# HADRON Enhancement Report

Public-safe evaluation output


Strong enhancement with improved separability and preserved waveform morphology.

Median power SNR gain: 11.02 dB (95% CI 10.68 to 11.54)

Median peak-to-RMS: 41.84 dB (95% CI 40.75 to 42.78)

Signal/noise AUC: 1.00 (95% CI 1.00 to 1.00)

Channels x samples: 300 x 4,000

Sample rate: 100 Hz

Metric scope: windowed signal-quality evaluation for this input/run.

Report generated

2026-04-29T18:48:12+02:00

# Executive Summary

Input characteristics, confidence intervals, and recommended next steps.

| | |
|---|---|
| **Input format** | HDF5 |
| **Size** | 300 channels x 4,000 samples @ 100 Hz |
| **Detected event centers** | 24.77s, 35.45s |
| **Metric window source** | embedded_labels |
| **Signal/noise samples** | 1,673 / 2,063 |
| **Raw median power SNR** | 5.88 dB (95% CI 5.64 to 6.29) |
| **HADRON median power SNR** | 16.47 dB (95% CI 15.58 to 17.16) |
| **HADRON power SNR gain** | 11.02 dB (95% CI 10.68 to 11.54) |
| **HADRON peak-to-RMS** | 41.84 dB (95% CI 40.75 to 42.78) |
| **HADRON AUC** | 1.00 (95% CI 1.00 to 1.00) |

## Verdict

**STRONG: Strong enhancement with improved separability and preserved waveform morphology.**

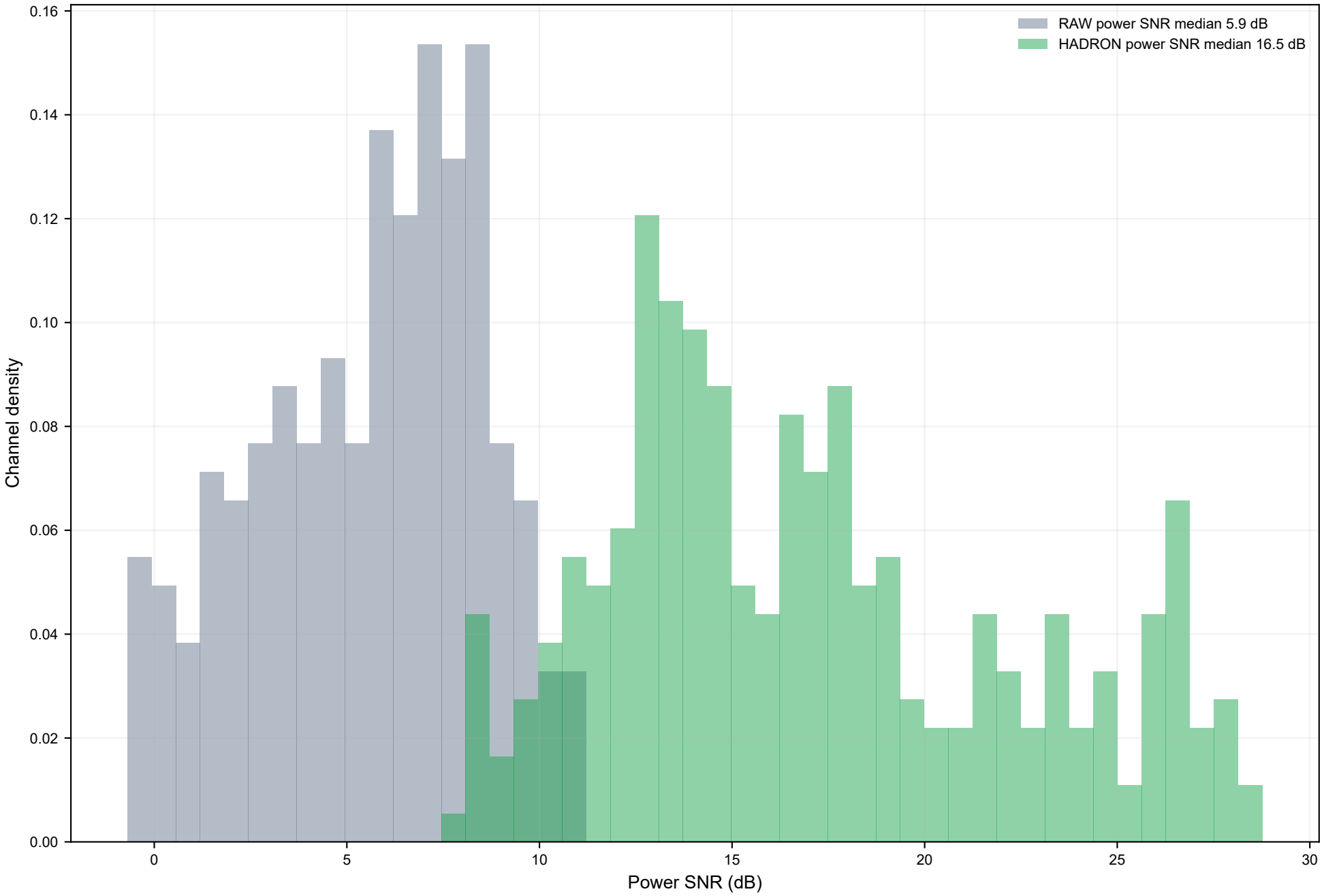
## Recommended next steps

- Inspect the top event windows on channel CH0159; this channel had the largest measured SNR improvement.

- Treat the enhanced output as a review candidate and validate it with domain expertise before any further use.

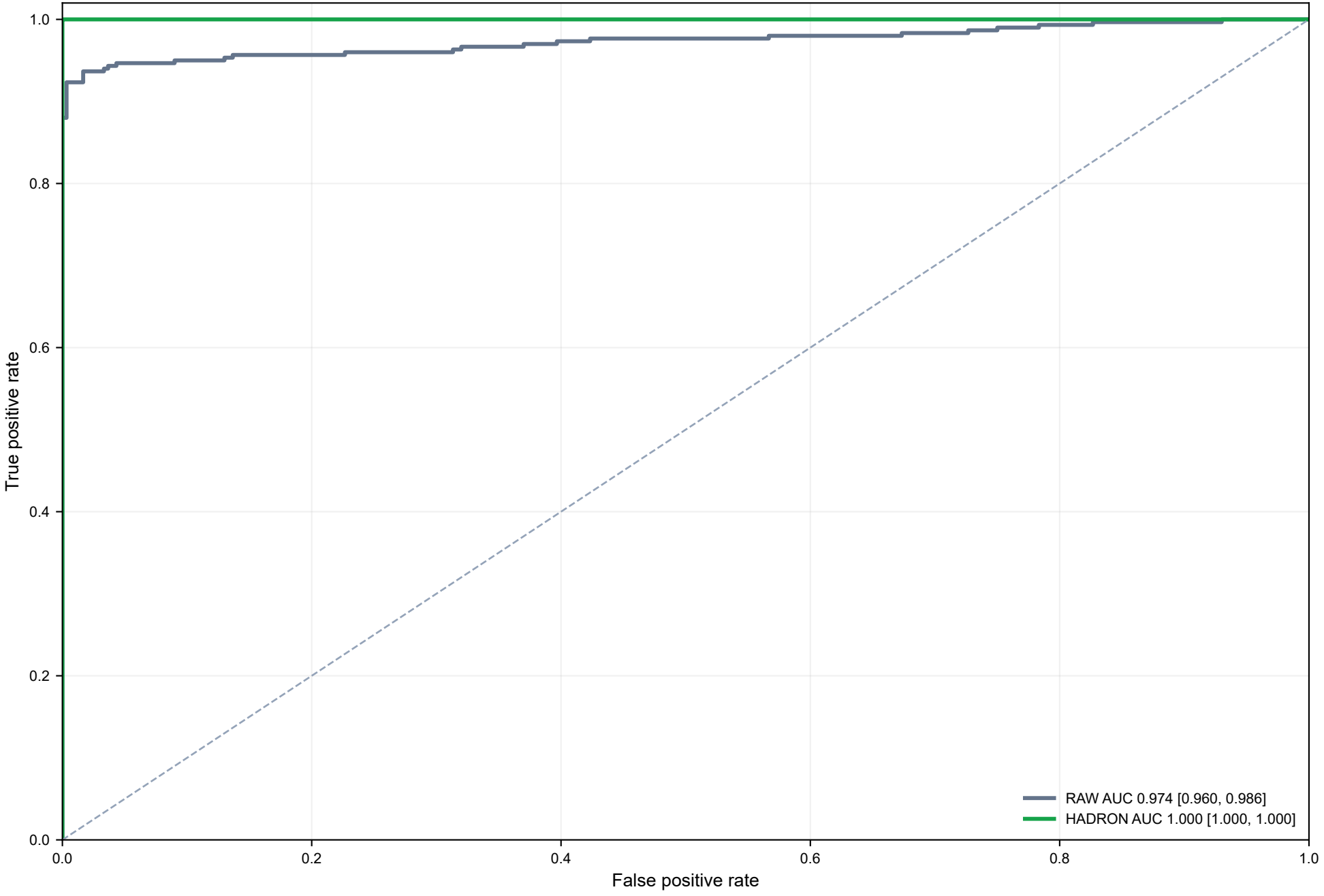
- Commercial use, publication, redistribution, customer delivery, API use, implementation, or operational use requires written agreement with JAWD AS.

Scope note: these metrics are windowed signal-quality checks for this input and run. They are not independent event detection, location, full spatial seismological validation, or a warranty of operational suitability.

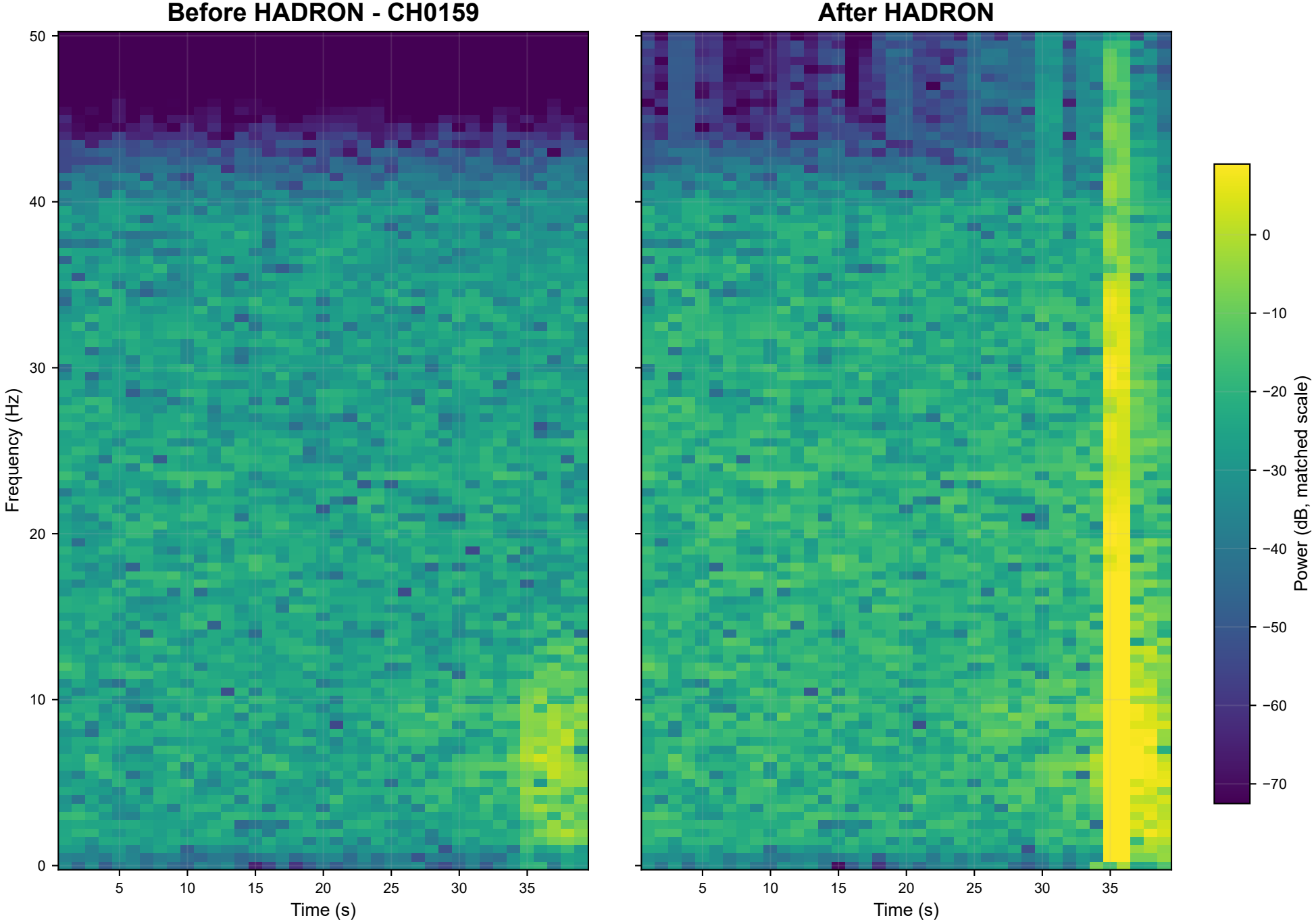



What this means: a rightward shift means more channels have usable event energy above the measured quiet-period noise floor.

# ROC Curve: Signal-vs-Noise Discrimination

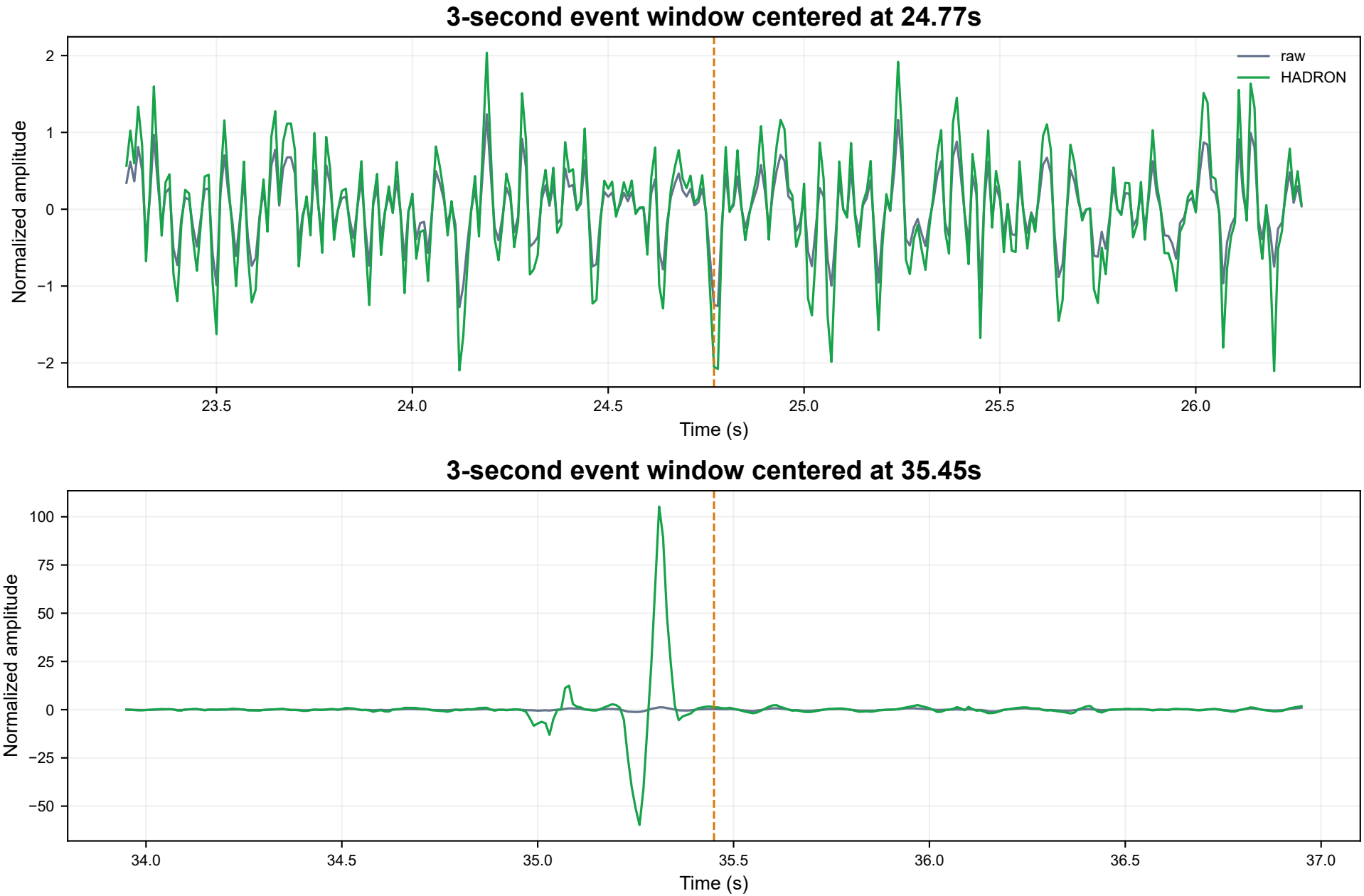



What this means: curves closer to the upper-left corner separate detected event windows from quiet windows more reliably.

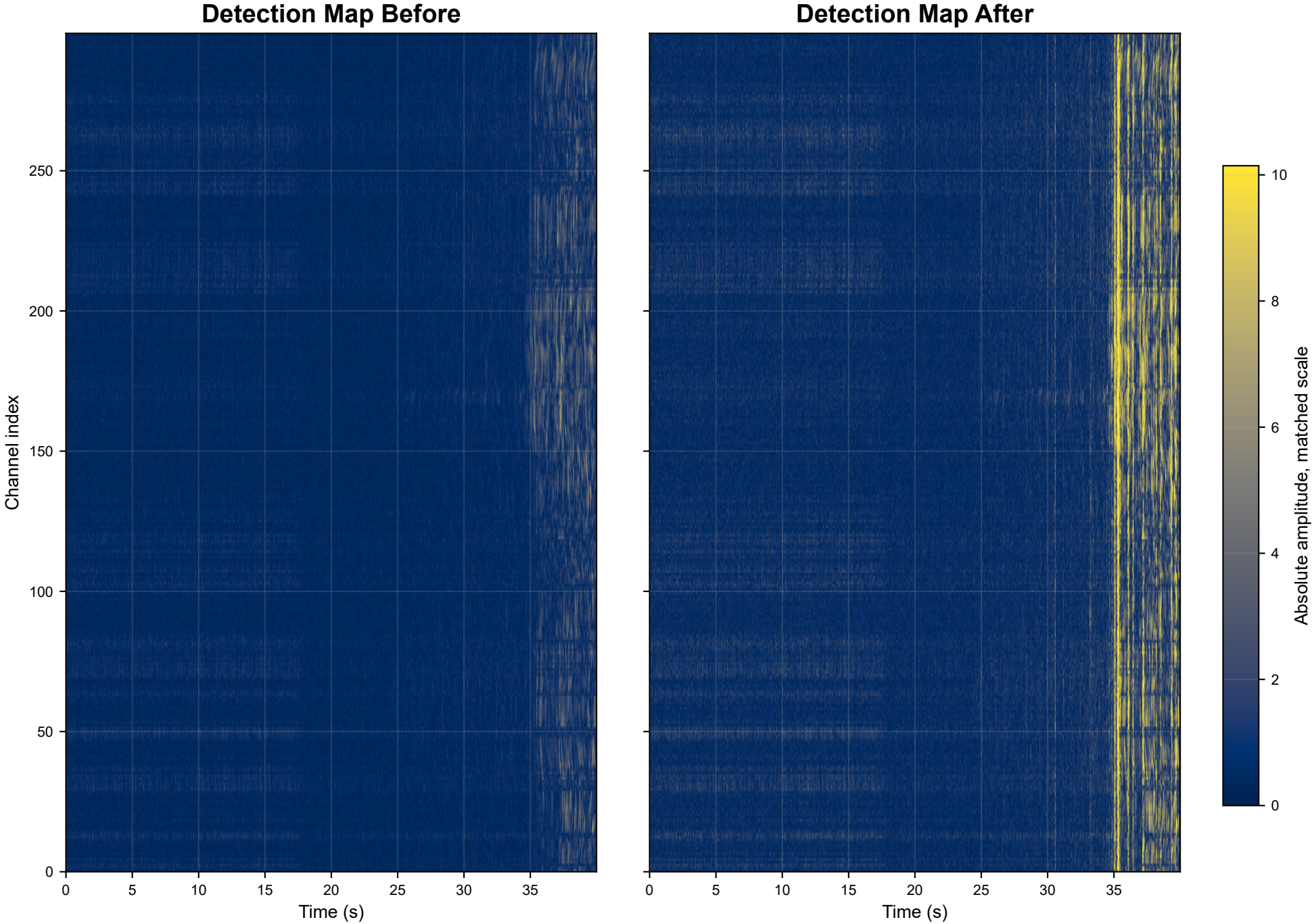



What this means: matched colorbars reveal where event energy improves without hiding broadband noise behavior.

# Time-Series Overlay - Best-Improved Channel CH0159

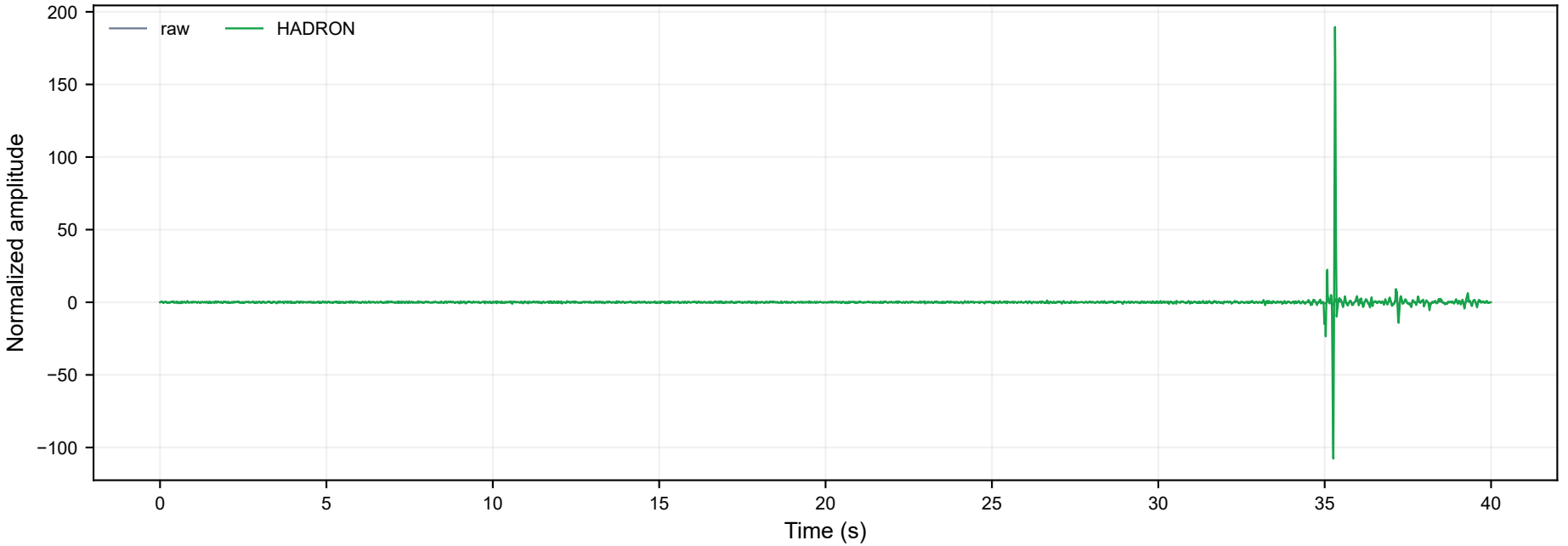



What this means: the enhanced trace should lift event arrivals while preserving waveform timing and morphology.

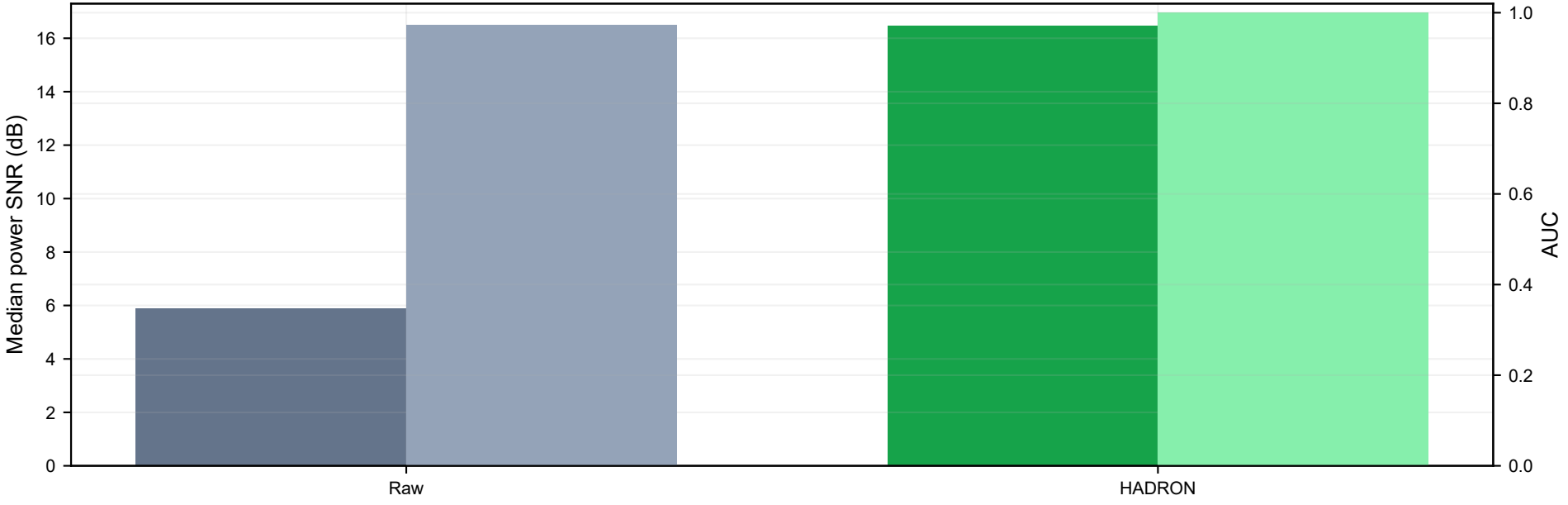



What this means: vertical or dipping event structures after HADRON are likely more pickable across channels.

## Waveform Overlay - CH0159




## Metric Comparison




What this means: the result is scored against the original input on signal/noise separation while keeping waveform timing intact.

# Data Appendix

| | |
|---|---|
| **Input reference** | redacted by design |
| **Format detection** | HDF5 |
| **Sample rate** | 100 Hz |
| **Channels** | 300 |
| **Samples** | 4,000 |
| **Review notes** | none |
| **Quality warnings** | Channel spacing metadata was unavailable; spatial-array interpretation is limited. |
| **Event centers** | 24.770s, 35.450s |
| **Metric scope** | Windowed signal-quality evaluation for this input/run; not full spatial seismological validation. |

**What this means:**
This appendix keeps the result auditable at the signal-quality level while avoiding source filenames, station identifiers, dataset paths, and proprietary processing details. The report is provided as-is for technology evaluation only and is not a warranty of suitability for any operational, safety-critical, commercial, or publication use.