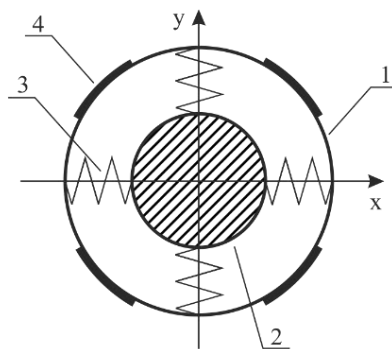
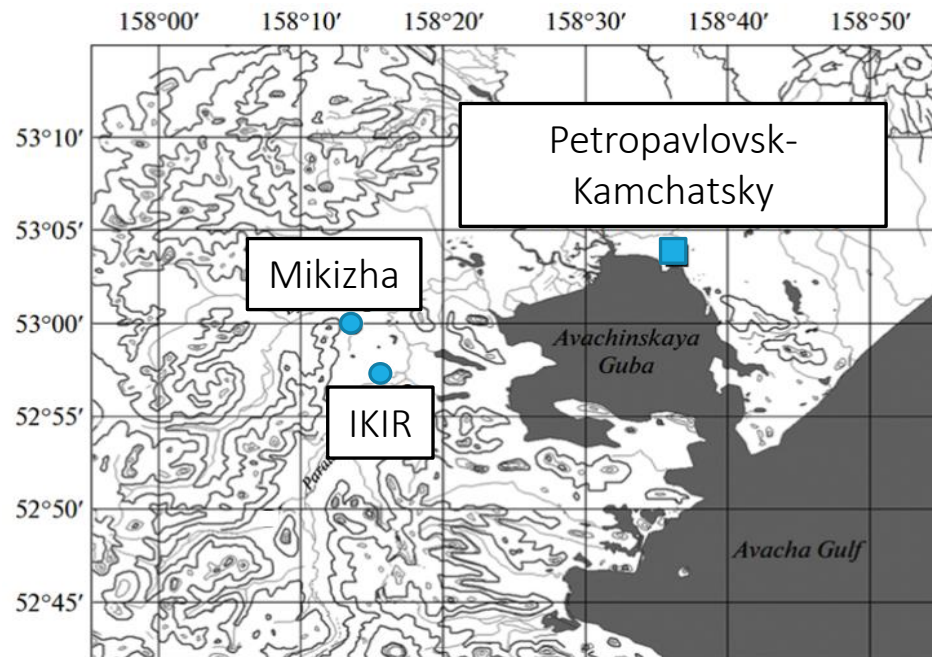




Localization of acoustic emission sources according to the data of a distributed system of combined receivers

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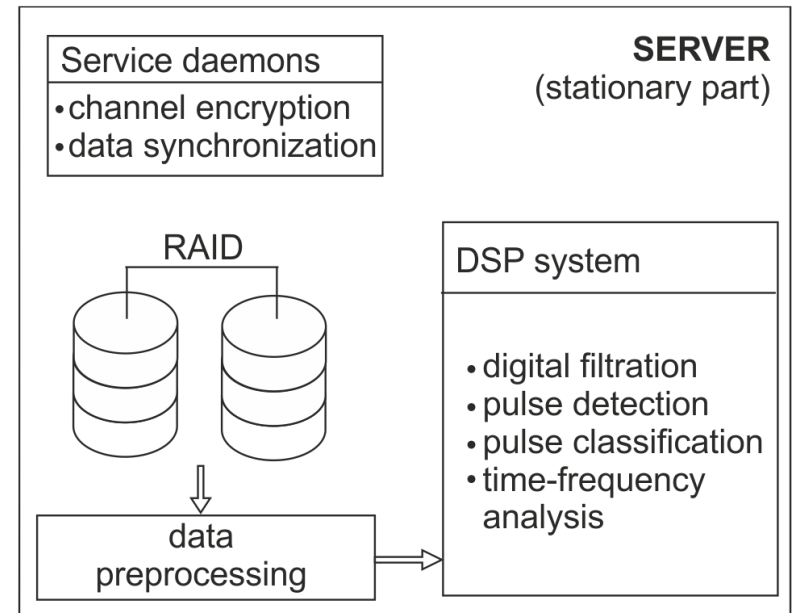
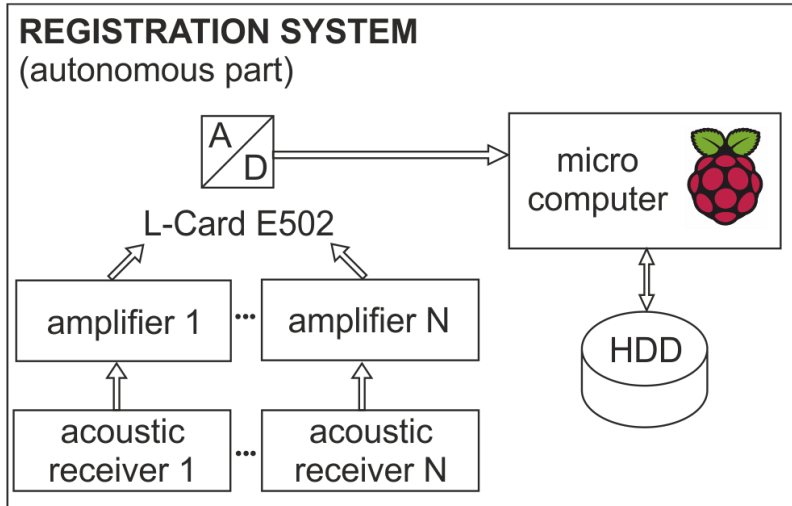
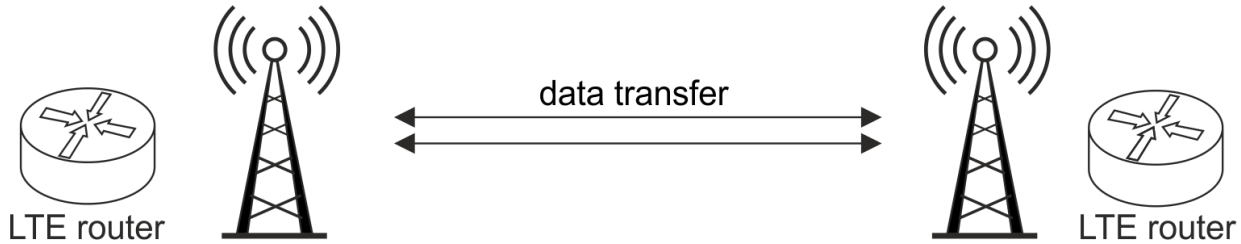
ACOUSTIC SIGNAL RECORDING



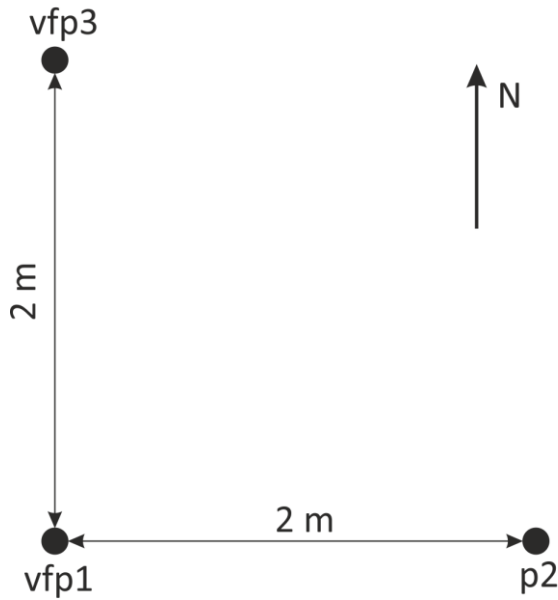
- 1 – receiver body,
- 2 – inertial mass,
- 3 – elastic elements,
- 4 – pressure receiver components

Measured values: P , ∇P_x , ∇P_y , ∇P_z
Frequency range: 100 Hz – 10 kHz

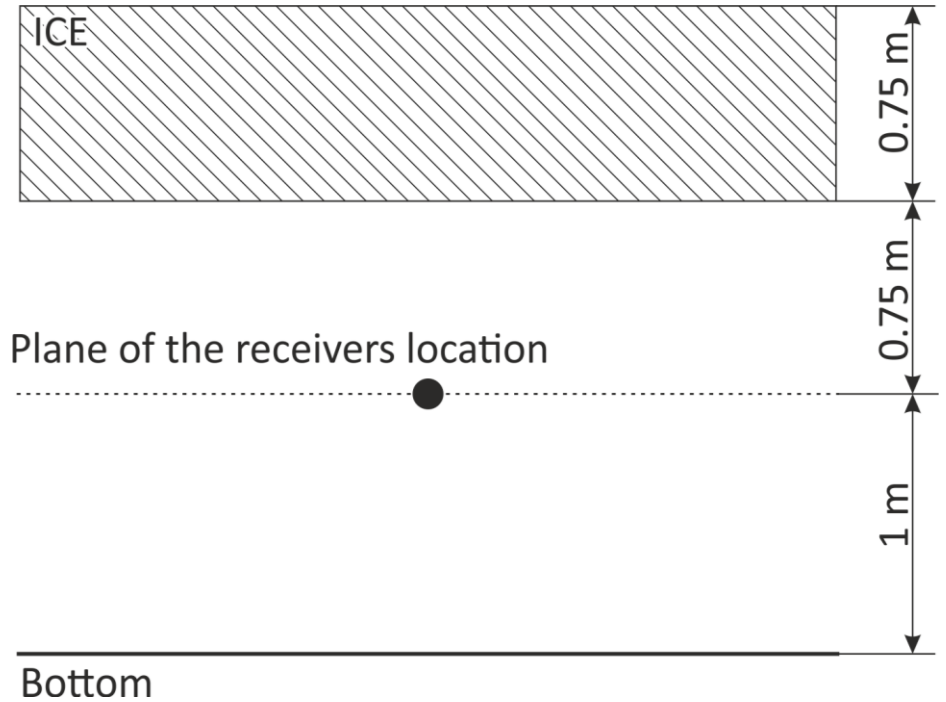
REGISTRATION SYSTEM



RECEIVER LOCATION DIAGRAM (February 13, 2023)

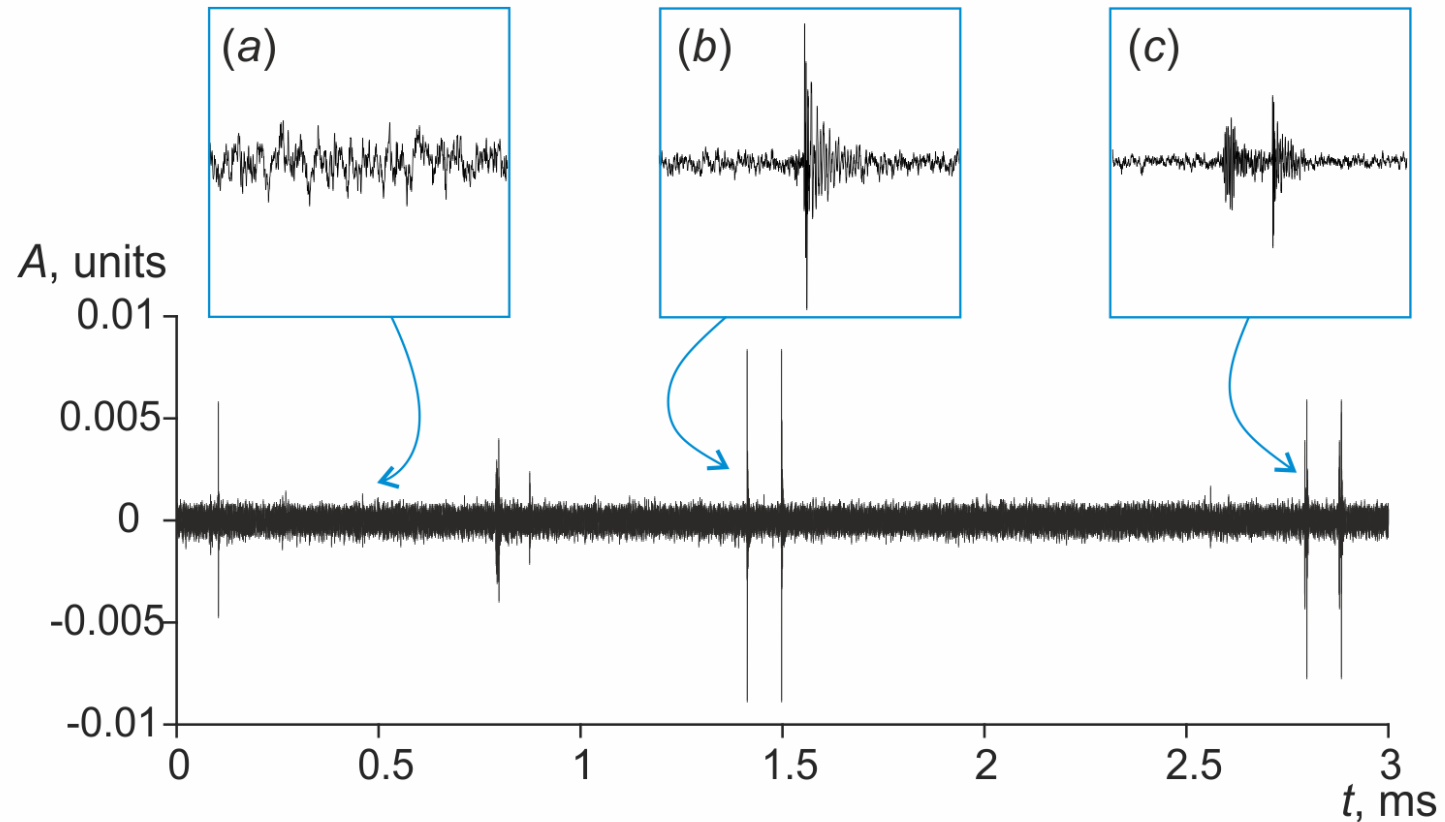


Overhead view



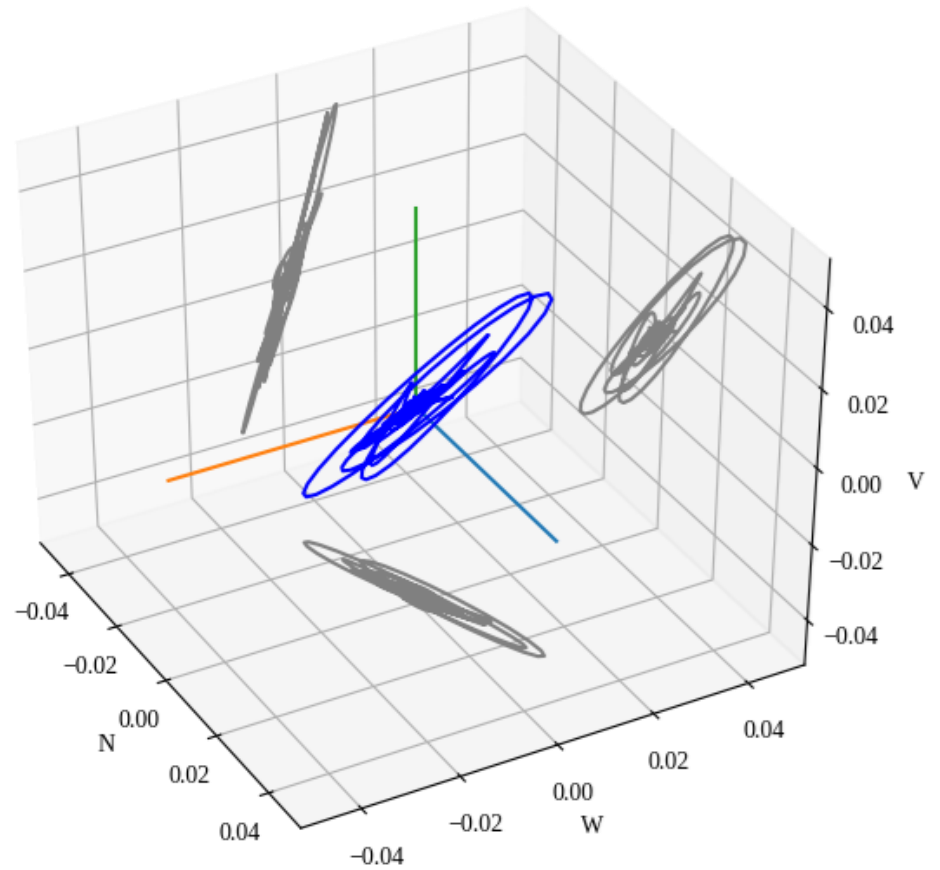
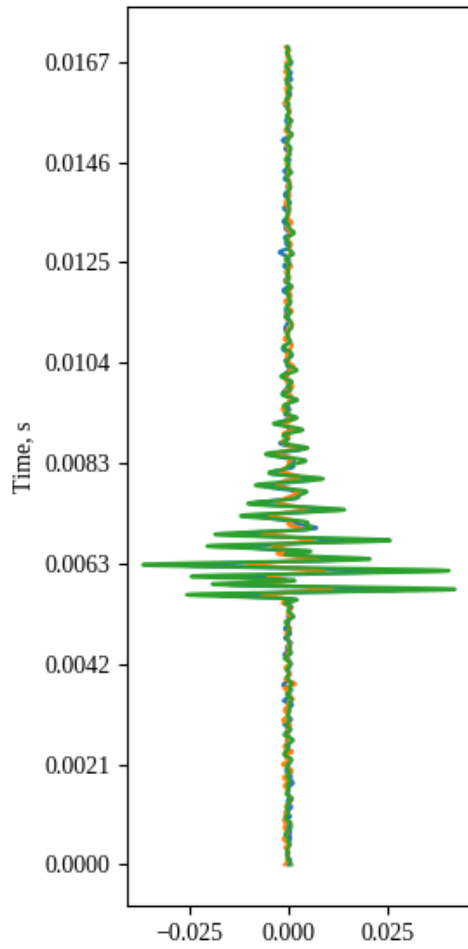
View in vertical section

ACOUSTIC EMISSION SIGNAL



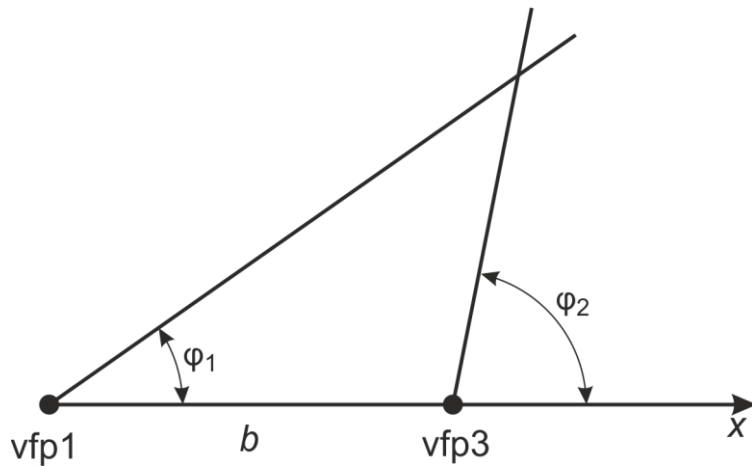
Acoustic emission signal fragment: (a) – noise; (b), (c) – pulses.

ACOUSTIC PULSE

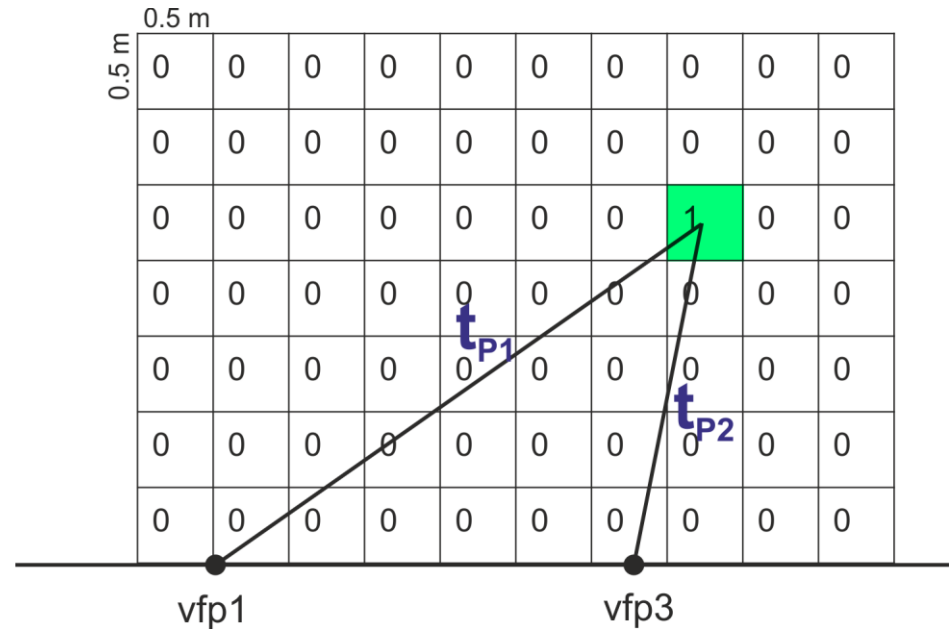


LOCALIZATION METHODS

Triangulation



Time delay



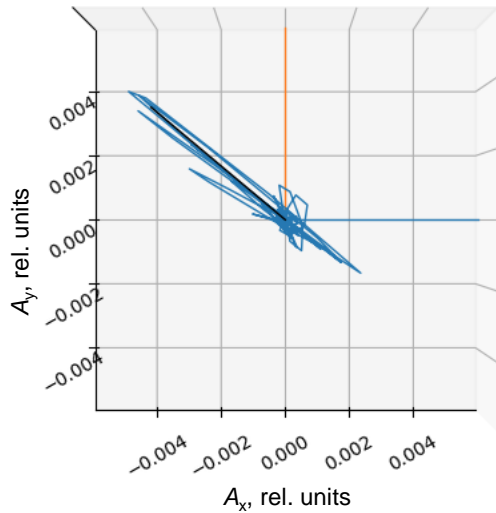
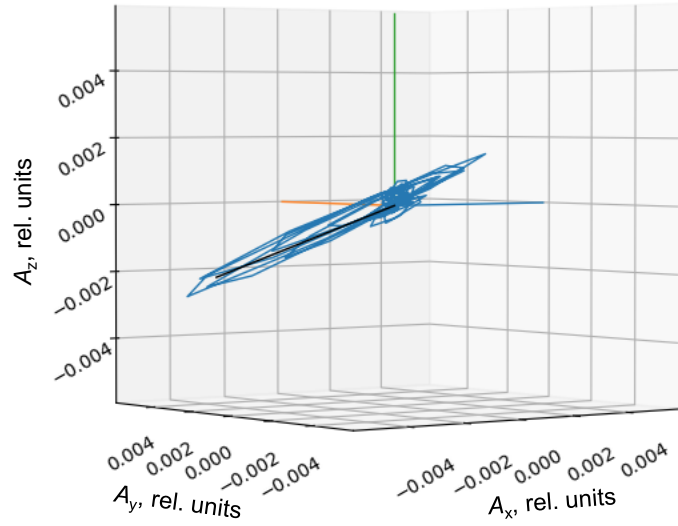
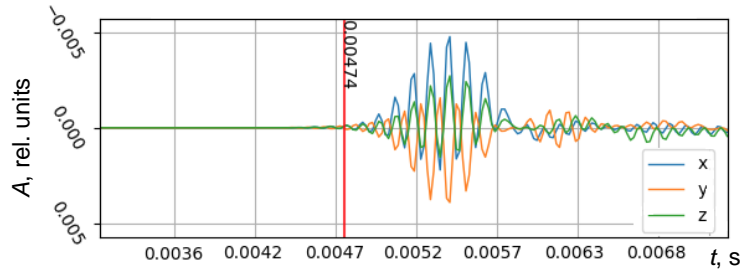
$$1 : \text{if } \Delta t_p - \Delta t_s < t_{\text{err}}$$

Δt_p - calculated signal delay,

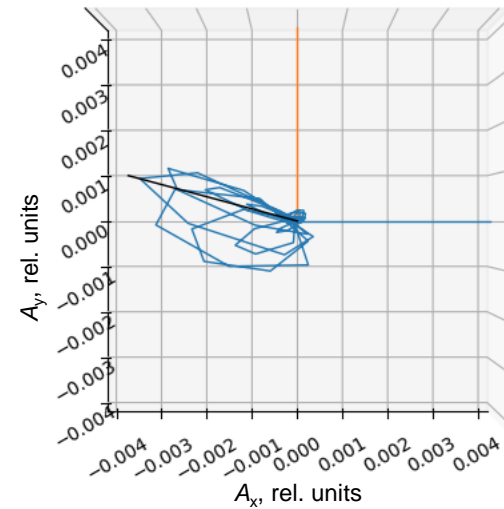
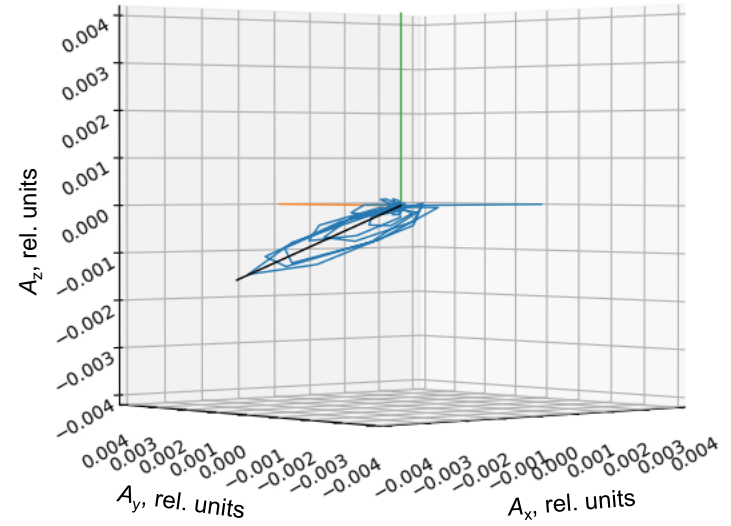
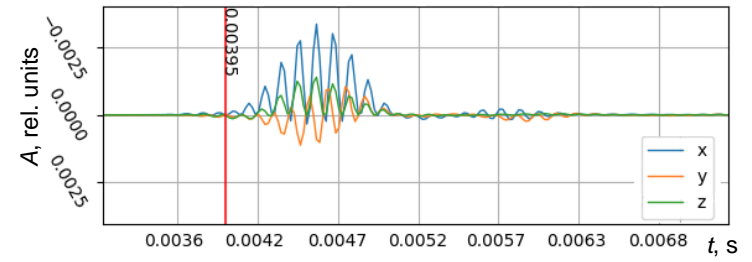
Δt_s - measured signal delay,

t_{err} - permissible error (corresponds to the time during which the wave propagates 0.25 m)

VFP1

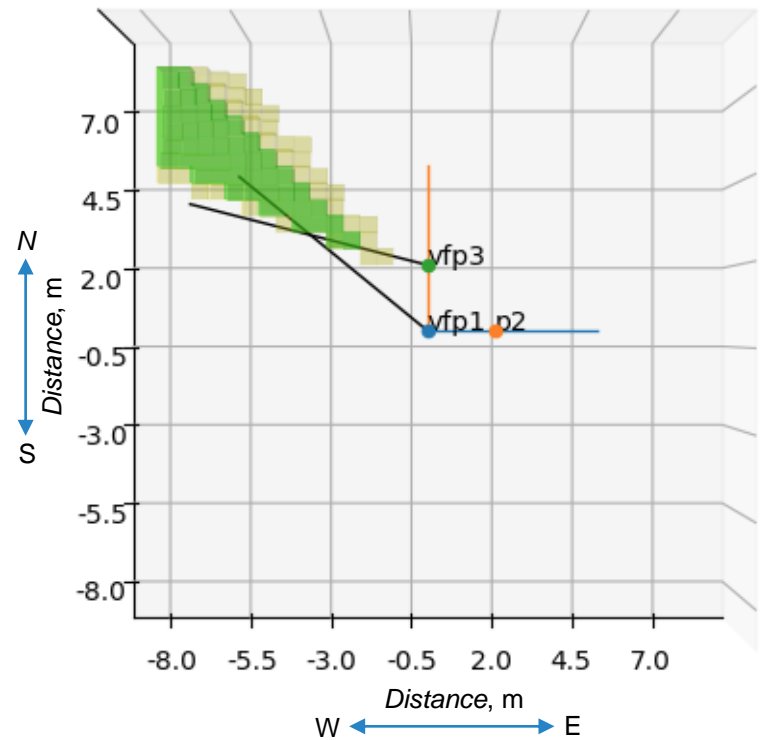
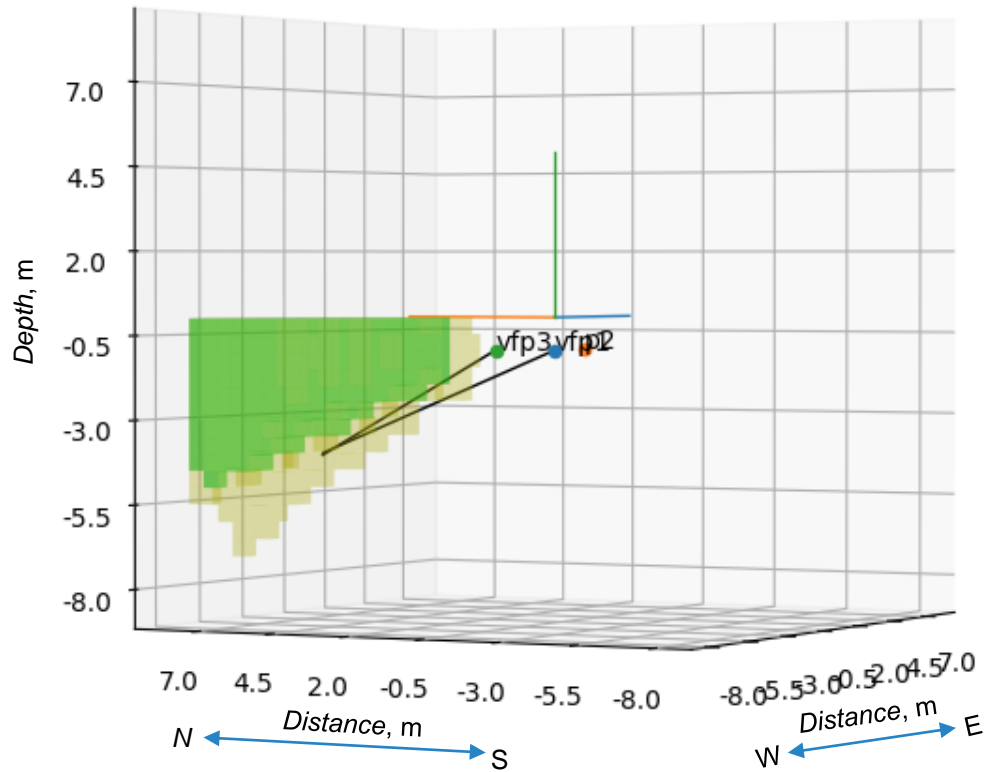


VFP3

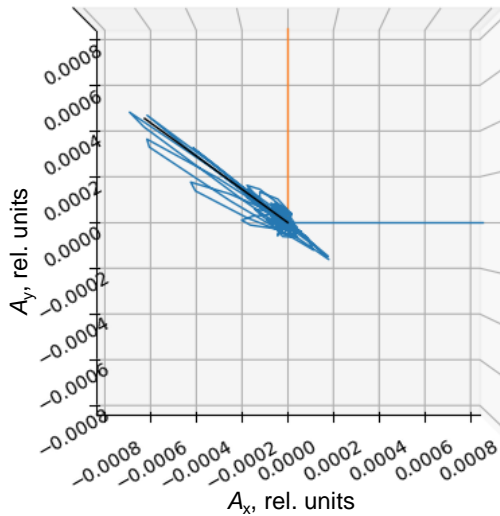
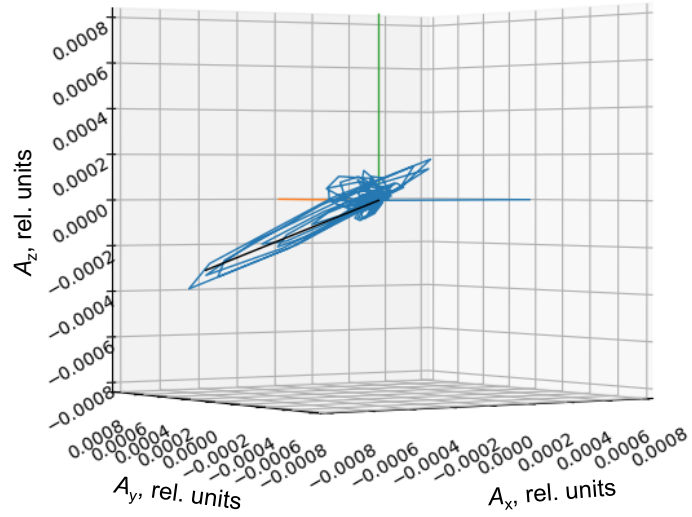
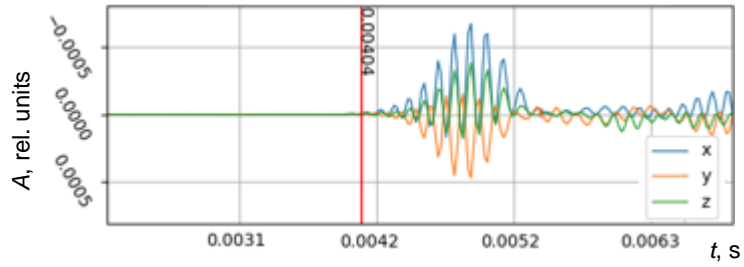


PULSE 1

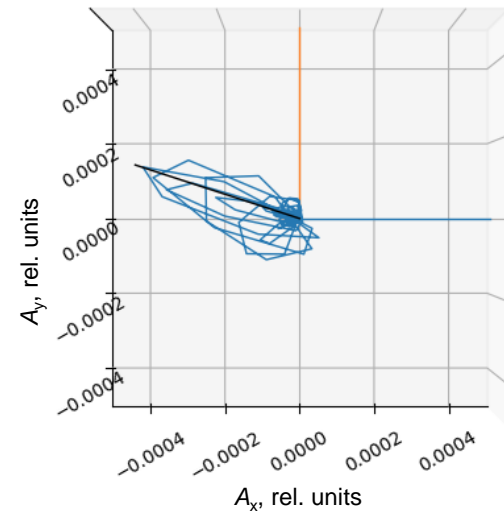
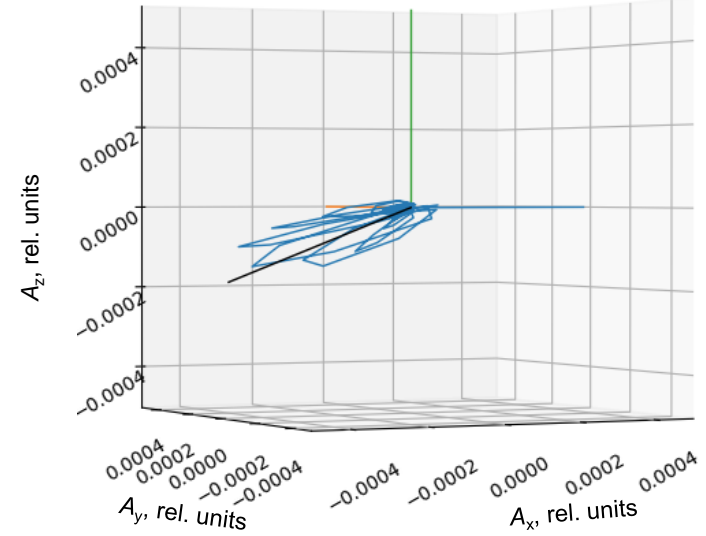
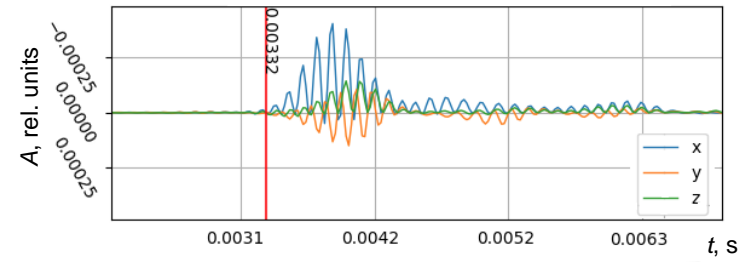
LOCALIZATION RESULT



VFP1

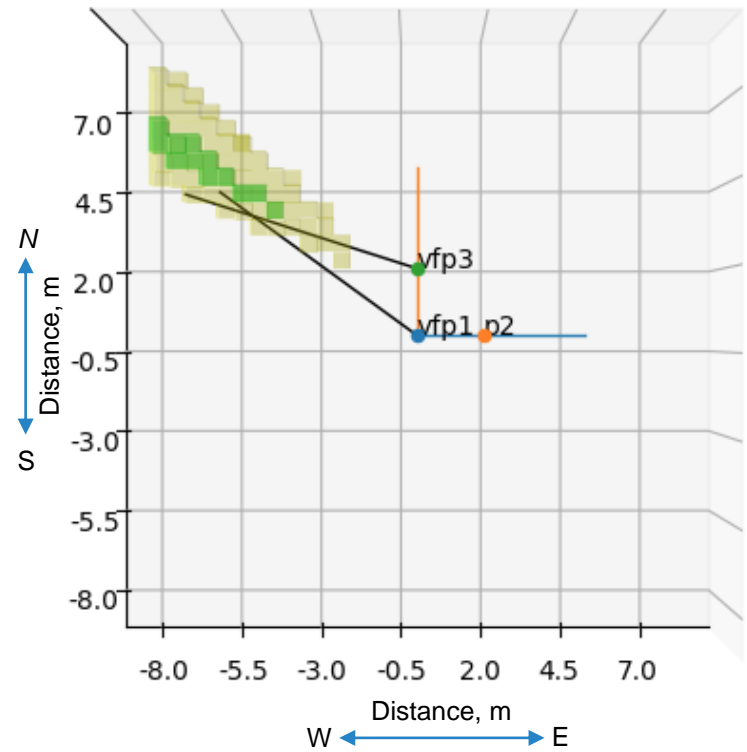
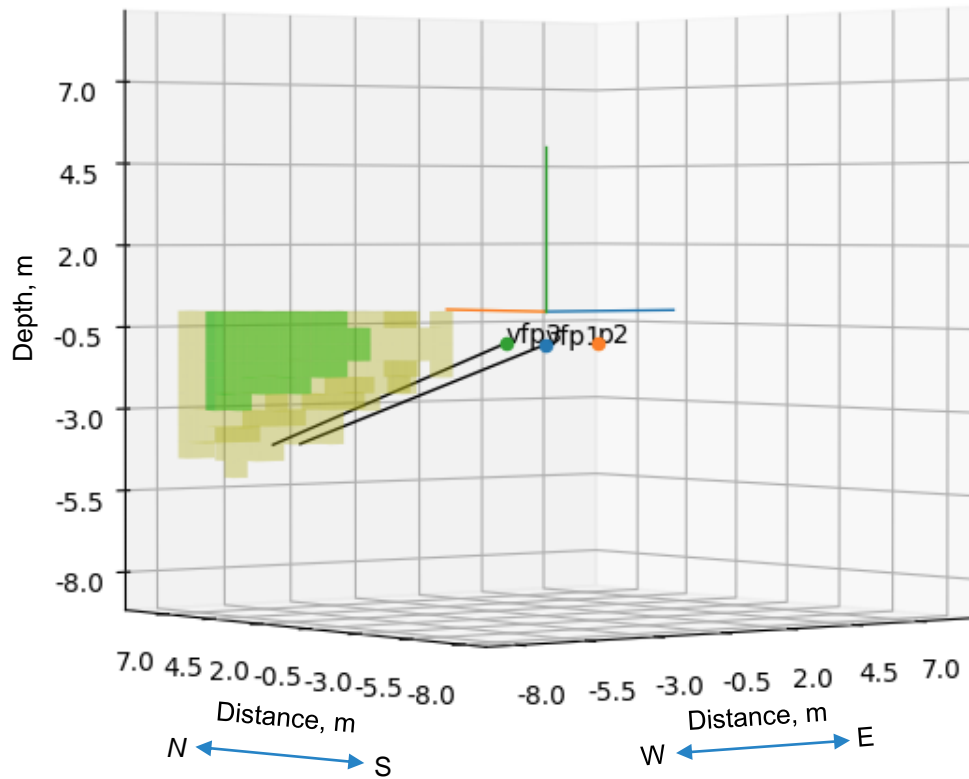


VFP3

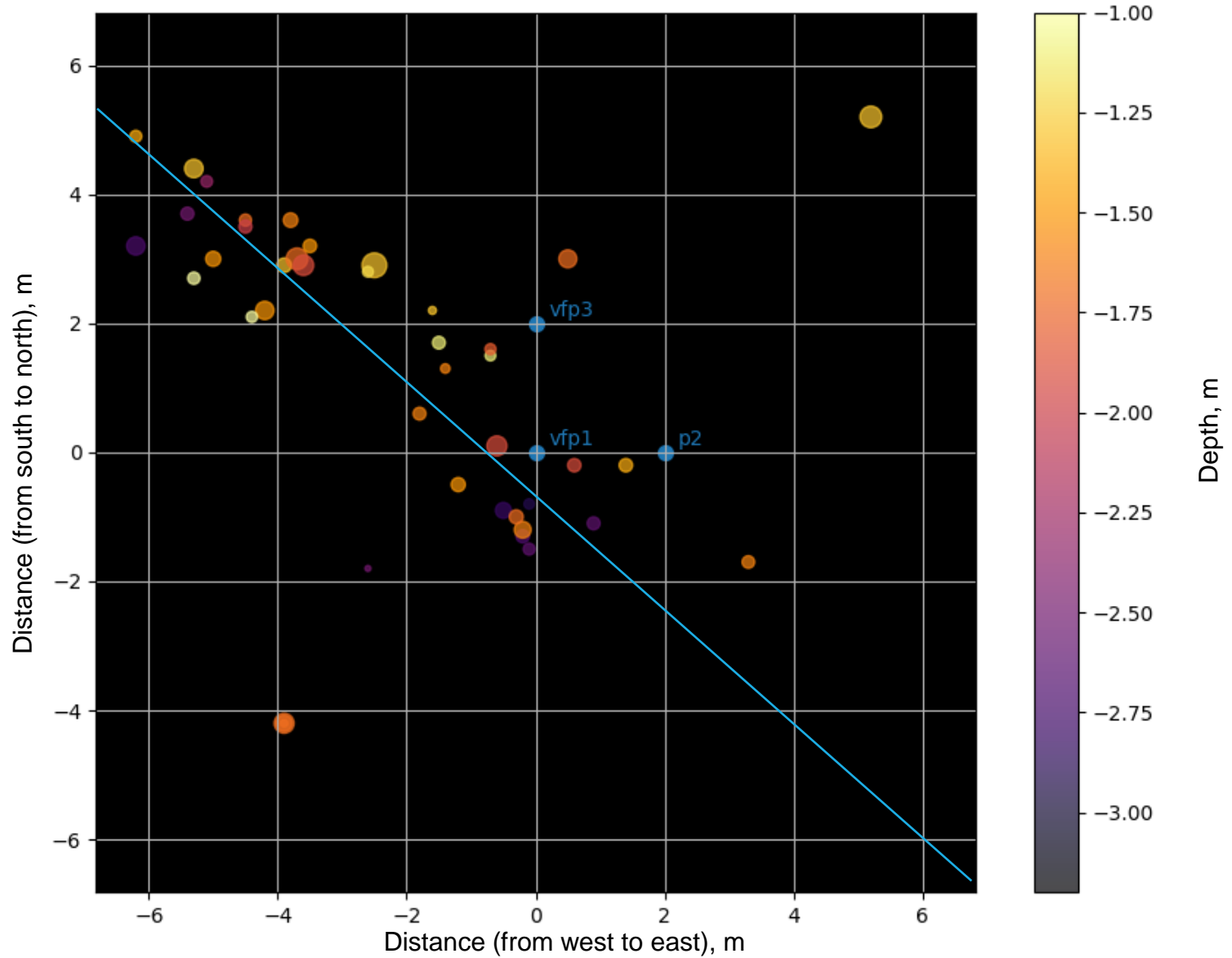


PULSE 2

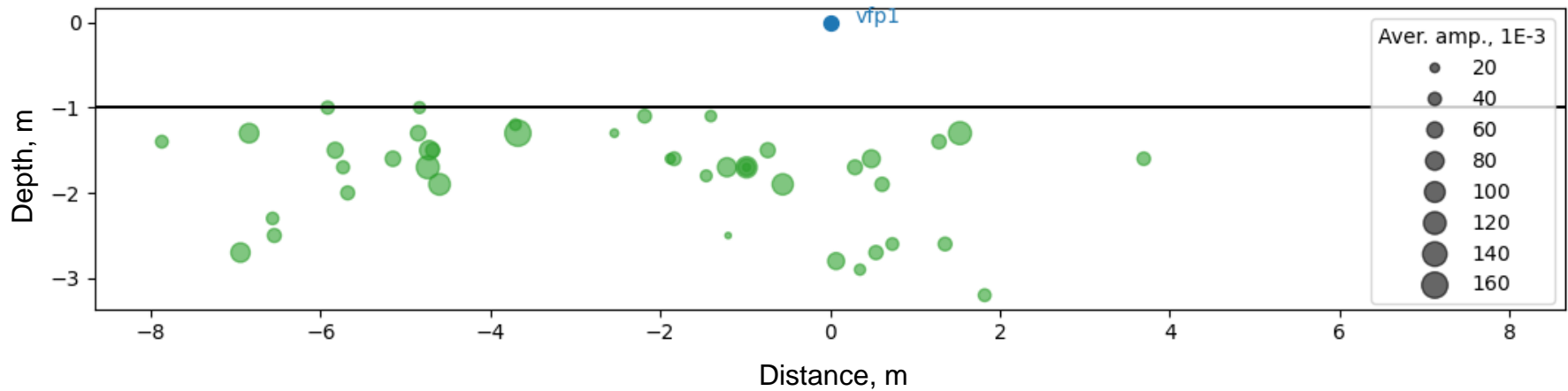
LOCALIZATION RESULT



RESULTS: SOURCE DISTRIBUTION



RESULTS: SOURCE DISTRIBUTION



Duration of the record	105 minutes
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Number of pulses	43
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Maximum depth	3.2 ± 0.25 m
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Maximum distance	8 ± 0.25 m
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