51º CONGRESSO BRASILEIRO DE

GEOLOGIA

13 A 17 DE OUTUBRO DE 2024

BELO HORIZONTE - MG

Centerminas Expo

ANAIS

ID do trabalho: 945

Área Técnica do trabalho: TEMA 19 - Magmatismo e Processos Petrogenéticos

Título do Trabalho: GENESIS OF FE-TI-(V) OXIDE-RICH ROCKS BY OPEN-SYSTEM EVOLUTION OF MAFIC ALKALINE MAGMAS: THE CASE OF THE PONTE NOVA MASSIF, SE BRAZIL

Forma de apresentação: Oral

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Resumo do trabalho:

Fe-Ti-(V) oxides-rich layers in igneous complexes (e.g., Bushveld, Sept Iles, Emeishan) are widely discussed mainly due to their significant economic importance. The formation and concentration of these layers are interpreted as the magmatic system's response to various processes (in an open-system context, mainly), such as: crustal assimilation, magma mixing, liquid immiscibility, presence of H2O and/or other volatiles, etc. The Ponte Nova alkaline mafic-ultramafic massif (PN, 87.6 Ma; SP-MG) corresponds to an intrusive body predominantly composed of cumulate rocks generated from successive magma pulses. Among several alkaline lithotypes present in the massif, Fe-Ti-(V) oxide-rich clinopyroxenites (OCP, 7-15 vol.% of Fe-Ti oxides) and magnetitites (MTT, 85 vol.% of oxides) are particularly enriched in Ti-magnetite and ilmenite. This work's main goal consisted in the petrological investigation of the processes associated with the formation of these rocks. Studies using optical microscopy, electron microprobe analyses (clinopyroxene and Fe-Ti-(V) oxides) and laser ablation ICP-MS (Fe-Ti oxides), as well as elemental geochemical analyses of whole-rock and Sr isotopes were integrated and compared with data from other lithological facies of Ponte Nova's massif. Clinopyroxene compositional trends are consistent with other lithologies of PN. Ilmenite and Ti-magnetite from both OCP and MTT exhibit distinct chemical behavior from other PN rocks, with high contents of MgO (MgO > 5.0 wt.%). The bulk geochemical compositions of studied lithotypes indicate enrichments specially in V but also in Co, Zn and Cu. Regarding the isotopic ratios of studied rocks, OCP exhibits high 87Sr/86Sri ratios, equivalent to crustal-contaminated lithotypes of PN's Central Intrusion, while MTT are less radiogenic, with similar ratios to least contaminated samples. Obtained results suggest that OCP and MTT were formed by different magmatic processes and in different contexts. The OCP would have evolved in the mush region, near the magma chamber's upper walls, associated with the evolution of the main pulse (Central Intrusion). Assimilation of crustal contaminants can have an important contribution on the crystallization of high amounts of Fe-Ti-(V) oxide minerals in the OCP. Differently, the MTT would have their origin associated with the interaction between magma chamber's evolved liquids and more primitive liquids during a new episode of magma recharge. Both crustal contamination and recharge events, that occurred in different moments in the shallow magma chamber, contributed to the dislocation of the liquid's cotectic evolution line, shifting to Fe-Ti-(V) oxide minerals stability field, mainly Ti-magnetite. Lastly, post-magmatic events were superimposed on these rocks, generating sulfides.

Palavras-Chave do trabalho: alkaline rocks.; Fe-Ti-(V) oxides; magmatic processes; open-system evolution;