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Fabric and petrological characteristics of peridotiites derived from Mariana serpentinite seamounts

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Serpentinite seamounts are unique seamounts that have only been in the Izu-Bonin-Mariana arc. The Pan-lid seamount is located at the northernmost Mariana arc, whereas the Deep Blue seamount is located at southernmost part. This study envestigated serpentinized peridotites derived from the eight seamounts (Pan-lid, Conical, Packman, Twin peaks, Big Blue, Celestial, South Chamorro, Deep Blue seamounts). Samples from these seamounts are mantle-derived peridotite. These samples were analyzed by EBSD and EPMA. As a result, olivine crystal preferred orientations (CPOs) were divided into three types: A-type AG-type and D-type. The northern seamounts are characterized by A-type and/or AG-type, whereas the southern seamounts consist dominantly of D-type. Only South Chamorro seamount has both AG-type and D-type. The compositions (Cr#-Mg#) of spinel vary among the seamounts. Only Cr# of spinel in South Chamorro and Deep Blue Seamounts exceeded value of 0.6. But no clear relationship between partial melting process and CPO development has been found. These suggest that the northern Mariana arc have a complex and heterogeneous structure.

Keywords: peridotite, Mariana Trench, Serpentinite seamount