



Seismicity, aftershocks and source behavior along Double Benioff Zones

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Double Benioff Zones (DSZ) are ubiquitous features of subduction zones, where seismicity is distributed along two layers separated by an aseismic region. Dehydration embrittlement is thought to be responsible for earthquakes in the subducting crust (upper layer), but the case for it in the lithospheric mantle (lower layer) is less clear. With a new relocated global earthquake catalog we characterize seismicity in 32 slab segments and identify controlling factors of DSZ geometry. We unambiguously assign events to either the upper or lower layer and estimate their seismicity rates and frequency-size distributions. We study the frequency-size distribution of the subducting crust and mantle using our catalog, and study differences in aftershock behavior using local or regional catalogs. Differences in source behavior, that is source duration as a function of magnitude, will also be presented between seismicity in the subducting crust and upper mantle.