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Observation of gliding tremors from the Gulf of Guinea might help solve over 50 year old mystery

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In the 1960's a peak in the seismic amplitude spectra around 26 s was discovered and detected on stations worldwide. The source was located in the Gulf of Guinea, with approximate coordinates (0,0), and was believed to be generated continuously. A source with similar spectral characteristics was discovered near the Vanuatu Islands, at nearly the antipodal location of the Gulf of Guinea source. Since it was located close to the volcanoes in Vanuatu, this source is commonly attributed to magmatic processes. The physical cause of the 26 s microseism, however, remains unclear.

We investigate the source location and evolution of the 26 s microseim using data from permanent broadband stations in Germany, France and Algeria and temporary arrays in Morocco, Cameroon and Botswana for spectral analysis and 3-C beamforming to get closer to resolving the source mechanism responsible for this enigmatic signal. We find that the signal modulates over time and is not always detectable, but occasionally it becomes so energetic it can be observed on stations worldwide. Such a burst can last for hours or days. The signal is visible on stations globally approximately 30 percent of the time. Our beamforming analysis confirms that the source is located in the Gulf of Guinea, as shown in previous studies, and that the location is temporally stable. Whenever the signal is detectable, both Love and Rayleigh waves are generated. We discover a spectral glide effect associated with the bursts, that so far has not been reported in the literature.

The spectral glides last for about two days and are observed on stations globally. Although at higher frequencies, very long period tremors and gliding tremors are also observed on volcanoes as Redoubt in Alaska and Arenal in Costa Rica, suggesting that the origin of the 26 s tremor is also volcanic. However, there is no reported volcanic activity in the area where the source appears to be located.