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世界最深の海洋底かんらん岩：トンガ海溝かんらん岩にみられる前弧拡大の証拠
The deepest peridotites in ocean floor: Tonga trench peridotites revealing forearc extension

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The Tonga trench is one of the deepest trenches in the world. We used peridotite samples collected from dredge hauls by Boomerang Leg 8 Cruise aboard R/V Melville in 1996 at the deep landward trench slope (19’15.19S, 172’56.29W; depth 8,194-9,371m; Bloomer et al., 1996, Fall Meeting, Abstract, OG32B-01). Most of samples are remarkably fresh, indicating that tectonic erosion is active in the Tonga trench. The samples are harzburgites and show some variations in microstructure consisting of dominantly coarse (>5mm) granular texture to minor fine-grained (~0.5mm) parts. They contain high-Cr# spinels in a range between 0.5 and 0.8 with very low Ti contents, suggesting that these peridotites were derived from the Tonga forearc. Equilibrium temperatures estimated by Ca in orthopyroxene geothermometer are approximately 900-1250. Olivine fabrics are characterized by intense [100]-fiber pattern, which could be developed by transtension type of strain (Tommasi et al., 1999, EPSL, 168, 173-186). These indicate that the Tonga trench peridotites have probably been derived from the lithospheric mantle due to the forearc extension during slab rollback (Smith et al., 2001, Science, 292, 713-716).

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