Origin of high vesicularity in massive basalts with N-MORB signatures from the Shimokawa ohiolite, Hidaka belt

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Basaltic rocks with N-MORB features from the Shimokawa ophiolite show poor vesicularity. Some of massive basalts, which intruded into clastic sediments, are considerably vesiculated. The chilled margina are not vesicular as well as pillow basalts. Nb/Zr ratios of these rocks are constant and comparable with N-MORB regardless of their vesicularities. LIL element contents of the vesicular basalts are slightly higher than those of poorly vesiculated rocks. The vesiculation occurred in situ after the intrusion of magma. When the magmas intruded into soft sediments, H2O and CO2 were expelled from sediments. The hydrothermal fluids may have been entrained into magmas, which results vesiculation of the magmas. LIL elements expelled from the sediments may also have been entrained in the magma.