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noise characterization in sub-daily GNSS solutions and amplitude detection thresholds.

Sub-daily GNSS positioning provides a unique opportunity to monitor crustal deformation at timescales relevant to transient geophysical processes. However, the reliability of such observations is limited by the presence of correlated noise and modeling deficiencies, which complicate the detection of small deformation signals. In this study, we assess the noise characteristics of kinematic GNSS time series under varying instrumental and tectonic conditions. We estimate noise floors across multiple stations and evaluate how they constrain the minimum detectable signal amplitude. By modeling the noise spectrum and deriving variance–covariance matrices, we propose a framework to statistically define amplitude thresholds for robust signal detection. Our results highlight differences in site-specific noise behavior and demonstrate how noise-informed detection criteria improve the interpretation of transient deformation in sub-daily GNSS solutions.

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