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Supporting Information for

**Constraining the Dip of Shallow, Shallowly-Dipping Thrust Events Using Long-Period Love Wave Radiation Patterns: Applications to the 25 October 2010 Mentawai, Indonesia and 4 May 2018 Hawaii Island Earthquakes**

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Figures S1 to S2

**Introduction**

Supplementary figures that demonstrate the sensitivity of the long-period Love wave radiation patterns to centroid depth (Figure S1) and rake (Figure S2).



Figure S1. Love wave azimuthal radiation patterns for period, *T* = 204.84 s for point-source step-function double-couples at depths of 6, 9 and 15 km in the PREM structure with strike ** = 0°, rake ** = 90°, seismic moment *M0* = 1.0 x 1020 Nm, and dip ** varying from 0° to 10°. Note that as depth increases, there is more pronounced variation in radiation pattern as a function of dip.



**Figure S2.** Rayleigh wave (blue) and Love wave (orange) azimuthal amplitude radiation patterns for period, *T* = 204.84 s for point-source step-function double-couples 6 km deep in the PREM structure, with strike ** = 0°, (a) rake ** = 75° or (b) rake  = 60°, for seismic moment *M0* = 1.0 x 1020 Nm, and dip ** varying from 0° to 20°. These can be compared with the patterns for = 90° shown in Figure 1. Note variation in vertical scales.