

## Evolution of the Philippine Sea: constraints from the new observations at Godzilla Mullion

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The largest oceanic core complex in the world, Godzilla Mullion, occurs along the extinct spreading center of the Parece Vela Basin (PVB) in the Philippine Sea. Based on poorly constrained magnetic data, spreading was thought to be intermediate (8.8 to 7.0 cm/y full-rate), ceasing at 12 Ma. In the segment that hosts Godzilla Mullion, there is a large alkaline axial volcano that erupted at 4.6 Ma (Ishizuka et al., AOGS, 2004). Ishizuka et al. interpreted this volcano as post-spreading.

We have new radiometric ages by Ar-Ar on basalts and U-Pb on gabbroic rocks from Godzilla Mullion that indicate a significant decline (to slow/ultraslow) and asymmetry in spreading rate for the terminal phase of PVB spreading. The peridotite petrology indicates a secular variation at Godzilla Mullion. Those from its distal end (i.e., near the breakaway zone) are moderately depleted, while those from the medial part are more fertile, and those from the proximal part (i.e., near the termination) show evidence for melt impregnation with abundant plagioclase pseudomorphs. The high abundance of plagioclase peridotites at the proximal part could be related to stagnation of melts in a thickened lithospheric upper mantle leading up to cessation of spreading. Furthermore, we recovered peridotites as well as basalts from the termination block that was generated during the final phase of the development of Godzilla Mullion. The morphotectonics in this region is similar to that at ultraslow-spreading ridges. Based on this scenario, the 4.6 Ma axial alkaline volcano is not post-spreading, but the final product of PVB spreading and magmatism at a terminal ultraslow phase.

Presence of post-spreading magmatism has been suggested in the Philippine Sea (e.g., the Kinan Seamount Chain in the Shikoku Basin). Our new scenario may instead suggest that the terminal phase of the evolution of the Philippine Sea involved significant decline in spreading rate, yielding alkaline basalt as the final magmatic product.

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