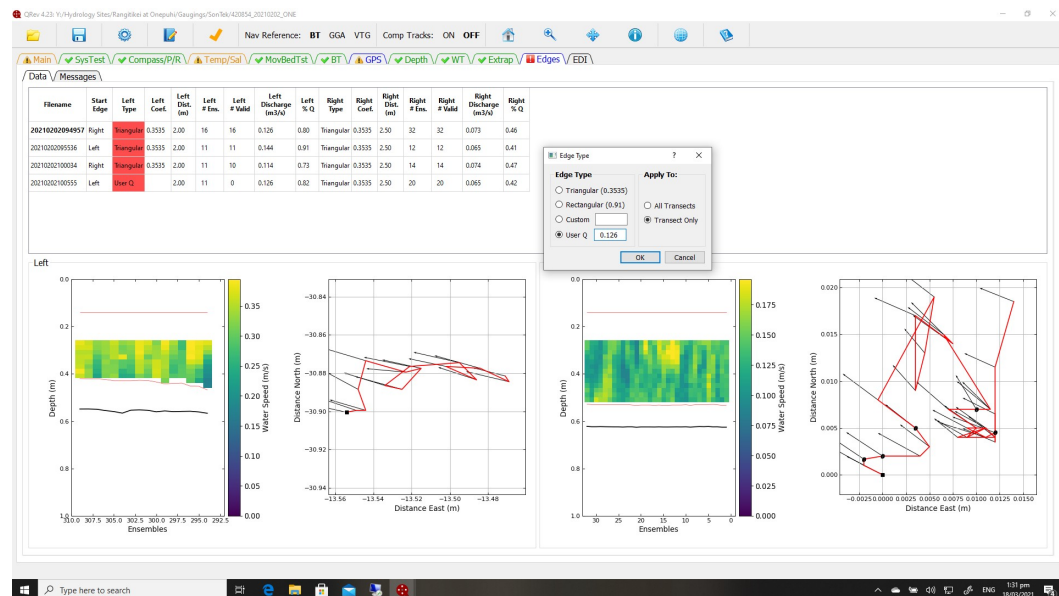
The Green tick ✓ selects or deselects transects. The Nav reference can be changed by clicking on **BT GGA VTG** in the banner.

Check Transduce depth in the Depth tab and the Mag Declination in the Compass tab and edit if needed.


ADCP – Processing and Data Entry – QRevInt



Next up have a look at the edges tab.



Make sure that the edge data contains at least 2 cells on either side. If not, this could be a reason for differing transect results. You can edit values in here. If you have no cells on an edge or something else doesn't look right you can manually enter the edge value Q. Sets off a warning but do what you think is right.

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If you have a water temperature you can enter it as the ADCP temp tends to change during a transect.

Pay attention to the messages on the main page, this gives important feedback on the gauging and helps develop field methods that may address these issues.

If your riversurveyer setup is right and your gauging is good you pretty much don't have to change much.

Fill out the Gauging Register

Save your file in the site gauging folder.

Gauging number_TIDEDA date_Site code_QRev.mat

This will produce 1 .mat file that contains all information and logs all editing.

An xml file is also created which is the file that is imported into Hilltop.


Gauging number_TIDEDA date_Site code_QRev.xml

Import the .xml file to Hilltop. Data-Import-QRev. Select the correct site name. Edit your facecard and print it out. You end up with a gauging error Uncertainty – Total %. Best thing about QRev is you don't need to make assumptions and fill out the Quality Coding Matrix on the back of the ADCP gauging card. Things like HDOP, pitch roll, measured %Q are accounted for.

Under 5% QC 600

5%-10% QC 500

Over 10% QC 400

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ADCP – Processing and Data Entry – QRevInt

Manager: [\\ars\Hydrology\Gaugings\Central Gaugings\hs]

File Edit View Data Configure Project Scan Window Help

Find

Base B at CD Farm Road
 Rangitikei at Halscombe
 Rangitikei at below Bulls Bridge
 Rangitikei at Bulls
 Rangitikei at McKelvie
 Rangitikei at Onepuhi
 Performance Monitoring
 Virtual Statistics
 Virtual Measurements
 Stage
 Flow
 Gauging Results
 Hydrometric Gauging
 Hydrometric Section
 Facemats
 Hydrometric Gauging
 9-Feb-2018 10:12:00
 24-Jul-2018 12:02:00
 16-Oct-2018 11:25:00
 15-Dec-2018 09:26:00
 15-Feb-2019 11:48:53
 20-Feb-2019 08:56:00
 23-Aug-2019 10:31:00
 12-Nov-2019 10:31:07
 26-Nov-2019 11:30:00
 22-Jan-2020 08:34:00
 4-Feb-2020 12:30:00
 12-Feb-2020 10:04:00
 18-Feb-2020 09:36:28
 9-Mar-2020 11:26:00
 9-Mar-2020 12:02:00
 14-May-2020 11:05:00
 9-Jul-2020 12:35:00
 8-Sep-2020 11:14:00
 16-Nov-2020 11:24:00
 2-Feb-2021 10:00:00
 25-Feb-2021 10:55:00
 Tamaki at Horsheds
 Te Awakotahi at Valley East Rd
 Te Rauwharua at Pohangina Valley East Rd
 Tokomaru at Riverland Farm
 Tairātea at Ohakatu Bridge
 Tairātea at Ngāhere Park

Station Number: 32705
 Station Name: Rangitikei at Onepuhi

Date (mm/dd/yyyy): 02/25/2021

| Measurement Summary | | ADCP Info/Settings | |
|---|------------------------|--------------------|-----------|
| Discharge (m³/s) | 13.155 | ADCP Model | H9 |
| Mean Velocity (m/s) | 0.4284 | Frequency | 1737 |
| Area (m²) | 30.72 | Serial Number | 4.10 |
| Width (m) | 36.96 | Firmware | 4.10 |
| Navigation Reference | 87 | Configuration | QRev 4.23 |
| Extrapolation Method (Top/Bottom Exponent): | Power/Power Exp:0.1667 | Software | |

| Measurement Statistics | | Measurement Setup / Tests | |
|-----------------------------|-------------------|---|--|
| Total Duration (s) | 1210.80 | Diagnostic Test Results | Pass |
| Measured Q (%) | 56.99999999999999 | Compass Calibration Results | No |
| Left Edge Q (%) | 0.96 | Magnetic Variation (°) | 22.00 |
| Right Edge Q (%) | 0.47 | Moving Bed Test Type | Loop |
| Mean Boat Speed (m/s) | 0.1160 | Moving Bed Condition | No |
| Invalid Bits (%) | 0.23 | Moving Bed Test Duration (s) | 173.00 |
| Invalid Ensembles (%) | 1.82 | Moving Bed Percent (%) | 0.30 |
| Uncertainty - COV | 1.9 | Moving Bed Correction for Discharge (%) | |
| Uncertainty - User Rating % | 4.6 | Moving Bed Message | Moving-bed velocity < Minimum moving-bed velocity criteria --- No correction recommended; |

Messages

Edges: The percent of invalid ensembles exceeds 25% in one or more transects. Temperature: No independent temperature reading;

Transect Discharge Summary

| File Name | Start Edge | Left Dist | Right Dist | Start Time | End Time | Top | Middle | Bottom | Left | Right | Total Q |
|--------------------|------------|-----------|------------|------------|----------|-------|--------|--------|-------|-------|---------|
| 20210225104330.mat | Right | 2.0000 | 2.0000 | 10:43:31 | 10:48:33 | 4.198 | 7.514 | 1.268 | 0.149 | 0.068 | 13.198 |
| 20210225105008.mat | Left | 2.0000 | 2.0000 | 10:50:08 | 10:55:10 | 3.884 | 7.476 | 1.249 | 0.114 | 0.06 | 12.783 |
| 20210225105527.mat | Right | 2.0000 | 2.0000 | 10:55:28 | 11:00:06 | 4.253 | 7.525 | 1.285 | 0.161 | 0.061 | 13.285 |
| 20210225110022.mat | Left | 2.0000 | 2.0000 | 11:00:22 | 11:05:56 | 4.254 | 7.619 | 1.34 | 0.083 | 0.057 | 13.353 |

Transect Supplementary Data

| File Name | L E Type | L E Coeff | R E Type | R E Coeff | Width (m) | Duration (s) | Invalid Depth Cells (%) | Invalid Ens (%) |
|--------------------|------------|-----------|------------|-----------|-----------|--------------|-------------------------|-----------------|
| 20210225104330.mat | Triangular | 0.3535 | Triangular | 0.3535 | 36.816 | 302 | 22.7 | 6.9 |
| 20210225105008.mat | Triangular | 0.3535 | Triangular | 0.3535 | 36.574 | 302 | 20.5 | 5 |
| 20210225105527.mat | Triangular | 0.3535 | Triangular | 0.3535 | 36.911 | 278 | 22.7 | 3.6 |
| 20210225110022.mat | Triangular | 0.3535 | Triangular | 0.3535 | 37.554 | 334 | 22.8 | 2.1 |

QRev Summary File: 420915_20210225_ONE_QRev || QRev Stylesheet Version: WSC v2.0 2017-02-14

QRev Measurement Review - Adapted for Water Survey of Canada

215 pm 18/02/2021

Print this out and attach to the gauging card.