Requesting and Comparing Intermediate Results from Several Backscatter Data Processing Software: A First Step Towards Future Consistency of Multibeam Backscatter Estimation

A.C.G. Schimel[1], M. Roche[2], M. Malik[3], C. Vrignaud[4], G. Masetti[5], M. Dolan[6]

1. National Institute of Water and Atmospheric Research (NIWA), New Zealand
2. Federal Public Service Economy of Belgium (FPSE), Belgium
3. Office of Ocean Exploration and Research, NOAA, USA
4. SHOM, France
5. Center for Coastal and Ocean Mapping, University of New Hampshire, USA
6. The Geological Survey of Norway (NGU), Norway

Backscatter mosaics of the seafloor are now routinely produced from multibeam sonar data, and used in a wide range of marine applications. However, significant differences (up to 5 dB) have been observed between the levels of mosaics produced by different software processing a same dataset. This is a major detriment to a number of possible uses of backscatter mosaics, including quantitative analysis, monitoring seafloor change over time, and combining mosaics. The Backscatter Working Group (BSWG) identified this issue and recommended that "to check the consistency of the processing results provided by various software suites, initiatives promoting comparative tests on common data sets should be encouraged […]". However, backscatter data processing is a complex (and often proprietary) sequence of processing steps, so that simply comparing end-results between software does not provide much information as to the root cause of the differences between results.

In order to pinpoint the source(s) of inconsistency between software, it is necessary to understand at which stage(s) of the data processing chain do the differences become substantial. Schimel et al. (2018) recently provided a comprehensive framework for this processing chain, including a self-consistent terminology for intermediate processing steps and corrective terms. We propose to invite willing software developers to discuss this framework and collectively adopt a list of intermediate processing steps that they can all generate. We will then provide a small dataset consisting of various seafloor types surveyed with the same multibeam sonar system, using constant acquisition settings and sea conditions, and have the software developers generate these intermediate processing results, to be eventually compared. If the experiment proves fruitful, we may extend it to more datasets, software and intermediate results. Eventually, software developers may consider making the results from intermediate stages a standard output as well as adhering to a consistent terminology, as advocated by Schimel et al. (2018). To date, the developers of four software (Sonarscope, QPS FMGT, SwathEd, MB Process) have expressed their interest in collaborating on this project.

Schimel, A. C. G., Beaudoin, J., Parnum, I. M., Le Bas, T., Schmidt, V., Keith, G., & Ierodiaconou, D. (2018). Multibeam sonar backscatter data processing. *Marine Geophysical Research*.