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Does the evolution of magnetic field geometry during a solar flare drive the generation of sunquakes?

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Solar flares are an explosive manifestation of complex magnetic loop reconfigurations in the vicinity of active regions in the solar atmosphere. During a flaring event, the magnetic field topology changes rapidly, abruptly, and significantly. Some of these eruptive events inject enough energy into the photosphere and sub-photosphere to generate acoustic responses observed as sunquakes. The precise physical mechanism causing the acoustic source of a sunquake is still a topic of debate. However, Most authors agree that magnetic field re-structuring must play a fundamental role in causing such acoustic drivers. Previous studies have mainly probed the line-of-sight component of the magnetic field in such scenarios. In this work, we investigate the temporal and spatial evolution of permanent changes in the magnetic field geometry in a sample of five acoustically active flaring events using vector magnetograms acquired with the SDO/HMI instrument. The highly energetic events under study occurred during the past solar cycle 24, and cover a range of high and low GOES classes. The analysis carried out represents a crucial input for the investigation of sunquakes origin and dynamics.

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