Detection and localization of low frequency industrial noise

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Industrial activity has a significant impact in the local seismic wavefield. The repetitive nature of industrial processes generates persistent mechanical energy that can be observed at distances of several 10's of kilometers, its signature is characterized by both broadband and tonal noise. Using a dense seismic and acoustic sensor network that scanned the contiguous US between 2009 and 2017 with broadband sensors with inter-sensor distance of around 75 km we identified areas within the territory that are affected by identifiable industrial noise. This identification and characterization of low frequency industrial noise in the background seismicity complements previous characterizations and include signatures (tonal noise) usually removed from traditional waveform processing. **Noise sources are further characterized through continuous particle motion analysis, resulting in the identification of persistent retrograde Rayleigh waves, distinct from globally observed microseismic sources.** Our research highlights the presence of noise with discrete spectrum with potential impact in high resolution seismic and acoustic imaging efforts. Our industrial noise mapping can also offer insights on the potential location for deployment of high-sensitivity instrumentation.