

Seismogenic event beds: Stories from perched basins during the last 20 kyr, offshore SW Taiwan

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The tectonic features of offshore SW Taiwan are dominantly controlled by the subduction and collision processes between the Eurasian and the Philippine Sea plates. Marine sediments may serve as archives of extreme events, including earthquakes, typhoons, submarine landslides, etc. The most common event bed is turbidite, while homogenites are relatively less well-known. The distinction between various deposits like muddy turbidites, homogenites, and hemipelagites has long been a matter of intricate controversy. Homogenites are one of the many event beds and are likely to develop in enclosed basins where suspended sediment clouds are trapped and deposited. They are very fine-grained sediments, initiated from re-suspended fine-grained sediments or sediment gravity flows, and are transported and deposited from suspension fall-out. Two giant piston cores, MD18-3547 (35.27 m) and MD18-3548 (20.07 m) were collected in the perched/isolated basins of the Taiwan accretionary wedge, at a water depth of 1806m and 1752m respectively. A total of 28 event beds (homogenites and turbidites) are identified from the piston cores. Detailed grain-size analysis (1 cm resolution), ¹⁴C AMS dating, and CT-scan of the above-mentioned cores were performed. CT scans reveal homogenites as thick structureless mud totally devoid of bioturbation while hemipelagites show bioturbation. The average thickness of homogenites and turbidites are ~250 cm and 5 cm, respectively, while the thickest homogenite layer is ~950 cm and the thickest turbidite layer is ~15 cm. All homogenite layers are floored by a thin (usually less than 10 cm thick) and fining-upward sandy unit. Grain size parameters like mean, mode, and median are highly constant for homogenites, excluding the basal sandy unit. A total of 27 ¹⁴C AMS dating of foraminifera were carried out from the two marine cores. The youngest homogenite is ~2,233 BP cal yrs and the oldest one is ~16,387 BP cal yrs, while the youngest turbidite corresponds to ~327 BP cal yrs and the oldest one is ~16,422 BP cal yrs.

Keywords: perched basins; homogenites; turbidites; ct-scan; ¹⁴C dating; grain size