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# Summer monsoon transition induced microseisms observed at the South China Sea seabed

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It has long been recognized that complex interactions and energy conversions between the atmosphere-ocean system and the solid Earth can generate strong ambient noise field, known as microseisms which can be detected worldwide. Under the vast majority of circumstances, such seismic energy is believed to be induced by tropical cyclones. Whether unidirectional propagating winds, such as monsoons, can generate microseisms lacks solid seismic evidence. Here we utilize broadband seismic data recorded by seven ocean-bottom seismometers (OBSs) deployed in the South China Sea basin and 17 terrestrial stations to systematically investigate possible influences of the summer monsoon transition on the microseisms. Spectral analyses over time reveal significant seismic energy in the secondary microseisms frequency band (0.1−0.5 Hz) during 18th to 29th May, coinciding with the period of the summer monsoon transition occurring in the South China Sea. Polarization analyses and time-space variation of offshore surface wind field indicate that the source region of the observed secondary microseisms is located at the South China Sea. Given the absence of tropical cyclones during this time, we attribute the observed strong secondary microseisms to the summer monsoon transition. When the near-surface wind field is transformed to be southwest, ocean waves are driven to propagate northeastward and interact with an opposing wave train which represents precursor waves and is reflected by coastlines, generating the secondary microseisms. This study provides solid evidence for a causal link between the monsoon transition and microseisms, highlighting the potential of applying ocean bottom seismic observations for monitoring and characterizing monsoon transition and ocean activities.