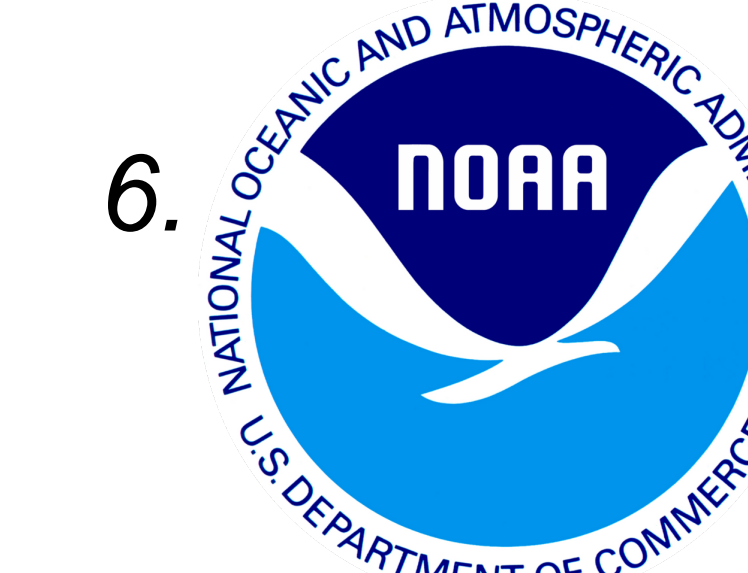
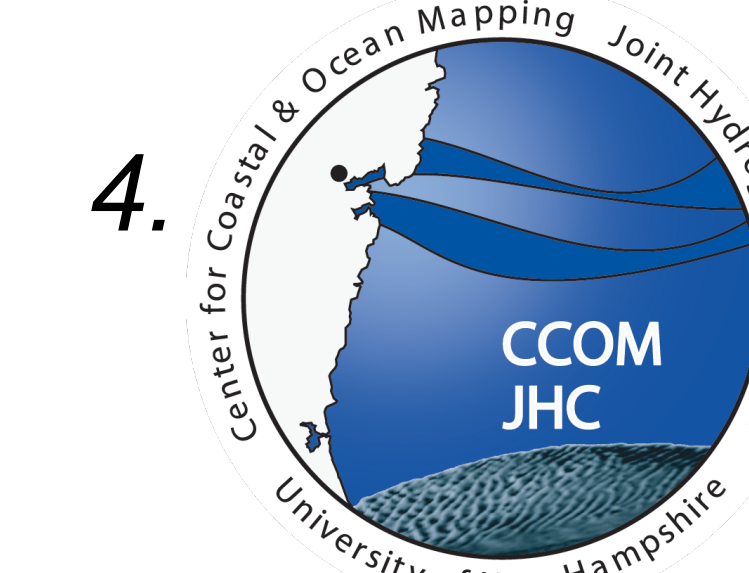


Xavier Lurton¹, Geoffroy Lamarche², Craig Brown³, Erin Heffron⁴, Vanessa Lucieer⁵, Glen Rice⁶, Alex Schimel⁷, Tom Weber⁴



Abstract

Backscatter data acquired with multibeam sonars are now commonly used for seabed geological interpretation.

However, many issues linger:

- A lack of standard procedures,
- poor or absent calibration, and
- limited understanding and documentation of processing methods, etc.

A workshop organized at the GeoHab meeting in 2013 was dedicated to seafloor backscatter data from multibeam sonars. It was concluded that there was an overwhelming need for better coherence and agreement on the topics of acquisition, processing and interpretation of data.

The GeoHab Backscatter Working Group (**BSWG**) was created with the purpose of documenting and synthesizing the state-of-the-art in sensors and techniques available today, and proposing methods for best practice in the acquisition and processing of backscatter data.

In May 2015, the resulting document "*Backscatter measurements by seafloor-mapping sonars: Guidelines and Recommendations*" was completed.

BSWG Timeline

- GeoHab 2013 - Multibeam sonar backscatter workshop and BSWG subsequently established.
- GeoHab 2014 - First draft of Guidelines and Recommendations presented.
- GeoHab 2015 - Guidelines and Recommendations completed and presented!

BSWG Contributors

- 130 people: scientists/users, operators, R&D engineers, sonar constructors, software developers
- 8 editors and lead authors - 15 co-authors
- Open to all: <http://geohab.org/BSWG/>

Multibeam Backscatter Issues

- **Lack of standardization** resulted in backscatter data users being left to themselves regarding acquisition, processing and interpretation, resulting in inconsistent results (Fig. 1 & 2).
- **Lack of 'best practice' documentation** is regarded as hindrance to progress of scientific and industrial uses of backscatter data.

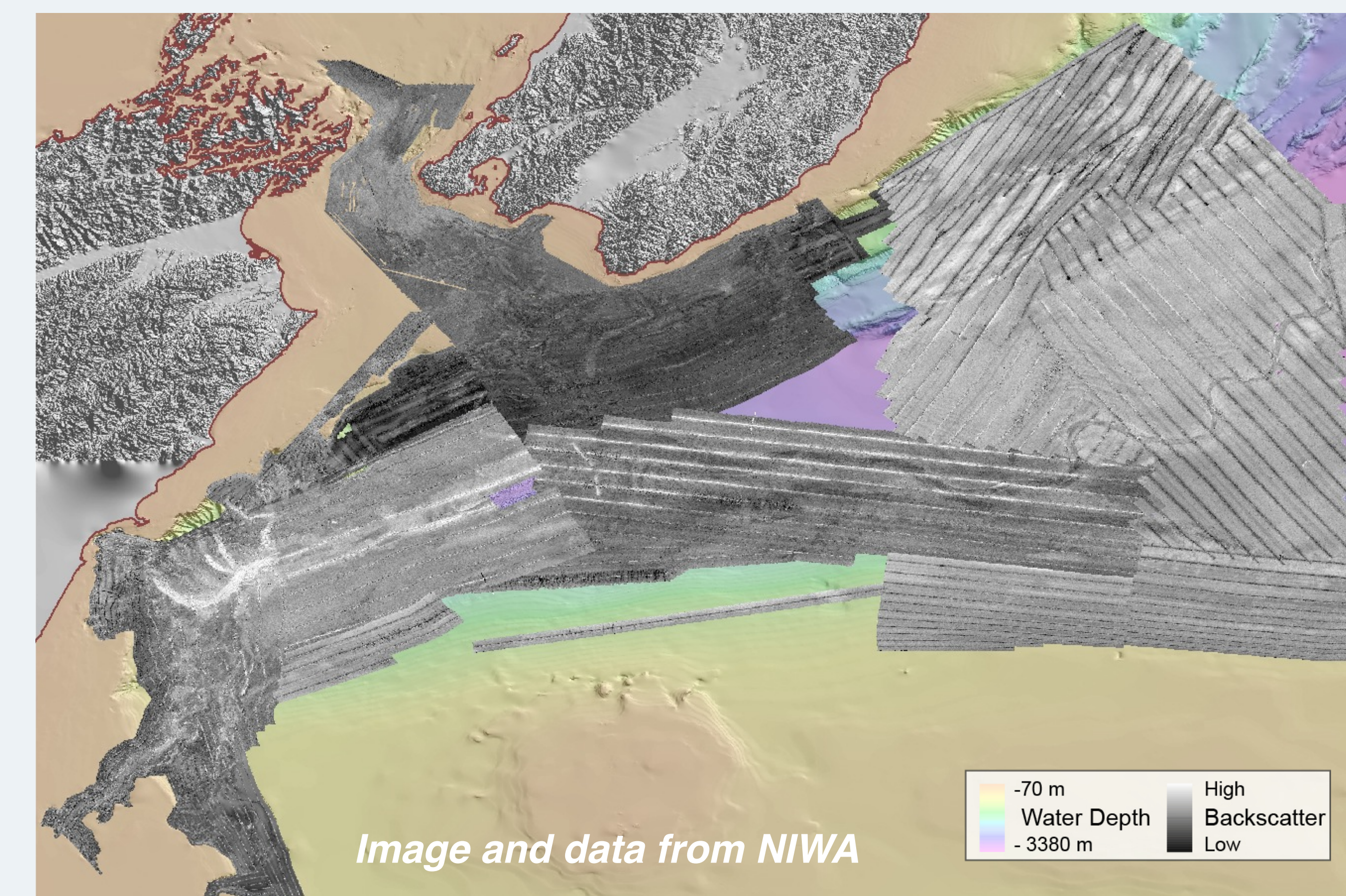


Figure 1 - Insufficient control of the data acquisition; inconsistencies using same sonar over a given area.

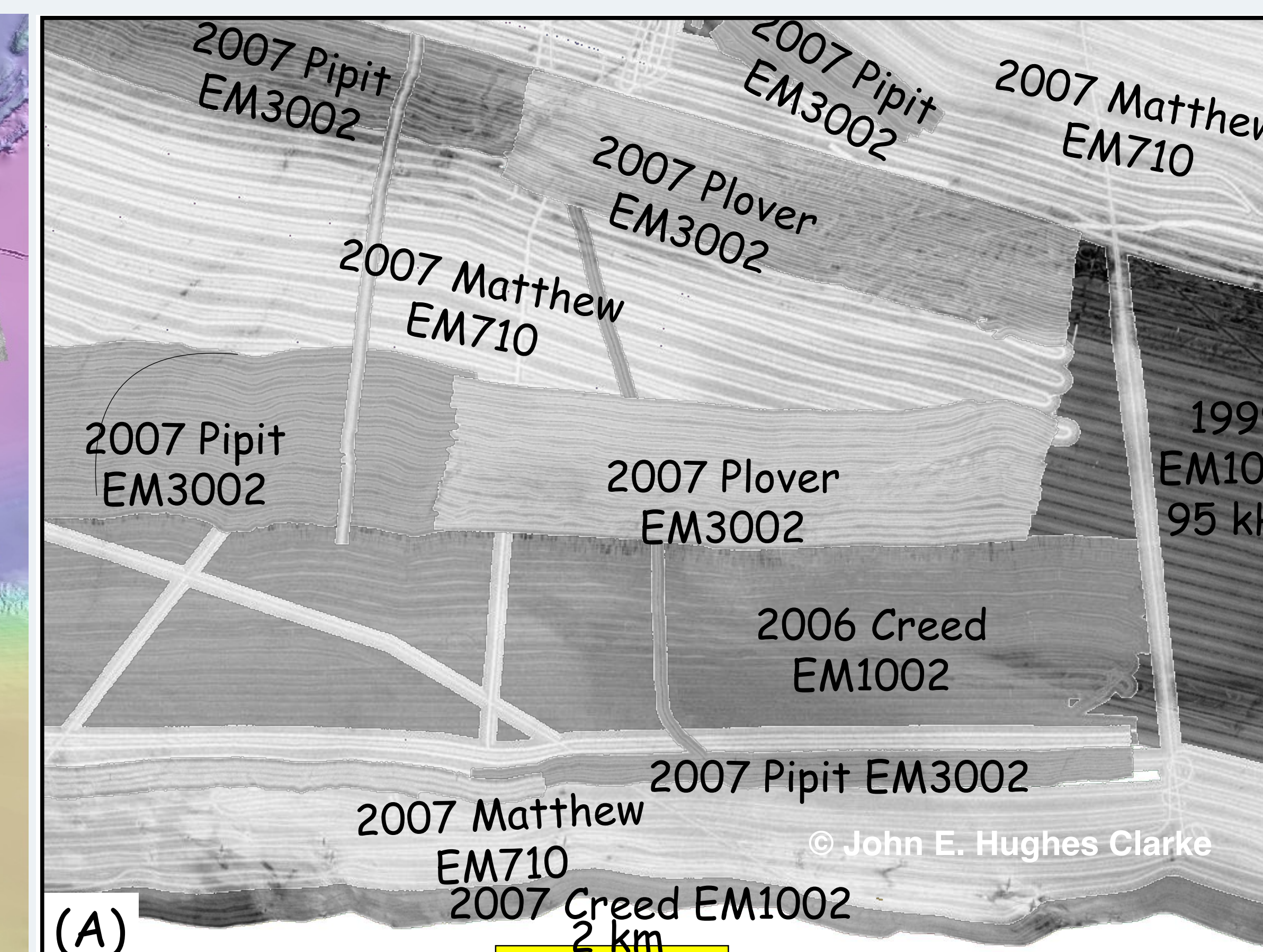


Figure 2 - Issues of sonar calibration and offsets (in dB values) between different sensors.

Three Primary Themes Addressed

- **Sonar hardware manufacturing issues**, including interactions between users and manufacturers, sonar configuration and related instrument uncertainty levels and best practices for sonar configuration;
- **Data acquisition protocols**, including best configuration setups, survey purpose and strategy, as well as best practice for backscatter acquisition;
- **Post-processing procedures and software** for various applications and purposes.

Guideline Goals

- A **common terminology** and definitions applicable to the physical phenomena, the processing operations, and the data at various stages of the process;
- A **clear presentation of the fundamental notions** about physical phenomena or sonar engineering;
- A **review of user needs** from various fields, and **technical requirements** for sonar systems and the processing software suites;
- An **illustrative guideline** of the potential of backscatter for mapping substrate and habitats;
- A **series of recommendations** to sonar manufacturers and software developers for future development, and to users and operators for best acquisition procedure and post- processing approaches.

BSWG Report

The report is an easy-to-read primer with five thematic chapters, and freely available for download.

1. Introduction to backscatter measurements by seafloor-mapping sonars
2. Background and fundamentals
3. Seafloor backscatter users needs and expectations
4. Backscatter measurement by bathymetric echo sounders
5. Acquisition: best practice guide
6. Processing backscatter data: from datagrams to angular response and mosaics
7. Synthesis and conclusions



Contact

Erin Heffron
eheffron@ccom.unh.edu

Center for Coastal & Ocean Mapping
University of New Hampshire
24 Colovos Rd., Durham NH

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