# Surface sediment geochemistry and hydrothermal activity indicators in the Dragon Horn area on the Southwest Indian Ridge

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The hydrothermal plumes are usually rich in ore-forming elements. Studies have shown that more than 90% of these elements usually disperse and precipitate in the sediments around the hydrothermal field (Rona, 1984). Therefore, the geochemical features of the sediments probably be used in seafloor sulfide exploration. This study analyzed the surface sediment geochemistry in the Dragon Horn area on the Southwest Indian Ridge. The results indicate that the debris contents in the sediments are lower than that of fast and medium spreading mid-ocean ridges. The relatively high amounts of ultramafic debris components reveals there probably ultramafic rock outcrops. In addition, hydrothermal elements precipitate in the sediments exhibited zonation of Zn, Cu, Fe, Mn. Sediments proximal to the hydrothermal field exhibit high Cu, Zn, Fe content and low Mn content. Hydrothermal Cu and Zn disperse within a limited range, and Zn precipitate earlier than Cu during dispersal from the plume. Hydrothermal Fe distributed similarly with Cu spatially but with a larger dispersion distance. Hydrothermal Mn was able to migrate beyond the ridge valley to precipitate in the ridge flank sediments. Two hydrothermal Cu and Zn anomalies were identified on the south ridge flanks, suggesting there probably undiscovered hydrothermal activities. Further, the study area sediments show relatively low Mn content and high Fe/Mn molar ratio, which probably resulted from larger migration distance of hydrothermal Mn under reduced environment. What's more, the Cu-Cu/Fe molar ratio model was proposed to identify mafic- and ultramafic - related hydrothermal activities. Higher slope of the Cu–Cu/Fe molar ratio probably representing more contribution of ore forming materials from ultramafic rocks. This model and the REE features of the sediments suggest that ultra-mafic rocks probably not the only source of ore forming elements for hydrothermal mineralization in the study area. The Cu and Zn anomalies on the ridge flanks of the study area probably resulted from serpentinization of ultramafic rocks.

**Key words**: Sediments; Geochemistry; Hydrothermal activity;

**Reference**

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