

## **Trace element variations in volcanic rocks of the Mandoos VMS Deposit (Samail Ophiolite, Oman)**

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Mandoos is one of the largest volcanogenic massive sulphide (VMS) deposits in the Samail ophiolite. This study provides the first ICP-MS data for Oman's VMS, allowing the analysis of element mobility in the course of successive alteration stages affecting the *cpx*-(micro) porphyritic basaltic to andesitic host rocks. The mineral and early textural transformations, assigned to oceanic metasomatism processes, affect both the hanging- and footwall sequence, comprises the breakdown of primary *cpx* into actinolite+chlorite±epidote, and the formation of secondary albite, titanite, carbonate and zeolites, and finally, carbonate+chlorite±hematite veins. A first low-temperature hydrothermal episode is responsible for the formation of jaspers and hematite veins. The following mineralising alteration stage (recorded only on the footwall) comprises pyrite dissemination and silicification, accompanied by the development of quartz+sulphides±chlorite veins. The hanging wall rocks show LREE depleted patterns with flat HREE segments and  $Zr/Hf = 29 \pm 1.6$  and  $Nb/Ta = 14 \pm 0.6$ ; footwall rocks display more REE enriched patterns, but similar  $Zr/Hf$  and  $Nb/Ta$  ratios ( $32 \pm 2.7$ ;  $14 \pm 0.3$ ). This suggests that these rocks erupted in a supra-subduction setting, consistent with the V2 unit of the ophiolite. Trace element data also suggests that: i) HSFE were immobile during the different alteration stages; ii) REE were leached, only under extreme hydrothermal alteration; iii) early mass-advection processes led to Pb+Sb+As enrichments, and iv) Cd+In enrichments characterize the mineralising event.