

Working Group on Sonar Backscatter Data Acquisition and Processing (Backscatter Working Group)

Presentation of the Working Group and Modality of Operation

7 September 2013

Background

The Workshop "*Multibeam Backscatter – State of the Technology, Tools, & Techniques*", organized by QPS on 5 May 2013 prior to the *GeoHab* conference in Rome, gathered one hundred of specialists of the domain. The main issues discussed were data quality control, the need for normalized acquisition and processing procedures, and the expectation for a better documentation from sonar manufacturers and software developers on their respective products.

As a consequence, the *Working Group on Sonar Backscatter Data Acquisition and Processing* was created (decision taken during the general assembly at the end of the *GeoHab* conference).

This document sets the working principles of this Working Group.

Purpose of the Working Group

The ultimate intention of the Working Group is that backscatter data acquired from differing systems, or processed through differing software tools, generate consistent values over a same area under the same conditions; and that these data are scientifically meaningful and usable by end-users from various application domains (geoscience, environment, hydrography...).

Within this framework, the purpose of the Working Group is to propose:

- To users: guidelines or best practice approaches for the acquisition and processing of backscatter data from seafloor-mapping sonars;
- To sonar manufacturers and software developers: recommendations for the improvement and further development of systems and processing tools.

N.B. While the initial expectation emerging from *GeoHab* concerns seafloor backscatter, the recent evolutions in sonar techniques and applications lead to include the water column data inside the topic.

Operation

The working group will progress through a series of virtual workshops and circulating documents. The onus will be on a chairing group (see below) to keep the momentum and focus.

Work content

Three themes have emerged during the initial discussions and will be addressed and discussed

1. **Sonar system design and configuration**
 - User requirements (expected performance and functionalities)
 - Instrument uncertainty level to be suggested to sonar manufacturers

- Best practices for sonar configuration, for seafloor backscatter and water-column data collection

2. Acquisition

- Methodology/best practices for backscatter acquisition
- Methodology/best practices for water-column multibeam data acquisition
- Compatibility with hydrography requirements (bathymetry best practices)

3. Processing/Products

- Definition of a terminology
- Guidelines for standardized levels of data processing
- Best practices for backscatter processing, for different applications
- Standard basic products, providing consistent results (to be defined) whatever the processing software.
- Benchmark datasets from various sonars usable to verify/compare processing results from different manufacturers

Outputs

The main deliverable from the group activity will consist in a report featuring:

- common terminology and concept definitions applicable to the physical phenomena, to the processing operations, and to the data at their various stages of elaboration;
- a summary of the needs expressed by users from various fields, and the associated technical requirements;
- recommendations for system calibration and data acquisition, including survey configuration; environmental conditions control; and ancillary sensor quality control;
- recommended operations for data processing limited to the first-level stages of the backscatter data conditioning, aimed at presenting physically consistent backscatter data (while excluding post-processing operations such as image segmentation, classification and characterization).

Schedule

The first objective is to propose a first version of the guidelines for Backscatter acquisition and processing - possibly including full water column data - at the 2014 *GeoHab* conference in Lorne (Victoria), Australia.

A series of recommendations to sonar and software manufacturers for development of future systems should be delivered within 2 years.

Web

A web page is now available on the GeoHab website at <http://geohab.org/BSWG/>

Chairing Group

In the first instance the Working Group is open to all interested parties, but should be led by a **chairing group**.

To optimise the chances of success and in particular of uptake of the recommendation by the various communities, the Working Group will need to obtain commitment from a core number of people from a mix of users of different levels (acquisition, processing, and down-stream users), manufacturers (software and hardware) and research scientists and engineers.

The Chairing Group is composed of:

Craig Brown (McGregor), Erin Heffron (QPS), Geoffroy Lamarche (NIWA), Xavier Lurton (Ifremer), Larry Mayer (UNH), Glen Rice (NOAA), Alexandre Schimel (Deakin), Terje Thorsnes (NGU)

A list of participants to the BSWG is available on <http://wp.me/a3FjCg-cR>

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