[Invited] Introduction to the SCEC Community Stress Drop Validation Study

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We introduce a community stress drop validation study using the 2019 Ridgecrest earthquake sequence, in which researchers are invited to use a common dataset to estimate earthquake stress drop. Earthquake stress drop is a key parameter in many ground motion, rupture simulation, and source physics problems in earthquake science. In theory stress drop relates the average slip on a fault to rupture area, and, in practice, it quantifies the higher frequency ground motions of an earthquake. We seek to understand the physical controls and methodological reasons for similarity or differences in stress drop estimates, so that they can be used more reliably by the earthquake science community. The common dataset consists of 2 weeks of earthquakes following the 2019 Ridgecrest M6.4 earthquake, including nearly 13,000 earthquakes of M1 and greater, recorded on stations within 100 km. This dataset and related information are available from the Southern California Earthquake Center (SCEC) Web site: https://www.scec.org/research/stress-drop-validation. We are soliciting stress drop estimates from community participants on any subset of these events, using a variety of methods. We are correlating and comparing these resulting stress drops as they are made available in a meta-analysis, to understand why similarities or differences arise. We will examine which earthquakes or methods generate grossly similar or different results in the first round of analyses. We will then share the findings and encourage individuals and groups to revisit their analyses and investigate the principal sources of discrepancies and uncertainties. We will present an overview of the study, and preliminary results. As a community study, all are invited to join!

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