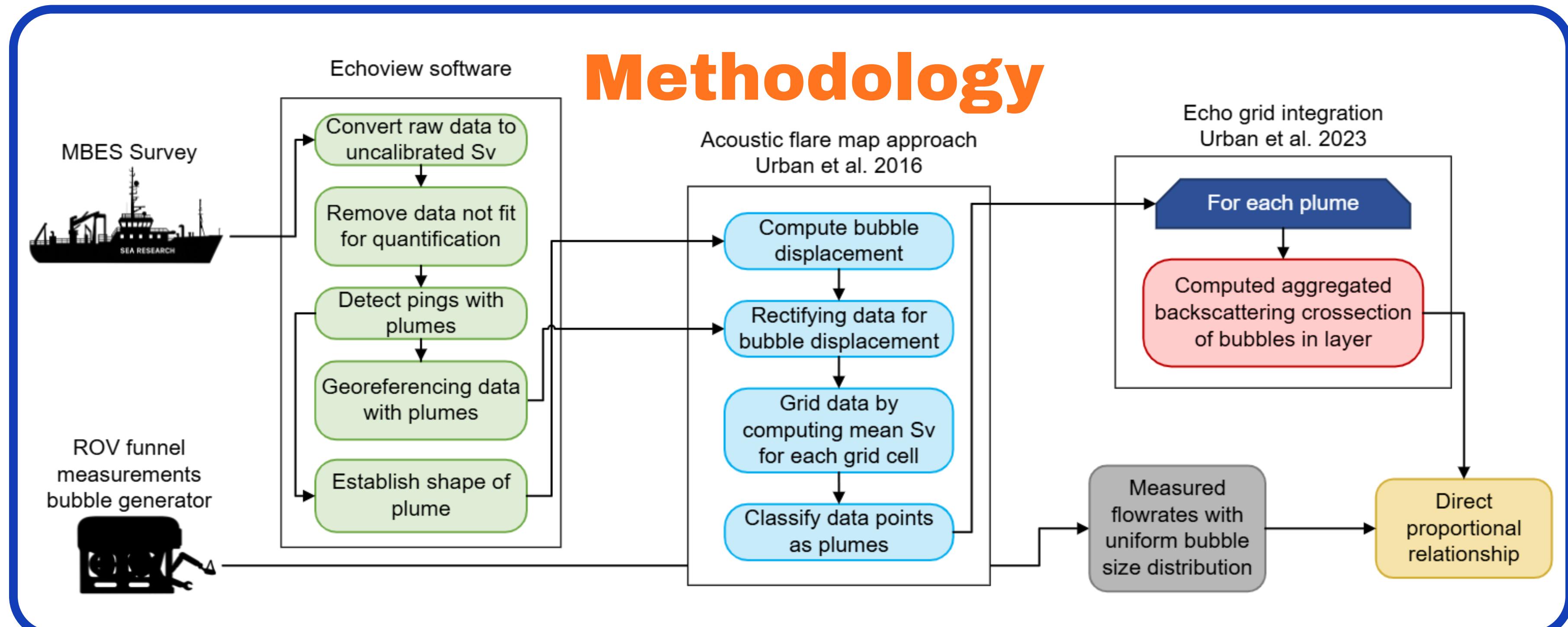
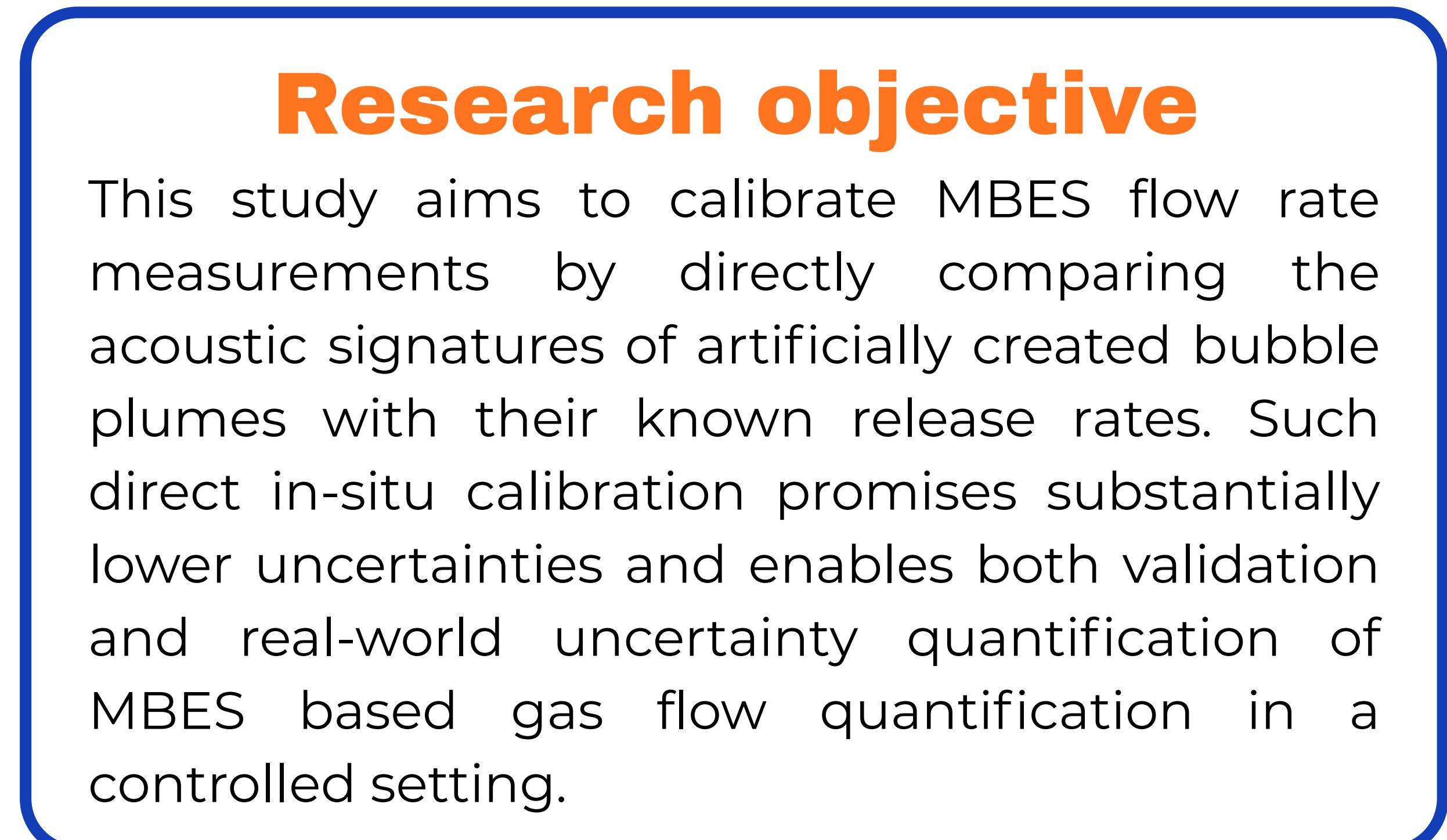


Calibration of multibeam echosounder bubble plume measurements using a controlled bubble plume generator

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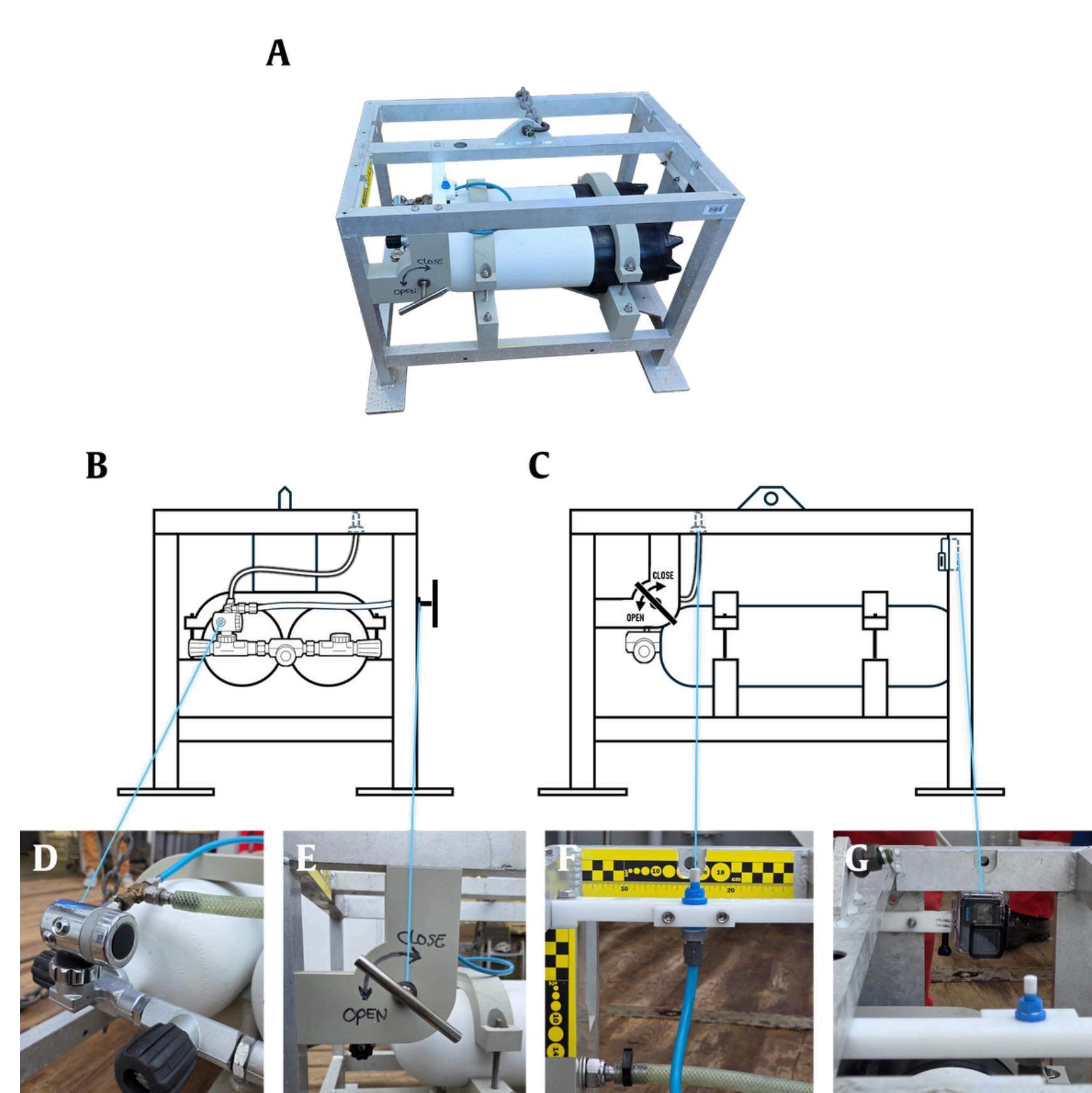
1) TNO Geological Survey of the Netherlands 2) Utrecht University, The Netherlands 3) NIOZ The Royal Netherlands Institute for Sea Research 4) Ghent University, Belgium



Technical details

Development of a Bubble Generator

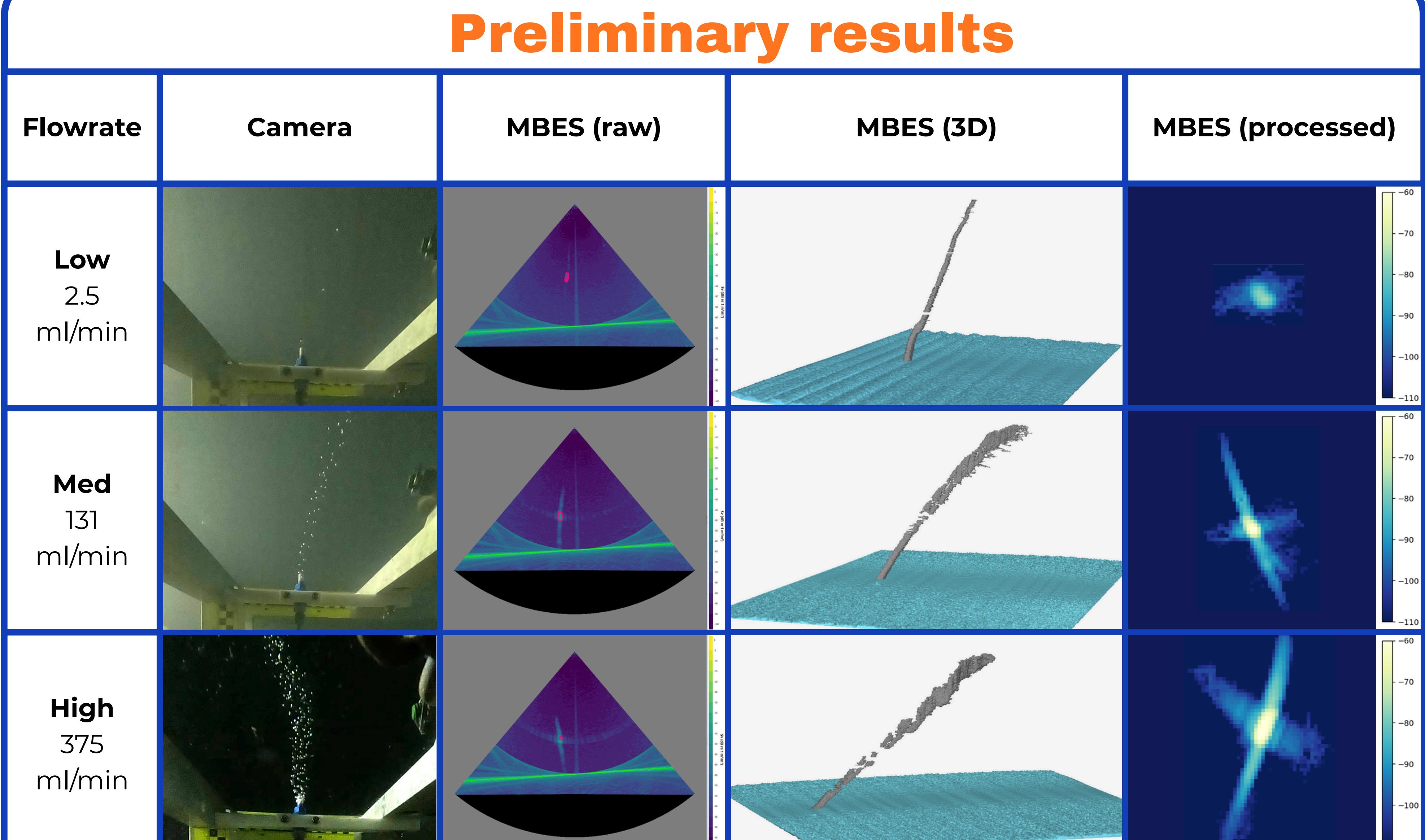
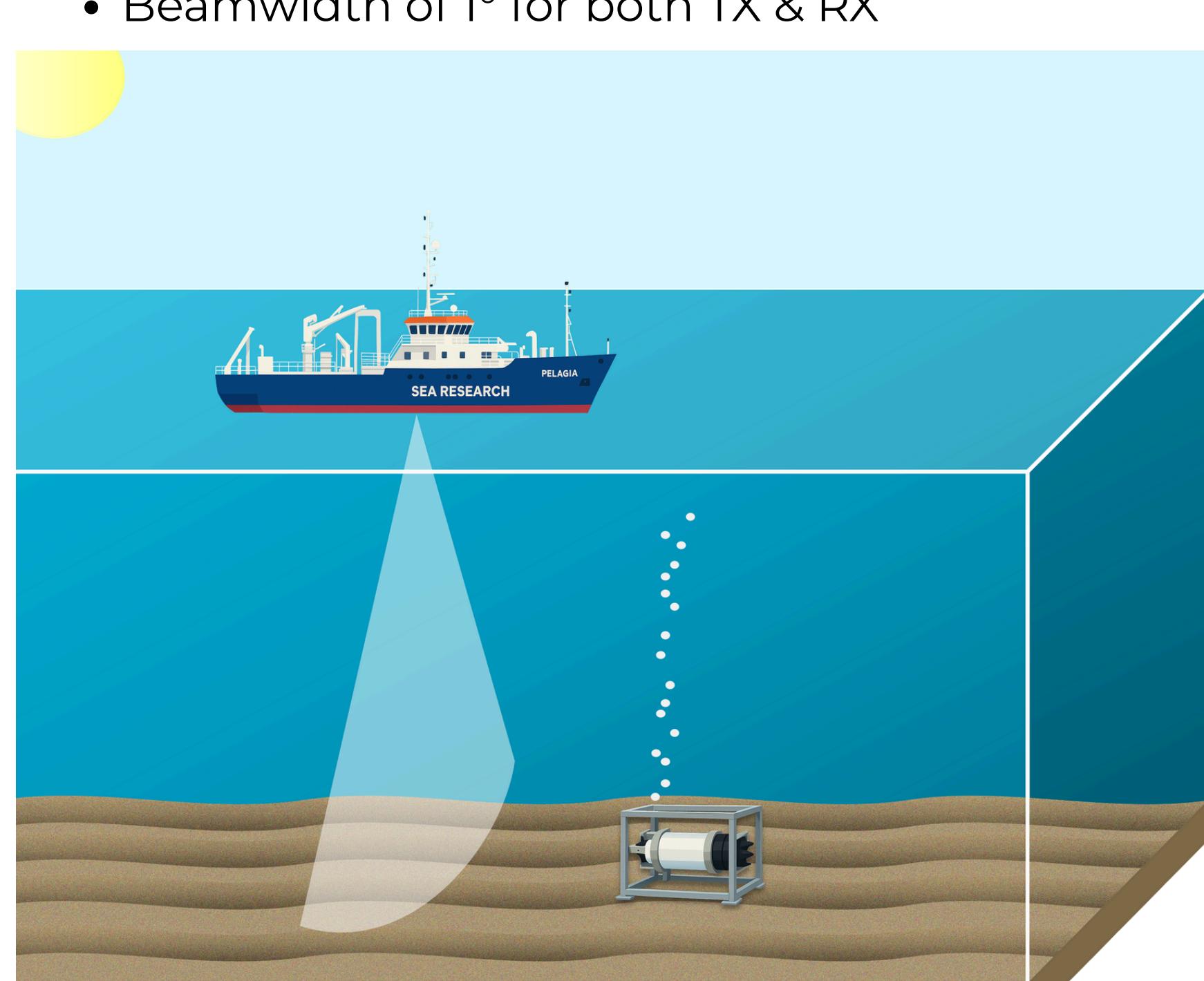
- Constant pressure of 10 bar (independent of depth)
- Adjustable and constant flowrate by turning handle specialized for ROV
- Sparger positioned on top of air outlet to create uniform and distinct bubbles
- Camera (GoPro) aimed at bubble release point for high quality imaging for bubble size distribution



Multibeam Echosounder measurements

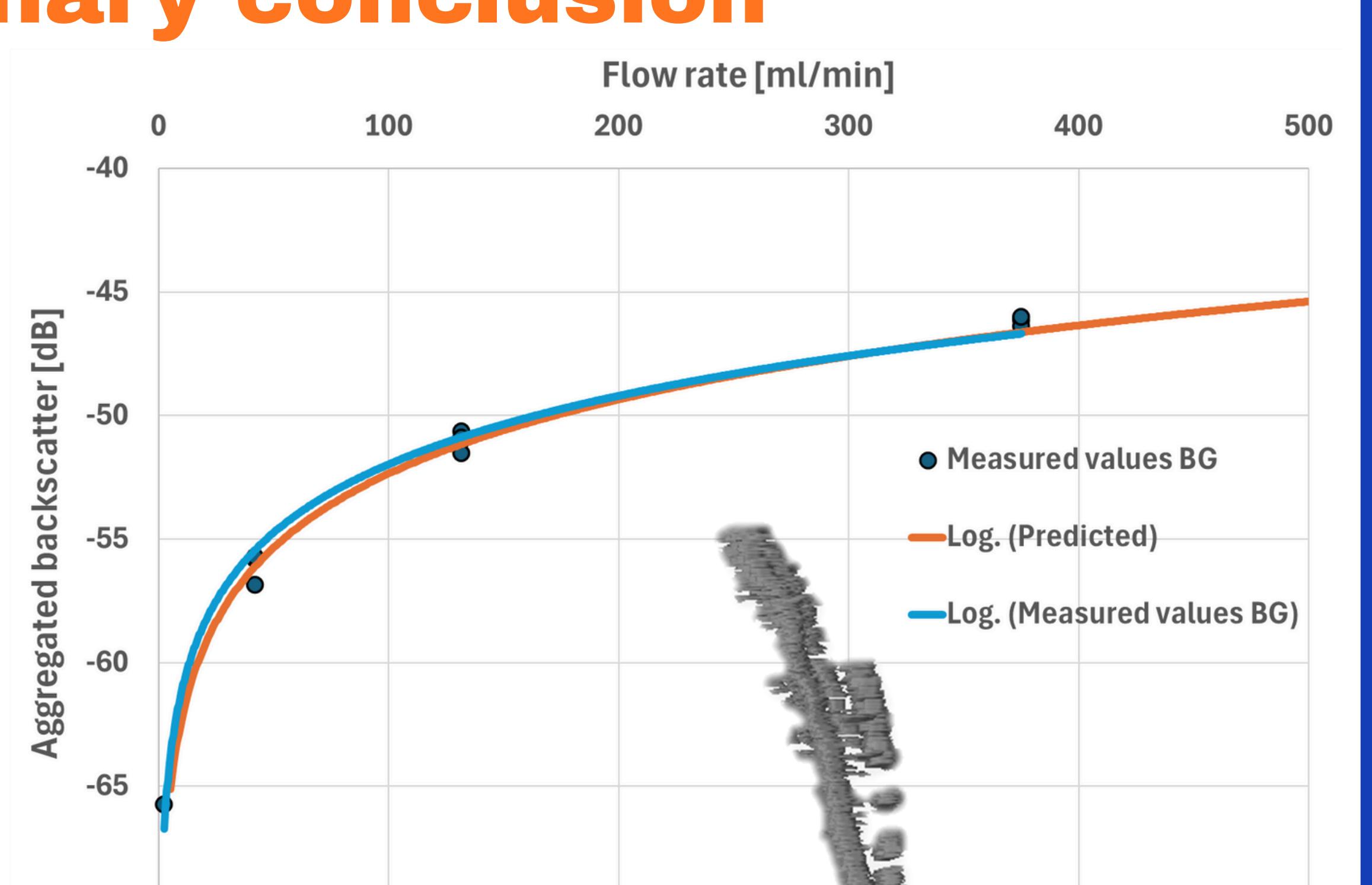
Kongsberg EM 2040 MKII:

- High resolution shallow water MBES
- Operated at a frequency of 300 kHz
- Beamwidth of 1° for both TX & RX



Preliminary conclusion

This experiment proves that there is a direct proportional relationship between flowrate [ml/min] and acoustic backscatter [dB]



Next step: quantification of a leaking well by using the established relationship and the bubble generator.

Leaking well

Bubble generator