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1. University of Texas Austin Researchers Publish New Data on Sensor Research (Phase Variance as a Seismic Quality-Control Attribute)

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University of Texas Austin Researchers Publish New Data on Sensor Research (Phase Variance as a Seismic Quality-Control Attribute)

Tech Daily News

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Body

2026 OCT 12 (NewsRx) -- By a News Reporter-Staff News Editor at Tech Daily News -- Research findings on sensor research are discussed in a new report. According to news reporting originating from Austin, Texas, by NewsRx correspondents, research stated, "Seismic sensors deployed in land acquisition record wavefields that are strongly distorted by near-surface heterogeneity, which introduces trace-specific, frequency-dependent phase perturbations that persist even after advanced time processing. These distortions are more pronounced for dense single sensor acquisition, where individual sensor coupling, local site conditions, and receiver-level near-surface variability drive phase behavior that differs from one sensor to the next."

Financial supporters for this research include Texas Consortium For Computational Seismology (Tccs) At The ***Bureau of Economic Geology***, University of Texas At Austin.

Our news editors obtained a quote from the research from University of Texas Austin: "Conventional processing relies primarily on surface-consistent deconvolution, which targets long- to mid-wavelength phase variability under the highly simplified assumption of surface consistency, equalizing large-scale trends and taming variability through overdetermination across many sensors. However, this approximation is inherently unable to correct localized, non-surface-consistent phase distortions, and its effectiveness further degrades when such effects dominate, as is often the case for modern high-density single-sensor data. A separate and equally important limitation is that conventional workflows provide no direct, quantitative per sensor measure of phase reliability, that is, trace-to-trace phase coherence. Phase quality is therefore assessed only indirectly, typically through amplitude behavior or visual inspection, leaving residual phase disorder largely undiagnosed. We introduce phase variance as a seismic quality-control attribute for seismic sensor-recorded data, by treating seismic phases as circular random variables and analyzing local trace ensembles using circular statistics. This data-driven measure quantifies localized phase dispersion without phase unwrapping, enabling analysis of local phase trends and sensor-to-sensor fluctuations without global assumptions or wavelet models. Phase variance provides frequency-by-frequency classification of the data, ranging from coherent signal behavior to fully randomized, noise-dominated phase. Synthetic tests confirm that phase variance reliably captures imposed phase perturbations and their frequency dependence."

According to the news editors, the research concluded: "Application of phase variance analysis to field prestack land data shows that conventional processing reduces phase variability primarily in the low-to-intermediate frequency range and struggles within the noise cone, while the highest and lowest frequencies often show little

improvement in phase coherence. Phase variance operates automatically over the full prestack volume, from shallow to deep, and frequency by frequency, providing a consistent, human-independent metric for defining effective bandwidth based on phase coherence and supporting phase-sensitive workflows such as AVO, migration, and full-waveform inversion."

For more information on this research see: Phase Variance as a Seismic Quality-Control Attribute. Sensors, 2026,26(18):5815. (Sensors - http://www.mdpi.com/journal/sensors). The publisher for Sensors is MDPI AG.

A free version of this journal article is available at https://doi.org/10.3390/s26185815.

Our news journalists report that additional information may be obtained by contacting Akshika Rohatgi, ***Bureau of Economic Geology***, University of Texas Austin, Austin, TX 78758, United States. Additional authors for this research include Andrey Bakulin, Sergey Fomel.

Keywords for this news article include: University of Texas Austin, Austin, Texas, United States, North and Central America, Sensor Research, Technology.

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