Isolated intermediate-depth seismicity: Implications for local slab hydration

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We analyzed an isolated seismic cluster in a depth range of 40–90 km located 100 km north of the Izu peninsula. We relocated 40 earthquakes by hypoDD using catalogue-derived arrival time differences and determined 7 focal mechanism solutions A total of 37 earthquakes occurred in the subducting Philippine Sea (PHS) plate. Based on the focal mechanism solution, the largest earthquake (M3.1) is interpreted as a thrust earthquake along the upper surface of the PHS plate. Locations of other earthquakes relative to the largest event suggest that most occur within the subducting PHS plate. Our results suggest that the PHS plate north of Izu peninsula has temperatures low enough to facilitate thrust and intraslab earthquakes at depths of 60–90 km. Earthquakes are likely to occur where pore pressures are locally high, which weakens pre-existing faults.

