



# **A POST-PROCESSING SOFTWARE FOR ADCP DISCHARGE MEASUREMENT PILOTED BY AN INTERNATIONAL AND INTER-AGENCY GROUP**

**A UNIQUE, AMBITIOUS EXPERIENCE...  
... AND ONE THAT WORKS!**

International Hydrometry Group

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# The International Hydrometry Group

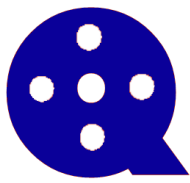
- A Group initiated in 2015
- 13 agencies from 9 different countries in Europe, North and South America and Oceania
- A loosely organized group of experts in instruments and methods for measuring discharge in rivers
- Meets virtually once a month to discuss scientific and technical issues relating to river flow measurements.

Country	Organization (full name)
Argentina	University of Cordoba
Australia	Department of Regional Development, Manufacturing and Water
Canada	Environment and Climate Change Canada
France	Groupe Doppler Hydrométrie
New Zealand	National Institute of Water and Atmospheric Research
New Zealand	New Zealand Hydrological Society
Norway	Norwegian Water Resources and Energy Directorate
Sweden	Swedish Meteorological and Hydrological Institute
UK	UK Centre for Ecology & Hydrology
UK	Environment Agency UK
USA	Genesis Hydrotech
USA	U.S. Geological Survey
USA	Kevin Oberg (retired from U.S. Geological Survey)

# Development of QRevInt

- A Main objective of the Group : to lead the development of QRevInt
- QRevInt:
  - A free and open-source software package for postprocessing moving-boat ADCP discharge measurements
  - Developed by Genesis HydroTech (Dave Mueller)
  - A fork of Qrev, created by the USGS
- Since 2020, the agencies of the Group:
  - Participate in funding the software developments
  - Contribute scientific inputs
  - Define the annual development workplan and its funding
  - Monitor progress during monthly monitoring meetings
- A unique collaborative and ambitious project !
- Work in progress:
  - Improvement of QRevInt
  - Development of QRevIntMS, for stationary (so called Section by Section) measurements

Version / Date	Changes and Known Issues
<a href="#">1.18</a> 3/28/2022	<ul style="list-style-type: none"><li>• Fixed bug so that the uncertainty value from the selected uncertainty model is recorded in the comments.ev_UA and Oursin details.</li></ul>
<a href="#">1.17</a> 3/8/2022	<ul style="list-style-type: none"><li>• Modified XML output. The Uncertainty node now contains only the total uncertainty and the model used. Separate nodes are provided for QRev_UA and Oursin details.</li></ul>
<a href="#">1.16</a> 2/11/2022	<ul style="list-style-type: none"><li>• Fixed bug causing crash when opening measurement when QRev Settings does not exist.</li></ul>
1.15 2/10/2022 Do Not Use	<ul style="list-style-type: none"><li>• <b>Known Issue:</b><ul style="list-style-type: none"><li>◦ <b>QRevInt will crash trying to open measurement</b></li></ul></li><li>• Fixed bug preventing QRevInt from running and producing a message that says "Failed to execute script QRev". This only occurred for new installations that did not have a previously defined QRev Settings file with the Folder key.</li></ul>
<a href="#">1.14</a> 1/18/2022	<ul style="list-style-type: none"><li>• <b>Known Issue:</b><ul style="list-style-type: none"><li>◦ <b>QRevInt will not run on a new installation where the QRev Settings file doesn't exist.</b></li></ul></li><li>• Fixed incorrect weighting when computing average water speed for time series plot</li><li>• Change ship track vectors to depth cell size weighted average for velocity components.</li><li>• Fixed compatibility issue with older QRev.mat files where edge ensembles were excluded in the for moving-bed tests.</li><li>• Fixed bug using Jet color map on WT tab</li></ul>



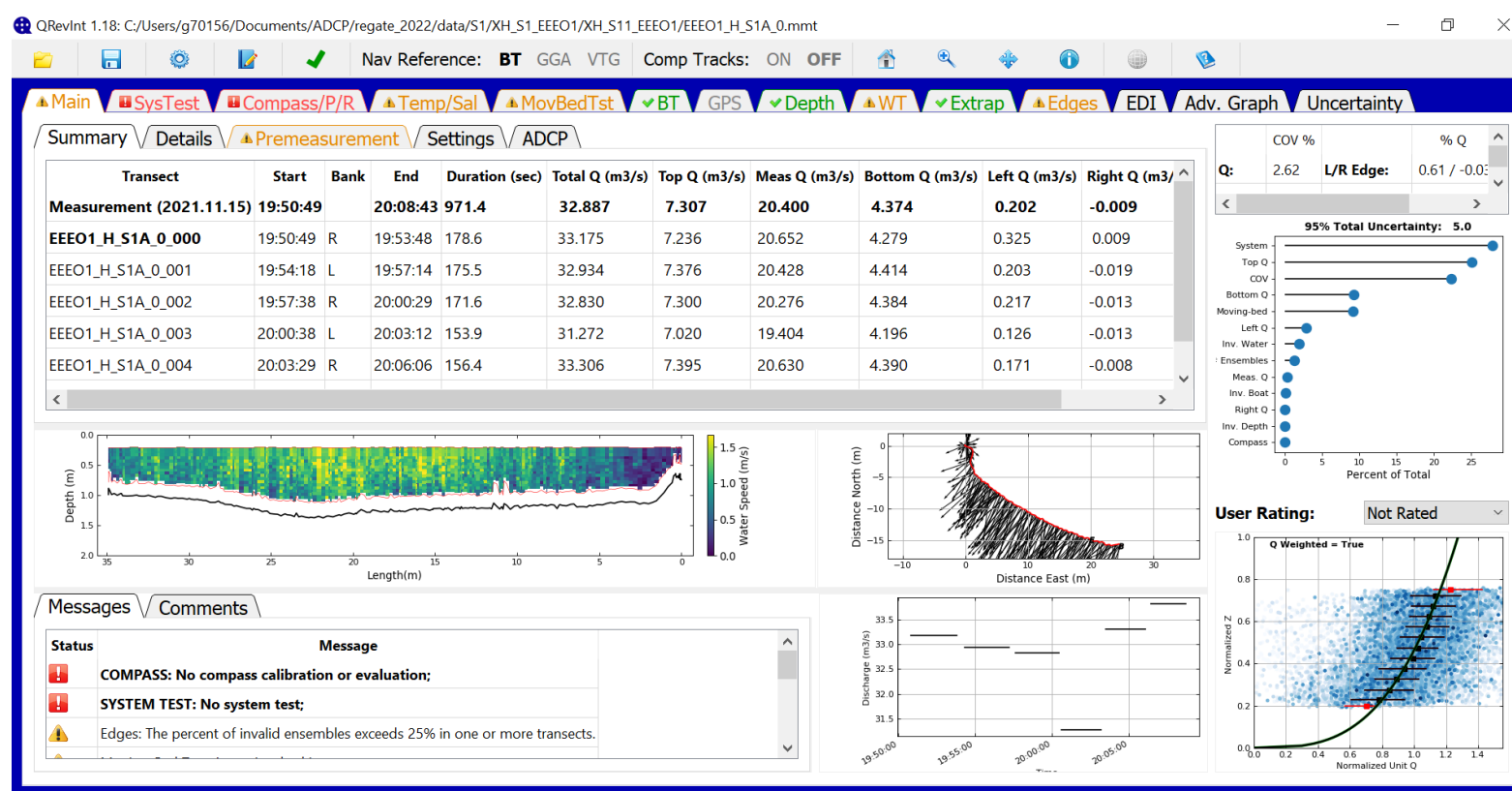
- A software for postprocessing moving boat ADCP discharge measurements
  - Using data collected with any of the Teledyne RDI (TRDI) or SonTek bottom tracking ADCPs
- Objectives of QRevInt:
  - Process and review SonTek and TRDI data
  - Use consistent algorithms for the computation of discharge, independent of the ADCP manufacturer
  - Better filtering / Use the best available data (interpolate only what is missing or invalid)
  - Provide a logical workflow.
  - Automate data quality assessment and provide useful feedback.
  - Use windows with tables and graphs designed to evaluate specific problems.
  - Provide uncertainty information to the user.
- Software available at <https://www.genesishydrotech.com/qrevint>
- QRevInt is now mandatory or highly recommended for a lot of agencies all around the world

# QRevInt

- Different tabs for a logical quality analysis of the measurement



- Tabs colored to easily identify the data quality status based on the automated data quality assessment



data has passed all the internal quality checks.

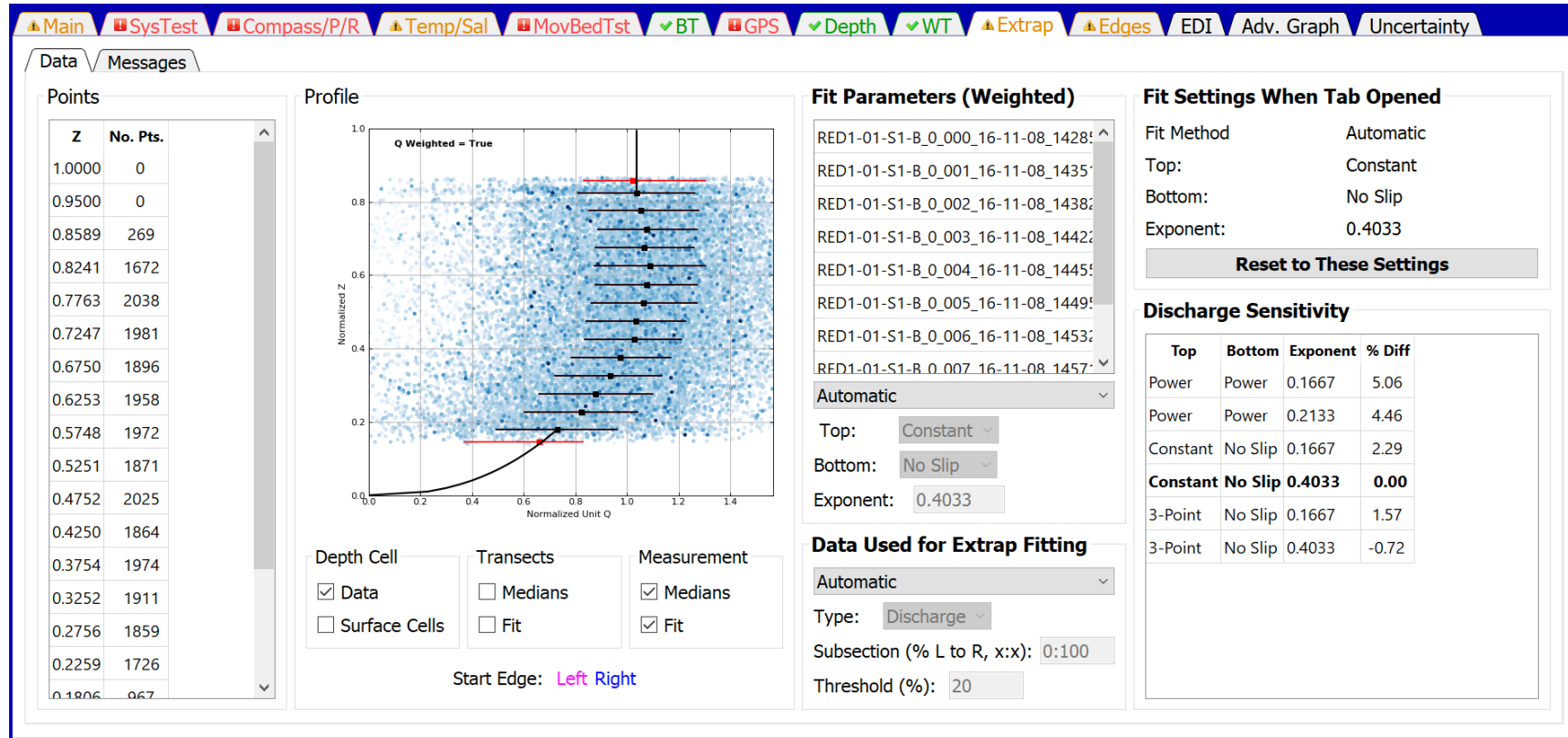
data has failed some of the internal quality checks and the user should evaluate that data.

data has failed some of the internal quality checks and the failure may have a substantial effect of the resulting discharge. The user needs to address these issues.



# QRevInt – Extrap Tab

- ADCP is unable to measure the entire water column
  - Unmeasured zone near the water surface and close to the streambed
  - Vertical velocity profile must be computed to extrapolate discharge in the unmeasured zones
- QRev provides an automated selection of an appropriate extrapolation fit for the measurement
  - Combining all transects of a measurement onto a single normalized plot
  - Using selected statistics to determine an extrapolation method that fit the data
  - Option of using a discharge weighted median (depending on the the relative measured discharge for each ensemble)



# QRevInt – Uncertainty tab

- Using the Oursin method
  - Based on the framework of the Guide to the expression of Uncertainty in Measurement (GUM)
- Compute the uncertainty of the measurement and the budget of uncertainty
- Useful for
  - Rating the measurement
  - Improving the next measurements → uncertainty helps !

