Energy Budget of Intermediate-Depth Earthquakes in Northern Chile: Comparison With Shallow Earthquakes and Implications of Rupture Velocity Models Used

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We calculate well-resolved corner frequencies and radiated energies for a set of 96 earthquakes divided into two clusters located in the same tectonic setting but with different depths in northern Chile. Fifty-three shallow events with a mean depth of 20 km are analyzed, along with 43 intermediate-depth earthquakes with a mean depth of 110 km. We deduce and compare their static (stress drop ??) and dynamic (rupture energy EG and radiation efficiency ?R) source parameters and test the implications of different common assumptions on their depth dependence, such as stress drop invariance, strain drop invariance, or constant rupture velocities. Our data show that, in this zone of Chile, most of these models imply higher rupture velocities at depth than for shallow earthquakes. In these cases, high stress drop, high fracture energy release rate, and higher radiation efficiency are observed for intermediate-depth earthquakes, suggesting