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# Imaging the Samos 2020 Mw7.0 earthquake rupture by backprojecting local strong-motion recordings and relocating the aftershock sequence

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On November 30, 2020 11:51 UTC, a major earthquake (Mw7.0) struck the northern area offshore Samos island, Greece, causing serious damage to the island and nearby Turkish coast. This seismic event is an ideal opportunity to explore extensional seismicity in the back-arc area of the Hellenic subduction zone. To that end, first and foremost we study the behavior and characteristics of the main event source. Then, we examine the evolution of the aftershock in space and time and relate it to the main event. We implement the technique of local backprojection on strong-motion recordings (e.g. Kao & Shan, 2007; Evangelidis, 2013) to infer the spatiotemporal distribution of the earthquake source. This method is performed at relatively short periods, making it possible to map in detail the high-frequency radiation of the source, without imposing any a priori constraints on the geometry or shape of the ruptured fault. Furthermore, and which is not often the case, the strong-motion recordings were carefully assessed prior to being used in backprojection, in order to avoid any significant influence of local site effects and amplification, which could in impact the robustness of the backprojection solution. Synthetic tests were also used to resolve the accuracy. Our results show evidence of multiple distinct sources of high-frequency radiation during the earthquake rupture. In addition, the first month of the aftershock sequence was located, clustered and relocated, ultimately highlighting the faults activated in the area. The quality of the resulting high-resolution catalogue was further assessed, and the moment tensors of the strongest events were estimated. Combining the backprojection results with the detailed picture of the aftershock seismic sequence leads to an interpretation of the short- and long-term fault rupture process and their associated secondary effects (tsunami, landslides) in the area.

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