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The magnetic structure along the ultra-slow spreading Mohns Ridge axis between 71.8°N and 73.7°N

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By combining the published and newly collected data, we calculate the inversed equivalent magnetization (IEM) and mantle Bouguer anomaly (MBA) along the ultra-slow spreading Mohns Ridge axis at 71.8°-73.7°N. We then compare the IEM with bathymetry, MBA, seismic-determined crustal structure and geochemical data on both between-segments scale (> 60 km) and in-segment scale (20-60 km) along the Mohns Ridge axis. Between segments, the IEM highs at segment centers are independent of the bathymetry and the MBA. Among all 11 segments, 8 of them with IEM values higher than 20 A/m coincide with axial volcanic ridges (AVRs) or just rifted AVRs identified from multibeam bathymetry map. The IEM highs at segment centers are then associated with the extrusive lavas rather than the amount of magma supply. With few exceptions, the IEM lows at segment ends increase from the south to the north, which is correlate with the increasing MBA at segment ends from the south to the north. We ascribe it to more serpentinized peridotites at segment ends in the north with thin crust or/and deepened isotherm, although thickened extrusive basalts at segment ends in the north is still a possible explanation. On segment scale, the most prominent feature is the IEM decrease from high values at segment centers to low values at segment ends with amplitudes up to 35 A/m. The IEM then positively and negatively correlate with the bathymetry and MBA within each segment. The magnetic signal produced by seismic-determined layer 2A with constant magnetization (20 A/m) is remarkably consistent with the observed magnetic anomaly, which strongly suggests the thickness of extrusive basalts dominate the magnetic structure in a segment of the Mohns Ridge. Two segment ends with notable higher IEM than the conjugate ends of same segment be ascribed to thickened lavas transported from the adjacent segment centers with relatively robust magma supply. Together, the thickness of extrusive basalts dominant the magnetic structure along the Mohns Ridge, while the contributions of serpentinized peridotites may be significant at segment ends and produce long-wavelength variations. The magnetic data are indicator of the relative thickness of the extrusive basalts in a segment and also provide independent constrains on the lithospheric structure along the ultra-slow spreading Mohns ridge.