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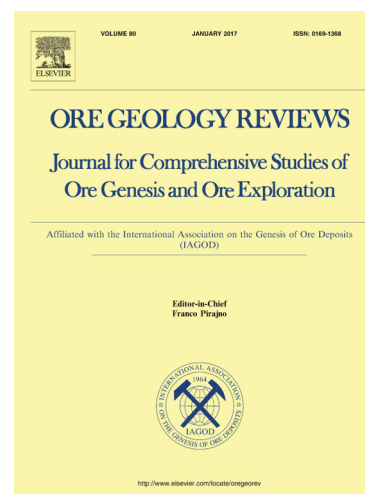
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GEOCHEMISTRY OF COBALT-RICH FERROMANGANESE CRUSTS FROM THE PERTH ABYSSAL PLAIN (E INDIAN OCEAN)

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Abstract

Geochemistry of cobalt-rich ferromanganese crusts from the as-yet-unexplored Dirck Hartog Ridge (DHR), a linear bathymetric feature of poorly understood origin, located in the centre of the Perth Abyssal Plain (PAP), is described for the first time, based on 3 samples analyzed with XRF, ICP-MS and EPMA. Mean bulk concentrations of Fe and Mn were 20.8 and 18.4 wt %, respectively; individual crust layers, however, proved chemically variable. The mean concentration of metals of the highest economic potential (Cu+Ni+Co) was 0.69 wt %. The mean total rare earth elements (REE) and yttrium (Σ REY) contents in the samples (1908 mg/kg) proved moderate. The crusts showed strong positive Ce anomalies, negative Y anomalies and a low Y_{SN}/Ho_{SN} ratio (mean 0.56). Observations on the texture and chemical composition of the crust samples studied allowed us to distinguish two major and two subtypes of representative colloform structures built of laminae. The Type I colloform structures showed the Mn/Fe ratio to range from 0.86 to 5.69, the ranges in Type II colloform structures being 0.49-2.47 (Subtype II-1) and 6.91-221.42 (Subtype II-2). The Subtype II-2 colloform structures were enriched in Ni (up to 7.31 wt %). The Co and Cu concentrations showed a high variability, 0.03-1.64 and 0.03-0.22 wt %, respectively. According to the current genetic models and discrimination diagrams, the crusts studied were classified as hydrogenetic, although individual laminae and groups of laminae could be regarded as diagenetic or hydrothermal.

Keywords: *Fe-Mn deposits, cobalt-rich ferromanganese crust, Perth Abyssal Plain, Dirck Hartog Ridge, Indian Ocean*

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