

Abstract Submitted
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The precursory fault width formation of large earthquakes FUMIHIDE TAKEDA, Takeda Eng. Consultant Inc., MAKOTO TAKEO, Portland State Univ. — We collect earthquake (EQ) events for a region of about 5 degree mesh from a focus catalog of Japan with a regionally dependent magnitude window of $M \geq 3-3.5$. The time history of the events draws a zigzagged trajectory in a five dimensional space of EQ epicenter, focal depth (DEP), inter-event interval (INT), and magnitude (MAG). Its components are the time series of the EQ source parameters for which time is the chronological event index. Each series has long-term memory and evidence of deterministic chaos. We thus use physical wavelets (P-Ws) to find the process producing large EQs. The P-Ws convert the moving-average of each series, its first and second order differences at any interval into the displacement, velocity and acceleration (A) in selective frequency region, respectively. The process starts with two unique different triple phase couplings of A on source parameters DEP, INT, and MAG, precursory to every large EQ's ($M > \text{about } 6$) throughout Japan. Each coupling then creates a linear DEP variation (W) on its series, which becomes comparable to the fault width of large EQ's. It suggests that the variation exerts the corresponding shear stress on a local plane in Earth's crust to form the fault plane of width W, rupturing a large EQ.

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